VOL. II

ENCYCLOPEDIA TECHNICA

F to J

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ENCYCLOPEDIA TECHNICA

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CHAPTERS

ENCYCLOPEDIA TECHNICA

JUNE 2013

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Introduction

Back by popular demand, we present to you the second edition of the long awaited Encyclopedia Technica series of booklets! As with Vol. I, we try to go beyond what regular encyclopedias offer.

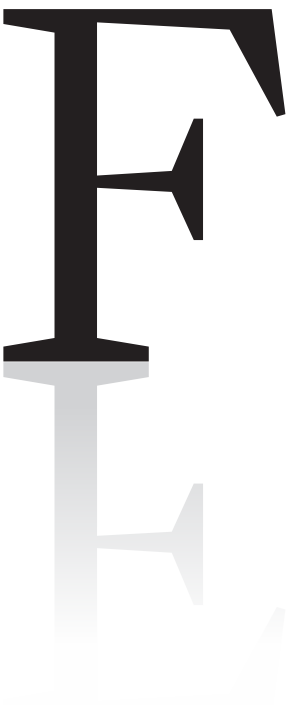
Encyclopedias are informative, and take great pains to try and cover as much of everything that they can. Wikipedia for instance is perhaps the largest Encyclopedia there is, and is a fantastic repository of knowledge, but so verbose that you could spend the rest of your life reading every entry and not get even quarter of the way there before the Grim Reaper comes a-knocking. It's a repository of everything, when sometimes all we just want a repository of everything important instead.

Digit has always tried to help you navigate the confusing world of technology, and that's where our Jargon Busters for confusing terms, and little trivia books (remember Digit mini?) come in. However, there wasn't one single collection for everything that's important until we started off with our Encyclopedia Technica series.

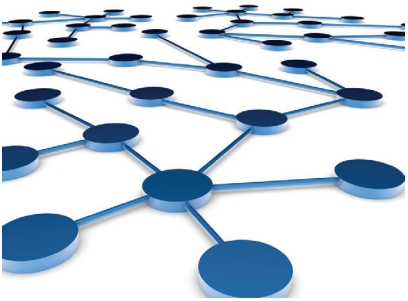
With this new edition of Encyclopedia Technica, we're continuing our mission of trying to sift through the millions of tech terms and notable people out there to come up with a must know list – discarding what we think you already know, or don't need to know. We've also thrown in some interesting trivia as always. For example:

Did you know that before 2007 Facebook's homepage contained what most people believed to be Al Pacino's face, and it was dubbed 'the Facebook Guy'? Turns out the image was actually sampled from a clipart in an early version of Microsoft Office and his actual identity is musician Peter Wolf.

You'll find many more such nuggets peppered throughout the book. So without further ado, we give you the second part of the Encyclopedia Technica... remember to write in to *editor@thinkdigit.com* and let us know your thoughts about this book, and what you would like more of in the next edition.



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 the before 2007 it contained what most people believed was Al Pacino's – 'the Facebook Guy'. It was actually a musician Peter Wolf.

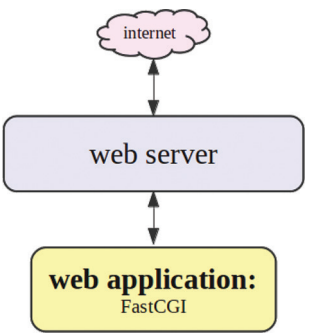
Facebook f8

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 feature 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.

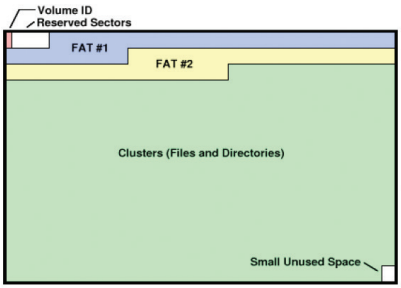
FastCGI

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.

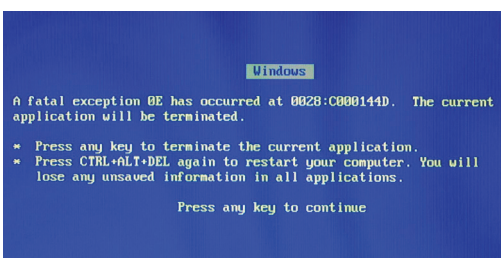
FAT32



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.

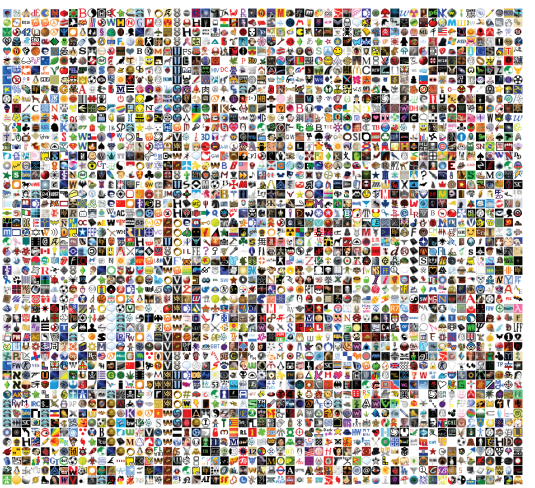


Fatal errors occur when invalid code or data has been accessed, an illegal instruction has been run, or an operation is disallowed from the current CPU cycle or the simplest of them all when a program attempts a divide by zero.

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.

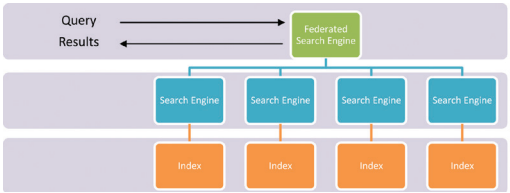
Favicon

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. Thought a federated search takes more resources in terms of time, it produces a superior level of results.

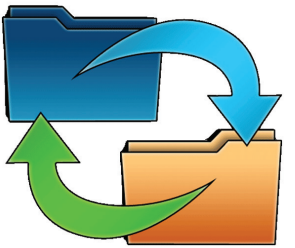
FidoNet

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

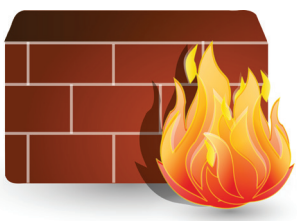
FileZilla is an FTP software which is free and cross platform. What started off as a computer science class project grew to be one of the best FTP software and was even voted 'Project of the Month' by SourceForge in November 2003. The credit for the development of FileZilla goes to Tim Kosse and two 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.

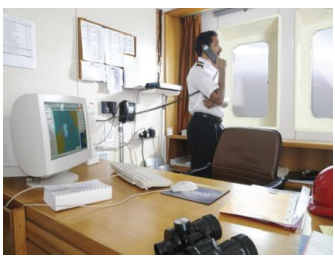
Currently the maximum capacity that a flash drive can store is 1 terabyte (1TB) with a ten year shelf storage time. A flash drive is made up of a small printed circuit board plus the USB connector.

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 maritimers 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.

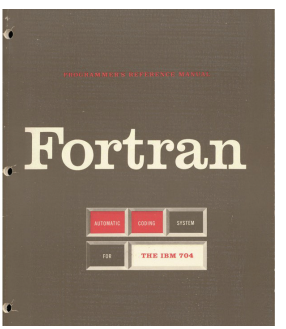
There is also a protocol called ReFlex which allows two way messaging.

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 readymade 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

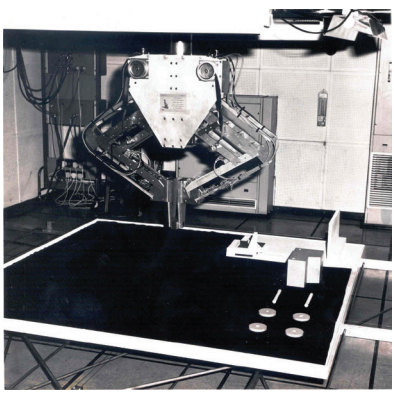
Fred Baker is an American engineer who specializes in developing computer network protocols for the internet. He is the current Internet Engineering Task Force (IETF) Chair. IETF is the body that develops standards for the internet. He has also served on the Internet Architecture Board and the Internet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

Born in 1952 he attended the New MexicoInstitute 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 ofthe 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 toreprogram 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.

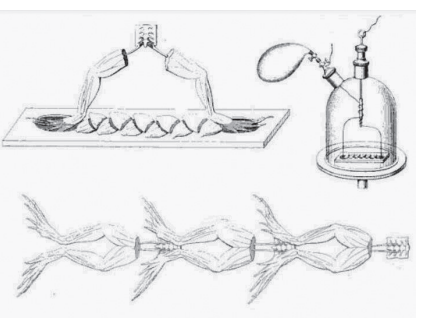
Freddy is currently on display in Edinburgh's Royal Museum.

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.

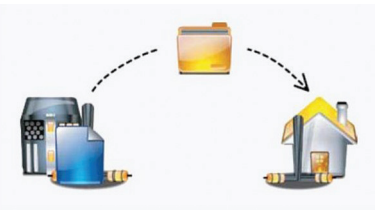
In computer systems a file manager serves as a front end where as the back end is the shell that launches programs of the operating system in response. Sometimes there are a lot of layers in between the front end and the back end which perform mediatory functions and this is called the middleware.

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 Fusker software stores the data locally on the client machine eliminating the need for excessive bandwidth.

The first Fusker technology was created by CarthagTuek. Fusker is a Danish term which means a person who slyly does work outside official guidelines. Some consider Fusker 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.


G

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

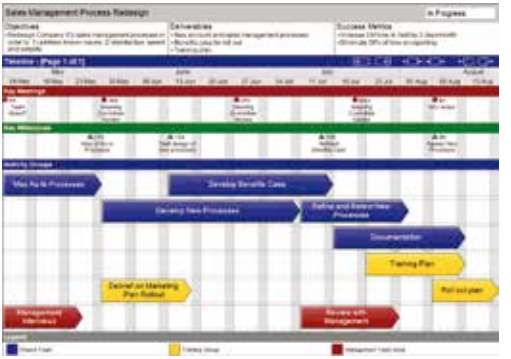
giving you shopping credits for running for say, an hour to lure you into stores or just normal credits to encourage you to stay healthy. It could incorporate a trip to public libraries with a game or make taking care of a street dog to earn credits a part of a game. Today, Gamification is a field of 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 1019 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

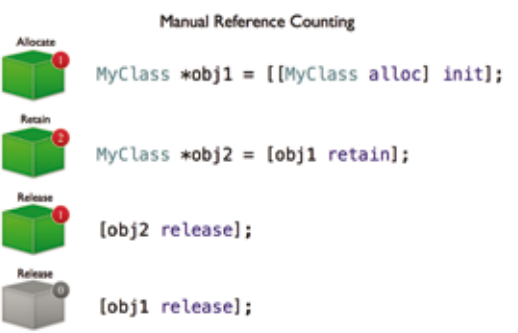
Introduced by Henry Gantt in around 1910, Gantt Chart is a widely used graphic representation of project schedules by various individuals and organizations. It's basically a bar chart that is prepared to aid project



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*, *Gear of War II* and *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.

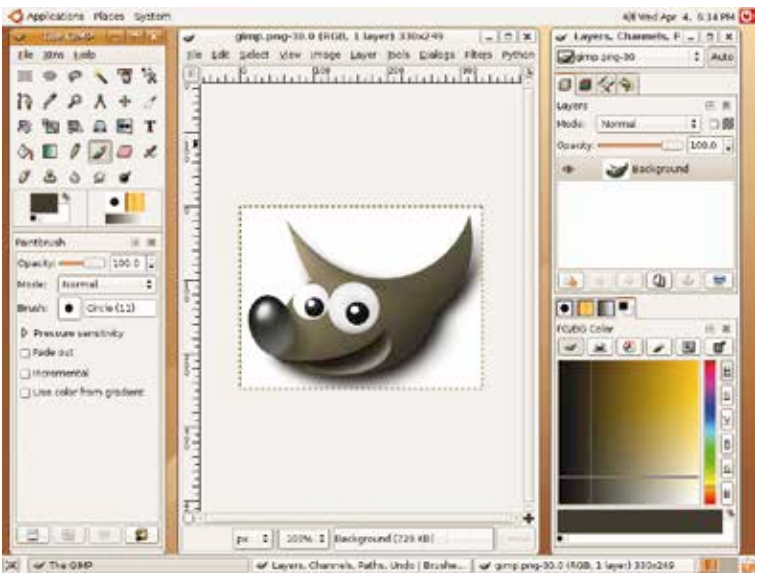
Ghostscript

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 PeterMattis. 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 Wamstrathand 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

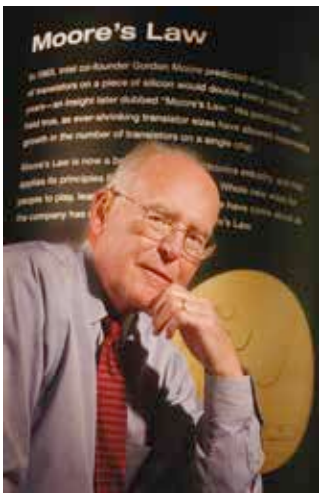
Google Earth is a software that projects a 3D virtual globe of the earth that displays map details and geographical information to users. It was originally created by a CIA-funded company called KeyHole Inc., which was acquired by Google later in 2004. Before it was changed to Google Earth, it was called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

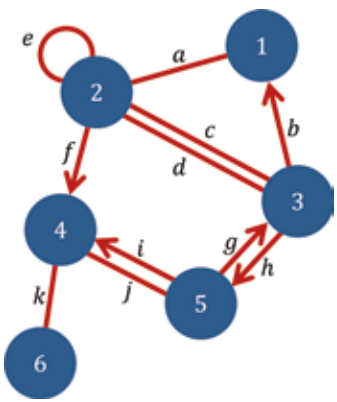
GPU or Graphics Processing Unit is a computing device capable of performing very high amounts of parallel processing and is majorly used for graphics rendering. Although, with leaps in technology, GPUs have evolved from being just graphics processors to more sophisticated processors that can be used 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-

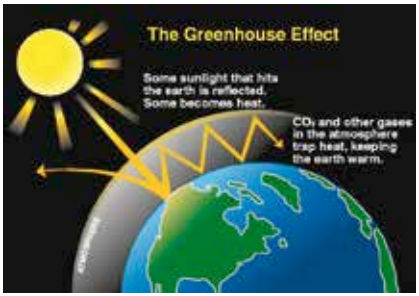
works and flow of data. The graphs studied in graph theory shouldn't be confused with the graphs of functions or other kinds of graphs. The origin of Graph Theory dates back to 1736 where it was first mentioned in mathematician LeonhardEuler's paper "Seven bridges of Konigsberg". Since then it has been 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 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

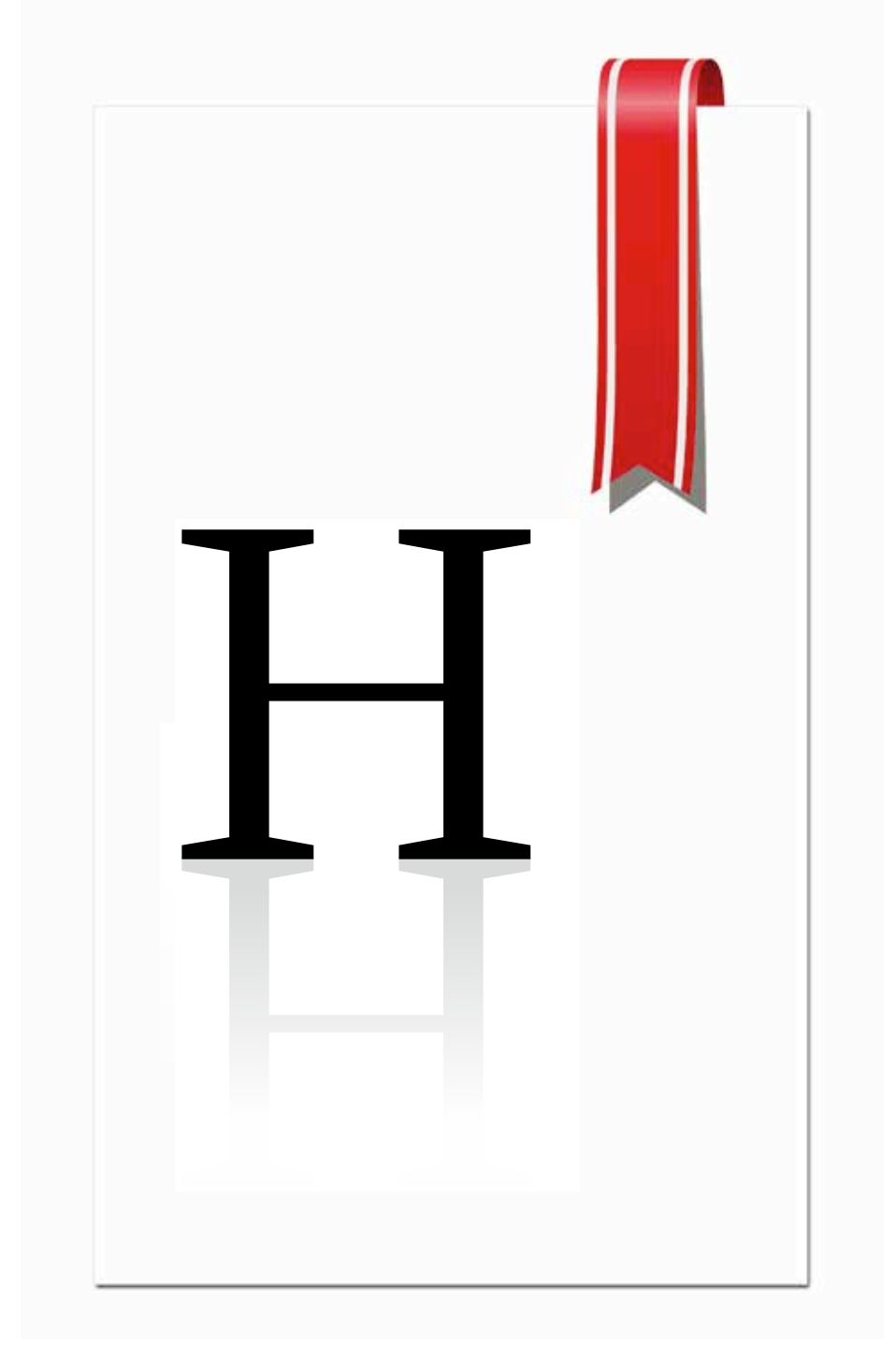
one system to be solved such as climate modelling can count on the distributed nature of grid computing. Problems that involve data intensive calculations such as mapping can also be solved using grid computing. Since solutions to cryptographic ciphers need high computational power, they're another great 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 Gitthat provide both, command line and GUI capabilities.


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 programmers 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

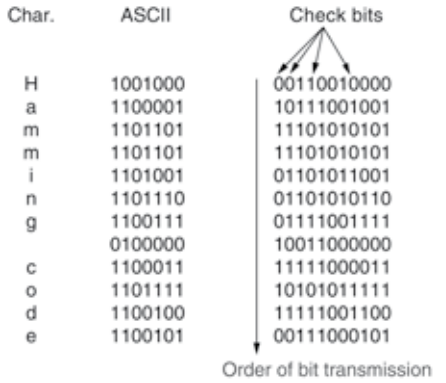
at Valve, was considered to be quite ambitious for a new game studio and had plenty of difficulty finding a publisher that would pre-fund the game. At last, Sierra Studios published *Half-Life* which went on to get highly positive reviews. Counter-Strike, one of the most played first-person shooter games 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 TBand 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 micro-blogging 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 #1reasonwhy 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 microcomputer 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

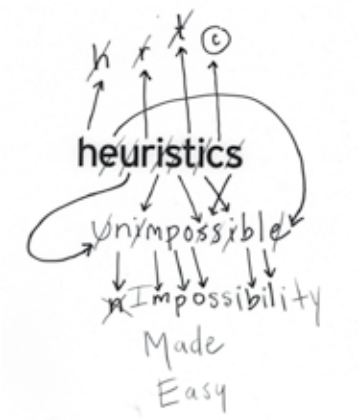
Hertz was one of the three scientists who made significant contribution to Quantum Physics back in the day; the other two being James Clerck

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.

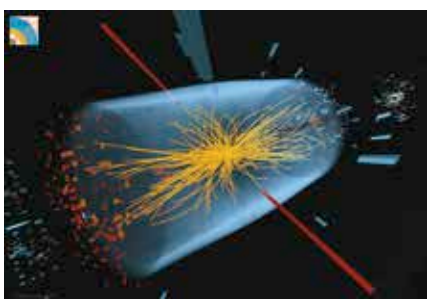
Heuristics



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

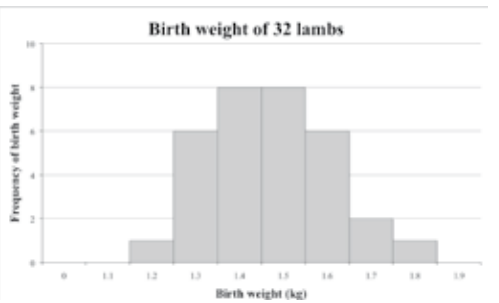


Higgs Boson or the "God Particle" became quite a sensation after it was empirically proven in 2012 and is one of the most important discoveries in Physics which lets scientists understand the universe better. To understand what Higgs Boson ac-

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.

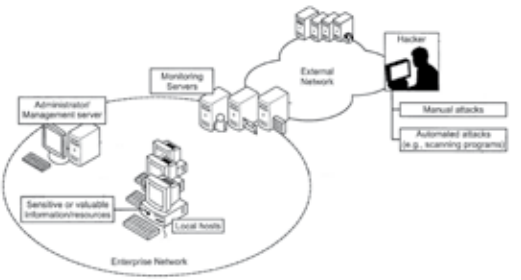
HITACHI
Inspire the Next

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

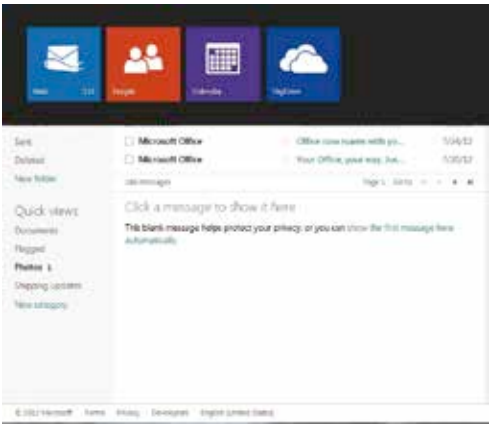


HoneyPot is a computer system established by organizations and institutions to protect their network and data from hackers and crackers. This system doesn't just protect, it also traps the hacker, through which more details about the attack and the hacker can be found out. HoneyPot is generally set up 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 HoneyPotsare 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

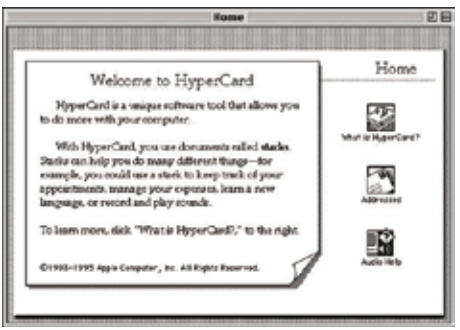
HCI or Human Computer Interaction is a broad field of study that acts as an umbrella to various concepts about machine and human interaction. Since it draws its origins from both the human and machine aspects, it covers Computer Graphics, Artificial Intelligence, Affective Computing and Natural Language 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 miceand 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 learns 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. Tin 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.

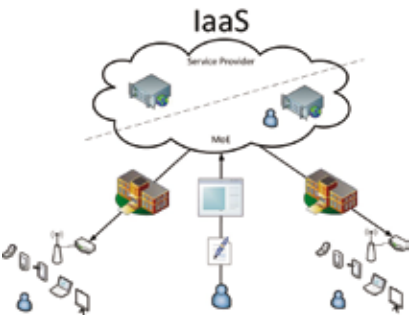
I

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 FORTAN, 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. Evan 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 GSMnetwork 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 Googleservers

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.

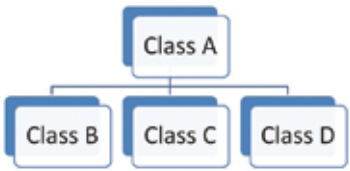
Infosys Corp

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 singleness. 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

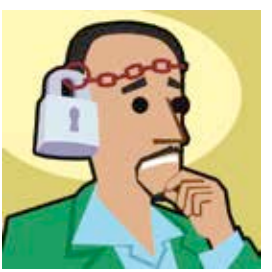
two ways: Category Sorting, where sorting is done on the basis of categories like "All students who took Maths"; or Intensity Sorting, where sorting is done in ascending order or alphabetical order. Insertion Sort belongs to the latter category. Insertion Sort algorithm sorts an array of things by repetitively 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-

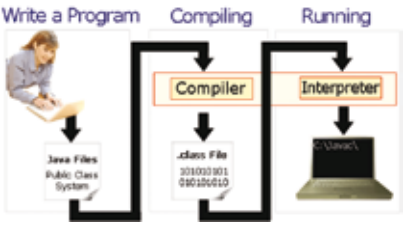
other called 'host', and these hosts have IP addresses that uniquely identify them. Each message that is sent is divided into little chunks called 'packets', which contain a header (that specifies source, destination and other information about the data) and the message data itself. The packet is transferred 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.

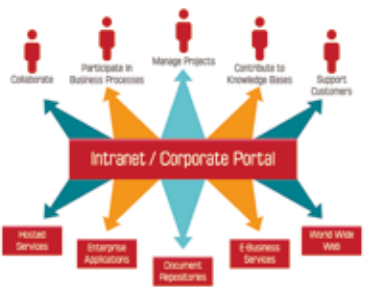
Interpreter

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-taskingabilities 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 messages 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 contributions 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.

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

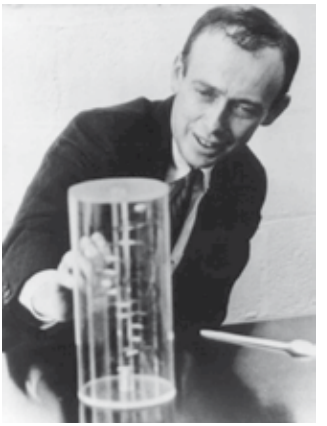
James Chadwick is an English Physicist who made a significant contribution to atomic physics. He was awarded the Nobel Prize in 1935 for discovering the Neutron. It started in 1911, when after his graduation he worked under Prof. Rutherford who was working in-depth in atomic physics. From 1913, he served 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/slows 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 power-ups. 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, HydroDymnamics 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 preinstalled 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.

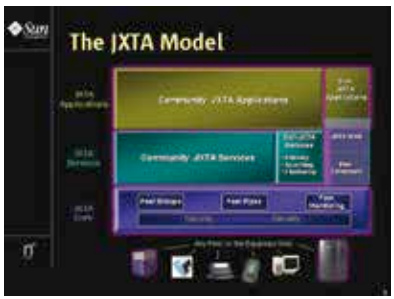
Just In Time Compiler

Just-In-TimeCompiler 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 Pythons 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.

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