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**CS8392**

**OPERATING SYSTEMS**  
(Common to CSE, IT)

**UNIT No. 1**

**1.1 Computer System Overview-Basic Elements**

Version: 1.XX



# COMPUTER SYSTEM OVERVIEW

## BASIC ELEMENTS OF A COMPUTER

A computer consists of processor, memory, I/O components and system bus

**i) Processor:** It Controls the operation of the computer and performs its data processing functions. When there is only one processor, it is often referred to as the central processing unit.

**ii) Main memory:** It Stores data and programs. This memory is typically volatile; that is, when the computer is shut down, the contents of the memory are lost. Main memory is also referred to as real memory or primary memory.

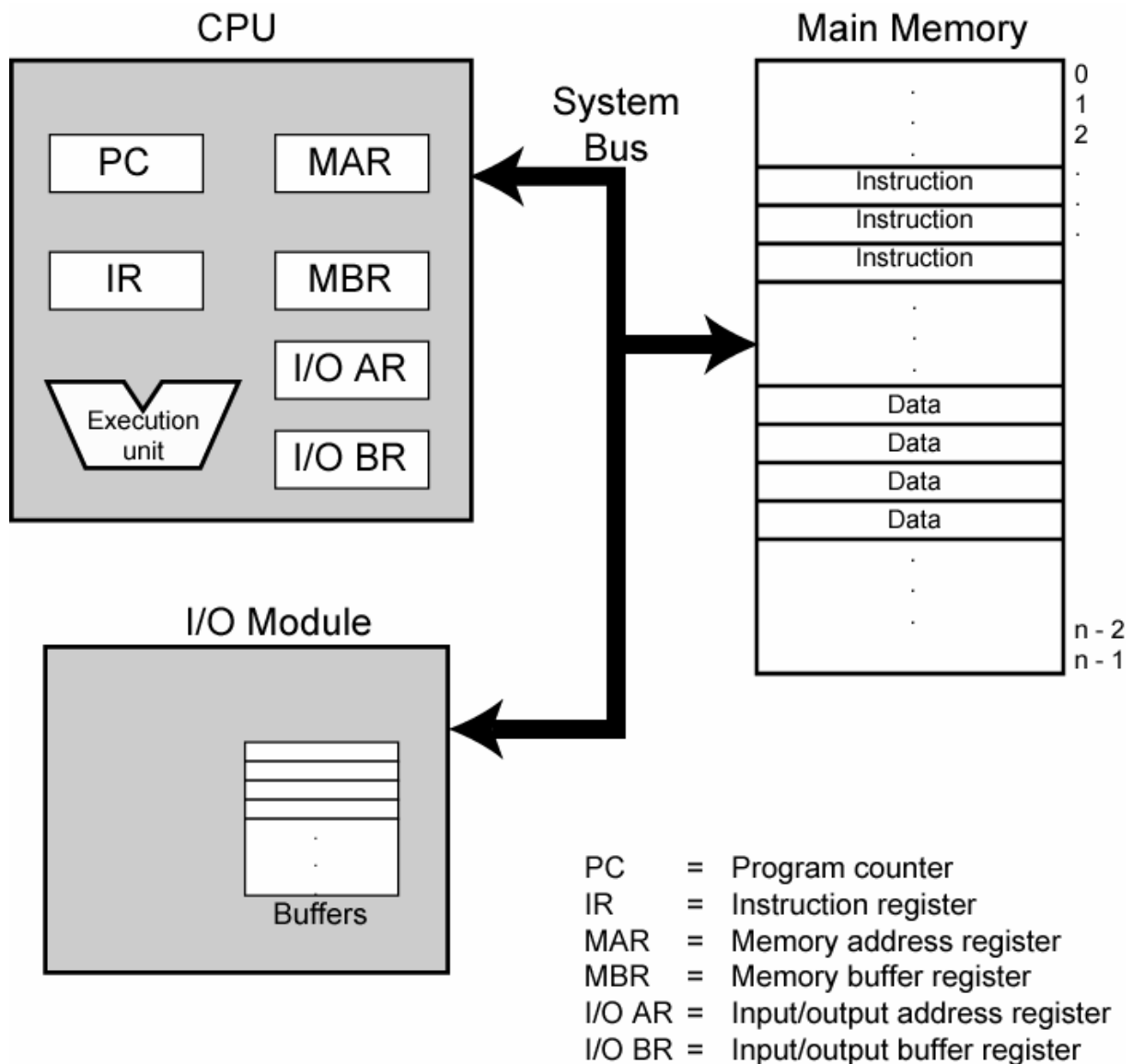
**iii) I/O modules:** It moves data between the computer and its external environment. The external environment consists of a variety of devices, including secondary memory devices (e. g., disks), communications equipment, and terminals.

**iv) System bus:** It provides the communication among processors, main memory, and I/O modules.

One of the processor's functions is to exchange data with memory. For this purpose, it typically makes use of two internal registers

i) A **memory address registers (MAR)**, which specifies the address in memory for the next read or write.

ii) A **memory buffer register (MBR)**, which contains the data to be written into memory or which receives the data read from memory.



An **I/O address register (I/OAR)** specifies a particular I/O device.

An **I/O buffer register (I/OBR)** is used for the exchange of data between an I/O module and the processor.

A **memory module** consists of a set of locations, defined by sequentially numbered addresses.

An **I/O module** transfers data from external devices to processor and memory, and vice versa. It contains internal buffers for temporarily holding data until they can be sent on.

### PROCESSOR REGISTERS:

A processor includes a set of registers that provide memory that is faster and smaller than main memory. Processor registers serve two functions:

i) **User-visible registers:** Enable the machine or assembly language programmer to minimize

main memory references by optimizing register use.

**ii) Control and status registers:** Used by the processor to control the operation of the processor and by privileged OS routines to control the execution of programs.

**1. User-Visible Registers:** A user-visible register is generally available to all programs, including application programs as well as system programs. The types of User visible registers are i) Data Registers ii) Address Register

**Data Registers** can be used with any machine instruction that performs operations on data.

**Address registers** contain main memory addresses of data and instructions. Examples of address registers include the following:

- Index register.
- Segment pointer
- Stack pointer

**2. Control and status register:** A variety of processor registers are employed to control the operation of the processor. In addition to the MAR, MBR, I/OAR, and I/OBR register the following are essential to instruction execution:

- **Program counter (PC):** Contains the address of the next instruction to be fetched.
- **Instruction register (IR):** It contains the instruction most recently fetched.

All processor designs also include a register or set of registers, often known as the program status word (PSW) that contains status information. The PSW typically contains condition codes plus other status information, such as an interrupt enable/disable bit and a kernel/user mode bit, carry bit, auxiliary carry bit.