NIELIT Gorakhpur

Course Name: A Level (1st Sem) | **Subject: CO**

Topic: Number Representation Contd. | **Date: 21-04-20**

Positive Numbers

Signed Magnitude Representation: Signed magnitude representation refers to the method in which we use a sufficiently larger register and the left most bit (LSB) of the register is reserved for sign. Rest of the register part is used to store the number in binary. Since here we are talking about positive numbers, the sign here is 0.

For Ex.: We have to represent $(56)_{10}$ in an 8-bit register. Following is the diagram that depicts this representation:

Since,

$$(56)_{10} = (111000)_2$$

It'll be represented like:

R_7	R_6	R_5	R_4	R_3	R_2	R_1	R_0
0	0	1	1	1	0	0	0
+	0	32	16	8	0	0	0

Here see that the $(111000)_2$ has been represented in an 8-bit register whose LSB is 0 since the number is +ve.

Remaining seven bits are 0 1 1 1 0 0 0 which equals $(56)_{10}$.

Negative Numbers

Signed Magnitude Representation: Signed magnitude representation refers to the method in which we use a sufficiently larger register and the left most bit (LSB) of the register is reserved for sign. Rest of the register part is used to store the number in binary. Since here we are talking about negative numbers, the sign here is 1.

For Ex.: We have to represent $(-56)_{10}$ in an 8-bit register. Following is the diagram that depicts this representation:

Since,

$$(56)_{10} = (111000)_2$$

It'll be represented like:

R_7	R_6	R_5	R_4	R_3	R_2	R_1	R_0
1	0	1	1	1	0	0	0
-	0	32	16	8	0	0	0

Here again see that the $(111000)_2$ has been represented in an 8-bit register whose LSB is 1 since the number is -ve.
Remaining seven bits are 0 1 1 1 0 0 0 which equals $(56)_{10}$.

NOTE: In Signed Magnitude Representation, both +ve and –ve numbers are represented in the same way. Only the LSB makes a difference. It is 0 for +ve and 1 for -ve.

Assignments:

1. In short, explain the Signed Magnitude Representation. How sign is handled here?
2. Represent the following in Signed Magnitude Representation:
    a. $(+307)_{10}$
    b. $(-268)_{10}$