MICROPROCESSOR

BCA 3RD SEMESTER 2020

LECTURE- 4

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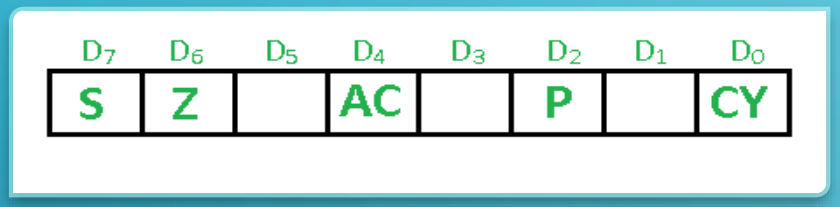
DEPARTMENT OF COMPUTER SCIENCE

KHARAGPUR COLLEGE

FLAG REGISTERS



1. Sign Flag (S)
2. Zero Flag (Z)
3. Auxiliary Carry Flag (AC)
4. Parity Flag (P)
5. Carry Flag (CY)

FLAG REGISTERS (CONT.)

1. Sign Flag (S) –

If the MSB is 0, it indicates the number is positive and the sign flag becomes reset i.e. 0.

from 00H to 7F, sign flag is 0

from 80H to FF, sign flag is 1

1- MSB is 1 (negative)

0- MSB is 0 (positive)

FLAG REGISTERS (CONT.)

2. Zero Flag (Z) –

After any arithmetical or logical operation if the result is 0 (00)H, the zero flag becomes set i.e. 1, otherwise it becomes reset i.e. 0.

00H zero flag is 1.

from 01H to FFH zero flag is 0

1- zero result

0- non-zero result

FLAG REGISTERS (CONT.)

3. Auxiliary Carry Flag (AC) –

If after any arithmetic or logical operation D(3) generates any carry and passes on to B(4) this flag becomes set i.e. 1, otherwise it becomes reset i.e. 0.

1- carry out from bit 3 on addition or borrow into bit 3 on subtraction

0- otherwise

FLAG REGISTERS (CONT.)

4. Parity Flag (P) –

If after any arithmetic or logical operation the result has even parity, an even number of 1 bits, the parity register becomes set i.e. 1, otherwise it becomes reset i.e. 0.

1- accumulator has even number of 1 bits

0- accumulator has odd parity

FLAG REGISTERS (CONT.)

5. Carry Flag (CY) –

During subtraction (A-B), if A>B it becomes reset and if (A<B) it becomes set.

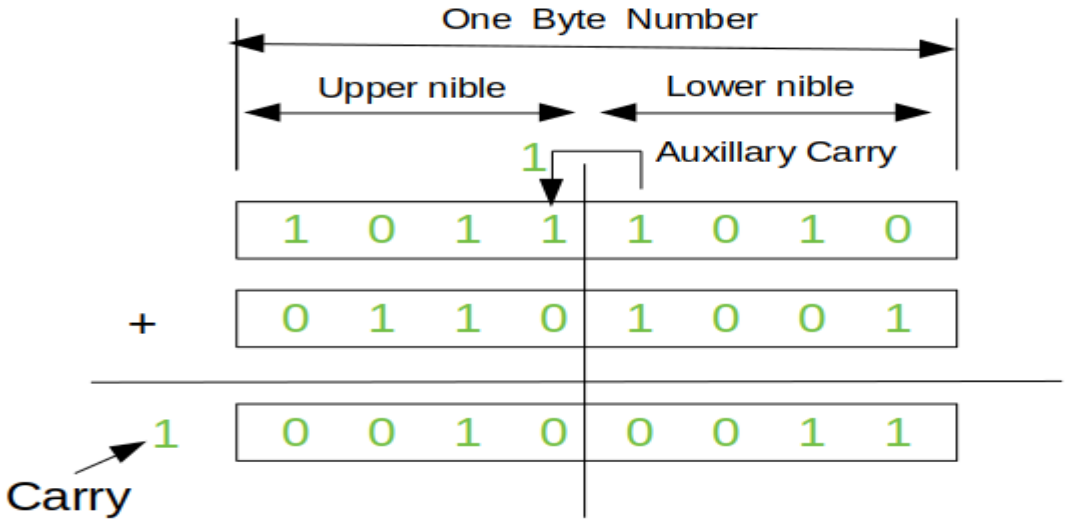
Carry flag is also called borrow flag.

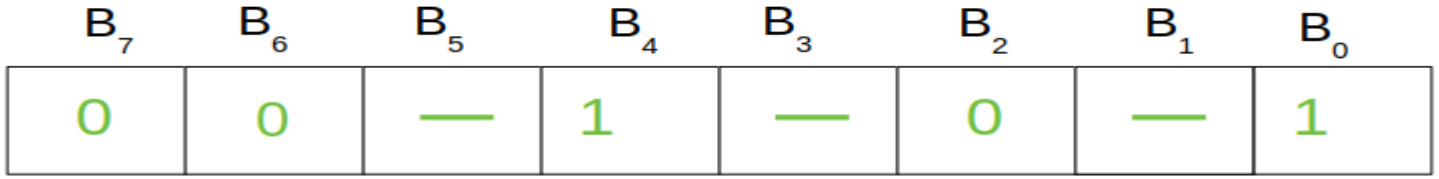
1- carry out from MSB bit on addition or borrow into MSB bit on subtraction

0- no carry out or borrow into MSB bit

FLAG REGISTERS (CONT.)

EXAMPLE 1





Value of flags

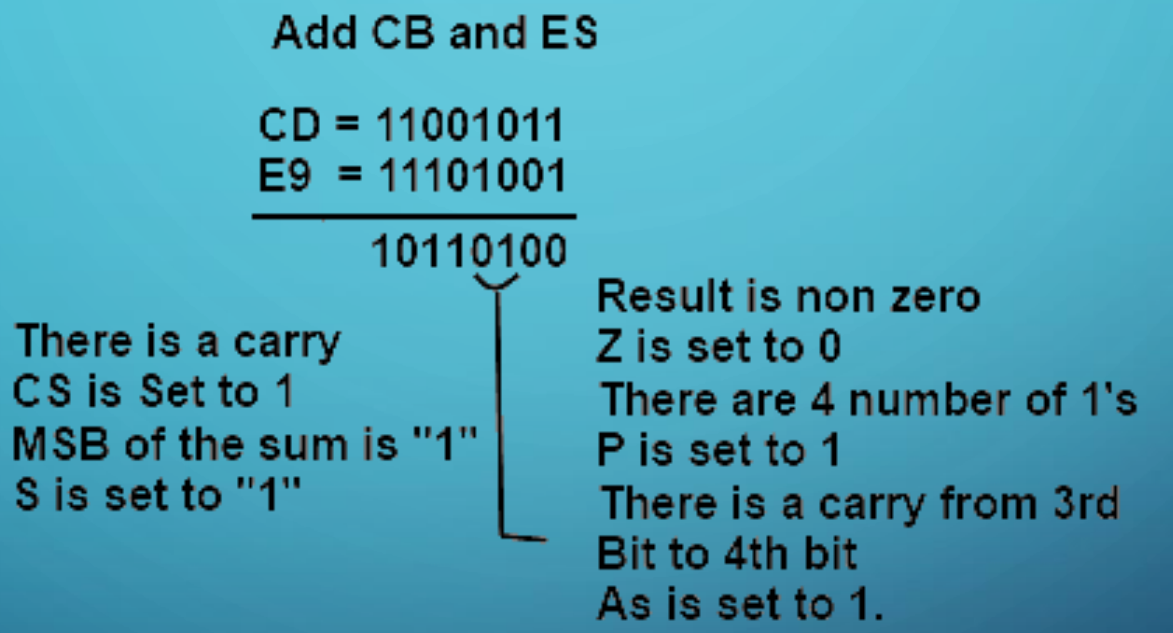
FLAG REGISTERS (CONT.)

Example 2

- *What will be the status of the flag registers after performing the operation CD + E9 ?*

- *What will be the status of the flag registers after performing the operation 25 + 15 ?*

FLAG REGISTERS (CONT.)



FLAG REGISTERS (CONT.)

Example: Let [C] = 27H & [A] = 15H

Instruction: ADD C

Addition:

```
27H = 0 0 1 0  0 1 1 1
+15H = 0 0 0 1  0 1 0 1
-------  ----------------
3C H = 0 0 1 1  1 1 0 0
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S = 0, Z = 0, Ac = 0

P = 1, Cy = 0

After execution: [A] = 3C H [C] = 27

Flag register -

0	0	-	0	-	1	-	0

THANK YOU

End of Lecture- 4

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