Computer
Fundamentals & Programming

Computer Configuration

Computer Operations

- **Data**
  - Anything in a form suitable for use with a computer.
- **Information**
  - Refer to processed data.
- **Program**
  - Computer instructions.

Computer Operations

- The computer is an electronic machine that performs the following five basic operations:
  - **Input**
  - **Process**
  - **Output**
  - **Store**
  - **Control**

Input

- It is the process of capturing or acquiring the information, or it is the process of accepting data or information, by using input the computer can do any process.
- Information or data that is entered into a computer or computer device using an **input** device.
- Data is gathered:
  - Manually
  - Automatically
  - Both

Types of Computer Input

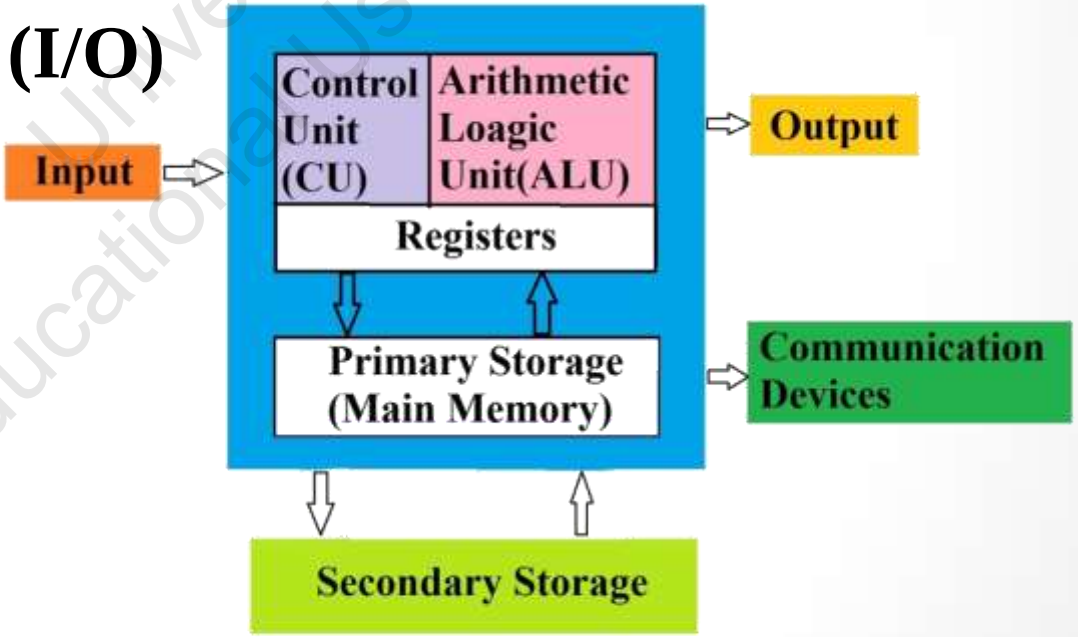
- **Data**
  - the raw facts given to the computer.
- **Programs**
  - the sets of instructions that direct the computer.
- **Commands**
  - Special codes or key words that the user inputs to perform a task.
- **User response**
  - The user's answer to the computer's question.

Processing

- It is the transformation process to convert the input into output.
- A **process** is an instance of running a program.
- It causes the computer to follow instructions from the Memory.
- Perform by **Central Processing Unit** (CPU).

Processing

- The CPU has three parts:
  - **Arithmetic / Logic Unit (ALU)**
  - **Control Unit**
  - **Input / Output Unit (I/O)**



CPU (Central Processing Unit)

Processing -Arithmetic / Logic Unit (ALU)

- The part of a computer that performs all arithmetic computations, such as addition and multiplication, and all comparison operations.

Processing -Control Unit

- The control unit is the circuitry that controls the flow of data through the processor, and coordinates the activities of the other units within it.

Processing -Input / Output Unit (I/O Unit)

- The computer components that control input and output devices.

Storing

- It is the process of storing or retaining the data or information or instructions, so that the user can retain and retrieve it whenever required.
- Capability to store information after processing.
- Storage are used to store programs and data when they are not being used in memory.

Controlling

- It is the process of directing the manner and sequence in which all the operations are to be performed.

Hardware vs. Software

- **Hardware** is any part of your computer that has a **physical structure**, such as the computer monitor or keyboard.

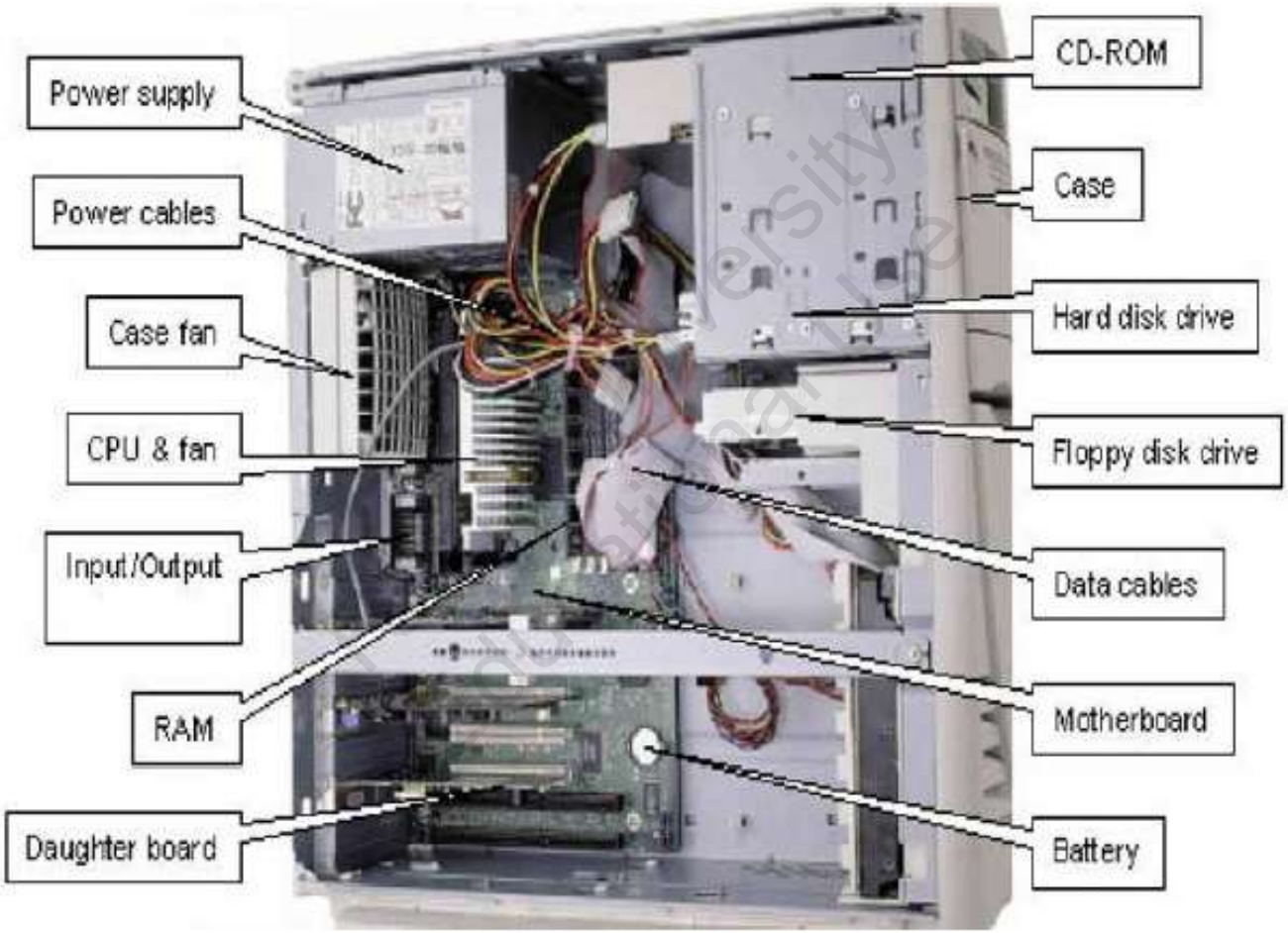
- **Software** is any **set of instructions** that tells the hardware what to do. It is what guides the hardware and tells it how to accomplish each task.

Basic Computer Configuration

System Unit

- The system unit is the core of a computer system.
- The most important of these components is the central processing unit (CPU), or microprocessor, which acts as the "brain" of your computer.
- Another component is random access memory (RAM), which temporarily stores information that the CPU uses while the computer is on.
- Almost every other part of your computer connects to the system unit using cables.

System Unit


Power supply
Power cables
Case fan
CPU & fan
Input/Output
RAM
Daughter board
CD-ROM
Case
Hard disk drive
Floppy disk drive
Data cables
Motherboard
Battery

Computer Case/Chassis

- The computer case serves mainly as a way to physically mount and contain all of the actual computer components.
- Cases typically come bundled with a power supply.
- Two types of casing:
  - Tower
  - Desktop

Computer Case/Chassis

- Two types of casing:
  - Tower
  - Desktop
- Desktop computers are designed to lay flat on the desk, while towers stand upright.

Tower casing

Desktop casing

Power Supply

- Used to sends power to all of the other hardware so they can operate.

+3.3 V, +5 V, and +12 V.

Central Processing Unit (CPU)

- The CPU, or the Central Processing Unit, is the brain of the computer and the most important chip in the computer.

- The CPU performs the system's calculating and processing.

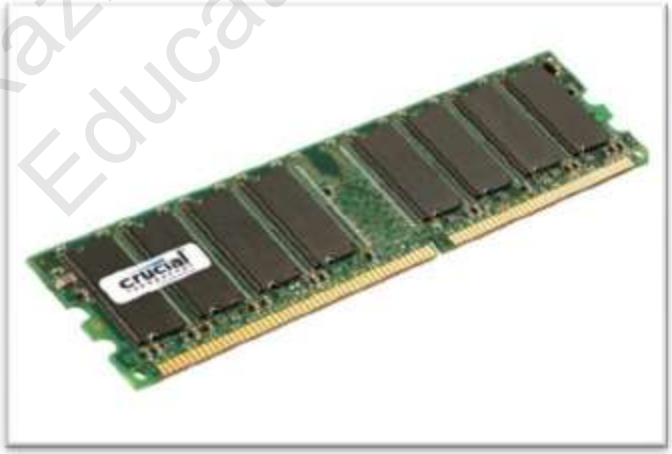
CPU Fan

- Any fan inside a computer case used for cooling purposes.

Computer Memory

- Also known as Random Access Memory (RAM)

- Computer memory is used to store information in electronic devices.



Motherboard

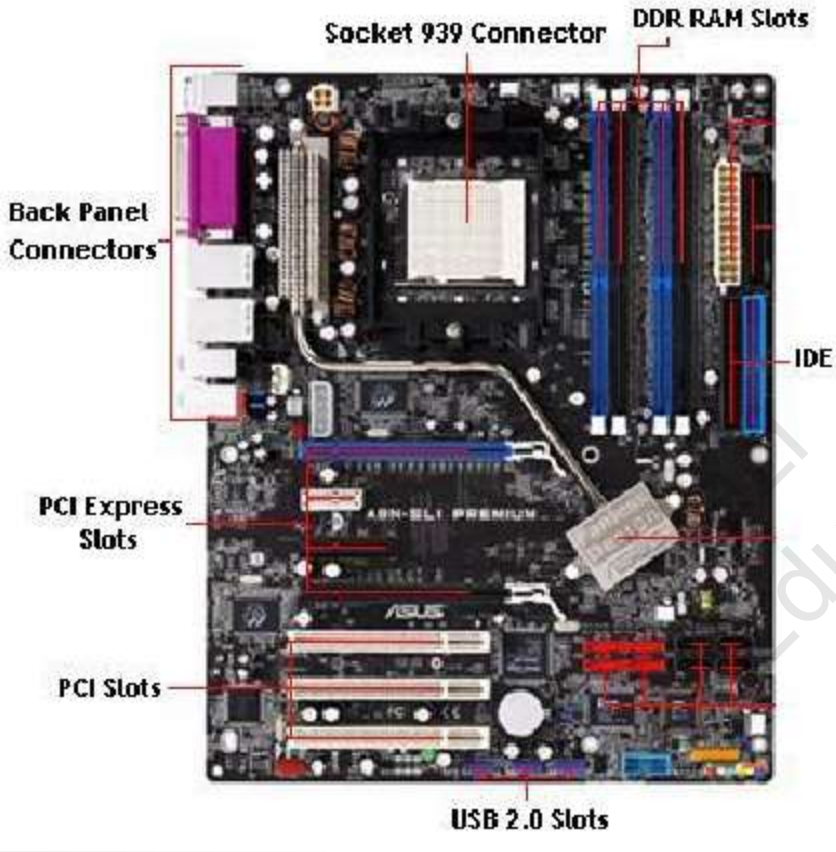
- The main circuit board of the computer.

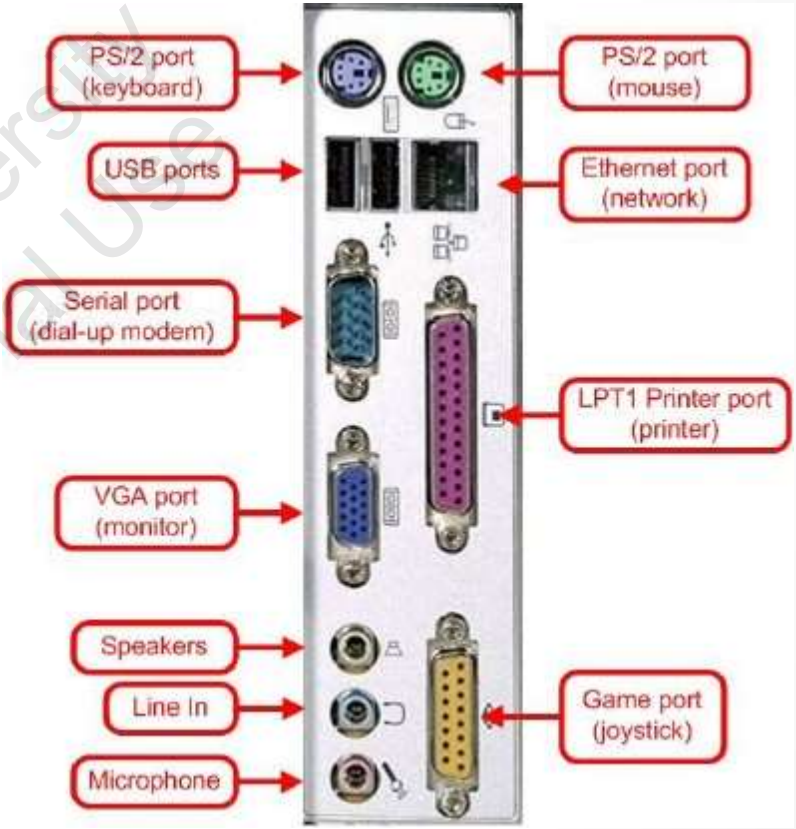
- All key internal and external components of the computer plug into the Motherboard.

Motherboard

- Components directly attached to the motherboard include:
  - CPU
  - Chipset
  - Random-Access Memory (RAM)
  - Read-Only Memory (ROM)
  - BIOS (Basic Input Output System)
  - Buses
  - Ports

Motherboard





Hard disk

- It used to store computer data and program.
- It can hold more data and are faster than removable storages.

Optical Disc Drive

- An optical storage technology that stores and plays back data.

- Some drives can only read from discs, but recent drives are commonly both **readers** and **recorders**.

Video card

- A board that plugs into a personal computer to give it display capabilities.

- The display capabilities of a computer, however, depend on both the logical circuitry (provided in the video adapter) and the display monitor.

Sound card

- A circuit board that plugs into your Motherboard that adds audio capability to your computer, providing high quality stereo output to the speakers.

Modem

- Short for **mo**dulator-**dem**odulator.

- A modem is a device or program that enables a computer to transmit data over, for example, telephone or cable lines.

Monitor

- The part of a computer that allows you to see what the computer is processing.

Other Components

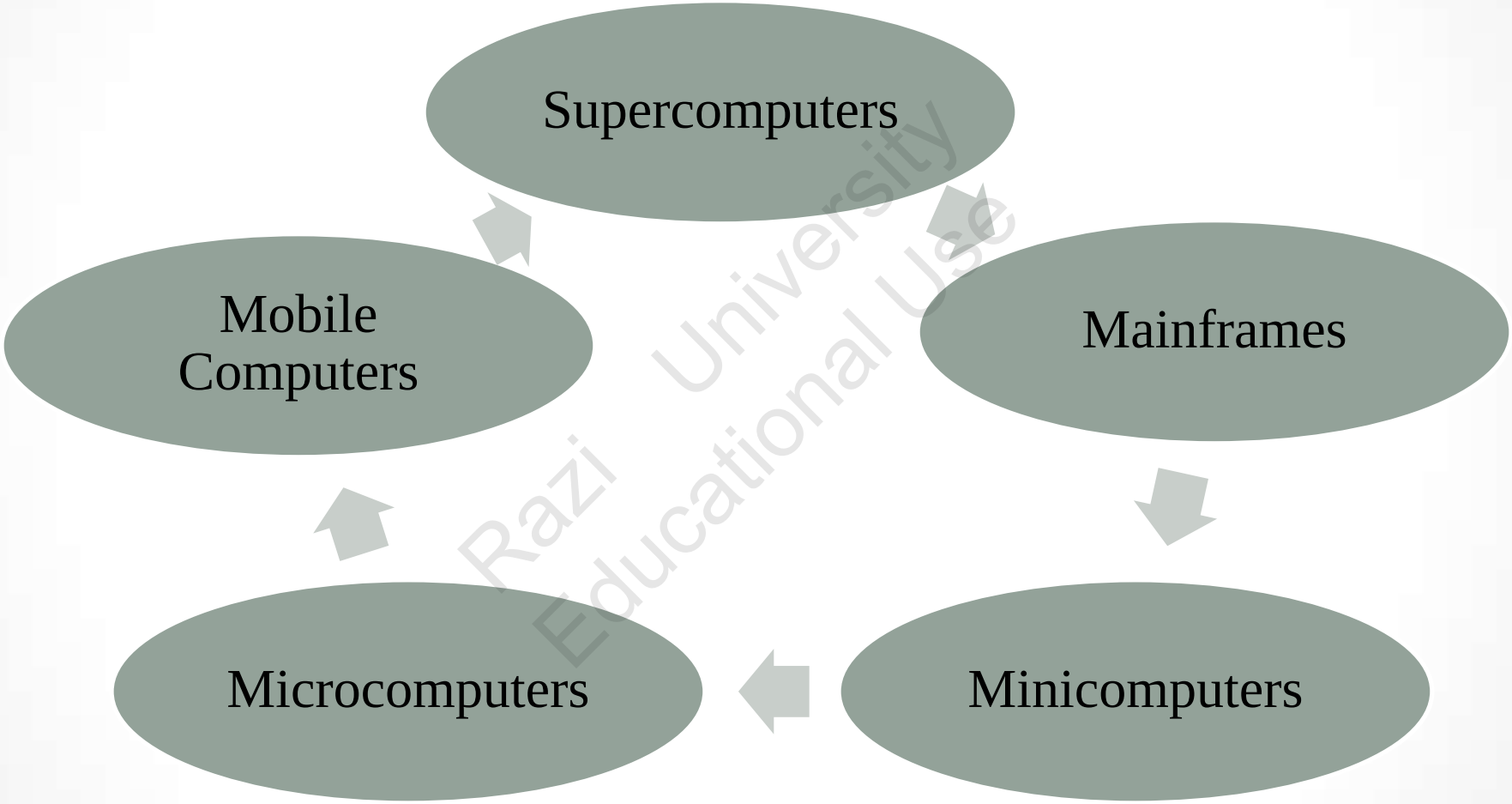
- Input Devices
  - Keyboard, mouse
- Output Devices
  - Printer, speakers
- Operating System
  - Windows, Mac OS, Linux

Computer Categories

What makes a computer powerful?

- **Speed**
  - A computer can do billions of actions per second.
- **Reliability**
  - Failures are usually due to human error, one way or another.
- **Storage**
  - A computer can keep huge amounts of data.

Computer Categories



Computer Categories -Supercomputer

- The fastest type of computer.

- Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations.

Computer Categories -Supercomputer

- Focused on performing tasks involving intense numerical calculations such as weather forecasting, fluid dynamics, nuclear simulations, theoretical astrophysics, and complex scientific computations.

Computer Categories -Mainframes

- A very large and expensive computer capable of supporting hundreds, or even thousands, of users simultaneously.
- In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs.
- But supercomputers can execute a single program faster than a mainframe.

Computer Categories -Mainframes

- These computers are capable of handling and processing very large amounts of data quickly.

- Mainframe computers are used in large institutions such as government, banks and large corporations.

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Computer Categories –minicomputers

- A midsized computer.
- In size and power, minicomputers lie between workstations and mainframes.
- A minicomputer is a multiprocessing system capable of supporting hundreds users simultaneously.

Computer Categories –Microcomputer

- A microcomputer is a small, relatively inexpensive computer with a microprocessor as its central processing unit (CPU)
- A small, single-user computer based on one microprocessor.
- Microcomputers are designed to be used by individuals.

Types of Microcomputer

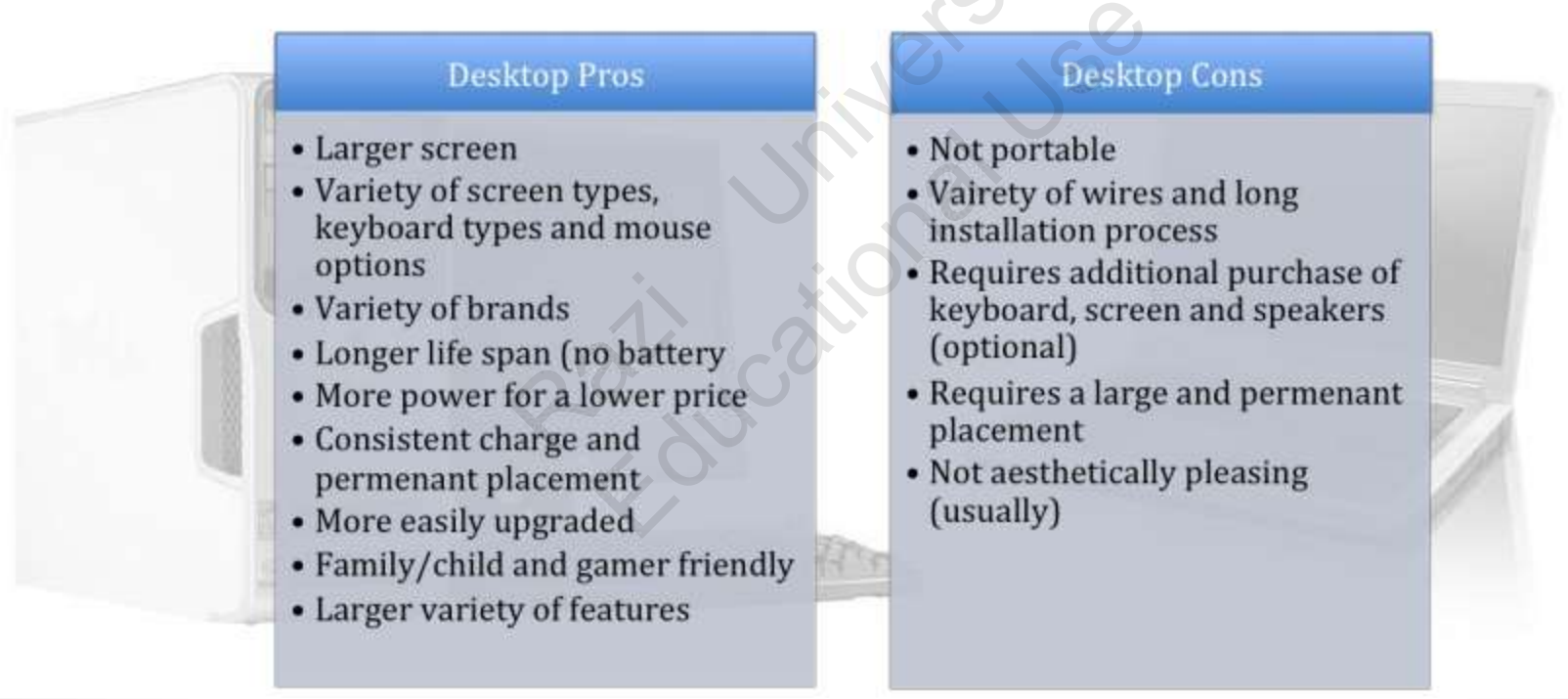
- Tower PC
- Mid-Tower PC
- Mini-Tower PC
- Server
- Workstation
- Personal computer (PC)
  - Desktop
  - Laptop

Computer Categories

Desktop Vs. Laptop

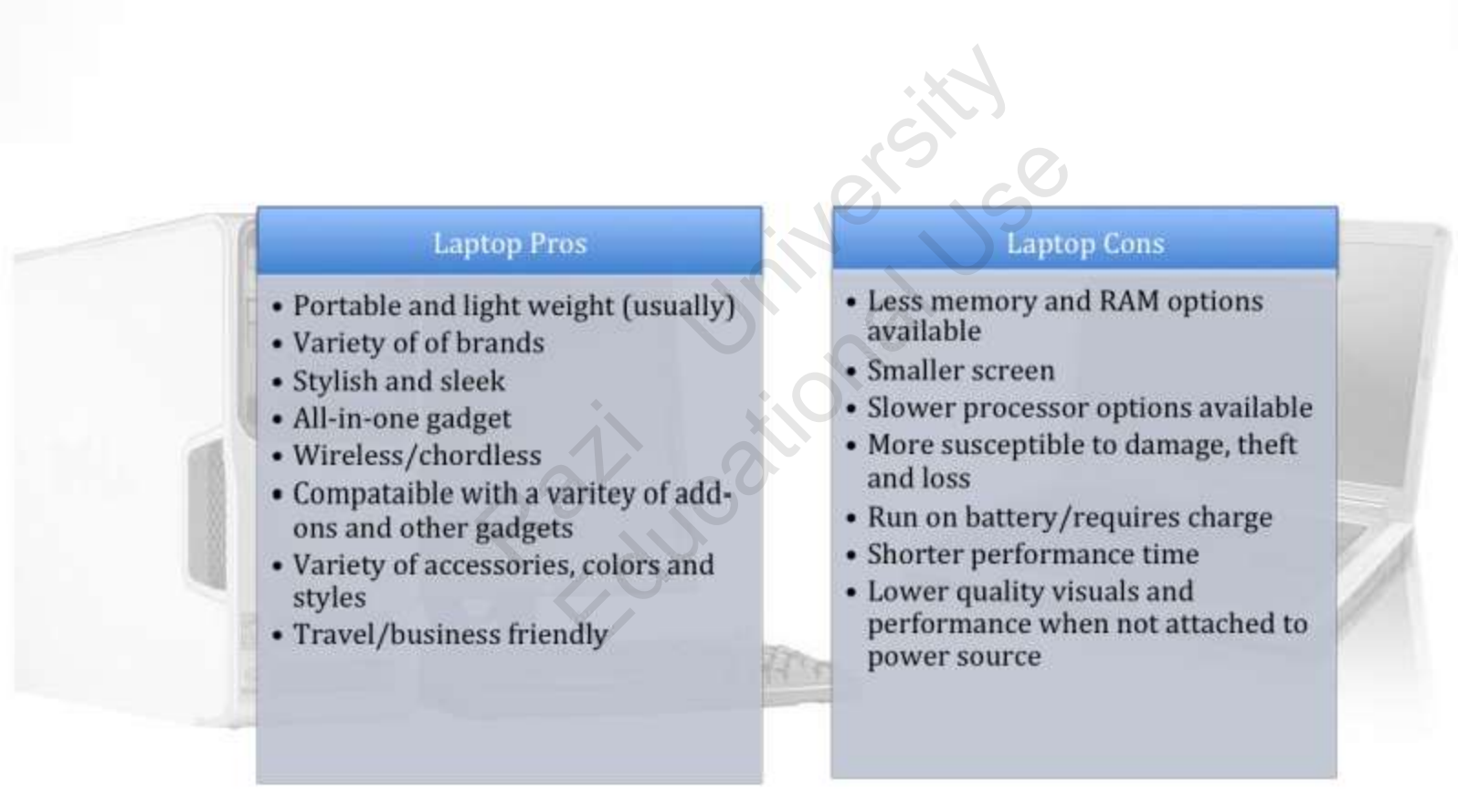
Computer Categories

Desktop Vs. Laptop



Computer Categories

Desktop Vs. Laptop



Computer Categories

Workstation

- A powerful, single-user computer.
- It has a more powerful microprocessor and a higher-quality monitor.
- Can be used as server computers that supply files to client computers over a network.

Computer Categories

Workstation Usages

- Engineering applications (CAD/CAM)
- Desktop publishing
- Software development
- Other types of applications that require a moderate amount of computing power and relatively high quality graphics capabilities.

Computer Categories –Mobile Computer

- Mobile computing is human–computer interaction by which a computer is expected to be transported during normal usage.
- Being able to use a computing device even when being mobile and therefore changing location.
- Portability is one aspect of mobile computing.

Computer Categories –Mobile Computer

- Example:
  - Personal digital assistant
  - Smartphone
  - Tablet computer
  - Ultra-Mobile PC
  - Wearable computer

Computer Categories –Mobile Computer

PDA

Smartphone

Tablet PC

Wearable Computer

Ultra-Mobile PC