NUMBER SYSTEM (contd...)

9's and 10's complement :—

- Subtraction of decimal no. can be obtained by the 9's and 10's complement methods similar
- The 9's complement of decimal no. obtained by subtracting each digit of that decimal no. from 9.
- 10's complement → adding 1 to its 9's comp.

eg:— 9's complement :—

3465

```
  9 9 9 9
- 3 4 6 5
---------
  6 5 3 4
```

↑ 9's complement of 3465

17 FRIDAY
WEDNESDAY • APRIL

2019 - MARCH

S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

10's complement
4069

✓

9999
− 4069
5930 ← 9's comp. of 4069
+ 1
5931 ← 10's comp. of 4069

✓ 1056.074

9999.999
1056.074
8943.925
+1
8943.926 ✓

9's complement Method of subtraction:-

↳ obtain the 9's complement of the subtrahend and add it to the minuend.

↳ If there is a carry, it indicates the answer is positive. Add the carry to the LSD of the result to get the answer. This is called end around carry.

↳ If there is no carry, the ans is -ve. and the intermediate result is its 9's complement. Take the 9's complement of this result & place a -ve sign in front to get the ans.

eg:-

745.81

− 436.62

⇒

745.81

+ 563.37 (9's comple. of 436.62)

(1) 309.18 (Intermediate result)

↳ +1

309.19 (Ans).

Carry → +ve ans.

∴ Ans:- +309.19

436.12

−745.81

⇒

436.62

+ 254.18 (9's comp. of 745.81)

690.80 (Intermediate result, no carry)

↓

9's complement is 309.19

∴ Ans:- −309.19

10's complement method of Subtraction :—

↳ Obtain 10's complement of the subtrahend & add it to the minuend.

⇒ If carry, ignore

⇒ If carry, ans is +ve; the result obtained itself is the ans.

⇒ If no carry, ans is -ve, the result obtained is its 10's complement.

Representation of Signed Nos:—

① Signed magnitude form.

② Complement form [→ 1's, → 2's]

7 ⟶ 111

+7 or -7 ⟶ ?

'+' → 0

'-' → 1.

Signed Magnitude form :-

Syntax :- [Sign bit | Actual Binary]

eg: +7 [0 | 111]

-7 [1 | 111]

Complement form :-

↓

- 1's complement.
- 2's complement.

→ complementing each & every digit of binary decimal no.

9 → 1001

↓ 1's comp.

0110

→ Adding 1 to 1's complement.

9 → 1000

↓

0 110 (1's complement)

+ 1

---

0 1 1 1 (2's complement)

1's complement Representation of signed no:-

Syntax:- | Sign bit | 1's complemat of actual binary |

(-7)

111

| 1 | 0 0 0 |

1s comp.

000

2's comp Representation

Syntax:- | Sign bit | 2's complemat of actual binary |

'-7' →

7 → 111

1's → 000

2's → +1

001

| 1 | 0 0 1 |

2's complement Subtraction:-

↳ Add 2's complement of the subtrahend to the minuend.

↳ If there is carry out, ignore it.

↳ Look at sign bit, i.e MSB of the sum term. If MSB is '0' result is +ve & if it is '1' result is -ve and is in its 2's complement form.

↳ Take its 2's complemant to find its magnitude in binary.

eg:- Subtract 14 from 46 using 8 bit 2's complement arithmatic.

+14 0000 1110

1111 0010

eg:- 48 − 28

48 + (−28)

48 → 110000

28 → 011100

↓

1's comp → 100011

+1

→ 100100

2's complement of 28

+110000

(1) 010100

Discard