

CS & IT ENGINEERING



Programming in C

Chapter -1

Data types and Operators

Lec- 02



By- Pankaj Sharma sir

TOPICS TO BE
COVERED

Introduction to Programming - II

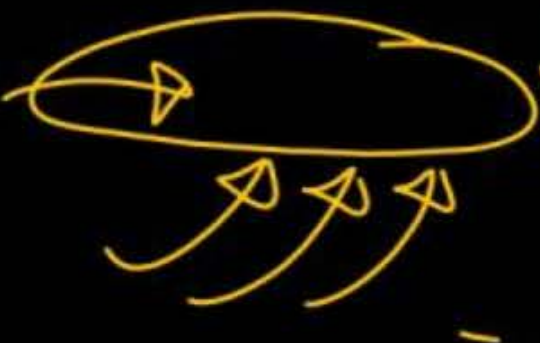
Variable / constant

being able to vary

$$y = 6x$$

email id:

Password:



$$x = 1 \Rightarrow y = 6$$

$$x = 2 \Rightarrow y = 12$$

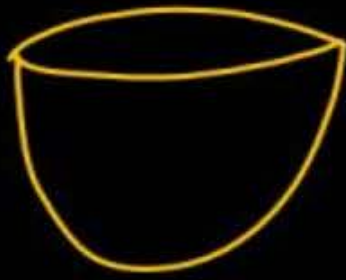
$$x = 3 \Rightarrow y = 18$$

Variable \Rightarrow Containers
Data/value



~~RICE~~

SUGAR



~~TEA~~

RICE



~~SUGAR~~

TEA

Lunch-box :

(20) → name them

retrieve

CHITRA ~~Photo~~



1012

		2016
		20

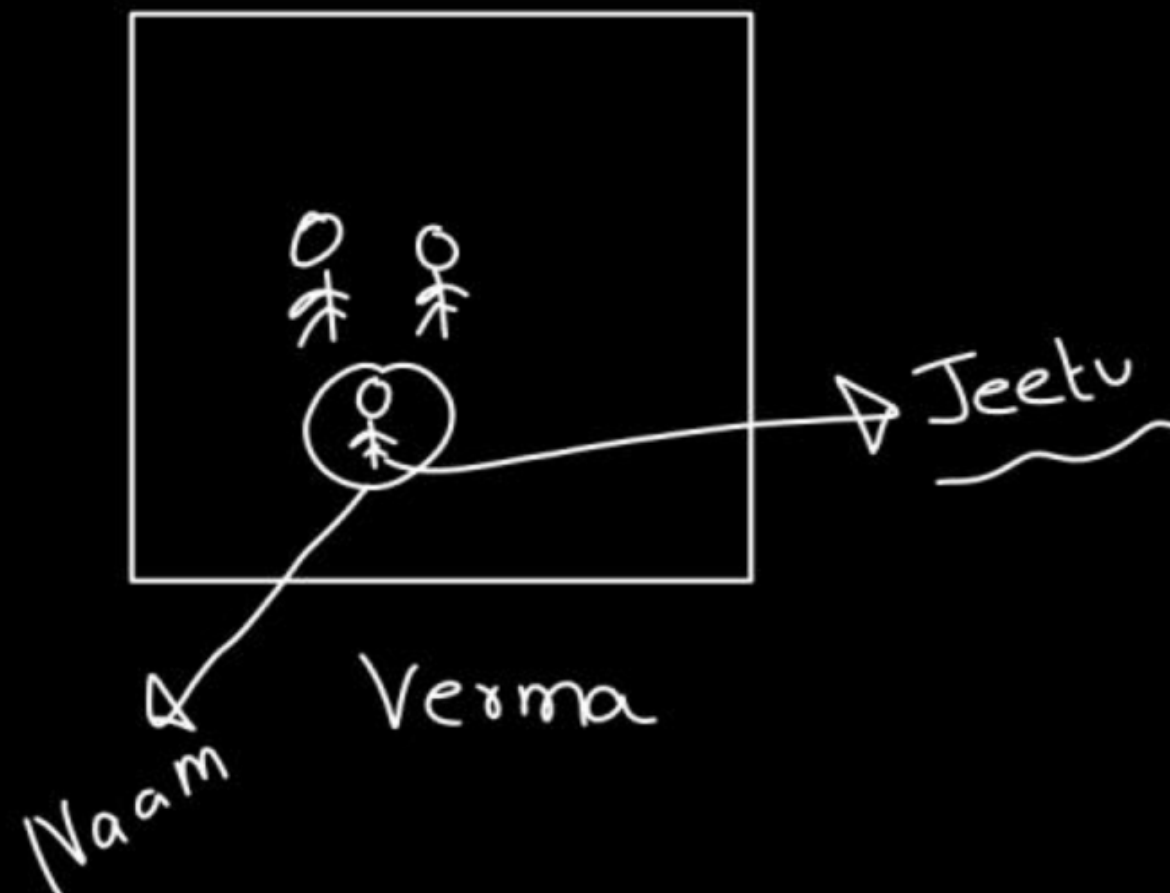
(20) → name them

a = 20;
↓
Variable

~

1012			Address Identifier a
		2016	
		20	

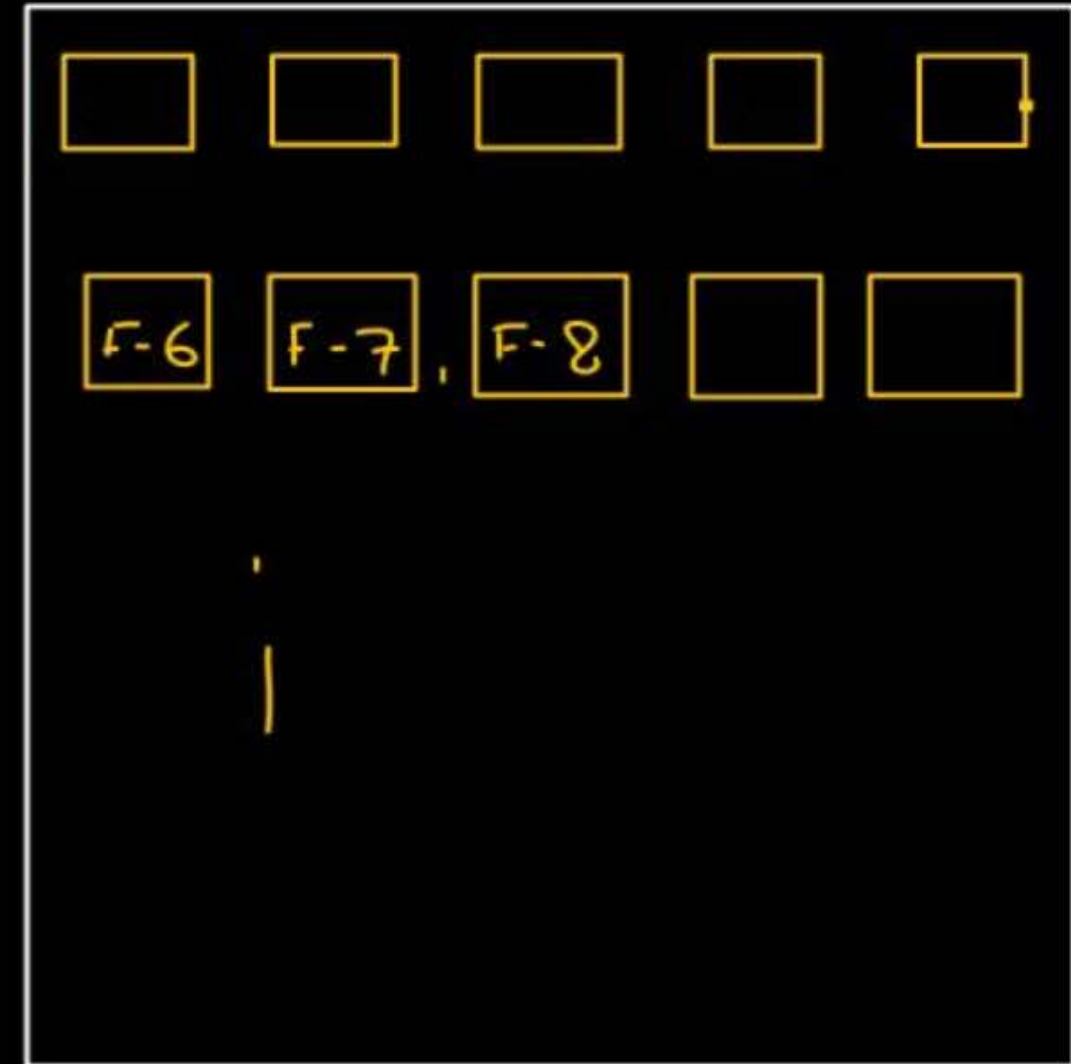
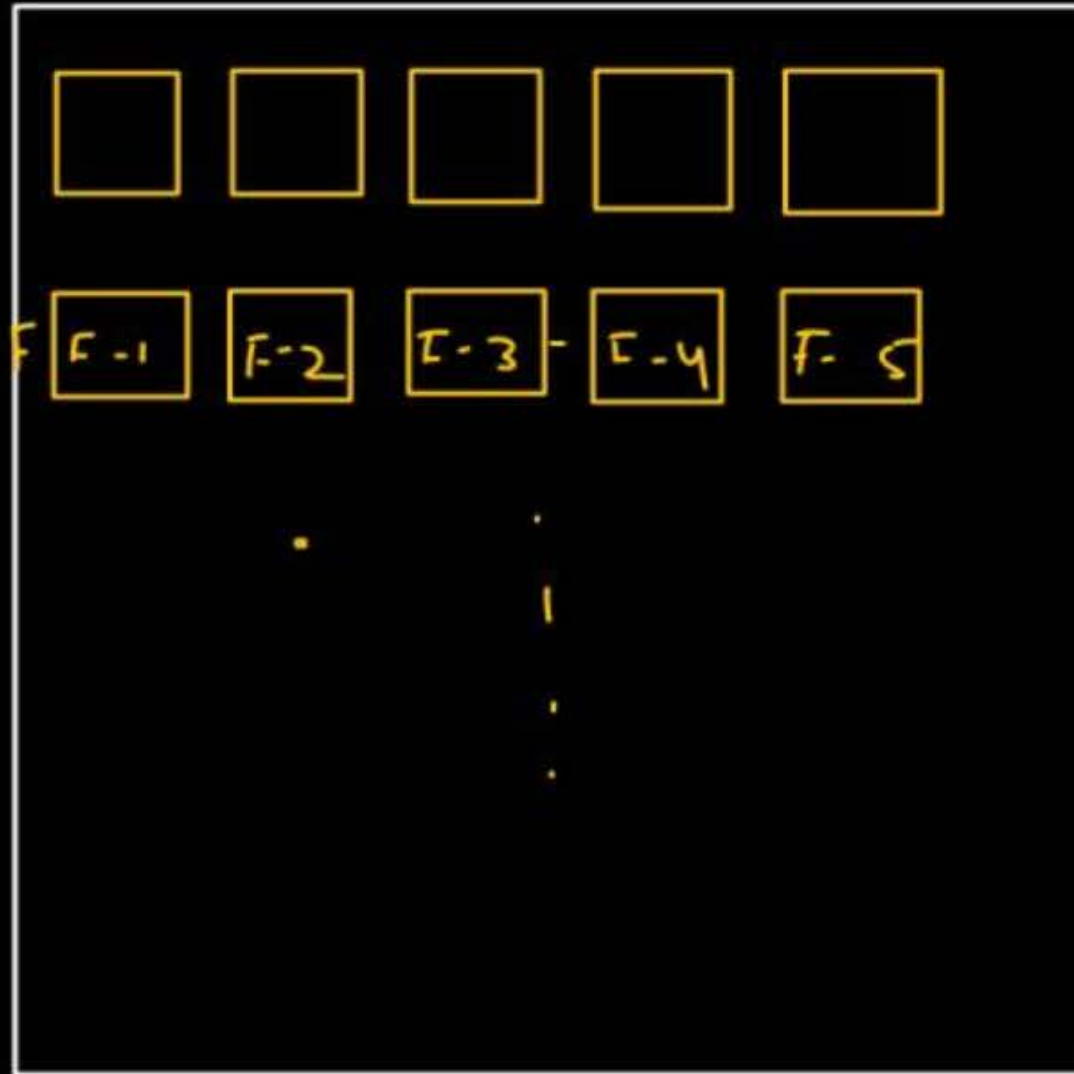
6 years



Ticket Label (name)

F-8

name, data, address



Variable

$a = 100 ;$

$a = 200 ; \checkmark$



i/p :

Google maps

1234

x

Delhi

✓

ATM M/c

Pin :

abcd

x

1234

✓

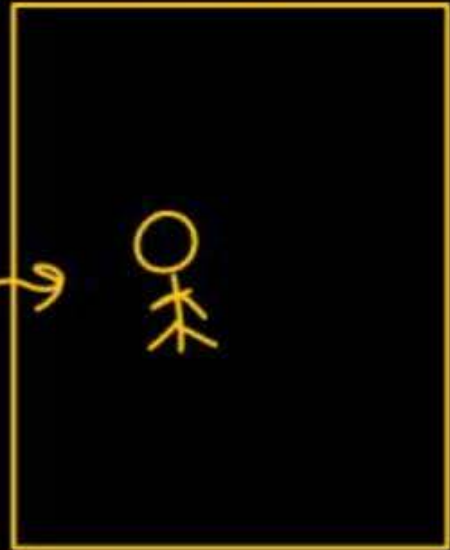
Theatre

Ticket
3:00-6:00 F-8

6:00-9:00

Garbage value

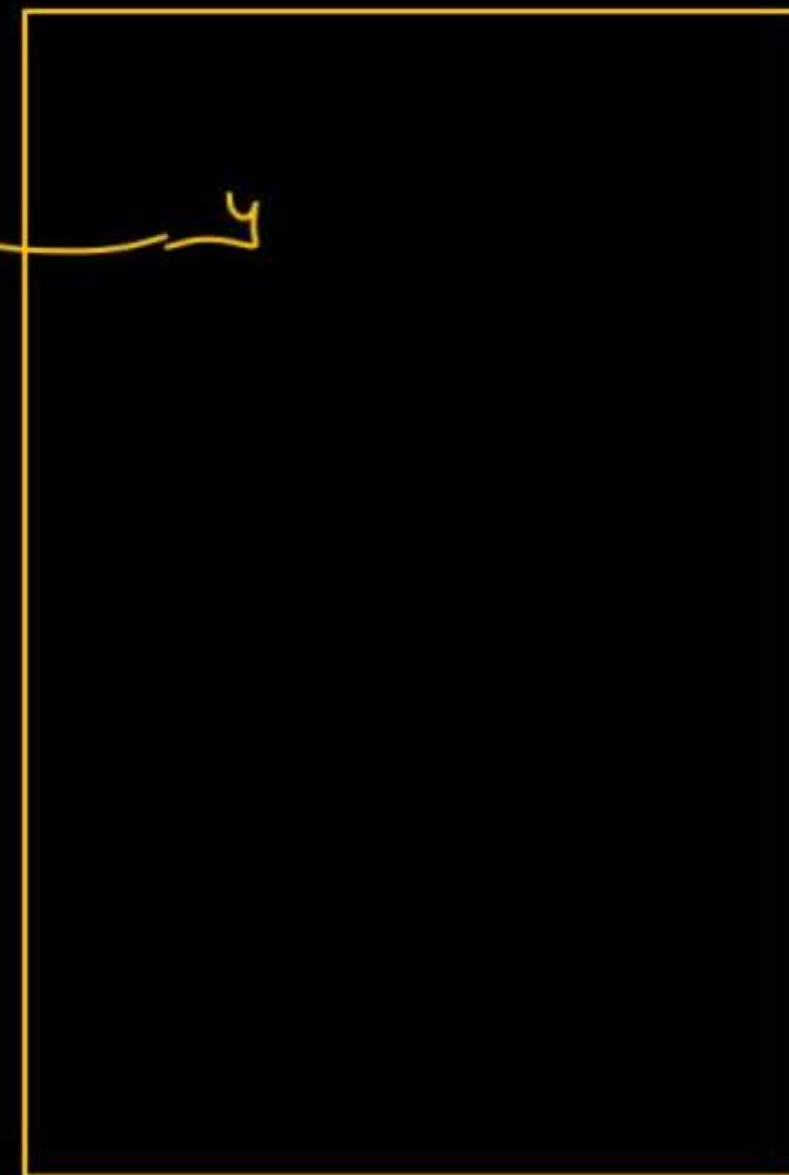
F-8



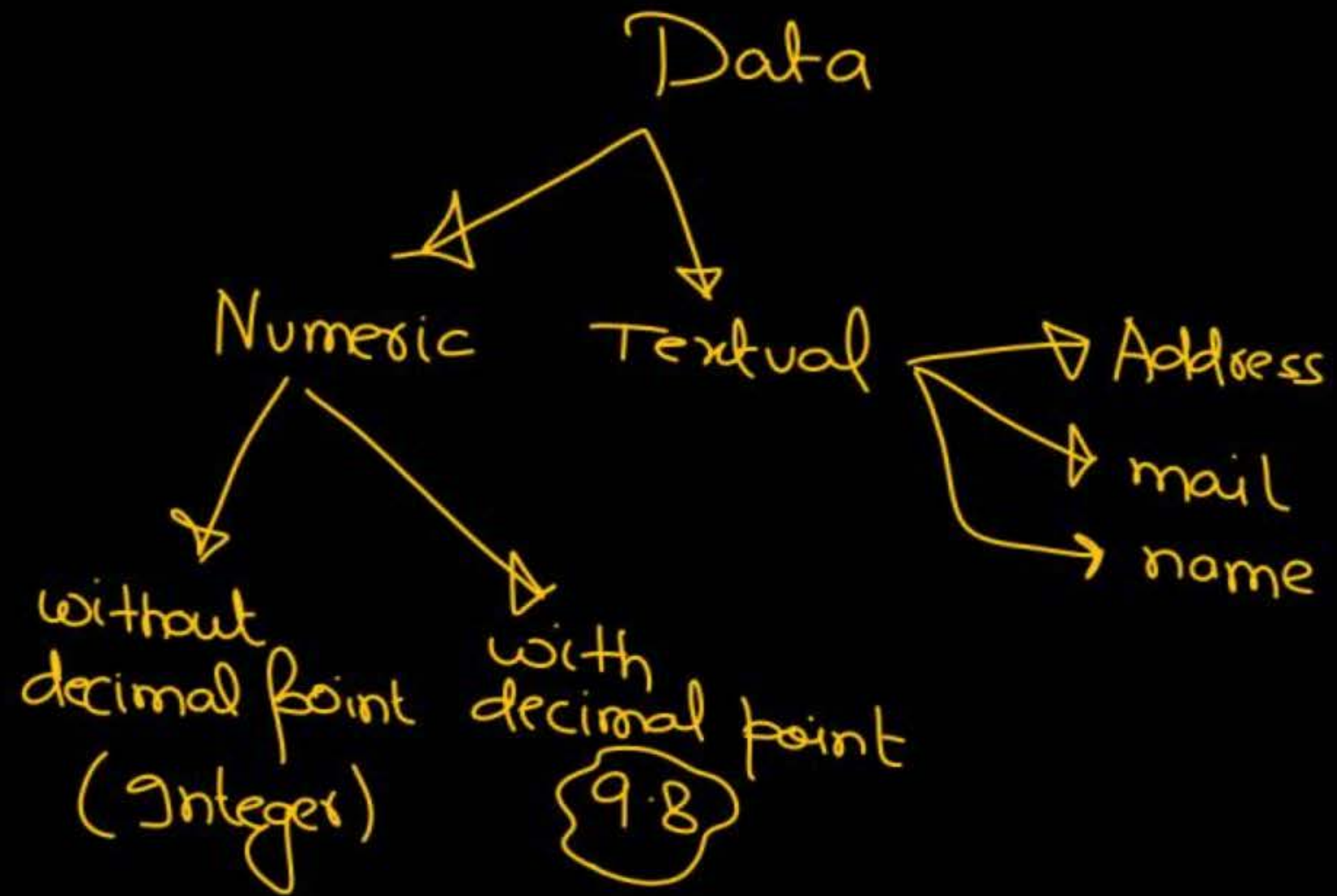
Pankaj Sir

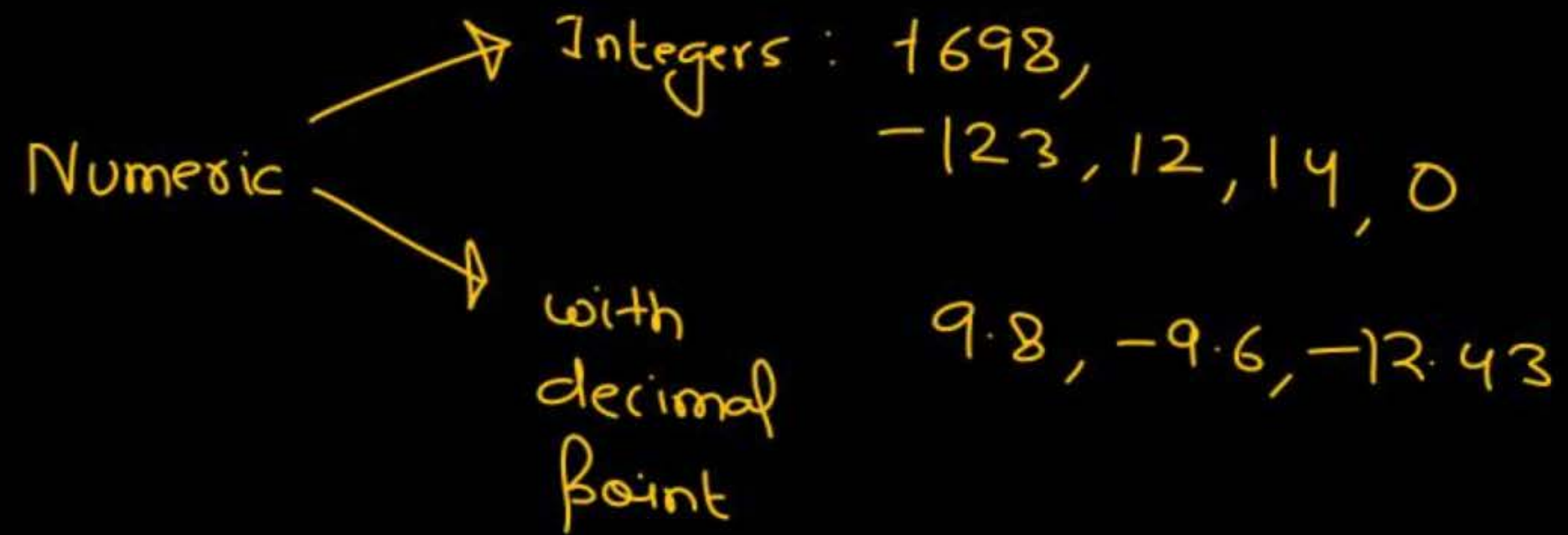
Amit

Rankaj C
a:35



119m



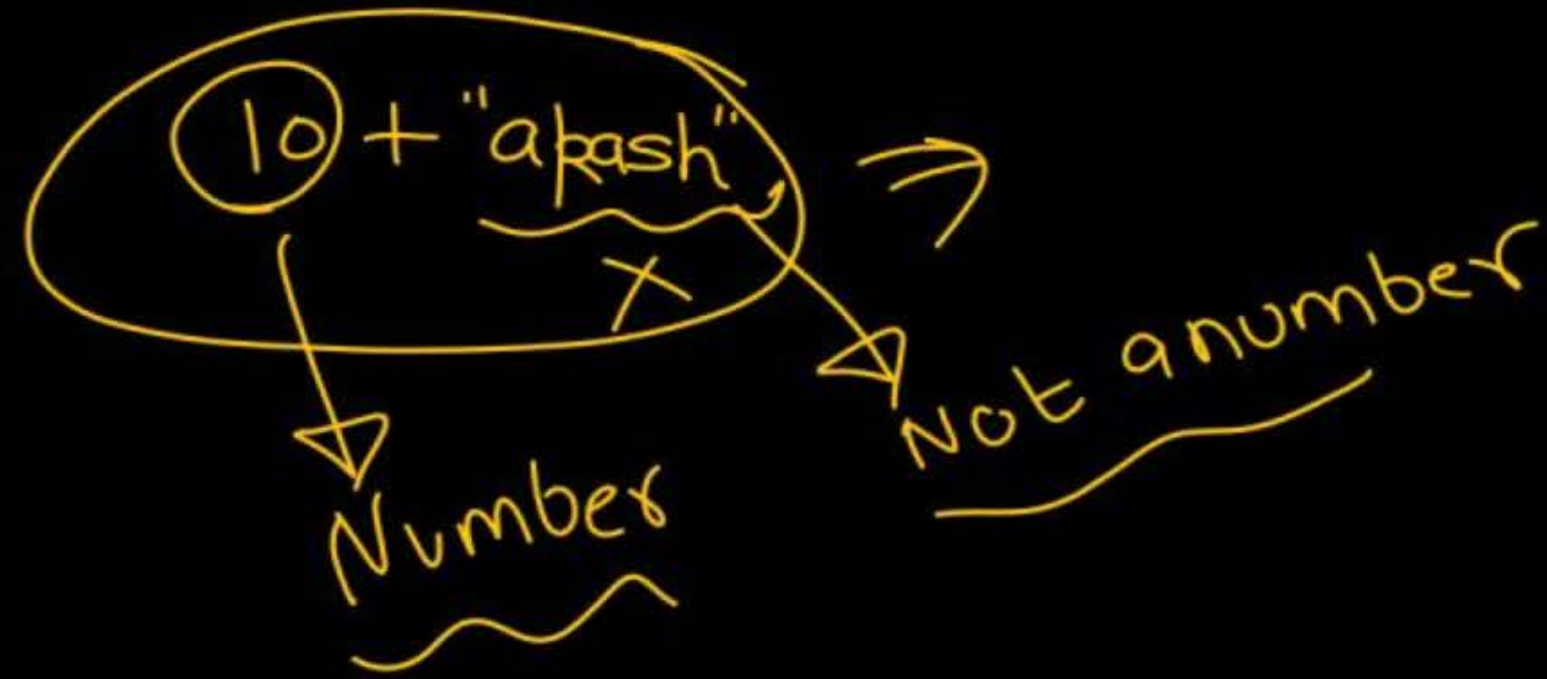


Text : Address
Name : Pankaj

$(10) + (20)$



$(10) + \text{"akash"}$

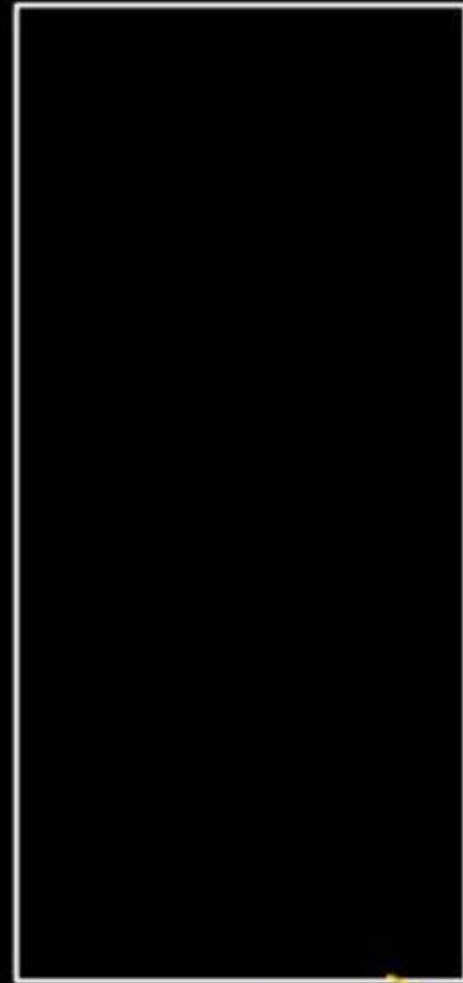


Numbers

Not a number

Integer
decimal point (floating type)
Text

whatever i/p we
provide from the KB,
⇒ seq. of 0,1



CPU

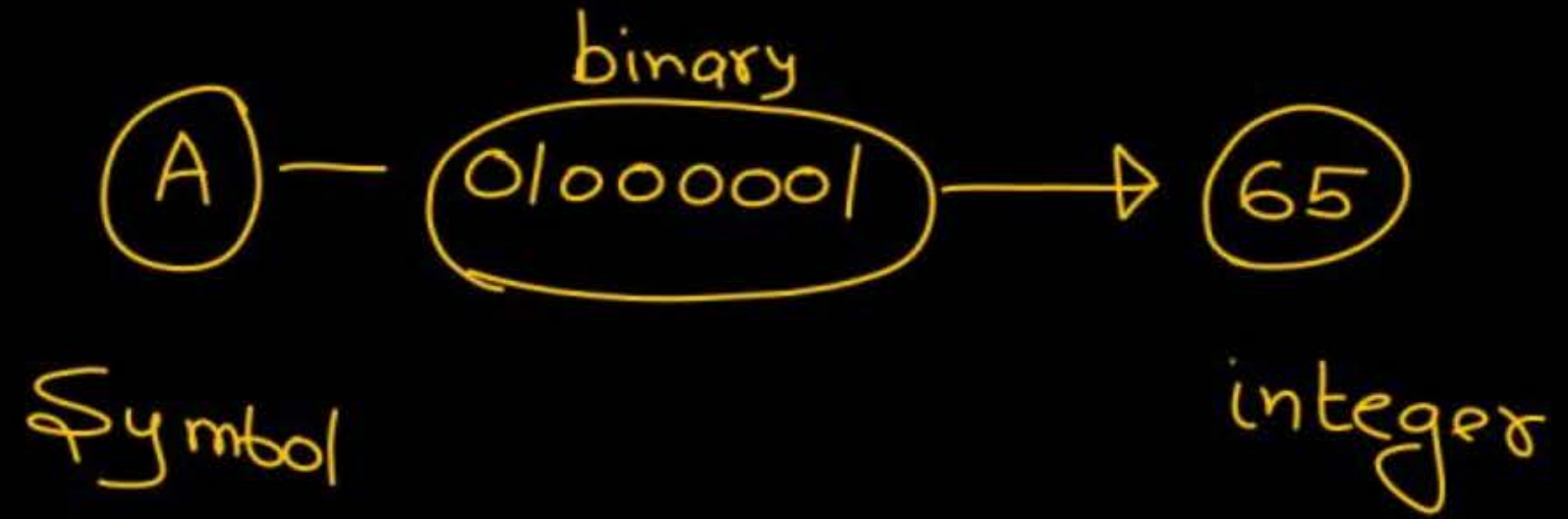


KB

i/p

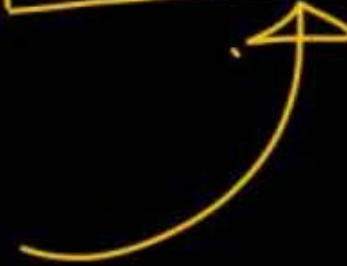
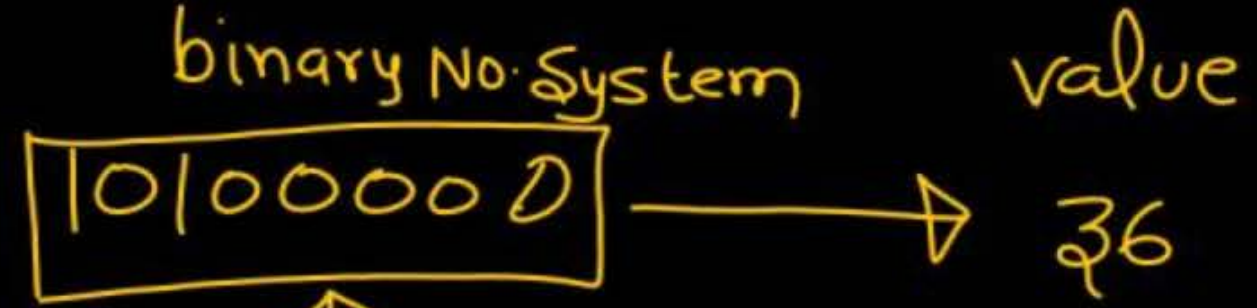
A - 01000001

q - 00001001





@

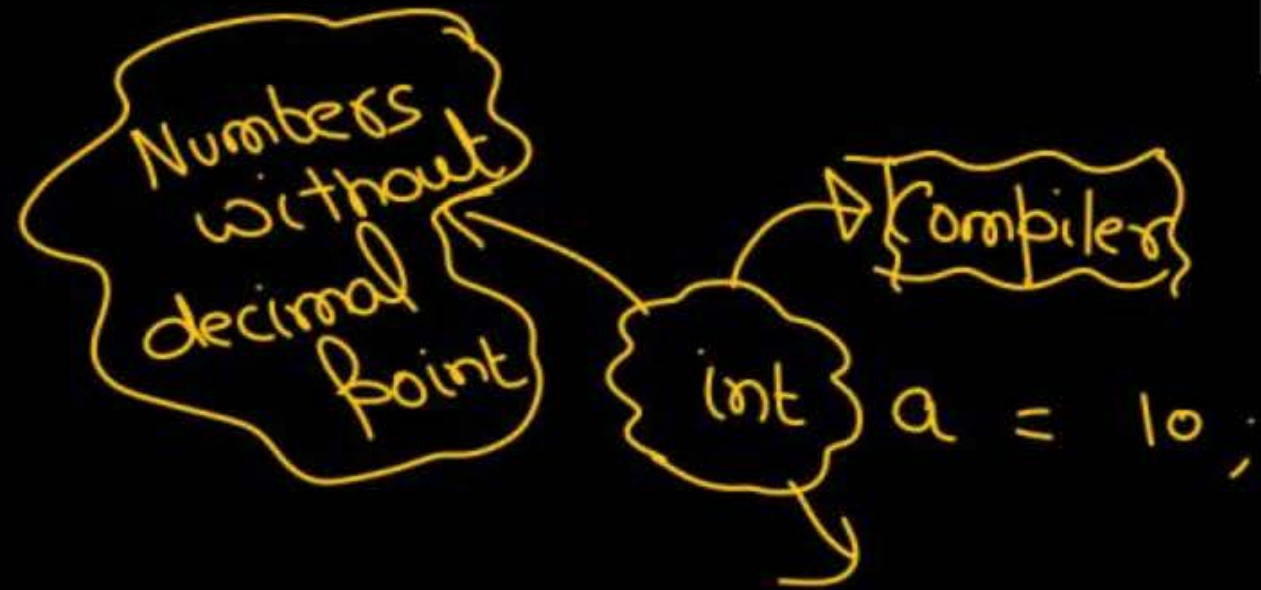
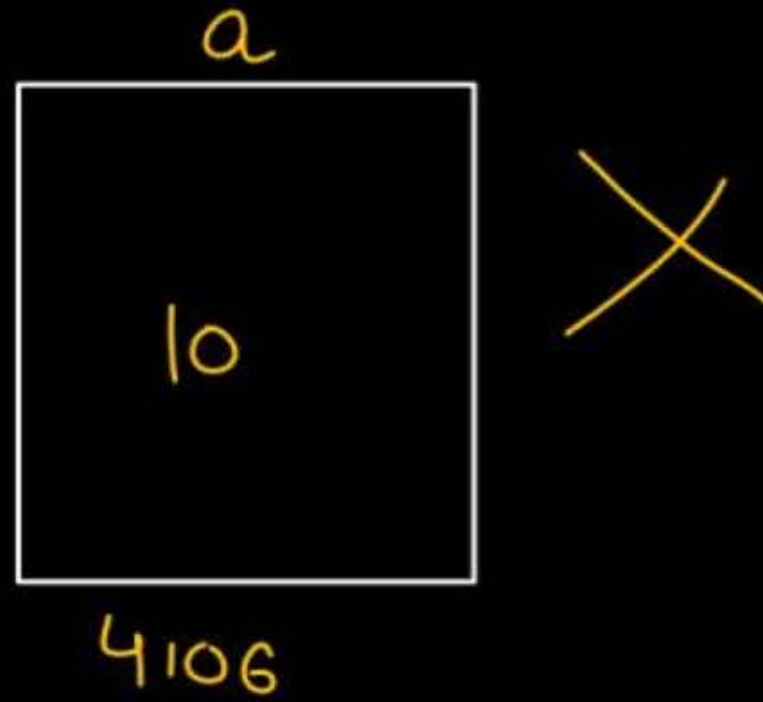


KB

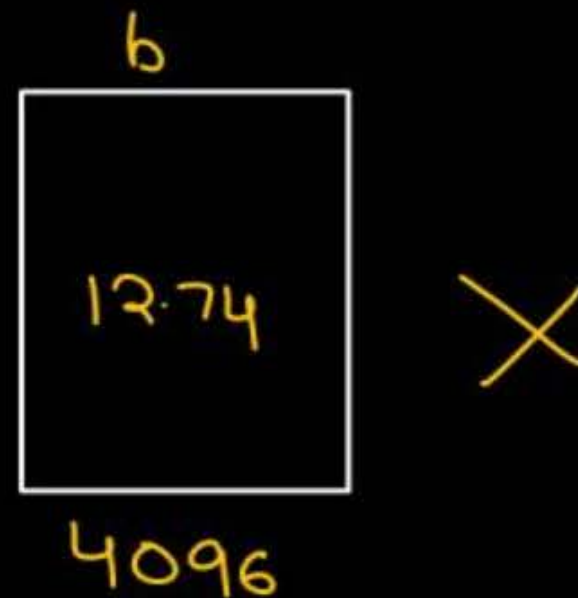


Containers ~~int~~ type

$a = 10$



$b = 12.74;$



Number with
decimal point.

float $b = 12.74;$

$b = 30.74;$



Numbers → integers
→ floating

x Text : Pankaj 6 Symbol

→ character data type → To store 1 symbol.

@

char c = '@'; ✓



- integer
- floating point
- char
- bool & other

- array
- pointer
- string

- structure
- union
- enum
- typedef

Integer type

+ve, -ve { short int ✓
int ✓
long int ✓
long long int ✓

8x10

Unsigned short int

Unsigned int

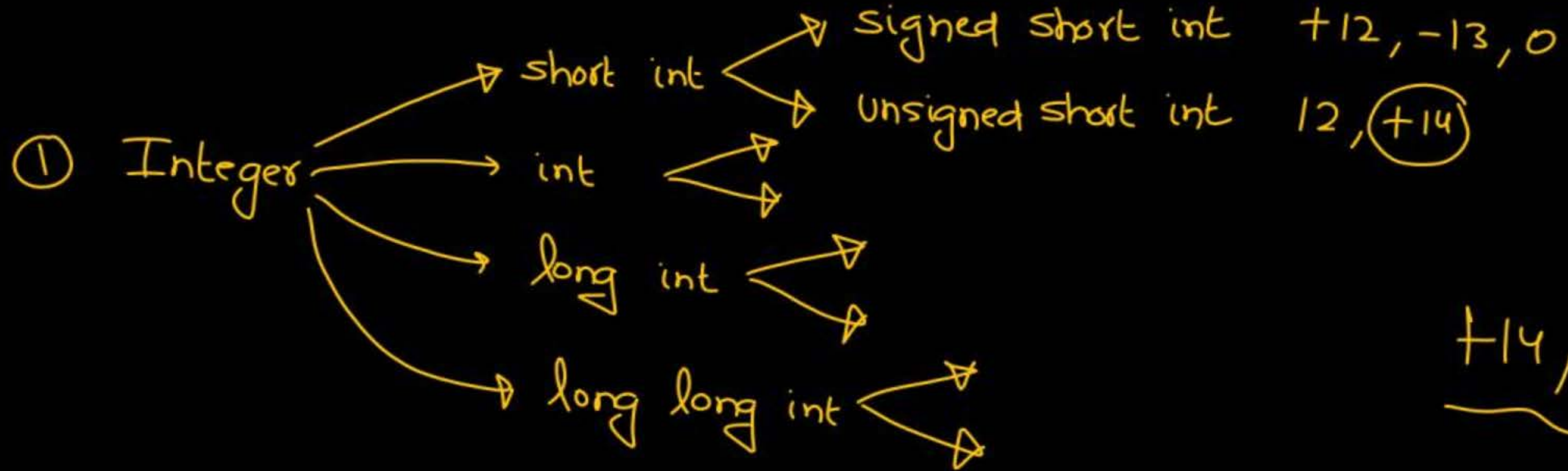
Unsigned long int

Unsigned long long int

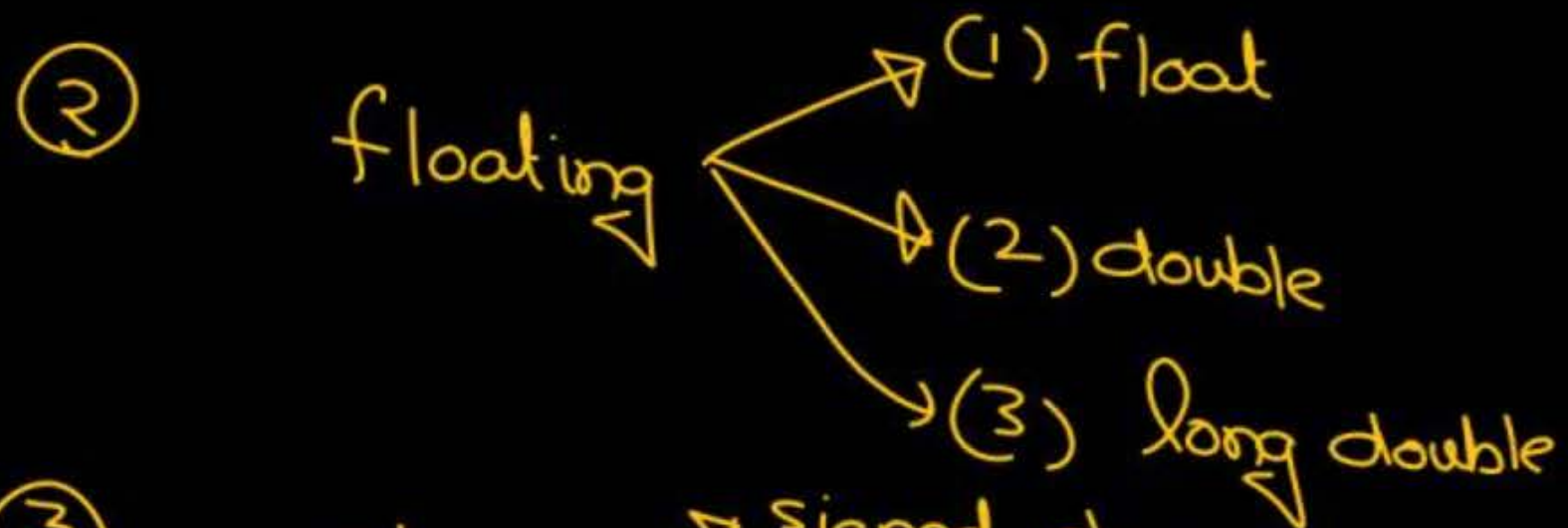


100

+ve



+14, 14



00 ✗
01 ✓
02 ✓

Computer \rightarrow 0,1 (binary)

Human \rightarrow decimal (0, ..., 9)

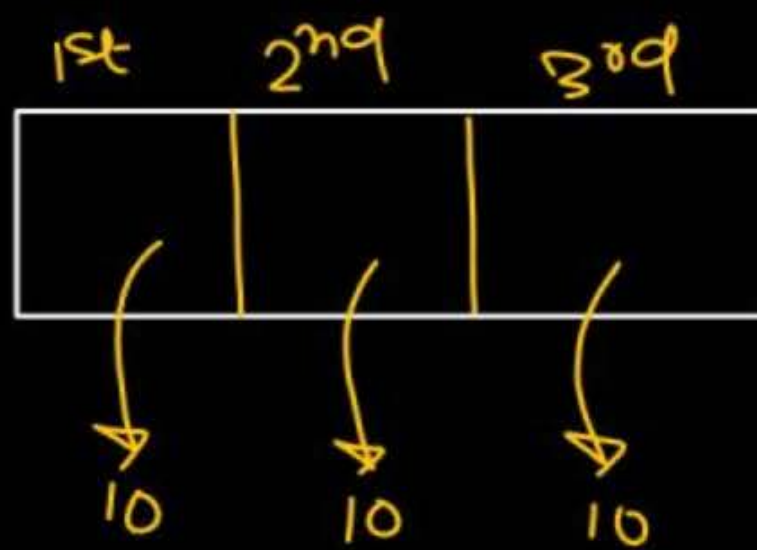


possible value

10

10

$$\Rightarrow 10 \times 10 = 10^2$$

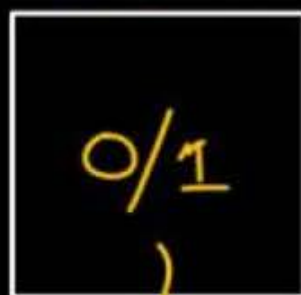


$\Rightarrow 10^3$

binary

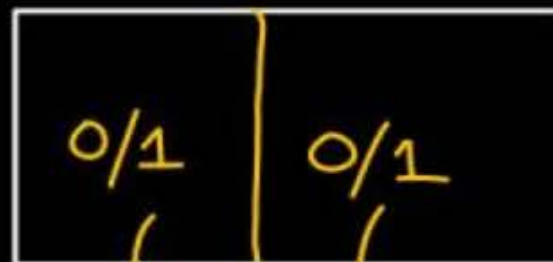
1 digit \Rightarrow bit

1 bit

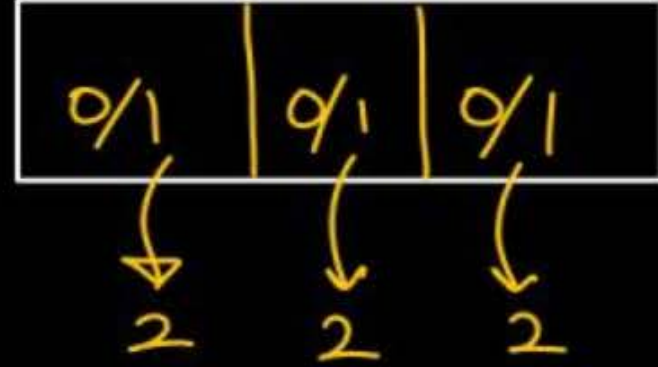


possible values $\Rightarrow 2$

1st bit 2nd bit

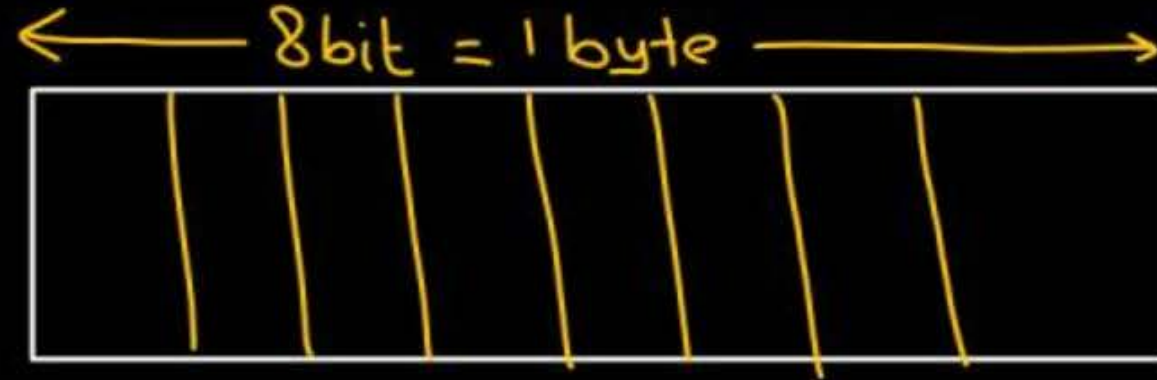


possible values
 $= 2 \times 2 = 2^2$
4



3 bit

possible values = $2^3 = 8$ values





possible value

$$2 \text{ bit} \Rightarrow 2^2 = 4 \rightarrow 0, 1, 2, 3$$



possible value

$$3 \text{ bit} = 2^3 = 8 \rightarrow 0, 1, 2, 3, 4, 5, 6, 7$$

Short int \rightarrow 2 byte

int \rightarrow 2 byte / 4 byte

long int

long long int

C Standards

Short int

Assume

Short int \rightarrow 2 byte

short int (2 byte)

(i) unsigned short int

$$2 \text{ byte} = 2 \times 8 = 16 \text{ bits}$$

$$\text{possible value} \Rightarrow 2^{16} = 65536$$

↓

0 to 65535

$$0 \text{ to } 2^{16} - 1$$

(ii) Signed short int: 2 byte = $2 \times 8 = 16$ bits

possible values = 2^{16} (65536)

↙
-ve

↘
+ve

$$\frac{2^{16}}{2}$$
$$2^{15}$$

-32768 ... -2, -1

-32768 to +32767

-2^{15} to $+2^{15}-1$

$$\frac{2^{16}}{2}$$

2^{15} (32768)

0, 1, 2, ... 32767

Range

⁽⁺⁴⁾ int (4 byte)

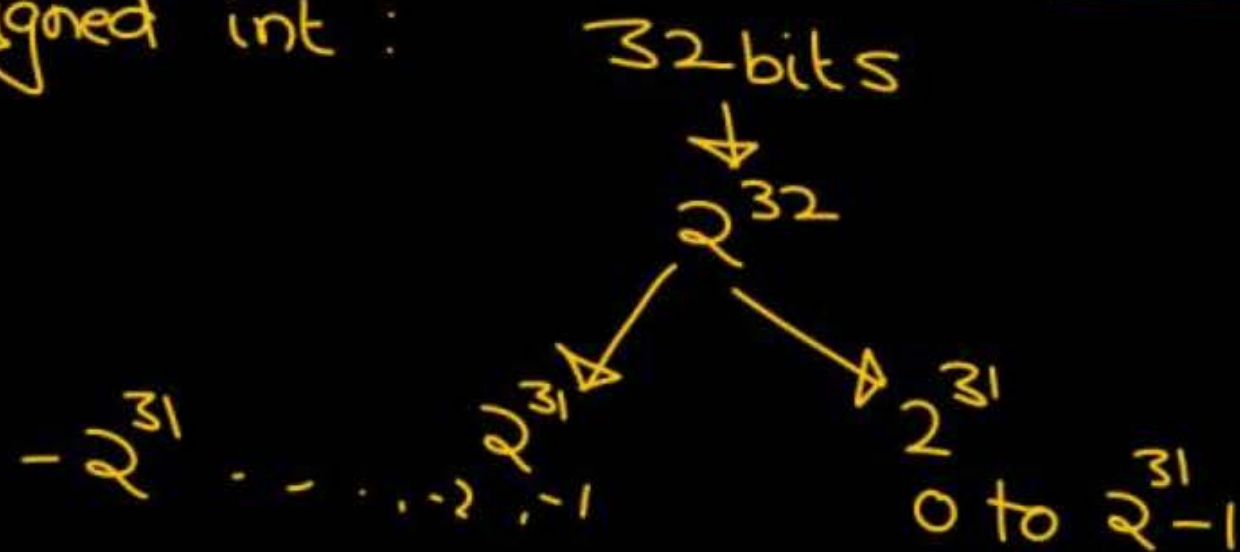
(i) unsigned int

$$4 \text{ bytes} = 4 \times 8 \text{ bits} = 32 \text{ bits}$$

$$\text{possible values} = 2^{32}$$

$$0 \text{ to } 2^{32} - 1$$

(ii) signed int :



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

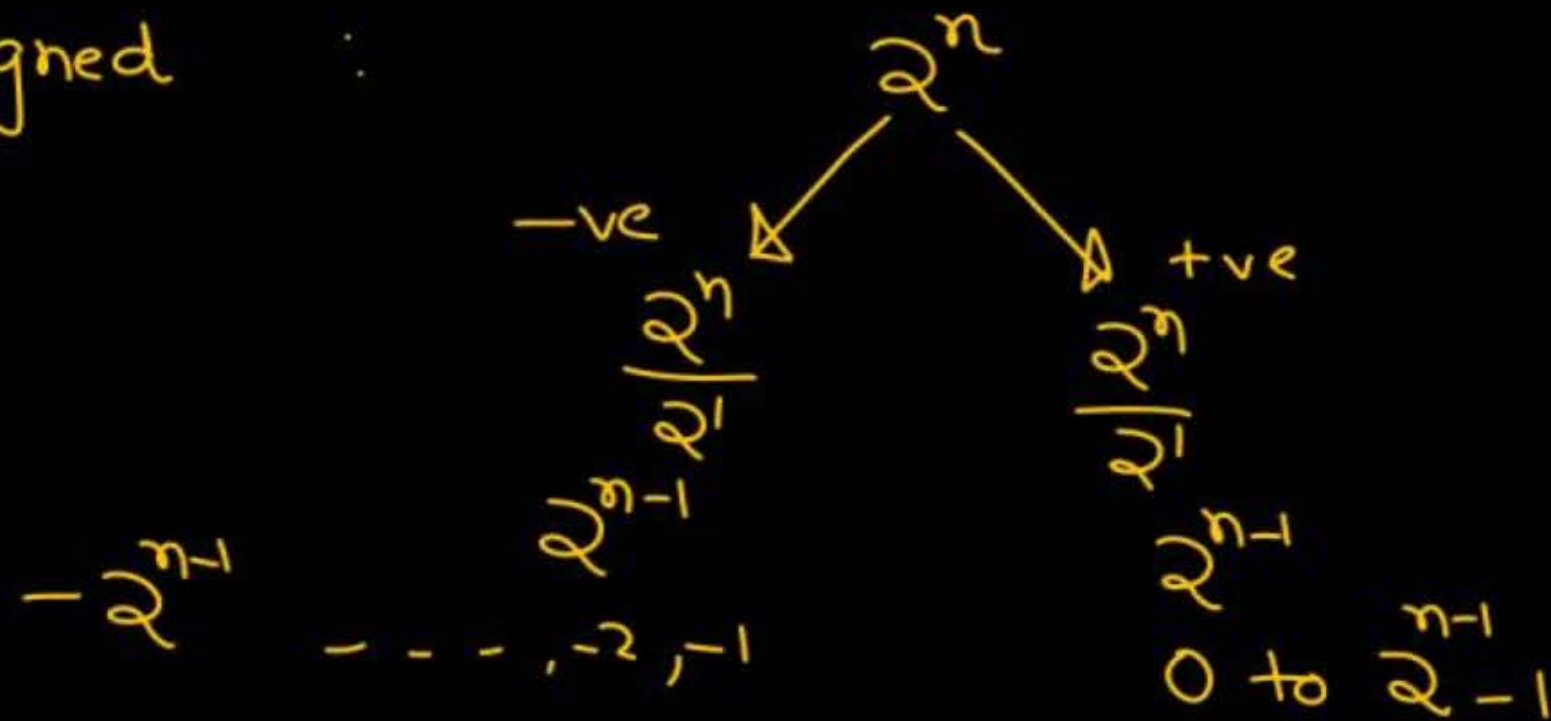
n bits
possible val = 2^n



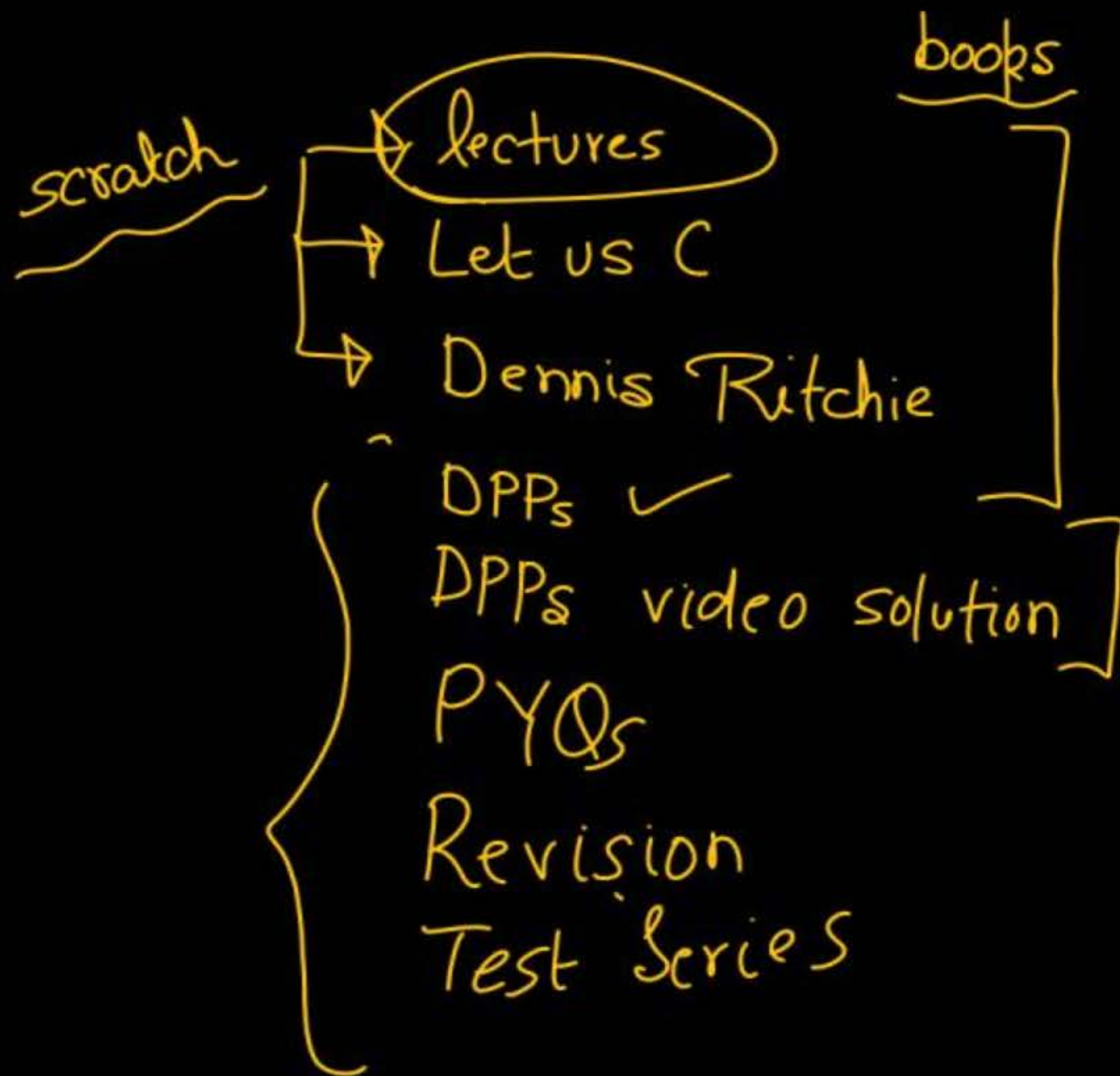
(i) unsigned : 0 to $2^n - 1$

Digital

(ii) signed :



$-2^{n-1} \text{ to } 2^{n-1}-1$



Sunday

Uncover

- ① 5:00 PM - 7:00 PM
- ② 8:30 PM - 10:30 PM

→

 int a = 10;

function

SORS

by default

Signed (+ve, -ve)

signed int a = 10;

OR

int a = 10;

} both
are
same

