

Lecture 6

8085 Flag Register

- Flag register includes five flip-flops, which are set or reset after an operation according to the data conditions of the result in the accumulator and other registers.
- They are called zero (Z), carry (CY), sign (S), parity (P) and auxiliary carry (AC) flags; their bit positions in the flag register are shown in fig.
- The microprocessor uses these flags to set and test data conditions.

| D ₇ | D ₆ | D ₅ | D ₄ | D ₃ | D ₂ | D ₁ | D ₀ |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| S | Z | | AC | | P | | CY |

Figure: Flags registers in 8085.

- The flags are stored in the 8-bit register so that the programmer can examine these flags by accessing the register through an instruction.
- These flags have critical importance in the decision-making process of the microprocessor.
- The conditions (set or reset) of the flags are tested through the software instructions.
- For instance, JC (jump on carry) is implemented to change the sequence of a program when CY flag is set.

Z (Zero) Flag:

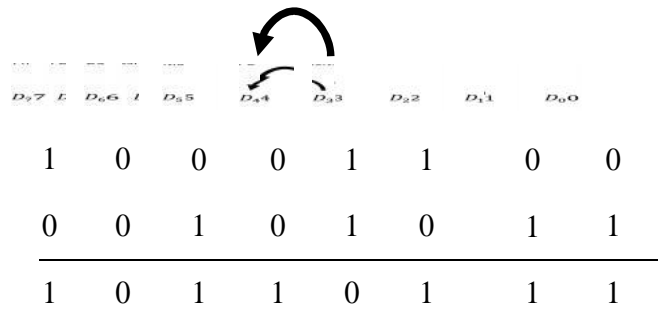
- This flag indicates whether the result of mathematical or logical operation is zero or not.
- If the result of the current operation is zero, then this flag will be set, otherwise reset.

CY (Carry) Flag:

- This flag indicates, whether, during an addition or subtraction operation, carry or borrow is generated or not, if generated then this flag bit will be set.

AC (Auxiliary Carry) Flag:

- It shows carry propagation from D3 position to D4 position.
- **AF (Auxiliary carry Flag):** It holds the carry (half-carry) after addition or borrows after subtraction between bit positions 3 and 4 of the result in a **BCD** operation.
- If carry or borrow generated to D3 and to pass to D4, then AC flag is set otherwise reset.



PF (Parity Flag):

- It is the **count of ones in a number** expressed as even or odd.
- It is **logic 0 for even parity** (i.e. even number of 1s) and **logic 1 for odd parity** (i.e. odd number of 1s).
- For example, if a number contains three binary one bits, it has odd parity and if a number contains no one bits, it has even parity.

SF (Sign Flag):

- It **holds the arithmetic sign of the result** after arithmetic or logic instruction executes.
- If **S = 1**, the sign bit (leftmost bit of a number) is **set or negative** and if **S = 0**, the sign bit is **cleared or positive**.