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- Registers are temporary storage locations inside the CPU.
- A register is a very very fast memory that is built into the CPU.
- Registers are used to store data temporarily..
- Different processors have different register.
- Registers are normally measured by the number of bits they can hold, for example, an 8-bit register means it can store 8 bits of data or a 32-bit register means it can store 32 bit of data.

## The basic computer has 8 registers.

| Register Symbol | Register Name | Description |
|---|---|---|
| AC | Accumulator | Store Result |
| DC | Data Register | Store Memory Data |

| | | |
|---|---|---|
| TR | Temoprary Register | Store Temporary Data |
| IR | Instruction Register | Store Instruction Code |
| AR | Address Register | Store Memory Address |
| PC | Program Counter | Store Address of Next Instruction |
| INPR | Input Register | Store Input Data |
| OUTR | Output Register | Store Output Data |

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## The registers in the processor can be put in two categories:

1. User-visible registers
2. Control and status registers

### 1. User-Visible Registers:

Enables the machine to minimize main memory references by optimizing use of registers.

User-visible registers includes,

## 1. General purpose registers:

General-purpose register can contain the operand for any opcode. General-purpose registers can be used for addressing functions  (e.g., register indirect, displacement).

## 2. Data registers:

Data registers may be used only to hold data and cannot be employed in the calculation of an operand address.

## 3. Address registers:

Address registers may themselves be somewhat general purpose, or they may be devoted to a particular addressing mode.

Examples include the following:

- Segment pointers: Segment register holds the address of the base of the segment.
- Index registers: These are used for indexed addressing and may be autoindexed.
- Stack pointer: This allows implicit addressing; that is, push, pop, and other stack instructions need not contain an explicit stack operand.

## 2. Control and Status Registers:

Used by the control unit to control the operation of the processor.

## 1. Program counter (PC):

Contains the address of an instruction to be fetched.

## 2. Instruction rester (IR):

Contains the instruction most recently fetched.

## 3. Memory address register (MAR):

Contains the address of a location in memory.

## 4. Memory buffer register (MBR):

Contains a word of data to be written to memory or the word most recently read.

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