Components of a Computer (Software)

Computer Maintenance and Protection

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Computer Software

- **Computer software** is a series of instructions that tells the computer what to do and how to do it. Software is also called *computer program*.
- Computer software gives life to computer hardware, just like breath giving life to a human body.
- Software, as the name implies, depicts a changeable nature. Software is flexible, it can be changed the way we want it to be. But we cannot physically see, we cannot feel, and we cannot touch the software.

Computer Software…

- There are basically two types of computer software;
    1. Application Software and
    2. System Software

1. Application Software

- **Application software** is aimed at supporting and improving tasks that the end user wishes to perform. It is designed to handle the needs of the end user.
- Basically, application software is a program that solves a specific problem, such as payroll, spreadsheet, whether forecast, etc.
- There are two categories of application software:

  A. *General purpose application software*, and

  B. *Special purpose application software*.

A. General Purpose Appl' Software

- **General purpose application software** are designed by software engineers without any special order from the end-user,
- The engineers study the needs of the users and develop software for any user who will be interested with it to buy and use it.
- This is more or less the same as a tailor tailing clothes, called 'ready-made clothes', and put them in a market just for any customer who will be interested with the clothes to buy them.
- Examples of these software are: word processor, spreadsheet, database software, desktop publishing, etc.

B. Special Purpose Appl' Software

- A next category of application software is called *special purpose application software.*
- They are specifically designed by software engineers with special orders from end users.
- Software used for University Library Information Management System is one of the examples of special purpose application software. Each library has its own needs. So each library can have a program that will solve its own needs.
- Because special purpose application software comes with a special order, they are normally produced in a low quantity hence their costs are high as compared to general purpose software.

2. System Software

- System software consists of programs that control and support operations of a computer system.
- System software acts as an interface between user, application software and the computer hardware.
- A computer can boot (start) without any application software but it can't without system software.
- For this case, system software is a platform for application software to play their roles
- There are basically two types of System Software:
  1) Operating System and
  2) Utility Programs.

1) Operating System

- An **operating system (OS)** is a set of programs containing instructions that coordinate all the activities among computer hardware resources.
- In most cases OS is installed and resides in computer's hard disk.
- Different sizes of computers use different operation systems. E.g. a mainframe computer does not use the same OS as a personal computer.
- Even the same types of computers, such as microcomputers may not use the same OS.

OS…

- Some typical operating systems are Windows, Linux, UNIX, Microsoft Disk Operating System (MS-DOS), etc.
- Most personal computers such as laptops and desktops use Windows OS. Examples of Windows OS are:
  - **Windows7**
  - **Windows Vista**
  - **Windows XP**
  - **Windows 2000 Professional**
  - **Windows ME**
  - **Windows 98**
  - **Windows NT** and
  - **Windows 95**

OS…

- There are many functions of operating systems in our computers. Some of the typical functions of operating systems are;
  - *Starting a computer*
  - *Providing user interface*
  - *Managing programs*
  - *Managing memory*
  - *Scheduling jobs*
  - *Monitoring performance* and
  - *Administering security*

Starting a Computer

- One of the fundamental function of operating system is starting (also called booting) or restarting (or rebooting) a computer.
- Each time you boot a computer, the *kernel* and other frequently used operating system instructions are loaded, or copied from hard disk to a computer's main memory (RAM).
- The *kernel* is the core of an operating system that manages memory and devices, maintains computer's clock, starts applications, and assigns computer's resources, such as devices, programs, data, and information

Providing User Interface

- You interact with software though its user interface.
- A user interface controls how you enter data and instruction and how information is displayed on the screen.
- There are three types of user interface;
  - *command line interface*,
  - *menu driven interface* and
  - *graphical user interface (or GUI)*

Managing Programs

- Some operating systems support a single user and only one running program at a time. These operating systems are called *single user/single tasking*.
- Others allow single user but many running programs, called *Single user/multitasking*.
- And the last group of operating system supports many users and many tasks to be run at a time, called *multi-user/multitasking*

Managing Memory

- The purpose of memory management of an OS is optimized through the use of RAM.
- The OS assigns data or instructions to an area of RAM while they are being processed.
- If you are working on multiple programs simultaneously, it is possible to run out of RAM.

Managing Memory…

- For example, assume for operation of a certain running computer;
  - an operating system requires 128MB of RAM,
  - a business software suite requires 40MB of RAM,
  - photo editing program requires 32MB of RAM and
  - web browser requires 32MB of RAM.
- With all these programs running simultaneously, the total RAM required would be *128MB + 40MB + 32MB + 32MB = 232MB of RAM*.
- If the computer has only 128MB of RAM, the operating system may have to use virtual memory to solve the problem.

Scheduling Jobs

- A job is a task for a computer. There are plenty of computer tasks
- E.g. It is very possible to be typing something on a keyboard while listening to music and at the same time printing is taking place. These are three different jobs taking place at the same time.
- It is a responsibility of an Operating System to schedule these jobs.
- An Operating System can process the jobs in the First Come First Served (FCFS) basis but sometimes it may process them due to the order of priority.

Monitoring Performance

- An Operating System contains a performance monitor.
- A performance monitor is a software package that monitors the processing of computer system jobs.
- It helps to develop a planned schedule of computer operations that can optimize computer system performance, and produces detailed statistics that are used for computer system capacity planning and control.

Administering Security

- One of the most critical issues in today's world is security.
- Operating System provides a way in which security can be administered in computers.
- In multi-user environments an Operating System gives a user an option to creating different user accounts and set the username and *passwords* for each user.
- A password is a code (combination of characters) used to identify a particular user and to control access to particular programs or data files.

2) Utility Programs

- Utility programs help to manage, maintain and control computer resources.
- Utility programs are available to help you with the day-to-day tasks associated with personal computing and to keep your system running at maximum performance.
- Some examples of utility programs include:
  - *Backup software,*
  - *Scandisk,* and
  - *Disk defragmenter*

Backup Software

- **Backup software** is software that assists you in backing up your files and even the entire computer hard drive.
- Loosing data is expensive so it is important for you to back up your files regularly.
- If you own a computer, you should think about how to backup your valuable data on your hard drive.

Scandisk

- **Scandisk** is a utility provided with Windows computers.
- Scandisk scans your disks to see if there are any potential problems on the disk, such as bad disk areas.
- Since disks are magnetic media, all disks, including your hard drive can be corrupted.

Disk Defragmenter software

- **Disk Defragmenter software** assists you in keep reorganizing your disk drives.
- After files are saved, deleted and resaved again, the disk can become fragmented; available space is in small blocks located throughout the disk.
- Disk defragmenters gather those free spots and put them together to enable you to continue to save your data in the most efficient manner.

Thank You!