# **Binary Arithmetic**

BINARY SUBTRACTION

**BINARY MULTIPLICATION** 

**BINARY DIVISION** 

**BINARY ADDITION** 

# 1) **BINARY ADDITION:-**

### Method by which binary addition occurs

- ▶ 0+0=0
- ► 0+1=1
- ▶ 1+0=1
- 1+1=0 with a carry of '1' to the next more significant bit.
- 1+1+1=1 with a carry of '1'to the next more significant bit.
- (0+1=1, 1+1=10, 10+1=11, where the two bit there one is the carry .)

# EXAMPLE :-

- 11101+10111=110100
- 11101.01111+01110.11010=101100.01001
- (58)H + (8B)H = (?)H
- For this first convert this hexadecimal number in the binary then use binary arithmetic after this result convert it in to the hexadecimal .
- ► (58)H=(01011000)2 and (8B)H=(10001011)2
- ► 01011000+10001011=11100011=(E3)H
- (5.6)O + (E.4)H =
  (0101.1100+1110.0100=10100.0000)=(24.00)O

# 2) <u>BINARY SUBTRACTION</u>:-

- Methods by which binary subtraction occurs
- ▶ 0-0=0
- ▶ 1-0=1
- ▶ 1-1=0
- 0-1=1 with a borrow of 1 from the next more significant bit .
- ▶ (11-1=10-1=1=1-1=0)

# EXAMPLE:-

- 11101-01011=10010
- 1110.0010-1101.1100=0000.0110
- (41E)H (13D)H = (2E1)H
- For this first convert this hexadecimal number in the binary then use binary arithmetic after this result convert it in to the hexadecimal .
- (5.C)H-(4.6)O = (01.00)O

#### **Binary Multiplication Rules**

- Binary multiplication, like other <u>binary operations</u>, is much easier, unlike the decimal multiplication when you remember the following multiplication rules. The rules of binary multiplication are:
- $\bullet 0 \times 0 = 0$
- $\bullet 0 \times 1 = 0$
- $\bullet 1 \times 0 = 0$
- $1 \times 1 = 1$  [No borrow or carry method is applicable here]

## EXAMPLE:-

#### Question 1:- 110 X 100

110 x100 000 000x 110xx

11000

## EXAMPLE 2:-

#### **Question 2:**

1000 x 1001

#### Product 1001000

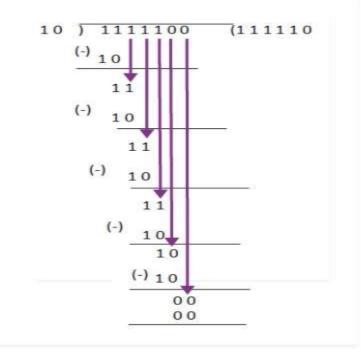
# 4) **Binary Division:-**

#### **Binary Division Rules**

- $1 \div 1 = 1$
- $1 \div 0 =$ Meaningless
- $0 \div 1 = 0$
- $0 \div 0 =$ Meaningless

# EXAMPLE1:-

# **Question 1:** Solve 01111100 ÷ 0010 SOLUTION:



## EXAMPLE2:-

#### Example 2: Solve using the long division method: 101101 ÷ 101

Solution:

