



Subject: DLCA

SEM: III

SIGNED BINARY NUMBERS

- In a decimal number system a plus (+) sign is used to denote a positive number and a minus (-) sign for denoting a negative number.
- The plus sign is usually dropped and the absence of any sign means that the number has positive value.
- This representⁿ of numbers is known as signed numbers.
- An additional bit is used as the sign bit and it is placed as the most significant bit.
- A 0 is used to represent a positive number.
- A 1 is used to represent a negative no.
- Eg: a 8-bit signed no. 01000100 represents a positive no. and its value (magnitude) is $(1000100)_2 = (68)_{10}$.
- Eg: 11000100 represents a negative no. with magnitude $(1000100)_2 = (68)_{10}$.
- The 1 in the left most position (MSB) indicates that the number is negative.



and the other seven bits gives its magnitude.

→ This kind of representation for signed numbers is known as sign - magnitude representation.

Find the decimal equivalent of the foll binary nos. assuming sign magnitude representⁿ of binary nos.

a) 101100.

Sign bit is 1 \Rightarrow no. is negative

$$\text{Magnitude} = 01100 = (12)_{10}$$

$$(101100)_2 = (-12)_{10}$$

b) 001000

Sign bit is 0 \Rightarrow no. is positive.

$$\text{Magnitude} = 01000 = 8$$

$$(001000)_2 = (8)_{10}$$

$$c) (0111)_2 = (+7)_{10}$$

$$d) (1111)_2 = (-7)_{10}$$