Complement

- It is of basic two type:
  - 1’s complement
  - 2’s complement

  Other types of complementary forms
  - 9’s complement
  - 10’s complement

One's Complement

- In a binary number if each 1 is replace by 0 and each 0 by 1.
- Example of 1's Complement are:-

Binary number	1's Complement
100	011
11000	00111
11110011	00001100

- 1's complement subtraction

Regular subtraction	1's complement subtraction
11010 - 1101 1101	11010 + 0010 1's complement of 1101 1 1100 1 add end around carry 1101

Regular subtraction	1's complement subtraction
100 - 110000 101100	011 + 001111 1's complement of 1101 010011 1's complement of result 101100

2’s Complement

Two's complement subtraction is the binary addition of the minuend to the 2's complement of the subtrahend (adding a negative number is the same as subtracting a positive one).

Binary number	1’s Complement	Add 1	2’s complement
100	011	1	100
11000	00111	1	01000
11110011	00001100	1	00001101

Binary Subtraction Using 2's Complement Method

For example,

7 - 12 = (-5)

0000 01 1 1 = +7

+ 1 1 1 1 0100 = -12

1 1 1 1 10 11 = -5

Regular subtraction	2's complement subtraction
11010 - 1101 1101	11010 + 0010 1's complement of 1101 ..... 1... 2's complement of 1101 **1** 1101 _____ . 1101

9's Complement

- The 9's complement of a decimal number by substracting each digit in the number from nine.
- Example :
  - 7 , 9's complement of 7 is 9 – 7 = 2
  - 25 , 9's complement of 25 is 99 – 25 = 74
  - 345 , 9's complement of 345 is 999 – 345 = 654
- 9's complement subtraction

Regular subtraction	9's complement subtraction
7 - 2 5	7 +7 . 9's complement of 2 1 4 1 . Add carry to result 5 .

Regular subtraction	9's complement subtraction
228 - 485 - 257	228 +514 . 9's complement of 485 742 …… - 257 no carry indicate that the ans is negative and in complement form .

10’s Complement

- The 10’s complement of a decimal number by substracting each digit in the number from nine.
- Example :
  - 7 , 10’s complement of 7 is 10 – 7 = 3
  - 25 , 10’s complement of 25 is 100 – 25 = 75
  - 345 , 10’s complement of 345 is 1000 – 345 = 655
- 10’s complement subtraction

Regular subtraction	10’s complement subtraction
7 - 2 5	7 +8 . 10’s complement of 2 5 Drop carry

Regular subtraction	10’s complement subtraction
228 - 485 - 257	228 +515 . 10’s complement of 485 743 …… - 257 no carry indicate that the ans is negative and in complement form .