

# Dsa DAY 12

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Decimal  $\xrightarrow{T_0}$  Binary (0,1)

0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111

Base $\rightarrow$	2	13	Rem
	2	6	1
	2	3	0
	2	1	1
		0	1

13  $\rightarrow$  .01101

# Decimal to Decimal

10	163	
10	16	3
10	1	6
	0	1

163

$$a = 1 \quad c = 3$$

$$b = 6$$

16

$$\overline{\text{ans}} = a + b \quad \times$$

$$\text{ans} = a \times 10 + b$$

$$1 \times 10 + 6$$

$$10 + 6$$

$$\text{16} \times 10 + c$$

$$160 + 3$$

$$163$$

$$16 * 10 + 3$$

$$d = 4$$

$$\downarrow$$
$$(1 \times 10 + 6) \times 10 + 3 = \text{ans}$$

$$1 \times 10^2 + 6 \times 10^1 + 3 \times 10^0$$

$$\text{ans} = 163$$

$$\left. \begin{array}{l} a = 6 \\ b = 4 \\ c = 8 \\ d = 9 \\ e = 7 \end{array} \right\}$$

$$\text{ans} = \text{ans} \times 10 + \underline{\text{num}}$$

$$\begin{aligned} \text{ans} &= 163 \times 10 + 4 \\ &= 1634 \quad \checkmark \end{aligned}$$

$$a = 6$$

$$b = 4$$

$$46$$

$$\text{ans} = 6 \times 10 + a$$

$$4 \times 10 + 6 = 46$$

$$\{ \underline{2} \quad \underline{4} \quad \underline{6} \quad \underline{8} \}$$

$$\boxed{8642}$$

$$\{ 8 \times 10^3 + 6 \times 10^2 + 4 \times 10^1 + 2 \times 10^0 \}$$

$$\underline{2} \times 10^0 + 0 = \underline{2} = \text{ans}$$

$$4 \times 10^1 + \underline{2} = 42 = \text{ans}$$

$$6 \times 10^2 + 42 = 642 = \text{ans}$$

$$8 \times 10^3 + 642 = 8642 = \text{ans}$$

$$8642$$

reverse

✓✓  $ans = [num \times 10^i + ans]$

for normal

$$ans = [ans \times 10 + num]$$

13 → 1101 Breaking condition

ans = num × 10<sup>i</sup> + ans

2	13		
2	6	1	
2	3	0	
2	1	1	
2	0	1	

x

$$\text{ans} = 0$$

$$\text{ans} = \text{rem} \times 10^i + \text{ans}$$

$$\text{ans} = 1 \times 10^0 + 0 = 1$$

$$= 0 \times 10^1 + 1 = 1$$

$$= 1 \times 10^2 + 1 = 101$$

$$= 1 \times 10^3 + 101 = 1101$$

int num ← (any number)

int rem, i, ans = 0;

int mult = 1;

while (num > 0) {

rem = num % 2;

num = num / 2;

// ans = rem × 10<sup>i</sup> + ans;

→ ans = rem × mult + ans;

mult = mult × 10;

} cout << ans;

✓ num = ~~13~~/~~6~~/~~3~~ 1

rem = ~~1~~/~~0~~ 1

mult = ~~1~~/~~10~~ 100

ans = ~~0~~ 1

1101



# Binary to Decimal

$$1101 = 13$$

$$\begin{aligned} & 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 \\ & 8 + 4 + 0 + 1 \\ & = 13 \end{aligned}$$

Qu

1101	mod 10
110	1
11	0
1	1
0	1

Qu

$$\begin{aligned} & 16 \div 16 \rightarrow 3 \\ & \quad \downarrow \\ & \quad 6 \\ & \quad \downarrow \\ & \quad 1 \rightarrow 2 \\ & 163 \end{aligned}$$

$$\text{ans} = \text{rem} \times 10^i + \text{ans}$$

↑  
2

$$\text{ans} = \text{rem} \times 2^i + \text{ans} \quad \checkmark \checkmark$$

$$\text{ans} = 0$$

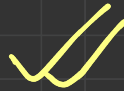
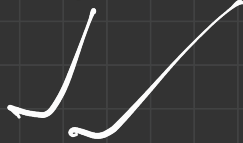
$$\text{ans} = 1 \times 2^0 + 0 = 1$$

$$= 0 \times 2^1 + 1 = 1$$

$$= 1 \times 2^2 + 1 = 5$$

$$1 \times 2^3 + 5 =$$

$$8 + 5 = 13$$



<u>10</u>	<u>1101</u>	
10	<u>110</u>	1
10	11	<u>0</u>
<u>10</u>	1	1
	0	1

int num = 1101 binary

```
int ans = 0, mult = 1, rem;  
while (num > 0) {
```

```
    rem = num % 10;
```

```
    num = num / 10;
```

```
    ans = rem * mult + ans;
```

```
    mult = mult * 2;
```

```
}  
cout << ans;
```

num = ~~1101~~ 110  
ans = ~~0~~ 1  
mult = ~~1~~ 2 4

rem = ~~1~~ 0

ans =  $1 \times 1 + 0 = 1$

ans =  $0 \times 0 + 1 = 1$

ans =

13

# Decimal to Octal

$\{0, 1, 2, 3, 4, 5, 6, 7\}$

8	15
8	1
0	7

8	13
8	1
0	5

~~10~~  
15  
15 →  
 $1 \times 8^1 + 5 \times 8^0$   
 $1 \times 8 + 5 \times 1$   
 $8 + 5 = 13$

15

17  
17  
 $1 \times 8^1 + 7 \times 8^0$   
 $8 + 7 = 15$

# Binary to Octal

