Lecture 5: System Software.
This Lecture Covers:

- **Classifications of Computers.**
- **Computer Performance.**
- **System Software.**
Classifications of Computers

- Use the computer that fits your needs
- Based upon
  - Size
  - Speed
  - Cost
  - Portability
  - Number of simultaneous users supported
  - Available software
  - Typical use
Computer categories

- **Mobile computers**
  Very small device with some type of built-in computing or Internet capability

- **Microcomputers**
  - *Personal computer (PC)*: Small computer used by one person
  - *Workstation*: Multi-users

- **Minicomputers**
  Multi-users, medium-sized computer used to host programs and data for a small network.
  - *Midrange server*
  - *Workstation*

- **Mainframe computers**
  Multi-users, Larger, more expensive, and more powerful than Minicomputers, (for large organizations, hospitals, banks, universities)

- **Supercomputers**
  Fastest, most expensive, most powerful type of computer (for satellites, weather forecast, oil exploration, scientific research)
Mobile computers:

1. **Laptop** (Notebook or Subnotebook)
2. **Tablet PC**
3. **Handheld portable digital devices**
   a. Personal digital assistants (PDAs)
   b. Information appliance (palm-size PC, E-book reader)
   c. Graphics calculator
   d. Mobile feature phones
   e. Smart mobile phones
   f. Portable Media players
Personal Computer (PC)

- Small computer designed to be used by one person
  - Desktop models: desktop-case, tower-case, or all-in-one
  - Portable computer: laptop, tablet, PDA
- IBM invented the PC way back in 1981
- Capacity: Large hard disks combined with a large main memory (RAM)
- Costs: Getting cheaper by the day.
- The Apple Mac is a computer, but not IBM-compatible PC. It uses a different operating system,
Laptop & palmtop computers

- **Laptops**: are small portable computers which can run on batteries

- **Notebooks**: simply indicates a small laptop.

- **Palmtops**: are even smaller computers which can literally fit into the palm of your hand.

- **Speed**: and high performance compared with personal equipment Similar

- **Cost**: is high price with equal possibilities equipment

- **Typical Users**: Business users, people on the move, educational users
Handheld portable digital devices

a) Personal Digital Assistant (PDA)

- These devices use a special pen, rather than a keyboard.

**Capacity:** Much smaller storage capacity compared to a PC.

**Speed:** Much less than a PC unless you pay a lot extra.

**Costs:** In relative terms expensive when compared to a PC.

**Typical Users:** Mostly business users.
b) Mobile feature phones

- Cell phones
  - is used for mobile communication. As well a speech they may be used for text messaging, emailing accessing the Web.
  - Most mobile phones use a signal from a local transmission tower and will not work when you are out of range or if the signal is blocked by mountains, or even buildings.

- Mobile phones (Satellite phones)
  - use a signal coming from a satellite. They tend to be much more expensive to purchase and use. While you should never be out of range, the satellite signal may be blocked by tall buildings.
c.) Smartphones

- A smartphone is a mobile phone (cell phone) offering advanced computer-like features. Capabilities and standards vary from one manufacturer to another.

- Most smartphones have some sort of operating system allowing you to connect to other devices and also to install applications.

- Some even have a miniature computer-type keyboard built into them, while others have a touch screen.

- Some have GPS positioning systems.

- Some smartphones allow you to read documents in Microsoft Word or Adobe PDF format.
D) Media players

- Media players allow you to store digital music and video. A famous example is the iPod from Apple, which lets you store your digital music which you can then listen to at your leisure. Thousands of songs can be stored on these devices.
Computer Performance

Factors affecting computer performance
Factors affecting computer performance

1. CPU speed
2. RAM size And number of applications running
3. Hard disk speed and storage
4. De-fragmenting files
5. Upgrading Internet connection
6. Upgrading video graphics card
1- CPU speed

- The **CPU clock speed** governs how fast the computer will run.
  - It is measured in megahertz (MHz) or gigahertz (GHz)
  - 1MHz means that the device will run at one million cycles per second.
  - Higher CPU clock speed → more million instructions processed per second (MIPS)
- **CPU architecture** (multiple CPU cores), **bus speed**, and **cache size** also affect the overall processing speed of a computer
2- RAM size And number of applications running

- As a rule the more memory you have the faster the PC will appear to operate.
- RAM speed is measured in ns (Nano seconds).
- RAM size is measured in MB (mega bytes) or GB (Giga bytes).
- Windows also uses swap files on the hard disk a lot to simulate extra memory, so logically the faster the hard disk can operate then again the faster the PC will appear to run.
- Number of programs running in the same time affects the speed of each of them.
3- Hard disk speed and storage

- Hard disks speed are measured in milliseconds (ms).
- The disk storage capacity is measured in Gigabytes (GBytes).
- Operating system is constantly moving data between the hard disk and RAM (Random Access Memory).
- Microsoft Windows will create many swap files so-called “temporary files” which it uses for managing your programs.
4- De-fragmenting files

- When you use a PC, over a period of time the files get broken up into separate pieces which are spread all over the hard disk.
- De-fragmentation means taking all the broken up pieces and joining them back together again.
Software

- Unphysical components of the PC that enable it to perform the task we need.
- Programs or

- Set of instructions that directs the hardware to do a required task and produce the desired results
Software can be divided into:

- System Software
- Application Software
Systems Software

- All programs related to coordinating computer operations
- Examples
  - Operating systems
  - Language translators
    - Convert program code to machine-readable form
    - Ex: Compilers or Interpreters
  - Utility programs
    - Perform secondary tasks
    - Ex: File Manager (Windows Explorer), File Compression (WinRar), Disk defragmenter, Security program (Anti-virus), etc...
Operating Systems

- A set of programs that lies between applications software and the hardware
  - Manages computer’s resources (CPU, peripheral devices)
  - Establishes a user interface
    - Determines how user interacts with operating system
  - Provides and executes services for applications software
The operating system is a collection of programs that manage and coordinate the activities taking place within a computer system and loaded automatically by the Kernel when you start your computer. Ex:-
- DOS
- Win 3.1
- Windows 9x
  - Windows 95
  - Windows 98
  - Windows Millennium Edition (ME)
- Corporate Market
  - Windows NT
  - Windows 2000
- Windows XP
- Windows CE
- Unix
- Linux
- Mac OS
Graphical User Interface (GUI)

- User clicks an icon to perform tasks
- Start Menu in lower left corner launches programs
- Use menus to activate commands
Windows Features

- Long file names (up to 255 characters)
- Plug and Play
  - Makes installing hardware components easier
- Object Linking and Embedding (OLE)
  - Allows user to embed or link one document to another
System Software vs. Application Software

- **System software** acts as a mediator between application programs and the hardware resources of the computer system.

- **Application software** provides the tools to perform particular tasks on a PC, such as writing a letter, processing orders, playing games, composing an e-mail, and so forth.