

COMPUTER ORGANIZATION AND ARCHITECTUREUNIT -IIITOPIC- ADDITION AND SUBTRACTION OF SIGNED MAGNITUDEDATA PART-3**Addition and Subtraction of Signed Magnitude Data**

**Example problem 1:** Perform an addition of -35 and +40 using signed magnitude addition.

Addition

$$A = -35 = 100100011$$

$$B = +40 = 000101000$$

$$A_s = 1 \quad B_s = 0$$

$$A_s \oplus B_s = 1 \oplus 0 = 1$$

$$EA \leftarrow A + \bar{B} + 1 \quad \because A_s \oplus B_s = 1$$

$$AVF \leftarrow 0$$
  

$$A + \bar{B} + 1 = 11010111$$

$$\bar{B} + 1 = 1111 + 11011000 \rightarrow \bar{B} + 1$$

$$+ 00100011 \rightarrow A$$

$$\underline{11111011} \rightarrow A$$
  

$$AVF \leftarrow 0$$

$$E \leftarrow 0, A < B$$
  

$$\bar{A} = 00000100$$

$$A \rightarrow 00000101 = 5$$
  

Result  
A, A<sub>s</sub>  
+5

A<sub>s</sub> = 1  
A<sub>s</sub> = 0

**Try it yourself:**

1.  $35 + (-40)$
2.  $35 + 40$
3.  $(-35) + (-40)$

**Example problem 2:** Perform a subtraction of -6 and +13 using signed magnitude subtraction

Subtraction.

$$A = -6 = 1\ 00000110 = A$$

$$B = +13 = 0\ 00001101 = B$$

$$A_s = 1\quad B_s = 0$$

$$A_s \oplus B_s = 1 \oplus 0 = 1$$

$$EA \leftarrow A + B$$

$$A = 00000110$$

$$B = 00001101 +$$

$$\begin{array}{r} 00001101 \\ + 00001101 \\ \hline 00010011 \end{array} \rightarrow A+B \rightarrow A = 19$$

$$E \rightarrow 0, \text{ AUF} \leftarrow 0$$

Result sign is sign of  $A_s = 1 = -$   
 $-19$

**Try it yourself:**

1.  $6 - (-13)$
2.  $6 - 13$
3.  $(-6) - (-13)$

