Information Technology Software

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What is Software?

- The set of instructions that control how the IT hardware and computers perform is called software.

- It is interesting to note that most software costs more then the overall cost of the hardware. Sometimes one single software can be worth more then 100 computers.

- Developing software is a lengthy task that takes many years to complete.

- Without software, most computers would stay idle.

Computer Programs

- Computer programs are sequences of instructions for the computer.

- The process of writing programs is called programming.

- People who do programs are called programmers.

- Computer programs enable the user to instruct a computer to perform a specific function that has a certain business value.

Types of Computer Programs

- There are two sets of computer software:
  - System Software
  - Application Software
- **System Software** works as an interface between the user and the computer itself, so that various applications can be run.
- **Application Software** works as a set of computer instructions that provide a more specific functionality to the user.

Systems Software

- Systems software is a group of programs that control and support the computer system and its information processing activities.

- Systems software can be grouped as system control programs and system support programs

- One good example for systems software is the operating system of your computer such as Windows XP

Operating Systems

- Operating system provides an interface between the user and the computer.
- Operating System supervises the overall operation of the computer, monitors the computer's status, schedules the input and output operations
- Operating system also allocates CPU time and main memory to programs running on the computer
- Operating system provides an interface between the user and the computer.

Multitasking of Operating Systems

- Most operating systems use techniques of process management called Multitasking.
- Multitasking is the management of two or more tasks and programs running on the computer at the same time.
- If you are doing more then one task at the same program then that is called multithreading.
- If more then one user uses the computing power of the CPU, then this is called Time-sharing
- Actually what happens is that operating system switches tasks rapidly and you get the illusion of doing more than one things.

Multiprocessing

- If a computer has more then one CPU, then one CPU can work on a program, while another CPU can work on another program.

- Unlike multitasking each application uses another CPU, while multitasking uses the same CPU to switch back and forth between applications.

Virtual Memory

- An important concept in operating systems is virtual memory. Most operating systems simulate more main memory then it actually exists on the computer.

- For example, one method is to use a portion of your space on your harddisk to simulate more memory.

Operating Systems Interface

- Two main types of operating system interfaces are:

- Text Based Interfaces (DOS, UNIX)

- Graphical User Interface – GUI (Windows)

Text Based Interface

- The first type of operating system was the Text Based Interface.

- DOS (Disk Operating System) was the most publicly used operating system as it allowed the user to input certain commands to help copy, erase or change files.

- The most widespread DOS was invented by Bill Gates

- The two popular Text Based Interfaces are DOS and UNIX. These were both 16 bit interfaces.

Graphical User Interface (GUI)

- GUI allows users to control their computers by using visible interfaces such as icons.

- The first popular GUI was invented by Apple McIntosh, while currently the most popular GUI is the Windows operating system.

- A new type of GUI is Linux which is based on the old style UNIX operating system

Brands of Different Operating Systems for PC

- Microsoft Windows Operating Systems

- UNIX / Linux Operating Systems

- McIntosh Operating System (Mac OS X)

- IBM OS / 2

- JAVA OS

Windows Operating Systems for PC

- Windows 3.1
- Windows 95
- Windows 98
- Windows ME
- Windows NT / Windows 2000
- Windows XP
- Windows Vista
- Windows 7

Network Operating Systems

- If more then one computer is working together in a network environment, then the type of operating systems are slightly different to allow for added file sharing and user security.

- UNIX

- Novell Netware

- Windows NT / Windows 2000 / Windows 2003/ Windows 2008

Enterprise Operating Systems

- If you have mainframe computers in your corporation, then the types of operating systems used are more advanced as related to network and pc operating systems.

- They have advanced multitasking and multiprocessing capabilities and support online applications and global ecommerce operations with millions of transaction per day.

- IBM OS / 400 and IBM z/OS are the two major operating systems for enterprise mainframe systems

System Utility Programs

- These are special software that is designed to work with a particular operating systems.

- System Utility Programs augment the operating system, so that business applications can be run better and more safely.

- Some examples of System Utility Programs include *disk maintenance programs, Programs to Restore Lost Data, Programs to Increase Performance of your Computer and programs that allow for system security including Firewall and Antivirus programs*

Examples of System Utility Programs

- Disk Manager

- Memory Checker

- E-cleaner

- Norton Firewall and Antivirus

- NOD 32 Antivirus Programs

- MacAfee Antivirus Programs

Application Software

- Application software consists of instructions that direct a computer system to perform specific information processing activities that provide functionality for users.

- The two types of application software are Custom Made Software and off the shelf application software.

- With application software, you are able to get a business use out of your computer.

Custom Made Software

- With custom made software, you get the ability to create customized software that specifically addresses the issues in your organization.

- These types of software may be either developed in house or they may be given as a contract to an outside company.

- Most bank software are custom made.

Off the Shelf Application Software

- Off the shelf software are prepared to be accessible to the general public and they are prepared to be as general as possible.

- Majority of this group is personal application software such as spreadsheet, data management, word processing, desktop publishing, graphics, multimedia, communications and Computer Aided Design Programs

- Microsoft is the biggest player in the off the shelf application software market with its products such as Microsoft Word, Excel, Access, PowerPoint etc.

Office Applications Software

- Office applications software are used to help automate some of your office processes
- With office applications, you can use it to   -
- 1) calculate spreadsheets
  2) summarize data
  3) data management
  4) word processing
  5) desktop publishing
  6) website creation
  7) create professional presentations
  8) Image processing

Microsoft Application Software

- Microsoft is the leader of application software with the following programs:
- MS Word
- Excel
- PowerPoint
- Access
- Publisher
- FrontPage
- Outlook
- Paint

Computer Aided Design Software

- Computer aided design software are used to design items for manufacturing and they allow designers to design and build production types in the computer and test them in a virtual environment.

- Some popular CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) software include AutoCAD, NASTRAN, PATRAN, Gambit, Fluent, Solidworks, Catia etc.

Multimedia Software

- Multimedia software are very popular as everything seems to be revolving around Multimedia software in the 21st century.

- Nowadays, different versions of audio – visual files exist such as AVI, MP3, MP4, MKV, FLV etc

- Some multimedia programs are:
  - Windows Media Player
  - Real Player
  - QuickTime
  - VLC Media Player
  - Winamp

Communications Software

- In order to help exchange information between computers and users, communication software are used.

- With communications software, you can send email, send faxes or even send raw data on the net

- Some examples of communication software are:

  - Outlook / Outlook Express

  - Microsoft Fax / TRIO Fax

  - Cute FTP

Software Suites

- When several programs designed for similar purposes are clubbed together, then those software packages are called Software suites.

- Some famous software suites are Microsoft Office, Novell Perfect Office, Open Office, and Lotus Smart Suite

Software Licensing

- License of a software defines the things that you can do with that software.

- Unlike a product, you can not do everything that you want with a software. You can not sell it to someone else, you cant make a copy of it or you cant even use it for another purpose besides its original intention, unless granted rights by the license.

Developing software is a process that requires huge time and money. Thus, licensing is there because of these issues.

Software Piracy

- Software Piracy is a huge issue that creates problems for the software industry
- Due to relative ease of copying software, most programs are copied illegally.
- Some expensive programs (such as CAD programs) can lose lot of money due to software piracy.
- Almost 2/3 of the software used in the world are pirated.
- Proponents of software piracy say that everyone should have an access to software
- Open source software is a solution that deals with this issue.

Software are Made for Certain Systems

- It is essential to understand that computer programs are designed to work with certain type of hardware and even certain types of operating systems.

- For example, a software for a PC will not work on a mainframe and vice versa

- Computer programs that work in Windows may not work in UNIX or in McIntosh. Usually different versions of these software are released for different operating systems.

Software Bugs

- When a software is not working and giving an error for an unknown reason, it is said to contain a bug.

- One of the world's first computers ENIAC had a problem functioning, because a bug had been stuck in one of the vacuum transistor tubes and the computer malfunctioned.

- Hence, when a software doesn't work, it is said to have a bug.

Software Selection Factors

- Software investment for a company can be one of the biggest investments. Hence, you need to make sure that understand the considerations for software purchasing

- Does the software support enough number of users in your company?

- Does the software allow for list of authorized users?

- Is the software affordable?

- Is the software compatible with existing hardware, software and communication networks

- Does the software meet both the current and the anticipated future needs?

Software Upgrades

- Software vendors revise their programs and sell new versions.

- The revised software can offer valuable enhancements, and it may offer additional capabilities.

- Hence, whenever you are buying software, you also need to take care of the software upgrade issue.

Programming Languages

- All software are programmed using program languages. There are several different programming languages that can be used to program different software

- Machine Language is the lowest level computer language. The machine code is constructed of binary digits (0s and 1s). Machine Language is the only programming language that the computer understands.

- All other languages must be translated into machine language before it can execute the instructions.

Programming Languages

- Since machine language is extremely difficult to program, higher level programming languages are used by programmers to create software.

- Some higher level languages include:

  - PASCAL

  - FORTRAN

  - C++

  - Visual Basic / Visual C

  - Delphi

  - Java

Programming Languages

- Natural Programming Languages are the next step as translator programs will be able to translate natural languages into structured machine readable form

- For programming websites HTML or Hypertext Markup Language will be used. A hypertext document may contain text, images, data files, audio, video, and executable computer programs.