

COMPUTER BASICS

WEEK 2

COMPUTER BASICS

Objectives



At the end of this chapter you will be able to:

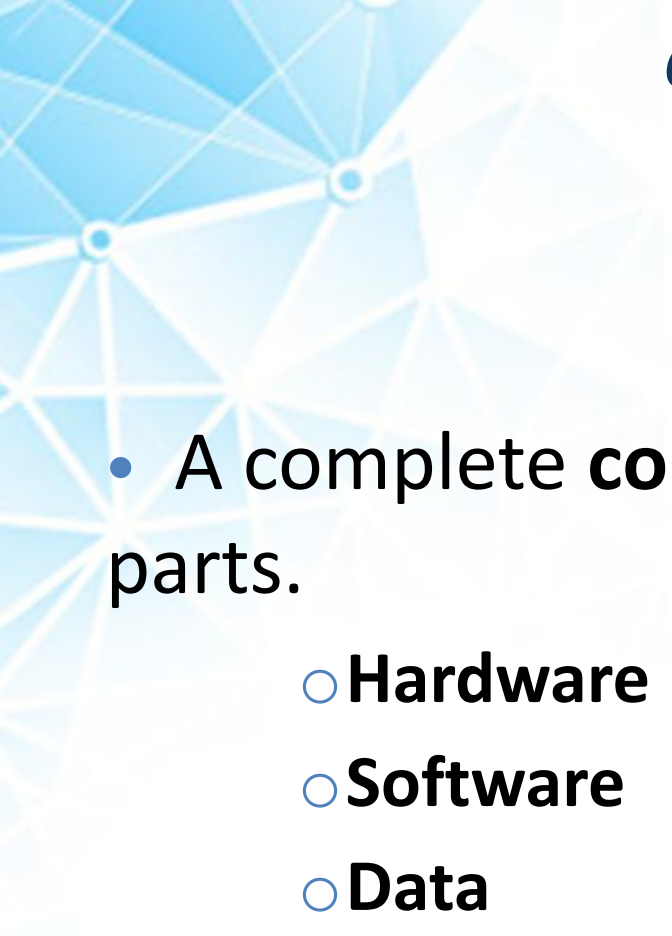
- Identify components of Computer Systems
- Learn Information Process Cycle
- Learn Essential Computer Hardware
- Learn Software types
- Learn other computing devices

COMPUTER BASICS

Computer System

- A **computer (or computer system)** is a set of tools that helps you to perform *information-processing tasks*.





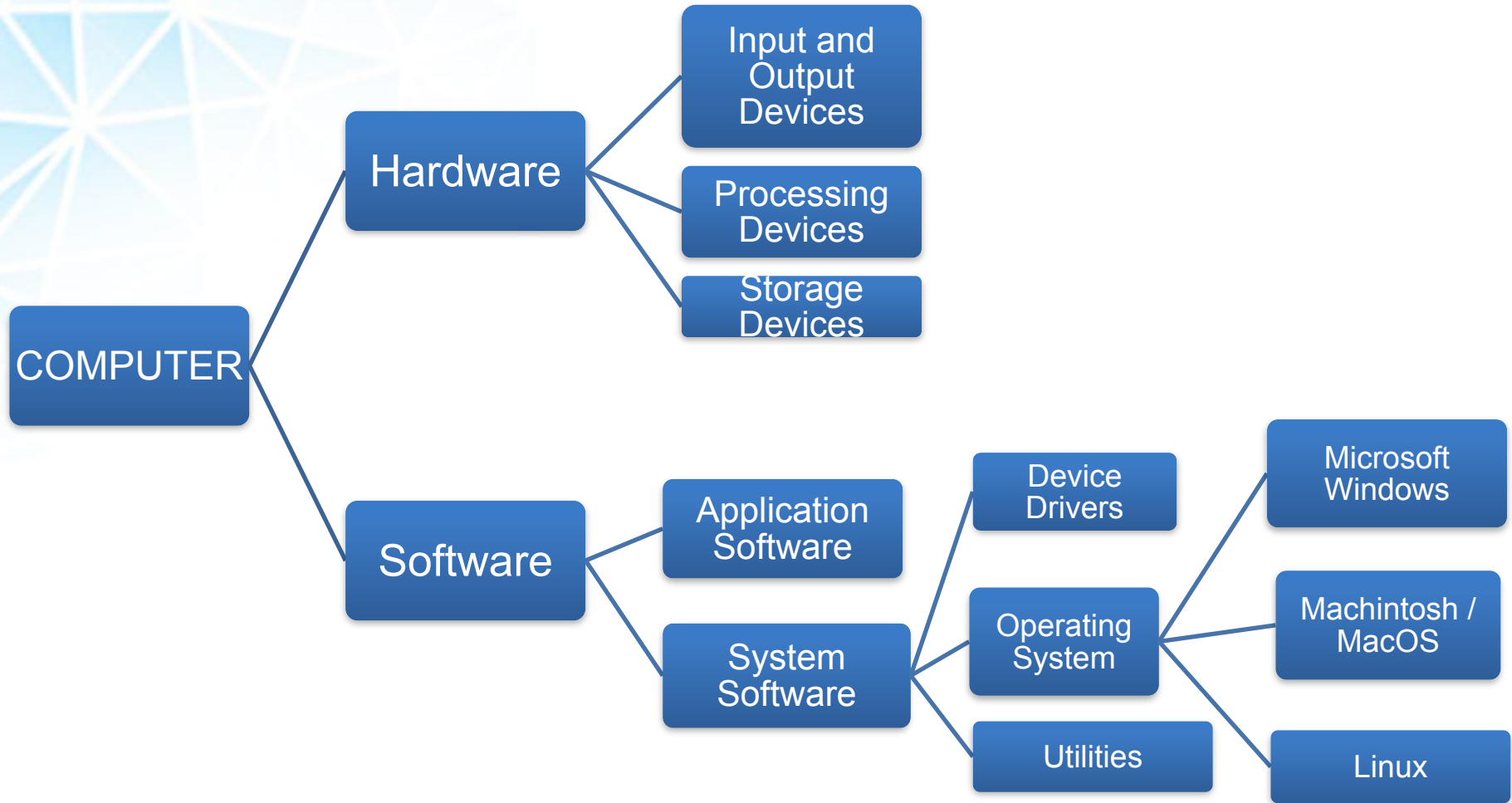
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Computer System

- A complete **computer system** consists of four parts.
 - **Hardware**
 - **Software**
 - **Data**
 - **User**

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Summary



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Computer System

- **Hardware** includes physical devices that make up your computer. Hardware is any part of the computer that you can physically touch.



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Computer System

- **Software** is the set of instructions that your computer hardware executes to process information. In other words, software tells the computer what to do.



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Computer System

- **Data:** A representation of facts, concepts or instructions in a formalised manner suitable for communication, interpretation, or processing by humans or by automatic means



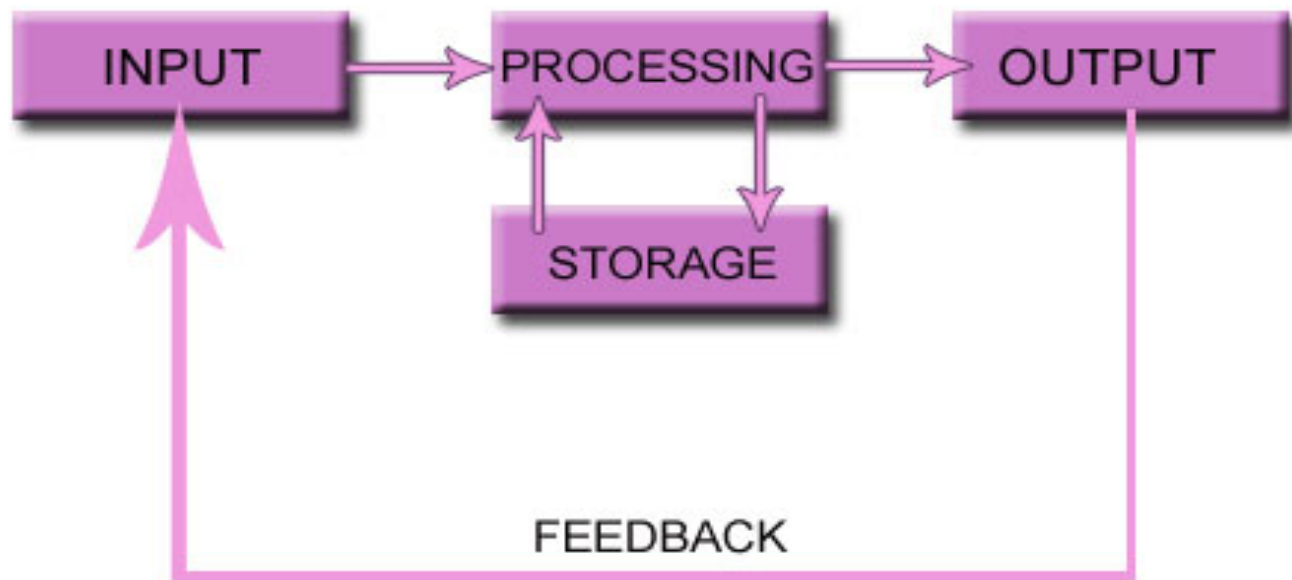
NOTE: A computer's primary job is to process these tiny pieces of data and to convert them into useful information.

- **Users:** People that work with computer are called as **users**.

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Information Processing Cycle

- **Information:** Information is data that has been summarized or manipulated for the use of decision making.



Input-output cycle

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Information Processing Cycle

- Using all its parts together, a computer converts **data** into **information** by performing various actions on the data. *These actions are:*
 - *receiving* data (**input**)
 - *processing* the data according to instructions (**process**)
 - *displaying* the resulting information to the user (**output**)
 - *storing* the results. (**storage**)

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Information Processing Cycle

- **Input:** During this part of the cycle the computer accepts the data from particular sources, such as the user or a program, for processing.



Input devices

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Information Processing Cycle

- **Processing:** Processing is the manipulation that a computer does to transform data into information.
- There are 2 types of operations:

Arithmetic Operations

$$4 + 16 = 20$$

Logical Operations

$$728 > 546$$

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Information Processing Cycle

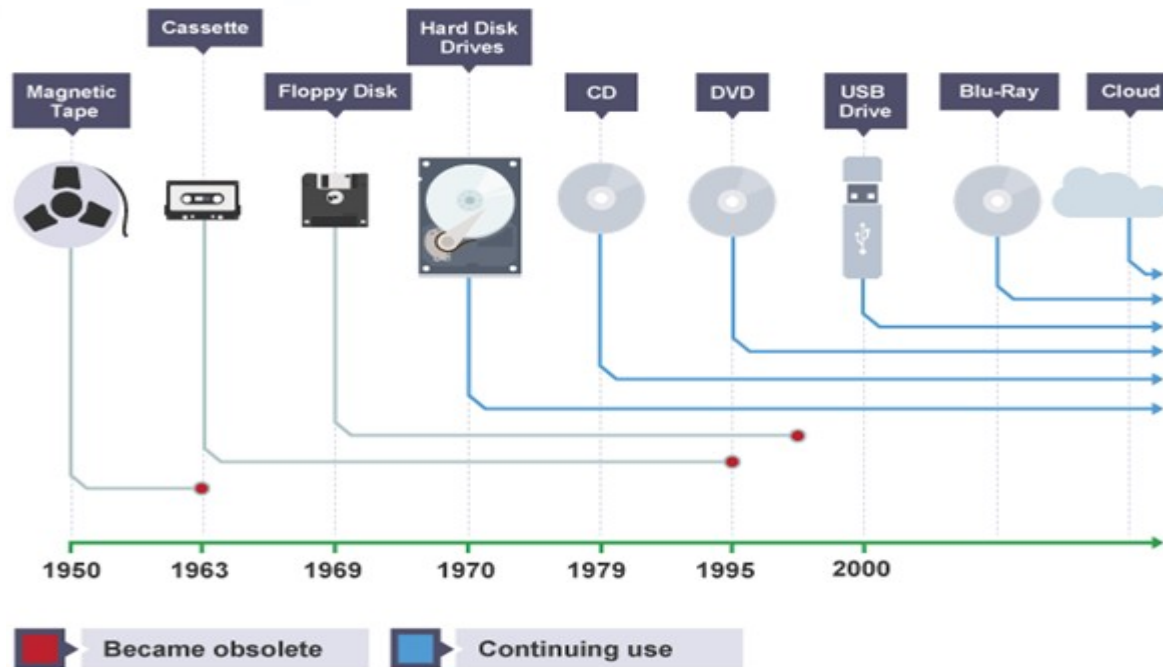
- **Output:** A computer may be required to display the *results* of its processes such as:
 - Text
 - Numbers
 - Graphics
 - Sounds



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Information Processing Cycle

- **Storage:** The computer stores the results of its processing on a disk, tape, or some other kind of storage medium.



Timeline of Storage Devices

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Information Processing Cycle

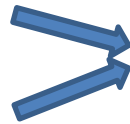
- 2 types of storage are:
 - temporary storage
 - permanent storage
- ***Memory or temporary storage*** is the internal circuitry that **temporarily** holds data waiting to be processed.
- ***Permanent storage*** refers to the device and media that stores data or information **permanently**.

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Information Processing Cycle

- A computer's hardware devices can be classified into one of four categories:

- *Processor*



for **Processing Action**

- *Memory*

- *Input and Output*



for **Input and Output Actions**

- *Storage*



for **Storage Action**

- **Communication** is another important ability that the computers have which extends the functionalities of the computers.

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Essential Computer Hardware

- ***Processing Devices***

- The procedure that transforms raw data into useful information is called **processing**.
- To perform this transformation, computer uses two components: the ***processor*** and ***memory***.

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Essential Computer Hardware

- **Processing Devices**

- **Processor:** Central Processing Unit (CPU)



- **Memory**

- Random Access Memory (**RAM**)
- Read Only Memory (**ROM**)



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Essential Computer Hardware

- **Memory**

- **RAM:** RAM holds data and program instructions **temporarily** while the CPU works with them.



IMPORTANT NOTE: RAM is **volatile**, meaning that it loses its contents when the computer is shut off or if there is power failure.

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Essential Computer Hardware

- RAM has a great impact on the speed and power of a computer.



The more RAM a computer has, the more it can do and the faster it can perform certain tasks.

- The most common measurement unit for describing a computer's memory is the ***byte***.

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Essential Computer Hardware

- A bit is an electronic signal which is either on (1) or off (0). It is the smallest unit of information that the computer uses. A bit might be called the "on/off" unit of information.
- Each byte (8 bits) means something to the computer.

Bit	On/Off
Byte	8 Bits
Kilobyte (KB)	1024 Byte
Megabyte (MB)	1024 Kilobyte
Gigabyte (GB)	1024 Megabyte

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Essential Computer Hardware

- **Memory**

- **ROM:** Unlike RAM, **ROM** permanently stores its data, even when the computer is turned off. ROM holds instructions that the computer needs to operate.
- Unlike RAM, **ROM** is not writable.



IMPORTANT NOTE: ROM is called *non-volatile* memory because it never loses its contents.

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Essential Computer Hardware

- **Input and Output Devices**

- **Input:** Devices which are used to enter data into a computer for processing e.g. from a keyboard or from a file stored on the disk.
- **Output** : Devices which are used to display result of processing data; information is sent to the monitor screen /printer or is stored on the disk or is sent to another computer in a network.



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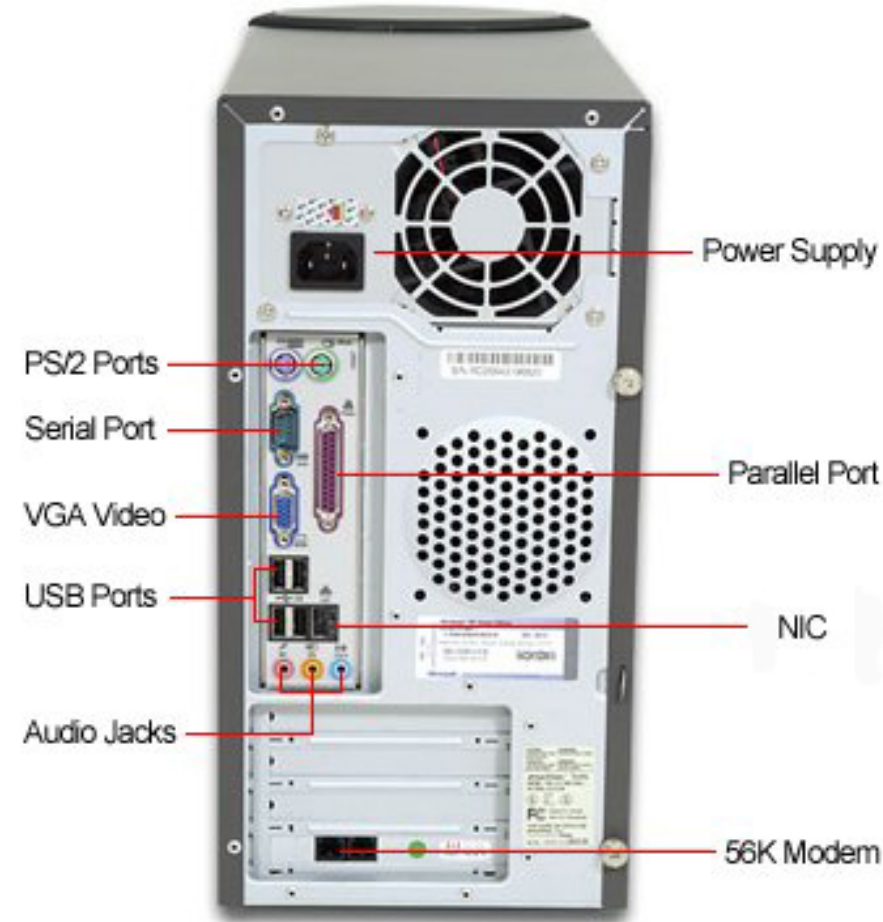
Essential Computer Hardware

- **Storage Devices**

- To function properly a computer needs a medium to keep program files ***permanently*** when they are not in use or when the computer is turned off.
- There are three main types of computer storage: ***magnetic*** (harddisk, floppy diskette), ***optical*** (CD, DVD, Blu-Ray) *and* ***flash memories*** (Flash memories, USB sticks, memory cards).

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Essential Computer Hardware



- **Ports:** Sockets at the back of a computer used to plug in external devices such as a modem, mouse, scanner, or printer.

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Essential Computer Hardware



Main power



This port is used to connect main power



Parallel port



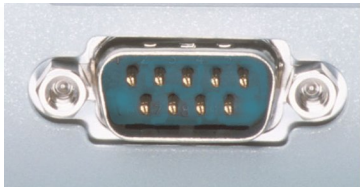
A port designed to connect printer



VGA Port



A port that is used to connect monitor.



Serial port



A standard connector and protocol that lets you attach devices such as modems to your computer.



HDMI and
DVI ports



HDMI and DVI ports are used to connect display devices. They provides higher resolution displays. HDMI also can transfer sounds to output devices.

HDMI

DVI

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Essential Computer Hardware



Mouse



This port is used to connect mouse

Keyboard



This port is used to connect keyboard



USB port



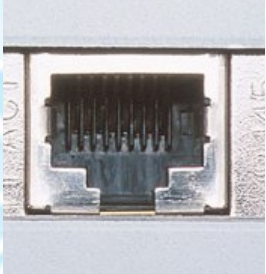
You can connect USB devices, such as flash disks, via USB ports. You do not need to install any driver to use it.



NOTE: USB ports can be used for mouse, keyboard, printer and modem connections

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Essential Computer Hardware



Ethernet port



Network Interface Card (NIC) also referred as “network adapter” is a printed circuit board. It contains necessary hardware used to connect a computer to network.



Audio jacks



Audio ports (jacks) are for microphone, auxiliary and speaker or headphones.

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Essential Computer Hardware

- **Wireless Ports:** While using wireless devices, you don't need any wire or connectors. The connection is established in the following ways:
 - **Infrared Data Association (IrDa)** uses infra red lights work similar to remote TV controller.
 - **Bluetooth** is a wireless technology standard for exchanging data over short distances.
 - **Wireless Fidelity (WiFi)** is a technology that allows an electronic device to exchange data or connect to the internet wirelessly.
 - **Near Field Communication (NFC)** establishes radio communication between devices by touching them together or bringing them into proximity, usually no more than a few inches.



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Software

- **Software**
 - **Application Software**



- **System Software**



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Software

- **Application Software** allows you to perform *specific information-processing* tasks such as
 - Writing a term paper (MS Office, OpenOffice, LibreOffice, Google Docs, Latex, Overleaf)
 - Citation Management (Zotero, Mendeley)
 - Creating slides for a presentation (MS Powerpoint, Prezi, Gamma, Google Slides)
 - Designing/Editing visuals (Canva, Adobe Photoshop, GIMP, Picasa)
 - Web Browser (MS Edge, Chrome, Firefox, Safari)
 - Communication (Zoom, MS Teams, Google Meet, Slack, WhatsApp, Facebook Messenger, etc.)

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Software

- **System Software:** There are three basic components of *system software*
 - **Operating Systems:** computing system.
 - **Device Drivers:** control peripheral devices.
 - **Utility Programs:** support, enhance, or expand existing programs in a computer system.



IMPORTANT NOTE: We interact mainly with the *application software* that functions with the *system software* which controls the hardware.

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Software

- **Device Drivers:** Specialized software programs that allow input and output devices to communicate with the rest of the computer system. If you buy a new peripheral device (e.g. a mouse/scanner), its package will include a device installer for the device (on a CD/DVD) or you can download the driver online.
- **Utility (Service) Programs:** perform tasks related to the control and allocation of computer resources. They *enhance* existing functions or *provide services* not supplied by other system software programs. *Norton* is an example for service programs.

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Operating Systems

- Most Common Operating System(OS)
 - **Macintosh (Mac OS)**
 - **Microsoft Windows**
 - **Linux:** Ubuntu, Debian, Pardus (Turkish variation of Linux developed by TUBİTAK)
- Operating systems are system softwares that manages computer hardware and software resources and provides common services for computer programs.
- They can run on any computer.

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Evolution of Computers



From room-size to palm size

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Other Computing Devices

- Computers are no longer our only computing device options. With the technological advancements, now we have smartphones, tablet pc's, smart watches, game consoles, smart TVs etc.



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Evolution of Mobile Phones



1984
Motorola
DynaTAC 8000X



1992
The First
Smartphone
IBM Simon



1997
Nokia 6110



2000
Sharp J-SH04



2007
The First
Apple iPhone



2008
The First
Android
HTC Dream



2022+
Modern
Smartphones



**METU
ODTÜ**



TEST YOURSELF

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References

- ©This lecture was prepared by using PETER NORTON'S INTRODUCTION TO COMPUTERS 6th Edition for teaching purposes.
- [1] <http://ademocut.com/bilgisayar-donanimi-ve-cevre-birimleri/>