HW1 - VAANIA KHAN

2026/01/23

1) Decimal to binary

a) 13

128 64 32 16 8 4 2 1
0 0 0 0 1 1 0 1 → 1101

13 − 8 = 5
5 − 4 = 1

b) 44

128 64 32 16 8 4 2 1
0 0 1 0 1 1 0 0 → 00101100

44 − 32 = 12
12 − 8 = 4

2) Binary to decimal : 1010110

128 64 32 16 8 4 2 1
0 1 0 1 0 1 1 0

64 + 16 + 4 + 2 = 86

3) 10100 + 00111

```
 1
 10100
 00111 +
 -----
 01011
```

→ 11011

4) 0x66 + 0x75

66 + 75 = 0xDB

11 → B
13 → D

5) P = 0x1234 Q = 0xABEF

a) P + Q

```
  1 1
  1 2 3 4
  A B E F +
  ---------
  0xBE23
```

15 − 4 = 11
19 − 16 = 3

14 − 3 = 11
11 + 1 = 12
12 − 6 = 6

A → 10
B → 11
C → 12
D → 13
E → 14
F → 15

b) P − Q

P + (−Q) :

−Q : 15 − 10 = 5
15 − 11 = 4
15 − 14 = 1
15 − 15 = 0

```
  1 2 3 4
  5 4 1 1 +
  ---------
  0x6645
```

```
  5 4 1 0
      1 +
  -------
  5 4 1 1
```

6) a) (+25) − (−11)

25 : 0 0 0 1 1 0 0 1

25 = 16 + 8 + 1

11 : 0 0 0 0 1 0 1 1

11 = 8 + 2 + 1

−11 : 1 1 1 1 0 1 0 1 (+1)

−(−11) : 0 0 0 0 1 0 1 1 (+1)

```
  1 1   1
  0 0 0 1 1 0 0 1
  0 0 0 0 1 0 1 1 +
  ---------------
  0 0 1 0 0 1 0 0
```

128 64 32 16 8 4 2 1
0 0 1 0 0 1 0 0 → NO OVERFLOW

b) (−62) − (+49)

62 : 0 0 1 1 1 1 1 0

62 = 32 + 16 + 8 + 4 + 2

−62 : 1 1 0 0 0 0 0 1 (+1)

49 : 0 0 1 1 0 0 0 1

49 = 32 + 16 + 1

−(49) : 1 1 0 0 1 1 1 1 (+1)

```
    1   1 1 1 1
  1 1 0 0 0 0 0 1
  1 1 0 0 1 1 1 1 +
  ---------------
  1 1 0 0 0 0 0 1 0
```

✗ 1 1 0 0 0 0 1 0 → OVERFLOW OCCURS