واحد ساری

Technical English

For

Computer and Information Technology
Students

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Contents:

Introduction:

Computer

Technically, a computer is a programmable machine. This means it can execute a programmed list of instructions and respond to new instructions that it is given. Today, however, the term is most often used to refer to the desktop and laptop computers that most people use. When referring to a desktop model, the term "computer" technically only refers to the computer itself -- not the monitor, keyboard, and mouse. Still, it is acceptable to refer to everything together as the computer. If you want to be really technical, the box that holds the computer is called the "system unit."

Some of the major parts of a personal computer (or PC) include the motherboard, CPU, memory (or RAM), hard drive, and video card. While personal computers are by far the most common type of computers today, there are several other types of computers. For example, a "minicomputer" is a powerful computer that can support many users at once. A "mainframe" is a large, high-powered computer that can perform billions of calculations from multiple sources at one time. Finally, a "supercomputer" is a machine that can process billions of instructions a second and is used to calculate extremely complex calculations.

Hardware

Computer hardware refers to the physical parts of a computer and related devices. Internal hardware devices include motherboards, hard drives, and RAM. External hardware devices include monitors, keyboards, mice, printers, and scanners.

The internal hardware parts of a computer are often referred to as components, while external hardware devices are usually called peripherals. Together, they all fall under the category of computer hardware. Software, on the other hand, consists of the programs and applications that run on computers. Because software runs on computer hardware, software programs often have system requirements that list the minimum hardware required for the software to run.

Software

Computer software is a general term that describes computer programs. Related terms such as software programs, applications, scripts, and instruction sets all fall under the category of computer software. Therefore, installing new programs or applications on your computer is synonymous with installing new software on your computer.

Software can be difficult to describe because it is "virtual," or not physical like computer hardware. Instead, software consists of lines of code written by computer programmers that have been compiled into a computer program. Software programs are stored as binary data that is copied to a computer's hard drive, when it is installed. Since software is virtual and does not take up any physical space, it is much easier (and often cheaper) to upgrade than computer hardware.

Unit 1

Introduction to Computer Software

For as long as there has been computer hardware, there has also been computer software. But what is software? Software is just instructions written by a <u>programmer</u> which tells the computer what to do. Programmers are also known as 'software developers', or just plain 'developers'.

Software programs can have millions of lines of code. If one line doesn't work, the whole program could break! Even the process of starting software goes by many different names in English. Perhaps the most correct technical term is '<u>execute</u>', as in "the man executed the computer program." Be careful, because the term 'execute' also means (in another context) to put someone to death! Some other common verbs used to start a software program you will hear are 'run', 'launch, and even 'boot' (when the software in question is an operating system).

Software normally has both <u>features</u> and <u>bugs</u>. Hopefully more of the former than the latter! When software has a bug there are a few things that can happen. The program can <u>crash</u> and <u>terminate</u> with a confusing message. This is not good. <u>End users</u> do not like confusing <u>error</u> messages.

Sometimes when software stops responding you are forced to manually <u>abort</u> the program yourself by pressing some strange combination of keys such as ctrl-alt-delete.

Because of poor usability, documentation, and strange error messages, programming still seems very mysterious to most people. That's too bad, because it can be quite fun and rewarding to write software. To succeed, you just have to take everything in small steps, think very hard, and never give up.

Everyone studying Information Technology should learn at least one programming language and write at least one program. Why? Programming forces you to think like a computer. This can be very rewarding when dealing with a wide range of IT-related issues from tech support to setting up PPC (pay-per-click) advertising campaigns for a client's web site. Also, as an IT professional, you will be dealing with programmers on a daily basis. Having some understanding of the work they do will help you get along with them better.

Software programs are normally written and compiled for certain hardware platforms. It is very important that the software is <u>compatible</u> with all the components of the computer. For instance, you cannot run software written for a Windows computer on a Macintosh computer or a Linux computer. Actually, you can, but you need to have special emulation software or a virtual machine installed. Even with this special software installed, it is still normally best to run a program on the kind of computer for which it was intended.

There are two basic kinds of software you need to learn about as an IT professional. The first is <u>closed source</u> or <u>proprietary</u> software, which you are not free to modify and improve. An example of this kind of software is Microsoft Windows or Adobe Photoshop. This software model is so popular that some people believe it's the only model there is. But there's a whole other world of software out there.

The other kind of software is called <u>open source</u> software, which is normally free to use and modify (with some restrictions of course). Examples of this type of software include most popular programming languages, operating systems such as Linux, and thousands of applications such as Mozilla Firefox and Open Office.

Now imagine you find a bug in a proprietary code base such as Microsoft Word. What can you do? Not much, just file a bug report and hope someone fixes it at some point.

Good programmers love code and they want access to it. Hiding the code from a programmer is like hiding the car engine from an auto mechanic.

Unit 1 Objectives:

Abort
To end a program or a process before its completion
When the word processor application crashed, the user had to abort the program and lose all his unsaved changes.

Bug
An error in a computer program
An average developer will create one bug for every 10 lines of code written.

Closed source
Software in which the license stipulates that the user cannot see, edit, or manipulate the source code of a software program
I wanted to develop a new feature for the program, but I couldn't because it was closed source

Compatible
Capable of being used without modification
The IBM 360 was the first commercially successful computer family with a wide range of compatible parts.

Crash
A computer failure due to faulty hardware or a serious software bug
The user was advised to reboot the computer after a serious crash in which the computer no longer responded.

End user
A person who uses a product or service on a computer
Developers must maintain a close relationship with end users if they want to have a successful career.

Error
An incorrect action attributable to poor judgment, ignorance, or inattention
The computer reported a "division by zero" error and automatically aborted the program.

Execute
To start a program on a computer
The program was set to execute every night at midnight.

Feature

Something a computer program is "supposed" to do; these are often reasons to use a particular program or upgrade to a more recent version

The man upgraded his copy of Word because of a new feature that allowed him to spell-check documents in Spanish.

Open source

A program in which the code is distributed allowing programmers to alter and change the original software as much as they like

The article stated that many programmers prefer open source solutions because they can modify features and fix bugs without waiting for an upgrade or patch from the manufacturer.

Programmer

A person who writes or modifies computer programs or applications

The software company needed to hire three new programmers to help debug their flagship application.

Proprietary

Privately developed and owned technology

Because of proprietary code, you may not modify or redistribute the source code of Windows or Macintosh operating systems.

Unit 2

The Software Development Cycle

Without software applications, it would be very hard to actually perform any meaningful task on a computer unless one was a very talented, fast, and patient programmer. Applications are meant to make users more productive and get work done faster. Their goal should be flexibility, efficiency, and user-friendliness.

Today there are thousands of applications for almost every purpose, from writing letters to playing games. Producing software is no longer the lonely profession it once was.

Software is a big business and the development cycle goes through certain stages and versions before it is released.

Applications are released in different versions, including <u>alpha versions</u>, <u>beta versions</u>, <u>release candidates</u>, trial versions, full versions, and upgrade versions. Even an application's instructions are often included in the form of another application called a <u>help file</u>.

Alpha versions of software are normally not released to the public and have known bugs. They are often seen internally as a 'proof of concept'. Avoid alphas unless you are desperate or else being paid as a 'tester'.

Beta versions, sometimes just called 'betas' for short, are a little better. It is common practice nowadays for companies to release public beta versions of software in order to get free, real-world testing and feedback. Betas are very popular and can be downloaded all over the Internet, normally for free. In general you should be wary of beta versions, especially if program stability is important to you. There are exceptions to this rule as well. For instance, Google has a history of excellent beta versions which are more stable than most company's releases.

After the beta stage of software development comes the release candidates (abbreviated RC). There can be one or more of these candidates, and they are normally called RC 1, RC 2, RC 3, etc. The release candidate is very close to what will actually go out as a feature complete 'release'.

The final stage is a 'release'. The release is the real program that you buy in a shop or download. Because of the complexity in writing PC software, it is likely that bugs will still find their way into the final release. For this reason, software companies will offer <u>patches</u> to fix any major problems that end users complain loudly about.

Applications are distributed in many ways today. In the past most software has been bought in stores in versions called retail boxes. More and more, software is being distributed over the Internet, as open source, <u>shareware</u>, <u>freeware</u>, or traditional proprietary and <u>upgrade</u> versions.

Unit 2 Objectives:

Alpha version
Normally the first version of a software application that is feature-ready and released to testers
Alpha versions are rarely released to the public and frequently contain serious bugs.

Beta version
A software program used for testing purposes before it is released to the public
The beta version of our program was released for testing yesterday.

Freeware
Software distributed without cost by the developer which normally cannot be modified or sold without permission
The woman said she always searched for freeware versions of an application before buying one.

Help file
A file containing instructions how to use a certain feature or program
The help file often contains useful program shortcuts.

Patch
A software update intended to fix bugs or security holes in a software release
Software patches and other updates should be available on a software publisher's web site.

RC (release candidate)
A piece of software that has passed the beta testing stage and is almost ready to be released to the public
Apple refers internally to a release candidate as "the golden master."

Shareware
Proprietary software which can be distributed freely but is limited by features and/or time limit until a full version is purchased
Many companies have a shareware version of their software with a 30-day free trial.

Upgrade
To replace an older version of software or hardware with a newer version
The man needed to upgrade his office suite so he could export files as XML.

Unit 3

Learning about Operating Systems

An <u>operating system</u> is a generic term for the <u>multitasking</u> software layer that lets you perform a wide array of 'lower level tasks' with your computer. By low-level tasks we mean:

- the ability to <u>log on</u> with a username and password
- <u>log off</u> the system and switch users
- <u>format</u> storage devices and set default levels of file <u>compression</u>
- install and upgrade <u>device drivers</u> for new hardware
- install and launch applications such as word processors, games, etc
- set <u>file permissions</u> and <u>hidden files</u>
- terminate misbehaving applications

A computer would be fairly useless without an OS, so today almost all computers come with an OS pre-installed. Before 1960, every computer model would normally have its own OS custom programmed for the specific architecture of the machine's components. Now it is common for an OS to run on many different hardware configurations.

At the heart of an OS is the <u>kernel</u>, which is the lowest level, or core, of the operating system. The kernel is responsible for all the most basic tasks of an OS such as controlling the file systems and device drivers. The only lower-level software than the kernel would be the BIOS, which isn't really a part of the operating system. We discuss the BIOS in more detail in another unit.

The most popular OS today is Microsoft Windows, which has about 85% of the market share for PCs and about 30% of the market share for servers. But there are different types of Windows OSs as well. Some common ones still in use are Windows 98, Windows 2000, Windows XP, Windows Vista, and Windows Server. Each Windows OS is optimized for different users, hardware configurations, and tasks. For instance Windows 98 would still run on a brand new PC you might buy today, but it's unlikely Vista would run on PC hardware originally designed to run Windows 98.

There are many more operating systems out there besides the various versions of Windows, and each one is optimized to perform some tasks better than others. Free BSD, Solaris, Linux and Mac OS X are some good examples of non-Windows operating systems.

Geeks often install and run more than one OS on a single computer. This is possible with dual-booting or by using a virtual machine. Why? The reasons for this are varied and may include preferring one OS for programming, and another OS for music production, gaming, or accounting work.

An OS must have at least one kind of user interface. Today there are two major kinds of user interfaces in use, the command line interface (CLI) and the graphical user interface (GUI). Right now you are most likely using a GUI interface, but your system probably also contains a command line interface as well.

Typically speaking, GUIs are intended for general use and CLIs are intended for use by computer engineers and system administrators. Although some engineers only use GUIs and some diehard geeks still use a CLI even to type an email or a letter.

Examples of popular operating systems with GUI interfaces include Windows and Mac OS X. Unix systems have two popular GUIs as well, known as KDE and Gnome, which run on top of X-Windows. All three of the above mentioned operating systems also have built-in CLI interfaces as well for power users and software engineers. The CLI in Windows is known as MS-DOS. The CLI in Max OS X is known as the Terminal. There are many CLIs for Unix and Linux operating systems, but the most popular one is called Bash.

In recent years, more and more features are being included in the basic GUI OS install, including notepads, sound recorders, and even web browsers and games. This is another example of the concept of 'convergence' which we like to mention.

A great example of an up and coming OS is Ubuntu. Ubuntu is a Linux operating system which is totally free, and ships with nearly every application you will ever need already installed. Even a professional quality office suite is included by default. What's more, thousands of free, ready-to-use applications can be downloaded and installed with a few clicks of the mouse. This is a revolutionary feature in an OS and can save lots of time.

Unit 3 Objectives:

CLI (command line interface)
A text-only link between a computer and its operator
The technician enjoyed administering the Unix server with the CLI tools.

Compression
A method of packing data in order to save disk storage space or download time
Zip and mp3 are two common file compression examples.

Device driver
Software which converts the data from a component or peripheral into data that an operating system can use
The IT support technician asked the end user if he had recently updated any device drivers.

File permissions
A set of strict rules for controlling read, write, and execute access to a file or directory
The company switched from FAT32 to NTFS file system because the former did not support file permissions.

Format
Prepare a device to store data, erasing any existing data
One must format a flash memory drive or a hard disk drive before it can used to store data.

GUI (graphical user interface)
An icon based link between a computer and its operator
Most users prefer an icon-based GUI over a command line option.

Hidden file
A file which does not appear by default in a directory listing; normally for security reasons or to spare confusion in end users
The administrator was upset when the end user found a way to display and then delete several hidden files.

Kernel
The fundamental part of an operating system responsible for providing access to the machine's hardware
The system administrator needed to upgrade the kernel in order to provide native support for Serial ATA drives.

Linux

An open source version of Unix developed by a volunteer team of programmers around the world.

Linux was originally developed by Linus Torvalds, who wanted a free Unix-like operating system that ran on standard PC hardware.

Log off

To terminate a connection to a computer or network

The server was set to automatically log off users after 10 minutes of inactivity.

Log on

To enter information related to an account name and its password in order to access a computer resource

The computer user could not log on because he forgot his username and password.

Multitasking

Concurrent execution of two or more tasks by a processor

UNIX is the original multitasking environment and was designed from the beginning to share resources over a network.

OS (operating system)

A GUI or CLI software link between the computer and operator; also provides a framework for productivity software such as an office suite, web browser, or programming languages

The programmer tested his Java code on many operating systems including: Windows, Linux, and Macintosh.

VM (virtual machine)

A software program which mimics the performance of one or more hardware devices in order to run software independently of the actual hardware

In order to run Java programs in Windows one needs to download an appropriate virtual machine.

X (X Window System)

A software toolkit for UNIX systems underlying numerous GUI window managers including KDE and Gnome

The man was surprised at how similar in functionality X was to Microsoft Windows.

Unit4

Computer Hardware Peripherals

Peripherals are a generic name for any device external to a computer, but still normally associated with its extended functionality. The purpose of peripherals is to extend and enhance what a computer is capable of doing without modifying the core components of the system. A printer is a good example of a peripheral. It is connected to a computer, extends its functionality, but is not actually part of the core machine.

Do not confuse computer peripherals with computer accessories. An accessory can be any device associated with a computer, such as a printer or a mouse pad. A printer is a peripheral, but a mouse pad is definitely not one. A mouse pad does not extend the functionality of a computer, it only enhances the user experience.

Peripherals are often sold apart from computers and are normally not essential to its functionality. You might think the display and a few vital input devices such as the mouse and keyboard would be necessary, but certain computers such as servers or embedded systems do not require mice, keyboards, or even displays to be functional.

Peripherals are meant to be easily interchangeable, although you may need to install new drivers to get all the functionality you expect out of a new peripheral device. The technology which allows peripherals to work automatically when they are plugged in is called plug and play. A plug and play device is meant to function properly without configuration as soon as it is connected. This isn't always the case however. For this reason some people sarcastically refer to the technology as 'plug and pray'.

Still, plug and play was a big deal when it was introduced in the 1990's. Before then, installing a new peripheral could take hours, and could even require changing some jumper settings, DIP switches, or even hacking away at drivers or config files. It was not a fun time except for real hardware geeks. With plug and play technology, all the nasty jumpers and DIP switches moved inside the peripheral and were virtualized into firmware. This was a clear victory for the common, nontechnical person!

Peripherals normally have no function when not connected to a computer. They connect over a wide array of interfaces. Some common ones from the past include: PS2 ports, serial ports, parallel ports, and VGA ports. These are all being replaced by some new standards including USB, Bluetooth, WIFI, DVI, and HDMI ports.

The most common peripheral linking device is probably USB technology. Why? USB is good because you can <u>daisy chain</u> a lot of peripherals together quickly, it is quite fast and growing ever faster in recent editions, and it even provides enough power to supply some smaller peripheral devices like <u>webcams</u> and <u>flash drives</u>.

Some peripherals are even used for security. A good example of this is the <u>dongle</u>. The dongle is often used to protect very expensive applications from software piracy.

Here is a list of common peripherals you should be familiar with as an IT professional. Keep in mind the list is always changing due to changing technologies:

- <u>monitors</u> or <u>displays</u>
- <u>scanners</u>
- <u>printers</u>
- external <u>modems</u>
- <u>dongles</u>
- <u>speakers</u>
- <u>webcams</u>
- external microphones
- external storage devices such as USB-based flash drives and portable hard disk drives
- input devices such as keyboards, mice, etc are normally considered peripherals as well.

Unit 4 Objectives:

Daisy Chain

To connect several devices one in back of another

The man daisy chained 3 portable USB drives to increase the storage on his laptop to 3 TB.

DIP switch

A set of electric switches using a dual in-line package design

A DIP switch is an attractive alternative to a jumper setup because there are no parts to lose.

Display

An output screen which contains visual information; some variants include: LED lights, CRT or LCD monitors, and virtual reality goggles

The almost man missed his connecting flight because the flight display at the airport showed nothing but a large "fatal error" message.

Dongle

A hardware device that plugs into a parallel or a USB port, acting as copy protection for a particular software application

The software no longer functioned when the man lost his dongle.

Modem

A device which converts digital signals into analog signals, and back again when needed

You normally need some type of modem to connect to the Internet from home, such as a cable modem or a DSL modem.

Monitor

A visual interface display between the computer and the operator; normally a large rectangular LCD, LED, or CRT device

The old CRT monitor needed to be replaced because it was flickering badly.

Plug and play

A term used to describe the technology where a peripheral device is automatically recognized and configured when it is detected

Thanks to plug and play technology, the new printer worked immediately after it was connected.

Printer

A peripheral device that produces a hard copy, normally paper, from data stored in a computer

Decent quality printers are very affordable, but the ink can be quite expensive.

Scanner

A device for capturing a binary digital image from a hard copy

A scanner can take a photograph or magazine article and digitize it.

Speaker

An internal or external device which converts electrical impulses into audible sound

The student turned up the speakers to play a new MP3 for his friends.

Webcam

Any specialized video camera designed to transmit video over the internet

Many websites allow video chat using webcams, but this sometimes brings out the worst in people.

Unit 5

Computer Storage vs. Computer Memory

In this unit you will learn the differences between computer memory and computer storage. Memory and storage are important concepts to master in Information Technology. The two terms are sometimes used interchangeably, so it is important to understand some key differences.

Computer memory needs to be quick. It is constantly feeding the CPU with data to process. Since nobody likes to wait for a computer, high-quality computers will have fast processors and lots of quick memory.

Computers do not normally process all the information they have at once. They also need to save some data for long term use. This is where storage comes in. Think of all the video files, mp3s , photos, documents, etc on your PC. These files are not always being processed by the CPU, they are mostly just hanging around waiting to be used at some point. Storage does need to be as quick as memory, but there does need to a lot more of it. This is a key difference between memory and storage.

Because memory needs to be much faster than storage, it is rather more expensive than storage per KB. A typical desktop computer today typically has between 512 MB and 8 GB of memory running at speeds of anywhere from 300 MHZ to 1.2 GHZ

Memory is almost always based on semiconductor technology. Examples of common computer memory include <u>RAM</u>, <u>ROM</u>, and <u>VRAM</u>. Memory is typically volatile in nature, meaning that it needs power in order to retain its state. There are exceptions however, such as <u>EPROM</u>s, which can retain their state even when the power is off.

Computer storage is typically cheaper, slower, and more plentiful than computer memory. Storage comes in many different types including <u>magnetic storage</u>, <u>optical storage</u>, and more recently <u>semiconductor storage</u>. Storage is typically non-volatile in nature, meaning that it retains its state even when the power is off. A typical computer today comes with anywhere between 50 GB and 1 TB of computer storage.

The most popular example today of magnetic storage is the hard disk drive. These devices use rotating, magnetically-charged platters to store data. Hard disk drives are popular because they can store a lot of data very reliably with relatively quick access times. Other examples of magnetic storage devices include the tape drive and diskette. Tape drives and diskettes are both good examples of legacy devices. It's unlikely they will even be made much past 2010.

Trends in computer storage are always changing. Now it looks as if traditional magnetic hard disk drives might eventually be replaced by SSDs or solid state drives. SSDs have many key advantages over magnetic storage including 1) no moving parts and 2) less power consumption. This makes them very good for laptops where battery life and overall durability can be big issues. If the technology continues to improve, we may even see them in desktop computers as well.

Optical storage is another technology strategy used in computer storage, and is particularly useful for sharing audio, video, and larger programs. Optical storage works by a laser burning or reading data off a plastic disc coated with various types of light sensitive material in it. Due to reliability and space limitations, optical storage is seldom used as a primary means of data storage.

Removable Storage

The main idea behind removable storage is that data can be easily transferred between computers via a portable <u>medium</u>. For many years the <u>diskette</u> (also known as a floppy disk) was the best example of this kind of storage.

In recent years, you are much more likely to see optical storage devices such as <u>CD-ROM</u>, <u>CD-R</u>, <u>DVD</u>-ROM, and <u>DVD-R</u> devices being used to store larger software and data archives. These devices can store between 650 MB and 50 GB of data.

But optical devices do have their drawbacks. As you probably know, these discs scratch easily. Also, optical drives have lower performance than hard disk drives, and they can normally only be written to one time with any degree of reliability.

Because of the need for ever greater capacity and performance for removable storage, a new device called the <u>flash drive</u> has taken over the industry by storm. Based on semiconductor storage technology, these devices can store up to 16 GB (or greater) of data. Data read and write times are very fast due to USB 2.0 technology.

As is true with most other types of computer equipment, the speed and capacity of removable storage is always increasing, while prices generally decrease for all but the newest technologies.

Unit 5 Objectives:

EPROM (erasable programmable read only memory)
A non-volatile (permanent) memory type that is erasable via ultra-violet light and reprogrammable
EPROMs are popular for use in critical firmware applications, such as BIOS's, because they are both non-volatile and they can be updated when necessary.

Floppy disk drive
A legacy storage device which can read and write data slowly from a removable magnetic medium (normally 3.5" in diameter and holding 1.44 MB of data)
Floppy disk drives were once included with almost all computers, but are now considered obsolete.

Hard disk drive
A storage device using rotating magnetic platters to quickly store and retrieve digital data
A hard disk drive can fail at any time, normally causing data corruption and loss.

Magnetic storage
A storage technique using patterns of charged particles on a metallic surface to store data; examples include hard disk drives, tape drives, floppy disk drives
Magnetic drives have been around since the 1950s and are typically used to store large amounts of data.

Optical storage
A data storage technique using a pattern of markings on a disc that can be read by a laser; examples include CD-ROM, and DVD-ROM technology
Optical storage is a good choice for distributing software packages because it has a good mix of storage size, portability, and a low cost to manufacture.

RAM (random access memory)
A type of computer memory known for being volatile (temporary) and fast
My computer was performing slowly when changing programs, so my technician installed more RAM and this solved the problem.

ROM (read-only memory)
A type of memory which is known for being non-volatile (permanent) and fast
The boy gave a puzzled look when the man showed him an old Atari 800 computer ROM cartridge.

Semiconductor storage

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A type of storage using integrated circuits to store data; examples include RAM, ROM, and flash memory

All computers created today use at least some form of semiconductor storage.

SSD (solid state drive)

A newer data storage device meant to replace a traditional hard disk drive; these are characterized by speed, non-moving parts, and lower energy consumption

Many new laptop models use solid-state drives, although they are more expensive and have less capacity than traditional hard disk drives.

Tape drive

A legacy storage device using magnetic ribbon inside a plastic cassette

The system administrator does a DVD-R backup every week, because it's cheaper and more reliable than using a tape drive.

VRAM (video RAM)

This is either dedicated or shared memory set aside specifically for the graphics processor

Modern games such as Quake IV load textures which can fill 512 megabytes of dedicated video RAM.

BD (Blu-Ray Disc)

an optical read-only disc storage media format used for data or movie storage with same dimensions as a standard DVD or CD; holds up to 50 GB or 6 times the storage of a DVD.

The name Blu-ray Disc comes from blue-ish colored laser used to read and write data to this type of disc.

BD-RE (Blu-Ray Disc Rewritable)

An optical disc format technology which can be re-recorded multiple times; disc capacities are up to 50GB

Blu-Ray Disc Rewritable technology holds 6 times as much data as a traditional DVD-RW.

CD-ROM (compact disc read only memory)

An optical storage medium which can store approximately 650 MB of read-only data

The CD-ROM has almost been completely replaced by the much more efficient DVD-ROM technology.

CD-R (compact disc recordable)

An optical, recordable storage medium that allows a user to write one time up to 650 megabytes of data.

The nervous author backed up his novel every day on a new CD-R.

DVD (digital versatile disc)

A portable storage medium which can hold between 4.7 and 17 gigabytes of data, often used for storing movies, games, and operating systems

The salesperson said that once he saw a film on DVD, he was never satisfied with VHS technology again.

DVD-R (digital versatile disc recordable)

A portable recordable storage medium which allows a user to write one time up to 4.7 gigabytes of data

DVD-R discs are a cheap way to make backups of larger files and folders.

Diskette

A portable magnetic storage media enclosed in a plastic sleeve, typically holding 1.4 MB of data

Diskettes are getting rare these days and have all but been replaced by USB flash memory drives.

Flash drive

A USB device used for portable data storage, typically 64 MB or higher; also known as a USB drive, jump drive, and even a key drive

The man stopped using his floppy disk drive for good when he found out that flash drives are faster, more reliable, and have more storage capacity.

Medium

A physical transmission device or storage device of information

Digital distribution over a network is rapidly replacing removable storage media such as CD-ROM's and DVD-ROM's.

Unit 6

Basic Networking

In the simplest explanation, networking is just computers talking to each other. They do this by sending data <u>packets</u> using various <u>protocols</u> and transmission mediums such as <u>Ethernet</u> cable or <u>Wi-Fi</u> connections. Computers must also know how to find other computers on the network. To put it briefly, every computer on the network needs a unique address so messages know where to go after they are sent.

Networks exist for many reasons including:

- <u>distributed computing</u> in a <u>client-server</u> or <u>peer-to-peer</u> networking architecture
- centralized data security and authentication
- elimination of risk of computer downtime.
- combining computers into a single <u>domain</u> to facilitate <u>groupware</u> applications and system administration tasks

The types of networks you deal with on a daily basis include <u>local area networks</u> (LANs) and <u>wide area networks</u> (WANs).

Many people today have LANs in their schools, offices, and even their homes. LANs are especially good for sharing Internet access and commonly used files and databases.

Users can also connect to wide area networks (WANS) as well, which are just large LANS spread out over several physical locations. The Internet itself is basically a large WAN, with each <u>node</u> on the network having its own unique <u>IP address</u>.

As you may have read in books or seen in movies, security considerations play a large role when designing networks. Technology such as <u>firewalls</u> can both block and filter unwanted network traffic. Virtual private networks (VPNs) are used to connect remote users to office networks without jeopardizing security. VPNs use strong data <u>encryption</u> to hide data as it is moving between routers over the Internet.

Networking is not something you can master in a week or even a month. Hundreds of books have been written about the subject and many more hundreds will come in the future as technologies mature and evolve. If you work on networks for a living, you are called a network engineer, and you will probably take certification exams by networking companies such as Cisco.

There are other kinds of networking as well which are not always between PCs and servers. An example is <u>Bluetooth</u> technology, which is optimized for networking between common consumer electronics such as mobile phones, mp3 players, and similar devices.

Unit 6 Objectives:

Authenticate
To verify that a process is true or genuine
The computer was very slow and took nearly 10 seconds to authenticate a user.

Bluetooth
An open wireless protocol for exchanging data; primarily used for connecting mobile devices to computers
The man used Bluetooth technology to create a personal area network (PAN) between his mobile phone and his computer.

Client-Server
A networking model in which the functions are divided between "child" computers and a single "parent" computer which stores and controls access to data
A standard protocol such at TCP/IP or IPX is used to define client-server interactions.

Distributed computing
a type of computing in which a computational task is divided into subtasks that execute on a collection of networked computers
The professor said the Internet could theoretically be used as a giant distributed computing platform.

Domain
a named group of networked computers that are administered as a unit with common rules and procedures
System administrators in large organizations use a domain to save time on common administration tasks.

Encryption
The process of making information 'more secure' by rendering it unreadable to anyone but the intended recipient
The company used SSL encryption on its ecommerce web site to protect its customers while they made online purchases.

Ethernet
A baseband local-area network originally developed by Xerox Corp. Normally running between 10 Mbps and 1,000 Mbps
The man could not connect to the LAN because he forgot to bring his RJ-45 Ethernet cable.

Firewall

A device or software program designed to prevent unauthorized access to a network
When the firewall was deactivated, the hacker found it easy to penetrate the system and upload a Rootkit virus.

Groupware

Software applications that facilitate shared work on documents and information
Since the members of the project were thousands of miles apart, a groupware application was an integral part of the solution.

IP address
A unique string of numbers that identifies a computer or server on the Internet
The server's IP address was 215.44.32.134.

LAN (local area network)
A small computer network normally contained within one room or building
The network administrator talked with great enthusiasm about upgrading the LAN to Gigabit Ethernet.

Node
Any computer or other device connected to network
The Networking 101 book said that all connected PCs, servers, and printers are nodes on a network.

Packet
A collection of bits normally sent through a network that contains data surrounded by error correction information
The network administrator was upset because the network connection kept dropping packets.

P2P (peer-to-peer)
A networking model where computers seamlessly share data; used primarily to reduce sever bottlenecks and reduce costs
Bit Torrent is a popular and controversial peer-to-peer networking program used by millions of people to distribute data.

Protocol
A set of standards or rules which govern communication
Before the Internet age, corporate LANs often ran on IPX or NetBEUI protocol.

VPN (virtual private network)
A relatively high security connection to a private network
The man connected to his work intranet from home using a virtual private network

Wi-Fi
A trademarked, nontechnical term used to describe a certain quality of wireless networking compatibility
The businessman was upset because he could not get his laptop to connect to the Wi-Fi hotspot at the convention.

WAN (wide area network)
A network which covers more than one building or area
The technical College's WAN connected all the county campuses.

Unit 7

The Rise of the World Wide Web

By the early 1990's, people were using computers in many different ways. Computers were already installed in most schools, offices, and homes. They were commonly used for writing papers, playing games, financial accounting, and business productivity applications. But very few people used them for communication, research, and shopping the way we do now. A man named Tim Berners-Lee changed all that. In 1990, Lee added an exciting hypertext and multimedia layer to the Internet and called it the World Wide Web. The rest, as they say, is history.

Believe it or not, the Web was not the first attempt at building a worldwide online community. Cutting edge geeks have been using online services such as Compuserve all the way back to the early 1980's. There were thousands of other privately run Bulletin Board Systems (BBS) as well, which served the general interest of curious nerds and researchers from around the world. Perhaps the most ambitious project was the French system Minitel, but it never caught on in the rest of the world and eventually faded into obscurity. Experiences on these BBS was poor by today's standards. There was no graphics or even color. There was no sound except of course the obnoxious beeps and gurgles a modem makes when it initiates a dial-up connection to a server. Bandwidth was also very slow compared to today's speeds. Today, a typical broadband connection is thousands of times faster than this.

The Web was not built for geeks. It was built for everyone. It was built with very high ideals. No single company, government, or organization controls it. It was new and exciting. New ideas and words appeared almost daily. Obscure technical terms became household words overnight. First it was email. Then it was URL and domain name. Then rather quickly came spam, homepage, hyperlink, bookmark, download, upload, cookie, e-commerce, emoticon, ISP, search engine, and so on. Years later we are still making up new words to describe our online world.

As a student of English and Technology, you will hear people use the words 'Internet' and 'World Wide Web' almost interchangeably. They are, of course, not the same thing. So what is the difference between the two? Perhaps a simple answer is that the Internet is the biggest network in the world, and the World Wide Web is a collection of software and protocols on

that network. I guess a more simple way to put it is, the World Wide Web is an application that runs on The Internet.

The original <u>backbone</u> of the Internet is based on an old military network called <u>ARPANET</u> which was built by ARPA in the late 1960's. ARPANET was built so information could withstand a nuclear war. The idea was not to have a single point of failure. This means if part of the ARPANET was blown up in a nuclear war, the rest of it will still work! What made ARPANET so successful was its packet-switching technology, invented by Lawrence Roberts. The idea is that "packets" of information have a "from" address and a "to" address. How they get from point "a" to point "b" depends on what roads are open to them. Packet switching is a very elegant thing. Without it, the Internet would simply not work.

People view the World Wide Web through a software application called a web browser or simply a "browser" for short. Some popular examples of web browsers include Microsoft Internet Explorer, Google Chrome, Mozilla Firefox, and Apple Safari. Browsers allow people to search, view, and even add and edit data on the World Wide Web.

The Web is not supposed to be a passive experience. Creating new pages for the Web is getting easier all the time. Web editing software is specially designed to work with hypertext languages such as <u>HTML</u>, which is the original specification for the Web. Web editing software normally allows for the WYSIWYG creation of text, images, and <u>hyperlinks</u> between related documents. With web applications such as wikis, MySpace and FaceBook, a typical user can create his or her first online presence in a matter of hours.

In the year 1999, the Internet suffered its first financial crash. Many companies selling products and services on the Web were not living up to sales expectations. This was known as the Dot Com Bubble. There were many reasons why this happened, but perhaps the two most important reasons were a combination of slow connection speeds and too much optimism. Very few people had fast internet connections and many people thought the Internet was "just a passing fad". But we know now that the Internet is not a fad.

Unit 7 objectives:

ARPANET (Advanced Projects Research Agency Network)
The predecessor to the Internet developed by ARPA and the first worldwide network with packet switching
The current public Internet owes a big debt to ARPANET, which was the original global network.

Backbone
A central high speed network that connects smaller, independent networks
Homeland Security is worried that an attack on the Internet backbone could cripple the country for weeks or months.

BBS (Bulletin Board System)
A predecessor to modern websites, these were early online communities that users could dial into using a modem
The network administrator ran his own BBS as a boy back in the 1980s.

Cookie
A text file created by web sites which contains personal information about an end user
The web's use of cookies is quite controversial because most users have no idea that their information is being collected and stored on their computer.

Domain name
The unique name which identifies a web site.
The domain name of Microsoft Corporation is microsoft.com

Download
The transfer a file or files from a remote computer to the user's computer
The professor asked us to download the example database from the school's server.

E-commerce (electronic commerce)
The term for buying and selling goods and services over the World Wide Web
Although e-commerce started out small, it has grown into a multi-billion dollar industry.

Emoticon
A symbol that uses the characters on a computer keyboard to convey emotion an email or instant message, such as the smiley face
One of the most popular emoticons is perhaps the wink and smile ;) which is used to convey irony or satire.

Hyperlink
A document cross-reference technique enabling the retrieval of a related document or resource simply by clicking on an underlined word or image.
The man made a hyperlink from his personal homepage to his friend's business.

Hypertext

Any electronic cross-referencing document first prophesized by Vannevar Bush in 1945

The woman asked her professor if the textbook was available as hypertext.

HTML (Hypertext Markup Language)

The coding or tagging syntax used to write documents for web browsers

A good web developer will know most HTML tags without looking in a book.

URL (Uniform Resource Locator)

The address which specifies the location of a file on the Internet

One uses a URL to go directly to a particular web site.

Upload

To transfer a file from a local computer to a remote computer

The boy decided to upload a picture of his new girlfriend to his Facebook page.

WWW (World Wide Web)

A global hypertext system operating on the Internet that enables electronic communication of text and multimedia

The World Wide Web is the best thing to happen to computing since birth of the PC.

W3C (World Wide Web Consortium)

An organization which develops specifications and guidelines for the World Wide Web

The W3C recommends that Web developers no longer use font tags in their HTML documents.

Unit 8

Recognizing Different Types of Computers

Computers were not always things you could carry around with you, or even have in your bedroom. Sixty years ago, computers (such as <u>ENIAC</u>) were as big as entire apartments. They were difficult to use and not very powerful by today's standards. They also cost a lot of money to build and operate. So computers were only used by large organizations such as governments, international corporations, and universities.

Throughout the 1950s and 1960s, computers captured the public's imagination in literature, films, and TV. More and more companies wanted computers, even if they didn't always have a good reason to own one. As a result, computers gradually became smaller, cheaper, and more practical to own. This was thanks in part to companies like <u>IBM</u>, which mass-produced computers for the first time and promoted them to medium and large businesses to do things like payroll, accounting, and other number-crunching tasks.

In the 1970s and 1980s a new type of computer started to gain in popularity. It was called the <u>PC</u> or personal computer. For the first time in history, computers were now for everyone. The PC started a revolution which affects nearly everything we do today. The ways we work, play, communicate, and access information have all been radically reshaped due to the invention and evolution of the PC.

PCs are everywhere you look today. At home, at the office, and everywhere in between. Many people still mistakenly believe the term PC is synonymous with a <u>desktop computer</u> running <u>Windows</u>. This is not really true. Really, any computer you use by yourself for general purposes could be called a PC. You probably already own at least one of these types of PCs:

- <u>laptop</u>
- <u>desktop computer</u>
- PDA or <u>personal digital assistant</u>
- <u>workstation</u>

Besides PCs, there are other types of computers you probably see at work or school. These include:

- file servers
- print servers
- web servers

But not all types of computers are so obvious as the ones above. There are still other kinds of computers that fit inside of other devices and control them. These computers are known as embedded systems.

Embedded systems can be found in traffic lights, TV sets, refrigerators, coffee machines and many more devices. Embedded systems are typically controlled by inexpensive, specialized processors which can only handle very specific tasks.

Types of computers go in and out of fashion as times changes. Older kinds of computers which were very popular in the 20th century (1900's) are now referred to as legacy systems. These include:

- mainframes
- minicomputers
- IBM clones

New types of computers are always coming out and replacing or augmenting existing computer types. Examples of new types of computers emerging would be notebooks, tablet PCs, and even wearable computers.

As you complete this unit, you will learn to differentiate between different computer types. Keep in mind that the lines between computer types are constantly being blurred. This phenomenon is known as convergence.

Unit 8 objectives:

Convergence
The evolution of devices towards common functionality
The iPhone is a good example of convergence, because it has all the features of a PDA, mobile phone, and an MP3 player in one package.

Embedded system
A computer using a relatively slow and specialized processor and ROM chip, normally used to control a particular device such as a washing machine or an MP3 player
Nearly all electronics you can buy today are controlled by embedded systems.

Laptop
A portable computer with a built-in screen, integrated keyboard, and battery power; also called a 'notebook'
As laptop computers have become more powerful and affordable, they are steadily replacing the more traditional desktop computer.

Legacy system
An older device or application that continues to be used because of the high cost of replacing it
Mainframes and minicomputers used to be cutting edge; now they are known as legacy systems.

Notebook
A small laptop with less powerful components meant for surfing the web, reading email, and other basic tasks.
I wanted to play Call of Duty 4 while I was traveling, but the graphics card in my notebook could only handle Solitaire.

PC (personal computer)
A computer designed for use by one person at a time
When people use the term 'PC', they are often referring to a desktop computer running Windows.

PDA (personal digital assistant)
A handheld computer about the size of wallet used as an organizer, web browser, game machine, mobile phone, or message recorder; also known as a hand-held computer
The modern traveling businessman depends on his PDA to organize all his contacts and appointments.

Print server

A physical or software device connecting and facilitating a network with a printer

The secretary could not get a hard copy because the print server was broken.

Router

A specialized computer which connects two networks

The DSL router allowed the entire office to share a single Internet connection.

Server

A type of computer intended primarily for central distribution of data to other computers on the same network

Because servers hold large amounts of centralized data, it is critical to have daily backup routines in place.

Supercomputer

Refers to only the most powerful class of computer, typically designed to perform specialized tasks such as weather prediction, governmental financial calculations, or space research

A typical supercomputer may have up to 100 processors and have speeds measured in tens of gigaflops.

Tablet PC

A portable computer shaped in the form of a notebook and capable of advanced handwriting recognition via use of a stylus or on-screen keyboard.

Bill Gates predicted the rise of the tablet PC in 2001, but not much happened until Apple announced the iPad in 2010.

Workstation

A high quality computer, typically with lots of RAM, plenty of CPU power, and a high quality video card

The engineer's latest 3d modeling project was so processor intensive, that he wouldn't even begin it until his new workstation arrived.

Unit 9

Some Common Computer Input Devices

We use <u>input devices</u> every time we use a computer. Simply speaking, it is these devices which allow us to enter information. Without them, the computer would not know what we want it to do.

Some of the things we do with input devices are: move a cursor around the screen, enter alphanumeric text, draw pictures, and even enter binary data in the form of graphics or audio wave forms.

Input devices have a history as long as computers themselves. Perhaps the first input device was the simple electronic <u>switch</u> (similar to a light switch) which turned <u>bits</u> on or off. There were hundreds or even thousands of these switches on larger computers. It used to take a team of programmers hours or even days to set up a computer to perform a single calculation.

Switches and <u>jumpers</u> are still used today on computers. For instance the power button on the computer is a switch which is also an input device telling the computer to power on or power off. Tiny switches called jumpers are also widely used on motherboards to change important settings such as processor clock speed or memory speed.

Most likely in front of you right now are two of the most popular input devices: the keyboard and the mouse. And instead of a mouse on a laptop computer you normally have a <u>touchpad</u>.

As computers evolved throughout the late 20th century, computers became more and more interactive. Input devices came and went. Some lasted and some did not. The <u>light pen</u> and the <u>joystick</u> are almost unknown today, although they were popular before the <u>mouse</u> and the gamepad became well-known. Touch screens are already replacing keypads on mobile phones and may come to replace or augment keyboards and mice on PCs and laptops in the near future.

Different people prefer different input devices for doing same task. For instance, many graphic artists prefer to use a stylus and graphics tablet rather than a mouse. It might offer them a greater deal of artistic freedom, or precision while performing their work.

Sufferers of carpal tunnel syndrome often prefer a <u>trackball</u> or <u>stylus</u> to a mouse. Handicapped computer users have invented a wide array of input devices designed to replace the mouse including devices controlled by foot or even eye movement.

Not only PCs and mainframes use input devices. Almost all computers feature some kind of input device. Special scanners are used in many stores and warehouses called <u>barcode readers</u> to enter stock and sell items at the cashier. These are input devices as well. Even <u>microphones</u> can technically be called input devices as a computer can respond to them and interpret them as incoming data.

Corporations and especially government institutions are already implementing the second generation of input devices to improve security. These include retina scanners and/or fingerprint readers to replace or improve accuracy of username and password authentication. You will be seeing more of this kind of biometric authentication in the coming years as a general remedy for weak passwords or leaked passwords.

In summary, input devices are how you interact with a computer. The computer responds to your input and hopefully does what you need it to do.

Unit 9 Objectives:

Barcode reader
A hardware peripheral designed to 'scan' products into an inventory tracking system.
Harry ran into trouble while taking inventory because he forgot to charge his barcode reader.

Click
To press and release the primary (left-side) mouse button
The screen prompt read "Click the button to continue."

Double-click
To depress and release the left mouse button twice in quick succession
The Macintosh user did not know that in order to open a file in Windows you need to double-click it.

Fingerprint reader
A device which forms a digitized image of a human finger print for the purpose of biometric authentication.
The security firm was so tired of people choosing weak passwords that they installed fingerprint readers to increase the security of their systems.

Graphics tablet
 An input device or mouse alternative using a sensitive rectangular surface and a stylus
The graphic designer sometimes used a graphics tablet in addition to a mouse.

Input device
Any peripheral used primarily to enter data into a computer
The mouse and the keyboard are two examples of common input devices.

Joystick
An input device with a vertical rod mounted on a base used to control pointing devices or on-screen objects; normally with one or more buttons
The man used a joystick to control the airplane in the flight simulation.

Light pen
An input device using a light-sensitive pen shaped handle which can be used to draw on the computer screen
Before the mouse became available, some older computers used light pens to increase interactivity.

Microphone
A hardware device plugged into a computer's sound card optimized for voice commands or other audio recording
The handicapped woman used a microphone to dictate her Word documents instead of typing.

Mouse

A handheld input device used to move an onscreen pointer by means of sliding on a flat surface

Before the invention of the mouse, the 'tab key' or 'arrow keys' were often used to navigate the screen.

Mouse pointer
A special icon (normally an arrow) which indicates the current location of the mouse on the desktop screen

The mouse pointer changes its shape at times, depending on the application being run and the task being performed.

OCR (optical character recognition)
The ability of a computer to determine standard letters and numbers based on fuzzy logic
Instead of retyping the stack of documents, the secretary decided to use OCR technology to scan them.

Right-click
To press the right-side mouse button
Windows 95 was the first major operating system to popularize the right-click.

Speech recognition
The ability of a computer to convert spoken words from a user into usable data
The new phone system used speech recognition to help reduce the number of customer service representatives.

Stylus
A part of an input device resembling a pen used to draw on the surface of a graphics tablet
The man lost his stylus and thus could no longer enter text on his PDA until he replaced it.

Touchpad
An input device consisting of a sensitive rectangular area in which one uses a finger to move a cursor on a display.
Laptops commonly include a built-in touchpad in addition to supporting a mouse.

Touch screen
A display that also acts as an input device by allowing a user to navigate a program by pressing specific locations of the screen
Most information kiosks in airports make use of touch screens instead of keyboards or mice.

Trackball
A pointing device consisting of a ball on top of a base that is rotated to move a cursor on the computer screen
The injured person used a trackball instead of a mouse to move the cursor.

Unit 10

Top 10 Most Popular Programming Languages

There are hundreds of programming languages in use today. Learning a programming language is not easy, but it can be very rewarding. You will have a lot of questions at first. Just remember to get help when you need it! You can find out the answer to almost everything on Google nowadays.... so there is no excuse for failure. Also remember that it takes years to become an expert programmer. Don't expect to get good overnight. Just keep learning something new every day and eventually you will be competent enough to get the job done. This article covers the top 10 most popular programming languages as ranked by Tiobe.com in June 2009.

1. Java
Java uses a compiler, and is an object-oriented language released in 1995 by Sun Microsystems. Java is the number one programming language today for many reasons. First, it is a well-organized language with a strong library of reusable software components. Second, programs written in Java can run on many different computer architectures and operating systems because of the use of the JVM (Java virtual machine). Sometimes this is referred to as code portability or even WORA (write once, run anywhere). Third, Java is the language most likely to be taught in university computer science classes. A lot of computer science theory books written in the past decade use Java in the code examples. So learning Java syntax is a good idea even if you never actually code in it.
Java Strengths: WORA, popularity
Java Weaknesses: Slower than natively compiled languages

2. C
C is a compiled, procedural language developed in 1972 by Dennis Ritchie for use in the UNIX operating system. Although designed to be portable in nature, C programs must be specifically compiled for computers with different architectures and operating systems. This helps make them lightning fast. Although C is a relatively old language, it is still widely used for system programming, writing other programming languages, and in embedded systems.
Strengths: Speed
Weaknesses: Memory management can be difficult to master

3. C++
C++ is a compiled, multi-paradigm language written as an update to C in 1979 by Bjarne Stroustrup. It attempts to be backwards-compatible with C and brings object-orientation, which helps in larger projects. Despite its age, C++ is used to create a wide array of applications from games to office suites.
Strengths: Speed

Weaknesses: C++ is older and considered more clumsy than newer object-oriented languages such as Java or C#.

4. PHP

PHP uses a run-time interpreter, and is a multi-paradigm language originally developed in 1996 by Rasmus Lerdorf to create dynamic web pages. At first it was not even a real programming language, but over time it eventually grew into a fully featured object-oriented programming language. Although PHP has been much criticized in the past for being a bit sloppy and insecure, it's been pretty good since version 5 came out in 2004. It's hard to argue with success. Today, PHP is the most popular language used to write web applications.
Strengths: Web programming, good documentation
Weaknesses: Inconsistent syntax, too many ways to do the same thing, a history of bizarre security decisions

5. VB (or Visual Basic) Visual Basic is an interpreted , multi-paradigm language developed by Microsoft Corporation for the Windows platform. It has been evolving over the years and is seen as a direct descendant of Microsoft's old BASIC from the 1970's. Visual Basic is a good language for scripting Windows applications that do not need the power and speed of C#.
Strengths: None.
Weaknesses: Only runs in Windows

6. Python

Python is an interpreted, multi-paradigm programming language written by Guido van Rossum in the late 1980's and intended for general programming purposes. Python was not named after the snake but actually after the Monty Python comedy group. Python is characterized by its use of indentation for readability, and its encouragement for elegant code by making developers do similar things in similar ways. Python is used as the main programming choice of both Google and Ubuntu.
Strengths: Excellent readability and overall philosophy
Weaknesses: None

7 C#

C# is a compiled, object-oriented language written by Microsoft. It is an open specification, but rarely seen on any non-Windows platform. C# was conceived as Microsoft's premium language in its .NET Framework. It is very similar to Java in both syntax and nature.
Strengths: Powerful and pretty fast
Weaknesses: Only really suitable for Windows

8. JavaScript

JavaScript is an interpreted, multi-paradigm language. A very strange one too. Despite it's name, it has nothing whatsoever to do with Java. You will rarely, if ever, see this language outside of a web browser. It is basically a language meant to script behaviors in web browsers and used for things such as web form validation and AJAX style web applications. The trend

in the future seems to be building more and more complex applications in JavaScript, even simple online games and office suites. The success of this trend will depend upon advancements in the speed of a browser's JavaScript interpreter. If you want to be correct, the real name of this programming language is ECMAscript, although almost nobody actually calls it this.

Strengths: it's the only reliable way to do client-side web programming

Weaknesses: it's only really useful in a web browser

9. Perl

Perl is an interpreted, multi-paradigm language written by Larry Wall in 1986. It is characterized by a somewhat disorganized and scary-looking syntax which only makes sense to other PERL programmers ;) However, a lot of veteran programmers love it and use if every day as their primary language. 10 years ago, Perl was more popular than it is today. What happened? A lot of newer programmers and even old Perl programmers (such as myself) have switched to other languages such as PHP, Python, and Ruby. Perl is perhaps still the best language for text processing and system administration scripting. I personally do not recommend it however as a primary programming language.

Strengths: text processing and system administration

Weaknesses: strange syntax, and perhaps too many ways to do the same thing

10. Ruby

Ruby is an interpreted, object-oriented language written by Yukihiro Matsumoto around 1995. It is one of the most object-oriented languages in the world. Everything is an object in Ruby, even letters and numbers can have method calls. It's a great language to learn if you love objects. The only negative is that its love of object-orientation makes it a bit slow, even for an interpreted language.

Strengths: Perhaps the world's most object-oriented language

Weaknesses: its superior object model comes at a price... namely speed

Unit 10 Objectives

.NET Framework

A software framework by Microsoft which executes code via a virtual machine

The .NET Framework is Microsoft's premium solution for programming applications, and supports over 20 languages including C#, VB.NET, and IronRuby.

C

A low-level, compiled programming language developed in the early 1970s by Dennis Ritchie for use on the UNIX operating system

C is still a popular programming language 40 years after it was created, mainly due to its minimalism and extreme speed.

C++

An "enhancement" to the C language providing object-oriented programming features

The young programmer decided to learn C++ because he heard it was very popular in game development.

Compiler

A program that takes human readable code and turns it into machine readable code for running at a later time

The students liked programming python more than C because they didn't have to use a compiler before execution.

ECMAScript

The official name and standard for the commonly known JavaScript language

The professor told us that officially JavaScript should be called ECMAScript, but that few people do so in practice.

Elegant code

Concise, clean, and clear code which allows other developers to understand and extend it

The junior programmer wrote elegant code and used variable names with a clear meaning.

Interpreter

A program that reads a high-level programming language, converts it into machine code, and then immediately runs that code

Computer languages that require an interpreter often run slower than languages that require a compiler.

Java

A high-level, compiled, object-oriented programming language developed by Sun Microsystems.

The computer science professor predicted that as processor speeds increased, Java would eventually replace C++ in application development.

JavaScript

A popular web page scripting language created by Brendan Eich at Netscape to provide client-side interactivity in Web pages

The web programmer used JavaScript to alert the user about invalid data entered in a required field.

Multi-paradigm language

A programming language that supports both procedural and object-oriented programming philosophies

PHP started out as a procedural language, but grew into a multi-paradigm language when it added support for objects in version 4.

Object-Oriented language

Any programming language optimized for modeling real-world objects and concepts

Java is the most popular object-oriented language.

Perl

A high-level, interpreted programming language written by Larry Wall in 1986 and typically used for a wide variety of programming tasks including system administration

Larry Wall is the inventor of Perl, a widely used programming language that has a very devout following.

PHP (PHP Hypertext Preprocessor)

A high-level, interpreted programming language written by Rasmus Lerdorf in 1995 and aimed mainly at web developers creating dynamic applications

The professor said that PHP is the most popular web scripting language in the world and supports many advanced object-oriented programming techniques.

Portability

A measure of how easily programs can be moved to a new system without having to make any changes.

Java and ANSI C are two attempts at making software portability a priority.

Procedural language

Any programming language that is based on a step-by-step approach to solving a problem.

C is the standard example of a procedural language.

Python

A high-level, interpreted programming language developed by Guido van Rossum at CWI in *the Netherlands*

The motto of Python is "there should be one- and preferably only one- obvious way to do it".

Rub

An object-oriented, high-level, interpreted programming language developed in the 1990's by ace Japanese programmer Yukihiro Matsumoto.

The creator of Ruby wanted a scripting language that was more elegant than Perl, and more object-oriented than Python.

Syntax

Rules governing the structure of a programming language

The basic concepts of all programming languages are quite similar, even if the syntax can be quite different.

VB (Visual Basic)

A Windows-only, multi-paradigm programming language developed by Microsoft and intended for beginners or casual use

The high school programming teacher taught his students Visual Basic in his Introduction to Programming class.

Computer and Internet acronyms

Acronym	Meaning
ACL	Access Control List
ADC	Analog-to-Digital Converter
ADF	Automatic Document Feeder
ADSL	Asymmetric Digital Subscriber Line
AGP	Accelerated Graphics Port
AIFF	Audio Interchange File Format
AIX	Advanced Interactive Executive
ALU	Arithmetic Logic Unit
ANSI	American National Standards Institute
API	Application Program Interface
ARP	Address Resolution Protocol
ASCII	American Standard Code for Information Interchange
ASP	Active Server Page or Application Service Provider
ATA	Advanced Technology Attachment
ATM	Asynchronous Transfer Mode
Bash	Bourne-Again Shell
BASIC	Beginner's All-purpose Symbolic Instruction Code
Bcc	Blind Carbon Copy
BIOS	Basic Input/ Output System

Blob	Binary Large Object
BMP	Bitmap
BSOD	Blue Screen of Death
CAD	Computer-Aided Design
Cc	Carbon Copy
CCD	Charged Coupled Device
CD	Compact Disc
CD-R	Compact Disc Recordable
CD-ROM	Compact Disc Read-Only Memory
CD-RW	Compact Disc Re-Writable
CDFS	Compact Disc File System
CDMA	Code Division Multiple Access
CGI	Common Gateway Interface
CISC	Complex Instruction Set Computing
CLOB	Character Large Object
CMOS	Complementary Metal Oxide Semiconductor
CMS	Content Management System
CMYK	Cyan Magenta Yellow Black
CPA	Cost Per Action
CPC	Cost Per Click
CPL	Cost Per Lead
CPM	Cost Per 1,000 Impressions

CPS	Classroom Performance System
CPU	Central Processing Unit
CRM	Customer Relationship Management
CRT	Cathode Ray Tube
CSS	Cascading Style Sheet
CTP	Composite Theoretical Performance
CTR	Click-Through Rate
DAC	Digital-to-Analog Converter
DAW	Digital Audio Workstation
DBMS	Database Management System
DCIM	Digital Camera IMages
DDL	Data Definition Language
DDR	Double Data Rate
DDR2	Double Data Rate 2
DDR3	Double Data Rate Type 3
DFS	Distributed File System
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-Line Memory Module
DLC	Downloadable Content
DLL	Dynamic Link Library
DMA	Direct Memory Access
DNS	Domain Name System

<u>DOS</u>	Disk Operating System
<u>DPI</u>	Dots Per Inch
<u>DRAM</u>	Dynamic Random Access Memory
<u>DRM</u>	Digital Rights Management
<u>DSL</u>	Digital Subscriber Line
<u>DSLAM</u>	Digital Subscriber Line Access Multiplexer
<u>DTD</u>	Document Type Definition
<u>DV</u>	Digital Video
<u>DVD</u>	Digital Versatile Disc
<u>DVD+R</u>	Digital Versatile Disc Recordable
<u>DVD+RW</u>	Digital Versatile Disk Rewritable
<u>DVD-R</u>	Digital Versatile Disc Recordable
<u>DVD-RAM</u>	Digital Versatile Disc Random Access Memory
<u>DVD-RW</u>	Digital Versatile Disk Rewritable
<u>DVI</u>	Digital Video Interface
<u>DVR</u>	Digital Video Recorder
<u>ECC</u>	Error Correction Code
<u>EDI</u>	Electronic Data Interchange
<u>EIDE</u>	Enhanced Integrated Drive Electronics
<u>EPS</u>	Encapsulated PostScript
<u>EUP</u>	Enterprise Unified Process
<u>EXIF</u>	Exchangeable Image File Format

FAQ	Frequently Asked Questions
FDDI	Fiber Distributed Data Interface
FIFO	First In, First Out
FiOS	Fiber Optic Service
FLOPS	Floating Point Operations Per Second
FPU	Floating Point Unit
FSB	Front side Bus
FTP	File Transfer Protocol
Gbps	Gigabits Per Second
GIF	Graphics Interchange Format
GIGO	Garbage In, Garbage Out
GIS	Geographic Information Systems
GPS	Global Positioning System
GPU	Graphics Processing Unit
GUI	Graphical User Interface
GUID	Globally Unique Identifier
HDD	Hard Disk Drive
HDMI	High-Definition Multimedia Interface
HDTV	High Definition Television
HDV	High-Definition Video
HFS	Hierarchical File System
HSF	Heat Sink and Fan

HTML	Hyper-Text Markup Language
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transport Protocol Secure
I/O	Input/ Output
ICANN	Internet Corporation For Assigned Names and Numbers
ICF	Internet Connection Firewall
ICMP	Internet Control Message Protocol
ICS	Internet Connection Sharing
ICT	Information and Communication Technologies
IDE	Integrated Device Electronics or Integrated Development Environment
IEEE	Institute of Electrical and Electronics Engineers
IGP	Integrated Graphics Processor
IM	Instant Message
IMAP	Internet Message Access Protocol
InterNIC	Internet Network Information Center
IP	Internet Protocol
IPX	Internetwork Packet Exchange
IRC	Internet Relay Chat
IRQ	Interrupt Request
ISA	Industry Standard Architecture
iSCSI	Internet Small Computer Systems Interface
ISDN	Integrated Services Digital Network

ISO	International Organization for Standardization
ISP	Internet Service Provider
IT	Information Technology
IVR	Interactive Voice Response
JFS	Journaled File System
JPEG	Joint Photographic Experts Group
JRE	Java Runtime Environment
JSF	Java Server Faces
JSON	JavaScript Object Notation
JSP	Java Server Page
Kbps	Kilobits Per Second
KDE	K Desktop Environment
KVM Switch	Keyboard, Video, and Mouse Switch
LAMP	Linux, Apache, MySQL, and PHP
LAN	Local Area Network
LCD	Liquid Crystal Display
LDAP	Lightweight Directory Access Protocol
LED	Light-Emitting Diode
LIFO	Last In, First Out
LPI	Lines Per Inch
LTE	Long Term Evolution
LUN	Logical Unit Number

MAC Address   Media Access Control Address

MAMP   Mac OS X, Apache, MySQL, and PHP

MANET   Mobile Ad Hoc Network

Mbps   Megabits Per Second

MBR   Master Boot Record

MCA   Micro Channel Architecture

MIDI   Musical Instrument Digital Interface

MIPS   Million Instructions Per Second

MMS   Multimedia Messaging Service

MP3   MPEG-1 Audio Layer-3

MPEG   Moving Picture Experts Group

MTU   Maximum Transmission Unit

NAT   Network Address Translation

NetBIOS   Network Basic Input/ Output System

NIC   Network Interface Card

NNTP   Network News Transfer Protocol

NOC   Network Operations Center

NTFS   New Technology File System

NUI   Natural User Interface

NVRAM   Non-Volatile Random Access Memory

OASIS   Organization for the Advancement of Structured Information Standards

OCR   Optical Character Recognition

<u>ODBC</u>	Open Database Connectivity
<u>OEM</u>	Original Equipment Manufacturer
<u>OLAP</u>	Online Analytical Processing
<u>OLE</u>	Object Linking and Embedding
<u>OOP</u>	Object-Oriented Programming
<u>OSD</u>	On Screen Display
<u>OSPF</u>	Open Shortest Path First
<u>P2P</u>	Peer To Peer
<u>PC</u>	Personal Computer
<u>PCB</u>	Printed Circuit Board
<u>PCI</u>	Peripheral Component Interconnect
<u>PCI-X</u>	Peripheral Component Interconnect Extended
<u>PCMCIA</u>	Personal Computer Memory Card International Association
<u>PDA</u>	Personal Digital Assistant
<u>PDF</u>	Portable Document Format
<u>PHP</u>	Hypertext Preprocessor
<u>PIM</u>	Personal Information Manager
<u>PMU</u>	Power Management Unit
<u>PNG</u>	Portable Network Graphic
<u>POP3</u>	Post Office Protocol
<u>POST</u>	Power On Self Test
<u>PPC</u>	Pay Per Click

PPGA	Plastic Pin Grid Array
PPI	Pixels Per Inch
PPL	Pay Per Lead
PPM	Pages Per Minute
PPP	Point to Point Protocol
PPPoE	Point-to-Point Protocol over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PRAM	Parameter Random Access Memory
PROM	Programmable Read-Only Memory
PS/2	Personal System/2
PUM	Potentially Unwanted Modification
PUP	Potentially Unwanted Program
QBE	Query By Example
RAID	Redundant Array of Independent Disks
RAM	Random Access Memory
RDF	Resource Description Framework
RDRAM	Ram bus Dynamic Random Access Memory
RFID	Radio-Frequency Identification
RGB	Red Green Blue
RISC	Reduced Instruction Set Computing
ROM	Read-Only Memory
RPC	Remote Procedure Call

RPM	Revenue Per 1,000 Impressions
RSS	RDF Site Summary
RTE	Runtime Environment
RTF	Rich Text Format
RUP	Rational Unified Process
SaaS	Software as a Service
SAN	Storage Area Network
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SD	Secure Digital
SDK	Software Development Kit
SDRAM	Synchronous Dynamic Random Access Memory
SDSL	Symmetric Digital Subscriber Line
SEO	Search Engine Optimization
SERP	Search Engine Results Page
SIMM	Single In-Line Memory Module
SIP	Session Initiation Protocol
SKU	Stock Keeping Unit
SLA	Software License or Service Level Agreement
SLI	Scalable Link Interface
SMART	Self-Monitoring Analysis And Reporting Technology
SMB	Server Message Block

SMM	Social Media Marketing
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SO-DIMM	Small Outline Dual In-Line Memory Module
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SRAM	Static Random Access Memory
SRGB	Standard Red Green Blue
SSD	Solid State Drive
SSH	Secure Shell
SSID	Service Set Identifier
SSL	Secure Sockets Layer
TCP/IP	Transmission Control Protocol/Internet Protocol
TFT	Thin-Film Transistor
TIFF	Tagged Image File Format
TTL	Time To Live
TWAIN	Toolkit Without An Informative Name
UAT	User Acceptance Testing
UDDI	Universal Description Discovery and Integration
UDP	User Datagram Protocol

UGC	User Generated Content
UML	Unified Modeling Language
UNC	Universal Naming Convention
UPnP	Universal Plug and Play
UPS	Uninterruptible Power Supply
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTF	Unicode Transformation Format
VCI	Virtual Channel Identifier
VDSL	Very High Bit Rate Digital Subscriber Line
VDU	Visual Display Unit
VFAT	Virtual File Allocation Table
VGA	Video Graphics Array
VLB	VESA Local Bus
VLE	Virtual Learning Environment
VOIP	Voice Over Internet Protocol
VPI	Virtual Path Identifier
VPN	Virtual Private Network
VRAM	Video Random Access Memory
VRML	Virtual Reality Modeling Language
W3C	World Wide Web Consortium

WAIS	Wide Area Information Server
WAMP	Windows, Apache, MySQL, and PHP
WAN	Wide Area Network
WDDM	Windows Display Driver Model
WEP	Wired Equivalent Privacy
Wi-Fi	Wireless Fidelity
WINS	Windows Internet Name Service
WPA	Wi-Fi Protected Access
WWW	World Wide Web
XHTML	Extensible Hypertext Markup Language
XML	Extensible Markup Language
XMP	Extensible Metadata Platform
XSLT	Extensible Style Sheet Language Transformation
Y2K	Year 2000
ZIF	Zero Insertion Force