

1's Complement

In general, the 1's Complement of the unsigned numbers 110011 & 11000 are

or

Generally, we know how to do complement

For 110011, 1's complement is 001100

For 11000, 1's complement is 00111



2's Complement

In general, the 2's Complement of the unsigned numbers 110011 & 11000 are

Generally, we know how to do complement

For 110011, 2's complement is 001100 + 1 = 001101

For 11000, 2's complement is 00111 + 1 = 01000

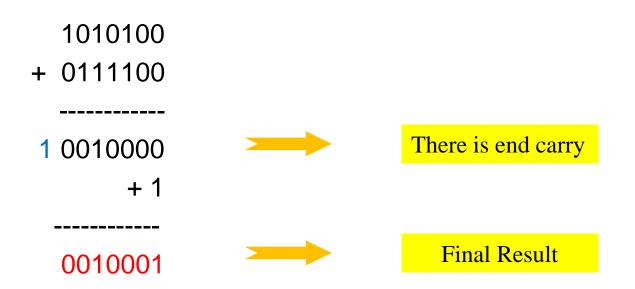


Subtraction of Unsigned number - 1's Complement

Example 1:

Using 1's complement, subtract (84) 1010100 - (67) 1000011 (M > N)

1's Complement of 1000011 is 0111100



End carry indicates that result is Positive. Carry need to be added to obtained value to get final result.

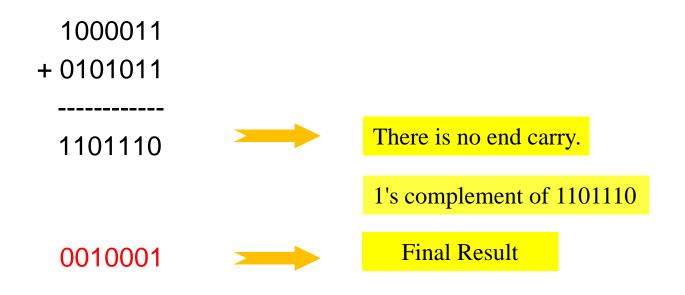


Subtraction of Unsigned number - 1's Complement

Example 2:

Using 1's complement, subtract (67) 1000011 - (84) 1010100 (M < N)

1's Complement of 1010100 is 0101011



No end carry indicates that result is Negative. Do 1's complement of the obtained value to get final result.

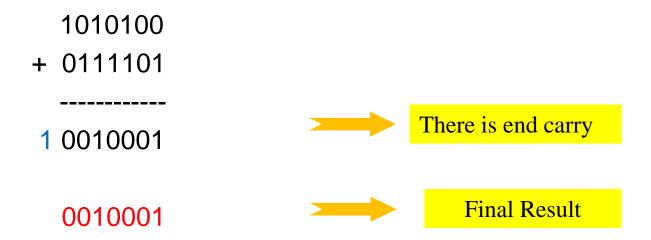


Subtraction of Unsigned number - 2's Complement

Example 1:

Using 2's complement, subtract (84) 1010100 - (67) 1000011 (M > N)

2's Complement of 1000011 is 0111100 + 1 = 0111101



End carry indicates that final result is Positive. Ignore end carry.



Subtraction of Unsigned number - 2's Complement

Example 2

Using 2's complement, subtract (67) 1000011 - (84) 1010100 (M < N)

2's Complement of 1010100 is 0101011 + 1 = 0101100

1000011
+ 0101100
----1101111

There is no end carry.

2's complement of 1101111

+ 1
----0010001

Final Result

No end carry indicates the end result is Negative. Do 10's complement of the obtained value to get final result.



Questions

Q 1: Using 1's complement, Subtract 1 1 1 1 1 0 1 – 1 1 0 0 1 0 1

Q 2: Using 1's complement, Subtract 1100101-1111101

Ans: 1's Complement of 1 1 0 0 1 0 1 is 0 0 1 1 0 1 0 9's Complement of 1 1 1 1 1 0 1 is 0 0 0 0 0 1 0

1111101 1100101 +0000010

1 0 0 1 0 1 1 1 (End Carry – Re +ve)

+ 1 (Add Carry)

0011000

0011000

1 1 0 0 1 1 1 (No End carry – Re –ve)

(9's Complement of result)

1's complement of 1 1 0 0 1 1 1 is 0 0 1 1 0 0 0



Questions

Q 1: Using 2's complement, Subtract 1 1 1 1 1 0 1 – 1 1 0 0 1 0 1

Q 2: Using 2's complement, Subtract 1 1 0 0 1 0 1 – 1 1 1 1 1 0 1

Ans: 2's Complement of 1 1 0 0 1 0 1 is 0 0 1 1 0 1 0 + 1 = 0 0 1 1 0 1 1 2's Complement of 1 1 1 1 1 0 1 is 0 0 0 0 0 1 0 + 1 = 0 0 0 0 0 1 1

1111101

+0011011

1) 0 0 1 1 0 0 0 (End Carry – Re +ve)

(Ignore carry)

0011000

1100101

+ 0000011

1 1 0 1 0 0 0 (No End carry Re –ve)

(2's Complement of result)

0011000

2's complement of 1 1 0 1 0 0 0 is 0 0 1 0 1 1 1 + 1 = 0 0 1 1 0 0 0