

Programming Basics - I

Foundation Course on Data Structures & Algorithm - Part I

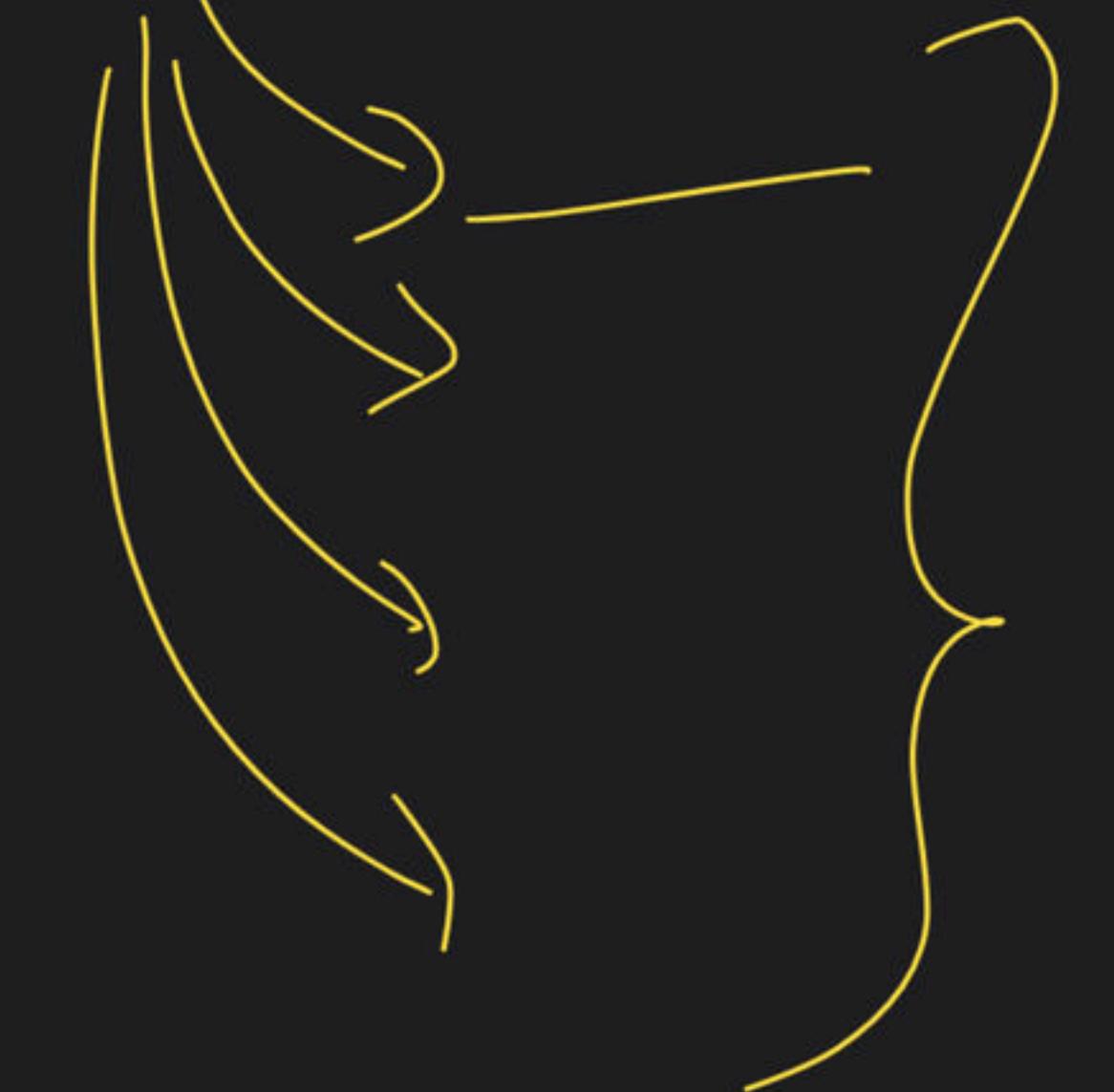
→ Programming / what is Program .]



flowchart



Pseudocode



→ First Program (Hello Duniya)

→ "Placement to begin in N"

→ where are we going to work

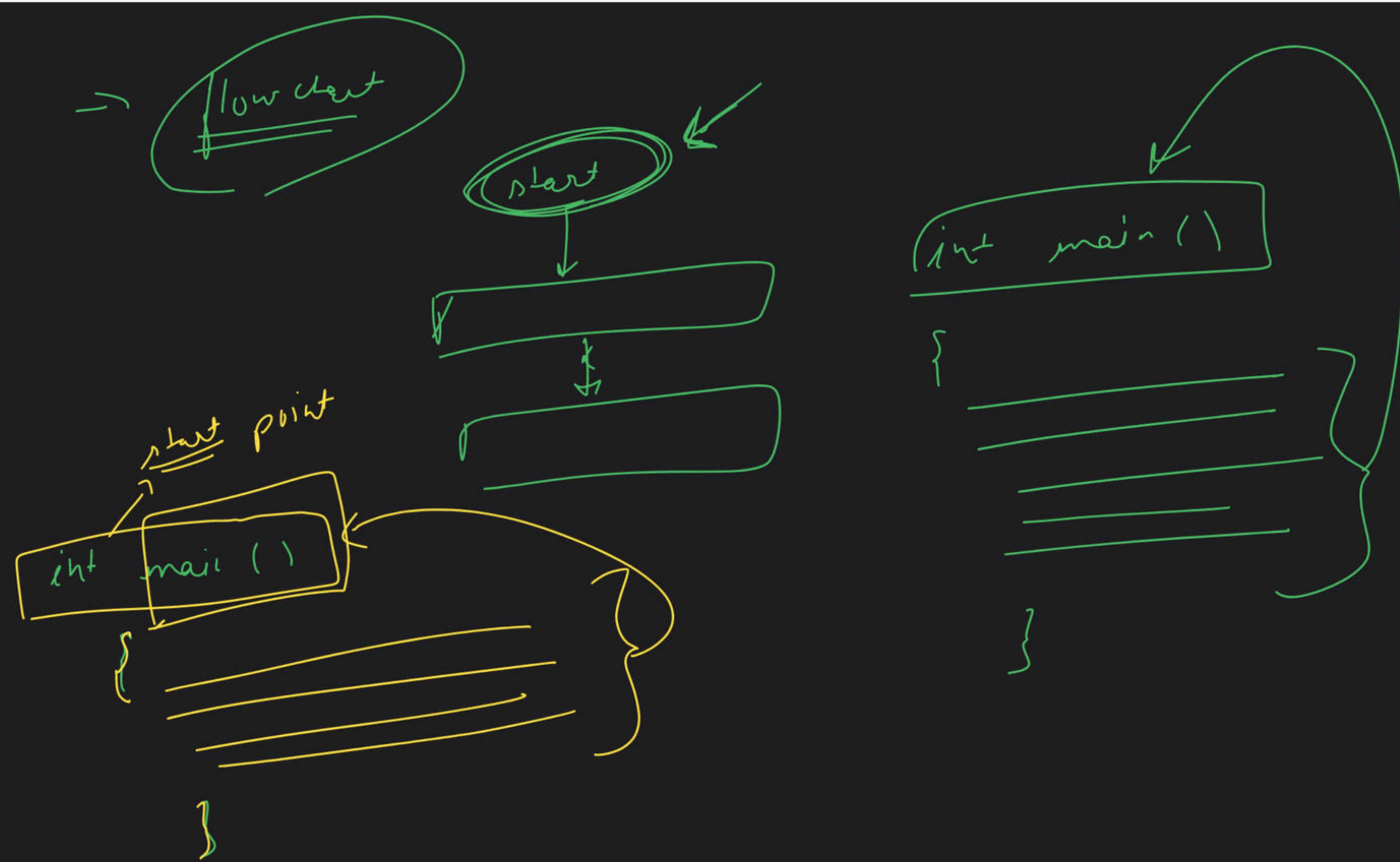
IDE / Code Editor / Online (Web app)

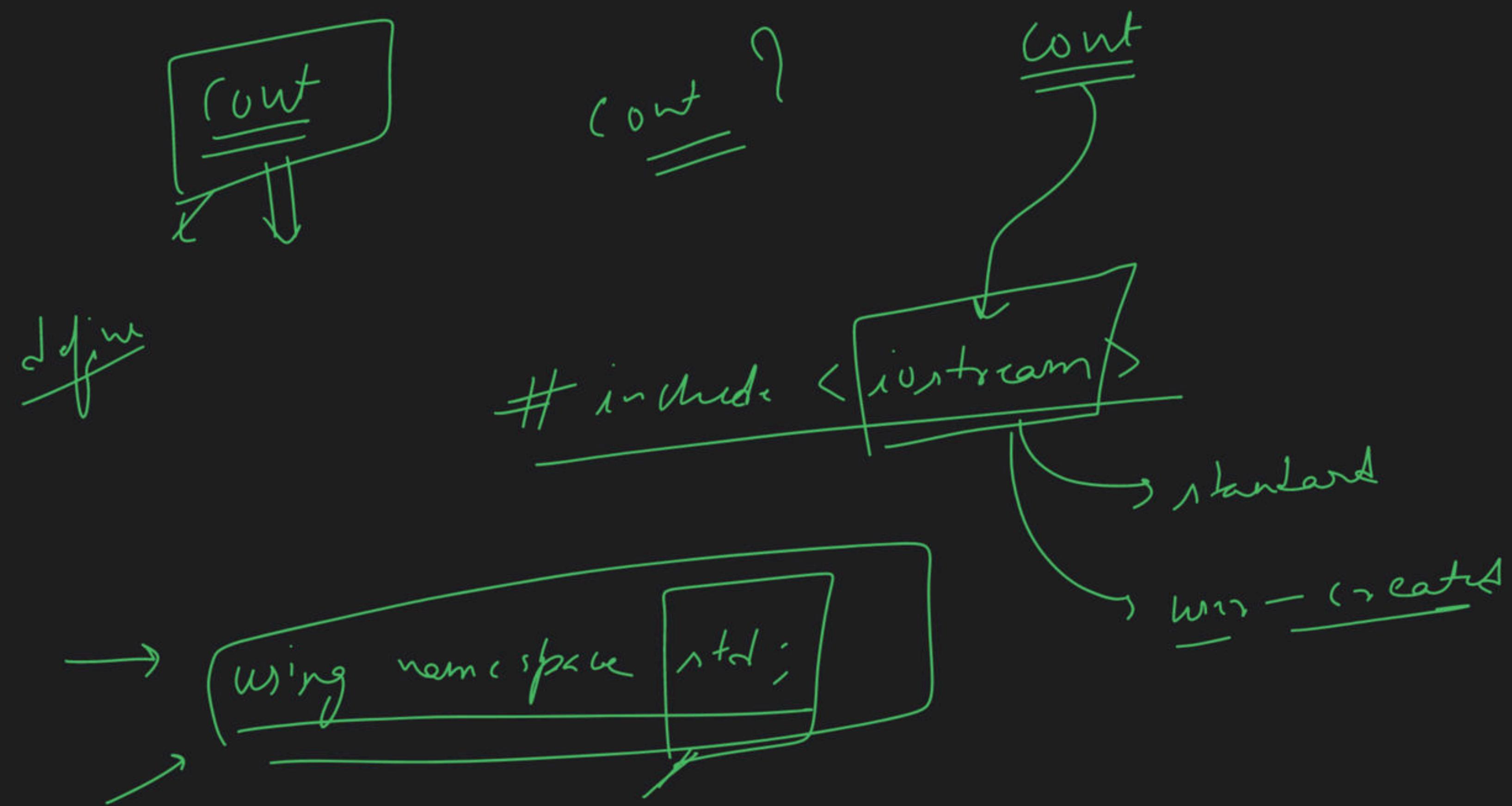
install

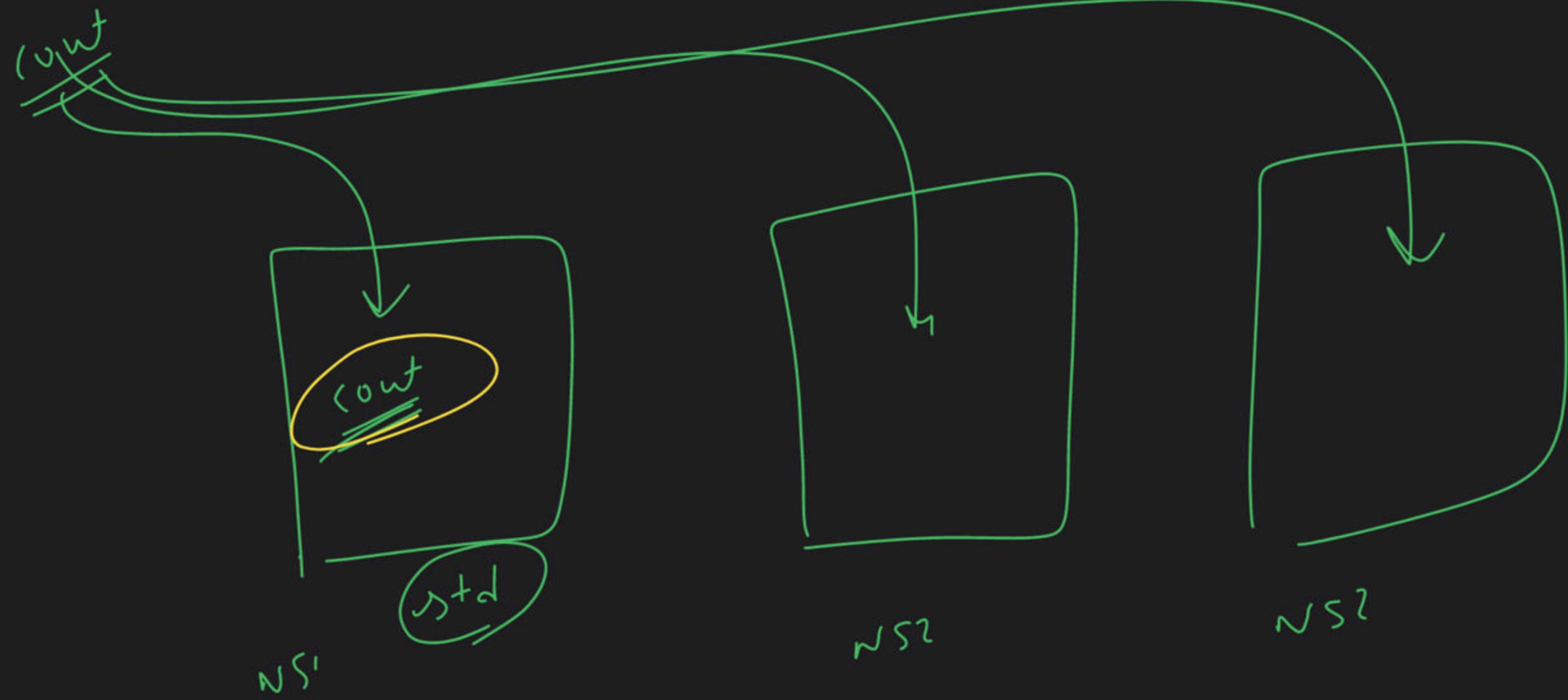
{
Visual Studio
Code Block
Visual Studio Code

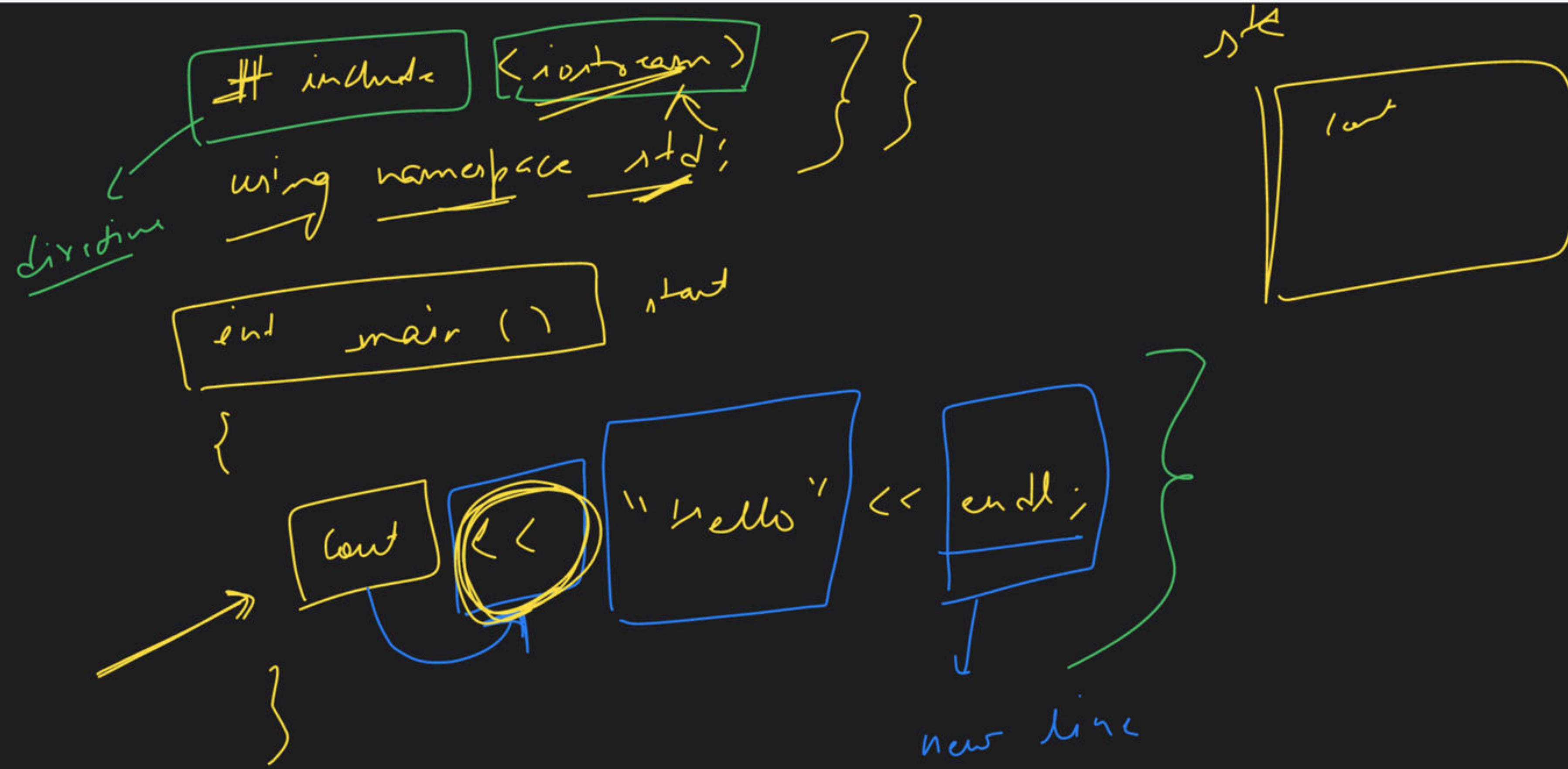
↳ ideone

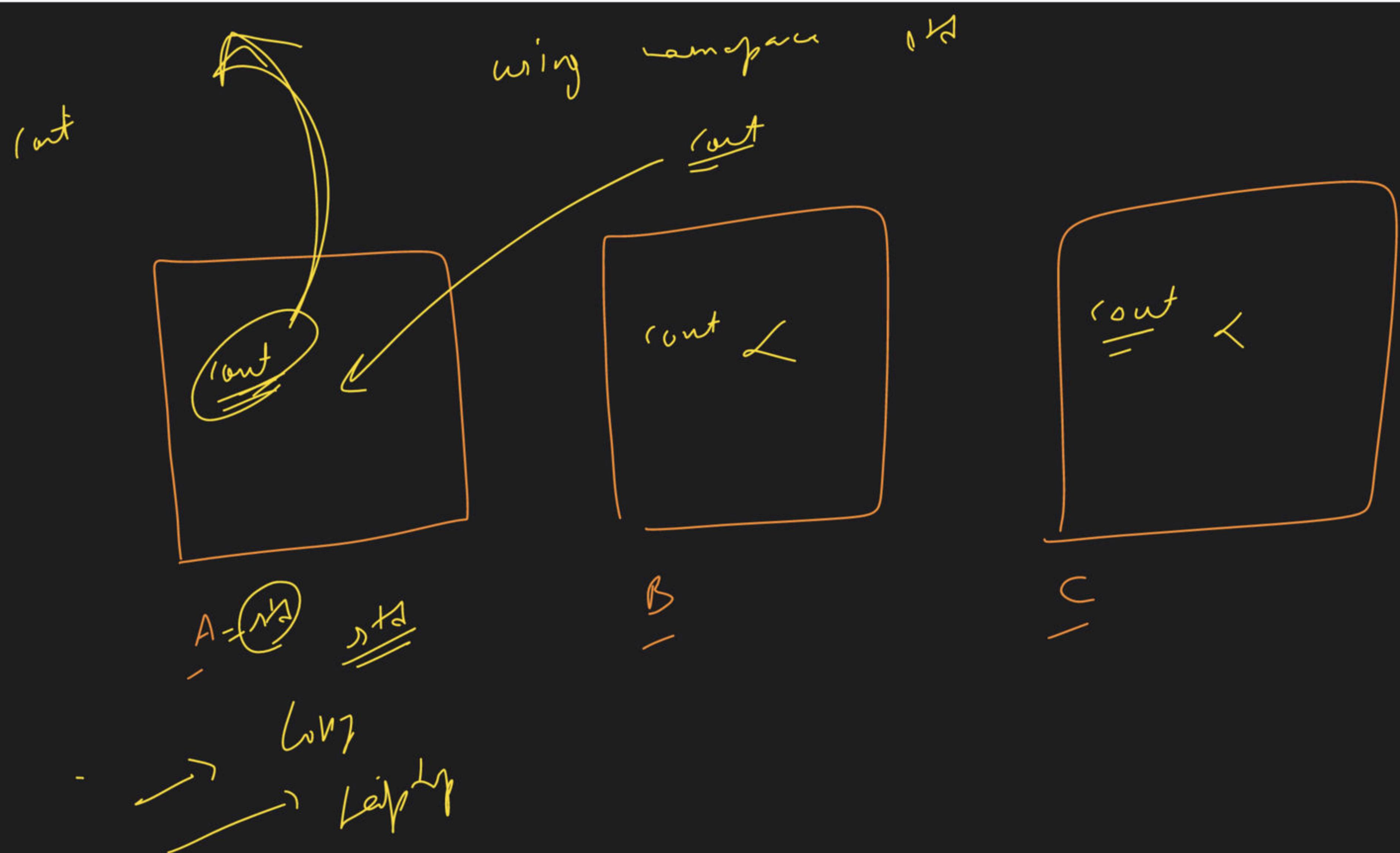
↳ repl.it











U/w

exploration

stack flow

↳ can i create internal
header file - ?

↳ can we create our
own namespaces?

↳ what all other namespaces
are present except std?

→ dag

→

int → void

~~char~~ → function

→ Data types ↗ Variables

float
double

int a = 5 ;

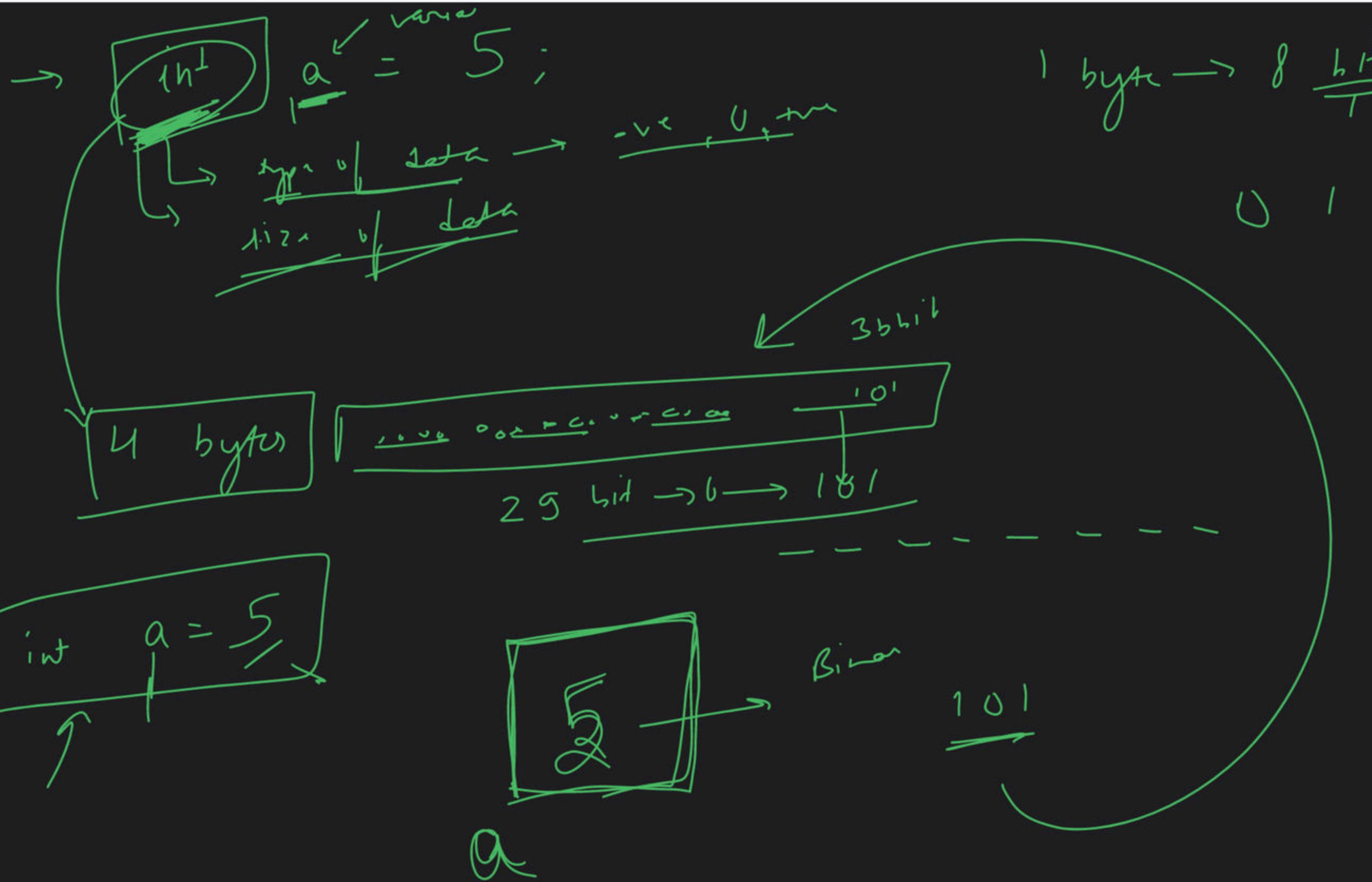
bool

5 →

'a' ⇒

char ch = 'z' ;

a ↴
+ B 2



\rightarrow DT int $a = 5;$

\downarrow \downarrow

hi variable

$a = 6$

$a = 7;$

\rightarrow bool $b = \underline{\text{true}};$

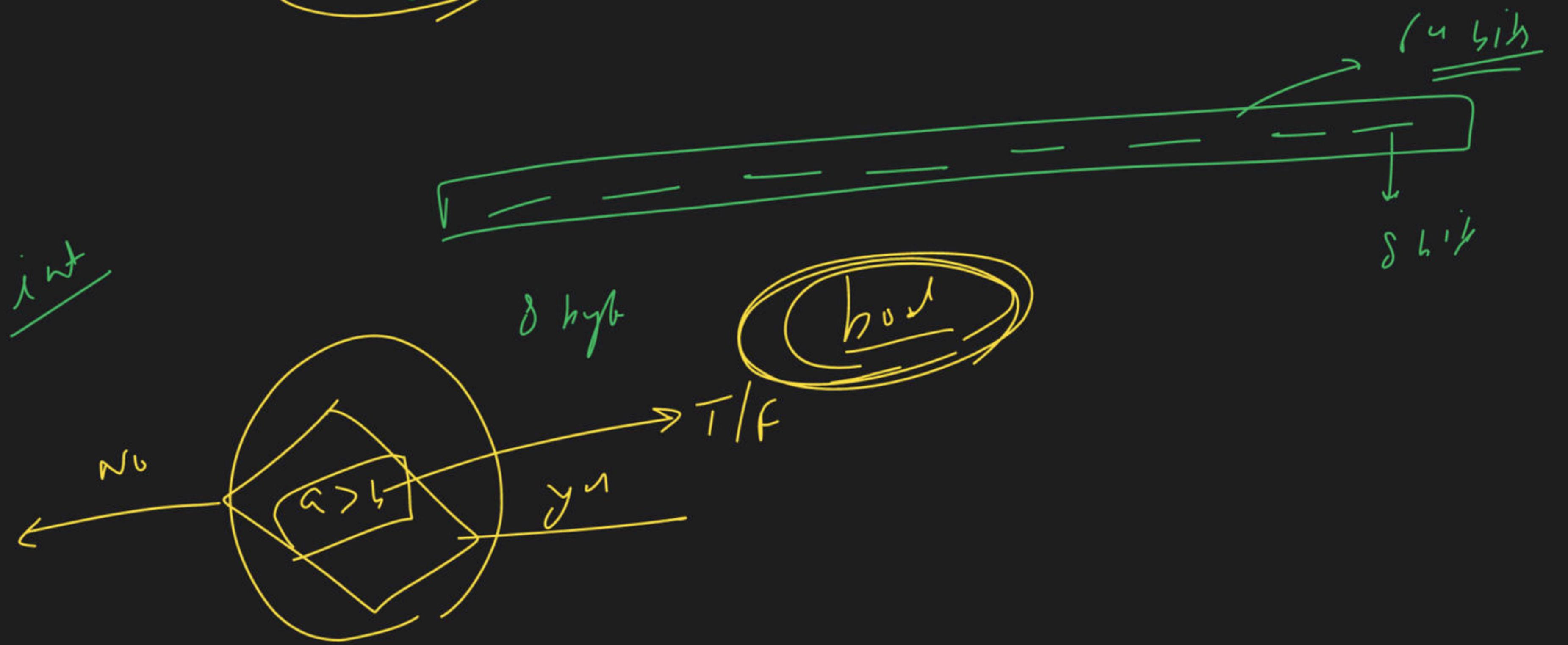
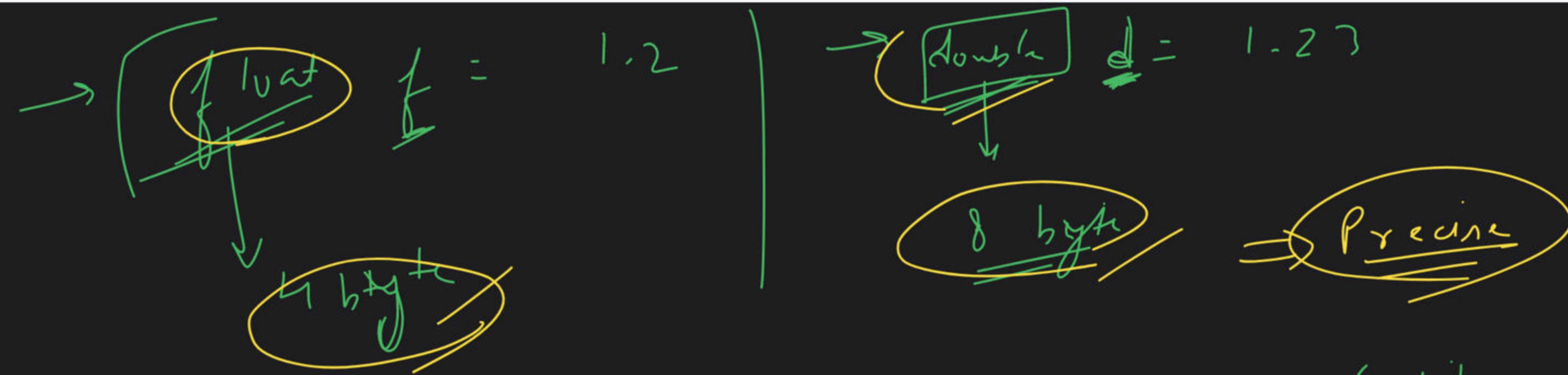
$b = \underline{\text{false}}$

1 bit

128

byte

11



→ Variable

int a = 5
variable

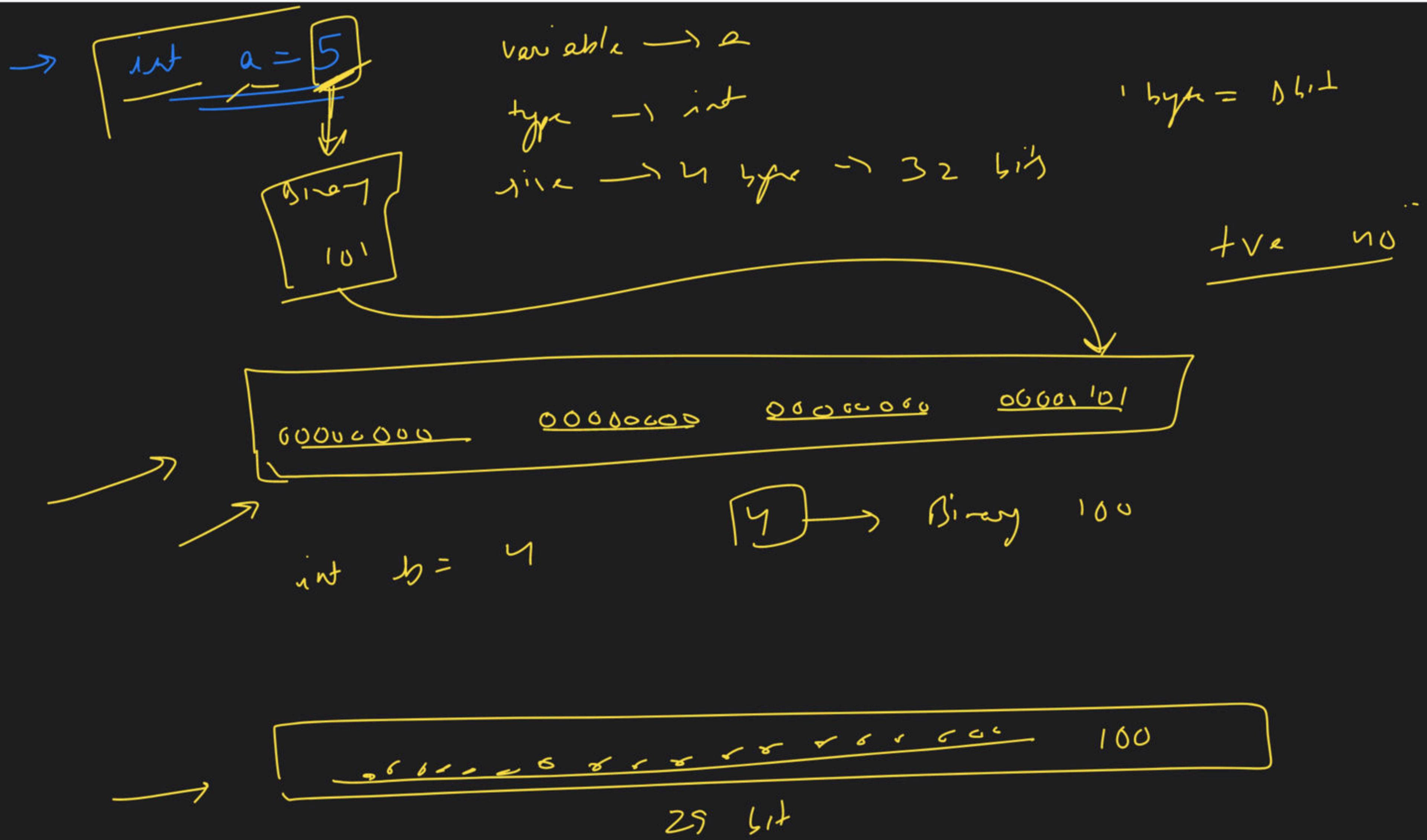
→ phsyc {
→ log } explore

Variable name

a b c
ABC
A1 *(absent)*
a - b

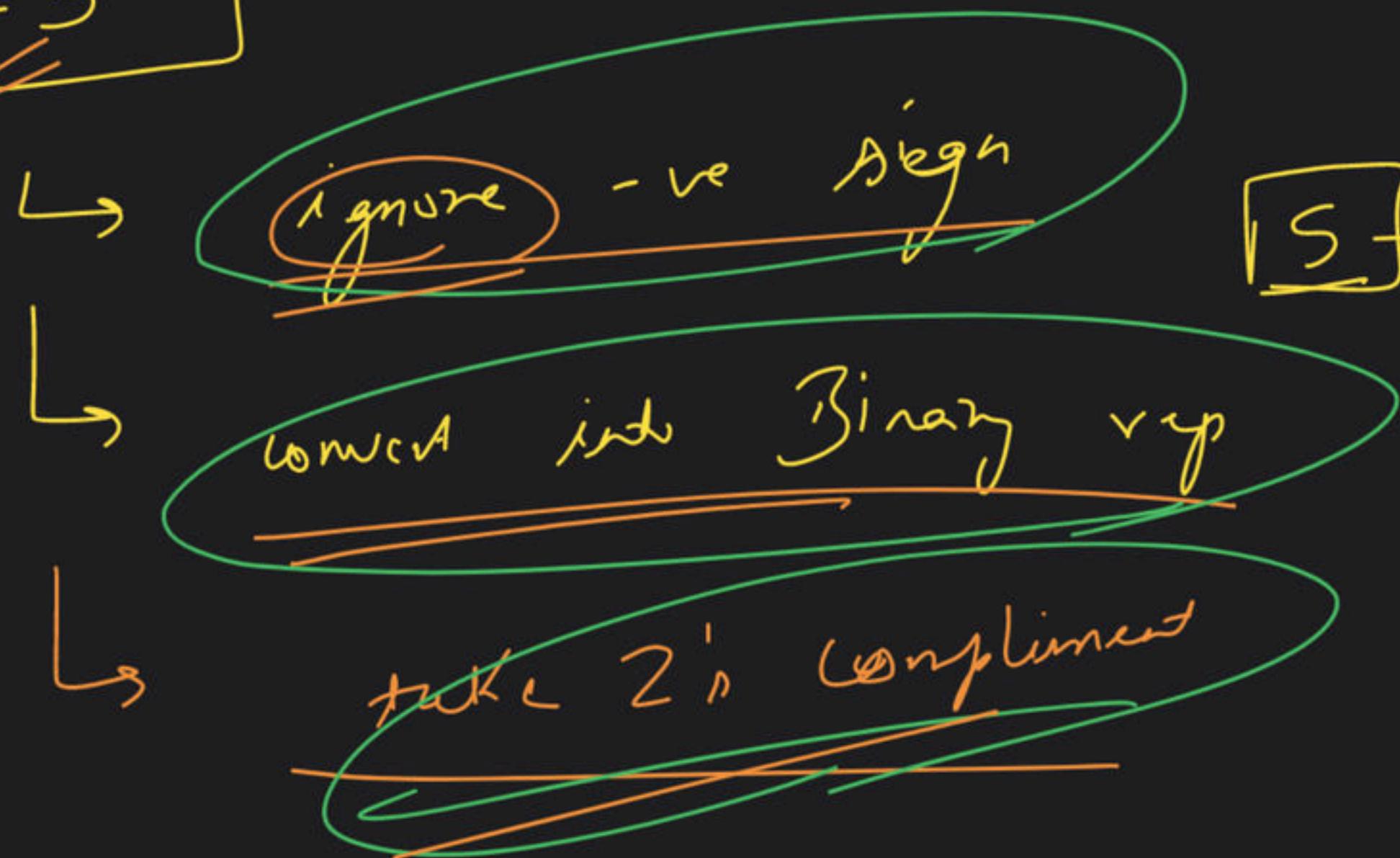
1 abs
abs 1

a - b - ad =



→ How - ve numbers are stored in memory

int $n = -5$



5
↓
"0000 101"
↓
2's comp

$1'$, complement
↓
bin flip

~~00~~ 1
~~0 1~~ 0
+ 1
0 1 1 0

$2 \rightarrow 10$

2 →
complement
take 1
1' complement
+ 1

1010



600000

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00000

000010'

0001
11

1100

000000

000000

000000

00000000

0110

+1 →

1111

1111

1111

1111011

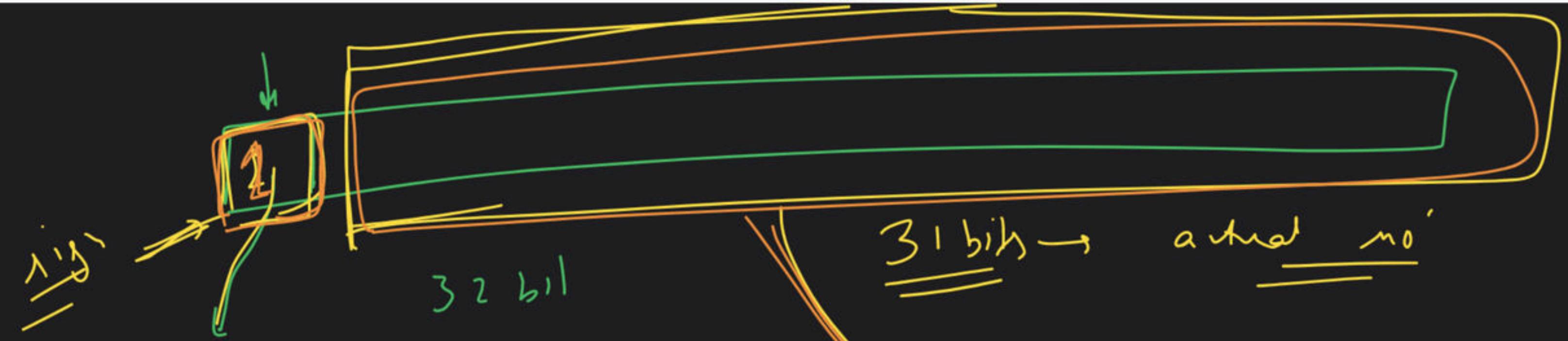
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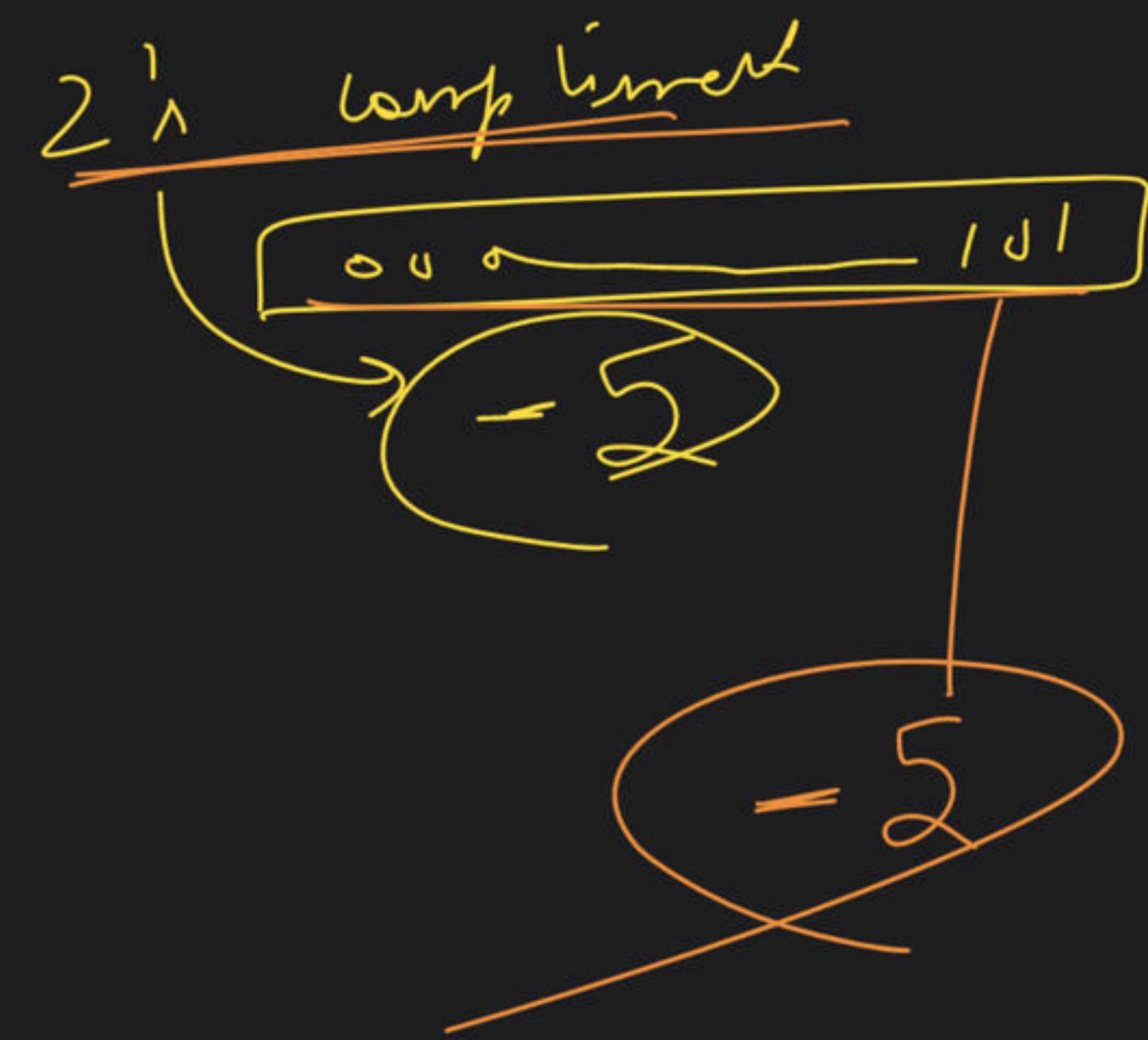
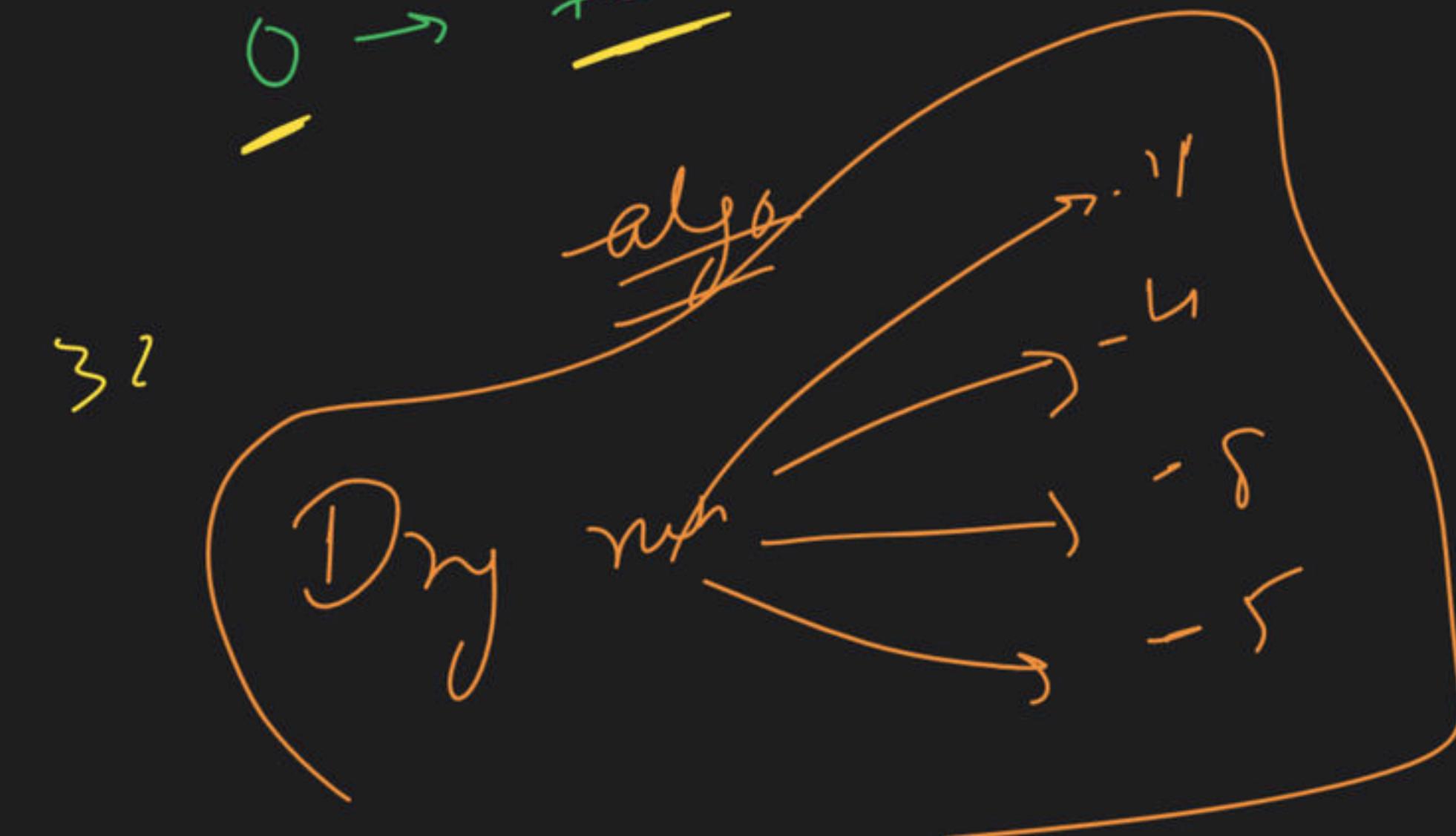
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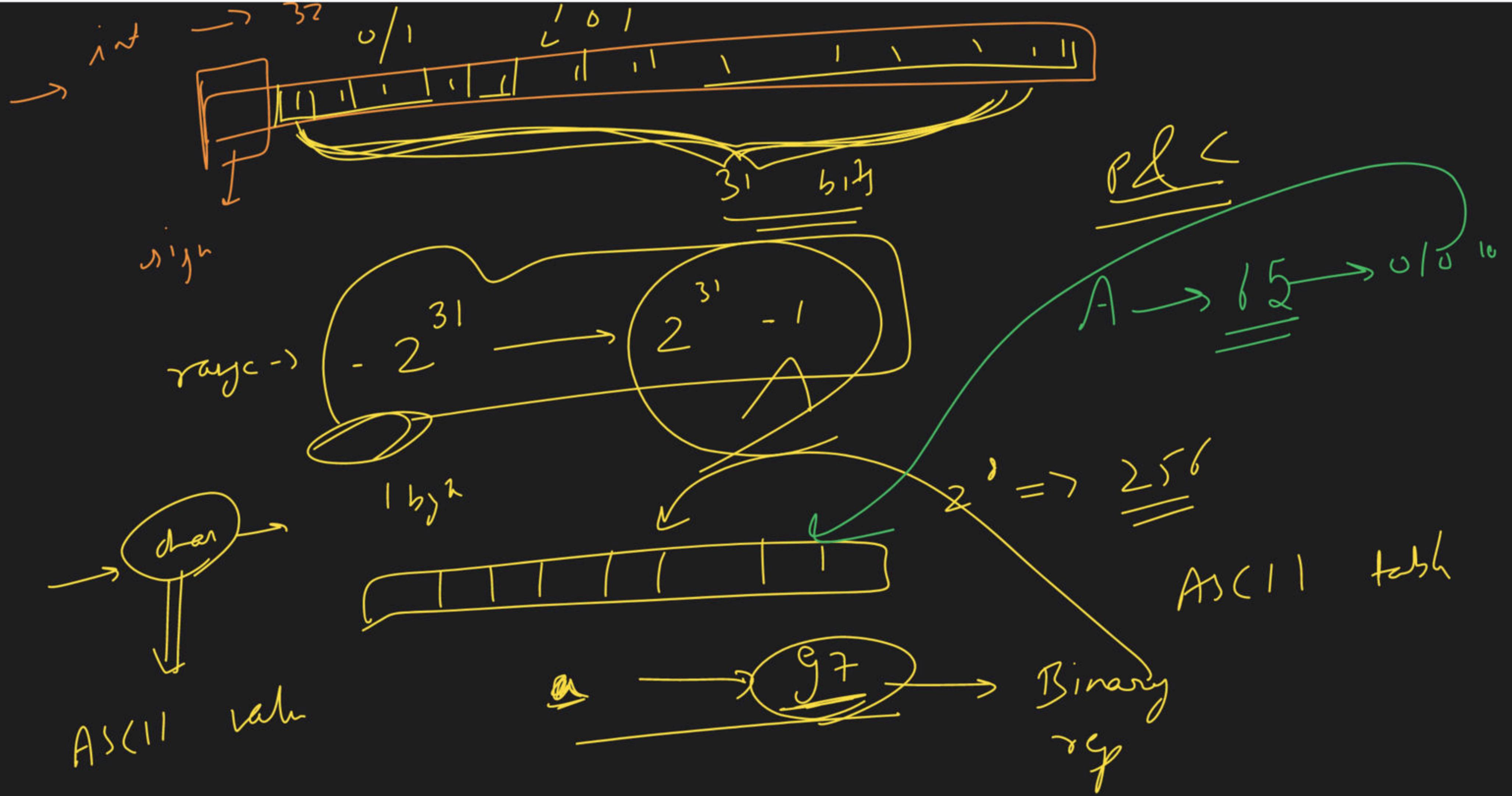
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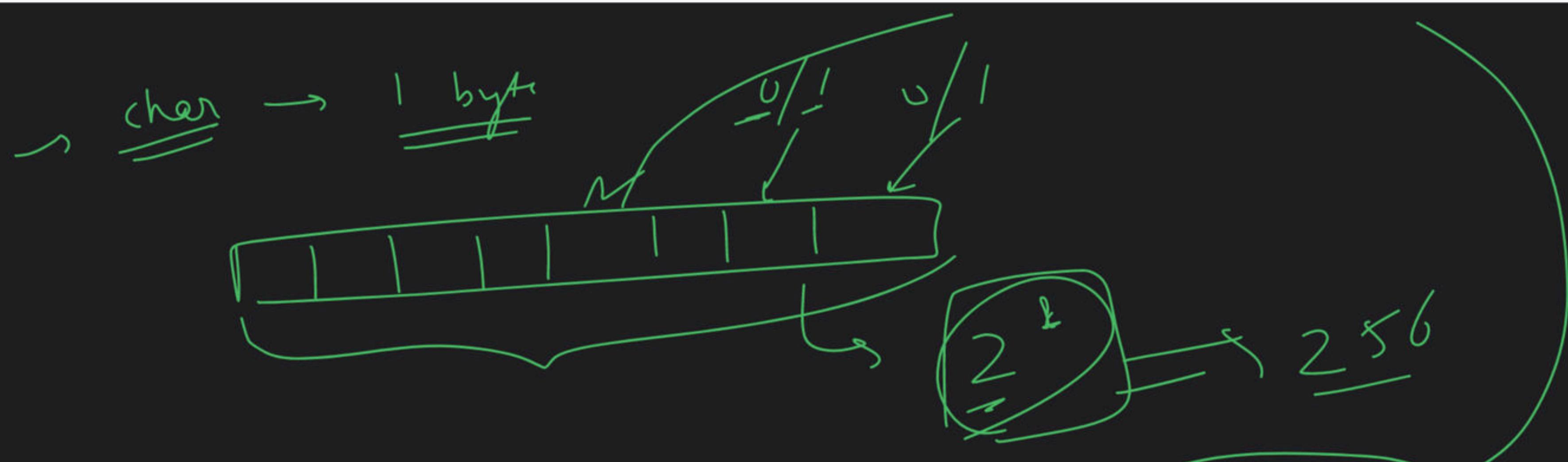
-5



+ve / -ve



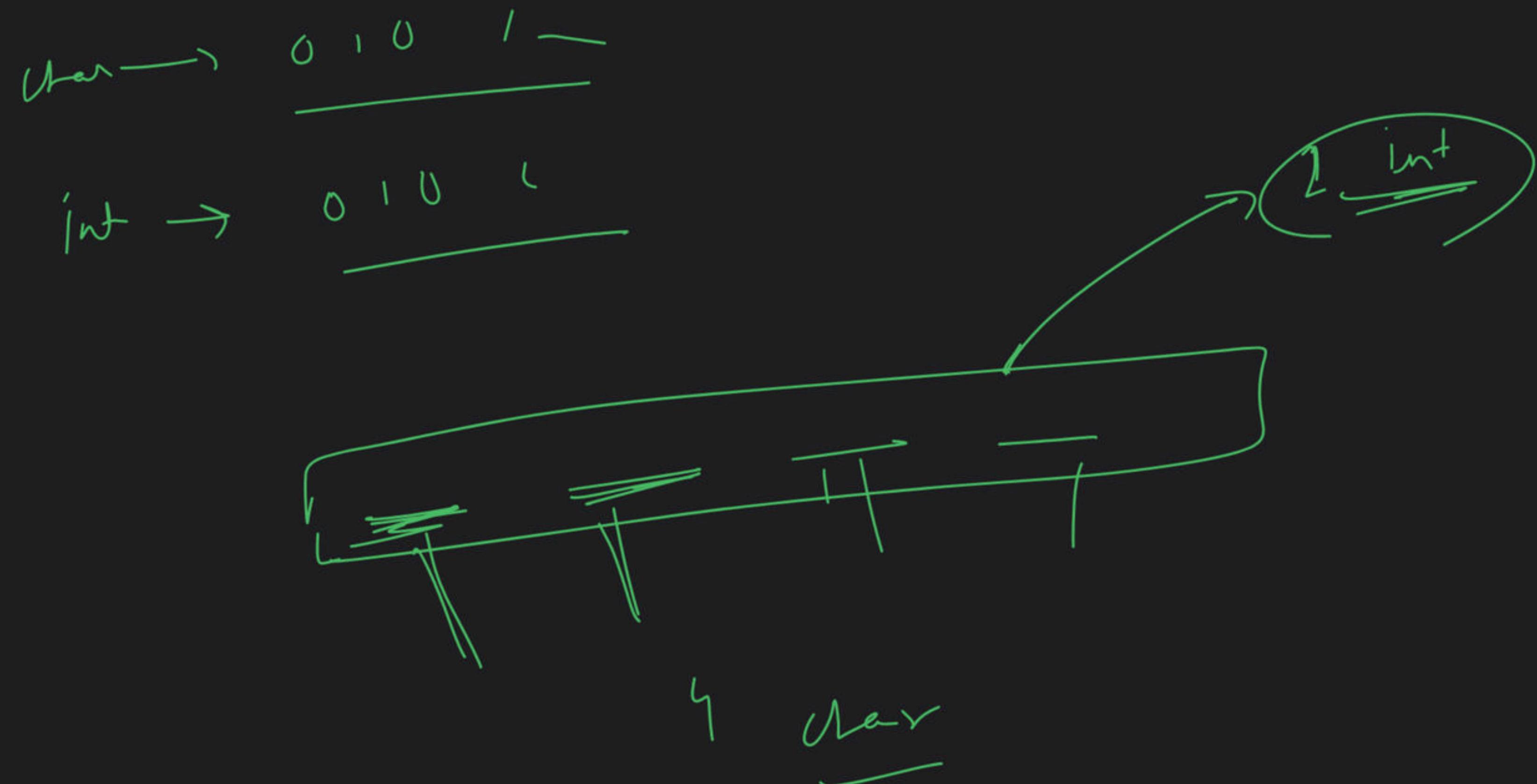




~~a~~ → 17
~~b~~ → 95
~~c~~ → 99

~~d~~ → 106

→ How are going to differentiate b/w int & char in memory



int → vje

char → wj

→ float
→ dark
→ long
→ short

→ color

→ Operators :-

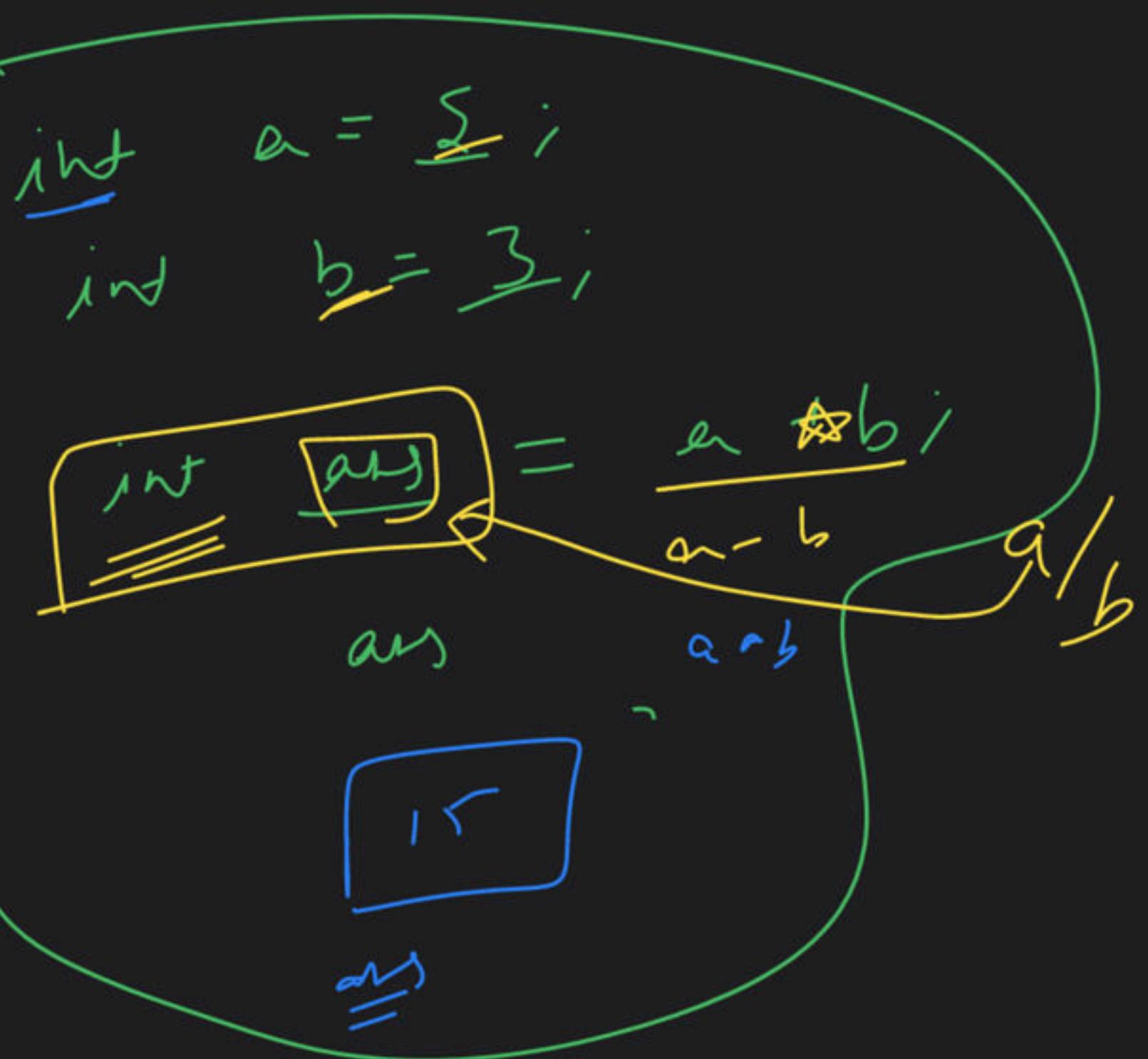
↳ Arithmetic Operators

$$\frac{a}{b} = \frac{5}{3} = 1.666\ldots$$

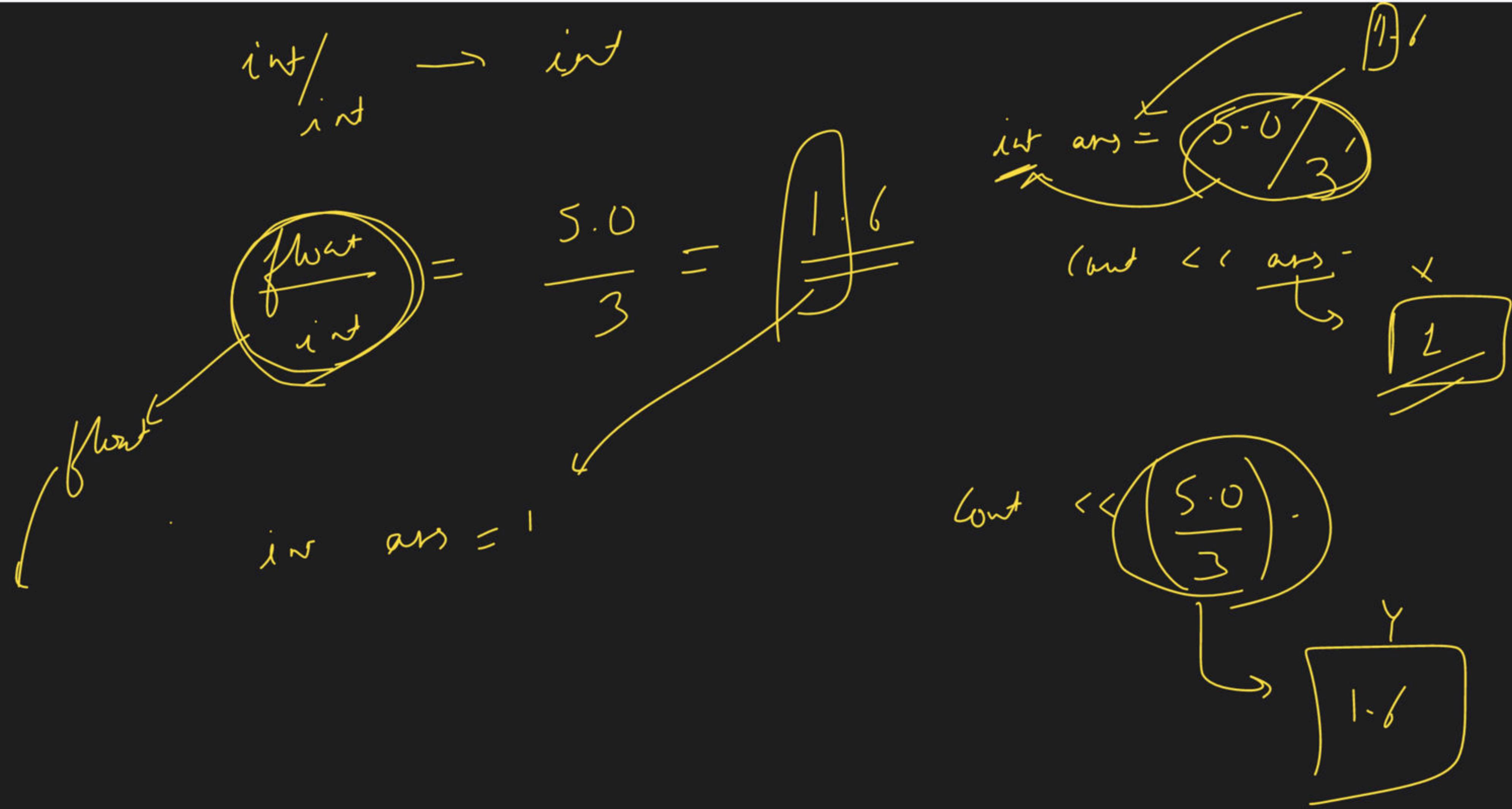
ans
1

$$a/b = 1.6$$

+
-
*
%



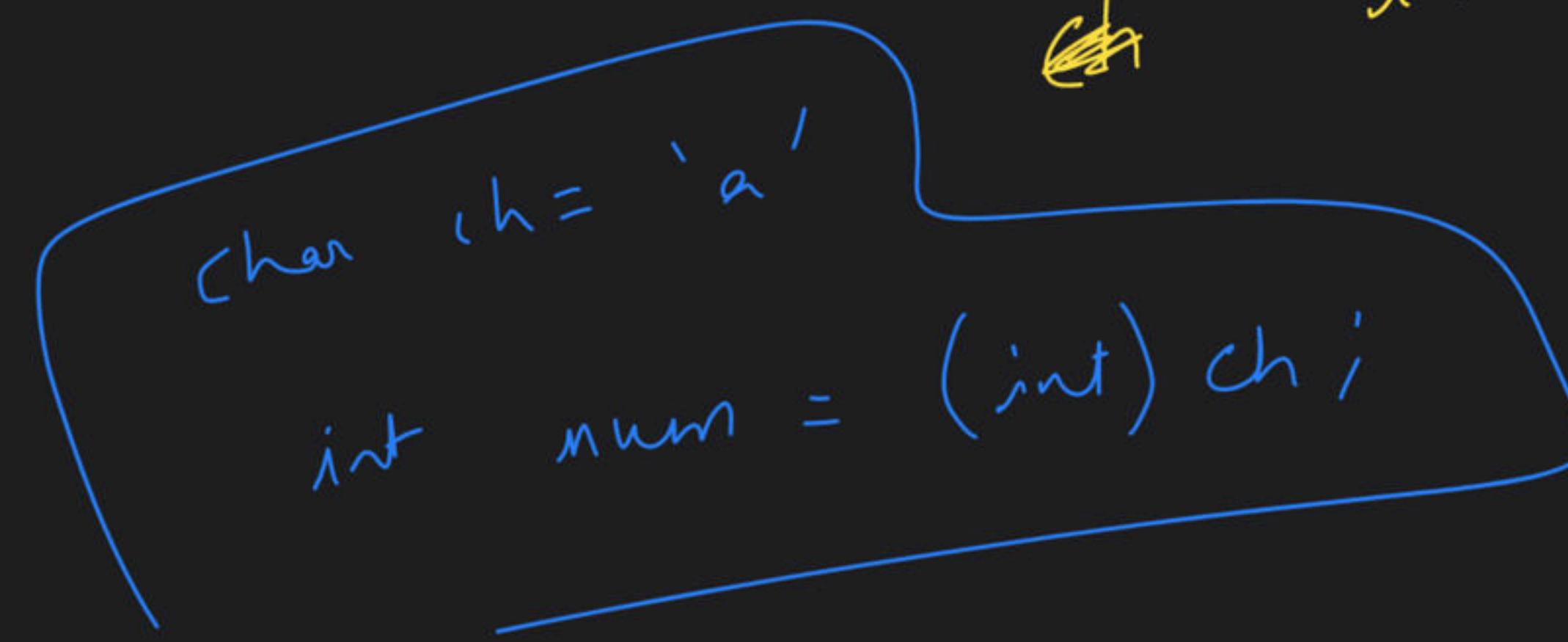
$$\frac{a}{b} = 1$$



$\text{int} / \text{int} \rightarrow \text{int}$

$\text{int} \text{ or } =$  $\rightarrow \text{float}$

$\text{double} / \text{int} \rightarrow \text{double}$


`char ch = 'a';`
`int num = (int) ch;`

Type Casting




`char ch = 'a'`

`int num = (int) ch`

$\rightarrow \text{char } \underline{\underline{ch}} = \text{'a'};$

$\text{int } \underline{\underline{\text{num}}} = (\underline{\text{int}}) \underline{\underline{ch}}$



97

num

$\rightarrow 0/0$

remainder

$$[5 \text{ } \underline{\underline{.}} \text{ } 3] = 2$$

$$\begin{array}{r} 5 \\ 3 \\ \hline 2 \end{array}$$

→ Relational operator

~~=~~

= → assignment op

>

<

≥

≤

==

!=

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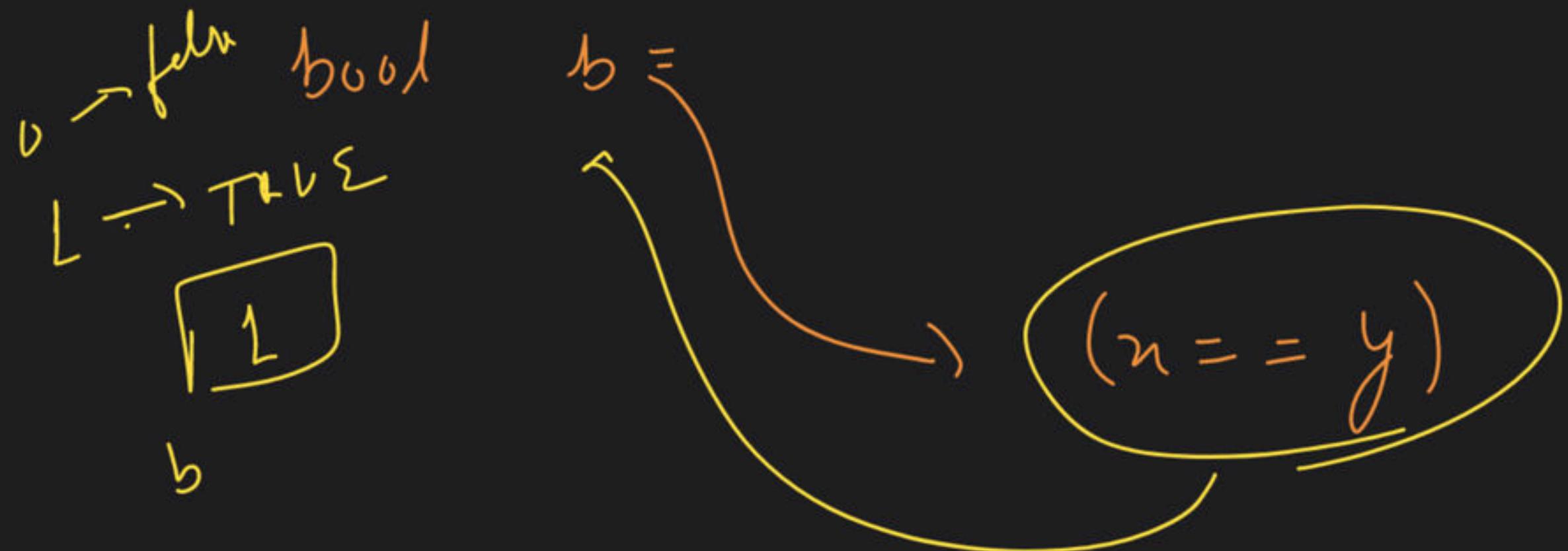
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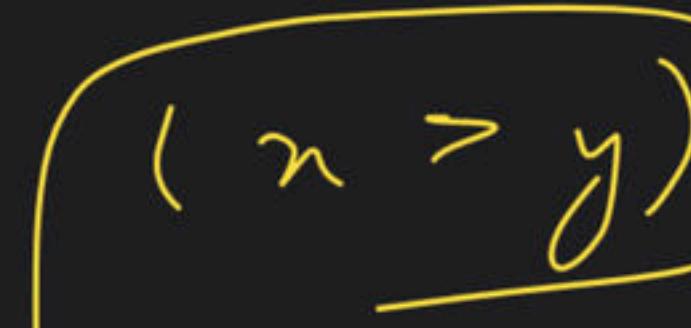
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=

$$n = 5, \quad y = 5$$



$$n = 5, \quad y = 3$$

bool ans = 

 $\underline{5 > 3} \rightarrow \text{TRUTH} \rightarrow /$

→

Logical Operators

$$\text{InterCount} = 1$$

$\omega^<$

→ (b) ω
behavior + teaching

A hand-drawn graph illustrating the relationship between quality and health care. Two parallel, upward-sloping lines represent the trade-off between these two factors. The upper line is labeled "Quality" and the lower line is labeled "Health care". A green arrow points from the left towards the upper line, and another green arrow points towards the lower line.

16 A 1



hood ans =

$$a = 5$$

$$\theta = 0$$

$$a = 1$$

$$\theta = 0$$

no \downarrow , \downarrow
 $b_g \rightarrow$ Not white

→ Bitwise Operator :-

Bit level

int $a = 5 \rightarrow 101$

int $b = 6 \rightarrow 110$

int $ans = a \& b$

101
 $\&$
 110

ans

&

$$\begin{array}{r} 1 & 0 \\ 1 & 1 & 0 \\ \hline 1 & 0 \end{array} \rightarrow 4$$

x	y	o/v
0	0	0
0	1	0
1	0	0
1	1	1

\rightarrow | $\ell \times l$

a / b



ω^k

n

$\frac{0}{0}$

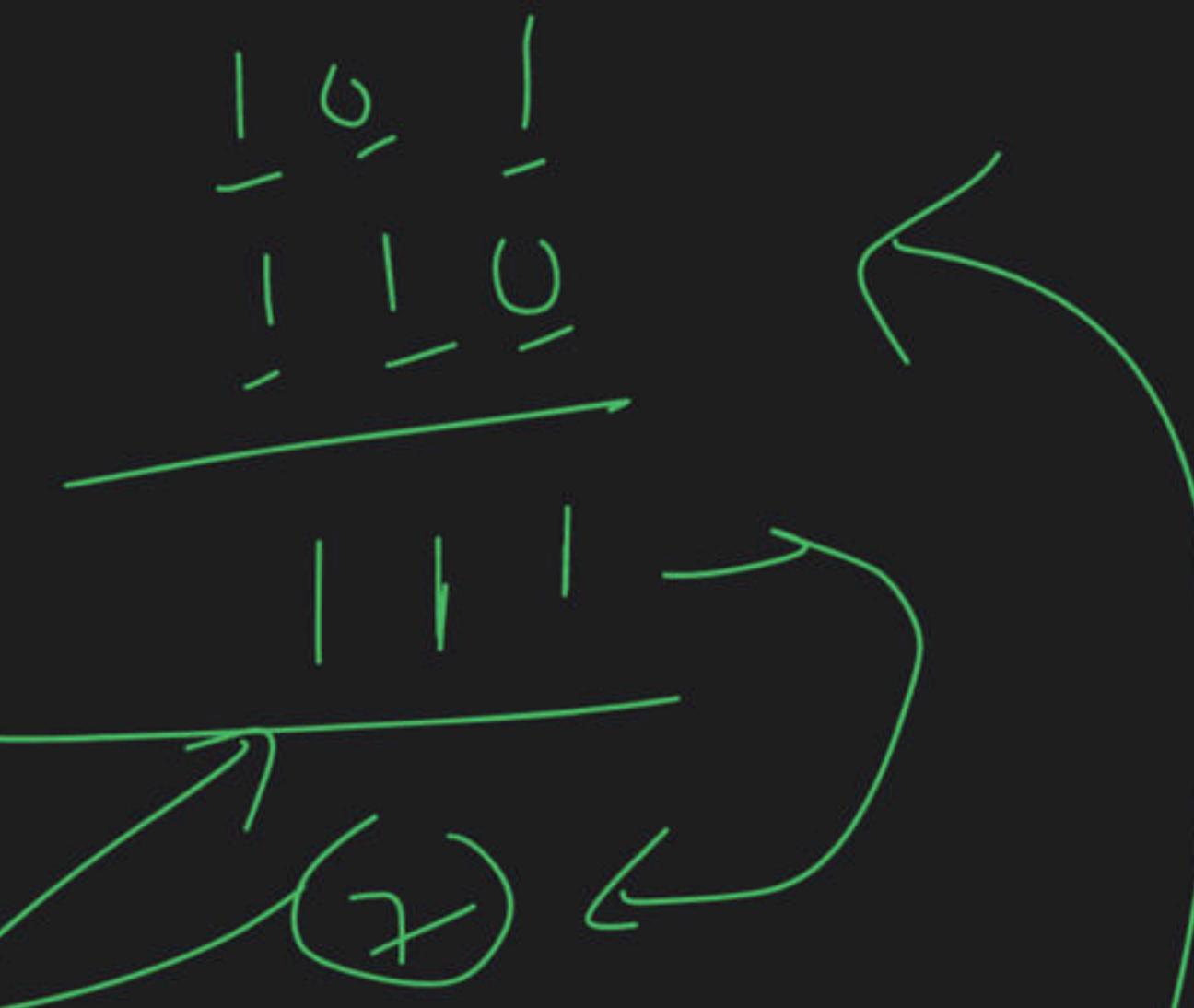
|

|

ω
W
 $\sqrt{\mu} I_0 \sqrt{\mu}$
V_{DC}

$a = 5$

$b = l$

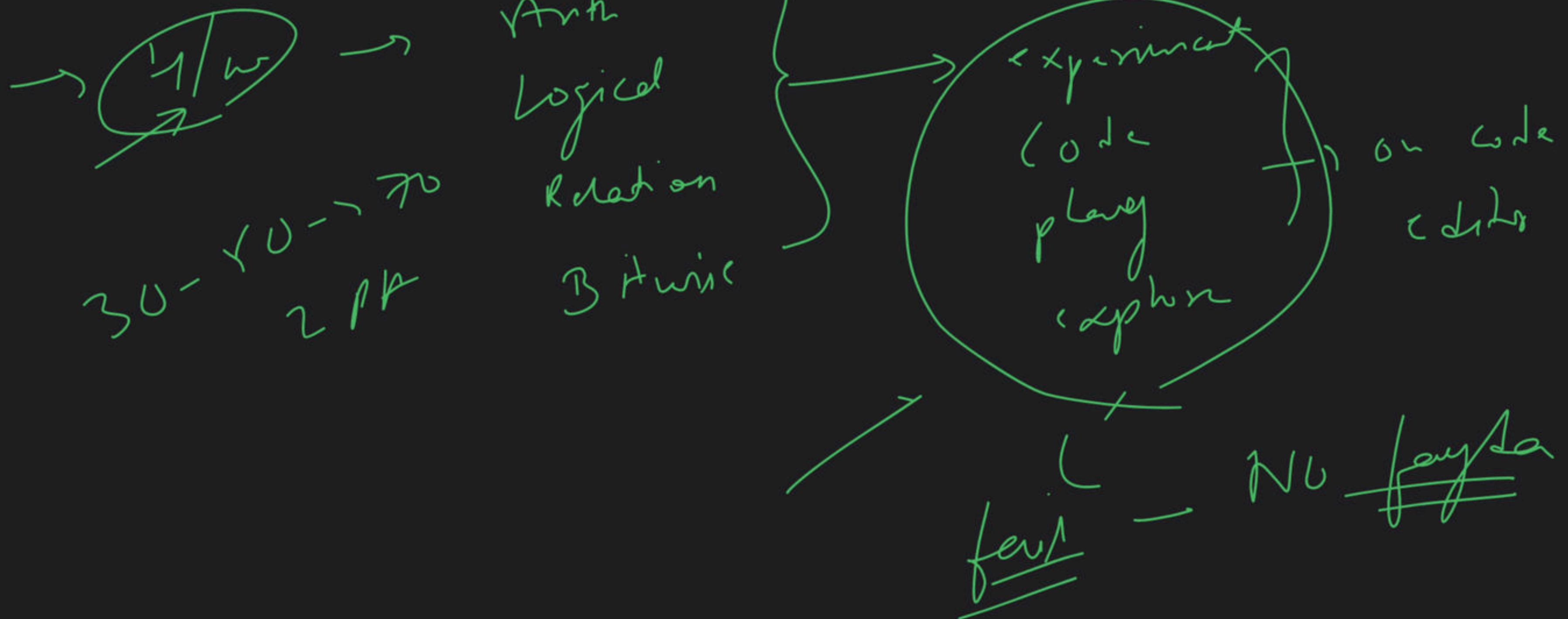


$$h \in \{ \dots \}$$

Dhayankar M.L







Left Shift Operator

X2

1000000000

5 << 1

Shift 5 by 1

5 << 1

5 × 2

0000000000101
000000001010000000

padding with 0

5 << 1 → 10

5 << 2

5 × 2 × 2 = 20

5 << 2

shift 5 by 2
by 2

-10000000001010000000 → 20



Bad thing → far worse

(not always)

x

1

A hand-drawn diagram illustrating a right shift operation. It features a yellow bracket at the top containing the words "Right", "Shift", and "Op". Below this, three parallel orange lines slope upwards from left to right. The middle orange line has an arrowhead pointing to the right, indicating the direction of the shift. The entire diagram is set against a black background.

number / 2

5
2

$$\begin{array}{r} < >> 2 \\ \hline & 5 \\ \hline & 2 < 2 \end{array}$$

577

$$\sum_{n=1}^{\infty} x^n$$

$5 >> 2$

15 > > 1

$$S \gg 1$$

$$5 \frac{1}{2} = ?$$

A hand-drawn diagram illustrating a diode circuit. A blue curved line represents a battery or voltage source. A blue rectangular component labeled "D1 D2 D3" contains three parallel vertical lines representing diodes. An orange arrow points from the left towards the diodes, indicating the direction of current flow. A yellow arrow points to the right from the right side of the diode component, also indicating current flow. The entire diagram is drawn on a black background.

0.024000 10 → 22

5 >> 2

0 0 . a c e e

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, ., , -

10 /
12 2

1

$$\cancel{5} \times 2 = 5 \times 2 \left(\text{ } \right)$$

$$\sim \nu / \omega \rightarrow$$

A hand-drawn diagram in yellow ink on a black background. It features a large, irregular oval shape. Inside the oval, there are two '<' symbols on the left and two '>' symbols on the right, positioned above a vertical tick mark. A curved arrow points downwards from the bottom center towards the bottom right corner of the page.

-ve no

$5 > 4$

1

$$\frac{5}{2 \times 2 \times 2 \times 2}$$

A hand-drawn graph on a black background. Two yellow lines intersect at the point (2, 0). The horizontal axis is labeled with 0, 2, 4, and 6. The vertical axis is labeled with 0, 2, 4, and 6. Several other points are marked with labels: (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (0, 1), (0, 2), (0, 3), (0, 4), (0, 5), (0, 6), (-1, 0), (-1, 1), (-1, 2), (-1, 3), (-1, 4), (-1, 5), and (-1, 6). A blue arrow points from the origin towards the bottom right. In the bottom right corner, there is handwritten text: "down" above "line" and "up" below "line".

~~for suggestions~~

$$\beta \rightarrow d$$

Dry run ↗

10 < x \neq
mal n.
big n.

