

# **ENCYCLOPEDIA TECHNICA**



A



## Aakash

Aakash is a series of Android-based tablets produced by British company Datawind in association with the Indian Government, IIT Bombay and an India-based manufacturer QUAD.

Aakash is presently the most economical tablet in the world. Commercially named UbiSlate 7+ it's available for \$60 in the market with a 50% discount for students.

Aakash is a 7-inch touch screen with ARM 11 processor and 256MB RAM, running Android 2.2 OS. Aakash 1 was developed with an aim to reach 25,000 colleges and 400 universities across India and provide all students at least one computing device, as part of the "One Laptop per Child (OLPC)" scheme.

Aakash 2 (UbiSlate 7 Ci) was released on November 11th, 2012 with a supposedly better processor. It was developed in association with IIT Rajasthan.



## Accelerated Graphics Port (AGP)

The AGP port was designed by Intel in August 1997 for video cards and 3D card accelerators. AGP is the brainchild of Ajay Bhatt, Intel's Chief I/O architect, who was also behind the invention of USB ports (Remember that Intel advert with an Indian walking around like a rockstar?!). AGP was a milestone in the area of video cards and GPUs. AGP introduced a dedicated point-to-point channel due to which the graphic controller can directly access the system memory. AGP allows 3D textures to be stored in the main memory rather than the video memory - a significant development over the PCI bus. This increases bandwidth and supports more powerful graphics.

A much advanced AGP Pro was developed later; it provided more power to video cards.

Earlier, not all operating systems and motherboards supported AGP due to limited or no driver support. By 2010, however, many motherboards were produced with the AGP slots.

## ActionScript

ActionScript is an object-oriented scripting language based on the ECMAScript (European Computer Manufacturers Association) and is used majorly in applications such as Flash. The language is strikingly similar to JavaScript. With the help of ActionScript, you can control the actions of Flash objects. It's also used for game programming, basic Flash animations and in the construction of multimedia websites, e-commerce websites and community portals.



With online gaming gaining popularity since the early 90s, ActionScript has become one of the most widely used programming languages. The numbers of APIs developed for ActionScript were sky-high. Many physics engines such as Box 2D were developed to merge with ActionScript and Flash, helping speed up the game development process. But since Apple stopped supporting Flash on iOS devices, ActionScript and Flash witnessed a major downfall.

Adobe came up with an extension of Adobe AIR that could port the Flash game onto iOS. Let's see how this changes the use of ActionScript.

## Active Shutter 3D Technology

Active Shutter Technology is one of the technologies used to display stereoscopic 3D images. This technology was expected to be part of every household in 3D TVs by 2012. But, that couldn't be achieved due to drawbacks to this technology.

This technology needs alternate-frame sequencing power shutter glasses, which alternately block the output for each eye. Hence, the image for the left eye is displayed and right eye is blocked and image for the right eye is displayed while the left one is blocked. This happens at a high speed (120Hz) and gives a perception of 3D. An infrared signal sent from the device helps blank out images in the glasses. So the glasses and the device have to be from the same manufacturer, and the glasses are pretty expensive.

The other technologies used to display 3D images are -

Passive Shutter 3D technology, which is used in cinema theatres and is comparatively cheaper than Active Shutter and

Auto Stereoscopy, which doesn't need glasses to display 3D images. This technology is used in Nintendo 3DS, a gaming device.

## ActiveX

ActiveX is a framework developed by Microsoft for defining reusable software components, like an API. This is a programming-language independent framework and hence can be used in a wide range of applications. It was developed to simplify the complex processes of Object Linking and Embedding (technology that allows linking to documents and objects) and Component Object Modeling (used for inter-process communication). Many of Microsoft's applications such as Internet Explorer, Office, Visual Studio and Media Player use ActiveX controls.

ActiveX helps make web browsers more interactive. Functionalities like opening PDF files within the browser can be included with the help of ActiveX controls. ActiveX controls dynamically vary depending upon the website that's accessing them. These controls are basically like browser add-ons and hence each has different functions such as enhancing security or enhancing video content.

Since ActiveX automatically downloads itself and installs during browsing, Microsoft had to work on plenty of security issues to secure the browsing session. It recently made ActiveX an Open Source technology to encourage developers to join in.



## Ad-hoc network

Ad-hoc is a Local Area Network that is built spontaneously and doesn't rely on pre-existing infrastructure such as routers, etc. Hence, all devices in an ad-hoc network have equal status on a network and participate in routing and data-forwarding. Data packets are dynamically forwarded to and from each other. It's useful in areas where central nodes don't exist or can't be relied upon. This is widely used in emergency situations and military conflicts. Ad-hoc networks can be easily and quickly deployed which increases its application domain.

Two types of ad-hoc networks are possible depending upon the devices that are connected:

Heterogeneous, where each machine has different capabilities and hence performs different actions and Homogeneous, where all machines/nodes have the same capabilities and hence the same responsibility.

Three types of ad-hoc networks exist on the basis of its application:

1. Mobile Ad-Hoc networks: A network of mobile devices.

2. **Wireless Mesh networks:** A network of radio nodes in a mesh topology.

3. **Wireless Sensor networks:** A network of distributed autonomous sensors to monitor physical or environmental conditions.



### **Address Resolution Protocol (ARP):**

ARP is an internet protocol used to map the IP networking address to the physical MAC address of a machine. This is a protocol used to resolve the address of the client machine that makes a request to know his machine address/MAC (Medium Access Control). The server machine which is on a remote computer gets a piece of information from the ARP which helps it uniquely identify the client machine. The whole process completes when the client receives a response from the server containing the required address. There are two types of ARP: Gratuitous and Proxy. Proxy ARP is more vulnerable to security threats and hence Gratuitous is used more often.

The reverse process i.e. finding the IP address can be done with the help of Reverse ARP. In this case, the client sends its physical/MAC address and then the server replies with the IP address.

### **Adobe**

Adobe Systems Inc., headquartered at San Jose California, is an American multinational company which focused on multimedia and creativity software products until recently extending into Internet Application Software Development. Adobe was founded by two ex-Xerox employees in 1982, and ironically its first project was a licensing of "PostScript" that Apple gave them to use in their LaserWriter printers.

Over the years, Adobe has developed some remarkable products such as Photoshop, Flash, AIR, After Effects, Premier and PDF Reader, which they provide individually and also as a package (Creative Suite). Flash was one of the major development platforms for online games and websites until Apple decided not to support Flash on its iOS devices, which raised quite a few eyebrows. Adobe locked horns with Apple by filing a lawsuit for anti-competitive actions. Recently though, Adobe developed a plug-in with the help of Adobe AIR, by which developers can port their flash games into iOS devices also.

Adobe also recently developed “Creative Cloud” aimed at students and faculty, giving them 24/7 access to all the Adobe tools.



## ADSL

DSL or Digital Subscriber line is the technology that allows us to use the internet by transmitting digital data over a local telephone network. ADSL or Asymmetric DSL is an advanced technology which enables even faster communication over copper telephone lines. This is done using frequencies that are not used by a telephone call. It's been observed that ADSL can be used only over short distances from a telephone exchange (up to 4 kms).

To allow both, ADSL and regular voice services to be transmitted simultaneously, a special filter named “Splitter” is used.

On being installed on old telephone services, ADSL creates a lot of interference and hence can be installed on only specific lines. In 1998, ADSL technology was very primitive and supported an upload rate of up to only 1.0 Mbit/s and a download rate of 8.0 Mbit/s. In 2012, these values have more than tripled!

## Adware

Adware is a software application running inside another software and has advertisements embedded in it. Adware generally runs in the background of a freeware program and intermittently shows the user advertisements. An additional code is included to display pop-up ads. The main aim of adware is to recover development cost which is forfeited to reduce cost for the user. For example, Amazon uses this technique to display ads in Kindle and sell them at a lower-cost than the ad-free versions of Kindle. Many iOS/Android apps also employ this application.

The main criticism of adware is that some of them track the user's actions and create a user profile and generate ads accordingly or sell this information to third parties. Hence, where this information is going is unknown and raises potential threats. Add to the fact that some adware affect the way computers perform. There's a whole slew of malicious adware even on Facebook; some of them cover your timeline with their ads!

## AES

Advanced Encryption Standard is a type of encryption that is widely used in U.S. government agencies and many other private commercial transactions. It was established by the National Institute of Standards and Technology (NIST) in the year 2001 and was originally called Rijndael. AES is more advanced than DES, which was a widely used encryption standard till the 90s. It was less secure and reliable, which is where AES shone.

In 1997, a process was initiated by NIST to find a replacement for DES which is based on a symmetric-key algorithm (same key used for encryption and decryption) and could support 128, 192 and 256 bits at a minimum. Another criteria mentioned in the proposal was that the implementation of that algorithm should be easy and shouldn't have software and hardware compatibility issues. Of all the entries that NIST got - even from big players such as IBM - Rijndael suited the requirements best; it was an entry from two Belgian cryptographers named Joan Daemen and Vincent Rijmen.

In 2001, the Secretary of Commerce agreed to it and announced that Rijndael would be called AES and would be used for all sensitive, unclassified documents.

## Ajax

Ajax is a collection of inter-related web development techniques which can be used to create a web application that communicates with the server in the background independent of the present stage of the page. It is a client-side used application and directly communicates with the server.



It is an acronym for Asynchronous JavaScript and XML and as the name suggests, it uses JavaScript functions to call methods from a web service. Using Ajax reduces the traffic levels between client and the server and the response time is also pretty fast. It is compatible with JSON also and hence can be used with CouchDB. As Java Script is open-source, a lot of libraries are available which makes it user friendly. In 2004, Google made a wide deployment of Ajax with Gmail and Google Maps.

But, it has a few drawbacks too: Pages which used Ajax didn't register themselves in the browser history and search engines like Google couldn't index Ajax pages. There are even some notable security issues.



## Alan Turing

Alan Turing, born in 1954, is considered to be the father of computer science and artificial intelligence. He was a British mathematician, logician, cryptanalyst and computer scientist with an Indian connection. His father, Julius Mathison Turing worked for the Indian Civil Service (the ICS).

At the age of 16, he encountered the work of Albert Einstein and found it quite interesting. He extended Einstein's work over Newton's laws of motion and even crisply explained it. He created the Turing machine which could simulate almost any algorithm - a major breakthrough in the field of computing and AI. He also helped the British Army in breaking the German ciphers during World War II.

In spite of all his contributions, he was ill-treated by the British Government due to his homosexuality. As it was illegal at that time in the UK, he was imprisoned in 1952. Recently, in 2009, British PM Gordon Brown issued a public apology on behalf of the British Government for his "appalling" treatment.

## Alexander Graham Bell

Alexander Graham Bell was the genius who invented the Telephone which laid the foundation for all the advanced modern communication systems of the 21st century. Born in Scotland in 1847, he moved to Boston in 1872 to open a school for teaching speech to the deaf. He started experimenting on the ways to improve and use telegraphy. His constant involvement with the school helped his research on hearing and speech which further led him to experiment with hearing devices which eventually culminated in Bell being awarded the first US patent for the telephone in 1876. Bell was also credited for his invention of metal detectors in 1881. Bell was granted 18 patents on his name alone and 12 with his collaborators, and his inventions were spread across the fields of Phonophone, Phonograph, HydroPlanes, Audio meter, Alternative Fuels.

His deep interest in medical research, especially in techniques for teaching speech to the deaf led to the invention of the Tape Recorder, Hard Disk and Floppy Disk. Due to a complication arising from his diabetes, he died in 1922.



## ALGOL

ALGOL, short form for Algorithmic Language is an imperative programming language developed in the 50s. It led to the invention of many languages such as C, Pascal and BCPL. ALGOL is the standard method for description of algorithms in textbooks and academic work, by ACM till date.

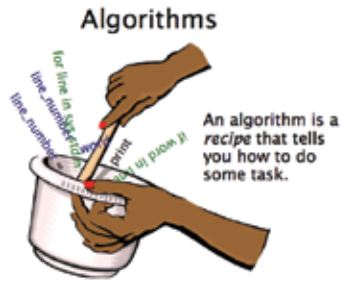
ALGOL was designed by a committee of European and American computer scientists taking into consideration the problems that would arise through FORTRAN (A programming language developed by IBM and extensively used till then as standard).

It was the first programming language to include code blocks which had “begin” and “end” pairs and had nested function implementations along with a lexical scope.

It received some negative feedback at the outset. People thought it was too “wordy” and it faced technical issues which were corrected in the later versions - ALGOL 58, 60 and 68. ALGOL 68 implemented expression-based syntax, user-declared types and structures/tagged-unions.

## Algorithm

Algorithm is one of the most commonly used words in Computer Science. An algorithm is a step-by-step procedure of solving a problem. The problem can be anything, such as “Find the shortest path between 2 points” or “Find what path birds follow in the sky” or “Search for a letter in a sentence”. The word is derived from the name of the mathematician, Mohammed ibn-Musa al-Khwarizmi, who was part of the royal court in Baghdad. The title of an important mathematical treatise by the 19th century Arabic is the source of the term “algebra”. An algorithm can be represented in any way - in either a specific programming language or a pseudo code or a flow chart or even control tables. Each algorithm has a time-complexity, which depicts the amount of time it would take to complete when compared to the input size. The lesser the time-complexity of the algorithm, the more efficient it is. There may be more than one algorithm for a single problem; for example “sorting”. There are numerous sorting algorithms such as “merge sort”, “bucket sort” and “bubble sort”.



## ALSA

Advanced Linux Sound Architecture (ALSA) is a free and open-source Linux kernel component that provides device drivers for sound cards. It replaced its predecessor Open Sound System (OSS). ALSA was started with a goal to automatically configure sound card hardware and handle multiple sound devices in a system. During the development process, more features such as hardware-based MIDI synthesis (resource of music) were implemented, which were not previously present when the project started.

Apart from functionalities like hardware mixing of multiple channels and full duplex operation, ALSA bundles user space library for application developers. This would help developers use the driver features with a higher level API than direct kernel interaction.

Its main drawback is its complexity in comparison to OSS, so the development of an application using ALSA is difficult. ALSA supports up to eight cards, where each card is a physical or logical kernel device capable of input, output or control of the sound card.

## Alternating current

Alternating Current (AC) is current that occurs when charges in a carrier or semi-conductor periodically reverse their direction of movement. The best example is the common household current; this is AC with an approximate frequency of 60 Hz. The other form of current is the Direct Current (DC), where electric charge has a unidirectional flow.

Guillaume Duchenne, in 1855, saw the practical application of AC and proved that it was better than the Direct Current for electro-therapeutic triggering of muscle contractions.

The AC waveform could be sinusoidal, square or saw tooth-shaped, which depends upon the agent producing it. For example, some types of electronic oscillators have a saw tooth-shaped AC.

Electric power is delivered to businesses and residences in the form of alternating current. AC power transmission is done in the form of sine waves. The production of alternating current was first done by a dynamo electric generator based on Michael Faraday's principles. Efficient transmission of power transmission is done at high voltage. AC voltage may be altered using a transformer. It can either be a Step-Up transformer (to increase voltage) or a Step-Down one (to decrease voltage).

## Amazon

Amazon.com is the world's largest e-commerce company and is based in Seattle, United States. Initially, it only sold books through its online web portal but later diversified to include software, games, electronic goods, MP3 downloads, apparel, furniture and jewelry. It introduced a range of e-book readers called Kindle, which even runs games. Recently Amazon ventured into games and also launched its cloud-based storage services in the Asia region.



Amazon attracts approximately 65 million customers to its U.S. website per month, so the company has also invested heavily on a massive amount of server capacity for its website mainly to handle the excessive traffic during the Christmas holiday season.

Amazon is famous for its Black Friday deals, on the next day of Thanksgiving.

The company has had its fair share of controversies. Wal-Mart filed a suit against it on October 16, 1998, alleging that Amazon had stolen trade secrets by hiring former Wal-Mart executives. This was settled out of court which caused Amazon to implement internal restrictions and reassignment of former Wal-Mart executives.

## AMD

AMD (Advanced Micro Devices) is an American computer processor manufacturer and is a famous rival to the world's leading microprocessor manufacturer, Intel. AMD processors are used in HP and Toshiba laptops and desktops. It is presently the second largest manufacturer of computer processors in the world and Intel's only significant rival in the CPU market for x86-based PCs.

AMD's product line includes microprocessors, motherboards, chipsets, embedded processors, graphics processors for servers, personal computers and embedded systems applications. Post acquisition of ATI, AMD took a leap into graphical processing units (GPUs) by starting an initiative named "Fusion" which implies the merging of CPU and GPU on its mainstream

chips. AMD and NVidia together have the whole 100% market share of GPU market space. Some notable AMD GPUs include Radeon, Eye Speed, and FirePro. AMD achieved a Guinness World Record for the "Highest frequency of a computer processor" at 8.429 GHz.



AMD's latest technology, BullDozer had a lot of hopes riding on it due to its 8 cores, but it wasn't all that great.

### **American MegaTrends (AMI)**

AMI is the biggest manufacturer of BIOS firmware for major motherboard manufacturers.

Founded by two Indians who were serial entrepreneurs, AMI started off to be a manufacturer of complete motherboards, but couldn't survive the competition from the original Taiwan-based manufacturers; and so, made BIOS firmware their niche market. AMIBIOS, one of the company's products is the most used BIOS firmware in motherboards. Initially, the firmware had a weird problem; it would play the Happy Birthday tune each time a PC booted up. This was solved with a Trojan-free firmware upgrade. In 1994, AMI released an update for AMIBIOS called AMI WinBIOS. It had a graphical user interface setup screen that resembled Windows 3.1; it received mixed response from its users due to the novelty of the concept.

AMI developed AMIDiag, a PC diagnostic utility sold only to original equipment manufacturers (OEMs) to help them spot problems while booting.

AMI later diversified into the domains of mobile applications, online data storage (through "StorTrends") and remote management ("MegaRac"), but BIOS firmware remains its primary product range.

### **Analog computer**

Analog Computers were pretty famous in the 40s. In fact, they were even used in major wars such as World War II, the Vietnam war and the Korean war, but are now technically extinct. An analog computer accepts inputs/physical quantities that vary according to time such as electrical potential, fluid pressure or mechanical motion and applies these to compute the operations of addition and subtraction. Setting up an analog computer requires plenty of effort; it's usually set with initial conditions/values which can later be changed.

The earliest analog computer was built in 1893 by Lord Kelvin. Some major milestones in its development process were:

Inclusion of the Harmonic Analyzer in 1898; it had 80 components and was capable of generating sinusoidal motion.

Invention of the Differential Analyzer in 1930; it used mechanical integrators to solve differential equations and was a major breakthrough for the technology.

Analog systems were mainly used in simulating dynamic environments such as aircrafts and nuclear processes. But, the Analog Computer lacked the ability to store large quantities of data unlike their modern day digital counterparts. Also, performing accurate arithmetic and integral operations in analog computers required costly hardware, which was infeasible.

## Android

Linux-based Android is the most widely used touchscreen-based operating system designed especially for mobiles and tablets. Android Inc. was acquired by Google Inc. in 2005 and since then has been developing and promoting the OS along with Open Handset Alliance. It released Android as open-source under the Apache license. Android is based on



Java language and apps can be developed using the Android Development Tools (ADT) plug-in. Android can also be used on other devices such as laptops, netbooks, smartbooks and smart TVs (Google TV).

Android has a huge-community of developers who develop apps that get published on Google Play and the Amazon App Store. Boom of Android development made Java the most used programming language in the world. In 2011, there are more than 500 million active devices that have Android OS, which constitutes to 75% of the mobile and tablet market share. As of Sep 2012, there are more than 675,000 apps available for Android and more than 25 billion downloads have been made from Play Store of Google Play.

Android has been criticized for aping the design of iOS exactly. But, who doesn't Apple blame for copying its designs?

## Angry Birds

Angry Birds is one of the most popular video game franchises, whose popularity can be compared to ever-green games like Mario and Pong. It was designed and developed by a Finland based Game Studio called Rovio, and the first version was published by Chillingo, a subsidiary of Electronics Art.



Initially, the game wasn't an instant

success since Rovio couldn't advertise much. So it approached Chillingo, and with the backing of EA boosted promotional efforts. It gained popularity within 3 months of its release in 2009. Since then, Angry Birds has been downloaded more than 1 billion times across all platforms.

Rovio followed up with more versions of the game namely Angry Birds Seasons, Angry Birds Rio, Angry Birds Space and recently Angry Birds Star-Wars and all of them were top-grossing apps not only on the App Store but also on Google Play, Amazon Kindle and on Facebook.

Rovio began selling all possible merchandise related to the characters in the game - plush-toys, key chains, cup cakes, soft toys, soft drink cans, etc.

## Animation

Animation is the process of playing a series of pictures/frames in sequence to create a simulation of movement. This is generally presented as a motion picture or a video program. Animation is used in movies, cartoons, games and even in software and advertisements. India has one of the biggest animation industries in terms of revenue in the world. Much of the animation for movies such as Thor is outsourced to India.

Animation was traditionally done using a projector and a camera. The images were individually captured by the camera and then scanned to make them digital. This was very tiring and costly. Software like Flash came along and made it easier. Seamless animations could be made in frames in Flash and the animation could be played at the desired frame-rate.

With advancement of technology, the concept of 3D animation was inevitable. Here redrawing was not needed, but proper bone-rigging of bodies had to be done to animate 3D objects with the help of software such as Maya and 3DS Max.

Other innovative forms of animation are Rotoscoping, Claymation, Puppet Animation and Cut-Out Animation.

## Anonymous

Anonymous is the name of a “hacker-tivist” group which is famous for hacking into major organisations such as Sony’s PlayStation Network. The members of this group are unknown, and they don’t have a leader, hierarchy system or even location. It’s known to be a group “which is impossible to join”.



This group took roots on imageboards such as 4chan and was started with the intention of collaborating as a unit with a hidden identity and a self-agreed upon goal – initially only targeting entertainment but eventually taking on governments worldwide. In a series of statements, the hactivists made it clear that their goal is to do what the common man in society can’t.

Anonymous is active on occasions of unethical behavior or attempts to curb free speech. When the Stop Online Piracy Act (SOPA) was planned to be implemented, Anonymous hacked and attacked the websites of the Department of Justice and FBI, and they remained down for many days. Supporters of the Anonymous protested in front of the Capitol Building wearing the Guy Fawkes mask. In 2012, a bunch of UK-based government websites were attacked in protest against government surveillance policies. Anonymous also attacked and hacked the Sony PSN to protest against a lawsuit by Sony on a public poster of ways to hack PS3. This rung up losses amounting to \$171 million for Sony and affected almost 77 million registered accounts.

A self-proclaimed leader of Anonymous was arrested in Texas, but his identity is in doubt.



## Anti-virus

Anti-virus is a software application that helps protect computers from viruses, adware, backdoors, hijackers and trojans. Computer virus attacks began occurring in the early 80s, but were pretty basic and could never crash computers

and hack private information. But by the 90s, more programmers were interested in exploring their skills to make a profit out of stolen data such as account details.

The first anti-virus was created in 1987 for Atari St Platform. Once PCs hit the market, viruses were spread through floppy disks and through applications like Microsoft Word. As the Internet gained popularity so did the number of viral attacks. Even e-mail services like Outlook were vulnerable.

There was no single algorithm to discover the virus, which was the main challenge. Signature-based algorithm for detection was applied in the late 70s. By this method, the anti-virus software compares the file to a repository of virus programs it already has. But this method has the threat of attack by new viruses. More sophisticated anti-virus software use heuristic-based detection techniques in such cases.

The most famous anti-virus software are Norton, McAfee, Avast and Kaspersky.



## Apache CouchDB

CouchDB is a widely used open-source database created by Apache. It is commonly termed as the “database that completely embraces the web” or the “NoSQL Database”. CouchDB is not based on traditional SQL-based queries and database tables. Hence no data is stored in relationships and there are no complex SQL queries generally needed for maintaining databases. Here, each database is stored in documents called JSON, which has its own schema. JSON documents can change dynamically to accommodate evolving needs. It is often complimented for its peer-based distributed database systems. All the CouchDB hosts (online and offline) have independent copies of the same online database. Once back online, database



its products – be it the iPhone, iPad, iPod, iMac, Mac Book, MacBook Air, OSX or iOS and its corresponding applications Safari Web Browser, FaceTime and the App Store.



Apple was founded in 1976 by three ex-Atari employees with Steve Jobs as its CEO. Its

first product was the Apple I computer which lacked any basic features that today's computers have. Apple II was its first major hit; it was in fact the bread-winner for the company. Following the success, Steve Jobs pulled together a team of his own to develop Macintosh, which he envisioned to be revolutionary. It was during this time that Apple faced a lot of conflicts (better known as “projectitis”) between its Apple II and Macintosh employees.

From 1985 to 1997, the Apple business witnessed a downturn due to a continuous line of failed products including digicams and portable CDs. In 1985, Steve Jobs, the founder of Apple resigned as its president and went on to establish NeXT. In 1997, he returned and Apple launched the first iPhone which became a huge success. Presently, Apple is considered to be the most valuable company in the USA.

It is, however, criticized for its “designed for the dump” style by releasing a new product every 12-15 months, making the old products obsolete quickly. This leads to a lot of wastage and harm to the environment. Also, Apple is not well known for any philanthropic contributions.

### **Application service provider (ASP)**

An ASP is an organization that provides computer-based services to consumers over the network and can be accessed through a web-browser. This model is also termed as Software as a Service (SaaS). The software or application given to the consumers is owned specifically by the ASP and it gives access to the consumers under a contract.

We use ASPs all the time but remain unaware about them. Some of the most famous free ASPs are Gmail, Yahoo Mail, Google Docs and Google Play. Some famous paid ASP tools are eproject.com and cVent.com.

Services provided by an ASP need not be installed on each machine and hence can be accessed anywhere and anytime with the help of a common client, in many cases the browser.

## Application-specific integrated circuit

ASICs are integrated circuits that are designed for a specific purpose unlike the normal ICs designed for general purposes such as a “logic gate”. For example, IC designed for a specific line of cellular phones of a company is an ASIC. Generally, it is the case that ASIC has only one customer and hence the availability, intellectual property, design and deployment is controlled by a single entity or company who is the customer.

There are three types of ASICs: Full-Custom, Semi-Custom and Structured ASIC.

## Arcade games

Arcade games or Arcades are coin-operated entertainment machines that are generally placed in public places like malls, food courts and amusement parks. Generally, each machine has a single game. Some examples of arcade games include Pinball, Pac-Man and Pong. The Golden Era of arcade games was considered to be 1970-1990, and Atari was the undisputed king of it; until the whole gaming experience was replaced by consoles and PCs.



The first arcade machines were established way back in the 30s, which majorly had only Pinball. In the 70s, SEGA and Atari established a bunch of arcade machines which housed famous games such as Space Invaders, Pong, Pac-Man, and Donkey-Kong.

After the decline of the Arcade Era, the meaning of the term arcade has changed. Any game that brings back memories of arcade machines are termed as “arcade games”.

## Arduino

Arduino is a tool for making computers that can sense and control more of the physical world than a regular desktop computer. It is an open-source electronic prototyping platform, a descendant of open-source wiring platform. The flexible, easy-to-use hardware and software is popular with artists, designers and hobbyists.

Arduino consists of a simple open hardware design with an ATMELE AVR processor and an I/O system that can sense the environment and control the lights, motors and other actuators of the devices connected to Arduino. Arduino projects can also communicate with other software such as Flash and MaxMSP.



The microcontroller is programmed using Arduino programming language (based on wiring) and the software uses standard programming language compilers.

As it's an open-source platform, developers have been known to create the likes of a Miniature Pocket Piano with its help. One can assemble the board by himself or place an order with specifications. Because of its cross-platform nature and being light on the pocket, it's one of the most preferred platforms for teachers, students and other hobbyists.

### **Arithmetic Logical Unit**

Arithmetic Logical Unit is a digital circuit that performs Arithmetic Operations (like addition and subtraction) and logical operations (like “and”, “or” and “not”). It is one of the most basic building blocks of a processor; others being Control Unit (CU) and Registers.

A typical ALU takes input variables, which are called “operands” and a code of instruction or the “op-code” from the Control Unit and then generates a “result”, which is stored in an “accumulator”. The operation is performed with the help of gated circuits that are controlled by a sequence logic which uses an algorithm for each op-code. ALU also gives an output status which indicates cases like carry-in, carry-out, etc. An ALU performs multiplication and division by a series of additions and subtractions and one of the 16 logical operations like comparison of two operands can be done in an ALU.

But an ALU performs only integer operations; hence typically it doesn't perform divisions as the result might be a “float”. The division operations are generally carried out by the Floating Point Unit in a processor.

### **ARM Architecture**

ARM refers to the set of 32-bit computer micro-processors designed in accordance with RISC (Reduced Instruction Set Computer). It was originally developed by Acorn Computers Ltd. in the 80s and presently is the most widely used microprocessor in phones, tablets and pocket calcula-

tors. But, ARM architecture was never used in desktop and laptops. Both Apple and Microsoft use x86 architecture, developed by Intel. The main difference is the lower power levels that ARM chips run at compared to Intel chips. Also they're much cheaper.



Microsoft recently announced that it will be using the ARM processor for Windows RT. For this, Microsoft had to rewrite almost all the code of Windows to make it run on ARM. This also means that all the software that used to run on x86 processors of Windows won't work on Windows RT. Even though, it's considered to be a disadvantage by many, to the 20% faster speed at which applications run on Windows RT should make it worth it.

## Artificial Intelligence

Artificial Intelligence, as the name suggests is the branch of Computer Science which aims to improve the intelligence of machines. AI is what people call "a wish to forge the gods". The concept of creating an artificial being, which is intelligent enough to think on its own and act accordingly could be a reality. Prominent traction in artificial intelligence was gained in the 40s, when people realized that it can be achieved with the help of computers and algebra.

Today AI is used in almost every discipline of computing varying from robotics and videogames to search engine optimization. Off late, a lot of work is being carried out on "emotional modeling", in which human emotions such as happiness, sadness, envy and hope are being embedded into artificial beings. It won't be long before a humanoid robot like Vicky from Small Wonder (or the real life ASIMO) will be in our homes.

## Assassin's Creed

Assassin's Creed is a historic action-adventure stealth game by Ubisoft Montreal. The first title in the Assassin's Creed series was developed in 2007. As of 2012, there are 5 games in the series excluding games and materials on different platforms.



It is commended for its

unique game mechanics such as its health system. The assassin's health is synchronized with his descendant's.

Commercially, Assassin's Creed has been very successful. Many novels have been based on the game series, and Sony is in talks with Ubisoft for a film. It has won many awards including Best Game of the Year by IGN and Game Critics Award.

## **ASUS**

Founded in 1989, ASUSTeK Computer Inc., a Taiwan-based multinational computer hardware and electronics company, is presently the fifth largest PC vendor. Its main product line consists of motherboards, desktops, laptops and monitors. Apart from producing and selling its own products, it also produces components for other major manufacturers such as Apple, Dell and HP.

ASUS has been producing motherboards since 2005. It also ventured into manufacturing graphic cards for videogame consoles and PCs the same year. In 2007, it introduced the ASUS Eee PC family and recently in 2011, it launched the Eee Pad Transformer – an Android-based tablet computer with a touchscreen as well as a keyboard. It has also been developing high-end graphic processing PCs aimed at gamers. In 2011, it expanded into cloud technologies with its cloud service, ASUS Web storage. This year, it also expanded into the smartphone market with ASUS Padfone. Google's Nexus7 tab was designed and developed in conjunction with ASUS.

## **Atari**

Atari is an American multinational company, and at one time was the biggest videogame company in the world. It was famous for its arcade games, home consoles and its all-time hit games Pong, Pac-Man, E.T., Space Race and BreakOut. Interestingly, all the founders of Apple once worked at Atari before moving on to Apple Inc.

Founded in 1972, and after being the market leader for several years, it faced problems and losses during the videogame collapse of 1983. Prior to this, Atari was a subsidiary of Warner Communications and contributed to almost one-third of Warner's annual income.

In 1997, only 500,000 out of 800,000 Atari 2600 consoles were sold which brought Atari into ruin.

By 1996, Atari had a substantial line of failed products since 1991 and ran into financial problems. Hence, Atari's name and assets were sold to

Hasbro Interactive. Atari Games was renamed Midway Games West by its new parent company but was disbanded in 2003 after a slump in game sales.

## Augmented Reality (AR)

Augmented Reality (AR) generates a composite view for the user that is a combination of the real-world environment and the computer-generated virtual environment. With this tech, users can interact with the surrounding world and even manipulate it digitally.



Recently AR has been the talk of town with the “Google Glass Project”. Google is developing a wearable computer (spectacles) which helps users in their day-to-day activities such as shopping, traveling, entertainment, etc. which is expected to take augmented reality to a whole new level.

Augmented Reality has huge application in Education and Health also. For instance, MITAR Games – an MIT product simulates locations and scenarios that help children learn faster.

## Autodesk

Autodesk is an American multinational corporation that makes high-end 3D software applications for use in architecture, engineering, construction and entertainment systems like games.



Autodesk was started in 1982, the year it developed its flagship (and its first) product AutoCAD.

Autodesk is a believer in green technology and has taken appropriate steps to help the environment through its products. Its programs such as the CleanTech program and the C-FACT carbon reduction goal setting tool help companies understand how to reduce greenhouse gas emissions.



## Automagically

Automagically is an interesting word used in the Technology space to explain the output of a technical process without going into its details. If the user wants to circumvent having to provide details of the process or is simply unaware of its workings, this is the word to use. It's a play on the words 'automatically' and 'magically'.

This term is sometimes used in a satirical way to say that the technological process is quite magical. For example, "You stand in front of a Kinect and it automagically recognizes all your gestures and movements."

## Automatic Speech Recognition

ASR is a technology that translates speech into text. Attempts to develop this technology began in the late 60s when stenographers were very costly and recording minutes of meetings was proving to be quite inefficient. In 1960, Suzuki and Nataka at the Radio Research Lab developed the vowel recognizer – a notable achievement in this area. At Kyoto University, the first use of a speech segmenter was witnessed; it helped with analysis and recognition of speech in different portions of input utterance. By the mid 70s, fundamental pattern recognition technology was being applied to speech recognition. With the help of algorithms such as the Hidden Markov model, satisfactory Speech Recognition software was developed by the 90s.

Presently, Automatic Speech Recognition is used in a wide range of fields varying from telephony to military. Applications have been developed to help the hearing and speech impaired and much research fund is being pumped into this area. Even though this technology is quite accurate, it's not completely flawless. For huge vocabulary sizes the error rate is as high as 3%.

## Albert Einstein

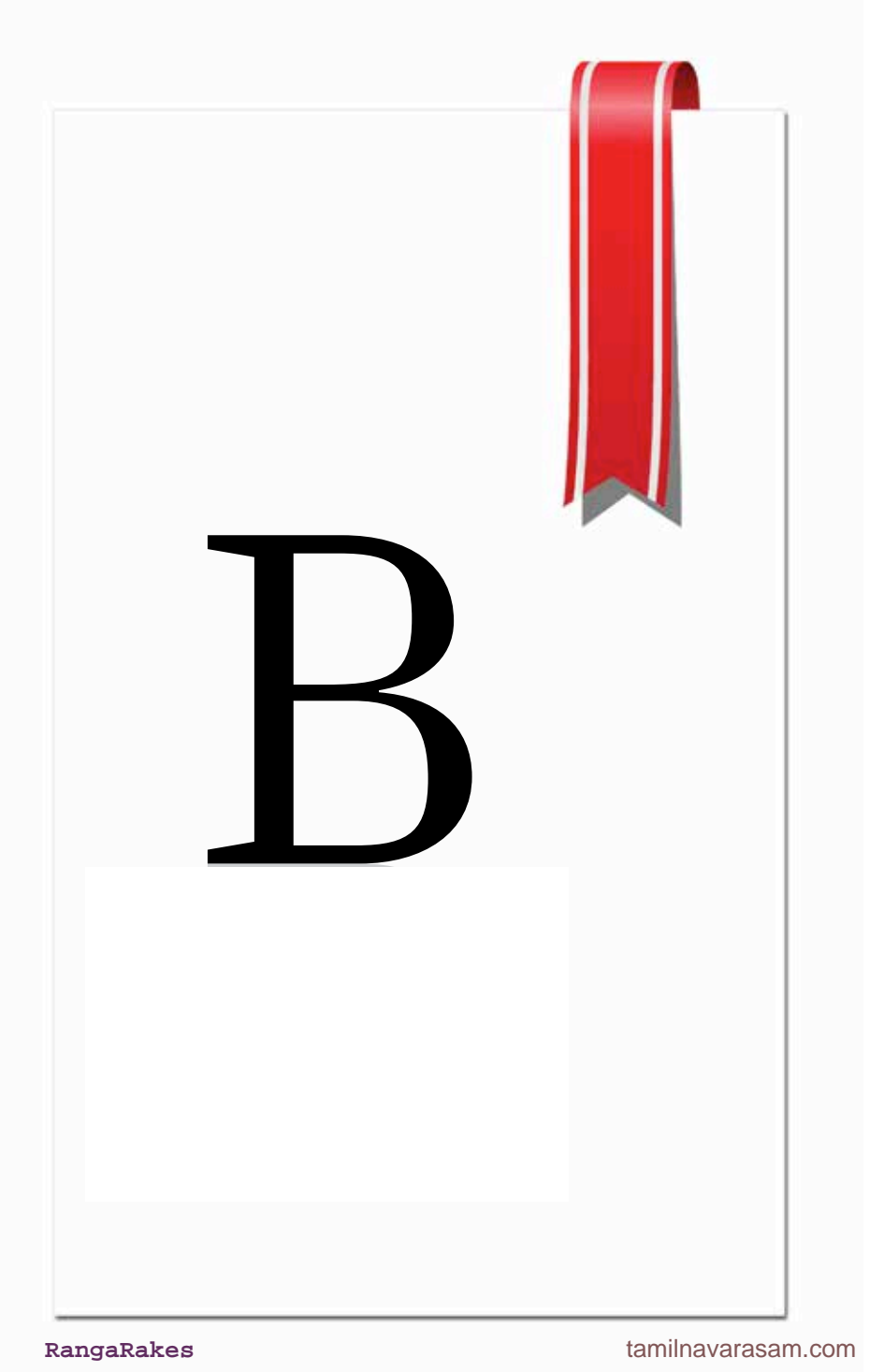
Albert Einstein needs no introduction: he's one of the most intelligent men who ever lived and is considered to be the father of modern physics. Today, 'Einstein' is used more often as a common noun than as a proper noun. In his childhood, he was quite different from the other kids and preferred isolation. He would score zeroes in all subjects except for Maths and Physics in which he would score full marks.

Einstein's work in Photons and Energy Quanta, Quantized atomic vibrations and Theory of Relativity are till date considered to be beyond comparison. The Theory of Relativity is still an unproven concept. In 1921, he received the Nobel prize for discovery of the Photoelectric effect.

Originally from Germany, the prodigy decided to stay back in the U.S. where he was visiting in 1933 on account of the violence back home due to Hitler's reign. He accepted US citizenship in 1940.



Einstein published more than 300 scientific papers in the fields of quantized atomic vibrations, the Adiabatic Principle and action-angle variables, wave-particle duality, Theory of Critical Opalescence, zero-point energy, general relativity, the Equivalence Principle, Entwurf theory, Cosmology, Modern Quantum theory, Bose-Einstein statistics, energy momentum pseudo tensor, Unified field theory, wormholes, Einstein-Cartan theory, equations of motion... phew. Einstein passed away in 1955, and Thomas Stoltz Harvey, his autopsy performer removed his brain without the permission of his family and preserved it hoping that the neuroscience of the future would be able to discover what made Einstein so intelligent.

A large, bold, black serif letter 'B' is centered on a white background. A red ribbon bookmark with white stripes is attached to the top right corner of the page. The entire scene is framed by a thin grey border.

B

## Backlink

A backlink or an incoming link is an external link or reference to the website from some other web page. If there are 20 other websites that link to your webpage, it has 20 backlinks. Web developers benefit from large numbers of backlinks as there is direct traffic to your website, and your web presence expands. Backlinks are an important factor for search engine optimization(SEO). Since search engines use backlinks as part of their algorithms for search result placements, the more backlinks your website has, more is its popularity, and it is more likely to turn up in search results with the right keywords. Anchor text is the text that appears on the hyperlink that leads to the website. Search engine bots analyse that anchor text and check its relevance to the contents of the web page. Their congruence is important for search engine result rankings. Many websites employ various SEO techniques to improve their ranking, an example of which is “linkbaiting”.



## Backup

Backup is a copy of data to be on the safer side, in case the original data is lost or becomes irretrievable. The data stored on your computer, tablet or phone is not completely immune from permanent damage. Another reason to back up your data is when you want to restore data from an earlier time. Data loss can occur due to hard drive crashes, accidental deletion, files corrupted by viruses or due to software corruption. In any case, all your important data becomes irrecoverable. So back up your data on an external hard disk, or another computer. You can even burn CDs and DVDs. Even better, have a commercial software perform regular backups for you. Many softwares are available which offer scheduled backup and system restore services.

## Barcode

Barcode is an optical machine-readable code consisting of a series of black and white spaces of varying widths along with a variation of different numbers. They are printed on various labels to uniquely identify them and rep-

resent data such as the item's description and price. Barcodes are read by a barcode scanner; softwares to read barcodes are now available for phones and tablets. The scanner reads special information from the code and sends it to a database, where it is used to get the necessary details. Dif-



ferent companies use different numbers of bars and number combinations. You can see barcodes on every item you purchase from a departmental store or a gift shop. Barcodes can also be used for various purposes other than to just check the price. For example, your luggage gets a barcode when checking in to an airport. Tracking shipments and other goods is also facilitated by barcodes. Their first use was to label railroad cars.

### **BarCamp**

BarCamp is a “democratic” conference of computer enthusiasts. The topics of discussion are focused on technology and the Internet. The conference is put together by a committee of IT professionals, professors and other industry veterans. These conferences are open for all and are better known as “unconferences” because they are participant-driven. Anyone can fill in their names and the topic on which they want to speak in the schedule chart; BarCamps make their organizational process open for all, coordinating with the help of a wiki. The quality of speakers is maintained by the “law of two feet”, i.e. anyone who finds the talk boring can use their two feet and walk away. Attendees are encouraged to form small groups in hallways and discuss about their favourite topics. The first BarCamp was held in the offices of Socialtext in Palo Alto, California in 2005. BarCamp was organized as an alternative to Foo Camp which was an invite-only conference organized annually by Tim O'Reilly, a supporter of open-source softwares.

### **BASIC**

BASIC stands for "Beginner's All-purpose Symbolic Instruction Code". It is a high level programming language developed with a goal to help non-science students write simple computer programs. The original BASIC language was designed in 1964 by John Kemeny and Thomas Kurtz. The language was based on FORTRAN II, with modifications to make it suitable for timesharing. The instructions in the programs were numbered in order to tell the processor in what order they are to be processed. It facilitated

rectifying of programs later by adding statements, and numbering them properly. “GOTO” statements were used to change the order of execution. BASIC has evolved since then, and can be used to write advanced programs for today’s computers. It uses “while” loops and may even use GUI(Graphical User Interface). Some of the popular BASIC implementations include REALbasic and Microsoft Visual Basic.

## **Batch Process**

A batch process executes a series of instructions or programs without manual intervention. Batch processing can run in the background, and stops only if an error has occurred or if all tasks are completed. Batch processing stores up several tasks and runs them all together when the computer is idle, thus saving time and improving your system’s performance. A batch process can be run by your OS using a batch file or a script. Batch processes can be used to automate repetitive tasks and save time. For example, a user may create a script that performs required calculations every time the data is updated. Virus scanning is a form of batch processing too. E-mail systems have batch jobs that periodically archive and compress old messages to save memory. The IBM mainframe z/OS platform has the best batch processing facilities for supporting thousands of complex job scripts concurrently.

## **Baud**

Baud is a unit for symbol rate, i.e. the number of distinct symbol changes per second. It is not a direct measure of data transmission speed, but measures electrical state changes per second. A single state change can involve more than one bit of data. So the accurate term to measure data transmission rate is bits per second(bps). The Baud unit is named after a French engineer, Jean-Maurice-Emile Baudot, who invented the Baudot telegraph code. The unit Baud was first used to measure the speed of telegraph transmissions.

## **Bcc**

Bcc stands for Blind Carbon Copy. When you send an email to multiple recipients, the addresses can be written in any of the three fields: To, Cc, and Bcc. You enter the addresses of persons in the To field who are directly involved in the conversation and from whom you expect a reply. The addresses in the Cc field are of those people who are not directly involved, but kept in the loop to keep them informed. They do not need to reply. All the recipients of these fields can see the addresses of all other people. Bcc is the third field, wherein

you write the addresses of those people who will receive the message, but you don't want the other recipients to know they got it. When a message is blind carbon copied, neither the main recipients nor the Bcc recipients can see the list of recipients. It is faster than sending the original message to the main recipients and then forwarding the sent message to the other recipients. It is good netiquette to use Bcc when sending a message to many people. It also prevents people from getting others' email addresses which they might use for spamming.

### **Beta**

Beta( $\beta$ ) is the software development phase following alpha(  $\alpha$  ). When a software is released, it goes through a beta phase, where it's tested for bugs, performance issues and other problems. A software in beta phase is only available to developers. First it goes through the beta testing phase, only then is it released for public use. Sometimes you can obtain a beta release from the software's website, but it might not work properly. You can tell if a software is still in its technical preview stage by checking the program's properties. If there is a "b" in the version number (i.e. Version: 1.2 b3) that means it's a beta version.

### **Big Data**

Big data, as the name suggests, refers to large volumes of data, structured or unstructured, that becomes difficult to process by the usual database management tools. This data comes from everywhere: sensors used to gather climate information, pictures and posts on social media websites, digital media, cameras, transaction records, wireless sensor networks, emails and cloud storage to name a few. Common softwares face problems in analyzing such quantities of big data, especially when analyzing a set of data reveals even more data. Big data cannot be quantified: what constitutes big data depends on the organization's capabilities to analyze it, or lack thereof. Big data may require parallel processing techniques spread over hundreds and thousands of computers. As of 2012, we have created 2.5 quintillion bytes of data every day, so much that almost 90% of the world's data has been created in the last two years.

### **Big Mother**

Big Mother is an advanced concept in which parents track the activities of their child using technology. The parents use GPS devices, digital cameras

and other wireless technologies to monitor their children. Although it is seen by some parents as an act of safety, teenagers consider it as an invasion of their privacy. Some parents use an RFID tag which they place in their kid's bag or clothes to track their whereabouts. Parents can use security cameras to check on their children when they are in the playground. Some people also insist on school buses having a GPS system, for the parents to know where and how fast the bus is going. There are several softwares for parents to check on their child's activity online. They can even put parental controls and restrict access to certain websites which they don't deem fit for their child.

## Bill Gates

Bill Gates is the co-founder and Chairman of Microsoft. He founded the world's largest PC company with Paul Allen, his school friend. The first program that he wrote, at age 13, was an implementation of tic-tac-toe using BASIC where you could



play against the computer. As young teenagers Bill Gates and Paul Allen ran a small company called Traf-O-Data and sold a computer based on the Intel 8008 processor to the city of Seattle that could count city traffic. The founders of Microsoft wrote a BASIC interpreter for the Altair 8800 in 1975 that fit into a mind-blowing 4K of memory. An entire language, plus floating point arithmetic, in 4K of machine code. Gates bought the licensing rights for 86-DOS operating system from Seattle Computer Products (SCP) and sold the OS to IBM as PC-DOS for their first personal computer. He retained the copyrights on the OS and proceeded to make a fortune with MS-DOS. Microsoft launched Windows, an operating system based on MS-DOS with GUI, in 1985. Gates was the world's youngest self-made billionaire at 32 in 1987. The Gates family funds various charitable and scientific research organisations through the Bill & Melinda Gates Foundation, the largest transparently operated private organization in the world.

## Binary

Binary means two. In the binary number system, every digit is represented using only two two digits: 0 and 1. The binary system is used by computers



to store data and instructions, compute a function and communicate. Digital switches inside the computer can take only two states, ON or OFF. ON is represented by a 1 and OFF is represented by a 0. A binary digit is called a bit. A binary string of 4 bits can have 16 possible combinations that can represent



16 unique symbols or characters. The digit's weight in binary numbers increase by power of 2 from right to left. In decimal number system, that we commonly use, digit's weight increases by a power of 10.

## Biometrics

Biometrics refers to the technology that is used for identification of humans by their physical characteristics. In the IT world, biometrics is used for authentication and access control. Biometric authentication includes fingerprint scan, facial recognition, eye retina and iris scan, DNA test and voice analysis. A biometric scan is similar to login. For example, a facial scan is done using a camera, and the image is processed using a biometrics software.

DECIMAL = 21	64	32	16	8	4	2	1
Binary	0	0	1	0	1	0	1

The software identifies specific points as match points and looks them up in the database. Those match points are translated into a numeric value using an algorithm, which is compared against the value in the database. If the scan is close enough to a specific user, he is granted access. To prevent identity theft, biometric data is usually encrypted when stored in the database. At the Walt Disney World in Florida, biometric measurements are taken to ensure that the ticket is used by the same person throughout the day.

## BIOS

BIOS(Basic Input/Output System) is a program pre-installed based on Windows based computers that the microprocessor uses to start up. The BIOS is an integral part of your computer, and your CPU communicates through it to check all the hardware connections such as the hard disk, video adapter, keyboard, mouse, and printer. If all attachments are in place, it loads the operating system into the RAM. When device details change, only the BIOS

program needs to be changed. It frees the operating system from worrying about the exact details of hardware attached to the system. BIOS is located in the EPROM(Erasable Programmable Read Only Memory). When the computer is switched on, the microprocessor passes control to the BIOS which is always located there. To reprogram the BIOS, the EPROM chips have to be physically removed from the motherboard. They may be erased by prolonged exposure to ultraviolet light. Modern systems use rewritable flash memory (which can be electrically erased) to store BIOS, as hardware manufacturers frequently release BIOS updates. Rewriting the contents of ROM is also called flashing. BIOS is being replaced by the more complex Extensible Firmware Interface (EFI) in many new machines.

## Bitmap

A bitmap is a map of dots or bits that looks like a picture if you're sitting at a reasonable distance from the screen. Each bit contains color information for the image. Bitmap graphic formats have a fixed resolution.



If you zoom in on the image, it appears to be blocky. Common bitmap file-types include BMP, JPEG, GIF, PICT, PNG, and TIFF. A pixmap (a rectangular grid of pixels) is used for images with multiple bits per pixel. Pixels of 8 bits and fewer can represent either grayscale or indexed color.

## BitTorrent

BitTorrent is a peer-to-peer(P2P) file sharing protocol which uses the upload bandwidth of each individual who is downloading or has downloaded the content, to transfer the content to others. It distributes file transfers across systems, reducing the bandwidth usage of each system. The bittorrent transfer is initiated through either a .torrent file or a magnet link. The system locates multiple computers with that file and starts downloading from all of them at once. Since most ISPs offer a higher download speed than upload speed, the file transfer takes place speedily. In order to use this, you need a bittorrent client such as uTorrent, LimeWire and Tribler. The client is a

software that uses the BitTorrent protocol. The author of the BitTorrent protocol, Bram Cohen, made the first BitTorrent client, which he also called BitTorrent. Most BitTorrent clients give you the option to pause and resume the download. There are legal issues associated with this service as various copyrighted softwares and media is being distributed via torrents illegally, causing serious financial damage to the developers.

## BlackBerry

BlackBerry is a brand of wireless handheld devices and services that allow easy access to email, phone, text messages, Internet and various applications. Research In Motion(RIM) is the company behind BlackBerry. RIM is best known for BlackBerry smart-



phones which are widely used for their push email and instant messaging services, which employ on-device encryption. The BlackBerry 850 was the first mobile device(a two-way pager) released under the BlackBerry brand name in 1999. The BlackBerry was originally known as "LeapFrog", but the marketing company Lexicon Branding chose it's new name because the keyboard's buttons resembled the drupelets that compose the blackberry fruit. Third-party developers can write applications using BlackBerry APIs. The Android App Player for BlackBerry allows its devices to run Android applications. RIM's first entry into the tablet market is the BlackBerry PlayBook. The upcoming BlackBerry 10 operating system will be based on QNX, a Unix-like real-time operating system.

## Blog

Blog, short for Web Log, is an online journal, intended for public eyes. Au contraire to the traditional way of a personal diary, people are now making an online presence with their blog. The blog posts are sorted in reverse chronological order. The topics of the posts include anything and everything that's going on in one's mind, including social issues, trivia from day-to-day life and funny anecdotes. Most people use it as a way to vent. Most blogs are interactive, allowing readers to comment on the post. Blogging can be seen as a part of social networking. You can either create your own website and publish content, or use a blogging website where you don't need to be an HTML expert to write. Microblogging, as in Twitter and Tumblr, features

very short posts. The term "weblog" was coined by Jorn Barger, which was then broken into "we blog" by Peter Merholz.

## Blu-ray

Blu-ray disc is an optical disc for playing high definition(HD) video and storing large volumes of data. It is of the same size as a CD or DVD. While a CD has a capacity of 700MB and a DVD of 4.7GB, a blu-ray disc can store up to 25GB of data per layer.

Dual-layer Blu-ray discs can store 50 GB of data, that is equivalent to 4 hours of HDTV. For audio, BD-ROM players are required to support Dolby Digital (AC-3), DTS, and linear PCM. Blu-ray discs are designed to supersede the DVD format. The term "Blu-ray" is coined after the blue-violet laser that is used to read the disc, as compared to the longer-wavelength red laser used for DVDs. The blue laser can be focused on a smaller area which allows information to be stored at a greater density than is possible with the DVDs. The Dark Knight Blu-ray disc was the first to sell over a million copies in the first week of release. The Blu-ray Disc specification requires it to be scratch resistant, unlike DVDs.



## Bluetooth

Bluetooth is a wireless technology for exchanging data over short distances between Bluetooth-compatible devices. Infrared served the same purpose but it had speed and distance limitations. Bluetooth uses radio waves at a standard 2.4 GHz frequency and sends information at distances up to 30 feet; even if there are obstacles between the devices, the connection won't be interrupted. Bluetooth was developed by Ericsson in 1994. Bluetooth was named after 10th-century King Harald Bluetooth of Norway and Denmark (where Bluetooth was invented), who united several warring Scandinavian tribes, in line with how Bluetooth promotes collaboration between different companies. Bluetooth is managed by the Bluetooth Special Interest Group, which has more than 17,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics.



## Bookmarks

Similar to the bookmarks for a book, an Internet bookmark acts as a marker for a website. A bookmark is a Uniform Resource Identifier (URI), that is stored by your browser as a shortcut to your favourite website. This way you don't have to type the address of your favourite web pages each time you visit it. All modern browsers including Internet Explorer, Google Chrome and Mozilla Firefox support bookmarking. Bookmarks have been incorporated in browsers since the Mosaic browser in 1993. In Mosaic, the bookmark list was called Hotlist. Most browsers have a colourless star shaped symbol near the address bar; if you click on it, the webpage you're on is saved to bookmarks and the colour of the star changes. Mozilla Firefox introduced Live Bookmarks which allow users to dynamically monitor changes to their favorite websites. New stories are attached as a list of links to the bookmarked web page, which are regularly updated via RSS feeds. Bookmarks have led to the development of link storing and sharing services such as Del.icio.us.

## Boot

Booting a computer means to get it up and running. The process begins when the power is turned on. It involves performing a power-on self-test (POST), checking all the peripheral devices followed by loading the operating system from the current boot disk. The boot disk is usually an internal hard drive. However, most computers allow you to boot from CD-ROMs, DVD-ROMs, and floppy disks. A boot loader is a computer program that loads the main operating system. Once the boot process is complete, the computer is ready to perform its normal operations. The term boot is short for bootstrap. In Linux, the flow of control during booting is from BIOS, to boot loader, to kernel. The kernel then runs a program called init (short for initialisation). init is typically assigned a PID number 1, and all other processes are spawned from it. It continues running until the system is shut down.

## Bosack, Len

Leonard Bosack and his wife Sandy Lerner co-founded Cisco Systems, a company that designs, manufactures, and sells networking equipment. Sandy was later fired by the management, following which Leonard resigned from the company. He is presently the CEO of XKL, LLC, a company that develops optical networking equipment for data communication. While studying at Stanford, he worked on the network router that connected com-

puters of various wings of the University, and enabled data sharing between them. He, along with his fellow staff members, created the first true LAN(Local Area Network) system by connecting 5,000 computers across a 16-square-mile (41 km<sup>2</sup>) campus area. Later, the couple founded their own company, Cisco, which designed and



built routers. The company produced the first multiport router-specific line cards, which gave them an edge against their competitors. Bosack was awarded the Computer Entrepreneur Award in 2009 for his contribution in commercialization of LAN technology.

## Bot

Bot, also known as web robot, is an automated computer software that performs repetitive tasks over the Internet. Botnet is a collection of Internet connected bots. Chatterbots are online chat bots used by organizations for interacting with users, promotion of websites and for providing automated online assistance. Bots are used extensively in web spidering or crawling, where an automated program searches the web in a methodical manner and analyzes the content and links found on the pages. Search engines use spidering as a means of providing up-to-date data. Web crawlers generate electronic catalogs of all the visited pages, which are indexed by the search engine to provide fast searches. If a site owner wishes to give instructions to the bots they must place a text file called robots.txt in the root of the web site hierarchy. This is the Robots Exclusion Protocol. This file is the first thing that the bot reads while accessing a website. Internet bots are also used for malicious purposes such as harvesting email addresses from forums and spamming. DDoS(Distributed Denial of Service) attacks also employ botnets. There are also gaming bots, which help a person cheat in an online game. These bots are programmed to ignore the Robots Exclusion Protocol.

## Bozo Filter

A bozo filter is an email filtering software. It enables a user to block emails from specific addresses. Besides blocking unwanted messages from indi-

viduals, it also employs anti-spamming techniques. The bozo filter moves the undesirable emails to the trash. It can be configured to filter email containing specific phrases or keywords. A list of addresses you want to block is called bozo list or kill file. Bozo filters are primarily used for incoming emails, but may also be used to inspect outgoing messages. Some email clients automatically filter your emails for spam; users can also install mail filters. They are also used by website owners to block unwanted visitors to the website and offensive content posted by someone. Bozo filter can be set up using JavaScript to prevent people from visiting a web page coming from another web pages.

## **Bridge**

In telecommunication networks, a bridge is a device that connects two or more local area networks (LANs) together. The device is similar to a router, but less versatile. It does not analyse the data or act as a firewall unlike most routers. It broadcasts the message to every address on the network, and is only accepted by the intended destination node. Bridge networks are typically interconnected LANs, because broadcasting a message to every other node may flood a larger network with unnecessary traffic. A bridge works at the data-link (physical network) level of a network, and can transfer data between different protocols.

## **Bring Your Own Cloud**

Bring your own cloud (BYOC) is a business trend in which employees use third party cloud services to get their job done. It often involves combined use of the enterprise and consumer software for completion of the task. All the cloud services, Google Drive, Microsoft SkyDrive, Apple iCloud, Dropbox, Box, or some other variant, offer some level of free storage. Google Drive is used by many individuals to store, share and collaborate on documents. Many workers use their personal account on Dropbox for work. Some organizations may encourage the use of these services as it reduces their operational costs and provides the flexibility of work-from-anywhere. The major downside to BYOC services is that the enterprise has no control over the cloud content. It is an employee-driven change, following the success of the Bring Your Own Device (BYOD) policy, in which you could bring your smartphones, tablets and notebooks to work and use them to access privileged company resources such as emails and file servers.

## Broadband

Broadband refers to the wide bandwidth that is used for high-speed data transmission; information can be multiplexed and sent on many different frequencies(or channels). Because of its ability to transport multiple signals simultaneously, it has started to replace baseband the single-channel technology. Prior to broadband, we used the slow dial-up Internet access at home, which are now being replaced by broadband internet connections: cable modems, which use your cable TV line, and DSL(Digital Subscriber Line) modems, which use your phone connection. With a broadband connection, the connection to the Internet is always on, no need to dial up; Internet access is faster and more efficient. The digital information is sent over a high-bandwidth channel via DSL. This channel is at a higher frequency than the baseband voice channel, so the phone line remains unaffected, i.e. you can make calls whilst using the Internet.

## Bropia Worm

The Bropia worm is a malware that spreads through instant messaging using MSN Messenger. It starts with a file, apparently sent from a friend, which is infected with the virus. Once it enters your system's memory, it resides in the memory and repetitively copies itself in the Windows System folder with various file names such as winhost.exe, updates.exe or lexplore.exe. These files make modifications to the registry's RUN section so that they are executed automatically. After the worm has been executed, you may notice strange effects such as changes in sound volume, disabled right mouse button, and other limitations in accessing menus. It also leaves a Spybot worm variant in your computer. This Spybot variant then connects to specific Internet Relay Chat (IRC) channels, giving the attacker unauthorized remote access to the infected computer, while running in the background as a service process. This backdoor entry into your system can be exploited by the hacker to steal sensitive information and do further damage.

## Browser

A web browser is an application program that is used to access, retrieve and view documents and other resources on the world wide web. Technically, browser is a client program that uses the Hypertext Transfer Protocol ([HTTP](#)) to load pages from the web servers. A browser translates the HTML(Hypertext Markup Language) code which lets you view text, images and videos. It also interprets hypertext links, Javascript, and Java applets.



After rendering the HTML code, the browser displays a nicely formatted page. The first web browser, called WorldWideWeb, was invented in 1990 by Sir Tim Berners-Lee. The name was later changed to Nexus. The first Web browser with a graphical user interface was Mosaic, which later influenced Netscape Navigator. Some common browsers are Microsoft Internet Explorer, Opera, Mozilla Firefox, and Apple Safari.

## **BSD**

BSD(Berkeley Software Distribution) is a version of the Unix operating system that was developed and distributed by the University of California, Berkeley. The first Berkeley Software Distribution (1BSD) was just an add-on to Sixth Edition Unix. The 2.9BSD was the first release that was a full OS in itself. Earlier versions of the SunOS, the operating system developed by Sun Microsystems for their workstation systems, was based on BSD. SunOS version 5.0 and later are based on UNIX System V Release 4, and are called Solaris. The BSD code has also been incorporated in the TCP/IP (IPv4 only) networking code in Microsoft Windows and is a part of the foundation of Apple's Mac OS X.

## **Buffer**

Buffer is a memory area where data is stored temporarily while moving it from one place to another. It's usually a part of the RAM due to much faster access time. Buffers are typically used when the rate at which data is received is less than the rate at which it can be processed. Buffering can be seen when you stream a video on YouTube. Part of the video is stored in the system buffer, whilst the rest of it is still downloading. Since you're playing it from your buffer instead of the Internet, there is less chance that it might get stuck due to network traffic. Buffer can be used by hardware devices to enable more efficient access to the data on the disk and improved coordination of separate activities. In programming, buffer is used to store data where it can be edited or processed before it is moved to the destination file.

## **Bunny hopping**

Bunny hopping is a technique used in video games where the player jumps repeatedly, often while firing a weapon, in order to run faster while attacking their opponents. The player can also dodge attacks from his opponents because they become a difficult target to hit. The hopping player gets to play on the offensive. The term is typically used in in first-person shooter (FPS)

games. To bunnyhop, you need to press the jump key while holding crouch and a movement key to move faster. It is a simple technique to evade attacks efficiently. As a countermeasure, many game developers have introduced stamina meters so that the player gets tired after continued running and jumping. Many shooter games have been patched to reduce hopping speeds. Traditional bunny hopping is possible in many games such as Tribes, QuakeWorld, Half-Life, Half-Life 2, and Counter-Strike.

## **BusyBox**

BusyBox provides tiny utilities for small and embedded operating systems such as Linux, Android, and FreeBSD. It combines several UNIX tools into a single executable. BusyBox is released as a free software under the GNU General Public License. It is also known as "The Swiss Army Knife of Embedded Linux". BusyBox was written by Bruce Perens. It was originally written to put a complete bootable system on a single floppy disk that could be used as a recovery disk and an installer for the Debian distribution. BusyBox is a powerful set of Linux utilities that you install on your Droid to give you some additional handy LINUX/UNIX based commands which you may need for some root level tasks. It is used by apps like MetaMorph and Titanium backup in order to do special operations.

C



## Cache

Cache is a form of Random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. Whenever a processor processes data, it first goes to cache and checks for the data in there. If the data is not found in the cache, then the main RAM is accessed. Scanning a larger memory block for data, a block which is also much further away, consumes a lot more time and resources than just accessing the cache. Cache memory is widely used in modern computers to store relevant near-use data during processing. Quicker access of data from Cache considerably increases the execution rate of the machine/processor. Usually, cache stores the data that is used most frequently by the applications run on a machine. There are various levels of cache including L1, L2, etc. The performance of the cache depends upon its Hit rate which is the “number of times data was successfully found in cache without accessing main memory”. Often cache systems use a technique known as Smart Caching in which the system slowly recognizes certain types of frequently used data and uses this information while caching.

## Caesar Cipher

Caesar Cipher, also known as a shift cipher, is one of the simplest encryption techniques in cryptography. It is also one of the most popular techniques of encryption and is a form of substitution cipher. Here, each letter in the message is replaced by a letter at some fixed position down in the alphabets. Therefore for a shift of 2, BOY will be written as DQA. The technique was named after Julius Caesar who used it in his confidential communications. As each letter in the message has a linear translation to each letter in cipher text, frequency analysis can be used to decipher the message. Even Brute force could also be used to decipher the message given the limited number of possibilities. Due to this linear relationship, multiple encryptions do not provide additional security. Say we shift by 2 once and then shift by 4, the total shift is 6, leading to no additional security.

## Cain and Abel

Cain and Abel is a password recovery tool for the Windows OS. It lets you recover various kinds of passwords by sniffing the network, using cryptanalysis or Brute force to crack encrypted passwords, decoding

jumbled passwords, gaining access to wireless network keys, recording VoIP communications, revealing password boxes on web forms and recovering cached passwords. Instead of exploiting vulnerabilities in the software the tool utilizes



certain weaknesses in authentication methods, caching mechanisms and loopholes in present protocol standards. It just makes your password recovery process from different sources a cakewalk. The latest version adds a feature called APR (Arp Poison Routing) that enables sniffing on Man-in-the-middle attacks and provides dictionary and brute force crackers for all common hashing algorithms and popular cryptanalytic attacks. This tool is available as a freeware and can be downloaded from the internet.

### **Call of Duty**

The Call of Duty franchise started as a World War II themed first person shooter game and was a surprise hit. The WWII theme was dumped in favour of a more modern setting when Modern Warfare was announced and that game almost redefined the entire FPS genre. It was one of the first few games that started the trend of chopping down on actual play time but delivering a more cinematic experience overall. The series, since Modern Warfare, has developed such a compelling multiplayer experience that it has replaced Halo as the most played multiplayer game on Xbox. The game made Activision billions and now follows a yearly release cycle. Some claim that this has watered down the initial appeal of the game and that the series is getting increasingly repetitive with each subsequent release, but Black Ops 2, which released this month, set new records for first launch sales and is already a runaway success. The Call of Duty games are published and owned by Activision and published for Apple OS X by Aspyr Media. The Majority of them are developed by Infinity Ward and Treyarch. Associated with the franchise, Activision Blizzard created an NGO called The Call of Duty Endowment (CODE) to aid and find employment for US military veterans.

## Camera Pill

Camera Pill is a pill loaded with technology similar to a digital camera and is used in medical science. It is used for capsule endoscopy to examine parts of the body that cannot be seen by other types of Endoscopy. The procedure was approved by the U.S. Food and Drug Administration (FDA) in 2001. PillCam, developed by Israel based company is the size of a large multivitamin supplement with a tiny camera at both ends. It travels through the entire length of the gastrointestinal tract through intestines in four hours and captures about four images per second following which it exits the body naturally in 5 to 8 hours. Many variants have been developed over the years and these pills have grown smaller and as with any form of technology, have grown smarter and more advanced over time.

## Captcha

Captcha is a program that generates and grades tests that are solvable by humans but not by computer bots/scripts. The term Captcha (Completely Automated Public Turing Test to Tell Computers and Humans Apart) was coined in the year



2000 by Luis von Ahn, Manuel Blum, Nicholas Hopper and John Langford of Carnegie Mellon University. The first Captcha was developed for use by Yahoo. Captcha can be both Audio or Graphic. An image Captcha shows a random distorted string to authenticate a human user and is almost impossible for computer bots and scripts to decipher. Captcha is used in a variety of ways including the prevention of spam in comments, web-form submissions, the protection of email addresses, in online polls, forums for protection from spam and Search Engine bots and so on. The important thing while making a Captcha is to make sure that it is accessible to a human and is based on visual/audio perception.

### Carbon Footprint

Carbon Footprint is defined as the total amount of greenhouse gas (GHG) emissions caused by an organization, event, product or individual. It's a single figure that gives us a quick idea of our impact on carbon change in the environment. Carbon footprints are easy to calculate, compare and understand with new measuring tools available today. Your carbon foot print depends on a lot of daily activities including the number of electric appliances you use, how often you travel by air and what kind of transport you use on a day-to-day basis. These measurement techniques are called Carbon Accounting. The reduction of carbon footprints through the use of alternative energy sources, such as solar or wind energy or activities such as reforestation is known as Carbon offsetting.



### Cascading Style Sheets (CSS)

Cascading Style Sheets (CSS) is a style sheet language, developed first in 1997 and is used for defining the look, formatting and style of web documents written in any mark-up language including HTML, XHTML, and HTML 5 etc. or even plain XML documents. CSS is used to separate formatting rules from content. It specifies a priority scheme to determine what rule has to be applied if more than one rule is matching and is thus called Cascading Style Sheet. These CSS specifications are maintained by the World Wide Web Consortium (W3C). A style sheet consists of rules and declaration blocks. CSS Filters are used for different browsers so that all browsers parse CSS correctly. It is one of the most powerful tools for a web designer and a well-designed CSS style sheets can make a website look awesome. CSS allows you more precise control of layout and helps you apply different layouts to different media-types such as web and print and different advanced techniques.

### Certificate Authority (CA)

A Certificate Authority (CA) is a trusted third-party authority on a network that manages and controls security credentials and issues the digital certificates used in creating digital signatures and public-private key pairs. It checks with a registration authority to verify that the information provided by the user requesting a digital certificate is accurate.

If the Registration Authority verifies the users' information, the CA can then issue a certificate. CA is a crucial component in data security, E-Commerce and M-Commerce where the identity of the user and service provider is of prime importance while information is exchanged between the two. For this reason, CA's usually use a combination of authentication techniques, including payment infrastructure, secured encrypted passwords and other custom heuristics. There are different service providers that act as CA and are scattered locally in all countries. In India, Digital Signatures are increasingly used in E-Governance and E-Commerce. For example, it is used by the Ministry of Corporate Affairs when a user registers a new company with them online.

### **CV Raman**

Shri Chandrasekhara Venkata Raman was the first Asian to be awarded the Nobel Prize for physics for his work on the scattering of light and the discovery of the Raman Effect. Born on 8 November 1888 in Madras, his earliest researches were in optics and acoustics. Raman joined the Indian Finance Department in 1907 and conducted experimental research in the laboratory of the Indian Association for the Cultivation of Science at Calcutta. Later, he became Professor at the Indian Institute of Science at Bangalore (1933-1948). The Raman institute of research in Bangalore was also established by him. Raman published about 475 research papers and wrote five remarkable monographs covering a wide variety of subjects. His contributions were in the fields of optics, magnetism, crystal physics and acoustics. In 1954 he was awarded the Bharat Ratna. He passed away on November 21, 1970.

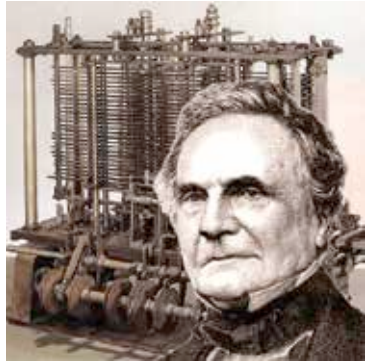


### **Charles Babbage**

Charles Babbage was born on the 26th of December 1701 in London, England. An English Mathematician, mechanical engineer, phi-



philosopher and inventor, Babbage invented the first mechanical computer and is thus known as the "Father of the Computers". One of his earliest honours bestowed on him include a Gold Medal from the Royal Astronomical Society for his invention of an engine for calculating mathematical and astronomical tables using a difference engine. He also invented an analytical engine that could be programmed using



punch cards. A very unsociable man, Babbage wrote numerous letters to the Times even complaining about the music being played on London's streets (he hated music). As a result, he was much reviled and musicians used to play outside his house just to annoy him. There were also times when people broke his windows and at least one person went to the extent of throwing a dead cat at him. Ever the statistician, Babbage actually kept track of the number of times these "annoyances" occurred. He died on 18th October, 1871.

### Checksum

Checksum also called a hash sum and is a value used to verify the integrity of a data/file transfer and detect any accidental error that may occur during the transmission or storage of that file. Network data transmissions produce errors, such as toggled, lost or duplicated bits. Checksums are typically used to compare two sets of data to check if they are same. Before sending, the transmitter calculates a checksum and once the receiver receives it, the receiver again calculates the checksum. If both the checksums match, the data has been transmitted successfully without manipulation/loss. Other applications include verifying a disk image or checking the validity of a downloaded file. Both Mac and Windows include free programs that can be used to generate and verify checksums. For Mac users, we have a built-in Apple Disk Utility and for Windows users we have the File Checksum Integrity Verifier (FCIV). These tools use different algorithms for finding the checksum. One of the most popular algorithms is the Cyclic Redundancy Check algorithm.

## Chipset

Chipset refers to a group of integrated circuits, or chips designed to work together to perform certain processing tasks. A chipset is generally marketed as a single product and is designed to work with a specific family of microprocessors as it controls communications between the processor and external drives. In PCs, the first chipset, the “NEAT chipset” was developed by Chips and Technologies for the Intel 80286 CPU. Mobile phones run on embedded chipsets that perform dedicated functions that are embedded as part of the hardware of that mobile device. Smartphones have advanced chipsets which can perform a variety of tasks. There are different chipsets for Intel-based and AMD-based CPUs. In the past, several different companies provided chipsets for the PC.

## Chrome OS

Chrome OS is based on Linux Operating System designed by Google for working exclusively on Web Applications. Launched on July 7th, 2009, it was made an open source project, Chromium OS on 9th Nov, 2009. Chrome OS is exclusively designed with a search key instead of the Caps Lock key. It is based on a minimal UI design philosophy and combines applications and web pages in a single tab strip. The first Chromebooks for sale were announced by Samsung and Acer Inc. along with a desktop called Chromebox. With 16 GB flash memory and a revamped media player, Chrome OS is a real treat. With next-gen Chrome OS running on the cloud without a hard drive, a lot more can be seen coming from the Chromium side. Certain disadvantages of Chrome OS being cloud based include issues with the security of data, not having an offline mode for Google Docs, etc. and other apps and the need for a reliable, high-speed Internet connection to run data-heavy applications or to perform multitasking.

## Cipher Text

Cipher Text is the result of encryption performed on plaintext/message using an algorithm or key, called a cipher. Cipher text is also known as encoded/encrypted text as it contains information which is un-readable until decrypted by a proper cipher. The process of converting cipher text back to plain text is called decryption. Computer scientists use Cryptanalysis for obtaining the meaning of encrypted information, without access to the secret information needed to break the cipher. Cryptanalysis involves understanding how the cipher text

was created and finding the secret key. Encryption has been used since time immemorial (see Caesar cypher) and has been one of the most popular forms for clandestine communication.

### **Cisco Systems Inc.**

Cisco Systems Inc. is an American multinational corporation which designs, manufactures and sells network equipment. Leonard Bosack and Sandy Lerner, a married couple who wanted to email each other across the campus started research into network equipment and were later joined by Richard Troiano who established Cisco Systems in 1984. The name cisco originated from San Francisco city. Cisco works on a wide range of next-gen network related hardware and software solutions using which the world network. The company has created a revolution with a project called “The future of Retail touch points” for changing the way people do retail shopping. It also has a project called “The future of Shopping” currently in line which uses the gesture-control technology of Kinect and helps shoppers pick up garments and other items without actually wearing/trying them. According to Anil Menon, President of Globalisation and Smart+Connected Communities at Cisco, “in 2020 a single family will be able to upload as much data onto the ‘net as all the information that existed online in 2008.” Cisco is also undertaking interesting projects including Road mapping the future of smart cities.

### **Clean Technology**

Clean Technology The term Cleantech has become renowned through the work of Nick Parker and Keith Raab founders of the Cleantech Group from 2002; it began as a term and was later expanded to Clean Technologies. It includes renewable energy sources like wind power, solar power, biomass, hydropower, biofuels, recycling, green transportation, electric motors etc. Aimed at creating a pollution free environment, green/clean technology is about creating technological solutions that are more energy efficient or use alternative forms of energy to run and minimize electronic waste. A lot of companies are on their way to support the clean technology initiative. Wipro has developed green PCs. Panasonic has developed green Air-Conditioners. Nokia secured the top position in green electronic marketing. Clean technology also involves measures of recycling and take-back programs similar to the “We recycle” program by Nokia. Siemens has developed a range of energy-efficient products

that conserved some 1.2 billion tons of carbon dioxide in a year. Intel's Instantly Available PC (IAPC) technology reduces a PC's power consumption in "sleep mode" to less than 5 watts, thus reducing power consumption by 71% over a year. GE announced its "Ecomagination" initiative under which it plans to commercialize technologies that aid customers in curbing emissions.

### **Cloaking**

Cloaking refers to the practice of presenting different content/URLs to human visitors and search engine bots. It is considered as a violation of all major Search Engine Guidelines including Google Webmaster as it manipulates the search results and furnishes the wrong results to users. There are various methods of cloaking, such as serving up an HTML page to search engines and a flash file/image based page to users or manipulating key-words when a page is accessed by search engine bots. Cloaking is done by furnishing content based on IP addresses and running a server-side script to alter the page content when the search engine is accessing it. Cloaking is a bad practice when it comes to maintaining high search engine ranks as many of the sites detected using cloaking are banned/black-listed by search engines. Often hackers use cloaking to make the hack harder to find. In September 2007, Ralph Tegtmeier and Ed Purkiss coined the term "mosaic cloaking" where only a certain portion of the page is cloaked by changing CSS and JavaScript, thus reducing the difference between the cloaked and the real page.



### **Cloud Computing**

The term "Cloud Computing" originated from the use of stylized clouds to denote networks in scientific diagrams. Cloud Computing is a computing model that enables convenient on-demand network and content access to a shared pool of resources including software, Installers, Scripts, Servers, Applications, Services and Storage Media etc. A lot of popular services such as YouTube, Vimeo, Flickr, Slideshare, and

Skype can be included in the list of cloud-based services. To put it more simply, cloud computing refers to computing resources (hardware or software) delivered over a network.

### **Codec**

Codec is a device or computer program that can encode and decode a stream of digital data or a digital signal. Originating from the pair Coder-Decoder, the term Codec should not be confused with a coding format as it is a program that can read and write files as opposed to a format that is coded to and decoded from. Based on the compression quality codecs can be classified as lossy codecs where quality is reduced to achieve compression and lossless codecs where archiving is done but all the information presenting in original stream of data is retained. There are media codecs which are designed to put special emphasis on certain aspects of a media. For example, a sport video needs better motion encoding while an art exhibit video demands better encoding of color information. The Codec Engine is a set of APIs that we can use to instantiate and run relevant algorithms. Codecs normally come grouped in libraries that contain the codecs any application needs to access different audio/visual file types.

### **CDMA**

CDMA or Code division multiple access is a channel access method in wireless technology where several transmitters can simultaneously send and receive data over a single communication channel through the use of specific codes assigned to each sender. CDMA techniques allows users to share the same bandwidth and uses spread-spectrum technology and a special coding scheme to allow multiple users on a single channel, thus optimizing the use of bandwidth. Each transmitter is assigned a code which is specific to it. Originally designed by Qualcomm in the U.S., the CDMA Standard was primarily used in the U.S. and portions of Asia by other carriers. GSM is the latest upgrade over CDMA. While both GSM and CDMA are competing with each other when it comes to higher bandwidth speed, GSM has a definite advantage because of its stronger global coverage. In India, the major players in CDMA technology are Reliance and Tata Teleservices.

### **Command-Line Interface (CLI)**

A Command-Line Interface (CLI) is defined as a means of interaction with a computer program where we issue commands to a program using

successive lines of text called Command Lines. The CLI was the primary means of human interaction for most early operating systems including MS DOS, UNIX and Apple DOS. Implemented with a command-line interpreter, command processor or shell, CLI can be either Operating System CLI (e.g. Linux) or Application CLI (Git). Using CLI over Graphical User Interfaces (GUI) has definite advantages for advanced users such as programmers and system administrators. Programs with command-line interfaces are easier to automate via scripting and are preferred whenever a large vocab of commands along with a wide range of options can be entered more frequently with text than with a GUI. For systems with insufficient resources to run a GUI such as Tiny Core OS, CLI is preferred. CLIs are also popular among the blind, who use refreshable Braille displays, and people with other visual disabilities such as colour blindness. CLIs have also been seen on many of the early text-based adventure games.

### Command Prompt

Command Prompt is a command line interpreter application available in most Windows operating systems including Windows Vista, Windows Server 2008, Windows 7, and Windows 8. Officially called Windows Command Processor or CMD, it emulates many of the command line abilities available in MS-DOS. As opposed to COMMAND.COM, which is a DOS program, cmd.exe is a native Windows application which allows it to take advantage of features available to native programs on Windows that are otherwise unavailable to DOS programs. Therese Stowell developed the initial version of cmd.exe for Windows NT. It is used to execute batch files, perform advanced administrative functions and troubleshoot issues in Windows. It can be accessed from Accessories or from the Run Dialog by typing cmd. The wide variety of commands helps users in quickly operating CMD as opposed to using a GUI, for advanced users.



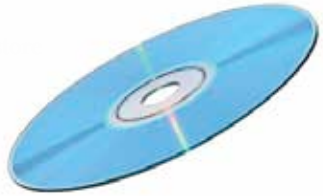
### Commodity Computing

Commodity Computing is about using many different already available computing components to get the most efficient parallel computation at a low-cost. This type of computing is done on hardware that is referred to as commodity hardware. The underlying principle in commodity

computing is that it is preferable to have more low-cost, low-performance hardware running in parallel than to have less/one high-cost, high-performance hardware. Commodity Computing as understood today came into the picture when Compaq developed its first IBM PC Compatible. An IBM PC Compatible is a PC that clones the IBM PC architecture and is capable of running Microsoft Windows, Linux etc. without requiring specific drivers. Commodity Hardware is very crucial to start-ups who cannot afford high-cost computers.

### **Compact Disc**

The Compact Disc is an optical disc used to digital data. It was originally developed to store and playback sound recordings back and was later adapted for all types of data and has since been extensively used for



backup and other purposes. Evolving from Laser Disc technology, many prototypes of the

current CDs were made by both Sony and Philips independently in the late 1970s. The two companies then collaborated to release a standard format and CD player technology. The first CD player, known as the Sony CDP-101 was released by Sony in Japan on October 1, 1982 and Billy Joel's album, 52nd Street, was the first commercially released CD album. CD-ROM (Compact Disc, Read-Only-Memory) was an adaptation over the CD to store Data in other formats. The CD has long since been replaced by the DVD given the fall in manufacturing costs and the very Spartan storage capacity. It is still a very popular medium for the distribution of high-quality audio tracks.

### **Compiler**

Compiler is a program or set of programs that convert the source code written in high-level programming language by programmers into object code or binary form understandable by the computing machine. A compiler usually performs Lexical analysis (converting a sequence of characters into a sequence of tokens), pre-processing, parsing, semantic analysis (determining the correctness of the syntax of programs), object-code generation and optimization. The first compiler was written by Grace Hopper, in 1952 but officially the FORTRAN at IBM is credited

as the developer of the first complete compiler in 1957. Later, the Just-In-Time (JIT) compiler was introduced which was used by Smalltalk and Java systems, and also by Microsoft's .NET Common Intermediate Language (CIL). In JIT compilers, applications are delivered in byte code and are compiled to native machine code just before execution. These days we also have online compilers using which a programmer can store his code online and use it from any internet connected device. Online compilers aid a lot in collaboration among remote teams. CodePad and CodeRun are a couple popular online compilers.

### **Computer-aided Design (CAD)**

Computer-aided Design (CAD) is the use of computer systems (Hardware and Software) to assist in the creation, manipulation, analysis and optimization of a design. Computer aided Design is a sub process of the design process. CAD has applications in Aerospace Engineering, Military and Defence, Rail and Marine etc. CAD involves the graphics pipeline where the real world object is modelled, transformed and rasterized for display. CAD involves the use of Geometric Models and Graphics, Moving or animating models to visualize how they will behave in real world, using analysis tools and software and optimizing the design. CAD can also be used to evaluate or test the model in a simulated world. There are several software solutions for computer aided design, with Autodesk's AutoCAD being a leading player. AutoCAD supports both 3D and 2D formats and has several variations for factory design, building design, plant design and other infrastructural requirements.

### **Computer Generated Imagery**

Computer Generated Imagery, or CGI for short, is a term applied to any type of imagery that has been entirely computer generated. This includes almost all the special effects that you see in movies and those fancy digital wallpapers and artwork that you might be downloading. CGI isn't just restricted to static imagery and is a blanket term for everything 2D and 3D generated on a computer, including animation and even those little animated GIFs.

### **Computing**

Computing is the study of how computers and computer systems work and how they are constructed and programmed. Its primary aspects of



theory, systems and applications are drawn from the disciplines of Technology, Design, Engineering, Mathematics, Physical Sciences and Social Sciences. Computer science has many sub-fields; some emphasize the computation of specific results (such as computer graphics), while others relate to properties of computational problems (such as computational complexity theory). The first known computing tool, the Abacus, was invented in Babylon circa 2400 BC. It was originally used by drawing lines in sand with pebbles. Also, the Antikythera mechanism, designed to measure astronomical positions is believed to be the earliest known mechanical, analogue computer. After John Napier discovered Logarithms in 17th century, there was a significant upsurge in the tools and methods of computing.

### Console

A console has many definitions when we're talking about computers and technology. The most popular reference is with regards to game consoles though. Dedicated devices that are built to serve one primary purpose, namely, allow you to play compatible games. Gaming consoles include devices such as the PlayStation 3, XBOX360 and Nintendo Wii U.



Another definition of console is the system console, which is the text-based admin panel that you see when you boot into your PC or even the terminal or Command Prompt in Linux or Windows. See Command Prompt for more details.

### Cookie

A cookie is a packet of data that a program receives and sends without any change. It is also referred to as an HTTP Cookie, Web Cookie or a browser Cookie which is a small piece of data sent from a website and stored in a user's web browser while a user is browsing that specific website. Cookies do not carry viruses or install malware on the host

computer. There are different types of cookies including tracking cookies that, if misused, can facilitate in the stealing of a user's identity, Authentication Cookies that facilitate the finding of the login status of a user and a session cookie (transient cookie) that tracks your browsing session and is erased when a session is terminated. Interestingly, Cookies are so small that they will never fill up your hard drive as it would take about a 100 million cookies to fill up a 10GB drive!

### Copyright

Copyright is a legal process to protect an author's specific work which restricts the rights of exclusive publication, usage and distribution rights only to the author. This means that nobody else other than the author can publish a copy of that work without the author's permission. The length of the copyright

protection is usually about the length of an author's lifetime plus 50 to a 100 years. For online content, it can be copyright protected by putting a copyright logo next to the content/image. Copyrights have to be registered with a central agency. Timely registration can help you protect your work better under law. Copyright doesn't apply to an idea, procedure, process, system, method of operation, concept, principle, or discovery. EA recently filed a copyright infringement lawsuit against Zynga for copying elements from EA's game, Sims Social. Also recently Apple won a case filed against Samsung for \$2.5bn in damages, claiming Samsung's phones and tablets copied its devices' behaviour and appearance.



### Cracker

The term Cracker was coined in 1985 by hackers in defence against the journalistic misuse of the term Hacker. A security cracker is someone who purposely circumvents or breaks security measures illegally. Many of the security crackers use their skills for evil and are generally referred to as computer criminals or Black Hats as opposed to Hackers or White Hats who break security for non-malicious reasons, perhaps to test and improve security systems. Crackers break into secure networks to destroy data or make the network unusable for authorized access, perform

security exploits, crack passwords and access authorized information. Recently, crackers stole the personal records of more than 77 million PlayStation Network users including their credit card information and social security numbers. Crackers use the same tools as hackers do but create/share illegal cracked software. There are strict laws against crackers. Till date, the longest sentence for computer crime was given to Albert Gonzalez for 20 years, who was accused of performing credit card theft and subsequent reselling of 170 million card numbers during the period 2005- 2007, regarded as the largest cyber fraud in history.

**Cray Inc.**

Cray Inc. is a global leader in the supercomputing world, providing world-class advanced systems and solutions to industry, government and academia. The Company was incorporated in December 1987 under the name “Tera Computer Company” and changed its name to Cray Inc. after it acquired the assets of Cray Research in April 2000. Cray Research was founded in 1972 by Seymour Cray. Their first product was the Cray-1 supercomputer which was a huge success when it was released as it was faster than all the computers available at that time. Their recent offerings include Cray XE6™ Series Supercomputer and Cray Sonexion™ Data Storage System. Cray's YarcData Inc. is a Cray company that provides efficient big data solutions for businesses worldwide. Cray's 2011 revenue was pegged at \$236M. Currently, Cray is conducting two major research programs: “Adaptive Supercomputing”, which combines multiple processing technologies into a single system clubbed with innovative software technologies and “Cascade”, which aims at building a system capable of sustained multi-petaflops performance on real-world applications.

**Creative Commons**

Creative Commons or (CC) is a non-profit organization for expanding the range of creative works available for others to build upon legally and to share. It has its headquarters at Mountain View, California. The organization has launched several copyright licenses known as “Creative Commons licences” free of charge to the public. With more than 100 affiliates in over 70 jurisdictions, the organization has strong support for promoting its activities around the world. It has corporate support from Google, the Mozilla Foundation and Red hat, etc. With a wide range of

applications including Snap Gallery, Inkscape and many other web and mobile applications, Creative Commons gives users the ability to make clear licenses and terms of usage before sharing their content. If you've created something and want to share it with people and let them use and build upon your work, you should consider publishing under a Creative Commons license. Also if you are an educator, a student or scientist looking for content that you can freely and legally use, you can access the huge library of CC-licensed content available to you.



### **Crippleware**

Any software program that cannot be utilized to its optimum level until it gets registered or is purchased is called a Crippleware. The usage of the software can be limited in many different ways until a full version is purchased officially and a license key is obtained. There are two types of Crippleware programs. One is where you cannot get full advantage of all the features of the program and the second where you get access to the entire set of features but for a limited time/usage such as Adobe Photoshop. Often Crippleware does not allow export or exports files with a watermark of the company owning the software e.g. Nitro PDF. In cases where the feature set is limited, the user may not get a real understanding of the locked features and may not be in a condition to justifiably judge the software. Considering the hardware aspects, it is a term used for those products whose functionality is limited and needs to be upgraded. The manufacturer generally releases the Crippleware as low-end or economy version of their product and interested customers can buy upgraded versions.

### **Cryptography**

Cryptography is derived from a Greek word "crypto" meaning hidden or secret, and "graphien" which means "writing". Cryptology is the study of techniques that help us in performing secure communications through networks without allowing the information dissemination to the adversaries or any other unauthorized third party. It involves concepts

of data integrity and confidentiality and calls for strict authentication. Cryptography involves processes such as Encryption, Decryption, and Cryptanalysis etc. Different types of cryptography include Symmetric Key encryption where both the sender and receiver share the same key and Public key Cryptography where the sender and receiver have different keys. Cryptography has always gained genuine traction from intelligence and law enforcement agencies. The crime investigation agencies have groups of cryptanalysts who are continuously involved in the decryption of un-cracked ciphers and generating new, stronger ciphers for encryption.

### **CRM**

CRM or Customer Relationship Management is a widely implemented model for managing a company's interactions with its customers, clients, and sales prospects. It involves the use of software solutions that help organizations in organizing, automating and synchronizing sales and marketing activities, customer service, feedback and technical support. Earlier, CRM was also known as Database Marketing in the 80s and later, Relationship Marketing in the 90s. Major vendors of CRM solutions include Microsoft, SAP, Oracle and Amdocs. For people who want open-source solutions, Zurmo, openCRX, SugarCRM and CentricCRM are the top rated ones. Today, many CRM vendors offer cloud-based CRM solutions that are sold as subscriptions with no added investment of purchase/maintenance required from the organization's side. This interesting trend towards cloud-based CRM forced traditional vendors to enter this market by several acquisitions including RightNow by Oracle and SuccessFactors by Sap in 2011. Salesforce.com, first company to provide enterprise applications through a web browser still continues to be the leader amongst providers in cloud CRM systems.

### **Cut the Rope**

Cut the Rope is a 2010, physics-based puzzle video game released for a number of platforms and devices. It was developed by the Russian entertainment and gaming company, ZeptoLab. The game was published by Premier iOS game publisher Chillingo and was followed by its sequel Cut the Rope: Experiments. The game is based on the physics of cutting ropes and feeding candy to an adorable green monster named Om Nom while collecting stars for better score. ZeptoLab also released Cut

the Rope comic based on Om Nom's story which was published by Ape Entertainment. Since its release, the game has been downloaded more than 100 million times. The game won an Apple Design Award for the iOS platform (obviously) at WWDC 2011 along with an award in the handheld category of the 7th British Academy Video Games Awards. The game also won Bafta Award becoming the first iOS game to do this. The character Om Nom was very well received and became the subject of a viral video and has its own plush toys in the market.



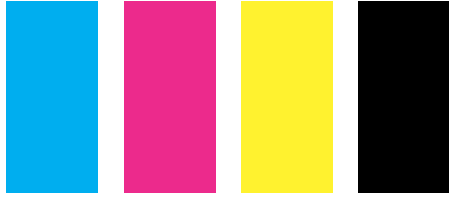
### **Cyber Crime**

Cyber Crime refers to offences that are committed against individuals or groups of individuals with a criminal motive to intentionally harm the victim directly or indirectly, using modern telecommunication networks such as Internet (Chat rooms, emails, Social Networks) and mobile phones (SMS/MMS). The term cybercrime is used as an umbrella term for crimes such as phishing, credit card frauds, bank robbery, scams, cracking, child pornography, cyber terrorism, the creation and distribution of viruses, spam and copyright infringement. These crimes are either network facilitated or network targeted. There are also cases where confidential information is lost or intercepted. In the past, cybercrime was committed by individuals or small groups. However, we are seeing a shift from small traditional groups to highly organized malicious technology professionals working together to make these crimes happen. With this shift, large scale cybercrimes have been possible recently. The cost of cybercrime worldwide was estimated to be about USD 8 billion in 2007-08.

### **CMYK**

CMYK is actually short for Cyan-Magenta-Yellow-Black. In a four colour printing machine, cyan, magenta and yellow printing plates are aligned with a black plate. This black plate is the Key and is represented by 'K'

in the acronym. In the CMYK colour model, all the colours are obtained from these basic colours. In general, any image viewing/editing program such as Photo Viewer or Photo-



shop displays an image in an RGB format. If you want the image/text to be printed, you need to convert it into CMYK mode so that the colour scheme appears to be the same as the one displayed in print. We have applications for converting images from RGB mode to CMYK mode, such as Adobe Photoshop, Adobe Illustrator, QuarkXPress, and Adobe InDesign etc. To avoid these problems in converting into CMYK mode from RGB, Apple filed a patent application for a monitor containing filters that automatically convert into CMYK mode instead of RGB mode to avoid the need for a change in mode for printing from a Mac system.

### **Cybernetics**

The term “cybernetics” was coined by Norbert Wiener, a mathematician, engineer and social philosopher, from the Greek word which means “to steer.” He defined it as “the science of control and communication in the animal and the machine”. Early applications of Cybernetics were in physical systems such as in the design of electronic circuits; later its relevance to mechanical, biological, cognitive, and social systems was understood and it became an interdisciplinary approach for exploring regulatory systems and their constraints. It’s valid for any closed loop system which takes an input and generates an output which is fed back as an input to the system. It includes the study of feedback, black boxes and communication and control in organisms and machines. Cybernetics is used as an umbrella term for systems related fields such as AI, Robotics, Bio-Cybernetics, Computer Vision, Management Cybernetics, Operations Research, Cognitive Psychology, etc.

### **C#**

The name 'C sharp' was inspired by the musical notation in which the sharp indicates that the written note should be made a semitone higher than the pitch. While the .NET framework was being developed, the class libraries were written in Simple managed C. In January 1999, Anders

Hejlsberg headed a team in developing C#. The latest version C# 5.0 was launched in August 2012. For building Android based applications using C# and .Net, there is software called Monodroid which can be used. The main applications of C# are Winforms (Windows like forums), Console (Command line Input and Output) and Websites. We can use Matlab plotting tools to plot data from C# applications. The game engine XNA developed by Microsoft runs on C # using which you can develop games for Windows PC, Xbox and Windows Phone. Also, XML documentation can be generated from source code comments in C#.

### **C++**

C++ was invented by Bjarne Stroustrup and is one of the most popular languages for programming. While working at AT&T labs, Stroustrup faced a problem in analysing the UNIX Kernel. With a view to solve that, he began with the C classes and ended up making a new programming language called C++. With continuous evolution, the standard library evolved with it with gradual additions to the iostream Library for input-output functions and a standard template library, C++ became a strong language for advanced programming. C++ is an Object Oriented Programming Language (OOP) under which it has features like Abstraction, Polymorphism, Function Overloading, Operator Overloading, Inheritance and Encapsulation. Most of the big applications like Windows 95, 98, Me, 2000 and XP are also written in C++. Also, Microsoft Office, Internet Explorer, Mozilla, Thunderbird and Visual Studio are written in Visual C++. For most programmers, C++ is the mother of all programming languages.





D

## Daemon Tools(Disk And Execution MONitor tools):

Daemon Tools is an optical media emulator for Microsoft Windows. It's a free tool that lets you create virtual drives on your PC for temporary usage, and burn images of CD/DVD/HD DVD/Blu-ray-ROM in the form of ISO, MDS/MDF and MDX files. These virtual drives work just like a physical optical drive, without you having to insert the actual disc every time, and data transfer speeds of images stored on the hard drive are 50x faster than a normal optical drive.

Daemon Tools also compresses disc images, enables password protection and allows you to add upto four virtual drives to your system. Also, all CD-like behaviour, such as autoplay and copy protection are replicated. The program also circumvents most copy protection schemas such as SafeDisc, SecuRom, LaserLock, and StarForce, which some game discs use.



## Data recovery

Data Recovery is the process of retrieving or salvaging data from a secondary storage media (such as hard drives, removable disks, USB flash drive, CD/DVD, or any other electronic storage media), which is no longer accessible by normal means of computer operation. It is needed for several reasons including physical damage to the device, accidental deletion of files, forgotten passwords, or OS failures. When files are deleted, the actual contents are not removed immediately from the drive, only references to them in the directory structure are removed, and memory is made available for overwriting. The data remains in distributed fragments of memory and may be recoverable. If there is a hard disk failure, the goal is one-time recovery. This involves repairing a file system, partition table or master boot record using software, and sometimes even physically repairing parts of the disk. When the OS fails, a Live CD is required to boot the system in order to be able to get to the data, or else the hard drive has to be physically removed and connected to another PC.



## Database

Raw data forms the very basis of computing these days. And if any data has to make sense it has to be structured properly for easy retrieval. That's exactly what a database is - a structured collection of interrelated data. The

stored data can be in the form of text, numbers, pictures, audio or video. The database is organised to model the real world in a way that it can be efficiently accessed, modified and updated whilst also ensuring security and consistency of data. Most databases are based on the Relational model, consisting of tables with various fields in the form of rows and columns. Databases are used everywhere these days – ranging from all of the world's financial data in banks, in universities, to run most web sites, etc. Basically if there's data to be stored, such as your name, address, telephone number, your airline booking, your salary being credited to a bank, your Facebook profile photo... it's all just entries in a database. Popular database software are Microsoft Access, MySQL and Oracle.

### **Dave Arneson**

Dave Arneson (1947 – 2009) was an American game designer who co-created the first role playing game Dungeons and Dragons (DnD) with Gary Gygax in 1974. DnD shifts from the traditional wargaming tactics to character involvement now called



role-playing. Initially the game used miniature figures to represent combatants. Arneson modified the rules of the game Chainmail, to apply to his role playing game scenario and developed the game Blackmoor. In early 80's he set up his own game company called Adventure Games. Arneson also wrote the TV series 'Dungeons and Dragons' (1983), and had a cameo role in the movie (2003) with the same title. In late 1980s he stepped into the computer industry and founded 4D Interactive Systems Inc. in Minnesota. He also worked as a professor of computer game design later in his life.

### **David Filo**

David Filo is the co-founder and chief of Yahoo! Inc. Filo directs the technical end of operations behind Yahoo!. He wrote the Filo Server Program in C language, which was the server-side scripting software that dynamically served several



web pages (called Filo Server Pages) on the Yahoo! web site. Later the company switched over to PHP. According to Forbes, he was estimated to be worth \$1.2B as of September 2012, ranking him as the 960th richest person in the world. David Filo and Jerry Yang started a web site “Jerry and Dave’s Guide to the World Wide Web”, which was later renamed “Yahoo!”. It started as a web portal consisting of a directory of other web sites, and has now come to provide various other services such as Yahoo! Directory, Yahoo! Mail, Yahoo! News, Yahoo! Finance, Yahoo! Groups and Yahoo! Answers.

### DDR 3

DDR stands for Double Data Rate. It is a type of SDRAM (synchronous dynamic random access memory) for computer memory. DDR memory can transfer data on both rising and falling edges of the clock signal, and thus they are twice as fast as regular SDRAM chips. The current version, DDR3 RAM is about 30 per cent more efficient in power usage than its predecessor DDR2, having a 1.5V supply voltage (DDR2 - 1.8V), with improved performance and speeds. While DDR2 memory can transfer data at up to 3200 MBps, DDR3 memory supports maximum data transfer rates of 6400 MBps. DDR3 memory modules look similar to DDR and DDR2 chips, but are not backward compatible with DDR2 memory slots.



### Debian

Debian is a free operating system for your computer released under the GNU General Public License. It is a popular Linux distribution. It runs on a variety of devices including laptops, desktops, phones and servers. It comes with a large repository of packages to choose from. The open source community focuses on security and stability of Debian, and packages are scrutinised for flaws before being released to the public. Debian is the only OS that supports three kernels – Linux, FreeBSD and the Hurd kernel. Its standard install makes use of the GNOME desktop environment, and includes programs such as LibreOffice, Iceweasel (Mozilla



Firefox), Evolution mail, media players, and CD/DVD writers. The Maemo operating system (seen in Nokia N900 and Nokia N9), developed by Nokia for smartphones and tablets, is based on the Debian Linux distribution.

## **Debug**

A computer program may contain several errors known as 'bugs'. These can be syntax errors or logical errors which change the whole meaning of the code. The process of finding and correcting or removing these errors is called "debugging". Debugging is a complex methodical process, and fixing some bugs may lead to others. Debuggers are software tools that help a programmer to test and debug a program by monitoring its execution, and allowing provisions to start, re-start, stop and set breakpoints in the program. The term "debugging" is not restricted to software code, and may be used to refer to correcting defects in a piece of hardware. Anti-debugging, on the other hand refers to techniques that hinders the debugging process and is used by some malware to hamper their detection.

## **Decoder**

A decoder turns a scrambled electronic signal into something meaningful. It does the reverse operation of an encoder to retrieve the original information that was encoded for security and other reasons. Whatever method is used to encode the signal is just reversed in order to undo the encoding. A decoder is a combinational circuit made of logic gates which are embedded on a single integrated chip. It is a multi-input multi-output circuit that can convert binary information from  $n$  input lines to a maximum of  $2^n$  unique output lines. It can be used to convert a binary number into decimal and vice-versa. They are also used in designing the computer architecture to obtain control signals for various functions of the CPU.

## **Defragment**

When a file is stored on your computer, it is distributed across the memory, i.e it is fragmented. To access that file, the reading head of hard drive has to skip many locations to fully read its contents. Because the data is spread across the entire disk, the hard disk seek time is increased and it can reduce your computer's performance. Defragmentation is the process to compile those fragments and store them in contiguous memory locations from start to finish. If you hear more than the usual amount of sputtering noises from your hard disk, in all likelihood it's extremely fragmented and it's time to

run defragmentation. Windows comes bundled with a defragmentation program or a commercial disk utility such as Norton Utilities can also be used. Mac users can use DiskWarrior or Tech Tool Pro. Its good practice to defragment your hard disk once a month. Of course defragmentation doesn't apply to SSDs and in fact doing so will reduce their life.

## Degauss

The Earth has a magnetic field, and charges due to this field may build up inside a CRT monitor which causes a loss of colour accuracy. Degaussing is the process of removing or reducing the unwanted magnetism from the monitor. Many of the later generation monitors could automatically degauss their picture tubes on startup causing the screen to go crazy for moment and a buzzing sound can be heard; others had a "degauss" button on them. Magnetism doesn't build up in flat-panel displays, so degaussing is not required there. Degaussing is also used to erase the data stored on magnetic storage media. Data is stored on magnetic media by aligning small areas called magnetic domains. Degaussing causes these domains to align randomly with no fixed orientation causing erasure of data. A degausser is a device that generates magnetic fields to erase data from magnetic tapes or disks.

## Del.icio.us

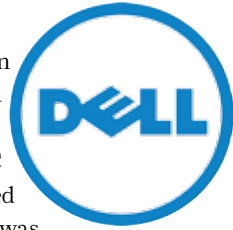
Del.icio.us(now Delicious) is a social bookmarking web service for collecting, categorizing and sharing your favourite web pages from across the web. Common bookmarked web pages include videos, pictures, blogs, news articles and tech support pages. You can add tags to your bookmarks for better search results and you can also add other's bookmarks to your list. The service keeps a track of all the bookmarks and you can see what are the most popular and trending items on the web. Delicious was founded by Joshua Schachter in 2003; later acquired by Yahoo! in 2005. The site was sold again in 2011 to AVOS, a company owned by YouTube founders Chad Hurley and Steve Chen. Delicious is just one example of the social bookmarking phenomenon that drives content discovery in the online space today. The name "del.icio.us" is a well known example of domain hack (like "goo.gl" and "fold.it"), where "del" is the domain prefix and "icio.us" is the domain name.



del.icio.us

## Dell

Dell is an American company, headquartered in Texas, that develops and sells computers and related products and services. It is named after its founder and CEO Michael Dell. It is the third largest PC vendor in the world after HP and Lenovo; it's ranked #44 in the Fortune 500 list The precursor to Dell was PCs Limited, created by Michael Dell in his hostel room in college. In 2006, Dell acquired Alienware, a computer hardware company that assembles third party components into computers. Alienware products have distinctive sci-fi looks that appeal to geeks. In 2009, Dell bought Perot Systems which we know as Dell Services.

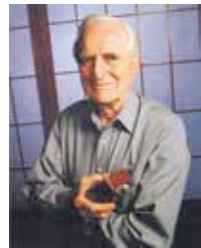


## Denial of Service

In a denial-of-service(DoS) attack, streams of requests are sent to a targeted server in order to overload its bandwidth and thus make it unavailable to the intended legitimate users. It may result in temporary or indefinite suspension of services. These requests may be as small as pings or large packets of data. While handling all these unwanted requests, others are queued to be processed and the backlog increases to a great extent slowing down the server. Even a highly secure network is vulnerable to a DoS attack since flooding the server with requests does not require authentication. A DoS attack initiated from several computers spread across the network is known as distributed-denial-of-service(DDoS) attack. It is commonly implemented using botnets which are more difficult to trace. It's a popular weapon of choice for hacker groups such as Anonymous.

## Dennis Ritchie

Dennis Ritchie is the creator of C language. He also co-created the Unix operating system with Ken Thompson at AT&T Bell Laboratories. His main contribution to Unix was the operating system's portability to various platforms. He also wrote The C Programming Language with Brian Kernighan; he was the R in K&R C. Ritchie received the Turing Award in 1983 and the National Medal of Technology from President Clinton in 1999. He was commonly known by his username dmr. He died a week after Steve Jobs in October 2011, but this news was overshadowed by the demise of the Apple CEO.



## DHCP

DHCP, or Dynamic Host Configuration Protocol, is a network protocol that allows the server to dynamically assign an IP address to your computer from a defined range of numbers stored on the server. When your modem comes online, it indicates to the DHCP server that it is looking for an IP address. The server acknowledges this request and your modem transmits its MAC address to the server. The server looks up the reserved IP or assigns a new one to your system. DHCP is preferred over static IP addressing, in which a computer is configured manually to a specific IP address, in setting up large networks. Static assignment may lead to loss of service if two computers are configured with same IP address. DHCP servers typically grant IP addresses to clients for a limited time interval, and renewal of IP address is client's responsibility before expiration of that period.

## Dial-up

Some of you may still remember the weird beeps and singsong tones of a modem from yesteryears. Those were the good old days when 56 kbps was the standard speed. A dial-up connection was the standard way of connecting to the internet in the 1990s, but of course now it is being replaced by DSL and cable modem connections (known as broadband) that provide speeds much better speeds. Dial-up used the facilities of Public Switched Telephone Network(PSTN) to establish a connection with your Internet Service Provider(ISP). When you initiated a dial-up connection, the modem dialed the phone number of your ISP which then establishes the connection. The dialing process would take a few seconds and you were greeted by that familiar beeping and whirring. The down side was that you could not make calls and use Internet from the same telephone line. Popular dial-up Internet Service Providers in India are Tata Indicom, BSNL, VSNL and MTNL.

## Digital Signature

Digital Signature is the digital analog for a paper signature for the purpose of authentication of sender's identity. It is attached electronically to data such as pdf, emails and other word processing documents, after which no changes can be made to it. Your unique digital signature should be difficult to forge. It can also provide non-repudiation, which means that you cannot claim that you didn't sign any electronic document bearing your signature. Digital signatures employ a type of public-key cryptosystem and hashing. The electronic message is encrypted with the private key and decrypted



with the public key that is sent with the message. The hash code is also sent along with the message to verify your identity. To digitally sign a document, you must obtain a digital ID from certification authorities like VeriSign and EchoSign. Using that digital ID, you can use the “sign” feature of programs such as Adobe Acrobat or Microsoft Outlook to stamp your documents.

## DirectX

DirectX is a set of commands and functions that are ready-to-use and makes it easier for the programmers to create software; mainly games. By using DirectX com-

Microsoft®  
DirectX®

mands, developers can use predefined functions to manage video and sound of their game. Technically DirectX is a set of APIs(Application Programming Interfaces) that software developers use when creating programs on Microsoft platforms. It is used to denote all the APIs beginning with Direct, i.e Direct3D, DirectPlay, DirectMusic, DirectDraw, DirectSound and the like, with X substituted for each API. The X initial was later used by Microsoft to name its gaming console Xbox which uses the DirectX technology. DirectX was introduced with the Windows 95 Service Release 2. The purpose of DirectX was to make Windows as developer-friendly as MS-DOS.

## Disk Image

A disk image is a soft copy of a physical storage device such as hard drive, CD, DVD, optical disc or a USB flash drive. Disk image is a clone of the physical disk that serves as backup in case system restore is required. It is created by copying the disk sector by sector thereby replicating the exact file structure and the entire data from the disk. Nero, Acronis True Image and Norton Ghost can be used for creating disk images for Windows, and Apple Disk Utility and Roxio Toast can be used by Mac users. The disk images are stored as .ISO, .BIN or .DMG files which aren't directly readable, they require mounting by the operating system or a disk utility program.

## DNS

DNS stands for Domain Name System. It is a naming system for computers, servers and other resources connected to the Internet. It is used because websites are located by their IP addresses, which are difficult to remember. When you type a website's name, the computer sends a request to the nearest

DNS server which finds the correct IP address for that website. Your computer then connects to the server with that IP address. You can bypass the DNS by entering the IP address directly in your browser, but that's only if you can remember all those numbers correctly. The DNS is kind of like the phone book on your cellphone. Paul Mockapetris invented the Domain Name System in 1983. Before that, the HOSTS.TXT file on each computer which mapped hostnames to numerical addresses. Modern operating systems still contain a hosts file by default which may be used to define any hostname or domain name for use in the local system.

## Dock

Dock is a GUI feature, originally introduced in the Mac OS X, with a virtual tray of icons that provides one-click access to frequently used programs. It can be displayed as an autonomous entity on the top or bottom of your desktop, and can be incorporated in the Taskbar. It contains shortcuts of various applications. You can customize your Dock by adding and removing applications of your choice. The earliest known implementations of Dock is the Iconbar in RISC OS. There are several dock applications available for various operating systems, for e.g. The Dell Dock application comes pre-installed on Dell computer systems running on Windows OS.

## Dolby Digital

Dolby Digital, formerly known as AC-3, is a digital audio coding technique developed by Dolby Laboratories. It is Dolby's third generation audio compression technique that makes it possible to store and transmit high quality digital sound far more efficiently than previously possible. It reduces the amount of data needed to produce high quality sound. Dolby Digital was first used in Batman Returns and debuted in theaters in 1992. Dolby Digital is used with DVDs, HD television, and digital cable and satellite transmissions. It has been selected as the audio standard for digital television. At the option of their producers, Dolby Digital programs provide five full bandwidth channels (left, centre, right, left surround, and right surround) and a sixth low-frequency effects(LFE) channel (sometimes referred to as .1 channel because it takes only one-tenth the bandwidth of the others) for action sequences and special effects that are felt more than they are heard in movie theaters.



## Domain Name

A domain name is a string of characters that uniquely identifies a website or any other service connected to the Internet. Every website has a domain name that serves as its address. Every domain name is translated to an IP address by the DNS which locates the server of the website you want to access. Domain names are a component of the URL (Uniform Resource Locator). For e.g. In the case of [www.thinkdigit.com](http://www.thinkdigit.com) “thinkdigit” is called the label, the domain name is “thinkdigit.com”; the “www” isn't part of the domain name, while the “.com” is called domain suffix. A domain suffix helps in identifying the type of website. Some suffixes indicate geographies – “.in” for India, “.us” for the United States, and so on. The first commercial registered domain name was symbolics.com by Symbolics Inc in 1985. Domain names conform to the rules of Domain Name System (DNS). Ultimately, the Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for managing the Internet domain name space.

## Dongle

A dongle is a hardware device that plugs into the serial or USB port of the computer and serves as an electronic key for some software and applications. Wordcraft was the first program to use a software protection dongle. Dongle can also be used to designate any hardware that plugs into the computer. A 3G or WiMAX dongle is a device that attaches to the USB port in your computer to connect to 3G or WiMAX networks. Internet dongles have a SIM inserted in them, which uses a network to connect to the Internet. These portable devices provide Internet connectivity while you're on-the-go.

## DOS

DOS, short for Disk Operating System, was the first operating system used by IBM compatible computers. DOS uses a non-graphical command line interface. The user has to type commands to perform functions, which is a tedious job as one has to remember a lot of commands. The first version of DOS for personal computers was developed by Bill Gates for IBM and called PC-DOS. Gates retained the rights to sell it under Microsoft's name and named it MS-DOS. The first Microsoft Windows operating system (until Windows 95) was really an application that ran on top of MS-DOS. The OS was rewritten and Windows NT was the first to run on its own. The DOS command prompt can be run from Windows by going to Run in Start Menu and typing cmd. There are various DOS emulators

for modern operating systems such as DOSEMU for Linux, and DOSBox for Windows.

## Dot Matrix

Dot Matrix is a 2D matrix of dots which can be used to represent characters, symbols or images. They are used in electronic LED displays, monitors and even printers. In a dot matrix display, the figure is approximated using a set of dots. The more the number of dots, more accurate and clear is the picture. If the number of dots is sufficient, the picture will seem continuous to the human eye instead of being formed by a group of dots. The resolution of a 16x16 matrix is more than that of a 8x8 matrix and so on. Bitmap images are also made up of rectangular matrix of pixels. Dot matrix printers, also known as impact printers use a matrix of pins (dots) to print characters. The pattern of dots is made to hit against the ink-soaked cloth ribbon and against the paper. LED dot matrix display is a low resolution display which can be used in large hoardings for industrial purposes.



## Douglas C Engelbart

Douglas Carl Engelbart made it easy to interact with the computer. He is the man behind the computer mouse. He invented a number of user-friendly systems that make interacting with the computer easier. He set up an Augmentation Research Center(ARC) at the Stanford Research Institute in California, which was funded by Defence Advanced Research Projects Agency (DARPA). There, he developed the mouse, chorded keyboard, hypertext, shared screen teleconferencing, real-time collaborative editing and more. The first mouse prototype developed by him and his colleague Bill English in 1963. It was a wooden shell with two metal wheels which were perpendicular to each other: the rotation of each wheel translated into motion along the axes. Engelbart applied for a patent for an "X-Y Position Indicator for a Display System", which was later nicknamed as mouse.

## Download

Download is the process in which your computer receives data from a remote computer or server. When you save something from the Internet, you are

downloading it to your computer. The opposite of this process, sending data from your computer to a remote server is known as uploading. Downloading implies that the data that is received is stored at least for a while in your computer, and can be used only after receiving it entirely, like when you download an attachment from your email. It is different from the concept of streaming, in which data is used almost immediately as it is received while the whole file is still in transmission.

## DPI

DPI, short for Dots Per Inch, is a measure of sharpness of an image both on electronic display and in print. As is clear from its name, it determines the number of dots that fit in a linear inch. More the number of dots or illumination points (on screen), better is the resolution of image. Pixels per inch (ppi) can also be used to indicate the sharpness of an image on screen; dots per inch is reserved for print medium. The average printer today provides 300 or 600 dpi. If a printer has 600 dpi, it means that it can print 600x600 dots per square inch. Higher quality prints reduce the speed of printing. When viewing the image on the screen, 72 or 96 dpi is sufficient as the pixels on screen take more space than dots on paper.

## DreamWorks

DreamWorks Studios is a motion picture company founded by Steven Spielberg, Jeffrey Katzenberg and David Geffen in 1994. The studio develops films, television programs and video games. Presently, it is owned by Steven Spielberg, Stacey Snider and The Reliance Anil Dhirubhai Ambani Group. While it released great movies



such as American Beauty, Gladiator, A Beautiful Mind, Minority Report and The Terminal, its greatest success was in the development of animated movies. DreamWorks' animation division split and merged with Pacific Data Images under the banner DreamWorks Animation Studios. They have released a total of 24 animated films yet including Shrek, How To Train Your Dragon, Madagascar and Monsters vs. Aliens. DreamWorks Interactive, the game developer wing of the DreamWorks Studios released several games like The Lost World: Jurassic Park and Medal of Honor for the PlayStation, and Someone's in

the Kitchen! and Clive Barker's Undying for Windows. This company is now known as Danger Close Games and has released the games Medal of Honor and Medal of Honor: Warfighter under its banner.

## **Driver**

A driver is a software that allows a particular hardware to work with your computer's operating system. It issues commands to the hardware device on requests by a program. Drivers may be required for internal components such as video adapters, network cards, as well as external hardware components such as printers, hard-disks and CD-ROM drives. Drivers are hardware-dependent and operating-system-specific. Most modern external devices are "plug and play" i.e. they do not require driver installation. But installing the specific driver may provide you additional options to customise the function of your device. For example, some keyboards are ready to use as soon as you connect them, but a driver may allow you to assign control functions to specific keys. Drivers can be installed from CDs that come with your device. Most drivers are pre-installed on your PC, and others can be downloaded off the internet from the support section of the company's website. When you check for updates, your operating system automatically detects the driver that need updation.

## **Dropbox**

Dropbox is a personal cloud storage service that allows you to store your documents, media and more on their server, which can be accessed from anywhere around the world via the internet. It creates a special folder on your computers, which can be accessed offline, and are kept in synchronisation. The file structure is preserved, and your data can even be accessed from their website and mobile application. Dropbox also facilitates sharing of data amongst its users. It is mostly used as an online backup service. Dropbox was founded by Drew Houston and Arash Ferdowsi, MIT graduates, in 2007. The file hosting service is written in Python, and runs on almost all platforms(Microsoft Windows, Mac OS, Linux, iOS, Android, Symbian, Blackberry OS, MeeGo/Harmattan). Until 2009, Dropbox's official domain name was "getdropbox.com". Dropbox now allows its users to directly share files to Facebook Groups. The service has now reached 100 million users.

## **DSL**

A Digital single-lens reflex(DSLR) camera is a single-lens reflex(SLR) camera with a digital sensor instead of a photographic film. SLR employs a light reflecting mechanism which uses a single lens and a mirror to reflect the photographic image into the camera's viewfinder. You see what the lens sees. The lens on your DSLR can also be changed according to current photographic needs. These cameras store the images on a memory card which can then be transferred to the computer. The image quality depends primarily on the size of the image sensor, and then the number of megapixels. DSLRs have larger image sensors than the compact point-and-shoot cameras, and thus produce a better quality picture. DSLRs are bulky cameras and they provide various creative options to customise your camera settings. A DSLR has a near-zero lag time; it is ideal for action photography.

### **Dual-core**

A dual-core processor is a computing element with two independent CPUs, called cores, in the same integrated circuit. You can integrate more than two cores on a single chip, which is called a multi-core processor. Each processing unit has its own controller and cache which enables it to work as efficiently as a single processor. The instruction set is the same as for a single core, but the processors execute multiple instructions at the same time. They can perform functions at twice the speed of a single processor. But the performance is software-dependent, as the program algorithm may not utilise both processors effectively. Parallel programming techniques can benefit from dual-core processor. However, most programs will be benefited from a multiprocessing system. Examples of dual core processors are AMD Phenom II X2 and Intel Core Duo.



E





### **E3 (Electronics Entertainment Expo)**

E3, which is short for the Electronics Entertainment Expo, is an expo presented by the Entertainment Software Association (ESA) and is reserved exclusively for the computer and video games industry. Video game publishers and gaming accessory manufacturers come here to promote their upcoming games and show off their newly releasing gaming peripherals.

E3 is considered the flagship expo of the gaming industry, it is easily the biggest gaming event of the year.

The first E3 was held in 1995 and featured the very first PlayStation, i.e., Sony's debut into the video game industry. The release of the Nintendo 64, then known as the Ultra 64 and Sega's Saturn were also announced at the very same E3.

E3 2005 was the first one to be aired on television. E3 was changed to the E3 Media and Business Summit for the duration of 2007-08, during which the number of attendees steeply declined as the ESA announced that new E3 was by invitation only. It was later reverted to E3 in 2009 and was reopened to all qualified computer and gaming audiences. This move was well received and saw an attendance boost of 820%.

### **E-Commerce**

The term e-commerce generally refers to business done via the internet. Amazon, flipkart and bestbuy are a few examples of websites devoted solely to the buying and selling of products over the internet.

The two major forms of e-commerce are Business-to-Consumer (B2C) and Business-to-Business (B2B). While B2C refers to catering directly to the consumers, B2B provides goods and products in bulk exclusively to other businesses.

E-commerce can be dated to way back in the 1960's when credit cards were first introduced. Electronic sales prior to the 1990's were pioneered by services like CompuServe and America Online which catered sales directly to consumers before the World-Wide-Web was readily available to all.

E-commerce is now a steadily growing sector with over 1.5 billion internet users world-wide feeding it, of which China has over 250 million users, making it the largest online market in the world. Successful e-commerce sectors include books, music and movies, clothes and electronics. Global e-commerce sales are steadily growing annually and are expected to hit about US\$1 trillion by the year 2013.

## E-mail

An E-mail, or electronic mail, can be defined as the sending of a message through a computer connection. E-mails today are a standard means of communication with over a billion messages sent out each year. The origins of e-mails can be dated back to the 1960's when users of a time-sharing computer would leave messages in a file which was accessible to all its other users.

The first glimpse of the conventional e-mail was seen in 1971 over the ARPANET (an ancestor of the internet) when Ray Tomlinson, a researcher at *Bolt Beranek and Newman Technologies* sent the first ever e-mail from one computer to another. Ray Tomlinson is more famously known for introducing the "@" sign to the email addresses we currently use.

The ARPANET was fueled by the use of e-mails through the 1970's which eventually acquired newer and better features as use of e-mails increased. Eventually, use of e-mails reached its peak after the 1990's with the universal availability of the Internet. The first free email service provider Hotmail, which was launched in 1996 by Sabeer Bhatia and Jack Smith paved the way for companies like Google and Microsoft who are now competing to offer the best full-featured e-mail programs.

## E-Reader (e-Book Reader)

E-readers or eBook readers are portable hardware devices designed for reading digital books or publications. These can be anything from eBooks, e-Magazines, and even digital versions of newspapers! Similar to an iPod or any kind of portable media player, e-readers can store thousands of publications and unlike media files, textual data requires comparatively little space so you can carry around all your favorite publications in your pocket and still have room for thousands more.



E-readers support a wide range of eBook formats and can download content via a wireless network. Many e-readers offer monochrome displays, called E Ink displays or e-paper displays, while others maintain the usual full-color backlit display. While monochrome displays do not

provide colour images, the screen appears like real paper and is easily readable even in bright sunlight. According to research, these displays are safer for the eyes and allows for longer reading sessions. While there are many e-Readers available in the market, some of the more popular ones include the Amazon Kindle, the Barnes and Noble Nook, the Pocketbook and the Sony Reader.

## EA (Electronic Arts)

Electronic Arts, or EA for short, is a gaming company which pioneered the early computer gaming industry. EA is still a prominent maker of games across all platforms and boasts the world's third-largest gaming company revenue following those of Nintendo and Activision Blizzard.



EA was founded and incorporated on May 28, 1983 by Trip Hawkins. Trip Hawkins, along with several of his colleagues, left Apple Computer and founded a company called "Amazin' Software" in 1982. The name was then changed to Electronic Arts late in 1982.

While EA initially published games developed by independent designers and programmers but started developing games in-house by the late 1980's.

Some of the company's biggest sellers come under the EA Sports label, including Madden NFL, FIFA Soccer, NHL and NBA Jam. EA has also established other popular franchises like Battlefield, Need for Speed, The Sims, Medal of Honor, Command & Conquer, and newer franchises like Dead Space, Dragon Age, Mass Effect and Star Wars.

EA acquires a large percentage of its revenues from console game sales. Over 40% of EA's annual revenue over the past few years have been solely from console game sales.

## eBay

eBay Inc., is the world's largest online auction and shopping site. It first made its appearance in 1995 as AuctionWeb, which was part of Pierre Omidyar's personal web site. While it was initially free, Omidyar was surprised at the rapid growth of the auction service. After imposing a modest listing fee and receiving thousands of dollars in small checks, he decided that online auctions could become a full-time business.



It was in September 1997 after Jeff Skoll became president of the board, that AuctionWeb officially became eBay. The company went public in 1998, at the height of the first “Internet Boom”, which made Omidyar and Skoll instant millionaires. eBay’s revenue for the year 2011 was \$11.7 billion.

While eBay now has a more “traditional” shopping experience with fixed prices, online auctions still remain the core of eBay’s business, with over a million items across a dozen categories being listed and sold every day. Several small to medium sized businesses derive their revenue from eBay, either by selling their own merchandise or by acting as agents for others.

eBay has regional operations in over 20 countries, including India and China, as of 2007.

### **Eiffel (Programming Language)**

Eiffel is an interesting ISO-standardized, object-oriented programming language developed by Bertrand Meyer and his company Eiffel Software in 1986. The software was indeed named after Gustav Eiffel, architect of the famous Eiffel Tower in Paris. Eiffel fully supports and has in many ways pioneered programming concepts we see in more widely used programming languages today, with Java and C++ now using concepts which were first introduced in Eiffel.

While C++ and Eiffel were in development at around the same time, Eiffel provided arguably cleaner and superior design as compared to C++. However, the dominance of C++ was largely due to two factors, it had a readily available inexpensive compiler, and thousands of programmers already knew how to use C.

Eiffel is currently available for virtually all platforms and has interfaces to C, C++ and most other common languages, but remains a niche language which is used for teaching software design for a limited number of applications which still use the EiffelStudio programming environment.

### **Emoticon**

An emoticon is defined as the pictorial representation of a facial expression, usually by using punctuation marks, numbers and letters to give

the reader a sense of the writer's mood. This boring definition is far from what an emoticon can convey right? :-)

The word emoticon is the combination of the words emotion and icon. They are often automatically replaced by small corresponding images on web forums, instant messengers and online games. These small images are also called emoticons.

The first documentation of emoticons, “:-)” and “:- (“, being used over the internet was by Scott Fahlman on the 19th of September, 1982 at 11:44 am, where he proposed that emoticons be used with specific suggestions to express emotion. This documentation was considered lost, but was found 20 years later from old backup tapes by Jeff Baird.

Emoticons quickly became viral on the ARPANET and Usenet and saw a large number of variations over time.



## Emulation

The word emulation comes from the verb emulate, which means to imitate or replicate.

Computer emulation can be defined as when one system imitates or replicates another system. Emulation is achievable by using

hardware, software or a combination of both. But since hardware is expensive to reproduce, most emulation is software based.

Software emulation enables running of operating systems across different types of computers, such as being able to run Windows on an Apple Macintosh or Android on an iPhone. It also allows console video games, such as Super Nintendo, PlayStation and Game Boy games, to run on the PC. Creation of disk images is also considered a type of emulation. The .ISO file (Windows) and the .DMG file (Mac) are a few examples of disk images which can be mounted on the desktop to emulate a physical disk.



## Encapsulation

Encapsulation is a programming term which generally refers to the process of combining elements to create a new entity.

The class mechanism in C++ and other object-oriented languages are good examples of programs which utilize encapsulation. A class generally includes both private data and procedures and public methods that make up the interface. The main program's code uses the class interface to create and manipulate new objects. By doing so, the main program's code is protected by uncontrolled modifications or access. This prevents programmers who simply want to use the functionality of the program, from viewing information that they don't need to know about.

Encapsulation, more commonly known as the term "tunneling" in networking, is a technology that enables one network to send its data through another network's connections.

## Encoding

Encoding means converting of data from one form to another. It has several types including image encoding, audio and video encoding and character encoding.

By encoding digital audio, video and image files into different, more efficient, compressed formats a lot of disk space can be saved. Encoded media files typically maintain similar quality to their original uncompressed counterparts but have comparatively smaller file sizes. A WAVE (.wav) audio file that has been converted to an MP3 (.mp3) file may be 1/10th the size of the original WAVE file. This also applies to the MPEG (.mpg) compressed video file which takes only a fraction of the disk space the original digital video (.dv) file would take.

Encoded data can only be read by a program that supports that type of encoding. This is accomplished by Codecs in the case of audio and video files, which decodes the data in real-time.

## Encryption

Encryption is used to code or scramble the meaning of messages. These messages can then be decrypted only by someone who has the correct code or key, which is called a cipher. Encryptions are primarily used to secure web sites or any other means of data transfer. If a third party were to intercept a message sent via a secure connection, they would be unable to make any sense of the encrypted data.

The use of encrypted messages dates back thousands of years to the Romans, who first used substitution ciphers. The first machines to use ciphers came into use during the 1930's. The German Enigma cipher machine which was used during World War II used multiple rotors to create a continuously varying cipher that was thought to be unbreakable. Allied code breakers succeeded in exploiting the flaws of the German machine with electro-mechanical and electronic devices, while simultaneously unknowingly advancing computing technology.

### End User

The term "end user" comes from the idea of the "end goal" of a software or hardware product, which is ultimately to be useful to the consumer. While software and hardware go through various intermediaries as they progress through development, the end user is the person who the software application or hardware device is finally designed for. Developers, programmers, installers and administrators of the product are considered the intermediaries in this case.

Simply put, the end user is someone who uses the fully developed software or hardware product after it has been marketed and installed.

The term "user" and "end user" generally mean the same thing.

### Eric Emerson Schmidt (Chairman, CEO Google)

Eric Emerson Schmidt is the executive chairman of Google. He was Google's CEO between 2001 and 2011 but later stepped down and Google co-founder, Larry Page took up the position. Eric Schmidt has a net worth of \$6.9 billion.

Born in Washington on the 27th of April, 1955, he pursued his higher studies at Princeton University, where he got a BSEE (Bachelor of Science and Electrical Engineering) in 1976. He got a Master of Science at California University in 1979 and then a PhD in EECS (Electrical Engineering and Computer Science) in 1982.



He worked in Sun Microsystems as the technical and general Director in 1983. In 1997 he became Novell's CEO and president of the board of directors. In 2001, he joined Google as the CEO. In 2006 he was elected as a member of National Academy of Engineering. As strange as it may sound, he also joined Apple's board of Directors in the same year but was later forced to resign due to conflicts between Google and Apple.

## Error

An error can be described as a flaw, fault, mistake, bug or failure in a computer program or system. This usually causes the program or system to produce incorrect and inaccurate results and/or behave in unintended and unexpected ways. The most common source of errors is when people make mistakes in the code, script or design of a program. In other cases it is due to the compiler producing incorrect code.

The first computer error was said to have been caused by an insect that was attracted by the heat of the computer's vacuum tubes and got lodged in them. This caused the machine to short circuit, creating the term "bug". As a result, programs with a large number of errors or software bugs that affect its functionality are called "buggy".

A study in commissioned in 2002 by the US concluded that software errors and bugs annually cost the US economy \$59 billion.

## eSports

eSports is described as the competitive playing of video games where gamers come together to compete before live audiences.

Much like athletic events, video games also have various categories or





genres associated with eSports. These include real-time strategy (RTS) with games like StarCraft 2, DotA and League of Legends. First-person shooters (FPS) including games like Call of Duty: Modern Warfare and Counter Strike. Massively-multiplayer online (MMOG) and racing games such as FIFA Soccer, Need for Speed, Forza Motor Sport and Gran Turismo.

Annual gaming events like the World Cyber Games (WCG) and Major League Gaming (MLG) bring the world's best gamers together and offer cash prizes to the winners.

eSports date back to the 1980's when gaming tournaments were held in arcades. The 2000's saw a steep rise of PC gaming and LAN tournaments. Online gaming via the internet fostered a whole new era of eSporting with players being able to compete in gaming competitions remotely.

## Ethernet

Ethernet is the most common type of connection computers use in a LAN (local area connection). It was developed in 1976 by the Xerox Corporation in collaboration with DEC and Intel. Ethernet was introduced commercially



in the 1980's and was standardized in 1985 as the IEEE 802.3 (Institute of Electrical and Electronics Engineers project 802).

An Ethernet port resembles a regular phone jack but has slightly wider dimensions. This port can also be used to connect one computer to another computer, local network, or an external DSL or

cable modem.

Ethernet originally came in two forms, the 10BaseT and the 100BaseT, with transfer speeds of up to 10Mbps and 100Mbps respectively. The newer and faster "Gigabit" Ethernet connection's data transfer speeds peak at a whopping 1000Mbps.

## EUP

EUP stands for "Enterprise Unified Process". It is a software development methodology which helps companies create software in an organised and systematically structured manner. The EUP is an extended variant of the RUP or "Rational Unified Process" which was developed by Scott

W. Ambler and Larry Constantine in 2000. It was reworked in 2005 by Ambler, John Nalbone and Michael Vizdos. The EUP was made to improve upon the shortages of the RUP and adds two new development phases.

## Exabyte



An Exabyte is a unit of data or information storage and is 2 to the 60th power bytes, or 1,152,921,504,606,846,976 bytes. That's over one quintillion (1,000,000,000,000,000,000) bytes. An exabyte is 1024 petabytes and precedes the zettabyte in units of computer

storage measurement. Every piece of content ever written would take up roughly 5 exabytes.

Global computing capacity has increased at a rate of about 58% every year from 1986 to 2007. The world's technological capacity for information storage was 2.6 exabytes in 1986, which grew rapidly to 295 exabytes in 2007. 295 exabytes is equivalent to roughly 404 billion CD-ROMs, that's almost 61 CD-ROMs per person. Piling up 404 billion CDs would easily create a stack from the earth to the moon and still have around a quarter of the pile left over. In today's world around 2000 exabytes of information is broadcast every day.

## Excel

Excel, or Microsoft Excel, is a spreadsheet program used for Windows and Mac computers. It is one of the components of the Microsoft Office suite which include other useful programs like Word and PowerPoint.

Ironically the first version of Excel was released for Mac in 1985. Later in 1987 when Microsoft first introduced Windows 3.0, Excel was made available for Windows. After the introduction to Windows, Excel has been available to both platforms and has been regularly updated at a period of about two years.

Since the release of Microsoft



Excel, the IBM Lotus 1-2-3 (for Windows) and the AppleWorks spreadsheet program (for Mac OS) were almost completely replaced in the spreadsheet industry. Excel continues to lead the spreadsheet market and is still the most popular spreadsheet program to date.

### **Executable File (.exe)**

An executable file runs a program when it is opened. It basically executes a series of codes or instructions contained within the file. There are 2 types of executable files – compiled programs and scripts.

Compiled programs have the .exe file extension, short for executable. While Windows systems use the .exe file extension, Mac computers have the .app extension, short for application. These files are compiled into binary machine code and are executable by the CPU. The code is executed by the operating system, which only understands OS specific formats. This means that the EXE files will only run on Windows and APP files will only run on Mac OS X.

Scripts are files that are saved in plain text format, rather than binary. This allows you to open the script file and read the code. Since they have no machine code, they require an interpreter to run.

Opening unknown .exe files can run malicious code which is why it is advised not to open them, especially ones received as email attachments or via the internet.

### **EXIF**

EXIF stands for exchangeable image file format. It is a standard means of tagging image files with additional information about the image, or metadata (metadata is data which describes data). It supports most image file formats, including the TIFF and JPEG formats. EXIF is most commonly seen in images captured with digital cameras, which mostly consist of JPEG images.

When taking pictures with a digital camera, EXIF data is automatically saved with a photo. These include various bits of info like the shutter speed, whether the flash was on or off and the date and time etc. Additionally, some cameras may include EXIF data such as the brightness value, white balance setting and sensing method.

The Japan Electronic Industries Development Association (JEIDA) first introduced EXIF in 1995. Versions 2.1 and 2.2 of the specification were later established by JEIDA in June 1998, and by the Japan Electronics and

Information Technology Industries Association (JEITA) in April 2002, respectively. EXIF is not currently being maintained by any standards organization, but almost all camera manufacturers use it.

## **Expansion Card**

An expansion card, also called an expansion board, adapter card or accessory card, is a printed circuit board which can be installed in a computer to add to its functionality. To add 3D graphics processing power to a computer, the user adds a new graphics card. Sound cards may be added to machines to increase the computers audio input and output connections. Users who want more USB ports can add USB expansion cards and so on. Expansion slots were first seen commercially in 1973, on the Micral N microcomputer, but were standardized by the Altair 8800, which was developed in 1974-75.

Expansion cards are usually installed in PCI slots. PCI slots have a few variations, such as PCI-X and PCI express.

Expansion cards require free slots. All-in-one machines like the Apple's iMac cannot accept expansion cards. In more simple terms, no slot, no expansion card.

## **Export**

The Export command is usually found within a program's File menu. The export command is similar to the Save as... command, which is also located in the File menu. Instead of just saving files with different name or format using the "Save as..." command, "Export" can be used to save parts of a file, create a backup copy of the file, or save a file with customized settings.

The Export command is very situational, hence, it is not available in all programs. Text editors usually don't include the export feature simply because text documents do not (usually) contain specific content to export. The Export command is often used in multimedia programs, such as photo and video editing programs like Adobe Photoshop and the Apple QuickTime Player where users can play around with multiple settings, formats and dimensions.

## **Extranet**

The extranet is an internal network which allows controlled access to other users over the Internet. An extranet can be viewed as an extended intranet which is accessible only to specified users. Extranets can be accessed via the

Internet and certain security protocols need to be followed while accessing an extranet.

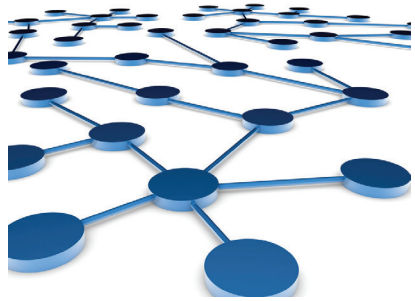
While intranets are used within businesses and companies, extranets are used to share selective information with other businesses or individuals securely over the Internet, without divulging information to the general public.



**F**  
F

## Fabric Computing

Fabric Computing refers to a high performance computer network or fabric consisting of many nodes, which seem like they are interwoven to form one big system. These nodes consist of loosely coupled storage, networking and parallel processing functions.



They have to be linked by interconnects having high bandwidth and good network security to ensure smooth performance and fast communication. While the system may consist of a number of different nodes performing different functions it appears as a single logical unit. Fabric Computing is also sometimes termed as 'grid computing'. A good example is the Windows Azure Services Platform which manages applications and services through a global network of datacenters. Massive concurrent processing is a key feature of fabric computing and the system must be scalable and dynamically configurable to ensure good performance. A major challenge is ensuring security with so many nodes working in parallel.

## Facebook

Who doesn't know Facebook right? In fact because of the movie, everyone even knows about the story of Facebook's inception. To recap: Facebook is a social networking site launched in February 2004 by Mark Zuckerberg and his roommates



Eduardo Saverin, Andrew McCollum, Dustin Moskovitz and Chris Hughes. Registered users can create profiles, upload photos and videos, chat, send messages etc. It was originally created only for Harvard students then gradually grew to include other colleges and finally today anyone over the age of 13. It is available in 37 different languages. The most popular feature is the Wall which is like a virtual bulletin board. Since May 2007 Facebook opened its developer's platform to let third party developers build applications and widgets. Once approved these could be distributed and publically used. Facebook offers a range of privacy

settings to its users, but of course the site keeps getting a lot of flak from privacy advocates from time to time. A little known fact about the Facebook homepage is that before 2007 it contained what most people believed was Al Pacino's – 'the Facebook Guy'. It was actually a musician Peter Wolf.

### Facebook f8

Facebook F8 is a yearly conference event held by Facebook. It takes place in San Francisco California.

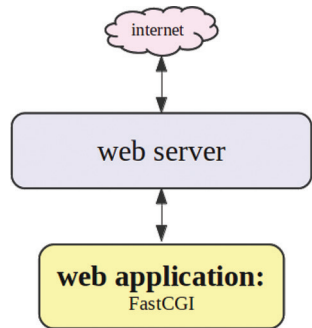
It was started with the purpose of bringing together all the entrepreneurs and developers who are contributing to building the social web.

The social web is an abstract concept which describes social relations that foster social interaction and link people through the web. The highlight of Facebook F8 is the starting keynote speech by Zuckerberg himself followed by discussions on various topics. Just after the event Facebook conducts an eight hour 'hackathon' which is where this event gets the name F8. All new features and announcements from Facebook are made public here for the first time. Similar events have been held by Apple – World Wide Developer's Conference (WWDC) and Google - Google I/O.



### FastCGI

FastCGI is a computing interface that speeds up and improves the performance of Internet applications. It is an improvement on the previous Common Gateway Interface (CGI). It runs applications in processes that are isolated from the core Web server. This also provides greater security as applications that run in the core Web server risk corrupting the entire server along with all of its other applications if infected with a bug. FastCGI is an open standard and libraries and upgrade modules are available for most servers. Since it is independent of server architecture



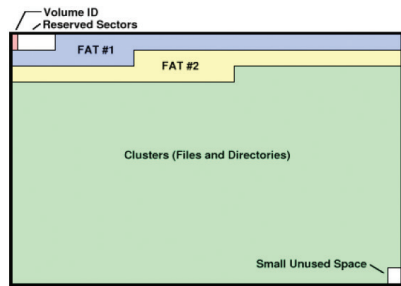


it works even when server technology changes. FastCGI supports Distributed Computing, that is, a user can run a FastCGI application on a different machine not necessarily where the web server is located. This improves scalability, availability and security. Implementing firewalls is easier with these applications. Speed and performance are improved almost 3-30 fold. Servers that currently implement FastCGI are the Apache HTTP Server, Cherokee HTTP Server and Microsoft IIS to name a few.

## FAT32

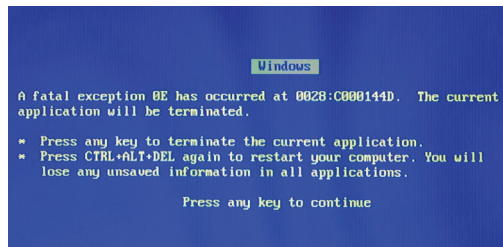
File Allocation Table (FAT) is a computer file system architecture. Before files can be stored on it a computer's disk must be partitioned. The File Allocation Table stores the disk address of each file in the partition. Since FAT32 uses 32 bit storage it is called FAT32. It might be hard to believe not, but FAT 32 was

originally designed for use on floppy disks and later it was adapted to use on hard disks. FAT32 increases the number of bits used to address memory clusters, thus reducing the size of each cluster. A memory cluster is a contiguous area of disk storage. This means that it can support larger disks while having better storage efficiency. Other such file system architectures are FAT16, FAT12, NTFS etc.



## Fatal Error

A Fatal Error, also called a Fatal Exception Error is a type of error that causes the computer system to abort its running state and return the user to the operating system. Data from the program running is usually lost when this occurs. Usually it results in the dreaded 'Blue Screen of Death' (BSOD) on a Windows Machine named after the change of colour of the screen.

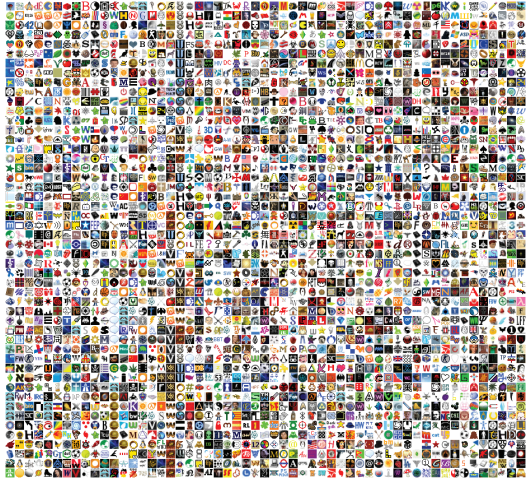


Fatal errors occur when invalid code or data has been accessed, an illegal instruction has been run, or an operation is disallowed from the current CPU cycle or the simplest of them all when a program attempts a divide by zero.

A fatal error usually requires the system to log an error report or system image into the crash dump. This is used for debugging purposes at a later stage by programmers or system administrators.

## Favicon

A Favicon, short for favourite icon is the small(usually 16 pxX 16px) icon you see beside your browser's address bar. Strange as it may sound, Internet Explorer 5 was the first web browser that supported Favicons. This small graphic is associated with a web page. It is also called a web site icon, url icon or a bookmark icon. The favicon is also displayed in tabs next to the site name. Site specific browsers use the favicon as their desktop icon. They can also be used in bookmark lists and feed generators. Favicons are a quick and easy way created by web developers for users to recognize their websites.



While making a favicon it is recommended that developers use Microsoft ICO format as png, gif, jpg formats are not recognised in all browsers. The ICO format is also advantageous as you can have multiple favicons of different sizes in one ICO file. Scaling becomes easy when you drag bookmarks to your desktop. Online tools that generate favicons are freely available for the novice developer. Some developers have done some fantastic work with the old favicon, adding interactivity and even mini-games!

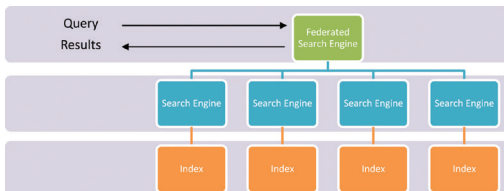
## Federated Search

A Federated Search is a technology that allows users to search multiple resources with a single query. Multiple search engines take part in the

federation for this information retrieval technology. The federating engine sums up the outputs from these search engines and presents it to the user.

There are four steps that go into a Federated search. First: broadcasting the query to the registered group of resources or databases in the appropriate formats required by each one. Second: collecting and merging these results collected. Third: presenting these results in a unified and clear manner with no duplication of results. The fourth and last step is providing a sorting mechanism for the user.

An example of a federated search is a meta search engine. Though a federated search takes more resources in terms of time, it produces a superior level of results.



## FidoNet

It is a network that is used for communication and file transfer between Bulletin Board Systems. A bulletin board system is one that allows users to log on and send messages, files, emails etc through a terminal program on their PCs. They can upload and download software exchange news and bulletins, play games, visit chat rooms and a variety of other things.

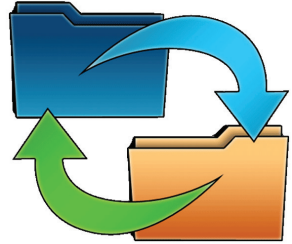
FidoNet connects about thirty thousand of these bulletin boards. It was created in 1984 by Tom Jennings. It consists of a small number of interacting programs, one of which is to be connected to all the bulletin board systems. FidoNet messages are sent using UNIX to UNIX



protocol. FidoNet is completely anti commercial and is run completely by volunteers.

## File Sharing

A.K.A piracy! We're kidding. File sharing has origins in legitimate use. Technically it is the process of sharing digitally stored information, programs, multimedia, documents or books. It may be done over a network or across the internet via file sharing servers. Usually over a network different levels of access privileges are given to different users. In a network the user who owns the file can set read and write privileges to regulate who can modify their files.



Files were initially shared on removable media like CDs, pen drives and floppy disks. Gradually easier methods for file sharing were adopted like file mounting servers, bulletin board systems, FTP servers etc. File sharing has also led to a lot of illegal exchange and piracy is now rampant. Due to this efforts have been made to enforce stringent rules on file sharing applications.

## FileZilla

FileZilla is an FTP software which is free and cross platform. What started off as a computer science class project grew to be one of the best FTP software and was even voted 'Project of the Month' by SourceForge in November 2003. The credit for the development of FileZilla goes to Tim Kosse and two of his classmates. They decided to make it open source as a commercial FTP software would not be profitable and its source code is currently hosted on SourceForge.



There is a FileZilla Client and a FileZilla Server which are sister programs. The Client can connect to any computer which has a valid IP address and an SFTP server regardless of the operating system. The FileZilla GUI is rather difficult for novice users to grasp at first but it fast and effective functioning more than makes up for it.

## Firefox

Until the rise of Google Chrome, Firefox was the browser of choice for anyone who wanted something better than the default IE. Today Firefox is a very popular, free and open source web browser. It works on most operating systems like Windows, OS X, Android, and Linux and is available in 70 different languages. Firefox was developed in September 2002 by a group of volunteer programmers from all over the world. The Mozilla Foundation which developed Firefox is a non profit organization that promotes open source development. On the 17th of June 2008 Mozilla held an event called 'Download Day' during which people were expected to download the latest stable release (Firefox 3.0). Download Day was a huge success and Firefox holds the Guinness World Records for 'the most downloads of a software application in 24 hours'. They also offer a 'bug bounty' which is 3000 dollars in cash and a Mozilla t-shirt for those who discover security flaws in the browser. As per some estimates, it is the third most popular web browser in the world with close to 450 million users worldwide.



## Firewall

Firewall is a system designed to regulate the inbound and outbound traffic from a network. The internet poses the biggest threat and for this reason many operating systems come with built in firewalls for added protection. Many routers also have firewalls with routing capabilities. All packets of data are analyzed and allowed through based on certain predefined rules. Firewalls can be hardware based or software based.



Firewall technologies were created in the 1980s. The term firewall was taken from fire fighting where a firewall was a structure used to prevent a fire from spreading. There are four types of firewall techniques namely Packet Filter, Application Gateway, Circuit Level Gateway and Proxy Server. Usually a combination of two or more of these techniques is used to build a firewall.

## Firmware

The combination of applications and hardware that control how a device works is called its Firmware. This device can be a mobile phone, remote control, watch, most embedded systems. Generally firmware is permanently installed and is rarely changed throughout the device's lifetime. Since firmware lies somewhere between hardware and software it is termed firmware. Most computer peripherals like printers, cameras, scanners are special purpose devices themselves and have firmware stored internally. The firmware is the only program that will run the device. No other program can take over making it somewhat limited in its capabilities. Since it is used only for special purpose devices this is not seen as a major drawback. Sometimes firmware needs to be updated in case of bugs or to add new features.

## Flaming

Flaming is the term given when someone verbally attacks another person online. It may be through the use of profanity, insults, name-calling etc. Flaming usually arises as a difference of opinion about certain topics. These insults are called 'flames'. If a person is a repeat flamer or attacks people daily then he or she is called an 'Internet Troll'. Flame wars are also called 'Pie Fights'.



Some flaming is unintentional and what was meant to be a sarcastic comment may appear as an insult resulting in retaliation and unpleasantness. Usually flaming takes place on discussion forums or bulletin boards. The flame thread or conversation may go on for quite a while depending on how heated the discussion gets. Flame trolling is when someone intentionally posts a provocative or offensive message called 'flame bait' on a discussion group.

## Flash drive

A flash drive is a data storage device used to store and transfer files from one computer to another. A flash drive can be connected to your computer by plugging it into any of the USB ports.



Currently the maximum capacity that a flash drive can store is 1 terabyte (1TB) with a ten year shelf storage time. A flash drive is made up of a small printed circuit board plus the USB connector.

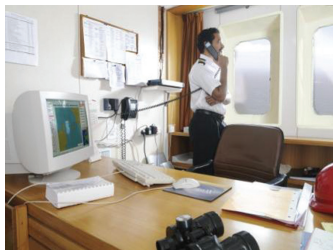
These are then electrically insulated and protected with a plastic or rubber case.

Flash Drive transfer speeds are quite high measured in terms of megabytes per second.

Besides data storage there are a lot of useful things that one can use a flash drive for. You can boot an operating system directly from a flash drive, connect to a wireless device, run portable applications, speed up your system performance and even lock your PC.

### **FleetBroadband**

FleetBroadband is a maritime global communications network developed by Inmarsat for ocean going vessels. It allows continuous global coverage (except for the poles) and Satellite Internet, Telephony, SMS Texting and ISDN. Vessels use domed terminal antennae to access it. They allow the phones and computers of sailors to be connected while at sea. FleetBroadband network consists of three geosynchronous orbiting satellites called I-4. The antennae on the vessels are required to have a direct line of sight to one of these satellites to establish connection.



FleetBroadband is modelled after terrestrial Internet services and works even in rough weather. It is not only cost effective but essential for mariners to communicate while at sea to exchange information, get alerts on dangerous situations, and maybe even to control sailor-less vessels.

### **FLEX (protocol)**

FLEX is a communications protocol used in many pagers. It was developed by Motorola.

FLEX provides one way communication from provider to receiving pager device. There are four modes 1600/2, 3200/2, 3200/4, or 6400/4 in which transmission of message data occurs. All of them use FSK which

is a frequency modulation scheme. Data transfer over FLEX is unencrypted and therefore insecure. The information passed via FLEX can be easily intercepted. FLEX messaging is used by many countries for messaging in case of emergency services. The Netherlands and South Africa are active users.

There is also a protocol called ReFlex which allows two way messaging.

## Footprinting

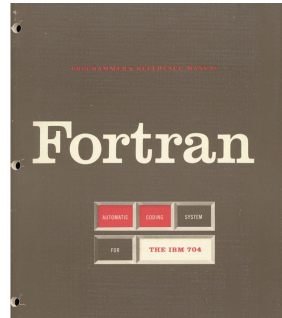
Footprinting is the process of accumulating data about computer systems or network environments. It is usually done to find vulnerabilities and anticipate attack vectors. Various tools and technologies are used such as DNS queries, Port Scanning, World Wide Web spidering. Using these tools relevant information that is necessary for hackers to attack a system, is obtained. Holes in security are detected. It is often the precursor to an attack.

Some describe footprinting as a necessary evil. It has to be done by the organization itself so that weaknesses can be identified and action can be taken to rectify them and make the security impenetrable. Some ready-made tools used for footprinting are Sam Spade and NMap. Sam Spade is a tool used to perform DNS interrogation. NMap is used to create a map of the network by sending out packets to all the nodes.

## FORTRAN

FORTRAN is the oldest high level programming language. It is especially suited to programming scientific and mathematical applications. FORTRAN is an acronym for 'Formula Translator'. It was designed by an IBM engineer John Backus in 1954 and released in 1957. It was introduced as a more practical approach to assembly language and had a significant effect on how future compilers were developed. FORTRAN has influenced many programming

languages like ALGOL 58, C, PL/I, BASIC, Ratfor. FORTRAN is used for computationally intensive applications like organic chemistry, numerical weather prediction, computational fluid dynamics, computational physics, video games, air traffic control systems etc.





John Backus won the 1993 National Academy of Engineering's Charles Stark Draper Prize for the invention of FORTRAN. It is the highest national prize awarded for engineering.

### **Fred Baker**

Fred Baker is an American engineer who specializes in developing computer network protocols for the internet. He is the current Internet Engineering Task Force (IETF) Chair. IETF is the body that develops standards for the internet. He has also served on the Internet Architecture Board and the Internet Society.

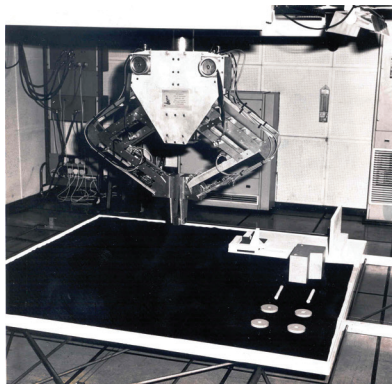
Born in 1952 he attended the New Mexico Institute for Mining and Technology from 1970-1973. He worked at Control Data Corporation (CDC), Vitalink Communications Corporation, and Advanced Computer Communications where he developed various computer network technologies. Later he joined Cisco in 1994 and post 1989 has been actively part of the Internet Engineering Task Force.

Baker has several patents to his name and has co-authored 50 Request for Comments (RFC) documents, while contributing to many others. The topics range from network management, routing protocols to quality of service agreements.

### **Freddy II (robot)**

Freddy II and his predecessor Freddy were experimental robots built at the University of Edinburgh and proposed by Donald Michie. They were built by the Department of Machine Intelligence and Perception as one of the initial attempts at creating artificial intelligence. Freddy had a robotic arm and a binocular vision system.

Freddy was used to assemble wooden objects given a heap of jumbled parts. In about 16 hours it could reassemble a wooden car and boat. What was truly fascinating about this project is that it was easy to reprogram and retrain it. The creation and continuous modification of



Freddy gave rise to RAPT a robot programming language more object based (behaviour was specified at the object level rather than event level). This language is till today considered more advanced than other robot programming languages.

Freddy is currently on display in Edinburgh's Royal Museum.

## Freeware

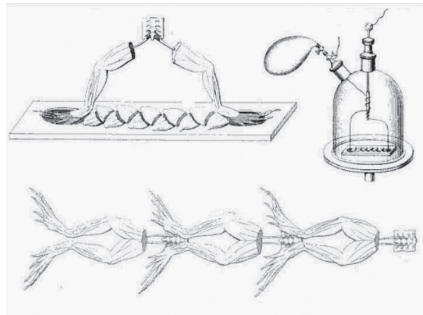
Freeware is given the its name by combining the words 'free' and 'software'. This is exactly what the term means - free software. Examples are Skype and Adobe Reader. Free software does not necessarily mean open source which is why the code is never distributed and always a copyright of the owner. The above examples are closed source but freely distributed software. Usually freeware comes with a few restrictions on usage. This is in contrast to commercial software which once paid for might be used for commercial or business purposes.



The first official freeware was PC Talk, a communications product by Andrew Fluegelman who was also responsible for coming up with the term freeware. Freeware is usually downloaded off the internet. It is different from Adware and Shareware. Adware is freeware that contains advertisements in it and shareware is freeware which is available only for a trial period after which one has to purchase it.

## Frog battery

As gruesome as it sounds, a Frog Battery is a bio battery which is made by connecting a number of dead or sometimes live frogs in series. Frogs' legs are small, easily handled and particularly sensitive to electric current. The response produced by frogs legs lasts considerably



longer than that produced by any other animal. Astonishingly frogs were not the only animals that were subjects of electric experiments. Batteries have also been created out of ox heads, eels, pigeons and rabbits.

The first working frog battery was developed by Carlo Matteucci in 1845. The principle that it works on is the 'injury potential' created by a muscle when it is damaged. This potential is generated by the dissection of the muscles. Matteucci's battery was created using the half thighs of 12-14 frogs and was powerful enough to decompose potassium iodide. A Frog Battery or any Biobattery (muscular pile) for that matter had no practical use except for better understanding electricity in the 18th and 19th centuries and academic demonstrations.

### Front end/Back end

Front End and Back End simply put, are the initial and final stages in a processing cycle. The front end is the part of the application you can see and interact with. It is generally the User Interface of applications. It takes the user input required to run the program. HTML, VB etc are used to write front end programs.

The backend is the complex logic that actually runs the program or application. It usually includes a database where relevant data is worked upon. Microsoft Access and SQL are examples of back ends.

In computer systems a file manager serves as a front end where as the back end is the shell that launches programs of the operating system in response. Sometimes there are a lot of layers in between the front end and the back end which perform mediatory functions and this is called the middleware.

### FruityLoops

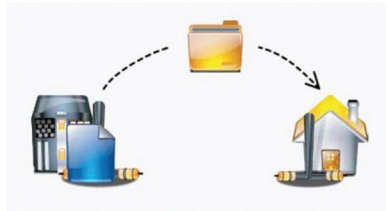
FruityLoops or FL Studio is a software that helps you create electronic music. It was developed by a Belgian company called Image Line. Fruity Loops is essentially a DAW, a Digital Audio Workstation, written in the Delphi programming language. It was developed for Micro-



soft Windows and has a Mobile version for iOS and Android devices. There are four editions depending on your needs – FL Studio Express, Fruity Edition, Producer Edition and Signature Bundle. There is also a Free Demo version that users can use before purchasing one of the above. Audio can be imported or exported to the software in WAV, OGG, MIDI, ZIP or MP3 file formats. The native project format is .FLP (.fruityloops extension). Fruity loops has features such as time stretching, beat slicing, audio editing, audio chopping, pitch shifting and even a digital piano roll. It is actively used in the electronic music industry by DJs such as Afrojack and 9th Wonder.

## FTP

FTP stands for File Transfer Protocol which is a standard for exchange of data and program files across a TCP based network. It is a Transport Layer Protocol and supports two modes of transfer - plaintext and binary.



FTP uses a client-server architecture. The client is the machine that initiates the network connection between itself and the computer it wants to exchange information with. Sometimes a username and password is required but most often public FTP servers set the username to anonymous.

The first specification for the File Transfer Protocol was written in 1976 by Indian IIT grad Abhay Bhushan.

FTP client applications were originally all command line based which made it difficult for most users to operate. Now however there are numerous GUI based FTP applications for all possible platforms like desktops, mobiles, tablets, servers etc.

## Fusker

A fusker is a utility or website that extracts images or videos from a web page. Using a fusker one can get an entire range of images.

The most well-known provider of fusker technology is Fusker.com built with PHP and MySQL.

Server side Fusker software displays the output images or videos extracted in a new page on the client's browser. The new page created on the

client's browser instructs the browser to retrieve each piece of information and display it on a new page causing a lot of bandwidth to be utilized.

Client side Fuser software stores the data locally on the client machine eliminating the need for excessive bandwidth.

The first Fuser technology was created by CarthagTuek. Fuser is a Danish term which means a person who slyly does work outside official guidelines. Some consider Fuser technologies to be extremely unethical as they violate other user's privacy. Entire galleries have been downloaded from media sites without the client's permission.

### Future-proof

Future Proof is a buzzword which means trying to actively anticipate future events and developments so as to secure the products and services developed presently. It ensures



creation of systems that will require minimal updating and versioning as time progresses. Usually technology follows a regular cycle of replacing and updating. Future proofing promises consistency and that technologies do not become obsolete as they become older.

Take for example electronic data storage years ago. Future proofing would have been selection of VHS tapes rather than Betamax tapes, as VHS players are readily available even now where as Betamax players are not.

Some say future proofing is a waste of energy as change is inevitable and the whole point of technology is to make advancements. However, future proofing is very important as far as loss of data is concerned. This is the reason open standards and formats are the preferred choice to closed proprietary formats.

### Fedora

Fedora is a Linux-based operating system. It is an open source, secure and general purpose operating system. Sponsored by RedHat it was developed under the Fedora project in 2003.

The Fedora Project distributes Fedora in many ways. There are the usual methods of Live CDs, DVDs, Flash Drives and image files but there is also a variation called 'Fedora Spins'. 'Fedora Spins' are de-

veloped to meet specific end user requirements. They are built from a specialized set of software packages. The Fedora OS comes with pre-installed software like LibreOffice, browsers like Firefox and instant messaging services like Empathy. The package manager can be used to install additional software based on user requirements. Fedora also has superior security support compared to its other Linux OS counterparts. It also has iPhone and iTouch support which other Linux operating systems are still struggling with.



Gg

Gg

## Game Theory

Remember that scientist in the movie *A Beautiful Mind*? The biopic is based on the life of John Nash and his concept of GameTheory. Game theory is the mathematical modelling of real world problems that require strategic thinking. It assumes that the players of the game are purely rational and models the problem in a strategic manner. Apart from being used in common games such as Tic-Tac-Toe and Chess, it is also used to model problems such as conflicts between nations, 3G spectrum bidding, political campaigns, stock trading and competitive modelling. Think about winning an eBay auction or say forming a military troop deployment strategy and game theory will give you the answer. Game theory has a wide variety of real world applications besides facilitating negotiations among nations; it is also used in Cryptography and Game Programming. The theory uses Nash Equilibrium as the basis for modelling.



## Gamification

Gamification is a process of integrating real-life activities with games for commercial or social benefits. An example is you brushing your teeth for a longer time as part of a game mission - the beneficiary here may be the toothpaste company due to your increased consumption of its toothpaste or just you, keeping your teeth healthy. It could also involve





giving you shopping credits for running for say, an hour to lure you into stores or just normal credits to encourage you to stay healthy. It could incorporate a trip to public libraries with a game or make taking care of a street dog to earn credits a part of a game. Today, Gamification is a field of study and research, and an increasing number of companies and NGOs are realizing the benefits of integrating core game design elements into daily activities. Business organizations use it every day to increase employee motivation and customer engagement as well as for training. For instance, the team at Microsoft Office released a game called 'Ribbon Hero' to teach MS Office users how to use the ribbon interface.

### Gamma Rays

Discovered by French Physicist Henri Becquerel, Gamma Rays are one of the highest energy components of the electromagnetic spectrum with energies ranging up to 100 keV. They have extremely high frequencies of about  $10^{19}$  Hertz.

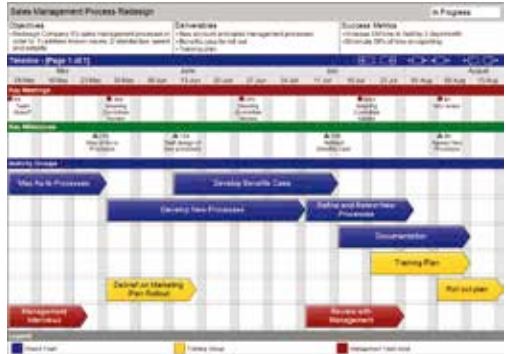


Gamma radiation originates from radioactive substances when the nucleus of a radioactive substance such as Cobalt-60 goes from a higher excited state to a lower excited state. In real world, gamma rays have various applications including inspection of casting and welds and treatment of brain tumors using 'Gamma Knife'. Though they bear very high energies, gamma rays can be stopped using material like lead. Gamma rays have a phenomenon associated with them in the outside universe called Gamma Ray Bursts. These are powerful explosions that occur in outer space with unknown origin or cause. Various missions to specifically monitor gamma ray distribution in outer space have been launched by NASA. These include SWIFT, a mission dedicated to answering questions related to Gamma Ray Bursts and Fermi gamma-ray space telescope (FGST), a space observatory that images Gamma Ray distributions to map the Milky Way Galaxy.

### Gantt Chart

Introduced by Henry Gantt in around 1910, Gantt Chart is a widely used graphic representation of project schedules by various individuals and organizations. It's basically a bar chart that is prepared to aid project

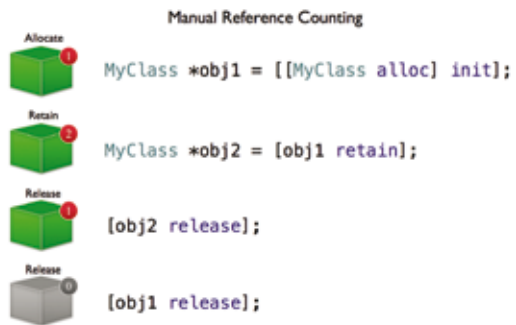
scheduling and resource allocation in the projects for resources such as cost, labor, machines etc. Gantt charts are commonly used for work breakdown structure where the bar length represents the tasks duration and is therefore a great tool for



comparing task durations and allocating resources alongside. It was first used during World War I to plan a ship building project. Later it was used in planning major infrastructure projects undertaken by governments. One of its few disadvantages includes its inability to visualize dependencies very well. Programs such as Microsoft Excel and PowerPoint help you quickly prepare Gantt charts. Of late, web-based, graphical drag-and-drop interface based tools such as Gantt Chart Creator have become popular. Upcoming project management software such as Hansoft keeps adding features to make Gantt charts more efficient and easy to maintain.

### Garbage Collection

In computer science terms, Garbage Collection is a technique of automatic memory management. A garbage collector program performs the function of trashing the objects that are no longer used by the application and thus freeing up memory. It was invented by John McCarthy in 1959 and has potentially evolved since then. Garbage collection identifies objects that are not needed in the future and reclaims the resources occupied by these objects. By doing this, it reduces bugs related



to dangling pointers and reference counting. The basis of garbage collection lies in automatic reference counting (ARC) where each object maintains a count of number of references to itself. A reference count of zero makes an object treatable as garbage. Objective C uses automatic reference counting where the burden of maintaining reference counts is given entirely to the compiler. With ARC-enabled projects, developers can just focus on their main work of writing the application code while memory management is taken care of by ARC.

## Gears of War

*Gears of War* is a best-selling third person shooter video game series owned by Epic Games and published by Microsoft Studios. The four games in the series include *Gears of War*, *Gears of War II* and *Gears of War III* and *Gears of War:*



*Judgment*. The game takes place on an earth-like planet called Sera and is based on a war between humans and fictional creatures called Locust Horde. Though the game has been a huge commercial success with the series crossing the target sales of 19 million copies in 2012, it has been heavily criticized for its violence. Scottish Police even blamed the game for increased instances of throat slashes in their area. Epic Games also announced a spin-off series called *Gears of War: Exile* which was later discontinued. Epic Games, in collaboration with Del Rey Books, published a five-volume 'Gears of War' book series authored by Karen Traviss. Epic Games also collaborated with DC Comics for the comic book series 'Gears of War: Hollow' in 2008. A board game based on the game was also released by Fantasy Flight Games. A film about the game was planned and it recently got a new producer Scott Stuber on board.

## Genetic Engineering

Genetic Engineering is a field of engineering that involves manipulating the genomes of organisms, plants and animals using biotechnology to achieve desired behaviours and features. It involves altering the DNA

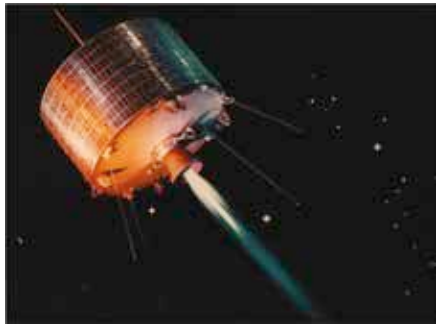
structures or synthesizing artificial DNA and then inserting it into the host that is being genetically engineered. Organisms that are generated using this technique are called genetically modified organisms (GMOs). The first GMO was



created way back in 1973. Since then, genetic engineering has been evolving rapidly. We're now in a world where it's possible for scientists to genetically engineer a pig to grow human organs that can later be used for transplants. Almost 70% of the food available at your favorite grocery store has at least one genetically modified ingredient. The goal behind growing genetically modified crop is to ensure greater immunity to pests, better yield and reduction in environmental changes. Genetic engineering also has major applications in medicine. Today, we can re-grow human body parts, prevent genetic disorders and produce artificial insulin. The method has raised much ethical concern about whether it is natural and right to alter genomes of crops, animals etc. Health concerns regarding side-effects of eating GM foods have also been discussed over the recent years.

## Geosynchronous Satellites

Geostationary satellites are the cool man-made satellites in the universe whose period of rotation is precisely synced to the rotation of the earth around its own axis. This means that they remain at the exact same spot over Earth at all times despite our planet's rotation. These satellites orbit the earth at a distance of 22,300 miles, which is the exact distance at which satellites can stay stable due to balanced forces, and have a rotation period of 24 hours. The origin of geosynchronous satellites dates back



to 1945, when a science fiction writer Arthur C. Clarke discussed their orbits and applications. Later in 1961, NASA launched Syncom I, the first geosynchronous satellite which unfortunately was a failed mission. Finally, five months later NASA launched Syncom II, which became the first geosynchronous satellite to stably orbit Earth. This revolutionized many fields including broadcasting, forecasting technology etc. It was the first satellite to transmit live footage of the 1964 Olympic Games held in Tokyo.

## Geotagging

Geotagging is the process of adding geographical and locational metadata such as longitude, latitude and/or altitude to different media such as photos, videos and blogs. Applications such as EveryTrail.com and Google Earth help you geotag your photos, which can be automatically geotagged by



your camera (if it has a built-in GPS receiver) or your smartphone (also geotags videos). Facebook and Foursquare are two awesome examples of geotagging apps. As per the Facebook Engineering page, it took some serious work to allow users to geotag status updates, pictures etc. without being connected to a GPS-enabled device. Recently, geotagging has led to privacy breach issues as address information can be easily found from photo sharing and video sharing sites. Almost every smartphone and camera now has an automatic geotagging feature which is set to operate in default settings and you should explicitly state if you need to disable it.

## Gesture-based Computing

Gesture-based computing is the use of human gestures to interact and interface with devices. It's a field of computing that encompasses computer graphics, image processing, video processing and complex mathematical algorithms. Gesture-based computing is becoming increasingly popular in a variety of applications – be it playing games using just your body or

shopping for dresses by just waving your hands in Microsoft Kinect, different devices use different gestures. Products such as iPhone and iPad employ actions like touch, swipe, multiple finger touches and tilt. Devices such as PS Vita recognize even when you blow air from



your mouth. And then there are devices such as Kinect where you're the controller. Gesture-based computing offers more intuitive controls for applications that were complicated to perform in the pre-gesture computing era. Heat, advanced cameras and motion sensors make it possible to detect even the slightest movements in the human body. Common application areas of gesture-based computing include games, medicine and training simulations.

## Ghostscript

Ghostscript is a generic term for a software that is used to interpret PostScript language and the PDF format. It is a set of procedures written in a programming language that allow interpretation of graphics and provide a wide variety of output drivers. As its basic function is language interpretation, it can be used as programming environment also. Different versions of Ghostscript exist and it is ported for almost all systems such as UNIX, Windows and Mac OS. Ghostscript was first written by Peter Deutsch in 1986 for a GNU project. Artifex Software maintains the original GNU ghostscript software and it is distributed under the GPL license. Ghostscript can also be used as a file converter for converting files from Postscript to PDF and vice-versa. It finds usage as a raster image processor for printers as well. Several programs such as GhostView and



PDF Blender were written as a front-end to run ghostscript although the command line. Some common commands to run this software are gs for UNIX and gsWin32 for Windows.

## GIMP

GIMP is a popular free opensource image-editing program available for all popular operating systems including OS X, Linux and Mac. GIMP was originally released as General Image Manipulation Program by its developers, Spencer Kimball and Peter Mattis. They were developing GIMP as part of their project at University of California, Berkeley in 1995. The first public version was released in 1996 after which GIMP became a part of the GNU project and was renamed to GNU Image Manipulation Program. Currently, GIMP is under GPL version 3 license. GIMP has almost all major features needed for an image-editing program including animation plug-ins and is often compared to Photoshop. Currently, it is being developed and maintained by a group of volunteers and participates in Google Summer of Code every year. In contrast to other open source software, GIMP has a commercial angle to it. Wilberworks.com was founded so that GIMP developers could have certain income for the plug-ins they develop but the company ceased to exist shortly after its



formation. Wilber is the mascot of GIMP and is also an amazing racer in an open source racing game SuperTuxKart.

## GitHub

If you're a contributor to an open source project or part of a software firm that builds its own product you'll know how essential Git and GitHub are for the purpose of sharing, tracking changes



and maintaining the code you write. As of date, around three million developers use GitHub to build their projects and share and collaborate with people online for development. At the core of GitHub is Git, which is a code version control system started as a project by Linux creator Linus Torvalds. Though used for code mostly, Git can also find usage in maintaining versions of documents. GitHub was originally founded by TomPreston-Werner, Chris Wamstrath and PJ Hyett and was launched in April 2008. Today, it has become one of the largest code hosts in the world with only a few competitors such as BitBucket in its domain. GitHub provides a GUI for Git which was originally command line. Even today, developers prefer using command line Git commands for certain purposes. The power of GitHub lies in its awesome features of forking, merging and performing pull requests. It also aids in collaboration with the help of Wikis. Along with public repositories where they get all the love from, GitHub provides an option to software companies to host their code on GitHub in a private repository. This is where the companies generate money from. GitHub has become a library of code in the form of public repositories for beginner programmers as they can learn about developing software from scratch by browsing the earliest versions of the project on GitHub.

## Glass (Google)

Glass is an awesome addition to the field of wearable computers. It's a head-mounted display based device designed as a glass that has capabilities of processing voice commands and performing smartphone-like



applications hands-free. The product was being developed at Google X Lab, Google's secret lab hosting its major future technology researches. Being tested



since April 2012, Google Glass was finally made available for developers and general public as a part of a Glass Explorer Program that called for creative people to tweet about what they would do if they owned Google Glass. It has some amazing features such as voice commands for taking pictures and videos hands-free, live video stream sharing, translation of your own voice on the fly, etc. Google also released the API for Glass in April 2013 to allow developers to program apps for Glass. These apps are called Glassware. Obviously, Glass integrates all major Google services such as Google NOW, Google Translate, Google+ etc. It's based on Android and has a 5-megapixel camera. Though early testers are warming up to it and it is one of the most anticipated gadgets, Glass has been criticized for certain hardware and software limitations such as battery life, inability to customize settings, camera resolution and bugs in the voice command system.

## GNU-GPL

In 1984, Richard Stallman thought of creating a piece of software that could be adapted and distributed freely without the hassles of proprietary licensing. Leading this revolution, he founded Free Software Foundation (FSF) in 1985 to support his own GNU (as opposed to UNIX's GNU) project and other similar free software. The organization also aimed at drafting and releasing licenses that could aid and protect such free distribution. In 1989, the first version of GPL (General Public License) was released; it was later revised in 1991 and 2007 as GPL Version 2 and 3, respectively. Of these, GNU-GPL Version 2 is the most popular open source license, currently being



used by more than 70% of the open source projects. Both, Drupal and Joomla use GPL licensing. The main feature of a GPL license is that the contributor retains the copyright on the software but grants the right to modify and distribute the software to the licensee, subject to conditions. One major condition is that the licensee cannot redistribute the modified work except under the terms of the GPL license. This practice of requiring the same rights to be preserved in modified versions of the software is called copyleft.

## God of War

*God of War* is a bestselling and critically acclaimed adventure video game series based on the ancient Greek mythology that focuses on revenge. It's a tale of vengeance where the player controls Kratos, a Spartan warrior and the main protagonist who is assigned the task of killing Ares, the God of War. The first title



of series debuted in 2005 exclusively for Sony PlayStation and was followed by *God of War II* and *III* and finally the prequel to the series *God of War: Ascension*. There were several other titles in the series for platforms other than PlayStation. The game was very well received and many of the titles won 'Game of Year' awards. Following the success of the game, the novel *God of War*, published by Del Rey Books was released on May 25, 2010. A film adaptation was also announced in 2005 which is still not released. Two documentaries were also released in 2010. *God of War: Unearthing the Legend* and *God of War: Game Directors Love*. Both discuss the franchise and its development.

## Google

Google hardly needs any introduction. Want to learn how to...well, do anything? Google it. It's one of the few companies that's also used as a verb. Google.com is the most com-



mon site to open to check whether our internet connections are working fine. Founded by Stanford PhD students, Larry Page and Sergey Brin, it's the company that brought you all the awesome products such as Drive, Adwords, Analytics, Google News, Maps, Google Earth, Google Translate, Google Chrome, Chrome OS, Gmail and, of course, the one-stop solution to all your queries, the Google search engine. Not only does Google have an amazing set of products and services, it's one of the few companies to have employee benefits even after death. If a US Google employee dies, their spouse will receive a cheque for 50% of their salary every year for the next 10 years. Google is currently working on an array of future tech projects such as Glass, self-driving cars such as in *The Dark Knight Rises* and space elevators. Google also owns and maintains the ever popular Android OS. This search engine giant is headquartered at Mountain View, California and is busy making products that truly change our lives. It makes us laugh on April Fool's Day by perpetrating hoaxes such as its decision to shut down YouTube and makes us smile every day with a new Google Doodle reminding us of events and great people.

### Google Chrome

Google Chrome is one of the fastest web browsers around. It uses the WebKit layout engine which is also used by Safari. Google Chrome was released in 2008 and since then statistics reveal that it's the most used web browser in the world. In



December 2008, Google began an open source project called Chromium from which Chrome gets its source code. Chrome comes loaded with nifty features including automatic translation of web pages, strong privacy and security and ultra-fast speed. In 2009, Google launched the Chrome Experiments project which showcases experiments and artistic stuff people do with the browser and open source technologies. In 2011, Chrome Web Store came along and allowed users to install web applications such as games and apps as extensions to the browser. As a developer, you can release your app for free or at a price in Chrome Web Store. Apart for the mentioned features, Chrome has a very intuitive interface and is designed to be extremely user friendly.

## Google Earth

Google Earth is a software that projects a 3D virtual globe of the earth that displays map details and geographical information to users. It was originally created by a CIA-funded company called KeyHole Inc., which was acquired by Google later in 2004.



Before it was changed to Google

Earth, it was called EarthViewer 3D. Previously Earth was a computer application and was later released as a webplug-in also and in 2008, a mobile version was released on iOS and Android. Earth serves as an innovative tool for tracking disasters such as earthquakes and tsunamis and immediately spreading news about which areas are most affected, among other functions. There's also a high educational value to this tool; teachers use Google Earth to teach about geography and structure of the earth. The high quality 3D maps that Google Earth displays makes just about everyone want to waste hours in the program, exploring the corners of the earth. As updates, later versions got a 'Flight Simulator' and 'Street View', which provided very neat 360-degree panoramic views of important streets. Another update was 'Google Sky', where you could look at stars, nebulae and other space bodies. In 2009, 'Google Ocean' gave users the power to virtually go deep sea diving and explore the vast blue oceans!

## Google Summer of Code

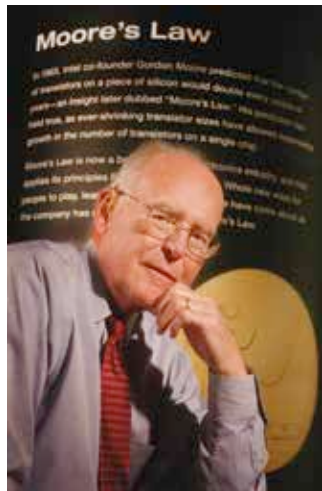
Google Summer of Code (GSOC) is a yearly global program run by Google to support various open source projects by integrating organizations/groups and post-secondary students of ages 18+ into a structured program. Every year, various organizations apply for GSOC and finally Google selects a list of projects that are floated on its



website. Students can then choose the project they wish to work on and submit their proposals accordingly. Accepted students are then assigned mentors from respective organizations and are given a set of tasks to be completed within three months of summer. Students who successfully complete the assigned project and pass the evaluation are awarded a certificate and a stipend of \$5,000. GSOC is also open to students from a non-computer related background. The program began in 2005 and since then has seen increased participation every year with over 6,000 successful students and over 3,000 mentors from different parts of the world. By this initiative of Google, open source projects gain a lot of momentum and active contributors. Interestingly, if you wish to make GSOC project a part of your college project evaluation, Google would help you get the required documents.

### Gordon Moore

He is one of the most important personalities in the history of electronics. It was Moore who predicted that the number of transistors on a chip would double every two years – a theory commonly known as ‘Moore’s Law’ that you probably remember studying in school. He is one of the founders of Intel and had been directing the organization since its inception in 1968. Presently, Moore is the Chairman Emeritus of Intel Corporation, before which he was the Chairman and Chief Executive for around nine years till 1987 after he served as President and Vice-President of Intel since its inception. Before starting Intel, Moore worked at the Shockley Semiconductor Laboratory, owned and run by William Shockley, the co-inventor of transistors. Moore along with seven other colleagues, who were part of a talented team that Shockley formed to do mass production of transistors, left the organization due to some conflicts with Shockley and went on to found Fairchild Semiconductor Corporation. Later these eight came to be known as the “Traitorous Eight”. Some even call them “Fair Children”.



## GPS

GPS or Global Positioning System is a satellite communication based system that allows tracking of time and location on earth at any time and at any location where the line of sight intersects at least 3-4 GPS satellites. GPS was first developed by the United States Department of Defence in 1973 and used about 24 satellites back then. With the passage of time, GPS is now integrated in almost all mobile devices, smartphones and tablets. There are tons of navigation apps for iOS and Android, and Google Maps is a valuable service integrated in Android. GPS is free to use for anyone who owns a GPS receiver. Due to the privacy issues that arise out of the precise location and time tracking, the export of GPS receivers is controlled by the government. Today GPS is used for a variety of applications including navigation assistance in automobiles and aircraft, augmented reality games and in the military. Recently, via the GPS system, Mount Everest was found to be getting taller!



## GPU

GPU or Graphics Processing Unit is a computing device capable of performing very high amounts of parallel processing and is majorly used for graphics rendering. Although, with leaps in technology, GPUs have evolved from being just graphics processors to more sophisticated processors that can be used for various other scientific applications including parallel data processing, machine learning, advanced game development and medical imaging. CPU and GPU when combined provide immense computing power as the CPU caters to serial processing while GPU caters to graphic and parallel processing. The term 'GPU computing' was coined to describe the use of the CPU+GPU combination to enhance computing power and was initially pioneered



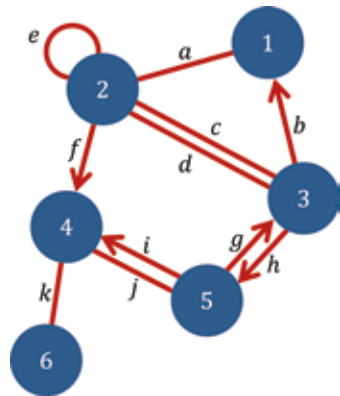
by Nvidia. A large number of supercomputers in the world today rely on GPU computing for advanced scientific calculations. Today GPUs are used everywhere, right from mobile phones to game consoles such as Xbox and PlayStation. Tesla, Quadro and GeForce are some popular GPUs manufactured by Nvidia.

## Graph Search

Graph Search is a search feature introduced by Facebook in March 2013. It is described as more of a semantic search based on natural language queries rather than keywords. The Graph Search powers itself with the big data acquired by Facebook since its launch and is being released to a select set of Facebook users as part of the beta program. It lets you search for queries about pages your friends like, films they've seen, places they've been to, restaurants nearby etc. Graph Search searches in public posts, people, pages, Events, Applications, Groups, Places, Check-Ins, Tags etc. The search results depend on the content shared by friends and content shared to public and thus each person sees different results for a particular search query. The algorithms scan the data available in a user's network and show relevant results based on intended meaning. The feature was developed under the guidance of ex-Google employees Lars Rasmussen and Tom Stocky. The maximum length for a search query is 122 characters right now, however Facebook has a long to-do list for graph search and we can expect more. Though a lot of early users have raised privacy concerns, Facebook maintains that Graph Search only shows the data already accessible to a user and the feature merely presents it in a more readable format.

## Graph Theory

Graph Theory is the study of graphs and problems that can be solved using graph algorithms. Graphs are an essential part of data interpretation in real life. They display a pair-wise comparison between objects. Simple things such as linking of web pages, linking of pilgrimages on India's map etc can be easily represented. In computer science, graphs are used to represent communication flow, net-



works and flow of data. The graphs studied in graph theory shouldn't be confused with the graphs of functions or other kinds of graphs. The origin of Graph Theory dates back to 1736 where it was first mentioned in mathematician Leonhard Euler's paper "Seven bridges of Konigsberg". Since then it has been used to model and solve a variety of problems such as the Four Color problem, routing problems (such as Hamiltonian Path), Travelling Salesman problem and network flow problems (such as Max-Flow Min-Cut problem). Graph Theory is also used for solving resource allocation and task scheduling in operating systems. The theory is usually part of a curriculum for postgraduate Computer Science students and is a dedicated study of the above problems and major graph algorithms.

### Green Technology

Green Technology is about techniques that support sustainable and eco-friendly use of technology. It aims at manufacturing electronics that use the least amount of hazardous substances and generating renewable green sources of energy, such as harnessing solar power. Companies such as Wipro have brought out energy efficient Green PCs that are 100% recyclable and biodegradable. With better eco-friendly design of data centers and virtual servers, companies are trying to contribute their bit to green computing. Green Technology aims at reducing usage of energy, reducing emission of greenhouse gases, better recycling of electronics and responsible dumping of factory waste. Companies are even working towards green architecture that promotes use of renewable resources. The green technology initiative is driven by rules and regulations posed by the government by providing incentives for development of green technology and increased costs of non-renewable energy sources.

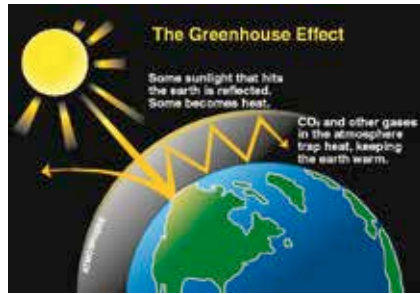


### Greenhouse Effect

When sunlight enters the surface of the earth, part of it is absorbed by various surfaces on earth and part of it is reflected back. Certain surfaces radiate thermal energy/heat back into the atmosphere. This radiated



heat, absorbed by some atmospheric gases, is re-radiated into the lower atmosphere. Such gases are called greenhouse gases and the phenomenon is called Greenhouse Effect. This natural process leads to warming up the earth's atmosphere and



is necessary for life on the planet to exist. Though the existence of the phenomenon was discussed in the early 1800s, its negative impact has been realized only more recently. The effect has intensified over the years - primarily due to human activities such as burning fossil fuels and deforestation. Since the concentration of these gases is increasing rapidly in the atmosphere it is contributing heavily to global warming and climate change. Water vapour, carbon dioxide and methane are a few greenhouse gases that are abundant in the earth's atmosphere. These gases vary in their global warming potential (GWP) which is the relative amount of heat absorbed by a particular gas. With increasing negative effects of global warming, the concepts of measuring greenhouse footprint and greenhouse debt have been introduced by certain organizations. These measure the amount of greenhouse gas emissions by a particular nation/organization.

## Grid Computing

Grid Computing is a field of computing that involves amalgamating hardware and software resources at different locations using standard and open protocols so as to achieve high power of computing, security and reliability. Grid-



based systems don't require centralized control and efficiently decrease response time. Grid computing can be done in various forms so as to achieve corresponding results. Problems that need more than

one system to be solved such as climate modelling can count on the distributed nature of grid computing. Problems that involve data intensive calculations such as mapping can also be solved using grid computing. Since solutions to cryptographic ciphers need high computational power, they're another great application for grid. Grid-based systems can also be used at places where there's a short-term requirement of certain resources that a system is unable to meet locally. Usually grid systems are formed by groups called grid communities. A public grid enables general public to use computational resources, while a private grid gives access to only group members.

## GTA

*GTA* or *Grand Theft Auto* is an open world videogame series developed by Rockstar North and published by Rockstar Games. The series has been critically acclaimed and is one of the most acclaimed franchises globally. The game debuted in 1997 and since then *GTA II*, *III*



and *IV* have been released and *GTA V* is in development phase. The game is set in an open world setting in cities of America. A typical gameplay session of *GTA* consists of roaming around the city on foot or in vehicles and completing missions by going to specific locations in the game world. *GTA* led the revolution of urban setting open world games in videogame development and many *GTA* clones soon sprang up around the world. Though the game did amazingly well in terms of sales numbers, it was condemned by lawyers, parents and NGOs for glamorizing violence. Since the game is an openworld setting, players are free to kick and kill characters in the game for absolutely no reason. This put *GTA* on the map for being included in the Guinness Book of World Records as “the most controversial video game series in history”.

## GUI

GUI or Graphical User Interface is an interface that allows interaction with a device using images and other graphical elements. A responsive, user-friendly GUI is essential for software to be usable



by a variety of users. Designing well-knit graphical user interfaces is crucial to applications such as Facebook, Twitter etc. The GUI must also be very simple and minimalistic for machines such as ATMs, auto-ticketing machines and use touch/gesture based devices. Applications such as games need very compelling and graphically intensive interfaces. Back in 1981, the first GUI-centric computer operating model, Xerox 8010 was introduced. Since then operating systems have been competing with each other for having the smoothest GUI. There have been attempts at creating 3D GUIs that lets you create breathtaking 3D desktop UIs for various operating systems. Project Glass is a good example of this. Graphical User Interfaces have made our lives easier, expert users still prefer using command-line interfaces. Because of this demand, there's software such as Git that provide both, command line and GUI capabilities.



H H

## Hashing

Hashing is a set of algorithms and methods that allow mapping of a set of varied length characters or strings to fixed length characters or integers. Hashing is essential to maintain data security and privacy in many circumstances. For example, consider the social apps you use from your smartphone. These apps try to access your contact list to find people who are already on that social app. Instead of uploading plain text contact details to their servers which leads to a privacy breach, these apps hash the contact numbers and emails using hash keys only known to the app developers. These hashed contacts can then be compared to a user database of the app to find people you may know. This is just one application of hashing. Hashing is also used widely in Cryptography where a cryptographic hash function is used. This is used for password verification on various websites. Although hashing is prominently used on client-side, hackers can still break the hash codes and gain access to information however those are rare cases.

## Hacking

Hacking is the process of seeking and exploiting weaknesses and loopholes in a computer system with either good intentions or bad. If it's for a sinister purpose, it's called a cyber-crime while if it's for a good reason it's called Ethical Hacking. Computer pro-



grammers often use ethical hacking to test the reliability and security of existing systems. However, certain groups of hackers perform malicious activities to gain access to personal and crucial information such as bank details. They're called Black Hat Hackers. Hacking can be done by Denial of Service (DoS) attacks and inclusion of other malware. There are hacker conventions and magazines that focus on security and privacy of networks. Despite their socially sound intentions, hacker groups such as Anonymous indulge in computer crimes. Such groups are known as hacktivists. Kevin Mitnick and Kevin Poulsen are two of the many fa-

mous hackers who've served jail terms for the cyber-crime. These days, hacking is a field of study as part of network security courses and is taught in many reputed universities.

## Hadoop

Hadoop is a Java-based framework that runs on Apache and was created by Doug Cutting, Chairman of Apache



Software Foundation. It was inspired by certain Google patents including Google's MapReduce. In today's world where about 80% of data is unstructured, frameworks such as Hadoop are pure bliss. The idea of hadoop came by when the World Wide Web was generating enormous amounts of data and computational systems were incapable of handling, storing and processing such large volumes of data on the fly. Since then, all major web organizations such as Google, Yahoo and IBM have been using it for their search engine and other computational needs. Hadoop enables parallel processing of data across servers that can both, store and process data and can scale without any limits. Thus, with Hadoop, there's hardly anything like Big Data. Hadoop is open source so the framework can be used by open source developers and provides a scalable, cost effective and fault tolerant system.

## Half-Life

*Half-Life* was the first game made by Valve Corporation, now one of the most successful game development studios that's responsible for bringing out games such as *Counter-Strike* and *Portal* and products such as Steam. *Half-Life* used id Software's Quake engine that was a big hit at the time the game was released; even *Half-Life* had a huge following and generated huge revenues. The concept of *Half-Life*, as conceived by the designers



at Valve, was considered to be quite ambitious for a new game studio and had plenty of difficulty finding a publisher that would pre-fund the game. At last, Sierra Studios published *Half-Life* which went on to get highly positive reviews. Counter-Strike, one of the most played first-person shooter games of all time, was a mod of *Half-Life*. Other mods of *Half-Life* include *Team Fortress Classic (TFC)* and *Deathmatch Classic (DMC)*. In 2004, *Half-Life 2* was released and it also received positive reviews.

## Halo

*Halo* is Microsoft Xbox's flagship product and is one of the top-grossing video games of all time. The Halo franchise raked in a total revenue of \$3 billion by the end of 2012 with more games in the offing. The

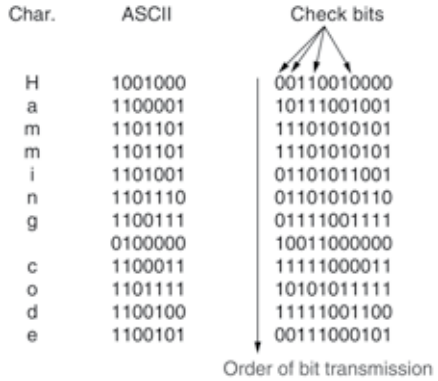


game has been a favourite of almost every hardcore gamer and stands as a benchmark in terms of quality of design, art and technology. There are eight games in the *Halo* series, the last one being *Halo 4* released in 2012 and the first one *Halo: Combat Evolved* that was released in 2001 by Bungie Software, which was founded by a bunch of undergraduates. An interesting fact is that *Halo* was originally targeted at the Mac OS and Windows OS. But the story and gameplay were so compelling that Microsoft poached Bungie Software and made *Halo* a Windows-only game. In 2012, Bungie had some differences with Microsoft and left it to work independently on a new game, which left Microsoft with all the rights to *Halo*.

## Hamming Code

Hamming Codes are named after Richard Hamming who understood the importance of detecting and correcting errors in transmission of data quite early in 1940's. His search for such a mechanism led to Hamming Codes. Hamming codes are a set of binary codes that can correct errors

during data transmission by using more than one parity bit. They're majorly used in telecommunication where the receiver can employ Hamming codes to eliminate noise bits in the signals transmitted by the sending station. They've also found application in data compression and for solving the famous puzzle, The Hat Game. The Hamming code algorithm uses a generator matrix that generates the code and a check matrix that is used for error correction. There have been some modifications to the originally proposed Hamming codes algorithm. These include q-ary hamming codes, perfect-1 error correcting code and extended binary hamming codes.



### Hansoft

Hansoft is a popular project management and collaboration software solution developed by Hansoft, a Swedish-based



firm. It's a team management and collaboration tool which has become increasingly popular in creative industries such as Game Development and technical areas such as aerospace, electronics and telecom. It has a wide feature-set supporting agile development, program management and has highly social collaborative tools. Hansoft is available for both, Windows and Mac. It has a free two person license which allows people to try out the software. For enterprise solutions, it can be used by organizations of all sizes for project scheduling, reporting, portfolio analysis, bug tracking and document/asset management. Hansoft also provides a start-up license of 8-10 users which can be availed by requesting the key through email. So if you're a start-up and are looking forward to channelise your project management and workflow, Hansoft is a very elegant solution for you! Today, Hansoft is used by industry giants such as id Software and Capcom.



## HardDiskDrive

If you love playing games, watching movies and maintaining a collection of your favourite data, there's a good chance that you may be owning an External Hard Disk Drive or HDD. Introduced by IBM in 1956, a hard disk drive is a storage device used to store digital information that can be accessed quickly. Hard disks back in those days were really big in size and very costly. Over time, the size has reduced and prices have gone down. Hard disk drives can be connected to computers through SATA cables or, in case of external HDDs, through USB cables. Consumer Hard disks store data from about 60 GB to 4 TB and are found in many devices including PCs and laptops. These days you can buy external hard disks online from all major electronics e-retailers including eBay and Flipkart to backup your data. At times, you can encounter hard disk drive failure due to factors such as bad sectors and overheating which may lead to complete loss of data. Often it's possible to retrieve data by consulting experts.



## Hashtag#

If you use Twitter, Instagram or Google+, you probably realize the power of Hashtags today. A hashtag is any phrase or word prefixed with the symbol #. It's used as a metadata tag by many microblogging sites including Twitter, Instagram and Google+. Tweeters, for instance, hashtag their posts so that when other users search for the term in that tag, all tweets that contain that hashtag are shown on a search results page at once. Originally used by IRC channels for grouping discussions and people, hashtags were adopted by Twitter to tag topics of interest. Since then, they've become extremely powerful tools for advertising as well as discussion. If many tweeters use a particular hashtag, it becomes a trending topic. Instagram followed suit by allowing instagrammers to add hashtags to pictures with tags such as #family,



#friends etc. This was followed by YouTube, Pinterest and many other social sites. Hashtags have been used for promotions such as #ifhadglass by Google Glass, consumer complaints such as #McDStories, events such as #GSOC for Google Summer of Code and for social upsurge such as #Ireasonwhy against sexism in video games industry.

## HCL

Hindustan Computers Limited (HCL) is one of the oldest IT enterprises in India, founded by



Shiv Nadar along with five of his colleagues in 1976. It was originally called MicroCorp Limited when established and later changed to HCL. Its range of services includes technology services, BPO services, cloud services, IT hardware, distribution of technology and telecom products in India. HCL was always a pioneer in R&D; it developed the first micro-computer at the same time as Apple. In the 80s it was the largest IT company of India when it was working on the development of client-server architecture, networking OS and fine-grained multiprocessor which reached the market ahead of Sun and HP. HCL has two public listed enterprises: HCL Technologies, that focuses on global markets and HCL Infosystems that focuses on Indian markets. HCL now operates in more than 31 countries and has more than 45,000 employees. It has been elected as the best place to work in India since the past three years.

## HDMI

If you've ever owned a HDTV, PlayStation 3 or Microsoft Xbox and Kinect, you'll know what an the HDMI cable is. Though it looks just like any cable at the back of your TV or monitor, it's comparatively more important. HDMI or High Definition Multimedia Interface defines the set of rules that need to be followed for high-definition electronic devices to communicate. These guidelines help establish high definition data transfer connections. The standard was created in collaboration by Philips, Sony and other electronics giants. The current HDMI standard can carry upto 1080p HD signals and supports about eight uncompressed audio channels. In a home theatre



setup, you can reduce the number of messy cables and remotes if you use an HDMI cable as it carries both, pictures and sounds on the same cable. Often, you may need HDMI-to-VGA converters if your monitor doesn't have an HDMI port. These days even digital cameras and mobile phones have a mini HDMI connector for data transfer. Gradually with high definition monitors, TVs and tablets replacing the standard low definition devices, HDMI-standard cables will be one of the most commonly used cables for multimedia data transfer.

## HDTV

HDTVs or High Definition Televisions are everywhere these days. They give you ultra-clear displays with impressive depth of colour and amazing sound. Televisions of the past used standard definition of display but HDTVs, which use information in the form of



binary can provide very high resolutions of upto 1080p. Therefore, compared to standard TVs, HDTVs have wider displays and a faster response rate. To achieve this speed, HDTVs need HDMI cables that are capable of transmitting electronic signals in the form of binary which reduce the burden of analog-to-binary conversion by the TV. Because of the huge demand of HDTVs in the market, many television channels have started high-definition broadcasting with channels named in the format ChannelName-HD. Among HDTVs, LED is the most energy efficient television technology. Some HDTVs are also smart TVs and they allow internet connection so that you can enjoy even more channels of entertainment by playing games, accessing Facebook and streaming your favourite YouTube videos. Some major manufacturers of HDTVs are Panasonic, Sony, LG and Samsung.

## Heinrich Rudolf Hertz

Hertz was one of the three scientists who made significant contribution to Quantum Physics back in the day; the other two being James Clerck

Maxwell and Max Karl Ernst Ludwig Planck. Hertz, the SI unit of frequency is named after him, as he was the first scientist to prove the existence of electromagnetic waves. During his experiments, he built the first antenna (radio) in 1888 that could transmit and receive radio pulses disproving all other known wireless phenomena. Hertz used a rapidly oscillating charge in an induction coil to create a rapidly changing electric field which, in turn, created a rapidly changing magnetic field. Then he kept



a receiver at a few hundred meters distance, where he noticed a spark being generated. So basically the charge in the sender loop of the induction coil sent the electromagnetic waves that were received by the receiver that detected the waves with a charge, hence proving the existence of electromagnetic waves.

### Henry Moseley

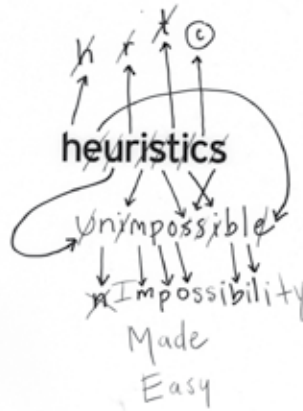
Henry Moseley was a distinguished scientist credited for developing the application of X-ray for studying atomic structure and modifying Mendeleev's Periodic Table according to atomic numbers. He proved that it's not the atomic weight but the atomic number that makes for a more sensible measure of arranging elements in the periodic table, thus improving on the periodic table suggested by Mendeleev. Following this discovery, the modern periodic table



has been based on atomic numbers of elements rather than weights. Moseley left his research at Oxford University to volunteer for British forces during World War I and unfortunately was killed during the service at an early age of 27. It was after this tragedy that the British Government decided to disallow any distinguished scientists of their nation from offering their services at warfare. Had he not died during the war, he would have been awarded the Nobel Prize for Physics and Chemistry in 1916.

## Heuristics

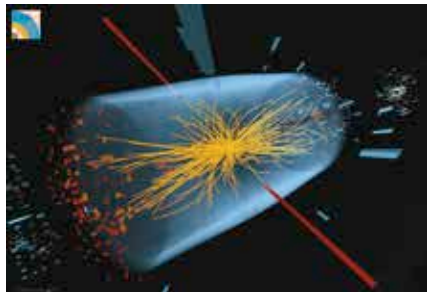
Grammatically speaking, Heuristics is an adjective for experience-based techniques that are used in problem solving. Heuristic techniques are used majorly in the fields of Psychology and Computer Science. In psychology, Heuristics is used when other classical approaches of finding a solution fail and they basically speed up the process by taking decisions based on some mental shortcuts or common sense. It's more like a rule of thumb.



In computer science, a Heuristic approach is used in areas such as anti-malware programs, AI, robotics and video games. For detecting network threats and anti-malware programs, generally signatures are used, which is good for already detected threats; however for new threats, heuristics can be quite beneficial. With the Heuristic approach of detection, instead of exactly detecting the program's signature, the patterns or set of rules on which anti-malware programs generally act are detected. Instead of checking whether a particular program is a Trojan, it checks whether the program is behaving the way Trojan viruses behave and accordingly gives results. Each heuristic has a weight and hence some heuristics/rules are more important than others. In Artificial Intelligence, heuristics are used to program AI agents.

## Higgs Boson

Higgs Boson or the "God Particle" became quite a sensation after it was empirically proven in 2012 and is one of the most important discoveries in Physics which lets scientists understand the universe better. To understand what Higgs Boson ac-

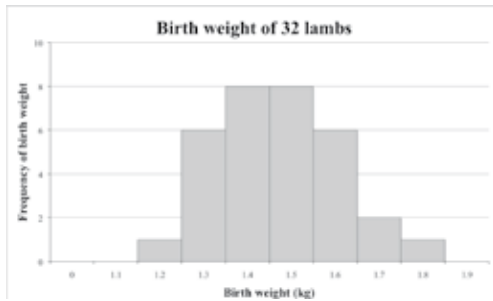


tually is we need to recap some past discoveries made on the same lines. The standard model, developed in 1970s gives us a basic understanding of particles and forces till now. This model shows us that in our entire universe there are 12 particle matters (six quarks and six leptons) and four types of forces (gravity, electromagnetic, weak and strong). Even though the model did prove a lot of theories, it still couldn't fit gravity into the model by explaining how particles have mass associated with it.

In 1964 however, a scientist named Higgs Boson suggested that the particle matter gains mass by interacting with fields called "Higgs Field", which occupies the entire universe and that the carrier particle to this field which would affect other particles and hence create mass in other particles is called as "Higgs Boson" particle. He couldn't prove it then, but it was eventually proven in 2012 and hence stands as one of the most ground-breaking researches ever.

## Histogram

Histogram is a statistical representation of the distribution and variation of a set of data. It consists of bars that represent frequencies on the Y-axis and the variable of the data on which the analysis has to be



done on the X-axis. This variable has to be continuous for a histogram to be able to represent it. A histogram should not be confused with a bar graph as they're very different. In a bar graph, the rectangles or bars represent different categories and hence these bars can be repositioned as the user wants. This is not the case with a histogram, as there are no specific categories; the continuous variable is divided into ranges and the bars/rectangles represent the frequency or probability distribution of those ranges. So the bars can't be repositioned as desired. The downside to a Histogram representation is that many factors depend on the range of the variable; if the range is too big then the representation can be quite misleading or only one bar could show up in the graph.

## Hitachi

Founded as an in-house venture in 1910, Hitachi is a Japanese electronics company. Founded by Namihei Odaira, Hitachi has grown from a small repair shop to a group of companies spanning a wide range of products and services. Some of the major companies in the group include Hitachi Works (the oldest member of the group), Hitachi Data Systems, Hitachi Electronics, Hitachi Rail, Hitachi Plant Technologies and Hitachi Global Storage Technologies. In those times, Hitachi took about 84 years to establish four regional headquarters. Later in 2011, Hitachi sold its subsidiary Hitachi Global Storage Technologies to Western Digital. Quite recently in 2012, Hitachi and Mitsubishi went through one of largest mergers in Japanese history by integrating both their thermal power businesses. Hitachi is credited for the development of ATMs and today produces everything ranging from washing machines to trains. The company has been actively involved in activities involving corporate social responsibility and has made contributions to many non-profit organizations. It has been a pioneer in developing energy efficient machines and has well laid out environmental vision plans.

**HITACHI**  
Inspire the Next

## Holographic Storage

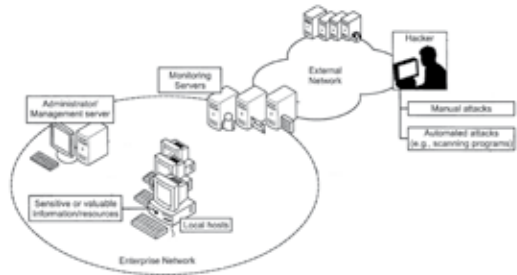
Holographic Storage is the next step in data storage. It's much more advanced than existing optical storage that CDs and DVDs use. This technology enables data to be stored in three dimensions and not two, and hence data can be stored at multiple depths that increase its storage capacity. This is not the case with DVDs, which have the disadvantage of data in them being capable of being read only from one angle, which is avoided due to the 3D storage capability of holographic storage. Discs using this type of storage also have better speed than existing optical storage techniques, as the data is read in parallel instead of being read linearly.



The first working prototype of a holographic storage system is called Tapestry. However, the technology is yet to become a reality since InPhase Technologies, the company working on Holographic Storage filed for bankruptcy in 2011 and can't make it ready for mass market due to technological constraints and hence is open only for organisational usage.

## HoneyPot

HoneyPot is a computer system established by organizations and institutions to protect their network and data from hackers and crackers. This system doesn't just



protect, it also traps the hacker, through which more details about the attack and the hacker can be found out. HoneyPot is generally set up on a machine that is inside the network and possesses some information or data that the hackers/crackers might need. It is ensured that the data is generally fake or has multiple copies on other systems. An application is installed to record all the activities of the attacker. Based on the type of deployment, HoneyPots are classified into two types:

1. Production HoneyPots are installed with the aim of improving the overall security of the network and hence only limited information about the attacker is captured. This includes details about how the attack is being done.
2. Research HoneyPots are installed to track the whereabouts of the attacker and the motives involved in the attack. These are installed in research and military organizations.

## Hotmail

Hotmail was one of the first web-based email services. It was founded by Sabeer Bhatia and Jack Smith in 1996 as 'HoTMaiL'. Both of them were colleagues in Intel when Bhatia came up with the idea of an email service that can be accessed from anywhere; he immediately shared it with Jack and they went about developing it. Bhatia is quoted to have said



that raising an investment was a problem for them as they had to be secretive about the idea, as it was such an obvious need that any big corporation like Netscape or Microsoft would have immediately worked on it. After the development and having acquired a user-base, Microsoft acquired Hotmail in



1997 for \$400 million and named it MSN Hotmail which went onto become Windows Live Hotmail and then Outlook.com in 2013. An interesting fact about Hotmail is that it was released on July 4th, 1996 (U.S. Independence Day) to symbolize freedom from ISP-based email accounts.

## HP

HP was one of the first Silicon Valley based start-ups that started in a garage which set the template for the rest. HP was incorporated in 1947 by Bill Hewlett and David Packard, two Electrical Engineering Stanford Graduates who decided the sequence of the name of the company with a coin toss, which Hewlett obviously won. HP's first product was a resistance-capacitance audio-oscillator and its first client was Disney. HP followed a form of management called "Management by Walking Around (MBWA)" which became quite famous once word got out about this unique style of working. The recreational and comfort facilities that modern day offices provide to employees are also inspired from HP, who started it first.



In the 80s, HP was the first to introduce Laser and Inkjet printers for desktops and in the 90s ventured into the desktop computers market. In the early 2000s after the merger with Compaq, it entered into the laptop and notebooks market and is now the world's largest PC vendor. HP

always stays in the Top 15 List of Fortune 500 companies and is considered one of the most dynamic workplaces.

## HRIS

The Human Resource Information System or HRIS is a web-based or native software solution that can perform all basic and advanced human resource functions for a company. HRIS helps companies formulate, organize and track data related to HR functions such as recruiting, payroll, training, employee engagement etc. Not all HRIS solutions provide the same feature-set. Depending upon the organization size and type, and HR needs, companies can choose a suitable HRIS solution for their



businesses. Many HRIS solutions add a layer of analytics over the basic solution and provide tools that can help companies analyse their Human Resources information databases. There are both, commercial and open source solutions available in this domain. OrangeHRM is one of the most popular free open source HRIS solution. Other Open Source solutions include LATRIX, Timetrex, WayPoint HR and Open Applicant. Commercial solutions include Halogen HRM, People Trak, iCMIS, iRecruit and many more.

## HTML

HTML or Hypertext Markup Language is a markup language used for creating the beautiful web pages you browse daily. It uses elements and tags to construct these pages. It allows the insertion of hyperlinks, images and lists within the web page. There are various versions of HTML including Dynamic HTML, XHTML and its fifth and latest version HTML5. These days you can easily edit HTML with WYSIWYG (What you see is what you get) editors, the GUIs of which make for quick formatting of the HTML code. All



content management tools such as Drupal, Wordpress, Joomla have such editors in their post/page sections. HTML5 has reduced dependency on plug-ins such as Flash. In a normal HTML page, if there are five images, a request is sent to the server for each of these images but with HTML5 all five of these requests can be clubbed into one. This increases the speed of loading. HTML5 has features such as CSS transforms that help create rich multimedia content such as web-based games and apps. It also allows application cache and local storage thus allowing offline apps.

## HTTP

HTTP or HyperText Transfer Protocol is a standard protocol for transferring requests from client-side and receive responses from server-side. The way it works is the client sends a HTTP request to the server and server responds with a HTTP response. This pair of request and response is



called an HTTP session. The content reply by the server can be static such as a file already stored on the server or dynamic such as a piece of code being executed by the server on behalf of the client. HTTP is an application layer protocol and lies under the transport layer protocol (TCP). The first version of the protocol was released in 1991. HTTPS or HTTP Secure is not a protocol in itself but it is achieved by layering the HTTP over the SSL/TLS protocol, thus making communications over the internet more secure. For a website to be completely secure, it should be loaded completely over HTTPS and none of its content should be loaded via HTTP.

## HUD

HUD or Heads Up Display in generic terms means any display that presents data to the user without looking away from their usual viewpoints. The term is adapted from modern aircraft where information is displayed to the pilot in front of him so that he can focus on



the view ahead. In video games, HUDs display vital statistics about the player and the game such as resources, lives, time, coins etc or the navigation maps needed by the player to navigate through the game world. A HUD may or may not need a screen. It can be just a projection in thin air. Some HUDs are mounted on the head or hats and these are called Head Mounted Displays or HMD. Google Glass is an example of HMD. Modern fighters use a combination of HUD and HMD. These days they're being tried out in alternate reality games and automobiles and in other forms of wearable computers.

## Human Computer Interaction

HCI or Human Computer Interaction is a broad field of study that acts as an umbrella to various concepts about machine and human interaction.



Since it draws its origins from both the human and machine aspects, it covers Computer Graphics, Artificial Intelligence, Affective Computing and Natural Language Processing on the machine side and Cognitive Psychology, Human Responses and Anthropology on the human side. HCI focuses on the design of various interfaces to enable interaction between humans and computers easier, friendlier and more interesting. HCI is a useful innovation for people with disabilities by removing the need for devices such as mice and keyboards or by interfaces that are color-blind friendly. HCI also aims at embedded computation and usability testing. Augmented Reality games and apps are real world examples of human-computer interaction.

## Humanoid

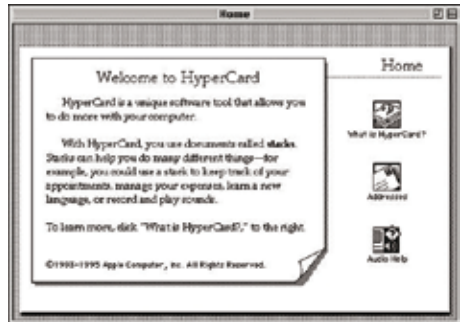
Humanoid is anything that resembles a human in appearance and traits. In robotics, the term Humanoids is used to represent robots that resemble humans in body shape and structure. Androids are humanoids with the aesthetic sense of humans. The first ever modern day humanoid was made in 1928 wearing a war suit and fixed with electrical actuators. However, the first ever humanoid was developed for a Chinese king by his

“artifactor”. It was a life-size humanoid that basically served tea for its beloved king. Currently, the development of humanoids is at a very advanced stage and they’re used in complicated fields like Medicine and Surgery. Some robots, like Honda’s ASIMO, are developed as companions and can play sports such as Ping Pong or Soccer. These bots are embedded with an adaptive artificial intelligence that helps them learn things with experience, just like a human, in the hope that one day humans would interact with them as comfortably as they do with other humans.



## HyperCard

HyperCard was a software program for Mac that allowed users to create “stacks” of cards that were visual pages on the screen. These stacks could be inserted with fields that could contain text, data, pictures and tables. Users could also insert customisable buttons that played various sounds.



Apart from being an application, it also included a scripting language called Hyper Talk that was pretty basic, enabling users to create custom commands like “Play Sound” or “Stop Sound”. It was basically a database software and a multimedia system that could hyperlink. It served as a base in the hyperlinking of web pages.

A few years after its introduction, this application was shelved. Tim Oren, the creator of HyperCard confessed in an interview that if he could have figured out that stacks could have been linked through the web then HyperCard could have been the first web browser. However, because he was in a box-centric culture at Apple, he made it as a desktop app and it lost its importance after the internet boom.

## Hyperlink

Hyperlinks are a common way to link web pages, documents and content within a document or web page. It makes navigation to particular data easier by directly taking you to the linked object. You can have hyperlinks on Wikis, Word documents, YouTube



videos and within HTML files. The term Hyperlink was coined by Ted Nelson around 1965. Hyperlinks are most used on the web for linking web pages to each other. Some websites require permission before being hyperlinked. The links that don't redirect you to the desired page are called broken links or dead links. Hyperlinks can be anchored or inline. An inline link just displays the remote content without actually embedding the content. An anchor link is bound to a specific section of a document or content. Hyperlinks can be internal, intra or external. Consider a Wikipedia page. If there's a word hyperlinked to a particular section in the same Wiki page, it's called an internal hyperlink. If that word is linked to another Wiki page, it's called an Intra-wiki link and if it's linked to a page outside Wikipedia, it's called an external link.



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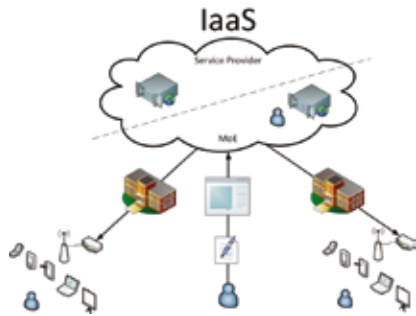
## i5 Processor

i5 is part of a series of processors that Intel released under the brand name, Intel Core. The i5 series is based on Nehalem microarchitecture, a successor to the Core microarchitecture that formed as a base for famous Intel processors such as Core 2 Duo and Core 2 Quad. Core i7 was the first processor released with Nehalem architecture, followed by Core i5 and i3. Compared to their predecessors, processors with Nehalem architecture display 10-25% better performance on a single thread, use 30% less power for the same performance and have more cache memory. Core i5 processors were released in September 2008 and this line contains both, mobile and desktop-based core processors. The Lynnfield Core i5 processors (Core i5-7xx) are desktop-based processors and have 4 cores and an 8MB cache but no hyper threading. Arrandale i5 (Core i5- 4xx) processors are mobile core processors that have dual-core parts with hyper threading. ClarkDale(Core i5-6xx) is a desktop variant processor of Arrandale, but with a higher cache memory. i5 processors are considered to have medium quality performance. They're superior to i3 processors, but inferior when compared to the i7 in terms of performance. In January 2011, Intel released a fresh version of i5 with the new 'Sandy Bridge' microarchitecture as the base, which again consists of both, desktop and mobile processors.



## IaaS (Infrastructure as a Service)

Also known as Hardware as a Service, Infrastructure as a Service (IaaS) is one of the three fundamental models through which cloud computing services are offered. The other two being Platform as a Service (PaaS) and Software as a Service (SaaS). In this model, service providers offer their clients virtual physical machines such as storage drives, servers, data center space and network components so that the client can deploy and run





arbitrary software like applications and operating systems on these machines virtually. The client doesn't have any control over the hardware that is provided by the service provider and can only access the software through client interfaces such as a web browser or Xen or KVM. It's the service provider's responsibility to house, run and maintain the hardware/infrastructure and for this the client typically pays the provider on a per-user basis. The main goal of IaaS is to provide flexible virtual physical machines to reduce the complexity in the daily operations of the client. Many organizations such as Microsoft (Azure), Amazon (EC2), IBM, HP, HCL and Oracle are major providers of IaaS in the market presently.

### **IBM (International Business Machines)**

Imagine a 100-year old technology company that survives till date and is one of the largest and most innovative corporations in the world. That's exactly what IBM is! IBM was founded way back in 1911, initially named Computing Tabulating Recording Company (CTR) and started with around 1300 employees in Armonk, New York, USA. It was formed as a merger between three companies back then and in 1924, its name was changed to IBM. IBM is well known for its research and holds the record for having the maximum number of patents in the past 20 years. IBM developed some very famous software and languages that include FORTRAN, SPSS, AMOS, Lotus and COBOL. IBM developed many computer hardware and peripherals that include the first laser printer, Xbox processor, PS processor, IBM PC and ThinkPad for Lenovo. Presently, IBM produces and markets software and hardware; offers hosting and consultancy services; and provides infrastructure in almost every field of computing, including Nanotechnology. IBM also ventured into non-computing fields such as Food, Manufacturing, Real-Estate, Military Products during World WarII and Medical Instruments. While some of these ventures proved to be successful, the group faced a negative phase in the early 90s due to miscalculation of trends in the computer and software industry. It faced a complete turn-around after a lot of restructuring and rewarding strategies in the late 90s, post which it expanded into new technology fields such as Nanoscience.



## iCloud

iCloud by Apple is a cloud service that syncs all the data on your desktops, mobile and tablets. iCloud is more of a push service than a pull service like most other cloud services such as Microsoft SkyDrive and Amazon E2C. Let us explain:



There's a central iCloud server

where the user can store data such as his email, calendars, photos, videos, documents, settings, etc. This is the “true” copy of the data and it is replicated on all the user’s devices. Whenever user changes any data from any device, the iCloud tracks it and makes the changes in this “true” data and makes changes in all the copies of data on different devices. iCloud was one of the first synchronization cloud services and had high expectations before release. Even App developers could include iCloud in their apps which would track all changes made in the app on any device and sync it to other devices. But, after a year of release, app developers heavily criticized it. It was practically impossible for apps to implement iCloud in their apps due to the complexity involved in the base design of the functionality. iCloud received many brickbats from users also. Sarcastically, it is said to be the only Apple product that is meant “just to work”!

## ICMP (Internet Control Message Protocol)

ICMP is one of the four core protocols on which modern-day communication is based; the other three being IP, TCP and UDP. An ICMP helps give feedback about errors in the network that are preventing the packet delivery. This protocol unlike other protocols like TCP doesn't only realize that there are problems, but also gives a method for discovering bigger problems such as 'TTL exceeded'. In fact, it's a classic example of client-server application.



This protocol executes on all IP end-systems and intermediate systems such as routers. It can be used to track down exactly which end system is not responding and find out whether the IP to which the data is sent has a machine and whether the end machine is overloaded. IP is quite unreliable; it could happen that the machine to which the data is being sent changes its IP and hence ICMP plays a major role here. It can be aptly compared to a traffic signal, which gives feedback as to when to move forward and when to wait. The ICMP packet is also known as a 'Ping Packet'. This ping packet is sent on the network to confirm whether an IP address is assigned or not. If there's an IP address, then an 'echo request' will be generated. If not, an error message will be generated and returned.

### **ICT (Information and Communication Technology)**

As the name suggests, ICT is the amalgamation of information and communication technologies and in a word sums up the major technological advancements of the modern era. The term, ICT has been used since the 80s, but gained popularity in the 90s. Now there are even curriculum courses that are based on ICT. Back in 1971, when the first world telecom event was held, ICT was all about telecom and telephones. A major paradigm shift took place in the late 80s when computers were being widely used and then in the 90s when Internet became mainstream. The way we communicate has drastically changed due to email, chats and messengers.



A hugestep forward for the ICT sector was the invention of smartphones; previously, phones were used just for text messages and phone calls but now they can also handle video, image and audio messaging. Advanced phones and tablets such as the iPhone and the iPad paved the way for better gadgets. Social networking made sharing of photos, videos and information easy to do on the fly. You could get in touch with, collaborate and work with unknown people from different parts of the world. It would be interesting to see what the future brings with the help of technologies like Cloud.

## IEEE

Institute of Electrical and Electronic Engineers (IEEE) is a non-profit professional association of engineers from Electrical, Electronics and Computer Science fields. IEEE is one of the premier organizations that support research in academic institutions. The foundation of AIEEE goes a long way back to 1884 when electric professionals felt a need to form an organization to discuss and share new research findings and innovations without a fear of losing their right to the work. Founding members include noted scientists such as Thomas Alva Edison, Alexander Graham Bell, and Nikola Tesla.



IEEE holds some of the best and most respected conferences in the world and publishes journals that are considered to be of utmost quality. However, IEEE is not a research organization, as in it doesn't produce research of its own; it only coordinates conferences, journals and peer reviews that help researchers share their work and publish them. IEEE presently has more than 38 societies; 130 journals, transactions and magazines; more than 300 conferences annually; 900 active standards; and more than 395,000 members in 160 countries.

## IllumiRoom

Microsoft recently in January gave a sneak-peek into its new technology - IllumiRoom - that it's working on after the revolutionary Kinect that will be a step ahead for the video game industry. The released video looks



like a shot from some futuristic sci-fi movie, but it's not. Basically, this technology uses Kinect, cameras and some software to "read" the room in which the equipment is present and then projects the TV screen's content onto the walls of your room, making the whole room your screen. With Kinect's absolute measurements and some really cool geometry, the projected visuals adapt to the room size and don't even require any setting changes. The projection technology basically blurs the lines between the

on-screen video game and the off-screen living room which makes the whole projection look quite awesome. As Microsoft researchers working on it say, it is a way to combine both our physical and virtual worlds.

## Image Processing

Image Processing is a type of signal processing which takes an image as an input and gives an image as an output. An image is a representation of a 2D picture as a finite set of values, called picture elements or pixels (in digital pictures). There are three types of image processing: Digital, Optical and Analog; Digital Image Processing (DIP) is most widely used. DIP mainly focuses on improvement of pictorial information for human interpretation and on processing image data for storage, transmission and representation for autonomous machine perception. The process started in the 1920s when a newspaper company transferred a news clip from London to New York in three hours by a submarine cable. In the 60s when travel to the moon was becoming a practicality, image processing took a major leap. Computers could refine the quality of images that were taken on the moon. Presently, image processing is one of the biggest research topics in academic institutions where groundbreaking research is taking place in Image Stitching. Many image processing techniques are used in digital cameras and professional cameras also.



## IMEI

International Mobile Equipment Identity (IMEI) is a very useful identification number that is unique to every mobile or satellite phone. It is a 15-17 digit code, usually found on the inside of the battery compartment in every phone and is used to track lost phones. The IMEI can enable the GSM network which in turn helps identify a lost phone's exact geolocation. If you register your phone's IMEI



number with CEIR (Central Equipment Identity Register), your phone won't work with any service provider. Many countries have laws prohibiting the use of devices that let people manipulate the IMEI. Even though changing the IMEI is not an easy task, skilled crackers can do it making the lost phones untraceable. Want to check your phone's IMEI? Go ahead and type `*#06#` on the dial pad. This should work for most phones; if it doesn't, look for it in system information in the settings menu if you have a smartphone.

## In-App Purchase

In-App Purchases, as the name suggests, are purchases that are made from within an application. This term is mostly used for mobile in-app purchases, but also covers in-app purchases made from all platforms such as Facebook, desktop apps, and console apps. Many companies create apps that



are based on this model. Most notable ones include Zynga (CityVille and ChefVille), iMangi (Temple Run) and Supercell (Clash of Clans).

In-App purchases are generally done to buy in-game currency which in turn brings some added advantage to the player in the game. For example, for \$0.99 if the player buys 10,000 gold coins, he can use those coins in exchange for power-ups and upgrades inside the game. The concept of in-app purchases led to a new model of games called Free-to-play (F2P). F2P games are freely downloadable but require purchase of additional items such as bonuses in a game via in-app purchases. Examples include *Subway Surfers* and Zynga's *Poker*.

## Indexing

Indexing in search engine terms is a database collection where information is collected, parsed, processed and stored for quick retrieval. The most common example of this is Google Indexing – a way by which Google servers



crawl pages on the internet, build an internal index based on the content on those web pages according to keywords (indexes) and quickly gives results when any user searches using those keywords. The reason for clubbing the data under an index is to make it easy to find when a search query is entered; without which it is almost impossible to retrieve. Due to the creation of an index, the engine need not scan all the data, and instead can just compare the query to the index and display the matching results. Proof of how quick and accurate this whole process is lies in Google's ability to give you about 20,100,000 results in 0.30 seconds! Whenever new data is added or existing content is changed, the index of that group is updated, but it is very important to avoid redundancy which will lead to plenty of space wastage on servers. Many techniques are used to deal with the deficiencies of mere indexing to optimise it further.

## Infinity Blade

*Infinity Blade* is one of the biggest hits on the Apple App Store. The action role-playing game, developed by Chair Entertainment and published by Epic Games, raked in revenues of around \$1.14 million in the first four days of its release in December 2010. By the end



of 2011, the figure climbed upto more than \$23 million. It was termed as the "fastest grossing app" in the history of iOS! *Infinity Blade* was the first iOS game to run on the Unreal Engine (UDK). It is a paid app which also has in-app purchases where players can buy more weapons and armoury. The game has a swipe control as its base to use the sword for attacking and other controls such as tapping to use the shield. *Infinity Blade* was famous due to its variety in enemies categorized as Regular, Large, Giant and Monstrosities. The storyline revolves around a warrior who must fight one-on-one battles with the 'Deathless immortals' and finally defeat the GodKing. Due to the huge success of *Infinity Blade*, *Infinity Blade II* was released in October, 2011.

## Information Management System

IMS is an amalgamation of management systems, first introduced by IBM in 1968 to cater to the operational needs of organizations. IMS were originally made on Data Language 1 programming language; but now IMS applications can be connected to a wide range of applications and languages such as CICS, DB2 and Java.



IMS is one of the two major database and transactional management systems that IBM produced – the other one being CICS – and together they handle majority of the world’s insurance and banking entry transactions.

There are two major components in IMS. The first one being IMS Database, in which the data is organized in a hierarchical manner where each level is dependent on the next level. This structure maintains high data integrity and allows optimised storage and retrieval process. The second component of IMS is the IMS Transaction Management that takes care of functions such as I/O processing, security in communications, logging and recovery of messages.

## Infosys Corp

Infosys is one of the leading multinational IT corporations based in India. It provides software, hardware and business consultancy to Indian as well as international clients. The larger part of Infosys’ clientele is based abroad and only 1.2% of its whole income comes from the domestic market. Narayana Murthy, a visionary and self proclaimed “compassionate capitalist” co-founded Infosys in 1981 in Pune with a mere \$250 investment along with five other team members after resigning from Patni Computers. For many years, this team of five worked from a small apartment and slowly shifted to Bangalore. Today, Infosys is one of the biggest companies in India with the highest revenues and maximum employees in the IT sector.



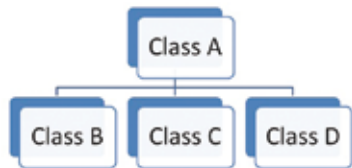
Infosys was the first Indian company to be listed in NASDAQ and played a very important role in making India, especially Bangalore an IT hub. Infosys is known for its corporate values and ethics. Infosys is one



of the few corporations to have said no to corporate corruption and was never involved in any kind of malpractices that are common in countries like India. So it stays true to its tagline when it was newly introduced - "Powered by Intellect, Driven by Values".

## Inheritance

Inheritance is one of the basic concepts of Object-oriented programming and is used in many languages such as C++, Objective C and C#. Inheritance can be done between two classes where one class is called the "Base Class" or the "Parent Class" and the other class/classes are called "Derived Classes" or "Child Classes". The "Derived Class/Classes" inherit the "Base Class". Hence the derived class gets all the member functions and member variables of the base class. More member function/variables can be added in the derived class also, but these cannot be accessed by the base class. In C# and Java, some classes can be declared as 'uninheritable', which restricts any class from inheriting its functions and variables. Using inheritance does bring some constraints in the design of the code. Since a subclass can inherit only from one base class, it leads to single-ness. Also, all the member functions and variables of the base class can be accessed from the derived class even if the member functions are not declared as public.



## Insertion Sort

Insertion is one of the computer algorithms that is widely used for sorting. Other algorithms include Merge Sort, Bucket Sort and Bubble Sort. Sorting is one of the most widely researched topics in the field of computer science as its practical applications are many. In computer games, sorting is used to sort scores, names and places. In organizations and educational institutions, sorting is used to sort names, numbers and other types of data. Sorting can be done in



two ways: Category Sorting, where sorting is done on the basis of categories like “All students who took Maths”; or Intensity Sorting, where sorting is done in ascending order or alphabetical order. Insertion Sort belongs to the latter category. Insertion Sort algorithm sorts an array of things by repetitively selecting an element, comparing it to the next element and swapping it if the latter is smaller than the first. This loop goes on until all the elements to the left of the last element are sorted in order.

### Integrated Circuits

ICs, though very minute in size, are one of the greatest inventions of all time and are responsible for the rapid boom in today’s electronic industry.



As Jack Kilby, a noted electrical engineer said, the IC was an invention that reduced the costs of electronic functions by a factor of million to one and nothing had ever done that before.

Technically, an IC is a small chip/electronic device made out of a semiconductor material on which a set of electronic circuits are placed. The need for ICs was huge after the invention of computers as it was necessary to increase the number of electronic components and multifunctionality. The invention of a semiconductor amplifying device in the 1940s by Werner Jacobi was an early development of ICs. However, it was in 1958 that Jack Kilby and Robert Noyce invented ICs, which were commercially introduced into the market by Texas Instruments and Fairchild Semiconductor Corporation. Integrated circuits went on to create a trillion dollar industry. ICs are categorized on the basis of number of electronic components per chip – SSI (100/chip), MSI (100–3,000), LSI (3,000-100,000), VLSI(100,000-1,000,000) and ULSI (>1 million).

### Intellectual Property

Intellectual Property (IP) is one of the most important legal concepts in terms of innovation and creation. IP law basically copyrights creations of people who created original works. In today’s world where everything is accessible over the internet and there’s no control over anything released publicly, this



law protects against violation of rights to ownership. Intellectual Property rights can be of many types such as Copyright, Trademark, Patents, etc. This concept came about in 1860 when many inventions were being stolen by evil corporations from each other and independent researchers who couldn't bring their innovations to the market. One famous example is Nikola Tesla, several of whose ideas were used by others including Edison and Marconi as their own work. Each type of IP law has its own purpose. Patents grant rights to inventions, ideas, processes or products; whereas Copyright gives rights only to work that is expressed in terms of some medium such as art and not to mere ideas. Each country has its own defined IP laws and India's IP laws are unfortunately pretty poor according to international standards.

### Internet Explorer

Internet Explorer is a web browser by Microsoft that runs on both, Mac OSX and Windows. The first version of IE was released in 1995 as a direct competitor to Netscape, which was the most widely used browser back then. In response, Netscape filed a lawsuit against Microsoft stating that Microsoft was trying to bundle IE with its OS and hence was trying to stop users from using Netscape. IE was the most widely used web browsers for a long time and its user base began dwindling with the release of Safari in 2003, Mozilla Firefox in 2004 and mainly Google Chrome in 2008. Now, IE is sarcastically referred to as a default browser used to download other browsers. Compared to other web browsers IE is reviewed to be very slow and inefficient, though security wise it is still preferred for bank transactions and other financial activities.



### Internet Protocol

Internet Protocol (IP) is the primary protocol used for communications through the internet. It was developed in the 70s and started being used widely after a paper was published in IEEE about this topic. Presently the most used version of IP is IPv4 which is a predecessor to IPv6.

An internet protocol is basically used to transfer data from one computer to an-



other called 'host', and these hosts have IP addresses that uniquely identify them. Each message that is sent is divided into little chunks called 'packets', which contain a header (that specifies source, destination and other information about the data) and the message data itself. The packet is transferred from one gateway computer to another until it reaches the computer whose address is specified in the destination address. The order of arrival of packets is not the concern of IP and hence the packets can arrive in a different order and it's up to the TCP (Transmission Control Protocol) to put them back in order. The zig-zag order happens because IP is a connectionless protocol, as in there's no connection between the sender and receiver and hence for reordering another protocol, TCP is needed.

## Internet Service Provider

In simple terms, Internet Service Providers (ISPs) are organizations that ensure that you stay connected to the internet. They maintain infrastructure, provide cabling and run network services in order to transfer and deliver web content to both, home and business users. ISPs provide a wide range of internet

connections from modem dial-ups to high speed broadband. ISPs that provide wireless internet are nowadays termed as Wireless ISPs. Examples of ISPs in India are Airtel, BSNL, MTNL and Tata. ISPs are classified into many types based on the internet service provided. Providers of web hosting services are called Hosting ISPs and providers of mailbox hosting services are called MailBox ISPs. Internet service providers have a hierarchical structure and are classified into Tier 1, Tier 2 and Tier 3 ISPs. Tier 3 is the lowest in hierarchy and Tier 2 and 3 in turn take services from Tier 1 and pay them a service fee.

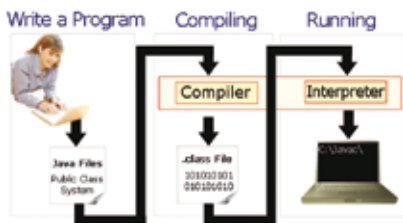


## Interpreter

An Interpreter is a programming language that converts the high-level code that a programmer writes into an intermediate form and executes it. Interpreter is an alternative to a compiler, which actually converts

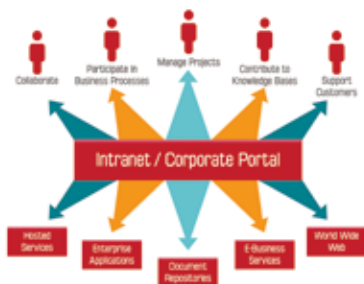
the high-level code to machine language directly. During this process though, a compiler takes a lot of time and so is not beneficial when very small changes are made. That's when the interpreter comes into the picture. It takes less time than

a compiler and hence is useful in the above situation for quick testing. Another advantage of an interpreter is the ease with which the program can be distributed as source code. Interpreters are available for almost all high-level languages like C++ and Java; but some elementary languages like BASIC and LISP were made to run on interpreters. In fact, LISP was the first interpreter ever made by IBM.



## Intranet

Sharing information and documents within an organization was a tough and costly task back in the 80s. Technologies such as APRANET and FTP reduced the tediousness, but an actual revolution in sharing took place when HTTP was introduced. Internet technologies were deployed to provide a modern and uniform interface to organizations that needed it. However, the term 'intranet' is used in contrast to 'internet' since it means a network of computers within the organization, not between organizations. In short, an intranet is a conglomerate of private machines within an organization or institute that have the ability to securely share data with each other. An intranet uses the same hardware technologies as the internet such as Ethernet and Wi-Fi; the same protocols such as TCP/IP and HTTP; and software such as web browsers and servers. Typically, an intranet is firewalled and doesn't allow direct access from outside the network of computers, unless authorized, to maintain the company's security and privacy. An intranet also keeps a check on the transmission of data from inside the organization to public networks. With the introduction of cloud, the fu-



ture of the intranet will be more hybrid with part of it inside the organization and part of it outside, which would change the whole perspective of data sharing through intranet.

## Intrusion Detection System

An Intrusion Detection System (IDS) is the patrolling police of the network system. It basically tracks all the network activity and alerts the user whenever it detects malicious patterns that might indicate an attack from someone attempting to break into the system. An IDS can be classified in several ways. One way to classify it is into Active and Passive IDS. While the Active system identifies *and* blocks suspicious patterns, the Passive system only identifies the pattern and alerts the network admin. Another way to classify it depends on where the detection system is implemented – If it's implemented within the network it's a Network-Based IDS and all the data packets that flow are monitored. Host-Based IDS is implemented on each host machine inside the network. The third way of classification is based on the method of identifying patterns – Signature-based IDS compares the data packets against a database of signatures from known malicious threats. This has a disadvantage though: if any new threat arises, then these IDS won't be able to recognize the pattern. Anomaly-based IDS will compare the patterns against what is considered to be “normal” pattern for that particular network. Anything that is abnormal is alerted to. This is a safer way of detection as new threats will also be detected.

## iOS

iOS is the operating system that runs on Apple's mobile/tablet devices such as iPod, iPhone, iPad and Apple TV, similar to OSX on Mac desktops and notebooks. iOS was introduced in 2007 along with iPhone. It was customized for touch devices and till date is



one of the most sold operating systems and the most innovative operating systems on mobile devices in terms of multi-touch response, UI design and ease of use. When iOS was released it was called 'iPhone OS'

until 2010, when Apple used the same OS in iPads and Apple TV. The first version of iOS had basic functional apps such as messaging, photos and email by default. But, what skyrocketed its popularity was the ease of downloading third-party apps from the AppStore with the help of which iOS could be used to its full potential. Multi-tasking abilities were implemented for iOS 4.0 onwards, which made it more functional and productive and got business users interested in using the iPhone for office purposes also. From iOS 5.0, Siri, the virtual personal assistant app, was included.

## iPad

iPad was the first commercially successful and widely used tablet computer released by Apple Inc. in 2010. iPad, similar to iPhone, has a touch interface and runs iOS on it. Steve Jobs always wanted to make a book-type PC that people can carry around. He mentioned in his 1983 public address that he wants people to use it for different purposes such as reading books, using the internet, and listening to radio and music. Apple's first attempt at tablets was Newton MessagePad 100 in 1993 and a series of other after that, but it discontinued its efforts in 1998 due to the losses incurred. Apple again started working on the concept of a tablet in early 2000 before it developed iPhone, but shelved this project seeing how the market at that time had a higher demand for mobile phones. The tablet was taken off the back burner and released in 2010. Now, iPad is considered one of the biggest markets for apps and games. It's one of the most wanted devices by consumers of all ages and backgrounds, and has spawned a new industry entirely.



## iPhone

iPhone is the range of Apple's magical touch phones that revolutionized the mobile industry. It all started in 1983 when the idea of having a screen associated with a telephone was prototyped by Apple. That phone had a stylus and its screen was connected to a telephone. That prototype was shelved back then, but a secret project codenamed "Project

Purple” kicked off in 2004 with the aim of creating a touch-enabled phone capable of carrying many tasks. The first-generation iPhone (2G) was released finally in June, 2007. Apple followed the launch of iPhone 2G with iPhone 3G, 3GS, 4G, 4S and 5. The reasons for iPhone being an instant hit were many, apart from it being an Apple product, which attracted almost every Apple fan boy. iPhone was one of the first phones to have an only-



touch input system - No buttons or keys, which allowed the iPhone to maximize its screen real estate. The large screen made it easy for users to check email, watch videos, shoot pictures and play games. With the release of iPhone, Apple also launched 'App Store', the first online portal to legally download licensed apps. This changed everything - Reduction in piracy, easy downloading of apps by users and easy uploading of apps by third-party developers. Presently, more than 45 billion apps have been downloaded from the App Store.

## IRC

Internet Relay Chat (IRC) is an internet protocol that helps users interact with each other via real-time text-based chat. It was mainly designed for multi-user conferences/discussions on forums called channels but, can also be used to send private mes-



sages to other users. IRC also allows data transfer and file sharing. IRC was created in 1988 by Jarkko Oikarinen, a student in Finland trying to replace an already existing chat program called MUT(MultiUser Talk). IRC is famous for being used to report about the 1991 media blackout incident caused by a Soviet group in an attempt to overthrow the Mikhail Gorbachev run government. Technically, IRC is used on TCP/IP and is a plain text protocol to which IRC clients can connect. All the communication between users take place through channels which are part of servers, and IRC as a whole is a tree of servers that are interlinked. All these channels in different servers are open globally and the user can connect to more than one at a time. This structure has a disadvantage though:



Loss of a single server-to-server connection can split a huge branch of channels and servers. This is called 'netsplit' which can lead to malicious attacks and loss of content.

## Isaac Newton

We all know that Isaac Newton, the Bible-obsessed alchemist discovered gravity. We bet you didn't know that the famous story of the apple falling on his head and making him think about the force involved in its fall is not all true. The apple didn't fall on his head; he simply saw it falling from his window. Stories aside, he is considered one of the greatest scientific minds of all time and has made large contribu-



tions to the scientific community. Major contributions include his Laws of Motion on which even Rocket Science is based, Theory of Optics due to which people today understand vision and lighting and Calculus which is the base for almost all complex scientific proofs. Newton preferred being secretive and rarely published his works. He published his work on Optics three years late. It was the same case with Calculus which led to one of the biggest controversies of the century as to who actually invented calculus. Newton was extremely religious and would scan the Bible in an attempt to extract scientific information. In a note found posthumously, he confidently stated that the holy book prophesizes that the apocalypse would come in 2060.



J



**J#**

Java is one of the most used high-level programming languages of all time, but needs its own runtime environment (Java Virtual Machine - JVM) and cannot run on Microsoft's .Net runtime platform, as Microsoft does not support JVM.



So, Microsoft came with a work-around and that is J#. It is a set of programming tools that helps programmers run Java-based applications on Microsoft's .Net platform.

Basically, the Java code is interpreted into an equivalent of Java Byte-Code called Microsoft Intermediate Language (MSIL) and then this can be used to run on the .net platform. An already compiled Java Bytecode can also be converted to MSIL. J# is similar in terms of interface and development systems when compared to Visual J++ and basically supports the functionality of J++ and Microsoft extensions.

J# was developed by the Microsoft India Development Center, Hyderabad and was released in 2007 as part of Visual Studio. It was later removed from Visual Studio, and will be supported only till 2015.

**J2ME**

An acronym for Java 2 Platform Micro Edition, it's also known as Kava ME, a Java based platform developed by Sun Microsystems aimed at consumer wireless devices like Mobile Phones and Set Top Boxes. J2ME, apart from providing Java libraries, also provides a wireless tool kit that assists developers in easily creating mobile-based applications. J2ME is widely used to develop applications on mobile platforms, and more than 2.1 billion devices are J2ME enabled. Most of these phones include feature phones such as the old Nokia or Samsung Phones. After the introduction and boom of smartphones, J2ME has sort of lost its sheen.

A dark rectangular box containing the text "Java 2 Micro Edition (J2ME)" in a white, sans-serif font. The text is centered within the box.

## JAD Joint application Development

JAD or Joint Application Development is a process of developing a piece of software by bringing together the business people, clients or end users and the developers and designers of the application. JAD requires a series of workshops to be conducted where both developers and end users participate to finally decide how the product will be developed. These workshops are called JAD sessions. This approach to software development was originally used by Chuck Morris and Tony Crawford from IBM and got popularized by the late 1980s. JAD has clear advantages which include improved quality and customer satisfaction, lower rate of error and rework, early end user feedback and reduced time of development. The only challenge with JAD is that it can fail if the organizers do not prepare themselves for the JAD sessions properly. Later, A development to JAD was introduced and it was called RAD or Rapid Application Development where reusing software components was an addition to the JAD process. Today, JAD sessions are even conducted over virtual spaces such as Skype, Google Hangout or other similar platforms.



## Jailbreaking

After the introduction of the App Store, piracy kind of became impossible. This was because the only place from where apps could be downloaded for iOS devices was the App Store. This is where JailBreaking came in. JailBreaking the device technically means hacking it and getting access to the entire Unix file system. Hence, the user gains access to the areas of the device that aren't supposed to be accessible to users. This gives the user freedom to install non-store apps and unlock other carrier services.



Jailbreaking also gives users the freedom to change the theme and look of the device – something that generally Apple doesn't approve of too much. For example, you can put 5 dock icons instead of the

default non-changeable 4. Jailbreaking's legal status is not fixed in all countries. In some countries like Singapore, it is not entirely illegal and can be done in some situations. In the US, it is legal to JailBreak a device but illegal to Unlock it.

### **James Chadwick**

James Chadwick is an English Physicist who made a significant contribution to atomic physics. He was awarded the Nobel Prize in 1935 for discovering the Neutron. It started in 1911, when after his graduation he worked under Prof. Rutherford who was working in-depth in atomic physics. From 1913, he served in World War I and was a prisoner of Germany for 4 years. In 1919, he came back to England and continued his work under Prof. Rutherford. That year, Rutherford was successful in dissecting atoms and discovering a positively charged particle that came to be known as "proton". But,



Chadwick and his fellow researchers believed that the proton was not the only particle that existed in the nucleus because the atomic mass of any element was greater than the atomic number (number of protons in the nucleus), which meant something apart from protons and electrons (electrons have almost no mass) were adding to the mass.

After years of research, they did discover the neutron in 1932.

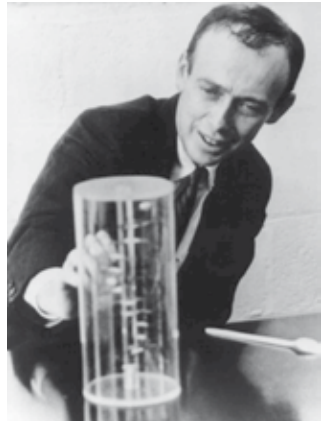
### **James Watson**

James Watson is a noted Geneticist and Zoologist who received the Nobel Prize for his contribution in Physiology/Medicine in 1962. Apart from being famous for his controversial comments about races and Irish people, he is famous as the discoverer of the DNA structure.

Born in 1928 to an English family, he always showed interest in bird watching and went on to pursue Zoology in his undergraduation and later acquired a Ph.D. In the early 50s he started showing an interest in studying DNA structures and began his research on the X-ray diffraction pattern of crystalline DNA.

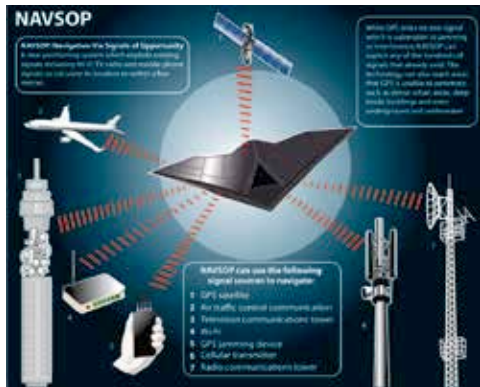
He met another scientist named Francis Harry Crick who had been working in molecular biology and had a common interest towards solving the DNA structure. They both believed that it is possible to predict the structure of DNA and finally after a lot of serious effort they could predict a double-helical structure in 1953.

Later he began working in Harvard, initially as an Assistant professor and he later went on to become a Professor in the Biology Department.



## Jamming

Jamming is the deliberate or accidental transmission of radio signals that disrupt communications by increasing the noise in the original signal. Jamming is common in busy frequency ranges if the range is overloaded with signals and this kind of Jamming is accidental. Often, nations deliberately use Jamming for security purposes to prevent stations at their borders from receiving the signals transmitted



inside the national boundary. This technique was used even during World War II to prevent over-hearing of secret communications. Dedicated devices such as wireless signal Jammers are used to jam signals over local area networks to perform Denial of service attacks. Satellite signals are also jammed using Jamming and there have been international conflicts due to this. In 2010, the European Union urged Iran to stop jamming satellite broadcasts else they will halt the export of censoring equipment to Iran. Jamming is always related to Freedom of Internet and is discouraged in its negative forms.

## Java

Java is the most widely-used Programming language in the world and since its introduction in 1995 more than 10,000,000 developers code using Java. Java is an object-oriented, high level Programming language that is largely derived from C++; but more simplified in order to make it multi-platform and to eliminate common programming errors. It also features an “automatic garbage collector” feature that efficiently manages memory. It was one of the first “Write Once Run Anywhere” (WORA) languages.



The inception of an idea to have an easy to learn, multi-platform, open-source programming language started in 1990 at Sun MicroSystems, where a team of developers headed by James Gosling began developing a language called “OAK”. Oak was initially aimed at cable set top boxes and VCRs. But, then the “www” boom happened, so the team shifted its focus onto making a language that can help programmers make Internet applications and changed its name to “Java”. Java received a very positive response from the developer community and after the release of Sun’s “HotJava” browser, in which Java’s power of applets was demonstrated, Java became the most widely used and accepted platform for internet applications.

## JavaScript

“JavaScript” is also an object-oriented programming language that is different from Java and should not be considered as just some add-on of Java. The name Java Script was a marketing move by NetScape, its creator. Initially it was named LiveScript, but changed to JavaScript, taking into consideration the popularity of Java. JavaScript is widely used as a prototype-based scripting language and has dynamic typing and weak typing. Dynamic typing is a functionality that comes in handy quite often. In Static Typing (the opposite of dynamic typing), variables need to be declared explicitly before using them; but in Dynamic typing, variables can be used directly without declaration. Hence the same variable can



be first bound to a number and then a string. This characteristic is also present in languages like Python and PHP. JavaScript also doesn't use classes, and so for Inheritance and other properties it uses "Prototypes".

## Jelly Bean

Google has been awesome in naming the versions of Android in many mouth watering forms. Jelly Bean is the codename of Android OS version 4.1 and 4.2 which was released in 2012 at the Google I/O conference. Like all versions of Android it's based on the Linux Kernel and was an update which focused on user interface tweaks and performance. The performance increasing side of the project was named "project butter" which aimed at using triple buffering to create ultra-smooth UI experiences on Android devices. Jelly Bean had increased system throughput and UI navigation speed. It included the new gesture friendly keyboard that dynamically predicts what you wish to type by just gliding over the letters.



## Jenkins

Jenkins is an open source software written in the Java programming language and is used by websites such as Github, LinkedIn etc for testing and reporting changes in a very large code base. Jenkins was originally part of the Hudson project at Oracle but due to certain conflicts it was forked as Jenkins and made open source in January 2011 and was released under MIT License after a lot of failed negotiations. Hudson is still in development at Oracle. Jenkins was primarily developed by Kohsuke Kawaguchi. Jenkins allows real time tracking of changes in the code base and helps in automating the testing of builds. It also supports SCM tools such as Subversion, Git, Mercurial etc. Jenkins has a lot of plugins and all Jenkins devs are advised to use these plugins. There are certain plugins that allow integration of Jenkins with other tools such as Gerrit





(Git code review) which allows pre-tested commits, JIRA that allows bug tracking and Sonar for management friendly charts and graphs related to code metrics.

## Jerusalem Virus

Now that's a cool name for a virus. Jerusalem virus is a computer virus first detected in Jerusalem in DOS system in 1987. Once this virus infects a system, it becomes memory resident and infects every file whenever it's run except the command.com file. It stays in memory even if the host program is being turned off. There are two ways in which this virus can harm your computer. The first is relatively harmless. It displays a blank window by shifting the rows and columns and thus enter a continuous loop that ultimately hangs/slow down the system. The second is a bit more harmful and it activates on any Friday the 13th and sweetly deletes any programs that you run on that day. Since it was first identified, there have been many versions of this virus. It often populates your command line interface with lame crypted slogans or restricts the running of some specific programs on a particular day. This menace became less prominent in later operating systems, so you don't have to worry much. If it still shows its face, use any decent anti-virus software and it'll be gone!



## JetPack Joyride

Jetpack Joyride is a major hit game developed and published by Half-Brick Studios (creators of Fruit Ninja). The game was initially released for iOS in September, 2011 and later released on Android, Facebook, PS3, PS Vita and Windows 8.

Joyride has a simple one-touch gameplay where the player can touch anywhere to move the character "Barry", who is on a Jetpack riding in a lab collecting coins and powerups. The plot if you really want one involves Barry, a guy who loves Jetpacks. He goes crazy after he notices a Jetpack in a secret



lab, steals it and starts flying it all over the place. The aim of the player is to keep Barry alive, by avoiding obstacles and collecting powerups to increase the lifespan.

## Job Scheduling

A computer has limited run-time memory and only some jobs/processes can run on it at a time. So the Operating System has to do some prioritisation as to what job should be done first. This process of placing the jobs in a schedule/queue according to some specified algorithm is called "Job Scheduling". Scheduling is generally done on the basis of turn-around time. The most used Job scheduling algorithms are:

1. First Come First Served: self explanatory

2. Round Robin: Every job gets a fix time and then the

job is preempted and the slot is given to another job. The preempted job is given the slot again after a round.

3. Shortest Job First: The least time consuming job in the queue goes first.

4. Priority Scheduling: Programmer decides the priority.



## John McCarthy

To sum up in one sentence, he's known as the Father of Artificial Intelligence (AI). Now in detail, he is a computer scientist who made significant contributions to computer science. He is the one who coined the term "Artificial Intelligence" and conducted the first AI conference in 1956. The objective of this conference was to explore ways in which a machine can be made to think, reason and act like a human. He believed that the way humans were capable of abstract thought, solving problems and self-improvement could be simulated into a machine by precisely describing it.

He created the Lisp Programming language in 1958 which was one of the first interpreter-based



languages and also a standard AI programming language even today. Lisp is also used in internet-based applications like credit-card fraud detection and airline scheduling. It also was the base for voice recognition technology including Siri.

## John Von Neumann

John Von Neumann is one of the greatest mathematicians of the modern day and was in fact considered to be the “last of the great mathematicians”. John published around 150 papers in his lifetime; 60 in pure mathematics; 20 in physics; 60 in applied mathematics. John was born in 1903 in Hungary and was observed to be very intelligent since birth. Relatives would play a game of memory with him on gatherings, where he would be given some random pages in a telephone book and asked to memorize in some time; people would randomly give out names and John would answer their telephone numbers. He made major contributions to the field of Mathematics - Functional Analysis, Foundation of Mathematics, Numerical Analysis, Functional Analysis.



Physics: He played a major role in the application of operator theory to Quantum Mechanics, HydroDynamics and Fluid Dynamics and more.

Computer Science: Laid the foundation of modern day computer architecture (Von Neumann architecture), Linear Programming, Game Theory, Stochastic computing.

## Joli OS

Joli OS is a free open source cloud-based operating system that can just make your netbooks dazzle with an amazing interface. It was released in 2008 by the french company Jolicloud. JoliOS is built on Ubuntu, Linux and Chromium. It is based on the earlier product by the company Joli Drive, which has an HTML5 interface. Since its release, it's one of the most popular choices for old PCs and netbooks with over 2 million users around the world. It's simple to install and comes with a lot of pre-installed apps that you can access over the cloud. Though it is designed for

cloud, it works well offline too. It provides online backup options and a wide array of social networking options. It's source code is hosted on Github and is maintained by a group of volunteers along with developers from Jolicloud. Among a few cons of Joli OS are a long installation time, low battery life and a long boot procedure.



## Jonathan Blow

Jonathan Blow is the hero of the independent game development community best known for his super-hit adventure-puzzle game "Braid". Braid was published by Microsoft Game Studios on Xbox first in 2008 and then on PC in 2009.

Blow became famous because he went through a lot of trouble in making his game, Braid. When we mean trouble, we mean \$40,000 debt from his friends, working alone on the game for four long years in a tiny apartment in San Francisco and investing more than \$200,000 of his own money into this game.



After all the trouble, Braid won the IGF Best Game of the Year in 2006 and was finally published by Microsoft. Braid was considered to be one of the most innovative and beautiful puzzle games of all time and received a positive response from gamers and critics.

Blow is working on his next title - "Witness" since 2009 (four years), which is a 3D puzzle adventure game based on a stranded island.

## Joomla

Joomla is an open source content management platform like Drupal and WordPress. Joomla was released in October by Mire International

Pvt. Ltd. and was developed by a team of developers led by Johan Janssens, one of the leading technopreneurs who believe in open software distribution.



Joomla is used by many major Organizations like Microsoft, Harvard, MTV for their websites. Joomla has a lot of variety in terms of themes of websites; it boasts more than 6000 free themes on the official site and many more by independent developers and about 3% of the websites worldwide use Joomla.

When compared to other CMSes like WordPress, Joomla is known for its safety and security and hence is used in a lot of e-commerce websites and online payment sites. Joomla templates control the layout, design and structure of the website and Joomla gives a plethora of template options according to the need of the website (Business, Blog, etc).

## Journey

Journey is one of the most critically acclaimed, beautiful and mesmerising games of recent times. It was made by an independent game development studio named TGC (That Game Company), who have a legacy of making games that stimulate human emotions like Flower, Flow and Cloud. Journey was published by Sony Entertainment for Sony PS3 and was distributed through PSN. Journey went on to become the most downloaded game on PSN of all time.



Journey is based on mutual trust and collaboration and not on violence and combat. It allows two players to collaborate, help each other and continue their mystical journey onto a mountain. The two players cannot speak, chat or communicate in any way and hence would never get to know who they played with. There are no missions or rewards or any temporary motivational game mechanic. Journey deals with actual human emotions and let players decide what they want to do and how they want their journey to be. Journey received many "Game of the year" awards and was nominated for best sound track for 2013 Grammy awards.

## Joystick

Remember those days? You as a kid playing video games with a joystick in hand? Those Fire buttons, turning and twisting the stick to win the race. The Joystick was one of the first input controls used in video-games.

In fact, the first videogame ever made in 1958, Tennis for Two used a Joystick as an input control. After that, in the 60s and 70s, it was one of the most widely used input systems in videogames like Space-War and many others.

Technically, a joystick is a device which has a stick that can be moved to indicate direction to the device it is controlling. In the 90s, analog sticks and gamepads started becoming famous and joysticks got replaced.

Apart from its popularity in video games Joysticks also see major use in Aircraft and have been in use since 1908. This concept is also seen in the early design of mobile phones. The four way button that helps people navigate in non-touch devices is more like a miniature joystick.



## JPEG

JPEG is short for Joint Photographic Experts group that is responsible for developing and maintaining the standards of compression algorithms for Digital files. This group specifies the standard for the codec which defines compression and decompression techniques for various types of visual data compression.

Any graphical image produced by the set of standards given by this group is called a JPEG image. The file is created by selecting a compression quality from the range of algorithms suggested. While saving the image in this format, it is important to understand the trade-off between quality and size; the higher the quality the higher the size and hence an option has to be compromised upon. The main disadvantage with JPEG compression is that transparency is lost.



## JQuery

To start with this might look like the name of another language, but it is not. It is basically a well-written JavaScript library that helps programmers easily transverse HTML documents, handle event methods, manipulate CSS documents, effects & animations and Ajax interactions. So, to work on JQuery, one needs to know JavaScript, HTML and CSS. This helps programmers use JavaScript with ease on websites as it's basically a "write less, do more" library.



The JQuery library consists of lot of common tasks that website developers use and combines these big lines of code into functions that can be called easily with a single line of code and hence making it fast and efficient. It was released in January 2006 at BarCamp NYC by John Resig and is now used in more than 55% of the top 10,000 most visited websites, making it the most popular JavaScript library in the world.

## JSON

JavaScript Object Notation is an independent data exchange format which is human-readable. It supports only text and numbers but not binary values.

JSON is basically a better alternative to XML and is considered to be more readable and more compatible with a lot of parsers.

The first use of what was not yet termed JSON was done by some guys at NetScape who were using Java Array Literals for data communication in 1996. They were using this as an alternative to the tedious XML format, but didn't give it a name or publicise it.



Five years later, Doug Crockford of Yahoo was trying to achieve something similar and discovered the concept of JSON, named it and shared it. So, technically he discovered JSON.

Even though JavaScript is part of the name, JSON, it is language-independent and works on all compilers. Apart from JSON and XML, other data exchange formats include OGDL, YAML, CSV.

## Just Enough Operating system

JeOS or Just Enough Operating system (pronounced as Juice) is a customised lightweight operating system that is specific to a particular software appliance. Software appliance is any software application that can be clubbed with JeOS for it to be able to run on a particular device. JeOS just fits the need of a particular software appliance and has minimum applications and third party tools required to run the appliance. JeOS leads to the software appliance being small and light weight and often more secure than an application running on a generic OS. Moreover, integrating the JeOS and the application together makes the installation and startup procedures really easy. A typical JeOS consists of OS Core such as kernel, drives, minimum OS maintenance tools such as task manager, minimum user functions and a repository of the application package.



## Just In Time Compiler

Just-In-Time Compiler is a type of compiler that compiles the bytecode into the device-specific machine language. It is what makes the multi-platform languages like Java run on multi-platforms quickly and efficiently. Technically, languages like Java's compiler turn the high-level code into an intermediate representation known as "ByteCode". ByteCode is platform independent and cannot be run on any machine directly. That's where JIT compilers come into picture. They translate this code into something that the machine can read and is then sent to the processor for execution. If JIT compilers don't exist, the same code has to be recompiled on each platform or maybe even re-written according to the platform, each time the code has to be run on a new device/machine. Apart from Java, even Microsoft's .Net framework uses JIT compilers. The concept of JIT was introduced in 1960 with the introduction of LISP by IBM.

## JXTA

JXTA (pronounced jux-ta) in simple words is a P2P protocol specification. P2P (Peer-to-peer) networking is a model where any node can act as a server or a client. In a traditional networking model, there is a spe-



cific client and a server and the server can never have the privileges of a client. But, that's not the case in P2P which opens up a lot of possibilities. JXTA is open-source and was introduced by Sun Microsystems in 2001. JXTA defines a set of flexible protocols that can be used to build any P2P application that can also be changed easily to adapt depending upon the application and the platform. It provides the basic functions of P2P like creating, finding, joining, leaving and monitoring groups. Even though there is no specific programming language or a specific runtime environment, java is generally the most preferred one. Another protocol that is widely used is Jini; but it requires a Java virtual machine on each of the machines unlike JXTA.

## Jython

Jython is an open source implementation of the Python programming language combined with Java platform and tools. Using Jython, developers can use a combination of awesome features from both Java and Python in their applications. They can compile the Python Source code to Java bytecode using Jython and then run the code on any java friendly platform including a JVM.

With Jython, Python developers can access almost all java libraries and use embedded scripting to include Jython libraries. Jython facilitates interactive experimentation which is about using a real time interpreter and supports RAD (Rapid Application Development) by utilizing Python's capability of reducing program code lengths to about one-half. The first version of Jython was developed by Jim Hugunin in 1997 after which it was moved to Sourceforge.net by Barry Warsaw. Jython was named Jython 2.0 then and since then it has been developed by a group of volunteers like any other open source software.

