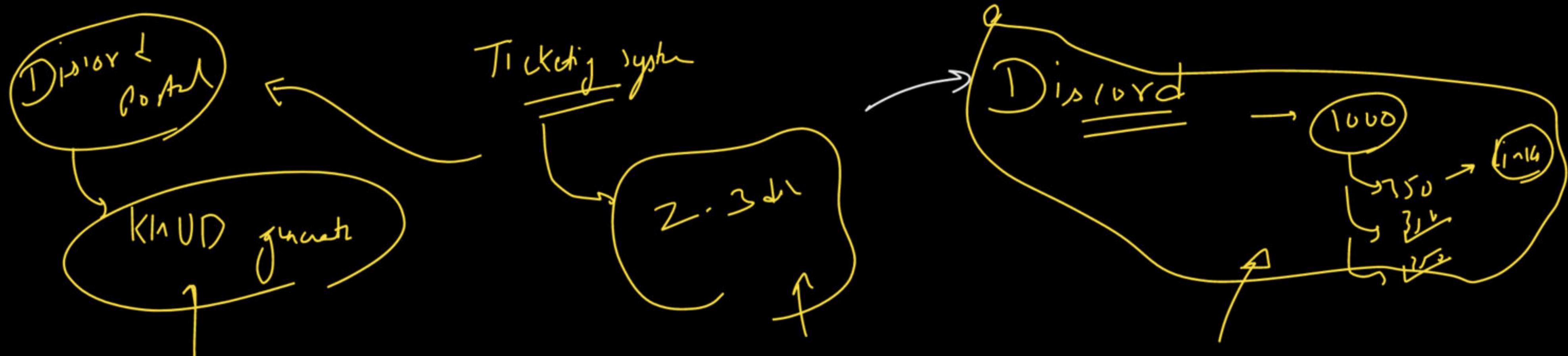


Write your First C++ Program

Special class



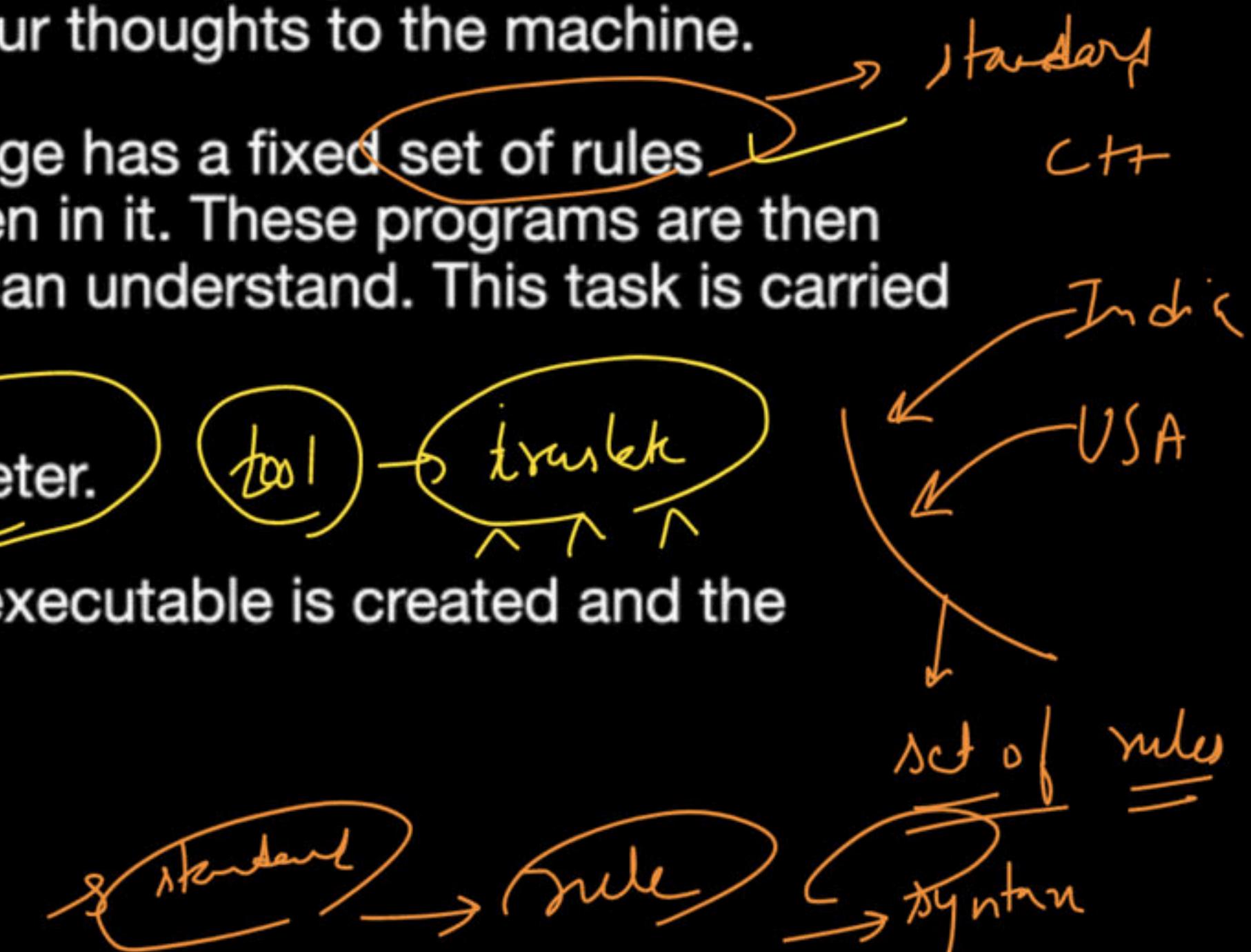
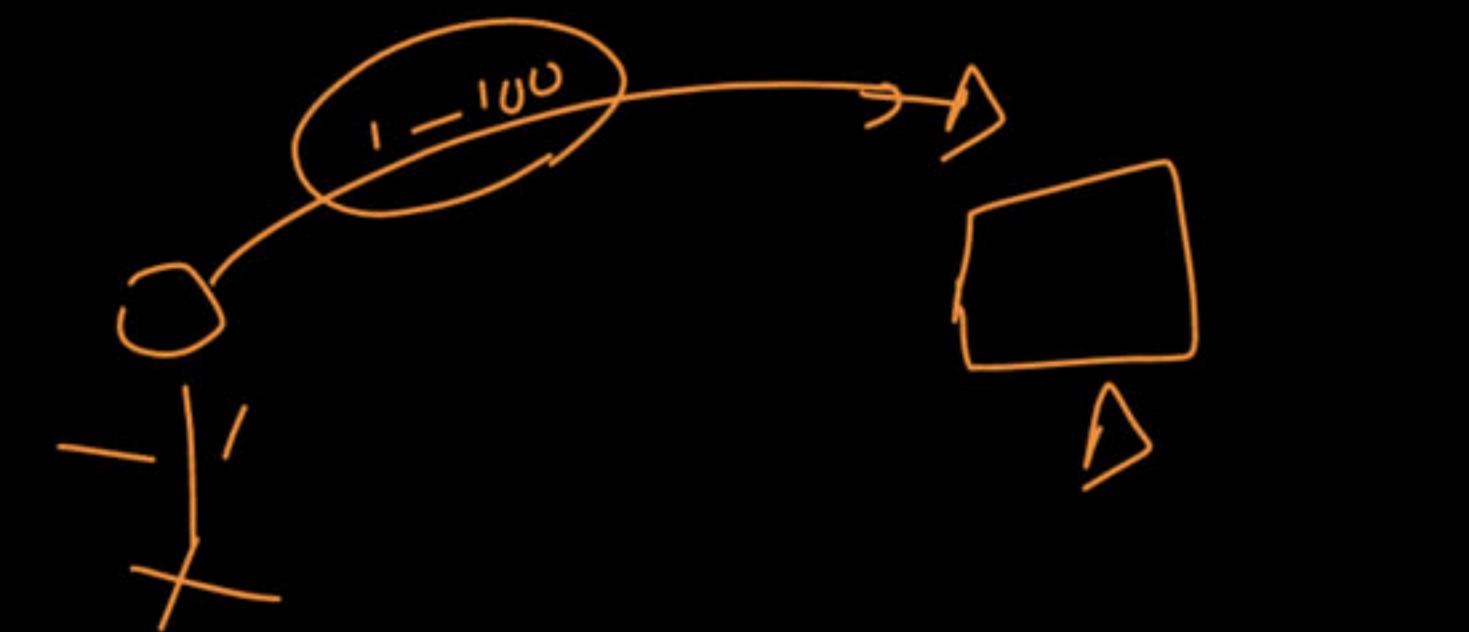
Write your First C++ Program

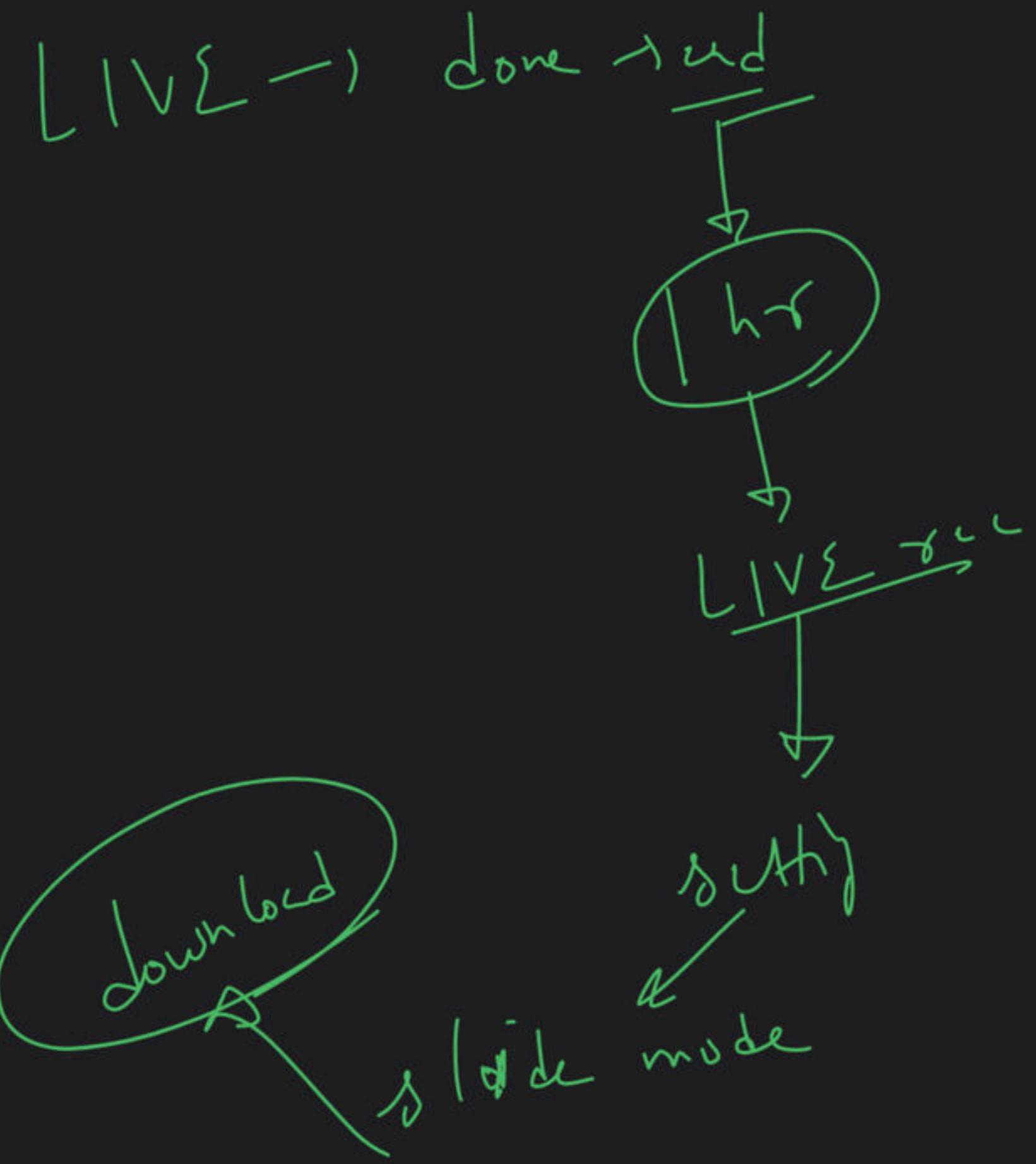
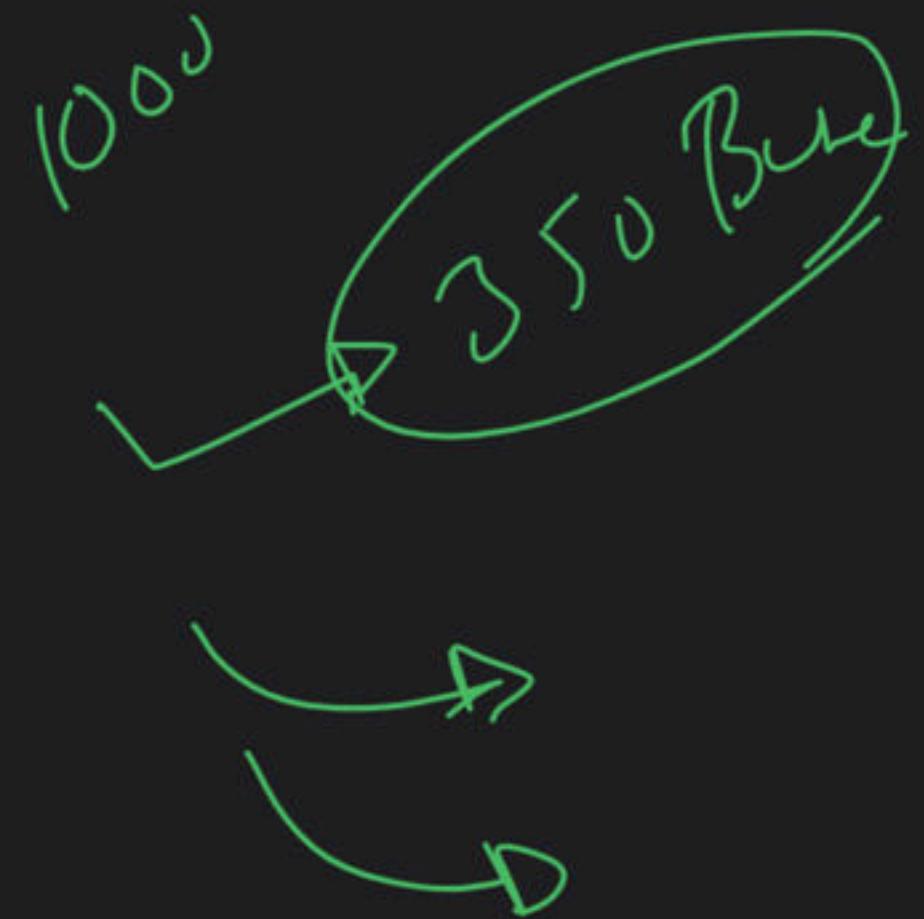
Instructor: Love Babbar [Ex- Amazon, Ex-Microsoft Engineer]

Programming Languages

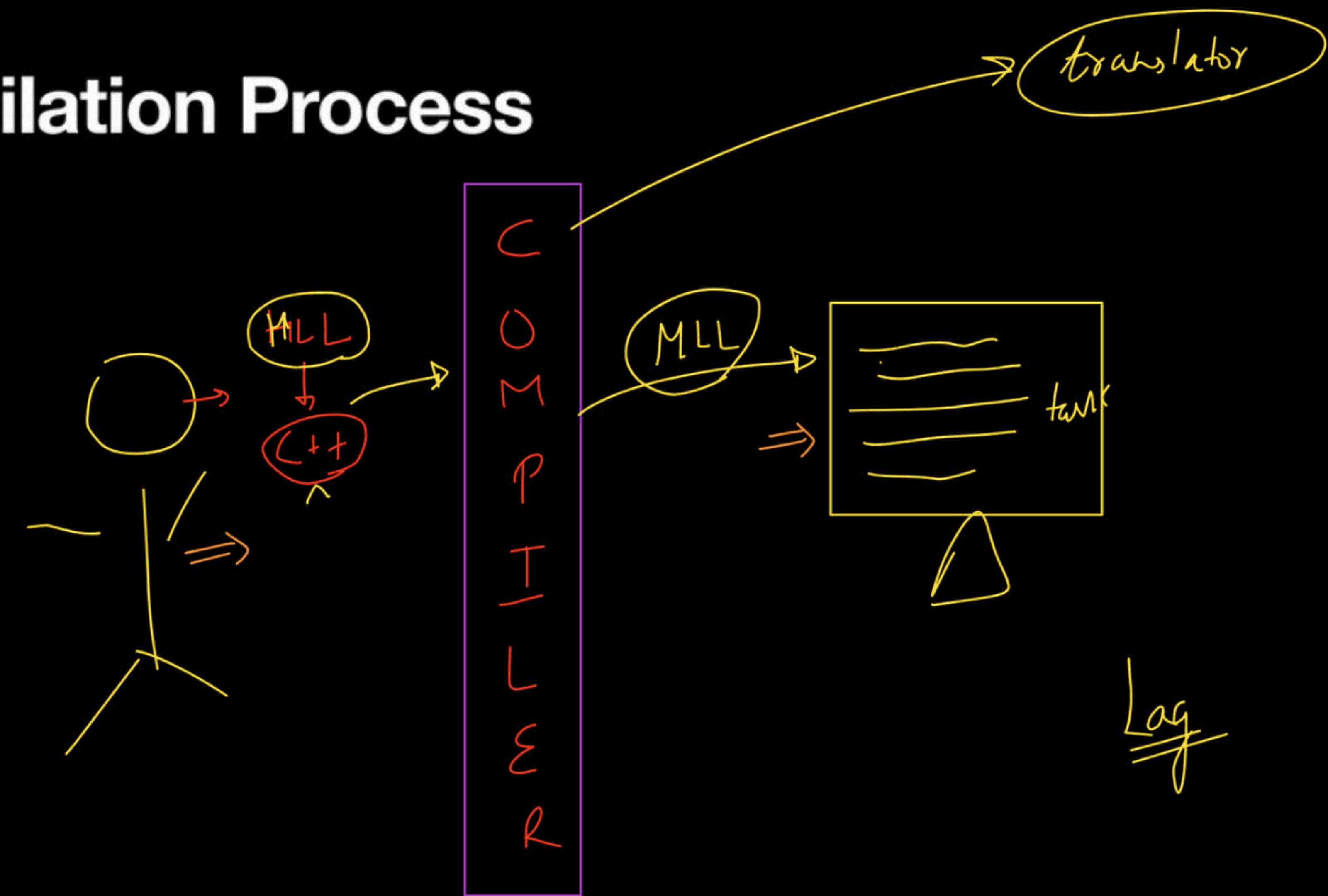
Why do we need it ?

- A Language using which, we can instruct the computer to carry out real life tasks and computations is called a programming language. It acts as a language in which we could easily express our thoughts to the machine.
- Like natural languages, programming language has a fixed set of rules according to which programs could be written in it. These programs are then converted into a language which machines can understand. This task is carried out by a special software called compiler.
- Every language has its own compiler/Interpreter.
- Once a program is compiled and linked, its executable is created and the computer can run our program now.

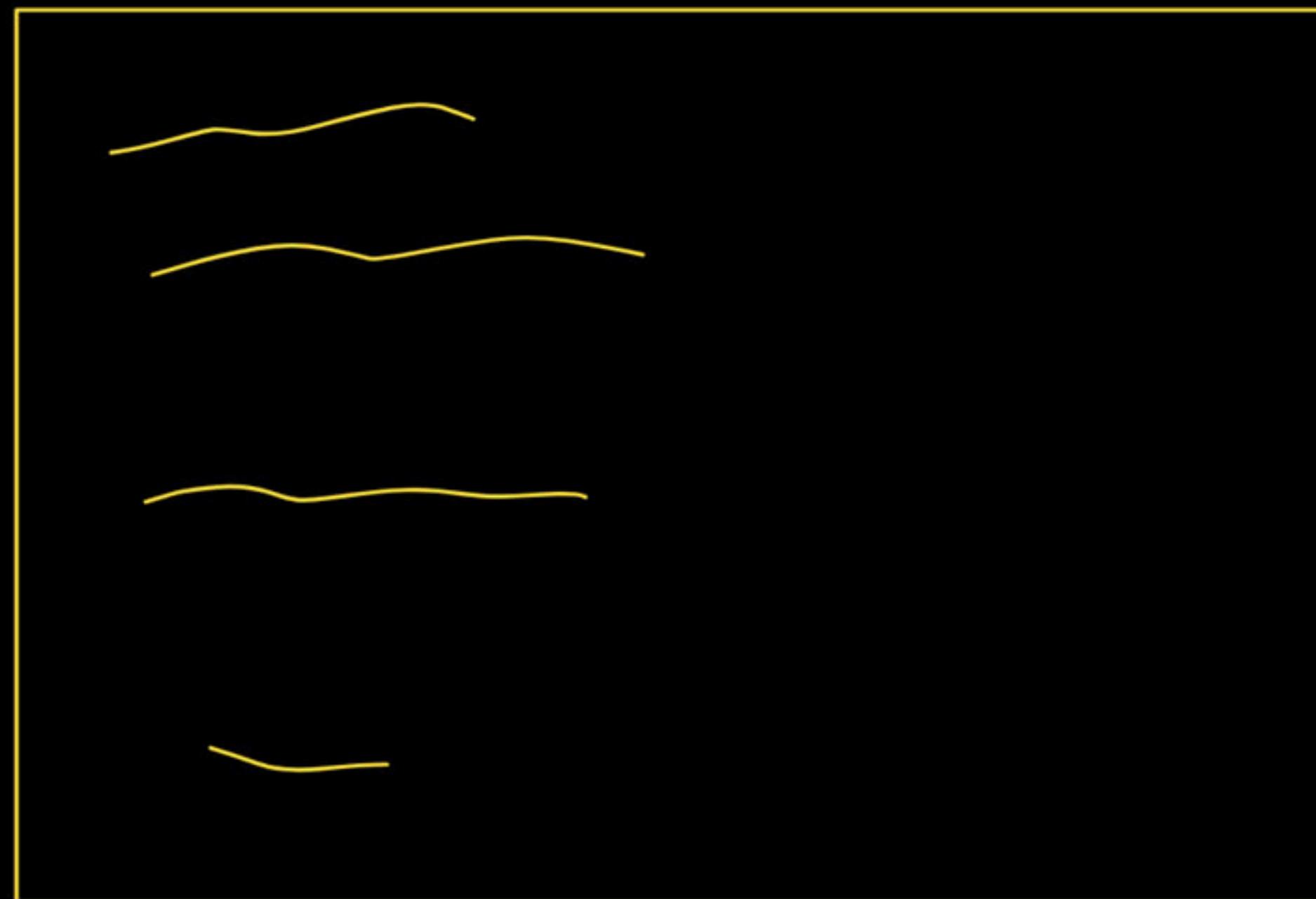
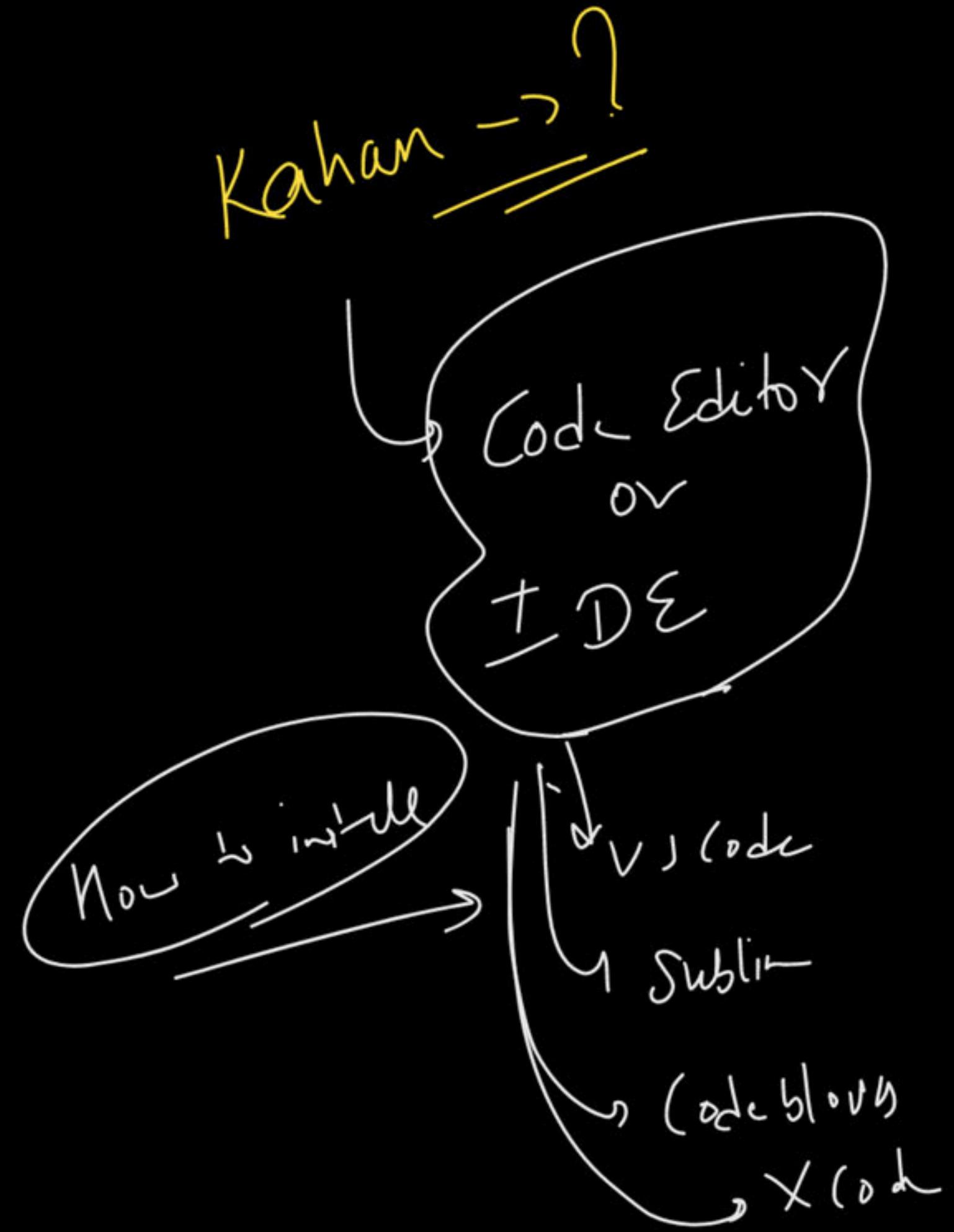




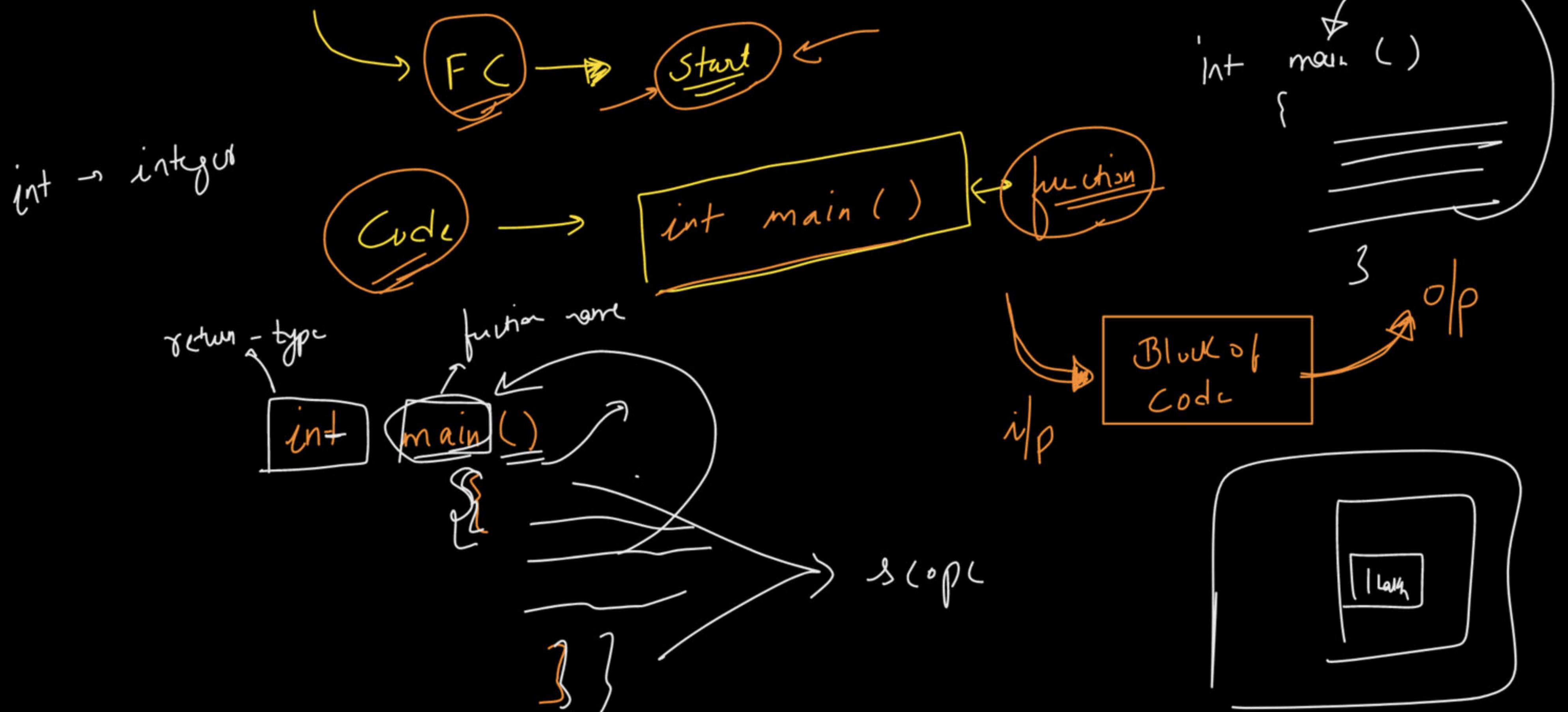
Compilation Process

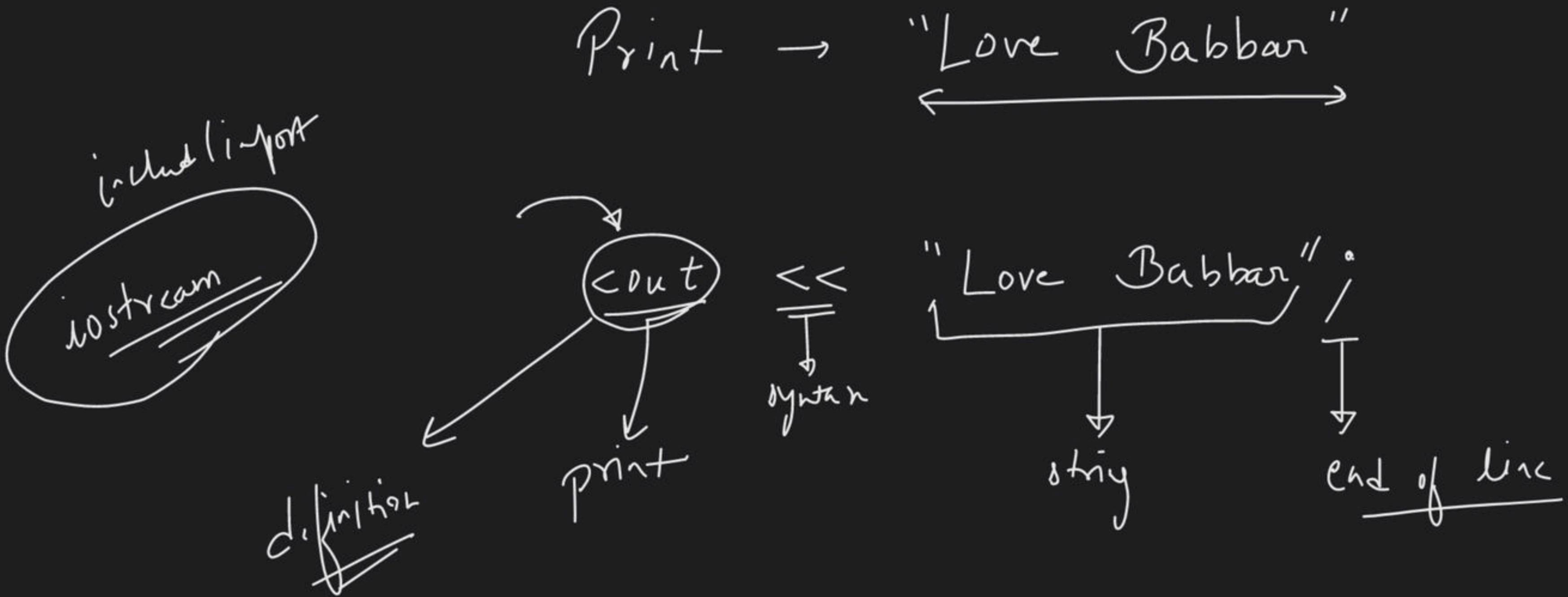


Where to Code ?

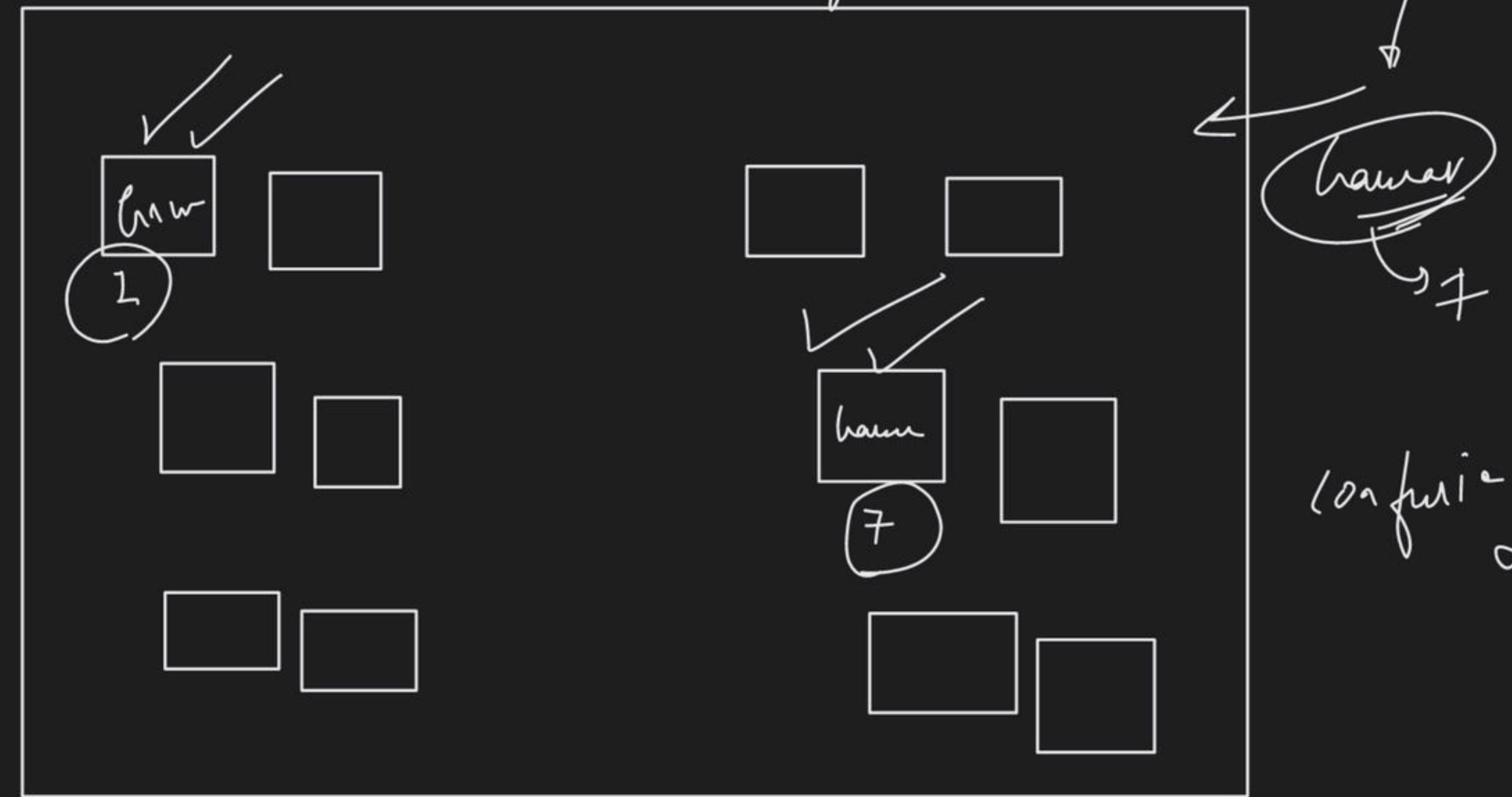


Let's write down the 1st Code

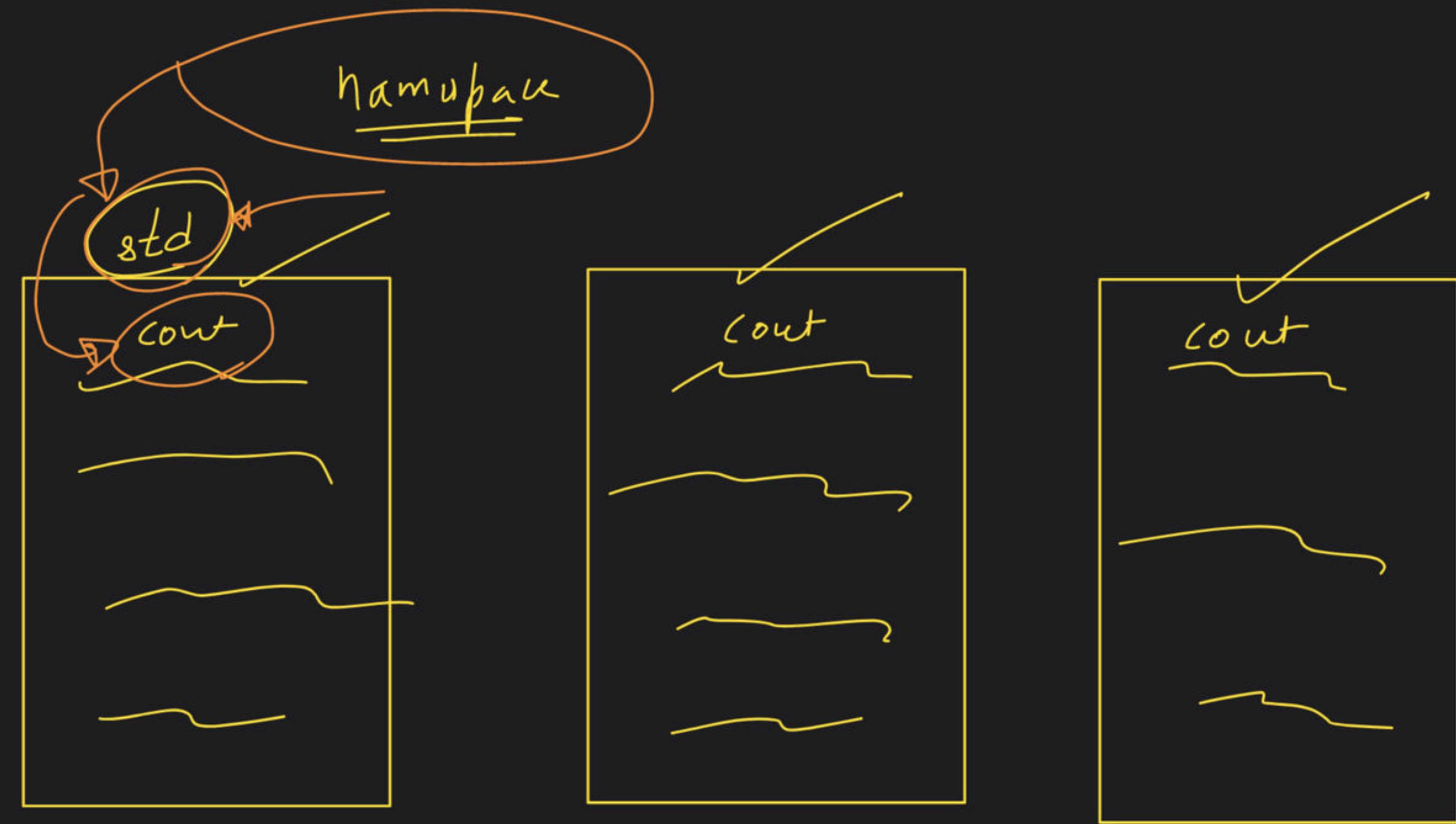


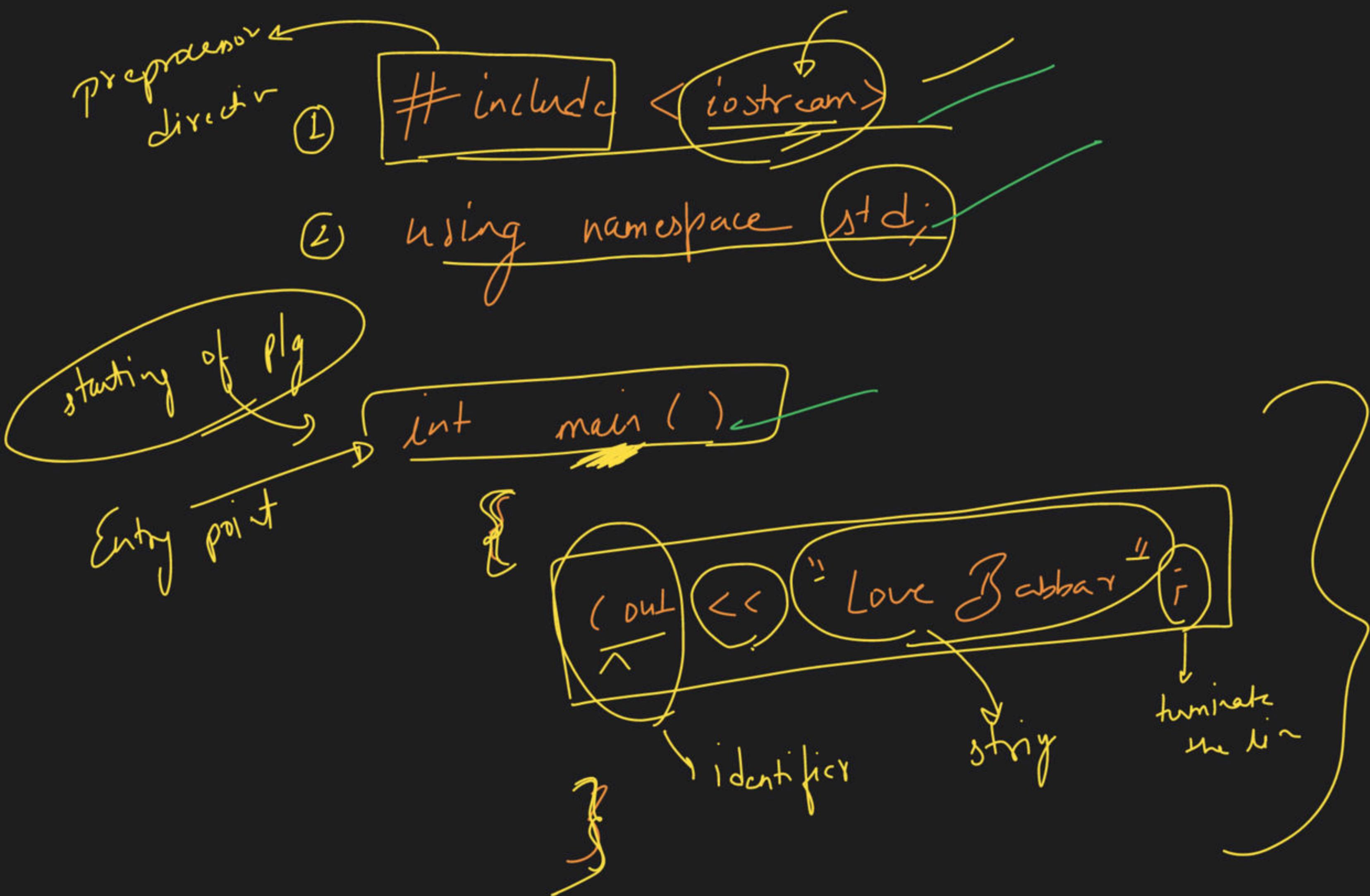


collisions / confusion \longrightarrow additional info



$c_{out} \Leftarrow$
 $\pi_1 2$





Entry point

①

```
#include <iostream>
```

②

```
using namespace std;
```

custom
namespace

③

```
int main ()
```

④

```
{
```

⑤

```
kout << "Babbar"; cout << "Balshai";
```

string

<<

⑥

⑦

finds
in

Input/Output in C++

cout

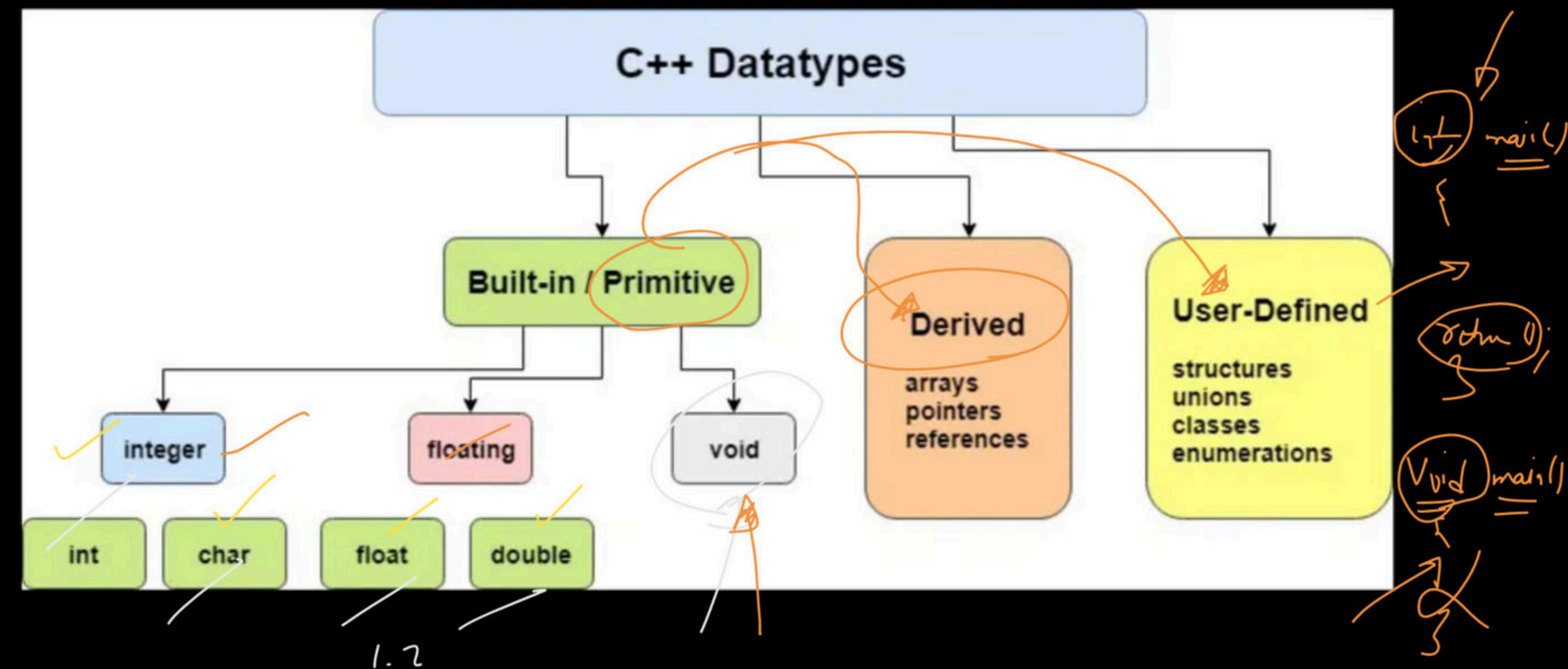
cin

How

?

Datatypes & Variables:

Variables in C++ is a name given to a memory location. It is the basic unit of storage in a program. The value stored in a variable can be changed during program execution. A variable is only a name given to a memory location, all the operations done on the variable effects that memory location.



what

is

Variable ?

type of data

int

a = () ;

5

a

Data types

add: - 10⁸

1 byte
memory location

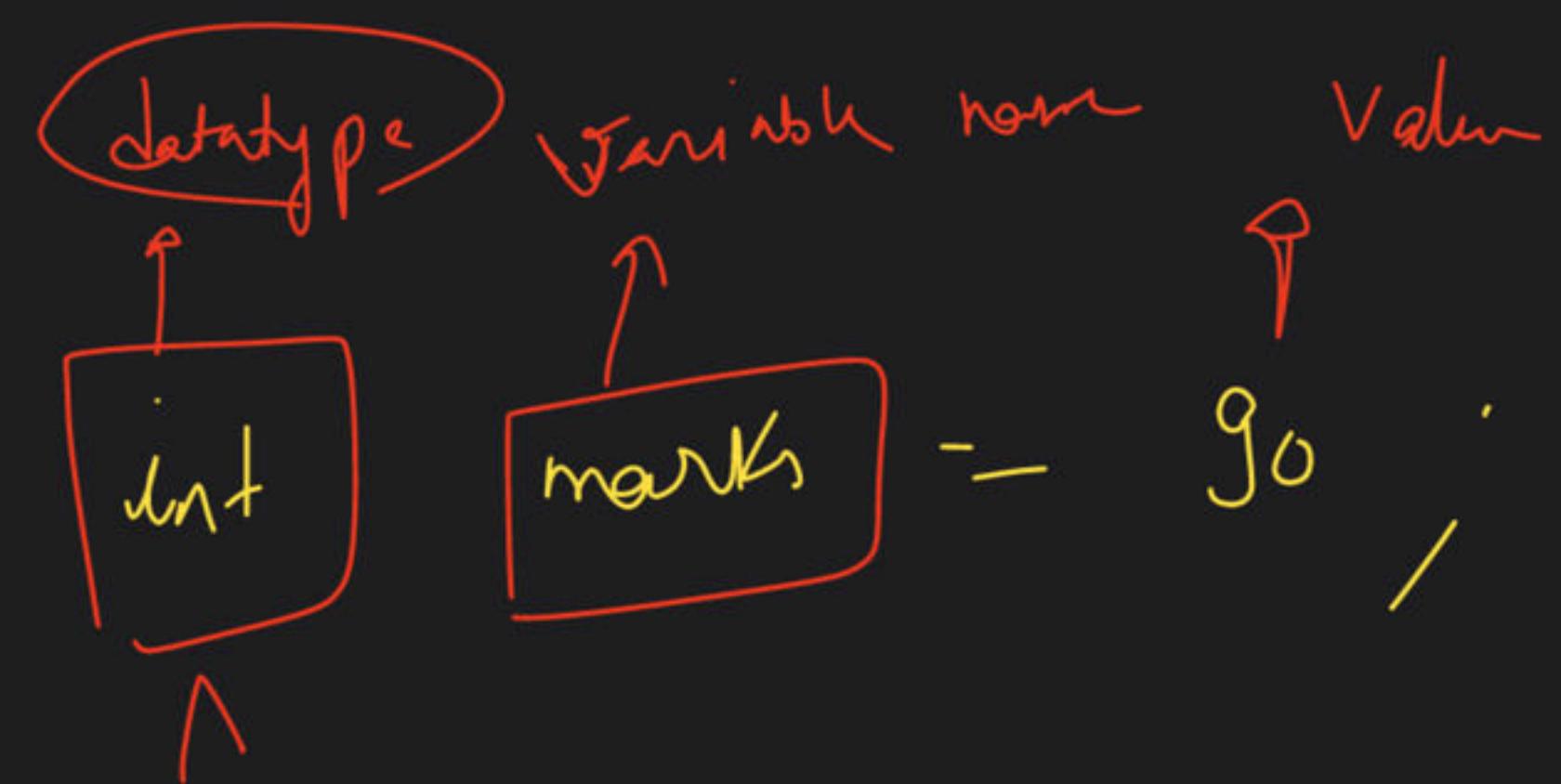
y

location

a

name

→



int $m = 2^0;$



int \rightarrow 4 byte

int $a = 5;$

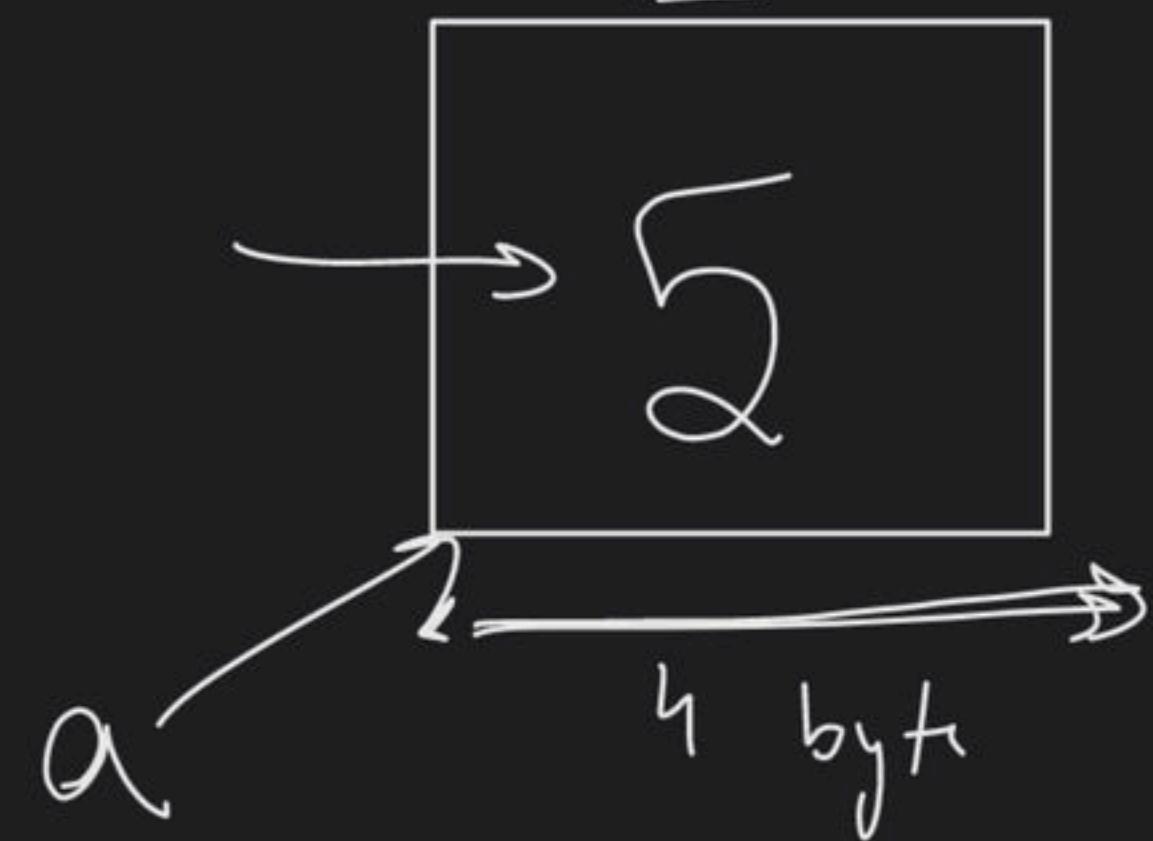
1 byte = 8 bit

1 bit \rightarrow 0 | 1

char $ch = 'a'$

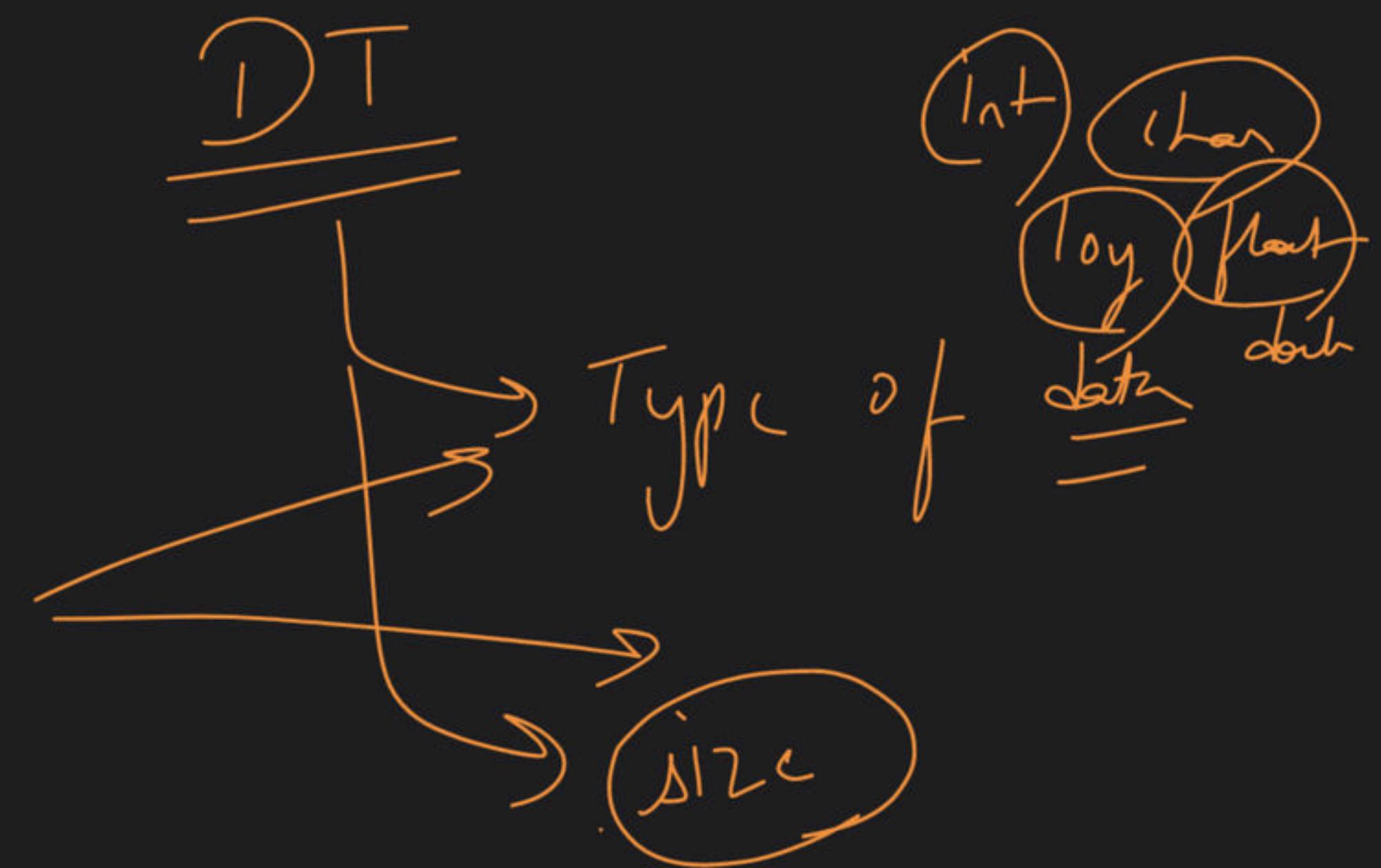
ch \rightarrow 'a'
1 byte

address = 108



int $n = 9$

n
9



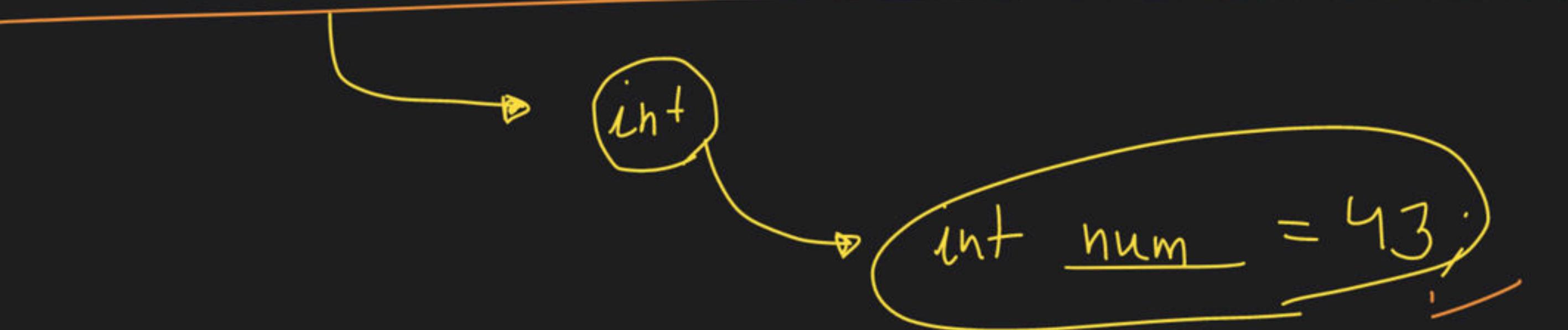
2 min

Datatypes:

C Basic Data Types	Size (bytes)	32-bit CPU Range	Size (bytes)	64-bit CPU Range
char	1	-128 to 127	1	-128 to 127
short	2	-32,768 to 32,767	2	-32,768 to 32,767
int	4	-2,147,483,648 to 2,147,483,647	4	-2,147,483,648 to 2,147,483,647
long	4	-2,147,483,648 to 2,147,483,647	8	9,223,372,036,854,775,808-9,223,372,036,854,775,807
long long	8	9,223,372,036,854,775,808-9,223,372,036,854,775,807	8	9,223,372,036,854,775,808-9,223,372,036,854,775,807
float	4	3.4E +/- 38	4	3.4E +/- 38
double	8	1.7E +/- 308	8	1.7E +/- 308

DI

- 3 1-21, - 59, 0, 1.2, 100



declaration

int num;

initialisation

int num = 50;

num
43
by hand

Variable Naming Conventions

Naming Conventions rules for Variables are:

- ✓ It should begin with an alphabet.
- ✓ There may be more than one alphabet, but without any spaces between them.
- ✓ Digits may be used but only after alphabet.
- ✓ No special symbol can be used except the underscore (_) symbol. When multiple words are needed, an underscore should separate them.
- ✓ No keywords or command can be used as a variable name.
- ✓ All statements in C++ language are case sensitive. Thus a variable **A** (in uppercase) is considered different from a variable declared **a** (in lowercase).

int totalNoofStudents;

int age=15;

int marks=12;

int num=12;

many
int a=;

How data is Stored ?

+ve or -ve integers ?

Number System



hint
class

3-111

→ 101

(10) → (101)

true

int num = (2)

[2]

num

1 byt

2

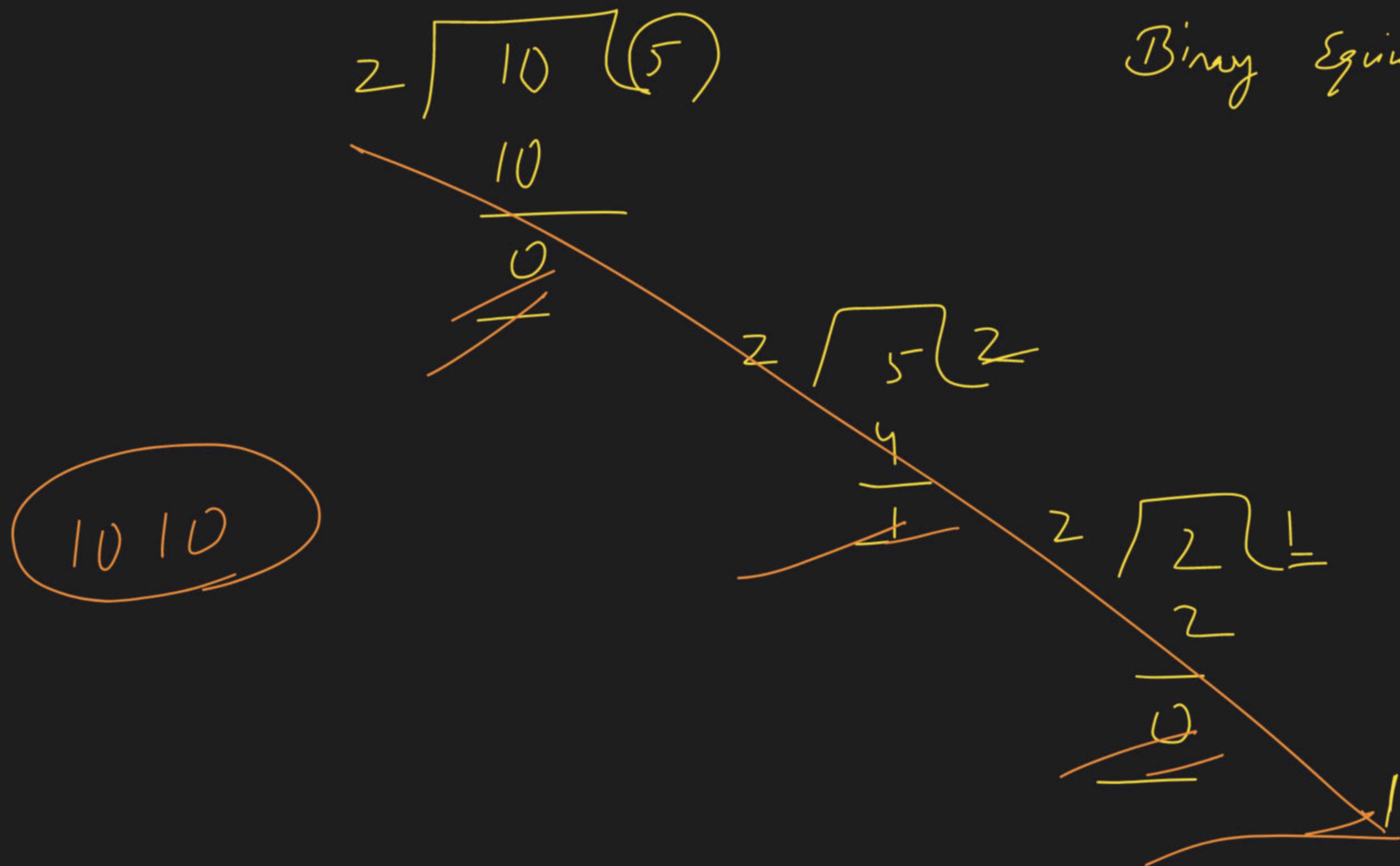
Binary Equivalent

00000000 00000000 00000000 00000010

num

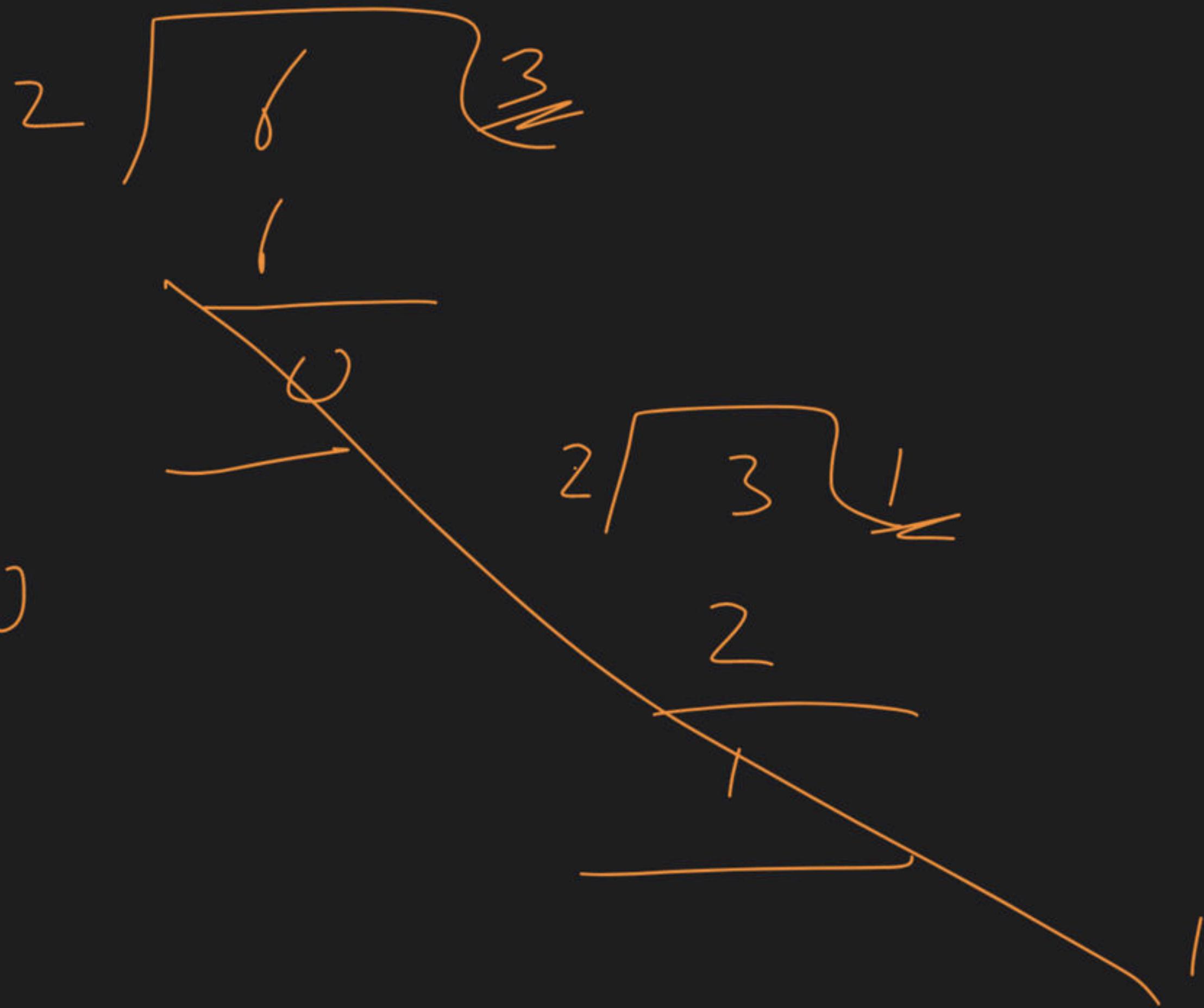
4 byt

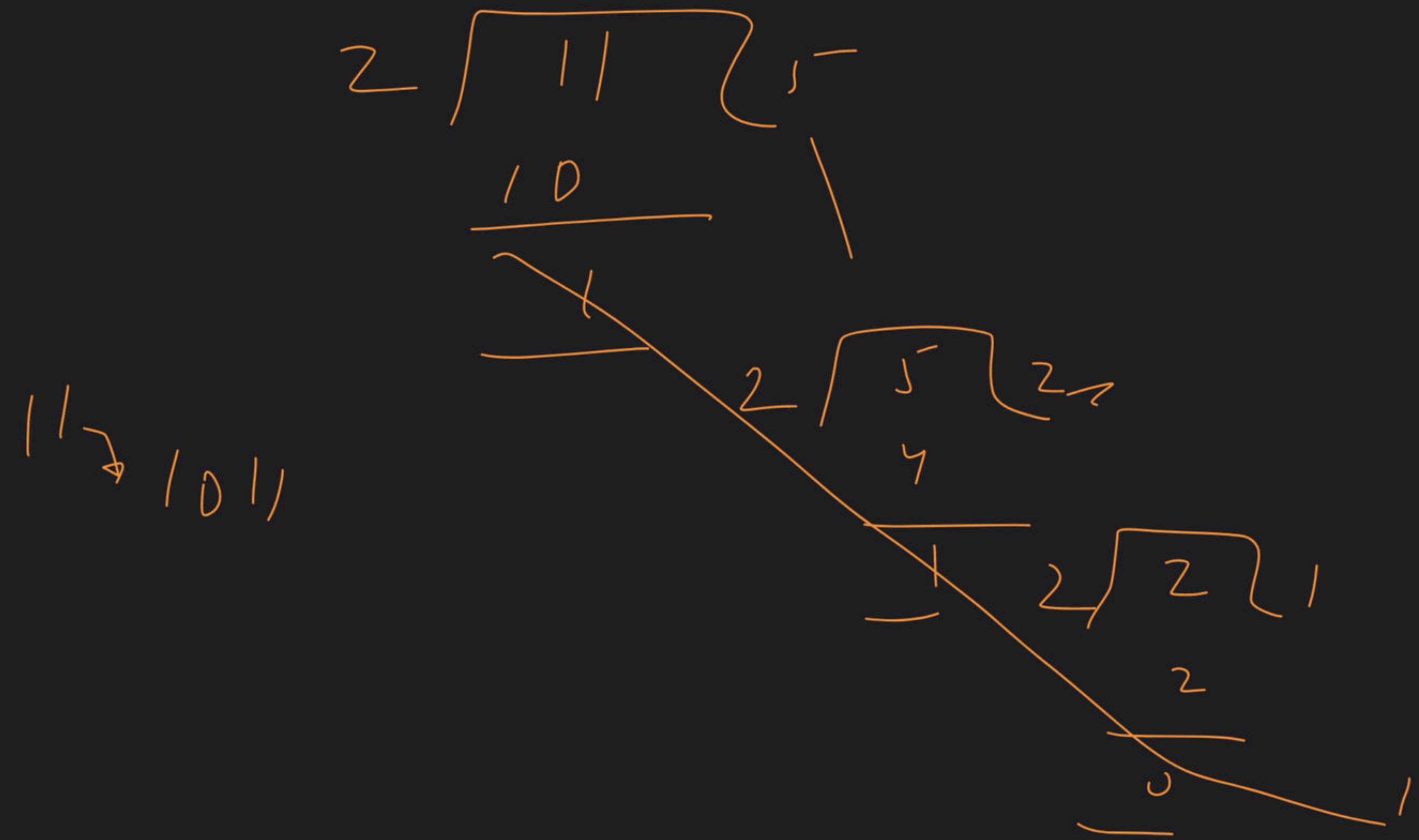
Binary Equivalent

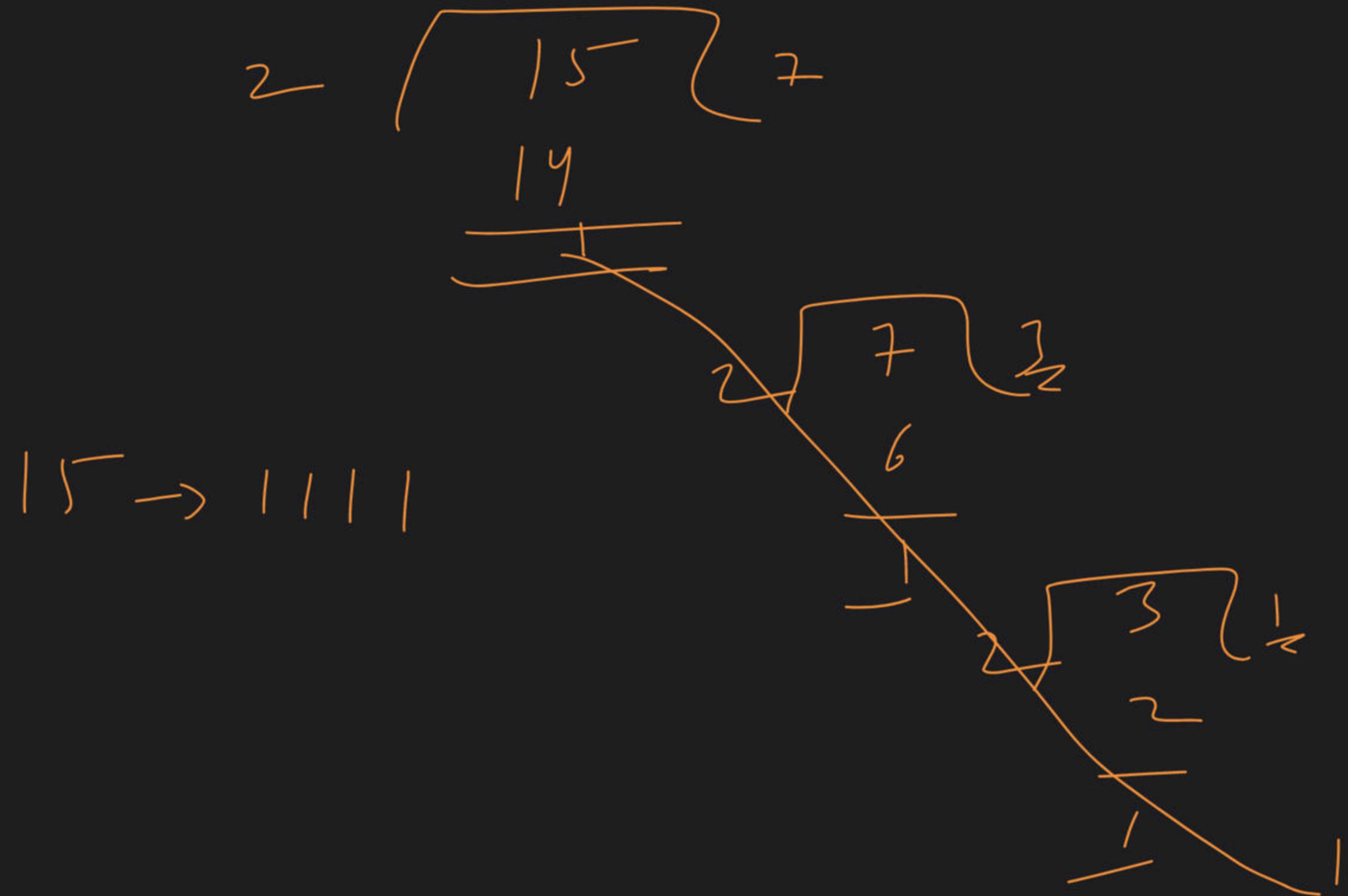


$$7 \rightarrow 111$$
$$2 \overline{)7} \quad 3$$
$$\underline{-6}$$
$$1$$
$$2 \overline{)3} \quad 1$$
$$\underline{-2}$$
$$1$$

$6 \rightarrow 110$







$$2 \sqrt{16} = 8$$
$$\begin{array}{r} 16 \\ \hline 0 \end{array}$$

$$2 \sqrt{8} = 4$$
$$\begin{array}{r} 8 \\ \hline 0 \end{array}$$

$$2 \sqrt{4} = 2$$
$$\begin{array}{r} 4 \\ \hline 0 \end{array}$$

$$18 \rightarrow 10000$$

$$2 \sqrt{2} = 1$$
$$\begin{array}{r} 2 \\ \hline 0 \end{array}$$

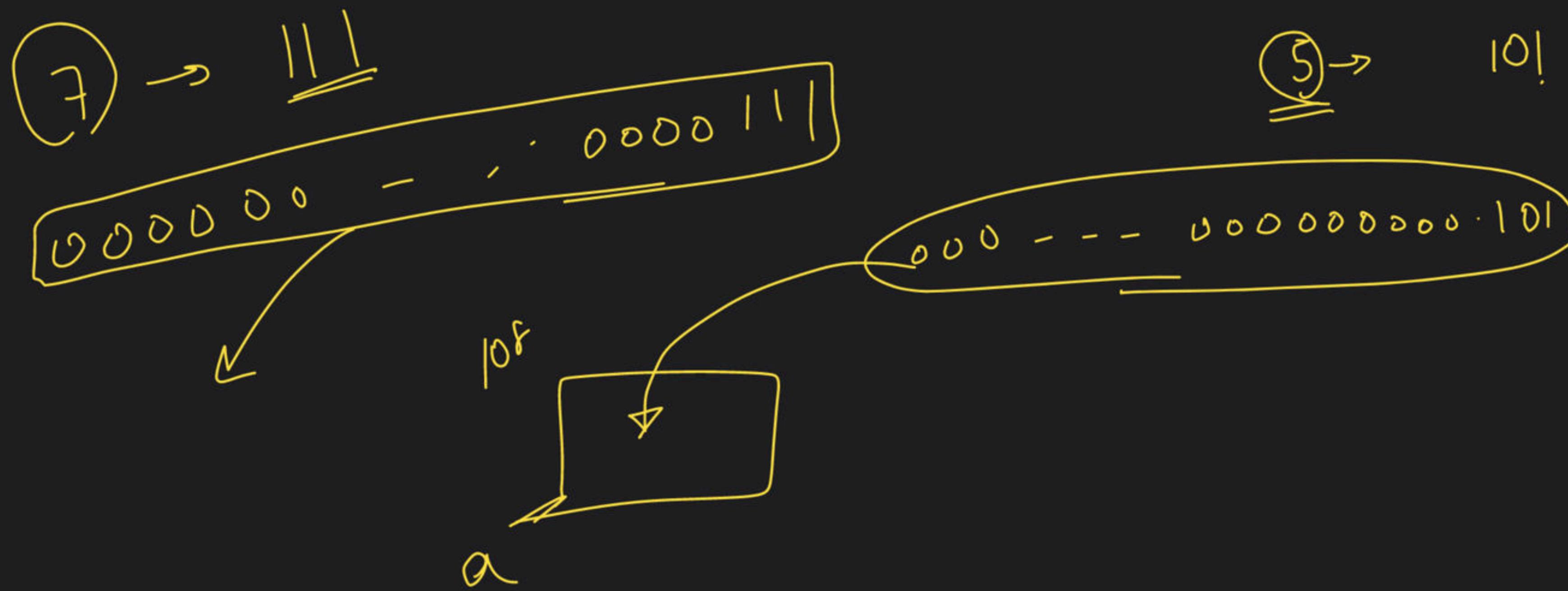
$$\begin{array}{r} 2 \\ \hline 0 \end{array}$$
$$1$$

1 → |
2 → 10
3 → 11
4 → 100
5 → 101
6 → 110
7 → 111
8 → 1000
9 → 1001
10 → 1010



int → 4 bytes → 32 bit

Int a = 5



97
int

97
int

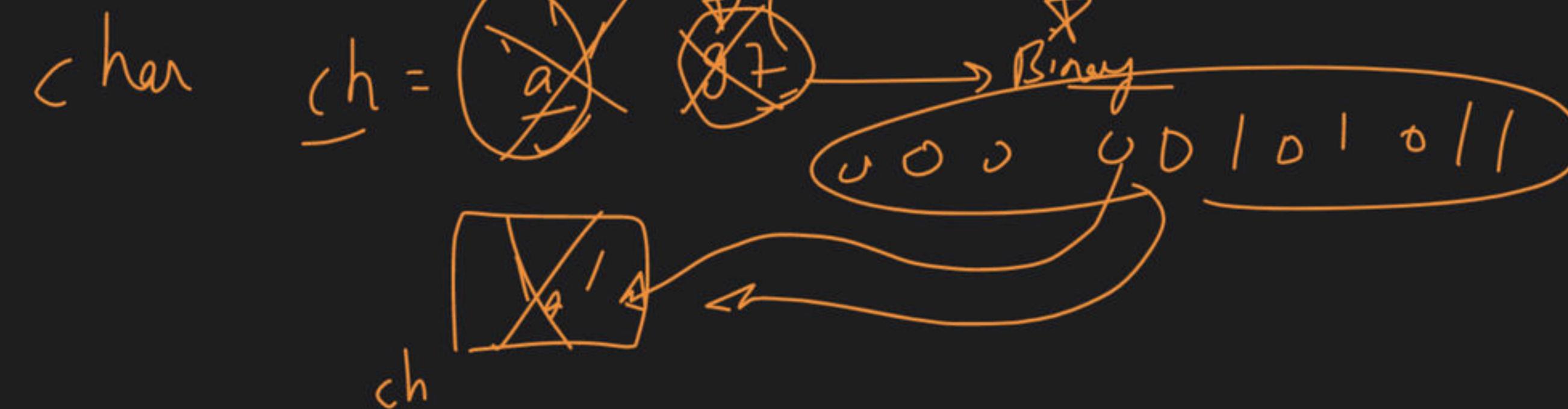
ASCII table



char \rightarrow
 $a' = \underline{97}$ ASCII value

1 byte \rightarrow 8 bit

3rd class



Datatype

boul

flag = true;

true →
false =

1 bit

Diagram illustrating memory storage:

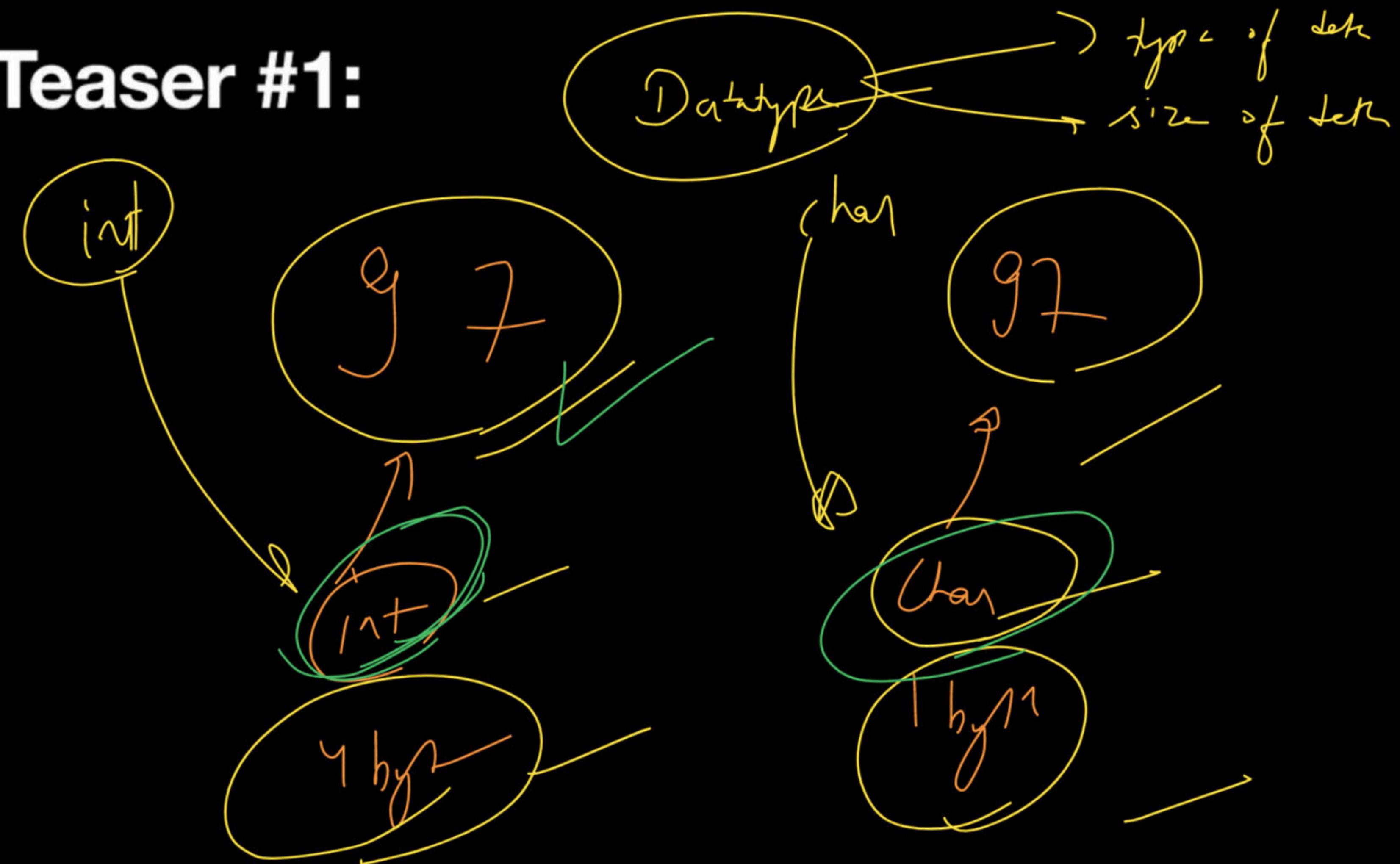
- 1 byte
- 1 bit
- 8 bits

Kyo?

U		0		0		0		0		0		1
---	--	---	--	---	--	---	--	---	--	---	--	---

fahr

Brain Teaser #1:



int $a = -5$

(A) ignore ~~neg~~ sign \rightarrow 5

(B) Binary \rightarrow

00000000 00000000 00000000 00000101

(C) 2's comp \Rightarrow

jmp 0 111111111111111111110100

add 1 (2)

+ 1

ave no

111111111111111111110111

Memory

$-V_C$

$n\delta'$

\parallel



$I^1 \wedge$ complement

\parallel

10101

\parallel

\rightarrow

$I^1 \wedge$ comp

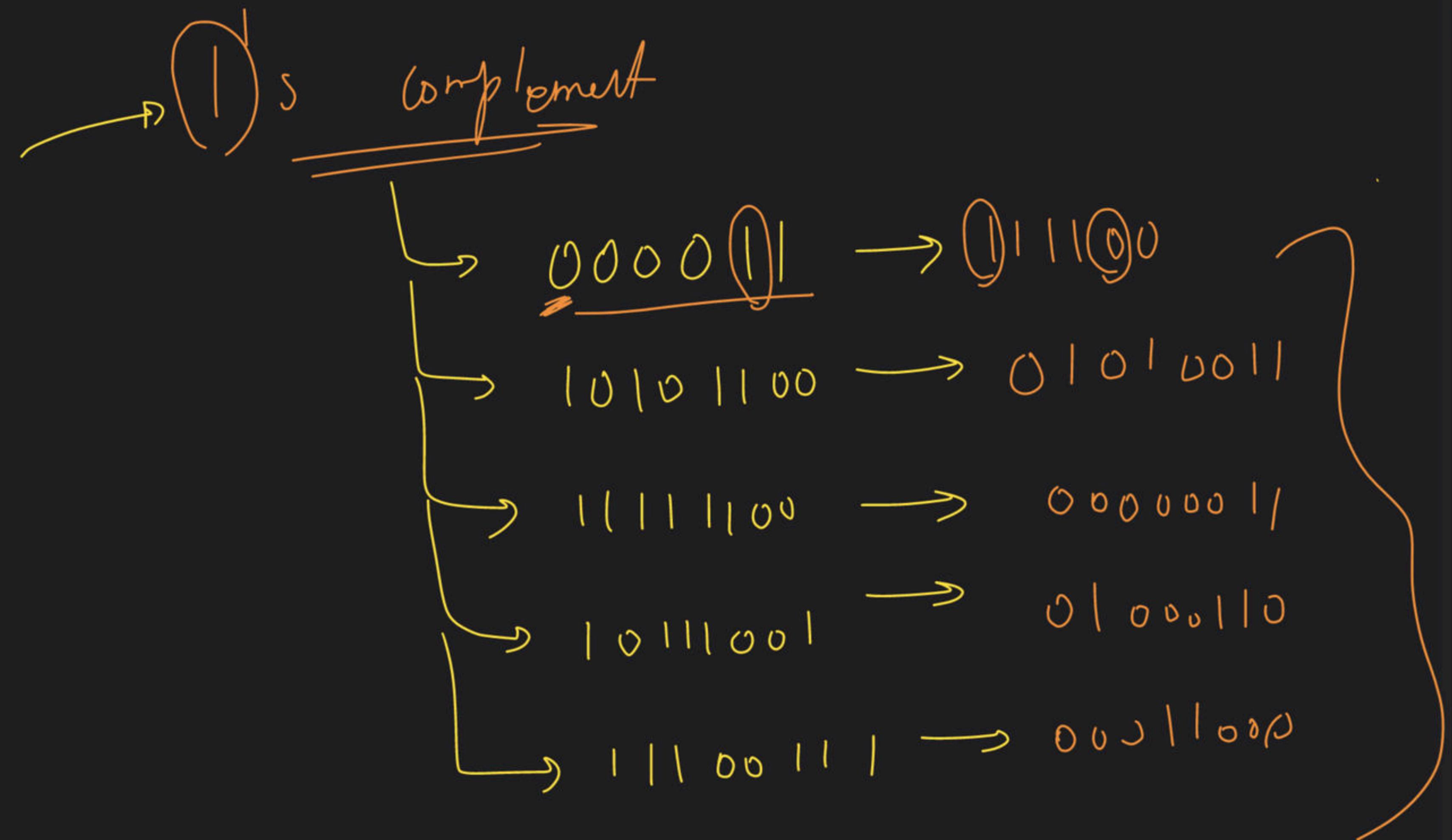
01010

101
 $\overline{010}$

flip

$1 \rightarrow 0$

$0 \rightarrow 1$



2^1 's complement

→ (A) find its complement

→ (B) add $+1$  $\cancel{+}$ → 101

1's complement

(A)

010

(B)

+1

2's complement

011

i/p

| 0 | |

1's

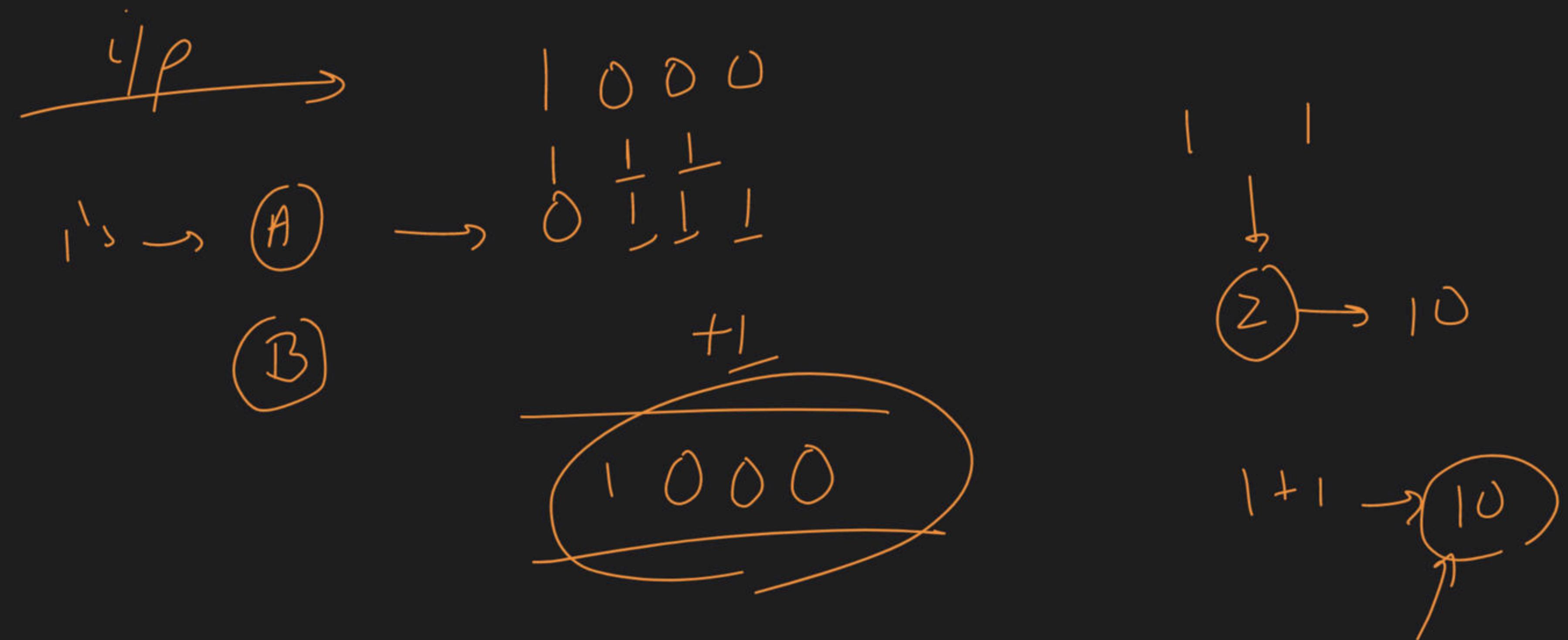
(A)

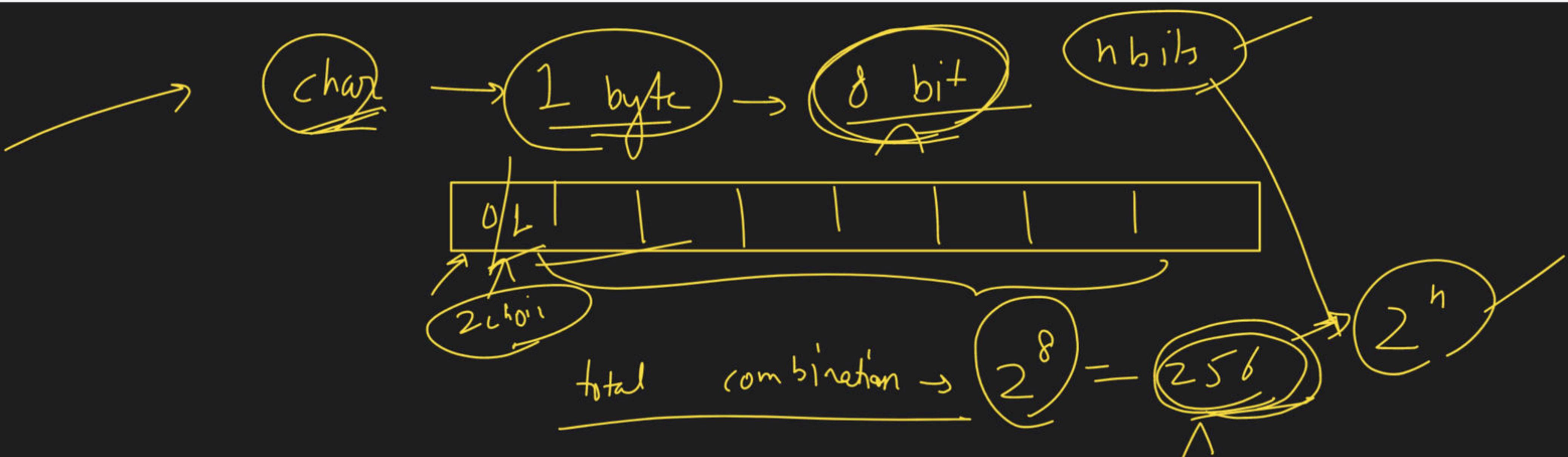
→ 0 | 0 |

(B)

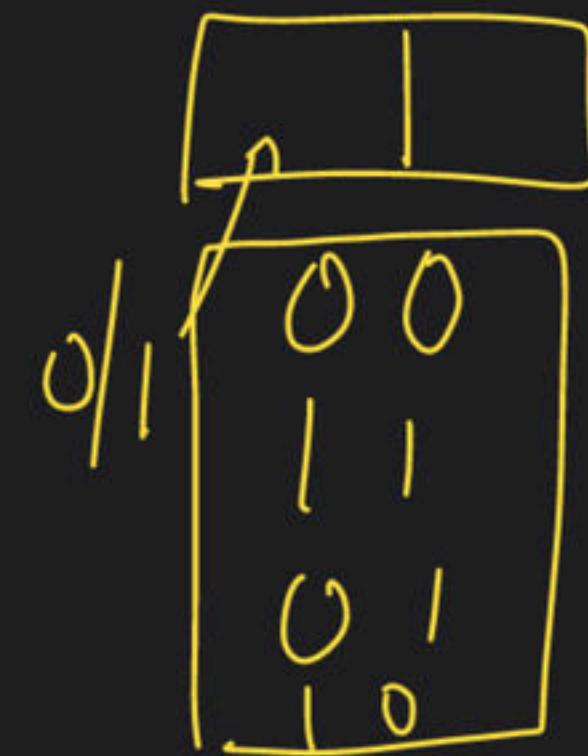
+!

0 | 0 |

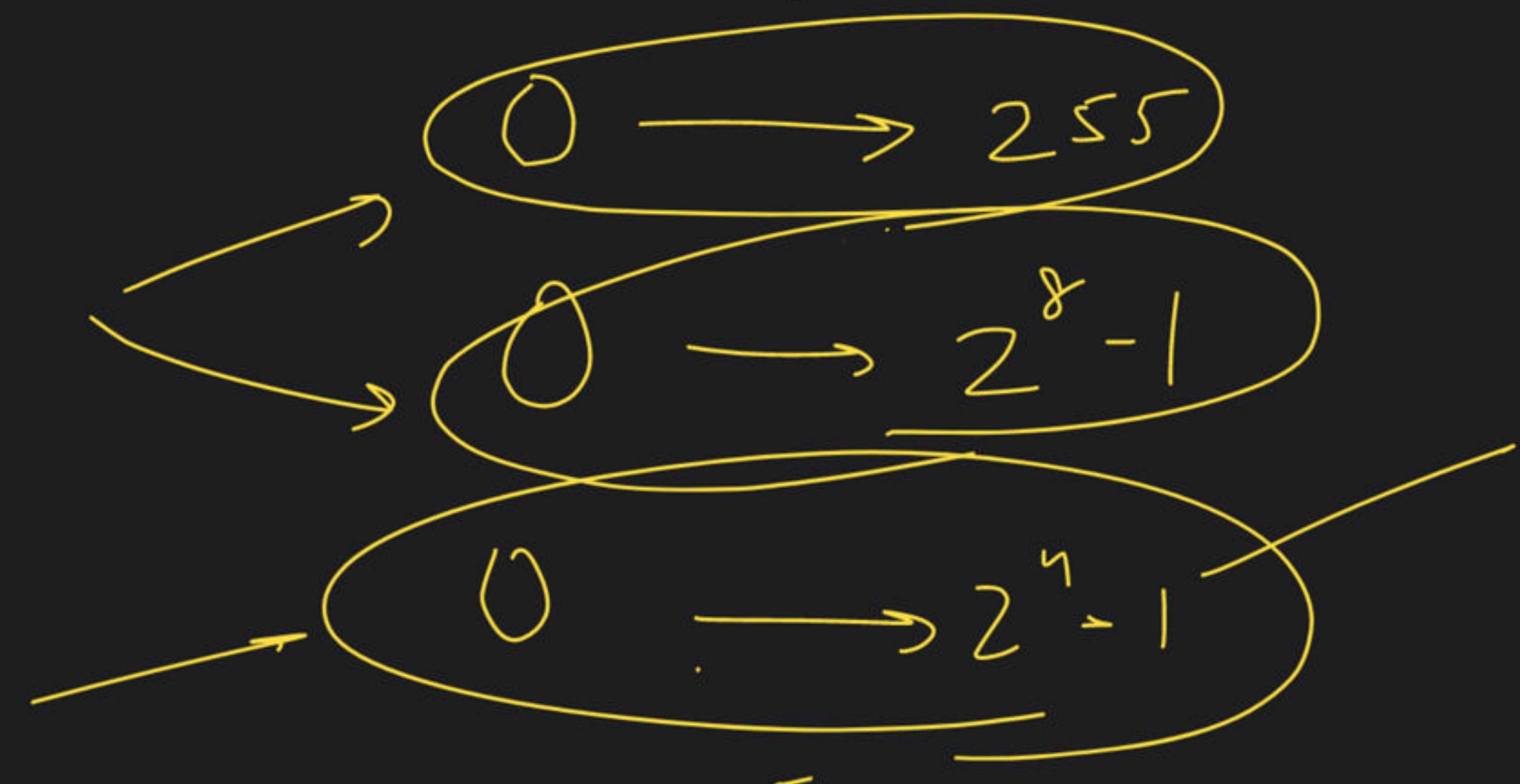


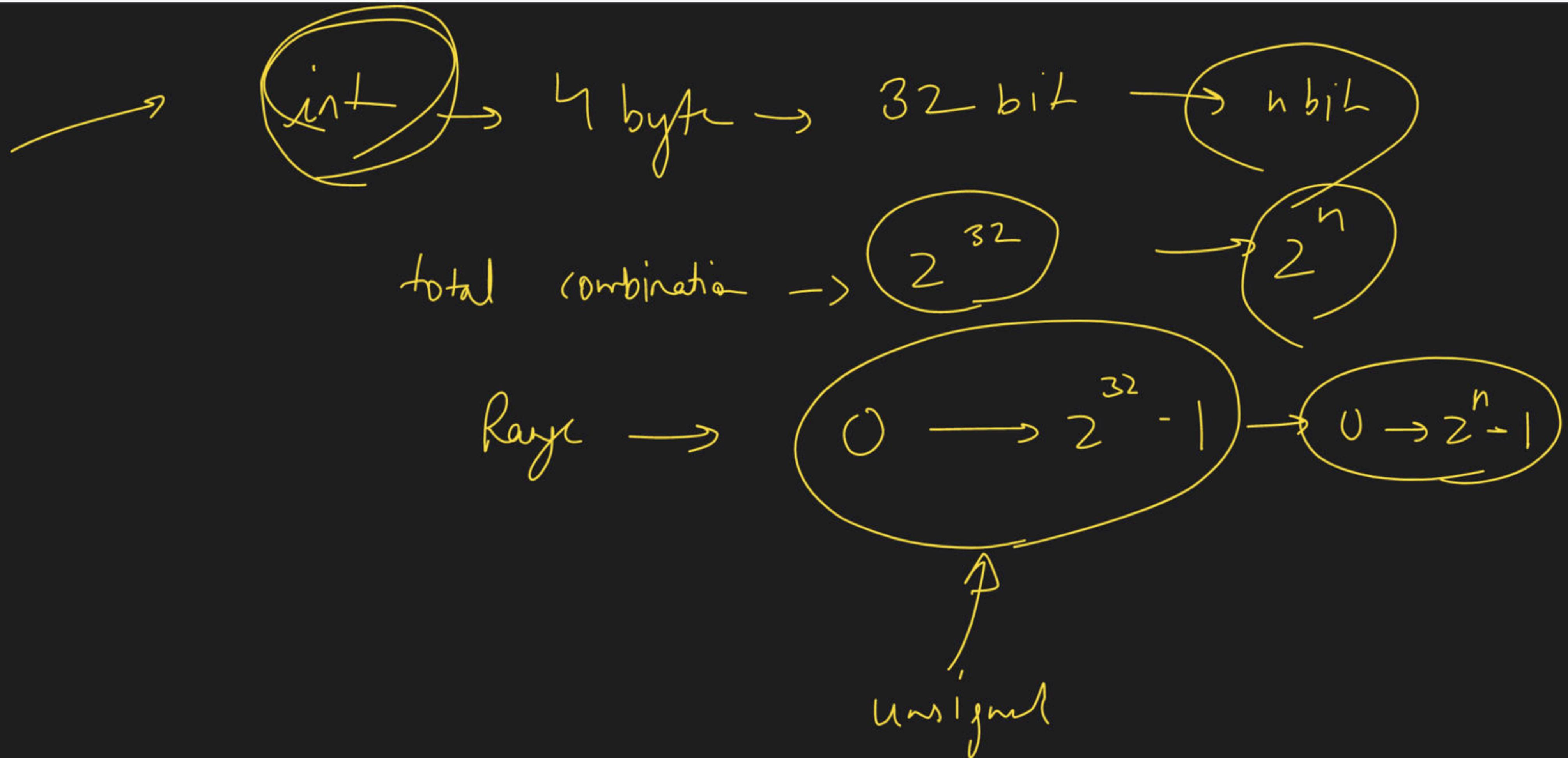


nyz → 2 bit



$$2^2 = 4$$





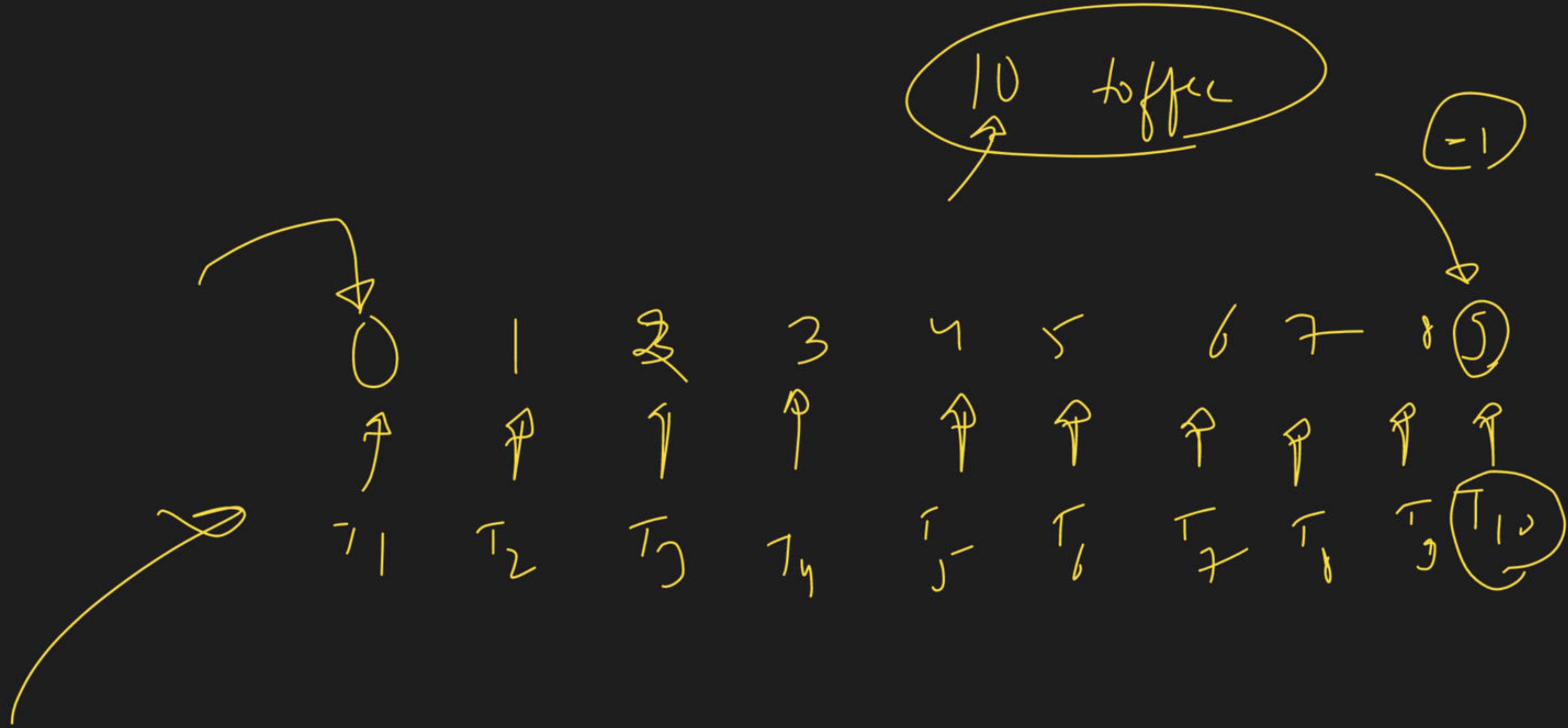
long → 8 byte → 64 bit → n bit

~~total combination~~ → 2^{17} → 2^n

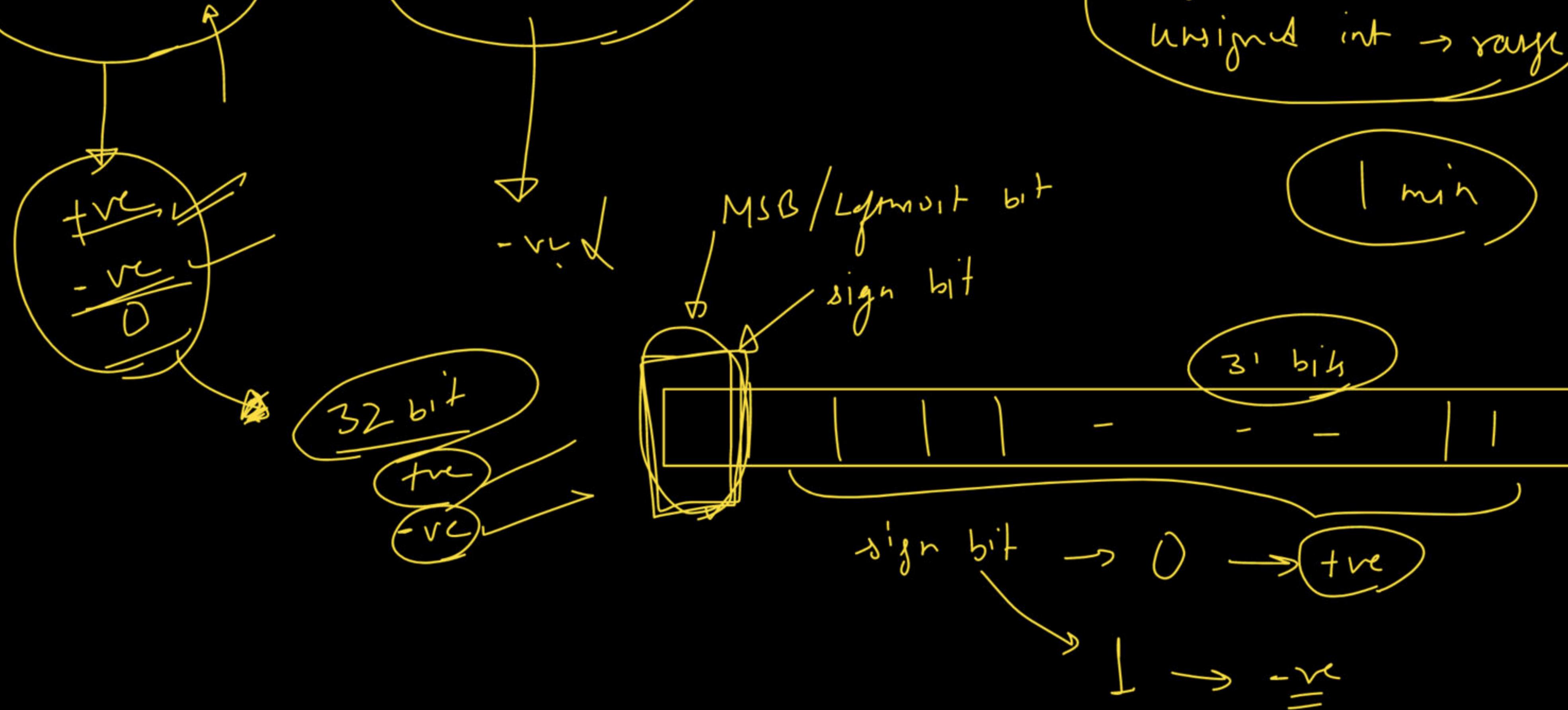
Range → $2^{67} - 1$ → $0 \rightarrow 2^n - 1$

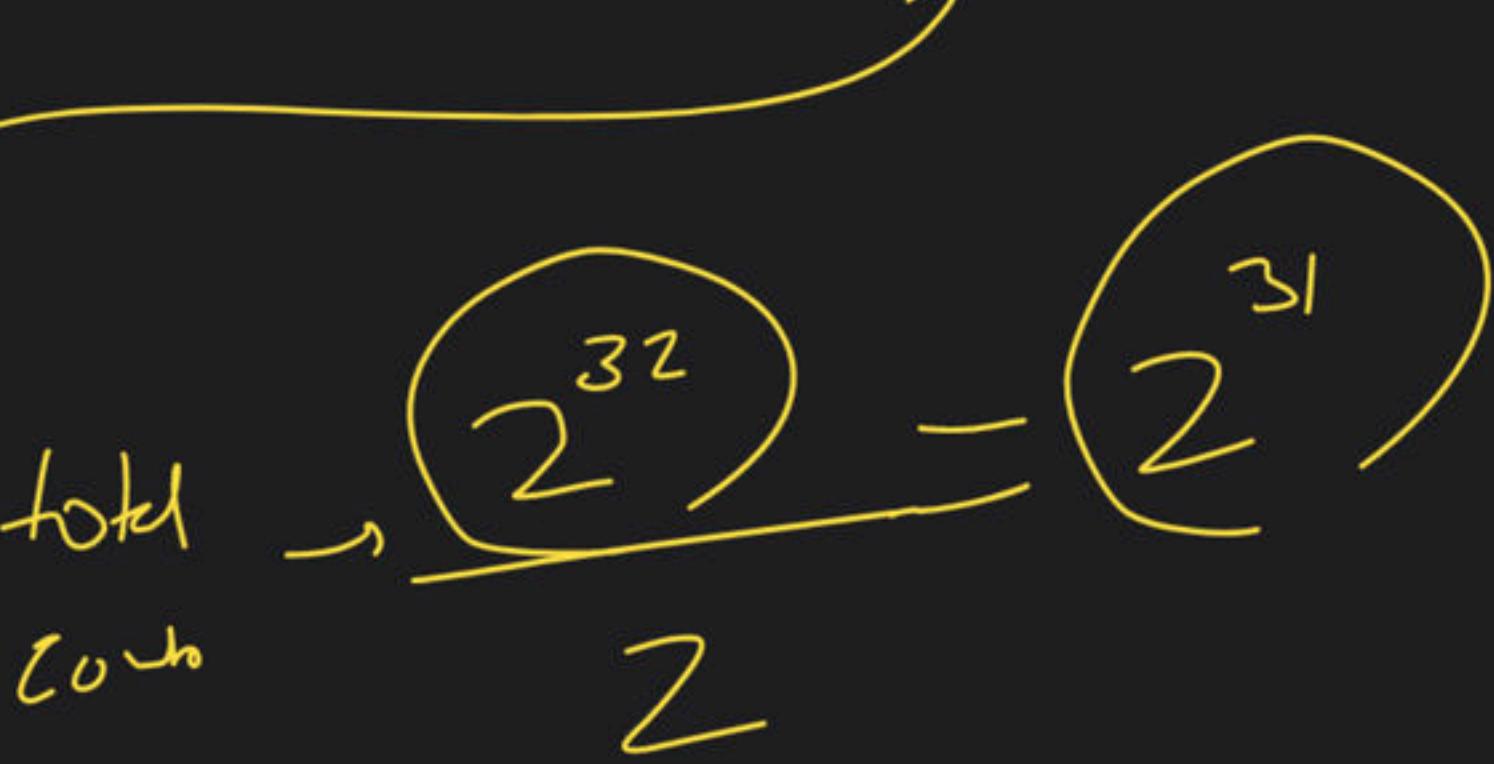
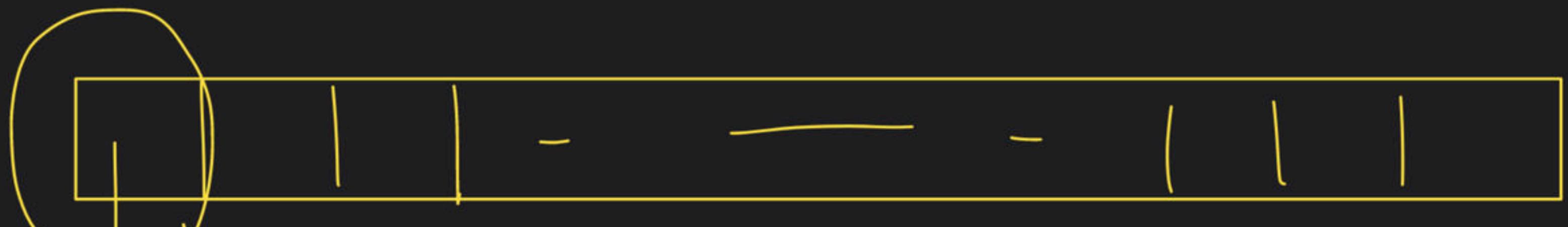
→ xyz → 71 byte → 71×8 = 568 bit

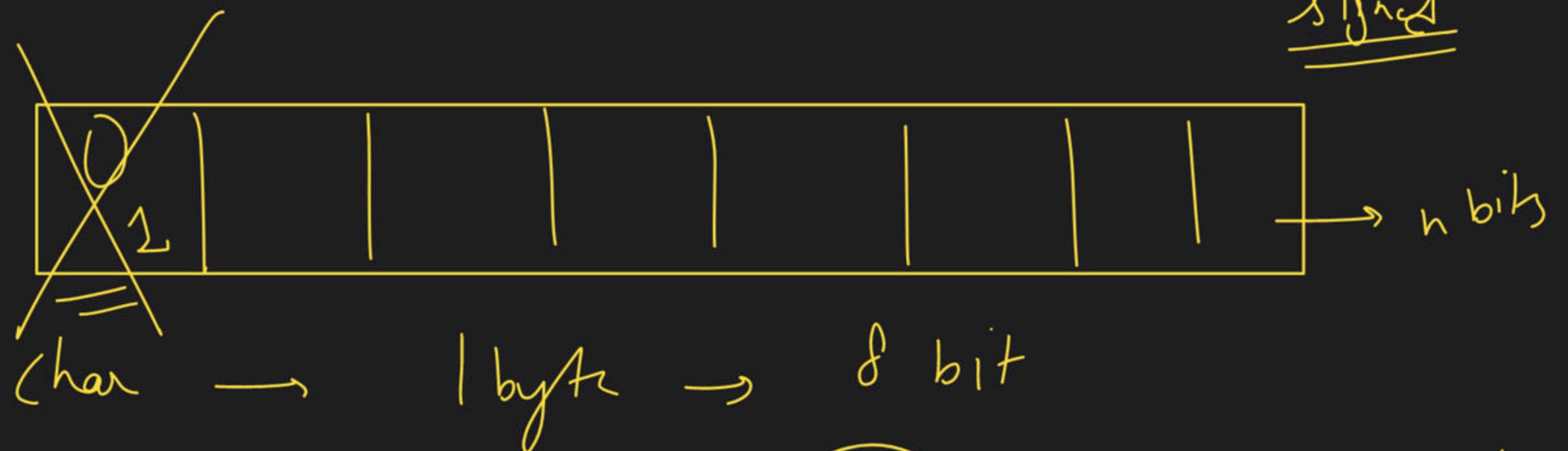
total comb → 2^{568} → $0 \rightarrow 2^{568} - 1$



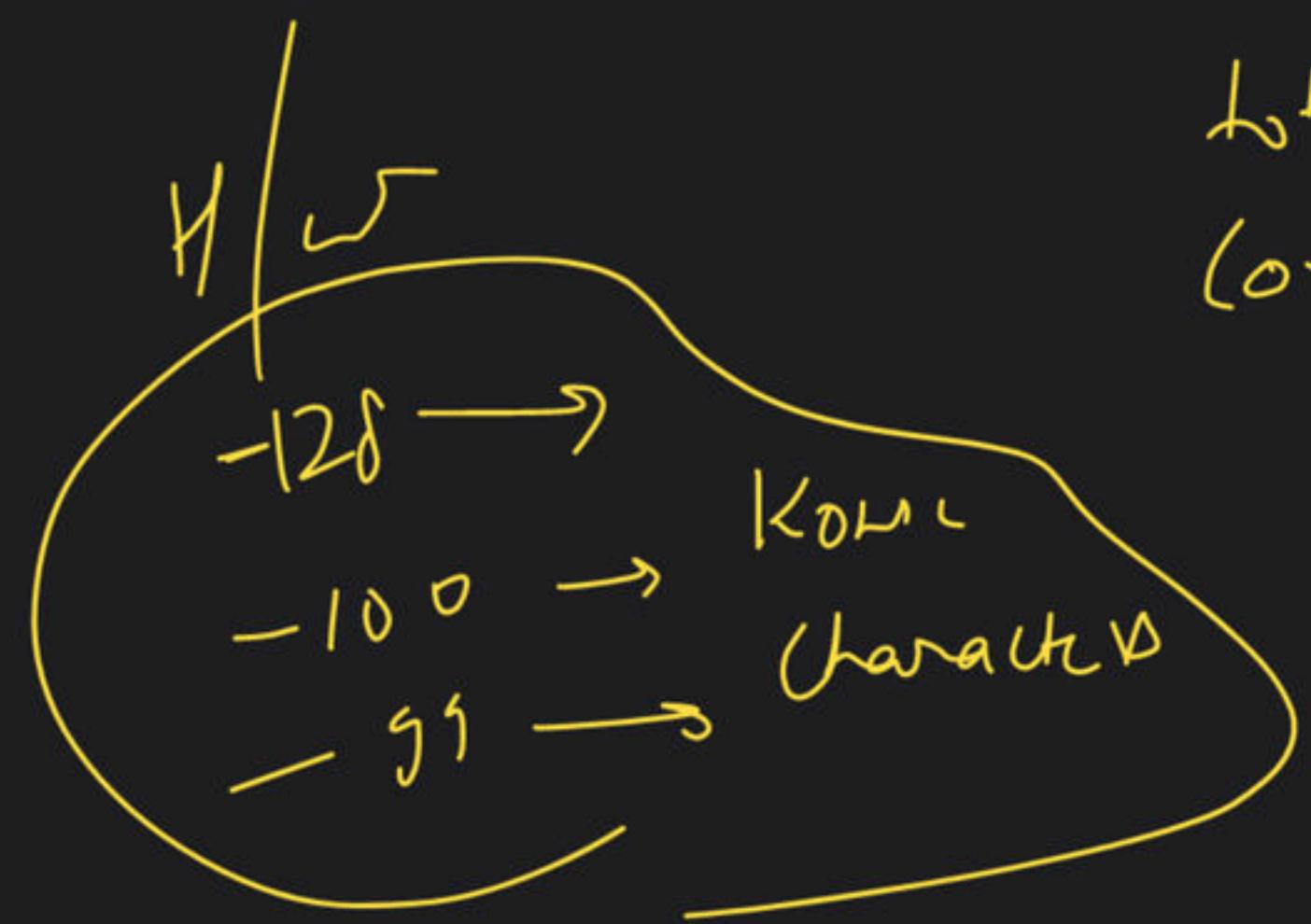
Signed vs Unsigned data:







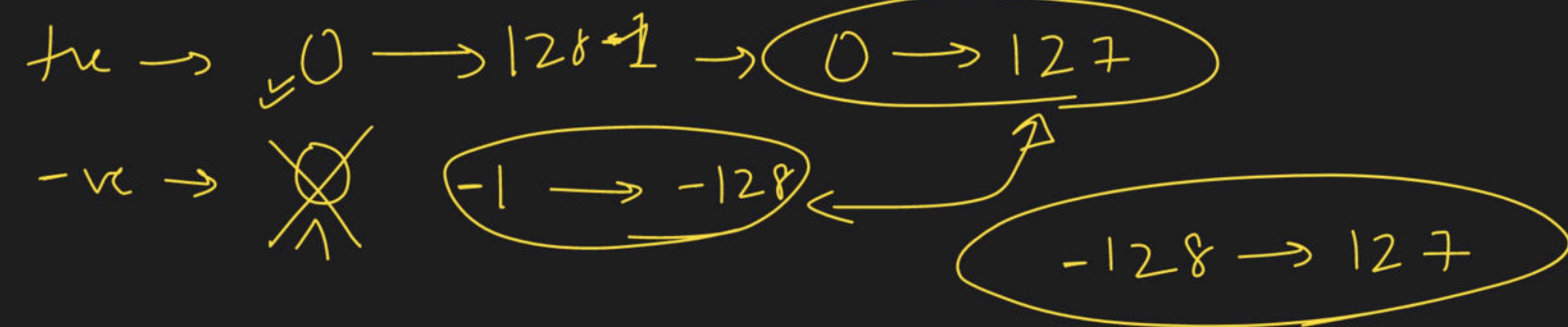
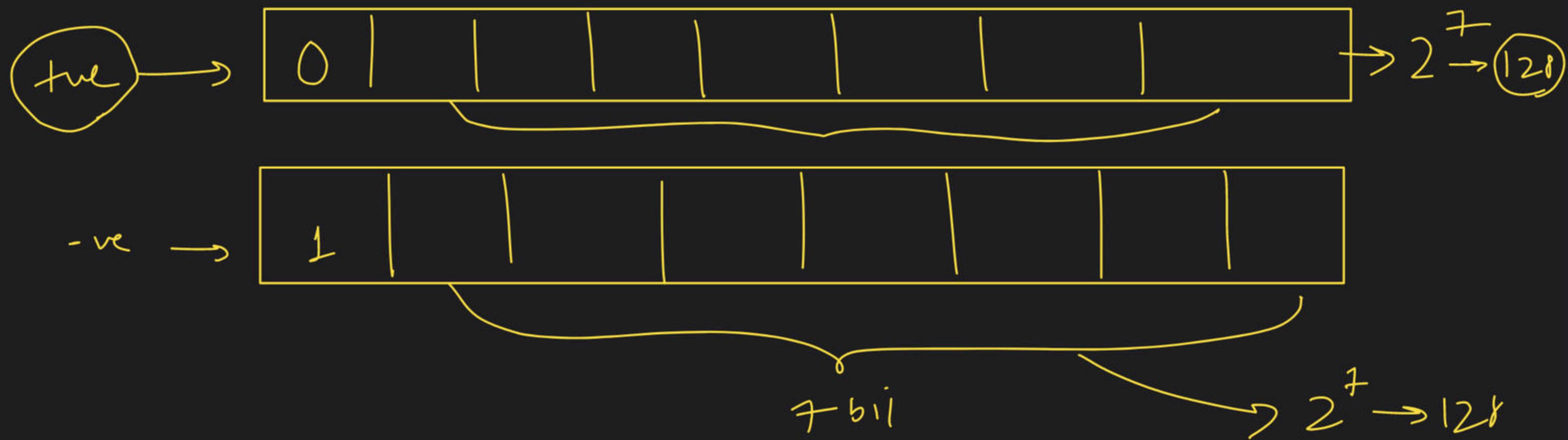
$$LW = \frac{2^8}{2} = 2^7$$

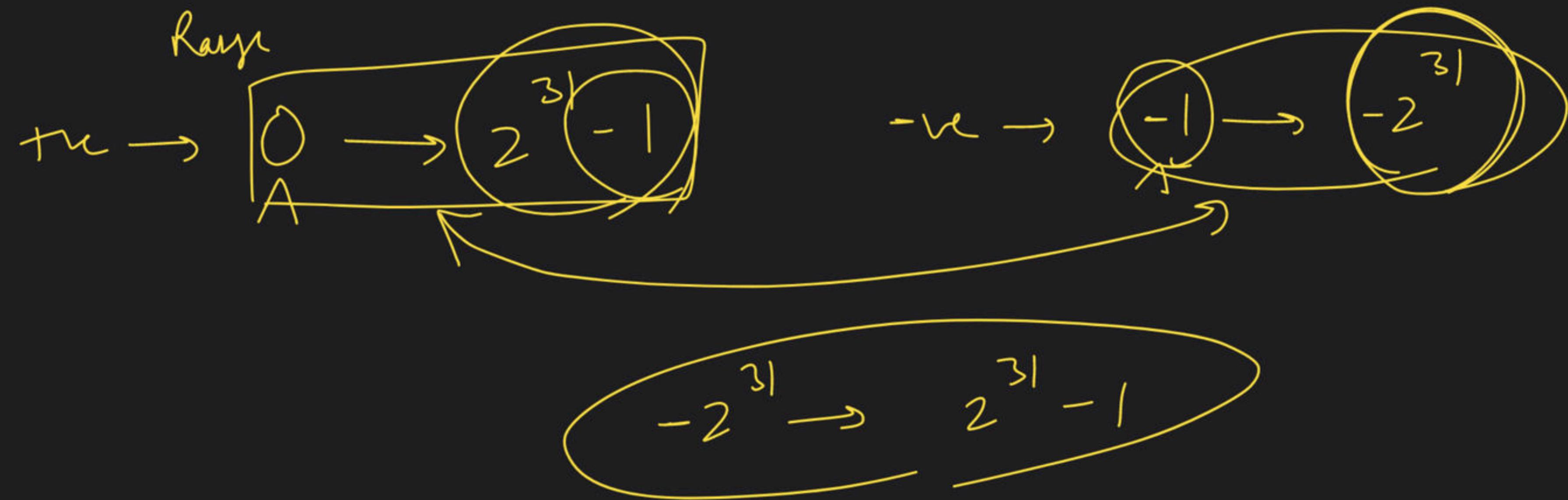


$$+2^7 \rightarrow 2^{7-1}$$

$$-2^{n-1} \rightarrow 2^{n-1}$$

char → 1 byte → 8 bit





Operators:

- Arithmetic

Typically
last day
video
use +

- Relational

+ × ÷ %
> <= != ==

- Assignment

remainder

- Logical

int a = 20

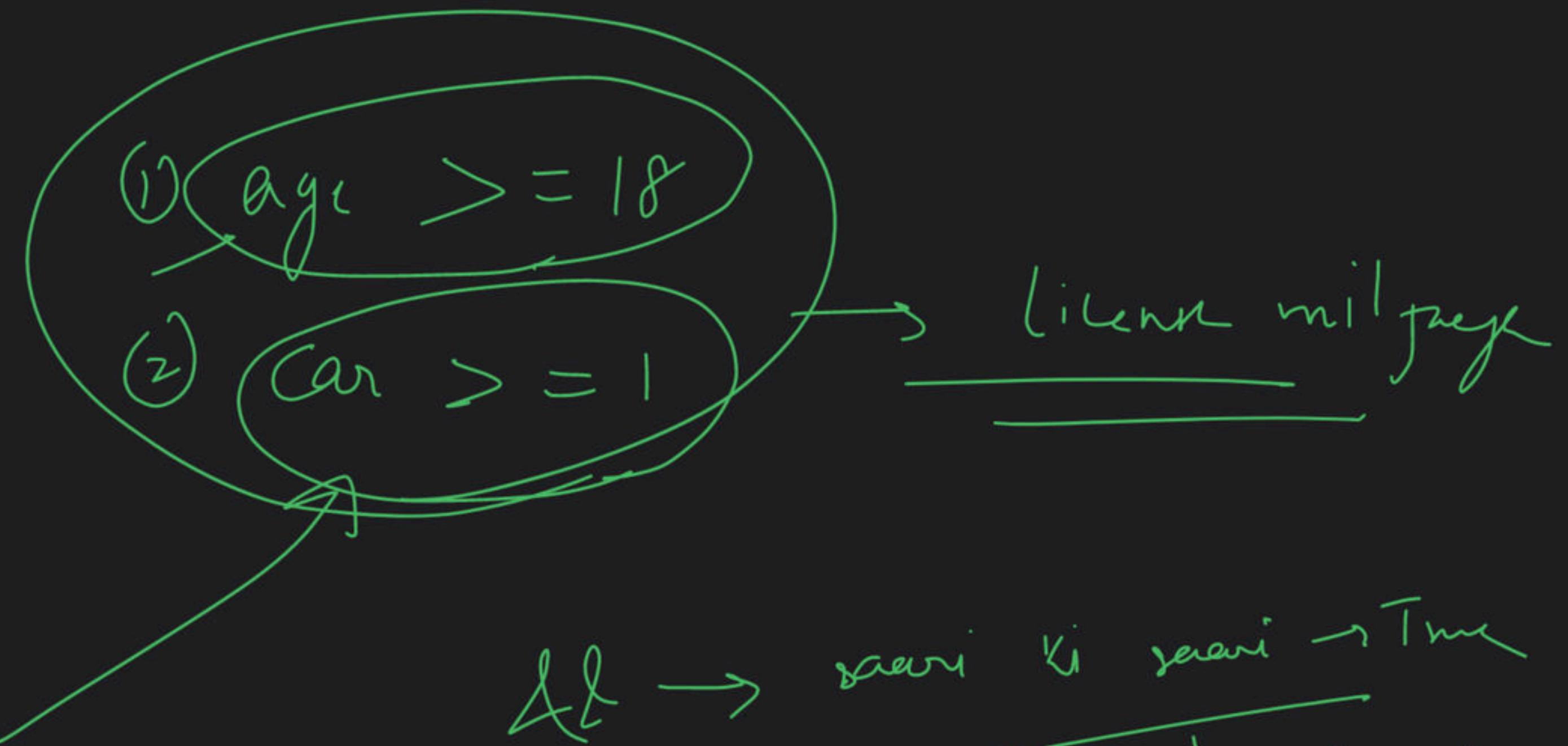
- Bitwise

&& || !

2 days back

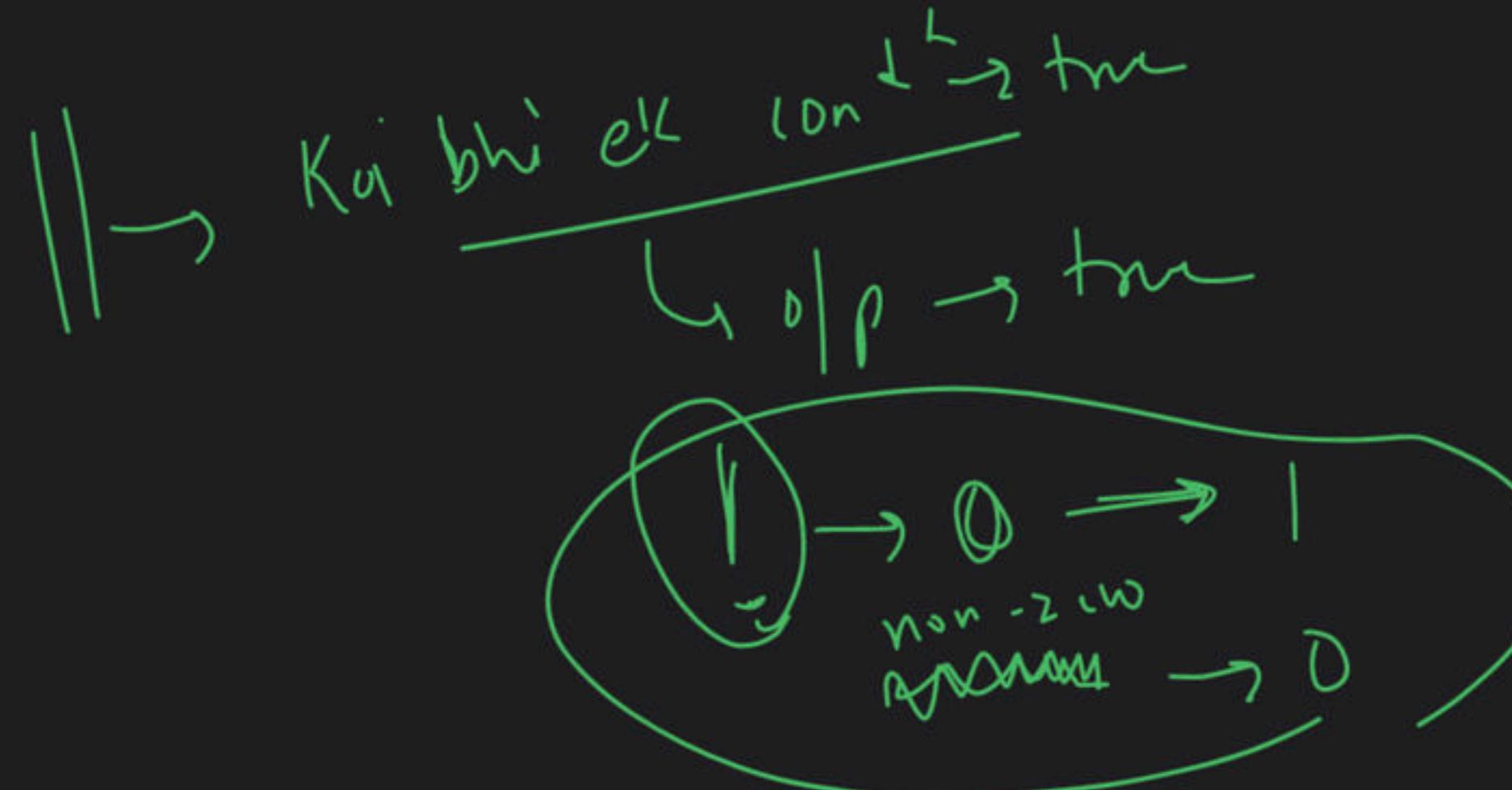
double → double
int → float
float → int
int → int
3 → 2

multiple condition



$\Delta t \rightarrow$ saari ki saari \rightarrow true
 \downarrow op \rightarrow true

nahi' to false
 \downarrow op \rightarrow true



HomeWork:

- 32 bit vs 64 bit Architecture → Lashay
- TypeCasting: Implicit vs Explicit
- Number System: Binary and Decimal

~~Sun day~~

9pm

Lashay

Doubt

Last week

Review
Doubt

251

