CSE-327

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Registers of 8085 microprocessor

A **microprocessor** is a multipurpose, programmable, clock-driven, register-based electronic device that reads binary instructions from a storage device called memory, accepts binary data as input and processes data according to those instructions and provide results as output. A 8085 microprocessor, is a second generation 8-bit microprocessor and is the base for studying and using all the microprocessor available in the market.

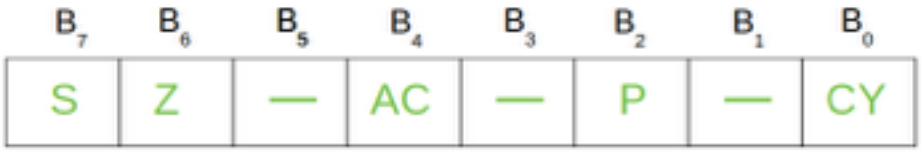
Registers in 8085:

(a) General Purpose Registers –
The 8085 has six general-purpose registers to store 8-bit data; these are identified as- B, C, D, E, H, and L. These can be combined as register pairs – BC, DE, and HL, to perform some 16-bit operation. These registers are used to store or copy temporary data, by using instructions, during the execution of the program.

(b) Specific Purpose Registers –

- **Accumulator:**
  The accumulator is an 8-bit register (can store 8-bit data) that is the part of the arithmetic and logical unit (ALU). Any data going to ALU and data after any operation gets in this register. Accumulator is also defined as register A.

- **Flag registers:**



fig(a)-Bit position of various flags in flag registers of 8085

The 5 flags are:

1. **Sign Flag:** It occupies the seventh bit of the flag register, which is also known as the most significant bit. It helps the programmer to know whether the number stored in the accumulator is positive or negative. If the sign flag is set, it means that number stored in the accumulator is negative, and if reset, then the number is positive.

2. **Zero Flag:** It occupies the sixth bit of the flag register. It is set, when the operation performed in the ALU results in zero(all 8 bits are zero), otherwise it is reset.

3. **Auxiliary Carry Flag:** It occupies the fourth bit of the flag register.This flag is used in BCD number system(0-9). If after any arithmetic or logical operation generates any carry that passes on to B(4) this flag becomes set i.e. 1, otherwise it becomes reset i.e. 0. This is the only flag register which is not accessible by the programmer

4. **Parity Flag:** It occupies the second bit of the flag register. This flag tests for number of 1's in the accumulator. If the accumulator holds even number of 1's, then this flag is set and it is said to even parity. On

the other hand if the number of 1's is odd, then it is reset and it is said to be odd parity.

5 **Carry Flag:** It occupies the zeroth bit of the flag register. If the arithmetic operation results in a carry(if result is more than 8 bit), then Carry Flag is set; otherwise it is reset.

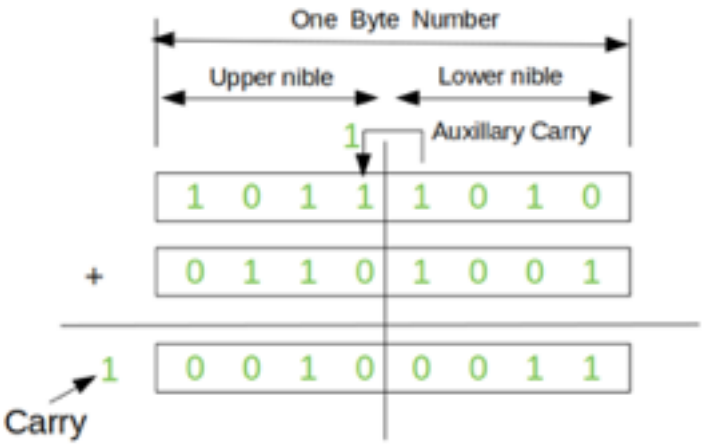
(c) Memory Registers –

There are two 16-bit registers used to hold memory addresses. The size of these registers is 16 bits because the memory addresses are 16 bits. They are :-

- **Program Counter:** This register is used to sequence the execution of the instructions. The function of the program counter is to point to the memory address from which the next byte is to be fetched. When a byte (machine code) is being fetched, the program counter is incremented by one to point to the next memory location.

- **Stack Pointer:** It is used as a memory pointer. It points to a memory location in read/write memory, called the stack. It is always incremented/decremented by 2 during push and pop operation.

Homework:



- **Sign Flag (7th bit):** Set/Reset? 0/1?
- **Zero Flag (6th bit):**Set/Reset? 0/1?
- **Auxiliary Carry Flag (4th bit):**Set/Reset? 0/1?
- **Parity Flag (2nd bit):**Set/Reset? 0/1?
- **Carry Flag (0th bit):**Set/Reset? 0/1?