Primitive

- byte
- short
- int
- long
- float
- double
- char
- boolean

Integer Values

decimal

character

true/false

Non Primitive

- String
- array

Computers only understands binary

0 and 1

byte ⇒ 8 bits ⇒ 2^8 ⇒ 256

```
byte a = 2;
```

-ve +ve

range -128 127

-2^7 2^7-1

short ⇒ 2 bytes ⇒ 16 bits 2^{16} ⇒ 32768

```
short a = 2;
```

range -2^{15} $2^{15}-1$

int ⇒ 4 bytes ⇒ 32 bits 2^{32}

```
int a = 2;
```

-2^{31} $2^{31}-1$

long ⇒ 8 bytes ⇒ 64 bits ⇒ 2^{64}

long a = 2;

-2^{63} $\quad$ $2^{63}-1$

$2^{31} \approx 2^{30} \times 2$

$2^{10} \times 2^{10} \times 2$

$2^{10} \approx 10^3$

$\approx 10^3 \times 10^3 \times 10^3$

$\approx 10^9$ ⇒ 1000000000

1024 $\approx 10^3$

if greater use long
else use int

Decimal

float ⇒ 4 bytes ⇒ 1078.94321f

double ⇒ 8 bytes ⇒ 278.96

double a = 45.8

float a = 0.3f; X

char

ASCII → American standards codes for information interchange

↓

256

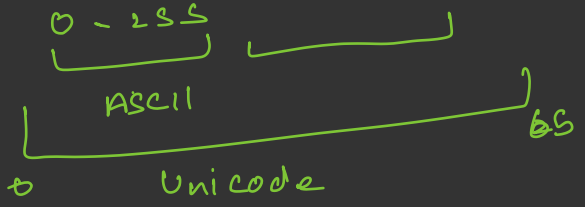
→ 2 bytes ⇒ 16 bit ⇒ 2^{16}

0 - $2^{16} - 1$

↓

Unicode

```
char ch = 'a';
char ch2 = 98;
```



0 -

'A' - 65
'B' - 66
'0' - 48
'1' - 49
'2' - 50
⋮

'a' - 97
'b' - 98
'c' - 99
'd' - 100
⋮

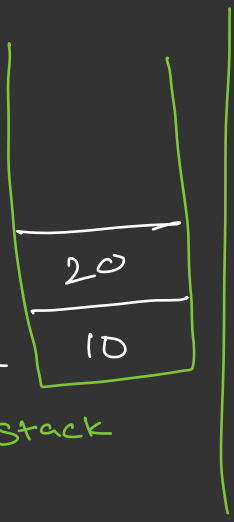
```
char var1= 'a';
char var2= 91;

Syso('b' - 'a');
      98 - 97
```

boolean → true / false

↳ default → false

Memory / RAM

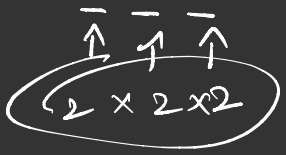
```
int a;  //declaration
a = 10; //initialisation

int b = 20;
```



All primitive data types are stored in stack

NP → heap

$2^3 = 8$



0 0 0
0 0 1
0 1 0
0 1 1

-2^{31} to $2^{31}-1$

$2^{10} = 1024$

$2^{10} \approx 1000$

$2^{10} \approx 10^3$

$2^{31} \approx 2^{30}$

$2^{30} = 2^{10} \times 2^{10} \times 2^{10}$

$2^{30} \approx 10^3 \times 10^3 \times 10^3$

$2^{30} \approx 10^9$

$2^{31} \approx 10^9$