

أسئلة واجوبة لمادة الأسيمبلي

-What is the flag register ?

The flag register is a **special purpose register**.

-Depending upon the value of result after any arithmetic logical operation the flag bits become **set(1) or reset(0)**.

-What does it mean set or reset?

Set mean the flag will become (1) and reset mean the flag will become (0).

-Flag register is part of **EU(execution unit)**.

- flag register is a **16 bit register** with each bit corresponding to a flip _flop.

-zero flag (ZF) **will set** if the result of execution of an instruction is **zero**.

- Eflags and Rflags register are **32 and 64 bits wide**.

- all flags register contain the **condition codes** , flag bits that let the result of one machine_language instruction affect another instruction .

- Flags register consists of 9 active flags out of 16.

- the remaining 7 flags marked “U” in 8086 flag register format are **undefined**.

- the 9 flafs in 8086 flag register format are two types : **6 status flags & 3 control flags** .

- flag bit divide into two sections, **the statues flags and the control flags**.

- carry flag It is **set** whenever there is a **carry or borrow** out of the MSB (most significant bit) of a result.

- D7 bit for an 8-bit operation and D15 bit for a 16-bit operation .
- the carry flag is only **relevant** to unsigned numbers, not signed.
 - The carry flag is set if the addition of two numbers causes a carry out of the most significant (leftmost) bits added:

 $1111 + 0001 = 0000$ (carry flag is turned on, CF=1) [add]

 $0111 + 0001 = 1000$ (carry flag is turned off, CF=0) [add]
 - The carry (borrow) flag is also set if the subtraction of two numbers requires a borrow into the most significant (leftmost) bits subtracted.

 $0000 - 0001 = 1111$ (carry flag is turned on, CF=1) [borrow]

 $1000 - 0001 = 0111$ (carry flag is turned off, CF=0) [not borrow]
- **parity flag** (pf) this flag indicates whether the number of bits of the result of an operation is odd or even.
- auxiliary carry flag (AF) is used as CF but when working on BCD.
- AF will be set when we have overflow or underflow on in BCD calculations.
- binary coded decimal or BCD is a 4-bit encoding system used to represent the decimal numbers or digits 0 to 9.
- zero flag (ZF)** it is set (1), when the result of an arithmetic operation is zero.
- sign flag (SF)** or negative flag, set to 1 when the result of the last mathematical operation is negative.
- sign flag (SF)** set to 0 when the result of the last mathematical operation is positive.
- **overflow flag (OF)** is used as CF but when we work on signed number.
- **trap flag (TF)** it is used to set the trace mode i.e. start single stepping mode . here the microprocessor is interrupted after every instruction so that the program can be debugged .

- the **trap flag** controls the operation of the **microprocessor**.
- Trap flag (TF) =0 normal operation
- Trap flag (TF)=1 single step operation .
- **Interrupt enable flag** (IF) It is used to mask (disable) or unmask (enable) the INTR interrupt.
- If the flag (IF) is set to 1, mask-able hardware interrupts will be handled.
- If the flag (IF) cleared (set to 0), such interrupts will be ignored.
- Direction flag (DF) This flag is specifically used in string instructions.
- If the directional flag is set (1), then access the string data from higher memory location towards lower memory location.
- If the directional flag is reset (0), then access the string data from lower memory location towards higher memory location.

Status flags:

- 1-carry flag (CF)
- 2- parity flag(pf)
- 3- auxiliary carry flag (AF)
- 4- zero flag (ZF)
- 5- sign flag (SF)
- 6- overflow flag (OF)

Control flags:

- 1-trap flags (TF)
- 2-interrupt enable flag (IF)
- 3- direction flag (DF)

