

Find the sum of a number digit

$$(567) \rightarrow 5 + 6 + 7 = 18 = \cancel{1} + \cancel{8} = \cancel{9}$$

$$567 \% 10 = 7 \text{ (rem)} \Rightarrow \text{last digit}$$

$$\Downarrow$$

$$567 / 10 = 56.\cancel{7} = 56$$

$$56 \% 10 = 6 \text{ (rem)} \Rightarrow \text{2nd digit}$$

\Downarrow

$$56 / 10 = 5.\cancel{6} = 5$$

$$5 \% 10 = \boxed{5} \rightarrow 5 / 10 = 0$$

$$\begin{array}{r} 10 \overline{) 567} \\ \underline{5} \\ 6 \\ \underline{60} \\ 7 \end{array}$$

$$\begin{array}{r} 300 \overline{) 600} \\ \underline{600} \\ 0 \end{array}$$

I will use loop \rightarrow Terminating condition

$$612 = 12$$

$$456 \rightarrow 456 \% 10 = 6 \Rightarrow \text{1st digit}$$

\downarrow

$$456 / 10 \rightarrow 45 \% 10 = 5 \Rightarrow \text{2nd digit}$$

\downarrow

$$45 / 10 \rightarrow 4 \% 10 = 4 \Rightarrow \text{3rd digit}$$

\downarrow

$$4 / 10 \rightarrow 0 \Rightarrow \text{Stopping}$$

\Downarrow

Terminating

$$\boxed{n \neq 0 \text{ or } n > 0}$$

$$\text{sum} = \cancel{0} + \cancel{8} + \cancel{13} = 20$$

```
int n = 758;
int sum = 0;

while (n > 0) {
    int rem = n % 10;
    // System.out.println(rem);
    sum = sum + rem;
    n = n / 10;
}
System.out.println(sum);  $\rightarrow 20$ 
```

$$\text{rem} = 758 \% 10 = 8$$

\downarrow

$$758 / 10 = 75 \% 10 = 5$$

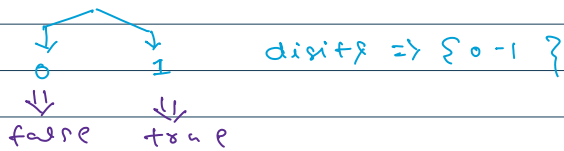
\downarrow

$$75 / 10 = 7 \% 10 = 7$$

\downarrow

$$7 / 10 = 0$$

what are binary numbers?



what are decimal numbers?

digits $\Rightarrow 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 \quad \{0-9\}$

2 3 4 6 $\Rightarrow 2 \times 10^3 + 3 \times 10^2 + 4 \times 10^1 + 6 \times 10^0$

Thousand's Hundred's ten's one's

2000 300 40 6

= 2346

Decimal to Binary Conversion

39 \rightarrow Binary?

2	39	1
2	19	1
2	9	1
2	4	0
2	2	0
	1	

$39 \% 2 = 1 \Rightarrow$ remainder

$\Rightarrow 100111$

$$\begin{array}{r} 2 \overline{) 39} \quad (19 \\ - 38 \\ \hline 1 \end{array}$$

Concatenation of string

$s = "" \xleftarrow{+} "a" \Rightarrow s = s + "a"$

$"a" \xleftarrow{+} "k" \Rightarrow s = s + "k"$

$"ak" \xleftarrow{+} "a" \Rightarrow s = s + "a"$

"aka"

\rightarrow out of integer range

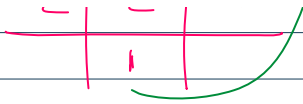
~~bin = "" int = 100111~~

$\Rightarrow 100111$

reverse

\rightarrow string reverse

2	39	1
2	19	1
2	9	1
2	4	0
2	2	0
	1	



Binary to decimal

$$456 \Rightarrow 4 \times 10^2 + 5 \times 10^1 + 6 \times 10^0$$

decimal

$$1011 \Rightarrow 11$$

↓

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

$$8 + 0 + 2 + 1$$

$$= 11$$

$$\begin{aligned} 493 &= 400 + 90 + 3 \\ &= 4 \times 100 + 9 \times 10 + 3 \times 1 \\ &= 4 \times 10^2 + 9 \times 10^1 + 3 \times 10^0 \end{aligned}$$

Binary → Decimal

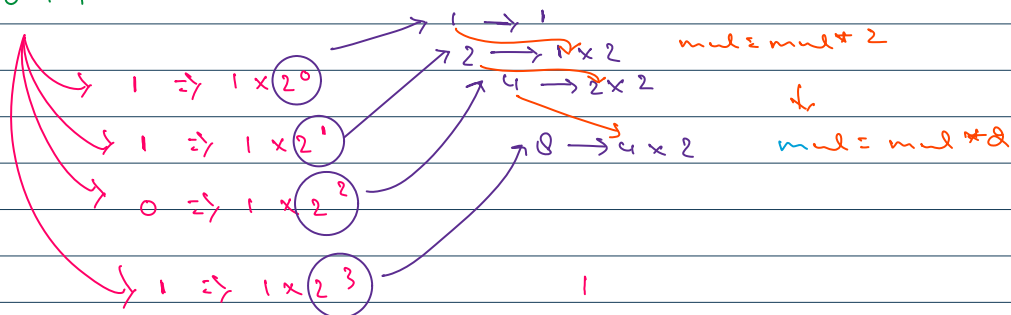
$$(1011) \Rightarrow 1011 \% 10 \Rightarrow 1 \rightarrow \text{last digit}$$

↓ / 10

$$101 \Rightarrow 101 \% 10 \Rightarrow 1 \rightarrow \text{second last digit}$$

1011

mul = 1;



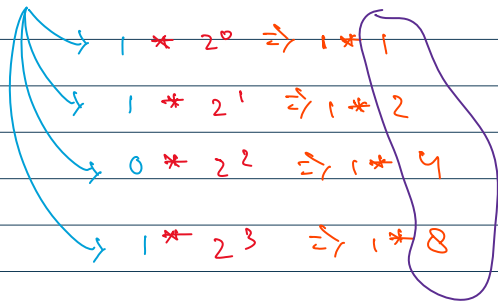
$$\begin{aligned} 1 &\rightarrow 1 \times 2 = 2 \\ &\rightarrow 2 \times 2 = 4 \\ &\rightarrow 4 \times 2 = 8 \end{aligned}$$

1011



mul = 1

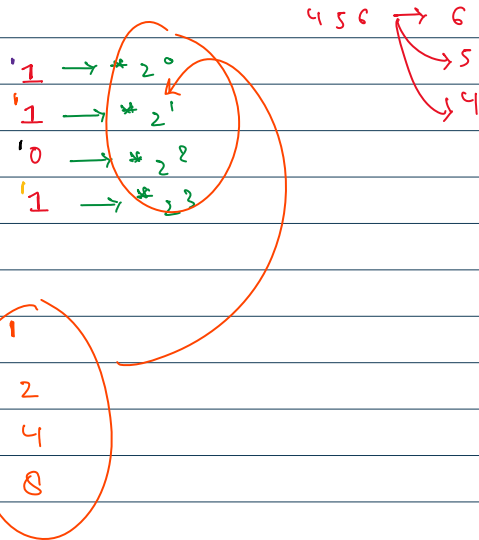
mul = mul * 2



$$mul = mul * 2$$

```
int n = '1011';
int mul = 1;
int dec = 0;
while(n > 0){
    int rem = n % 10;
    // System.out.println(rem);
    // System.out.println(mul);

    dec = dec + (rem * mul);
    mul = mul * 2;
    n = n / 10;
}
System.out.println(dec);
```



Java Data Types

- Primitive
- Non-primitive

1 byte = 8 bit

Type	Size	Range
int	32 bit	-32768 to 32767
char	16 bit	
short	16 bit	
byte	8 bit	-128 to 127
long	64 bit	
float	32 bit	
double	64 bit	

Byte = 8 bit =>

signed bit → it represents the sign

1 → ⊖ ve

0 → ⊕ ve

Positive \Rightarrow 0 1 1 1 1 1 1 1 \Rightarrow 127
 0 0 0 0 0 0 0 0 \Rightarrow 0

Negative \Rightarrow 1 1 1 1 1 1 1 1 \Rightarrow 0
 1 0 0 0 0 0 0 0 \Rightarrow -128

32767 to -32768

ASCII code \rightarrow (0-255)

A \rightarrow 65	a \rightarrow 97	' \rightarrow ascii
B \rightarrow 66	b \rightarrow 98	* \rightarrow code
C \rightarrow 67	c \rightarrow 99	
:	:	
:	:	
:	:	
Z \rightarrow 90	z \rightarrow 122	

Type Conversion

Converting one data type to another type.

char a = 'a'; \Rightarrow 65
 int b = (int) a;

You are given a char ch, find whether it is in upper case or not.

ascii value \Rightarrow A \rightarrow 65
 :
 :
 Z \rightarrow 90 } \rightarrow if the ascii value of the given character is in range of 65 to 90.

$\text{ascii} = 65 \ \&\& \ \text{ascii} \leq 90$

uppercase/lowercase

Print prime factors of a number

378

$$\begin{array}{r} 2 \overline{) 378} \\ \underline{378} \\ 0 \end{array}$$

$$4 \overline{) 70}$$

$$5 \overline{) 70}$$

$$6 \overline{) 70}$$

$$\begin{array}{r} 7 \overline{) 70} \\ \underline{70} \\ 0 \end{array}$$

$$\begin{array}{r} 3 \overline{) 189} \\ \underline{189} \\ 0 \end{array}$$

$$\begin{array}{r} 6 \overline{) 21} \\ \underline{21} \\ 0 \end{array}$$

$$\begin{array}{r} 3 \overline{) 3} \\ \underline{3} \\ 0 \end{array}$$

$$58 \rightarrow \underline{2}, \underline{29} \rightarrow \underline{29}$$