

# Mega Class: Searching & Sorting

Special class

# ① Sqrt with Precision

$$\sqrt{63} \Rightarrow 7??$$

$$\sqrt{63} = 7.93725393319$$

$\sqrt{63} = ? \Rightarrow$   $\sqrt{63}$ ,  $\sqrt()$ , Pow()

$\Rightarrow \sqrt{63} \Rightarrow$



B.S

Search Space

mid

31 is my answer ??

easily find

$31 * 31 = 63 ??$

$961 \neq 63$

① answer Range me aata ho

↓  
determine kar Blkte hai'

② mid nikalte ho  
↳ easily prov kar pa

ke wo answer hai ke ni

1



~~63~~  
~~63~~  
~~63~~

mid ~  $\rightarrow$

$$\text{mid} \times \text{mid} \leq 63$$
$$31 \times 31 \leq 63$$

$$e = \text{mid} - 1$$

2



$$15 \times 15 \leq 63$$

$$am = 7$$

3



$$7 \times 7 \leq 63$$

$$49 \leq 63$$

5



$$11 * 11 \leq 63 *$$

5



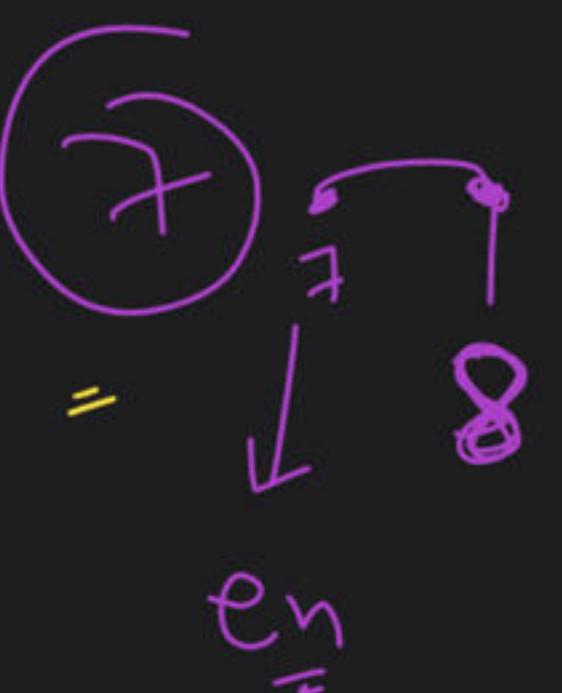
$$9 * 9 \leq 63 *$$

6



mid = 8

$$8 * 8 \leq 63 *$$



en

end = 7  
start = 8

S > e

stop

$\text{ans} = 7$

age ki Baat

$$7 \times 7 \leq 49$$



$$8 \times 8 \leq 64$$

$$64 \leq 63$$

$7 \times$

$8 \times$

=

6

7

8

$\Rightarrow$

$x$

$y$

$\Rightarrow$

$7.0$

$$7 \times 7 = 49 \leq 63 \checkmark$$

Step

0.1

$7.1$

$$7.1 \times 7.1 = 50.41 \leq 63 \checkmark$$

$7.2$

$$7.2 \times 7.2 = 51.84 \leq 63 \checkmark$$

$7.3$

$$7.3 \times 7.3 = 53.29 \leq 63 \checkmark$$

$7.4$

$$7.4 \times 7.4 = 54.76 \leq 63 \checkmark$$

$7.5$

$$\Rightarrow 55.25 \leq 63 \checkmark$$

$7.6$

$$\Rightarrow 57.76 \leq 63 \checkmark$$

$7.7$

$$\Rightarrow 59.29 \leq 63 \checkmark$$

1 Preco  
 $\downarrow$   
6.1

$7.0$

$\times$

$7.9$

$\checkmark$

$$7.8 \Rightarrow 60.84 \leq 63 \checkmark$$

$$7.9 \Rightarrow 62.41 \leq 63 \checkmark$$

$$8.0 \Rightarrow 8 \times 8 = 64 \times \times$$

$$\text{Step} = \text{step}/10 \quad 7.9 \checkmark$$

$$\text{step} = 0.61$$

$$7.90 \rightarrow$$

$$7.91 \rightarrow$$

$$7.92 \rightarrow$$

$$7.93 \rightarrow$$

$$7.94 \rightarrow$$

$$7.95 \rightarrow$$

$$7.96 \rightarrow$$

$$7.97 \rightarrow$$

$$7.98 \rightarrow$$

$$7.99 \rightarrow$$

$$8.00$$

$$\text{ans} \Rightarrow \cancel{7.9} \quad 7.93 \checkmark$$

$$7.9^2 \Rightarrow 62.41 \leq 63 \checkmark$$

$$7.91^2 \Rightarrow 62.56 \leq 63 \checkmark$$

$$7.92^2 \Rightarrow 62.72 \leq 63 \checkmark$$

$$7.93^2 \Rightarrow 62.88 \leq 63 \checkmark$$

$$7.94^2 \Rightarrow 63.04 \leq 63 \times$$

$$\text{Step} = 0.001$$

New Step  
for prec. 3

$$\downarrow$$
$$\text{Step} = 0.001$$

$\bar{x} = 93$

Sx ep = 0.001

$$\bar{x} = 93.0 \Rightarrow \bar{s}^2 = (2.8)^2 \leq 63 \checkmark$$

$$\bar{x} = 93.1 \Rightarrow \bar{s}_L \rightarrow 62.9 \cancel{0} \leq 63 \checkmark$$

$$\bar{x} = 93.2 \Rightarrow \bar{s}_L \rightarrow 62.91 \leq 63 \checkmark$$

$$\bar{x} = 93.3 \Rightarrow \bar{s}_L \rightarrow \text{--- --- --- ---}$$

$$\bar{x} = 93.4$$

↓

$$\text{--- } (\bar{x} = 93.5) \Rightarrow \bar{s}_L \rightarrow 62.99 \leq 63 \checkmark$$

$$\bar{x} = 93.6 \Rightarrow \bar{s}_L \rightarrow 63.011 \leq 63 \times$$

8.000

3 prc

93.7

$\Rightarrow$

Non Precisions  $\rightarrow$  Precisions



$\beta_s$

Linear Appr

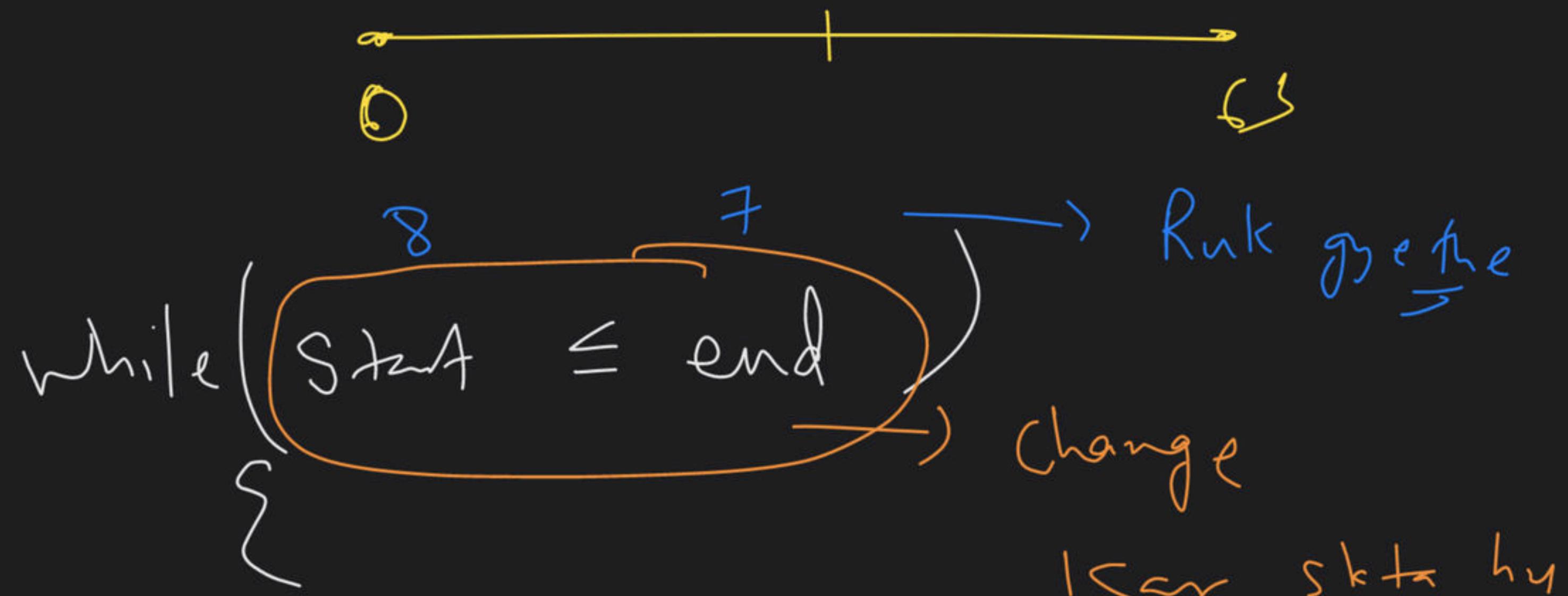
✓  
Finite force

2

63

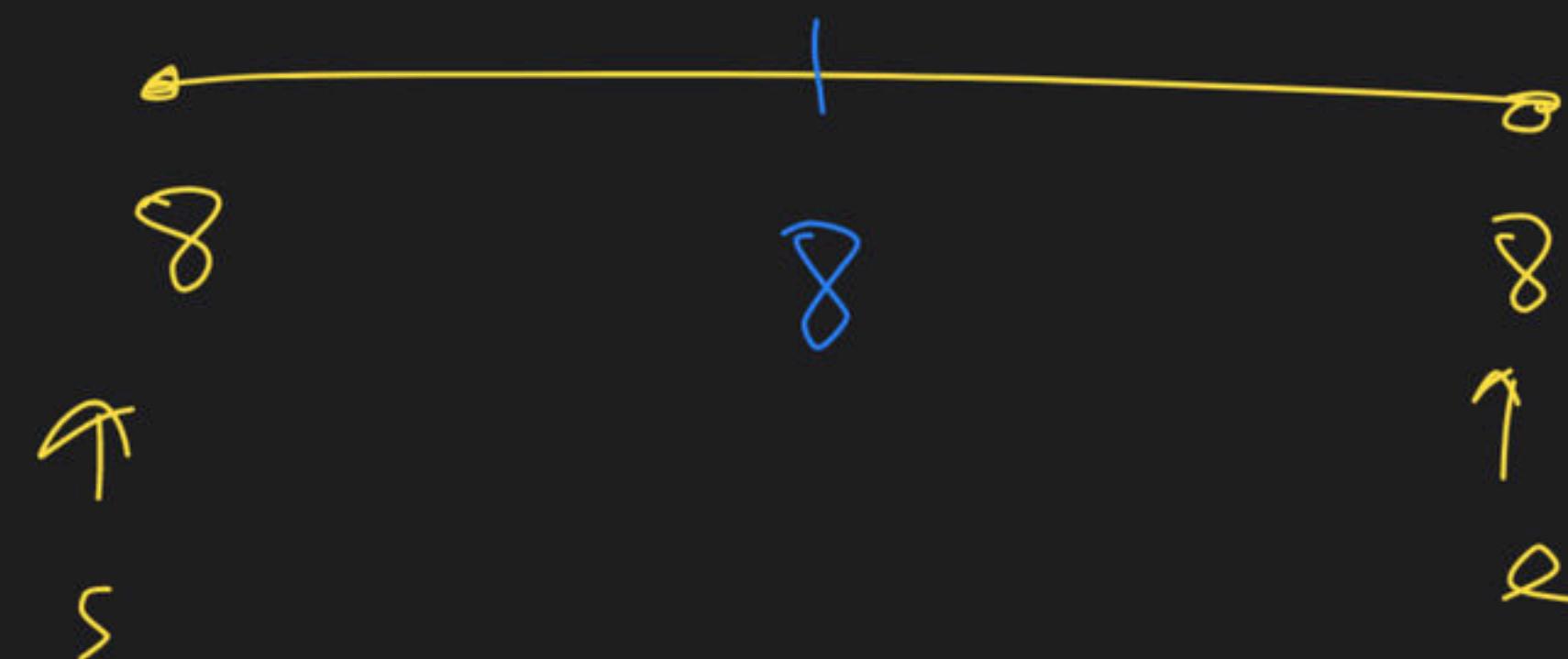
2

三



۳

Sach

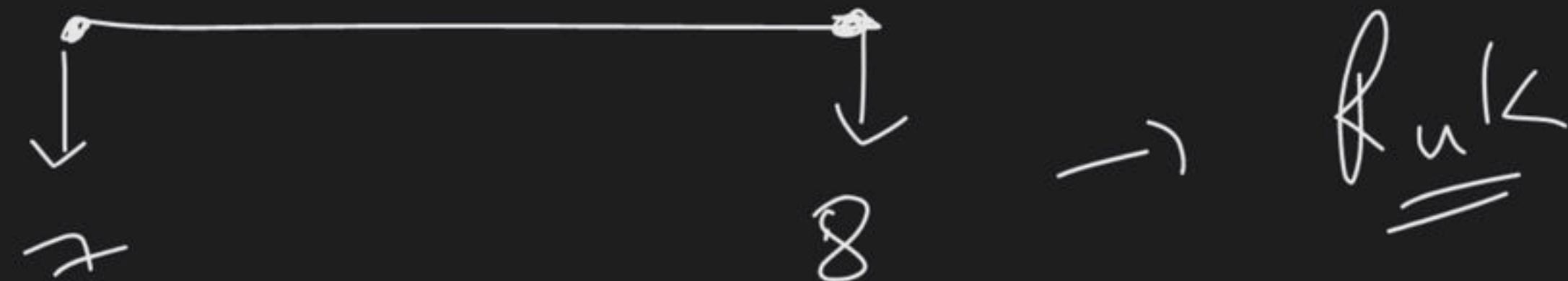


A circled inequality statement:

$$8 * 8 \leq 63$$

A handwritten note next to it says "Not".

$\text{end} = \text{mid} - 1$



gl

B.S  
Non-free

Cond

int  
int  
0

while ( end - start  $\geq 0$ ) Non-pre

start  $\leq$  end

$0 \leq \text{end} - \text{start}$

$(\text{end} - \text{start}) \geq 0$

White {  
end - start  $\geq 0.0001$

$\Rightarrow$

0.000000

3

No Pre  $\leq$  si  $\cup$

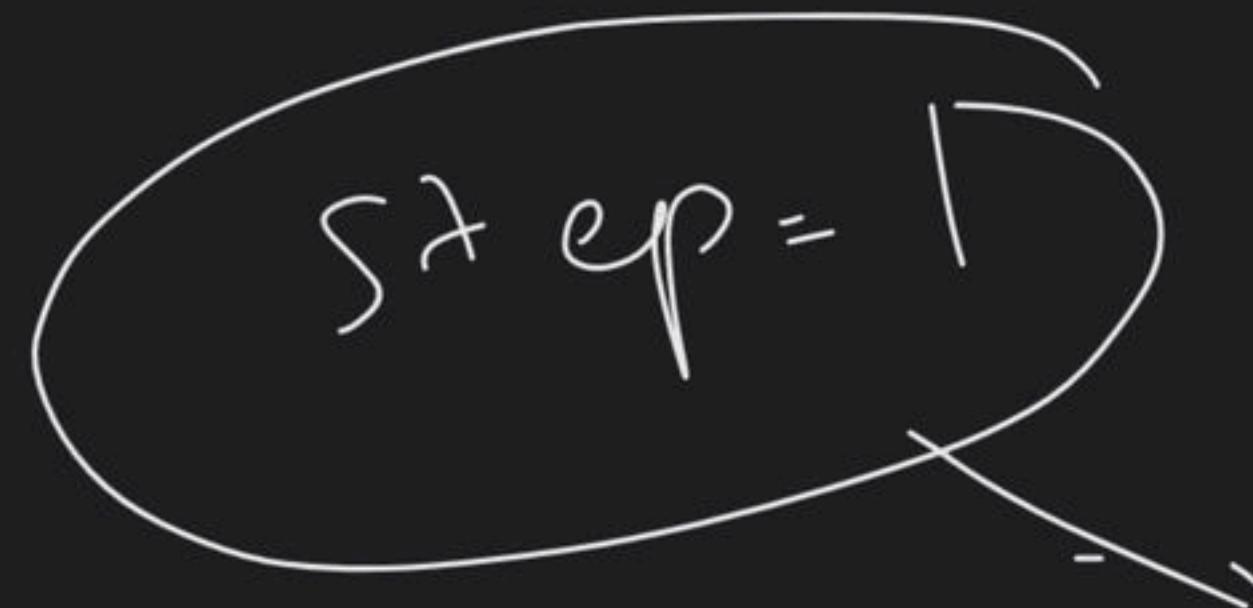


Shurwak

$s \rightarrow$  Non-Pre  $\cup$   
hi kar vah

me

$$s + e = 1$$



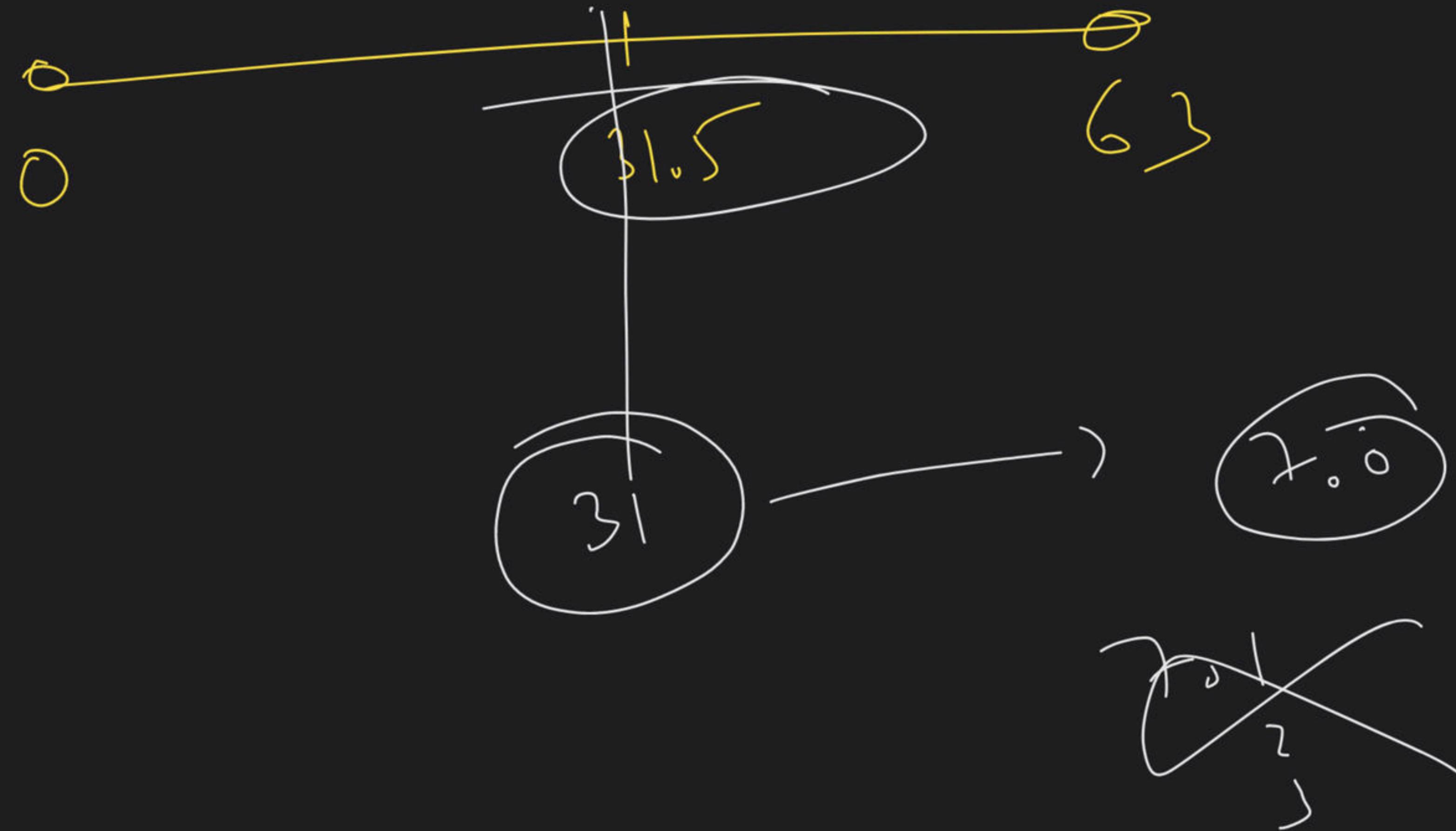
$$start = mid + 1$$

$$end = mid - 1$$

$$mid = (s + e) / 2$$

integer





6

$\sqrt{6} \Rightarrow$  old method  $\Rightarrow x_0 = \checkmark$

B. S. Precision →

31.1 31.2 31.3 1.5

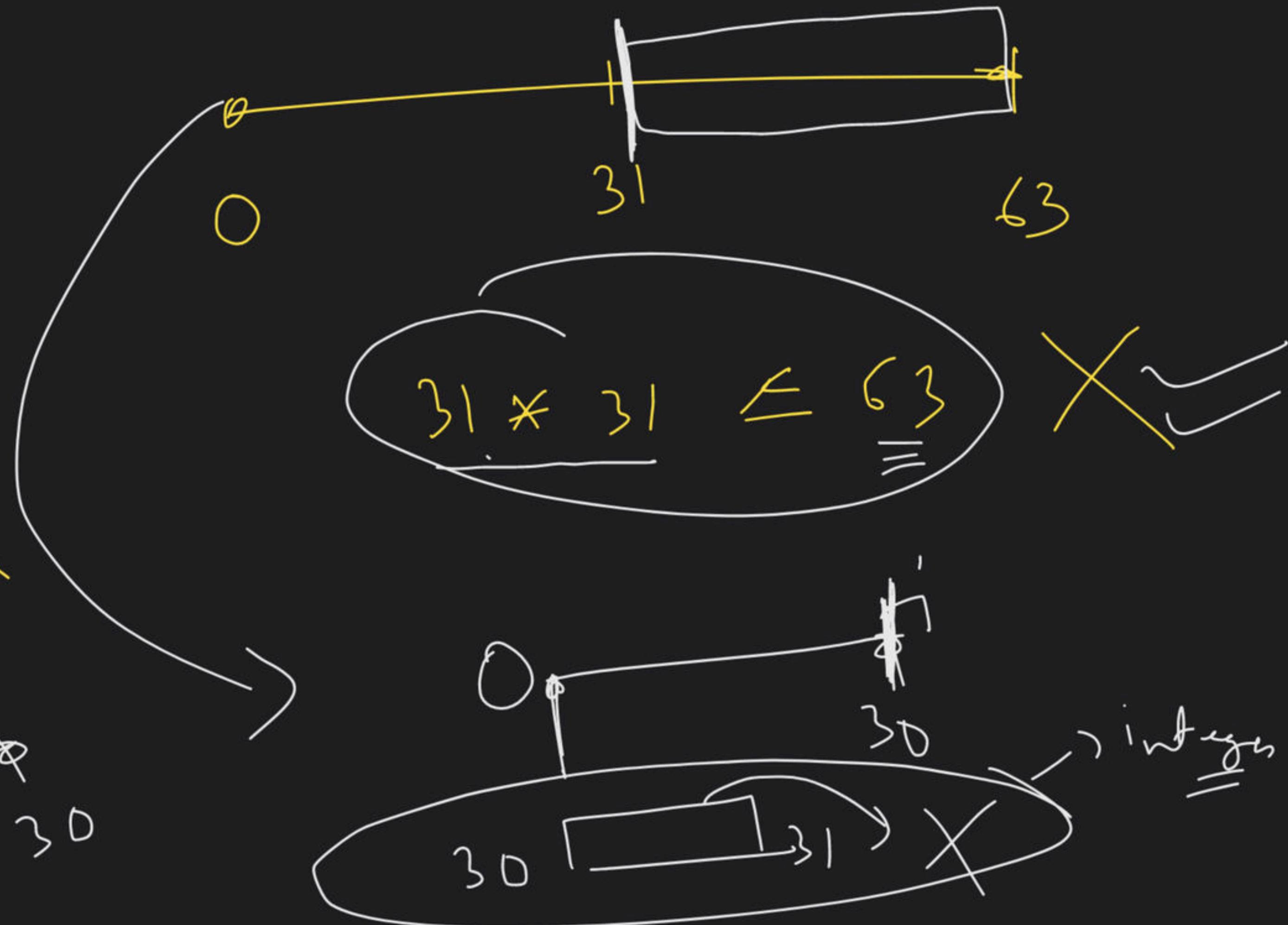
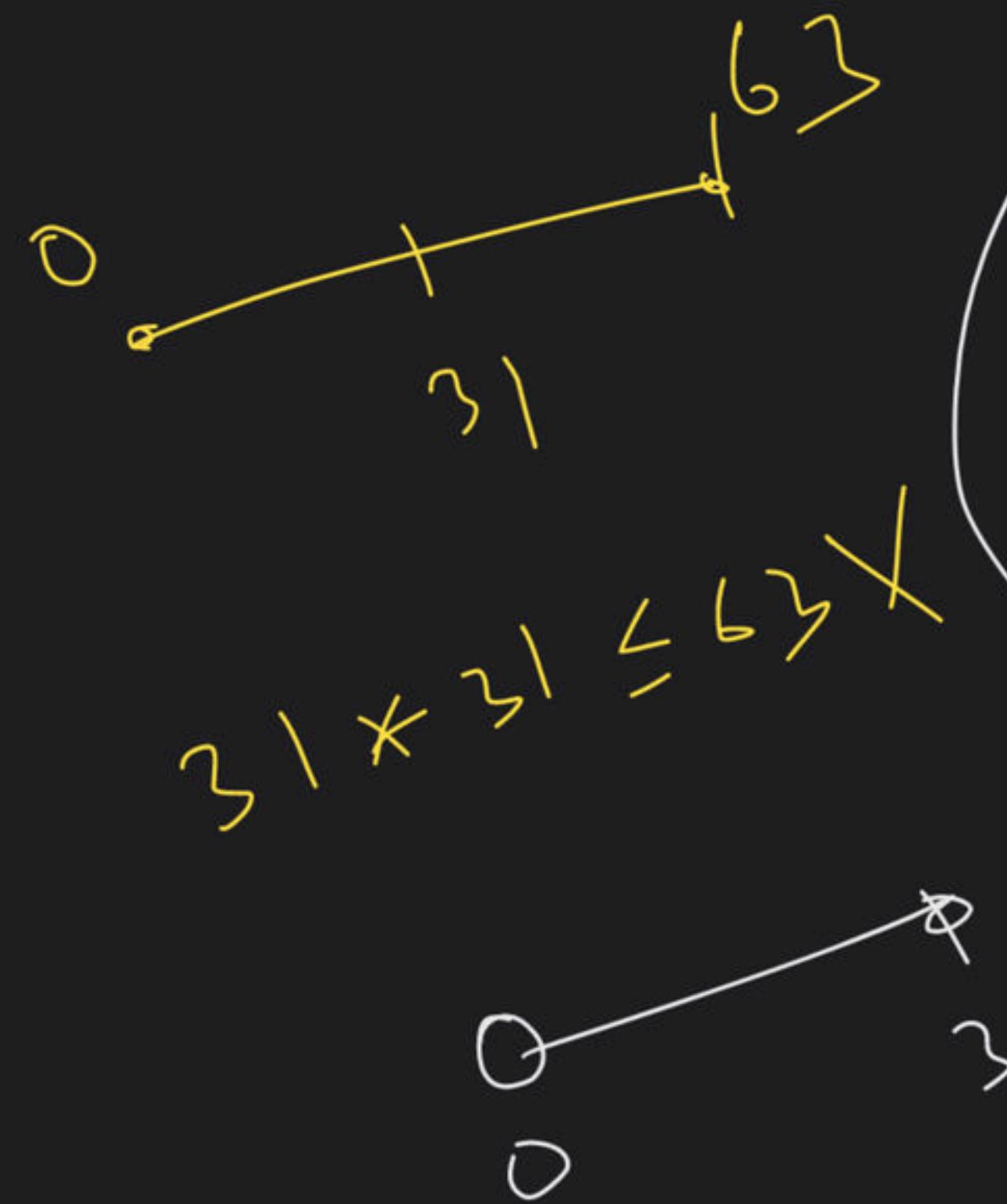
A hand-drawn diagram on a black background. It features a horizontal line with three points labeled '0', '31.5', and '63.0' from left to right. A vertical line segment connects the point '1' (which is circled in yellow) on the top to the horizontal line at the position '31.5'. Two curved arrows originate from the top of this vertical segment and curve upwards towards the right.

$$\Rightarrow 31,5 \times 31,5 = 992,25 \leq 63 \cdot x$$

$\rightarrow \text{end} = \text{mid} - 1$

~0.5

Non-Precision



2

4

1

315

1

63

31.49959595959595

$$31.5 \times 31.5 = 63$$

$$l = mid - 1$$

~~5.6~~

$$\begin{array}{c} \text{O} \\ | \\ \text{O} \end{array} + \begin{array}{c} \text{O} \\ | \\ \text{O} \end{array} \xrightarrow{\text{mid.}} \begin{array}{c} \text{O} \\ | \\ \text{O} \end{array}$$

~~5.6~~  
=

$$5.6 + 5.6 = 11.2$$

2

Precision Division

M<sub>1</sub>

→

B.S



Nonprec. ans  
integer

M<sub>2</sub>

fully B.S

+

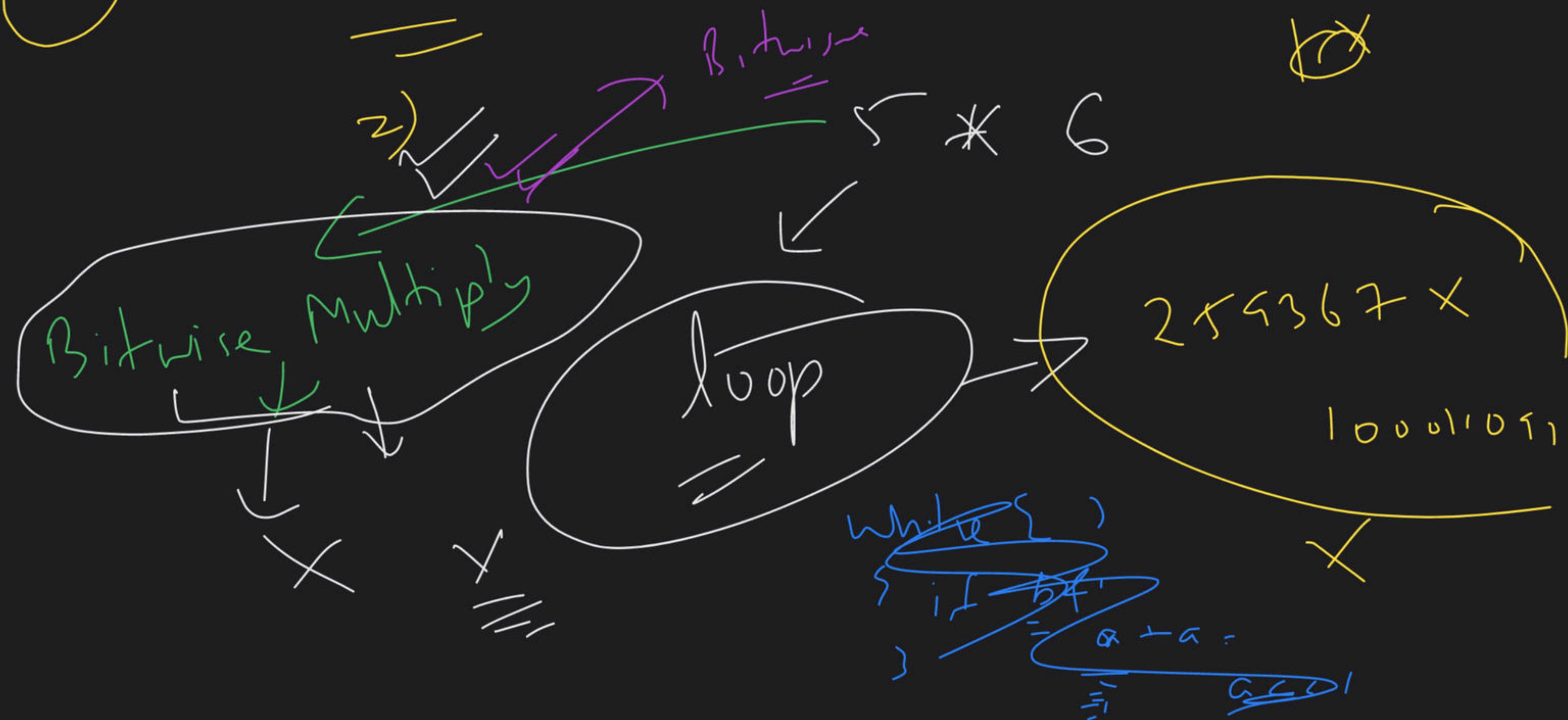
Linear Search



Precision



② Leetcode = 29



INT-MIN → INT-Man

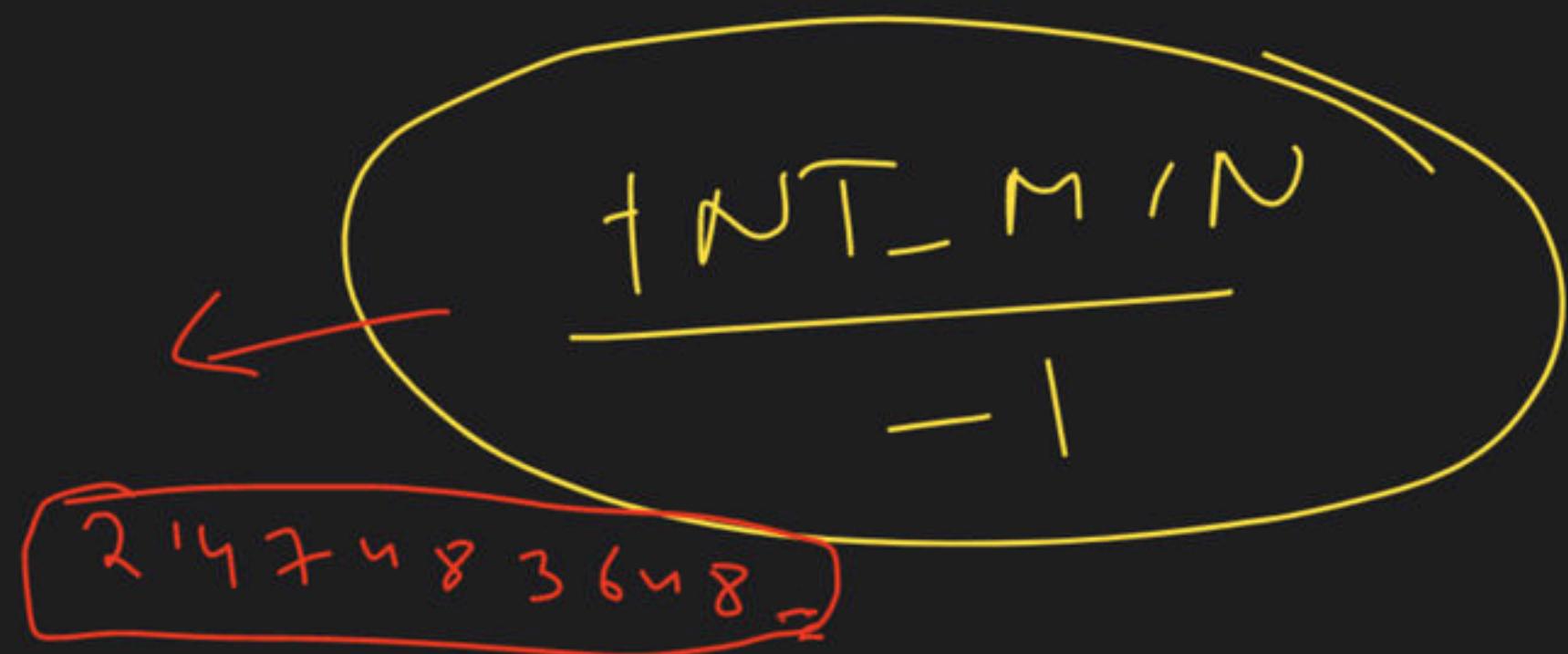
-2<sup>31</sup>

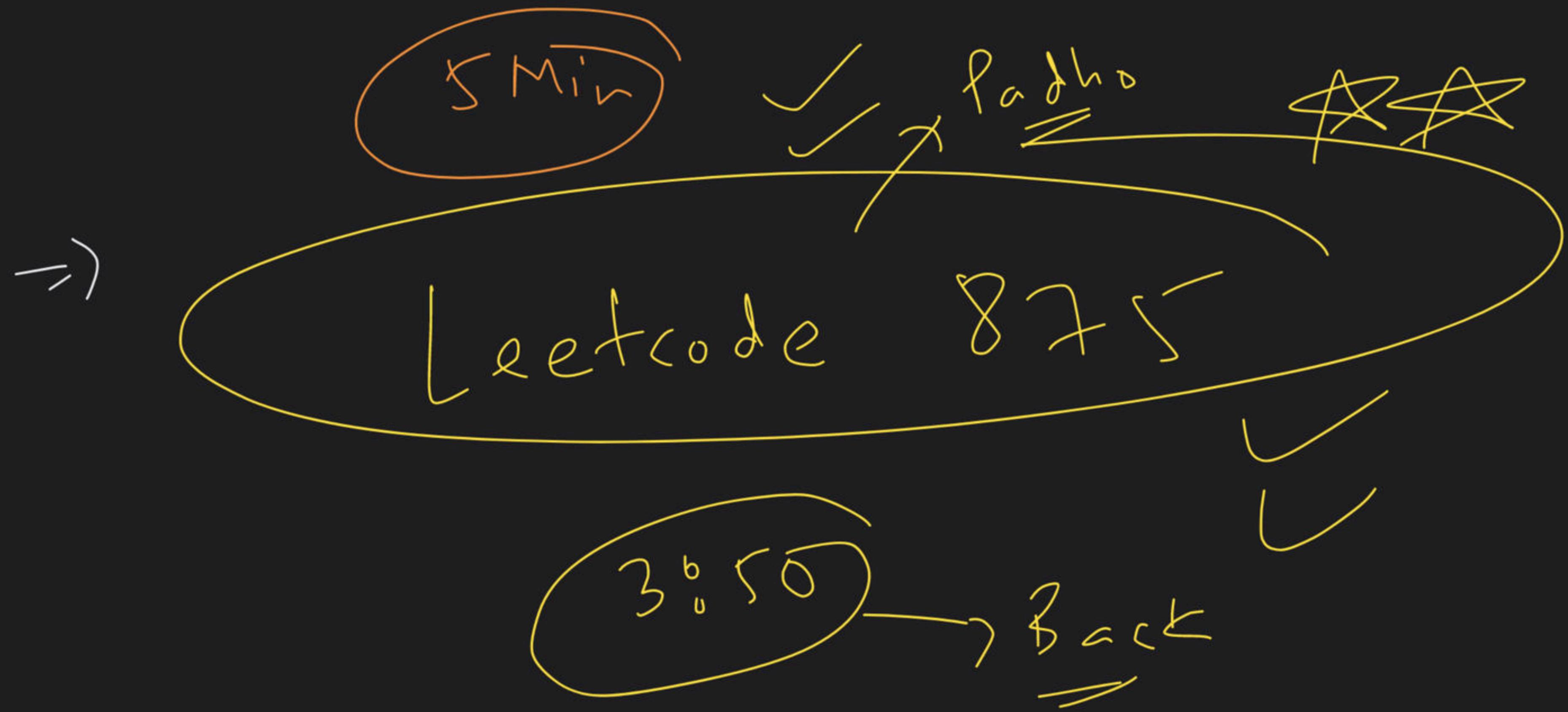
- +2<sup>31</sup> - 1

-2147483648

2147483647

2) ~~-2147483648~~  
-1





#

8756

koku

Eating Bananas

(1)



KOKO

Save  
Bananas

each know

she can eat only 'k' Bananas

NPile

=



guard

gaya

hna hai

h' hours

=

given

= &lt;--

(8)

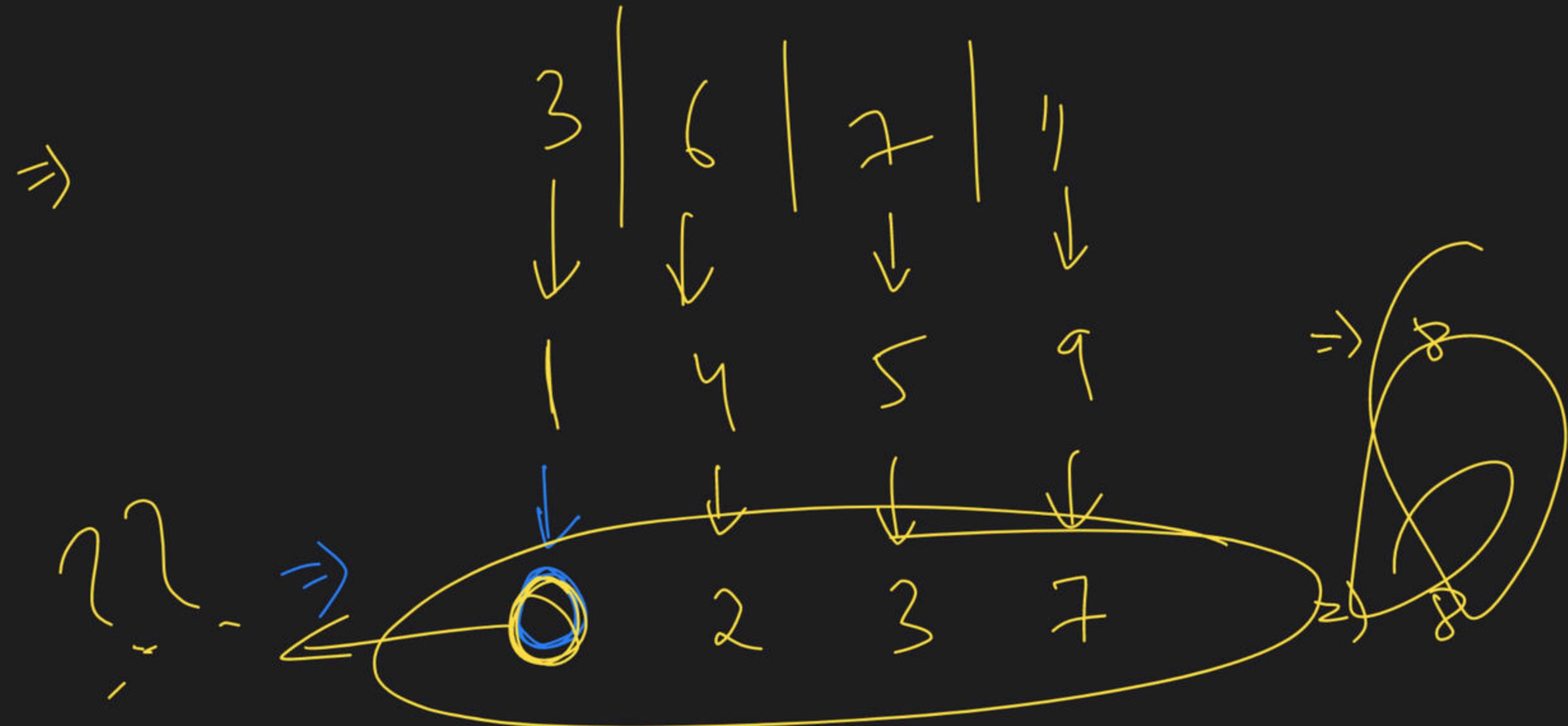
Save

=

$3 | 6 | 7 | 11$

$h = \cancel{8} \cancel{4}$

$\Rightarrow k = 2$



$K=11$

$3 | 6 | \chi | //$

$h = 8$

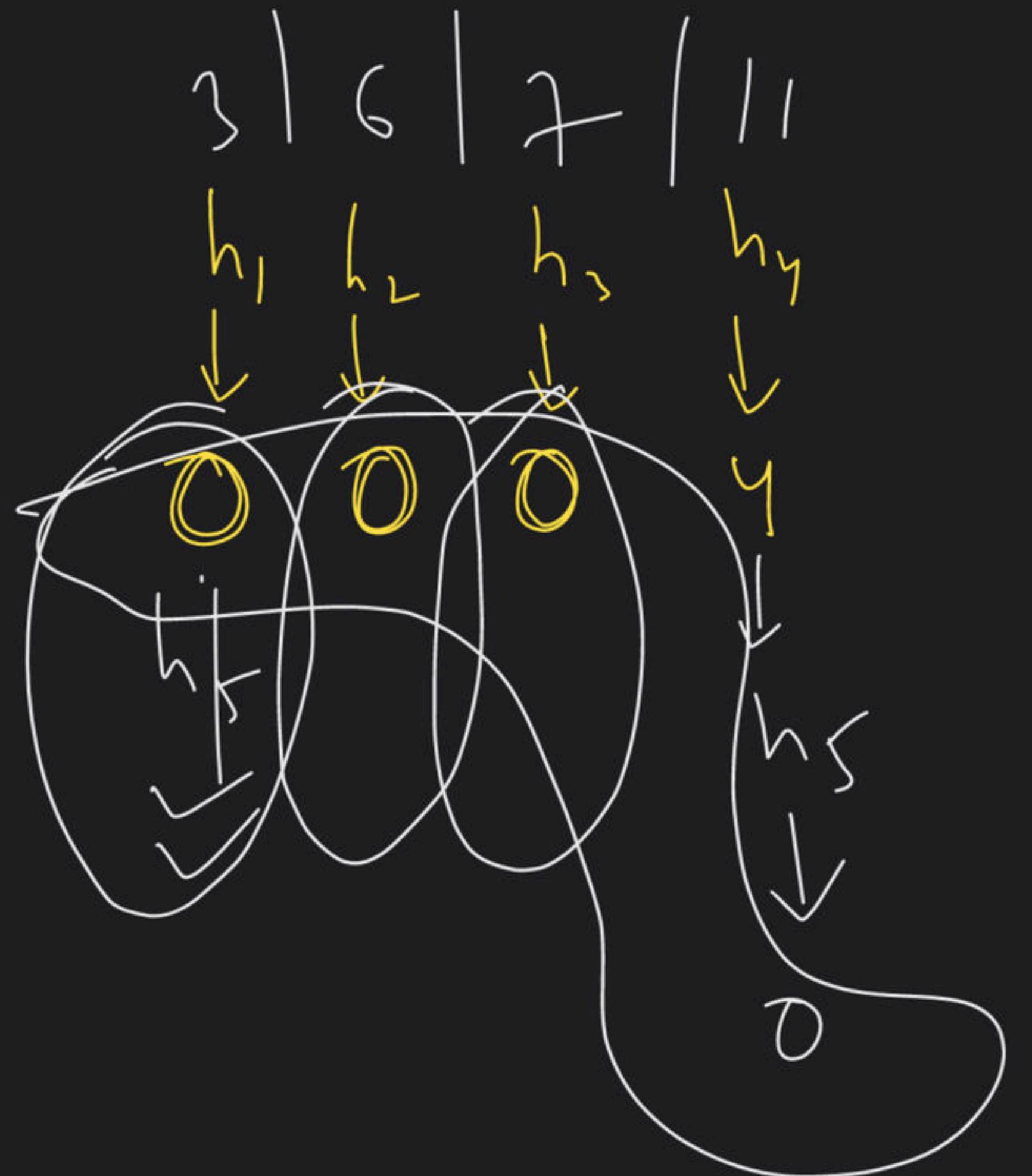
$3 | 6 | \chi | //$

$h_1$        $h_2$        $h_3$        $h_4$

$\checkmark$        $\checkmark$

$K = 15$

$$K = 7$$



3 | 6 | 7 | 11

$h_1$   $h_2$   $h_3$   $h_4$

$h = 8$

$$\sum h_i \leq h$$

$$K = 7$$

3 | 6 | 7 | |

A hand-drawn diagram on a black background. It features a large, irregular oval shape drawn with a single continuous line. Inside this oval, the word "LOODS" is written in a cursive, handwritten font. Below this main oval, there is a smaller, separate oval shape containing the letters "DOD". To the left of the main oval, there is a large, open arrow pointing towards the word "LOODS". The entire drawing is done in white ink or paint.

$$\Rightarrow \angle = 100^\circ$$

K = 100

A hand-drawn diagram on a black background. At the top, there is a large white circle containing four vertical yellow lines. Inside these lines, the numbers 3, 6, 7, and 1 are written in yellow. Below the circle, four white arrows point downwards from the vertical lines to a row of five checkmarks (✓) on the black background.

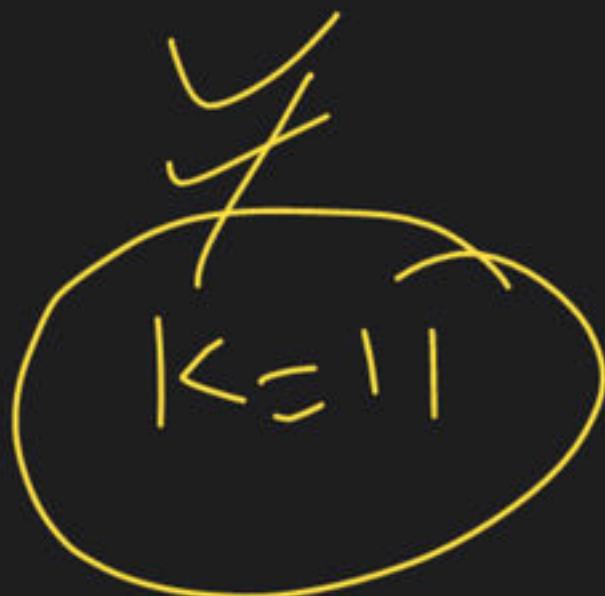
The diagram consists of two nested ellipses drawn with yellow and white lines on a black background. The inner ellipse, outlined in yellow, contains the handwritten text "h = 1". The outer ellipse, outlined in white, contains the handwritten text "h = 2". A small vertical tick mark is located on the left side of the inner ellipse's major axis.

$h \geq \text{Pillen. size}$

$3 | 6 | 7 | 11$



$1 =$



$k = 7 = 3 | ( | 7 | 11 )$

$h_1 \quad h_2 \quad h_3 \quad \downarrow h_n$   
 $\checkmark \quad \checkmark \quad \downarrow \quad \downarrow$   
 $h_5 \quad \downarrow$

$h = 8$

$h = 8 \geq \rho_{\text{iles.size}}$

$$10 \leq 8$$

$\downarrow$

Pakki  $\checkmark$   $k = 3$

$$h = 8$$

$$3 | 6 | 2 | 1 |$$

$$\begin{matrix} 7 \\ h_1 \\ 4 \\ h_2 \end{matrix}$$

How many hours Kokoo will take to finish all the Bananas with  $k$  Bananas eaten

speed per hour?

$\Rightarrow$

$$1 + 2 + \lceil \text{ceil}(2.33) \rceil + \lceil \text{ceil}(3.6) \rceil$$

$$1 + 2 + 3 + 4$$

$$= 10 \text{ hr}$$

$$3 | 6 | 7 | 1 |$$

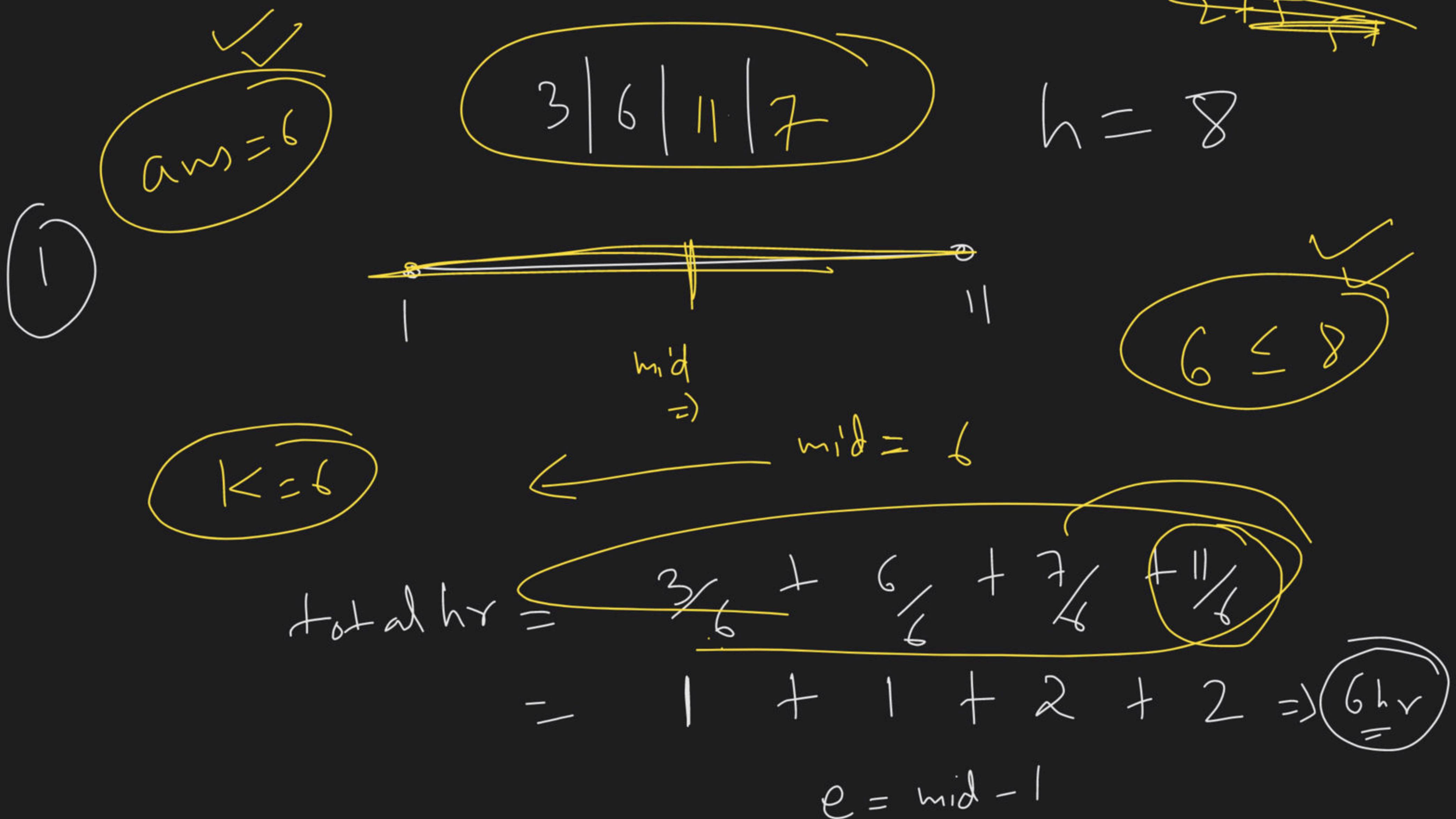
$\downarrow$   
 $3/3$   
 $\downarrow$   
 $2$

$\downarrow$   
 $6/3$   
 $\downarrow$   
 $2$

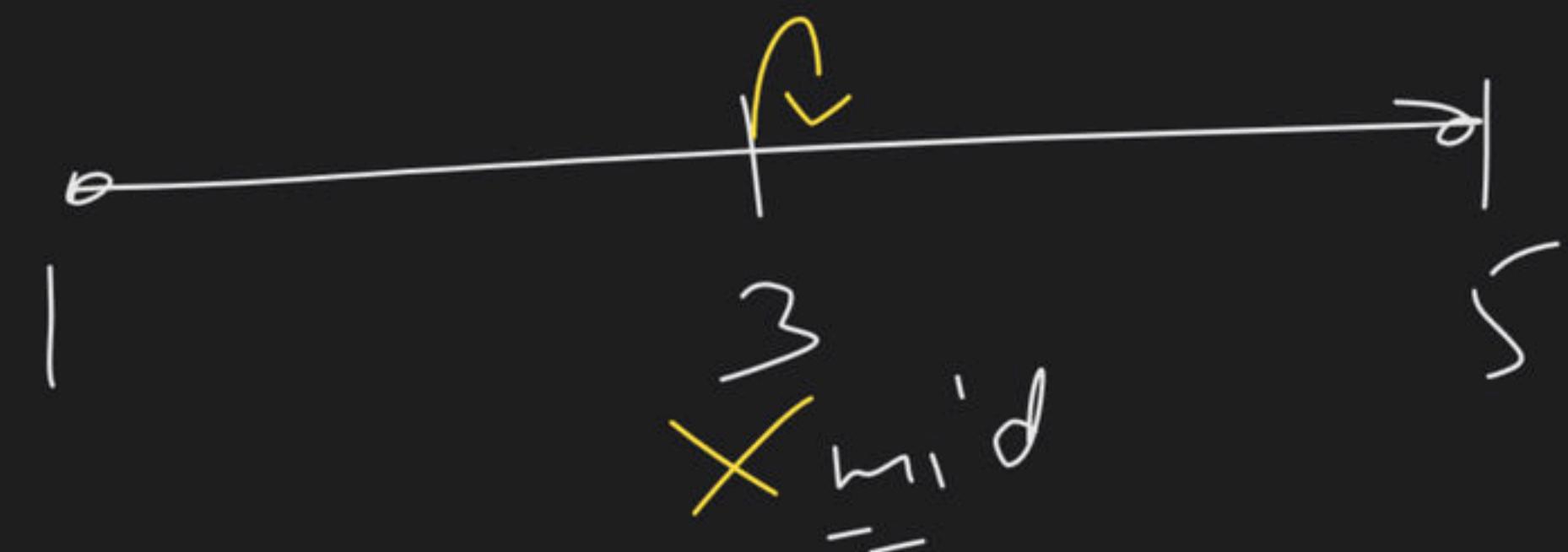
$\downarrow$   
 $7/3$   
 $\downarrow$   
 $3$

$\downarrow$   
 $11/3$   
 $= 3.6$

$2.33$



2



$k \leq 3$

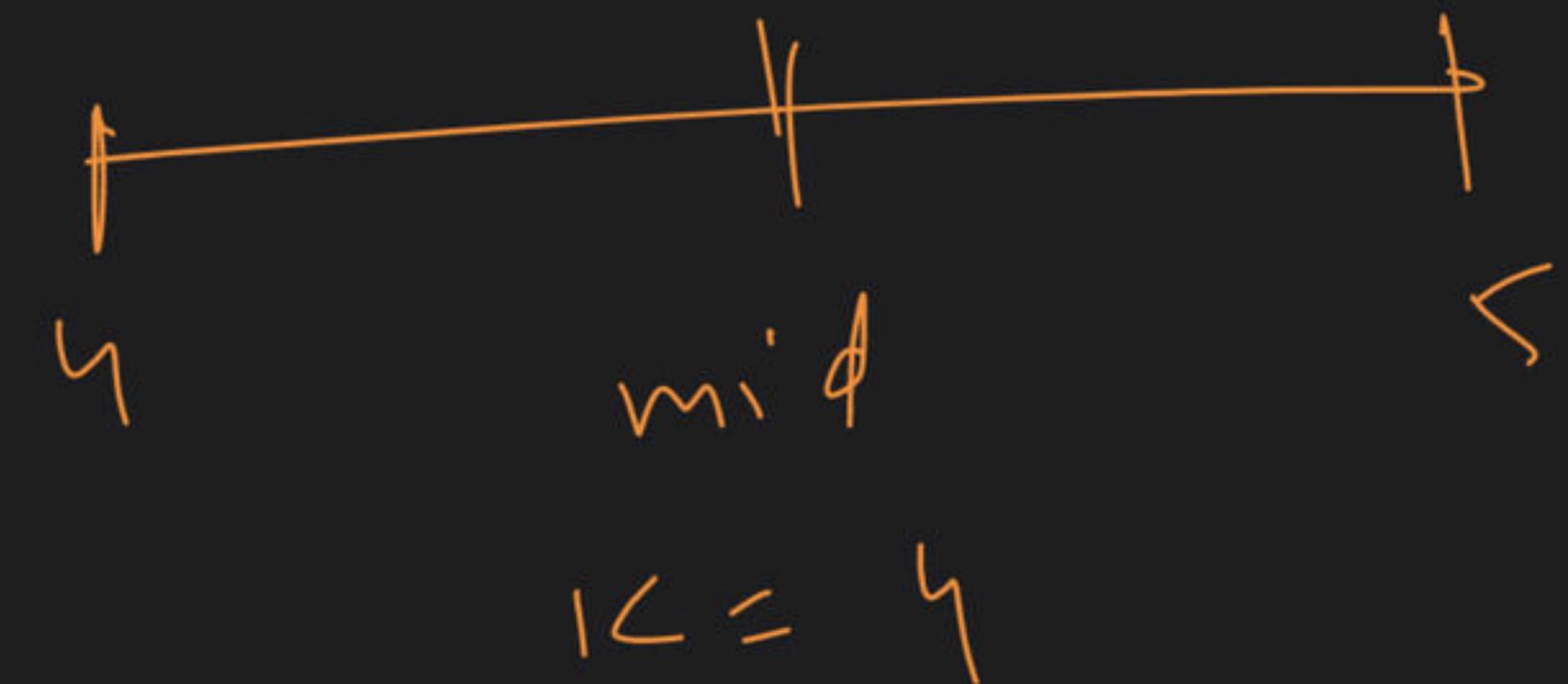
$\hookrightarrow \text{Total} \Rightarrow \frac{3}{3} + \frac{6}{3} + \frac{7}{2} + \frac{11}{3}$

~~X~~  $= 1 + 2 + 3 + 4 = 10$

$s = mid + 1$

$10 \leq 8$

③



3 | 6 | 7 | 11

Total elements  $\Rightarrow$

$$\frac{3}{4} + \frac{6}{4} + \frac{7}{4} + \frac{11}{4}$$

$$1 + 2 + 2 + 3 = 8$$

$$\text{end} - \text{mid} - 1 \\ \text{end} = 3$$

8  $\leq$  8

✓

Ans = 8

6

u  
↓  
s  
3  
e

Ruk Jiang

6  
 $s > e$

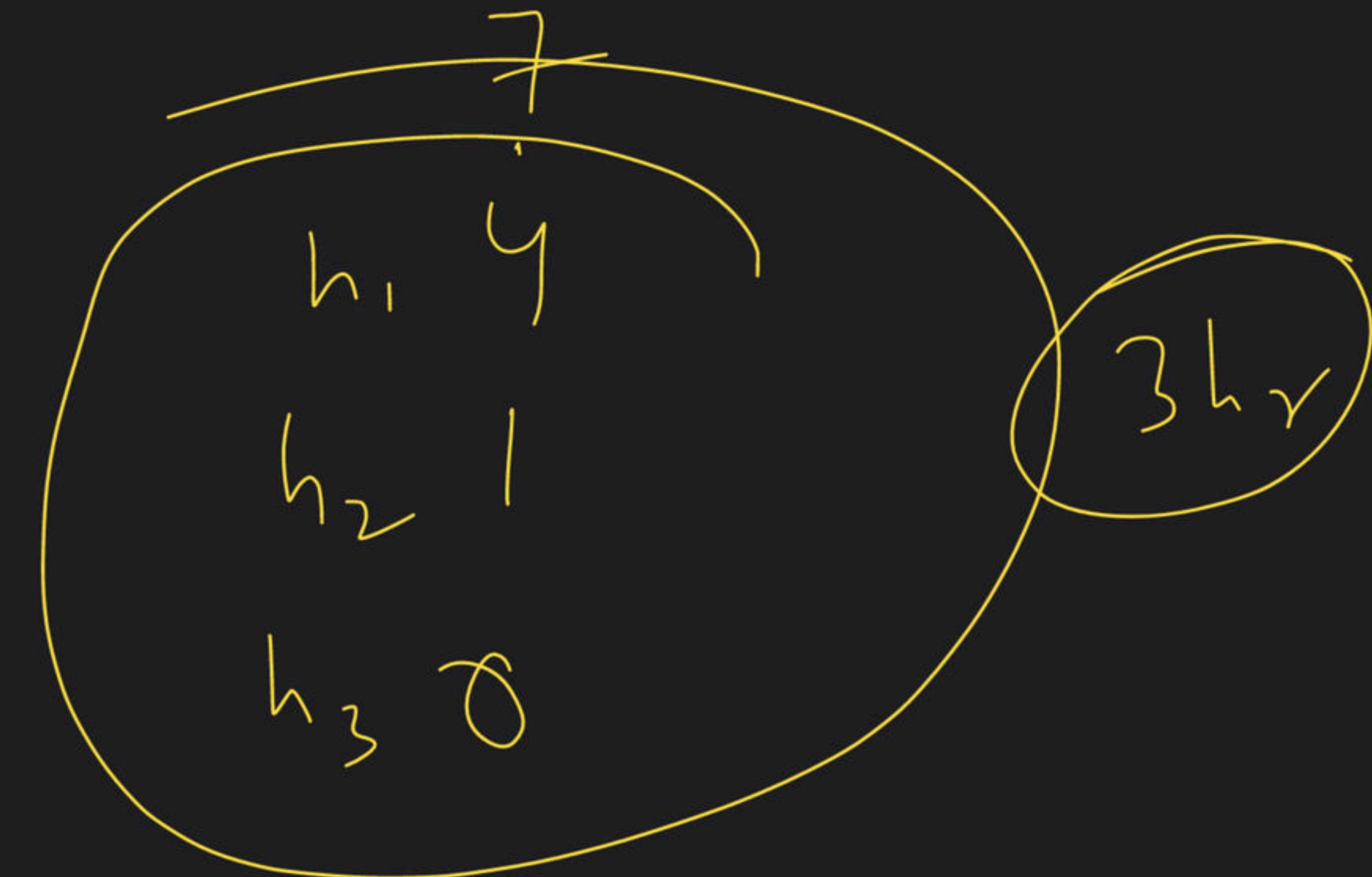
$$2.5 \rightarrow (e^i) \Rightarrow 3.0$$

$$2.5 \rightarrow \text{flow} \Rightarrow 2.0$$

$$2.73 \rightarrow \text{flow} \Rightarrow 2$$

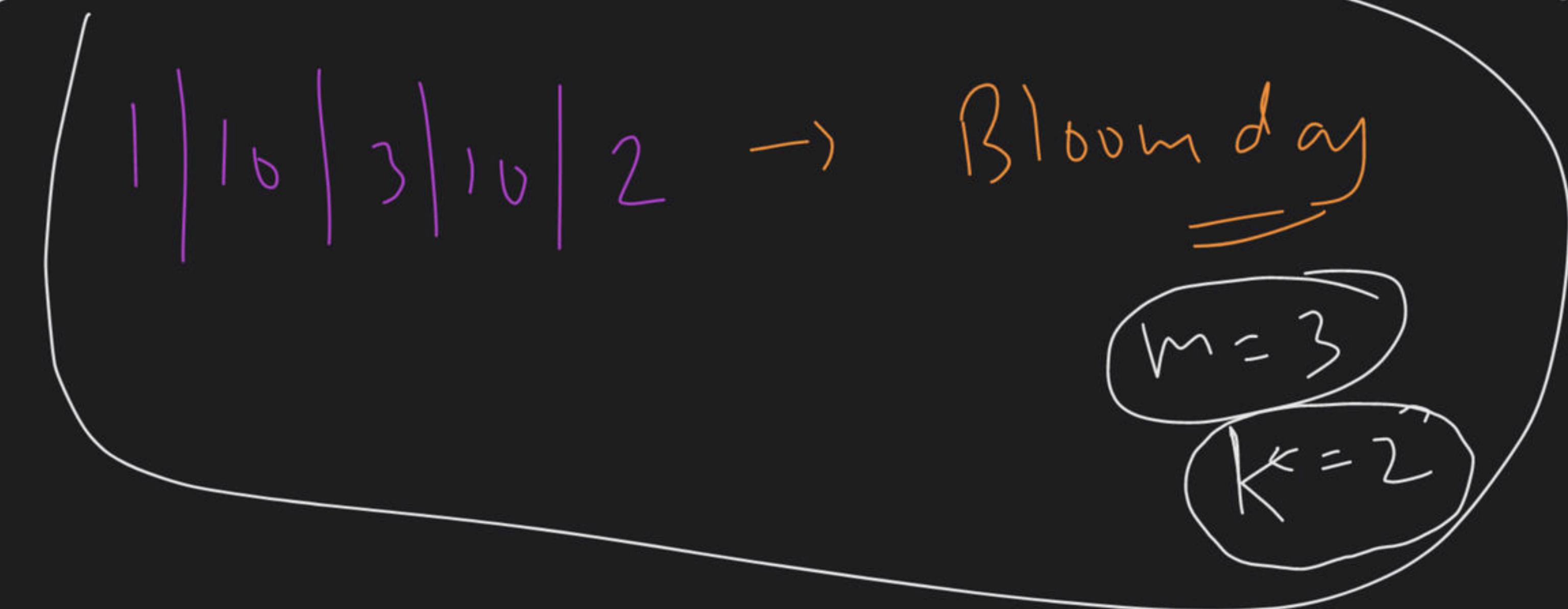
$$2.73 \rightarrow (e^i) \Rightarrow 3$$

$k \Rightarrow$



$L C \Rightarrow | 482$   
 $=$  Min. no. of days to  
make 'm' Bong webs

$\Rightarrow$



$$S \geq 6$$

adjacent

day

2

2

2

1

5

A blackboard with various mathematical symbols and numbers written in white chalk. A large orange curved arrow points from the left towards the center. The symbols include crosses (X), a question mark (?), a checkmark (✓), a minus sign (-), a plus sign (+), a multiplication sign (×), a division sign (÷), and several numbers (9, 8, 7, 6, 5, 4, 3, 2, 1).

- 
- 
- 
- 
-

7 → × 3 × 3 ×

$$8 \rightarrow \times 2 \times 2 \times$$

9 → ✓ | ✓ | ✗

D → X X X X

$$\Rightarrow N \geq mk$$

Make Bouquets

Total flowers =

if ( $N \geq mk$ )  
return -1

else =  $n^0$

No. possible

7 | 7 | 7 | 7 | 12 | 7

$m = 2$   
 $| \leq 3$

$N = 7$

$x \geq 6$



$2 \times 3$

6

7 | 2 | 2 | 7 | 1 | 12 | 7 | 7

Day 1 =>

Day 2

Day 7 => X X X X - - X X

Day 11 => X X X X - X X  
①

Day 12 => X X X X X X X X  
① ②

$$N =$$

$$8$$

$$M = 2$$

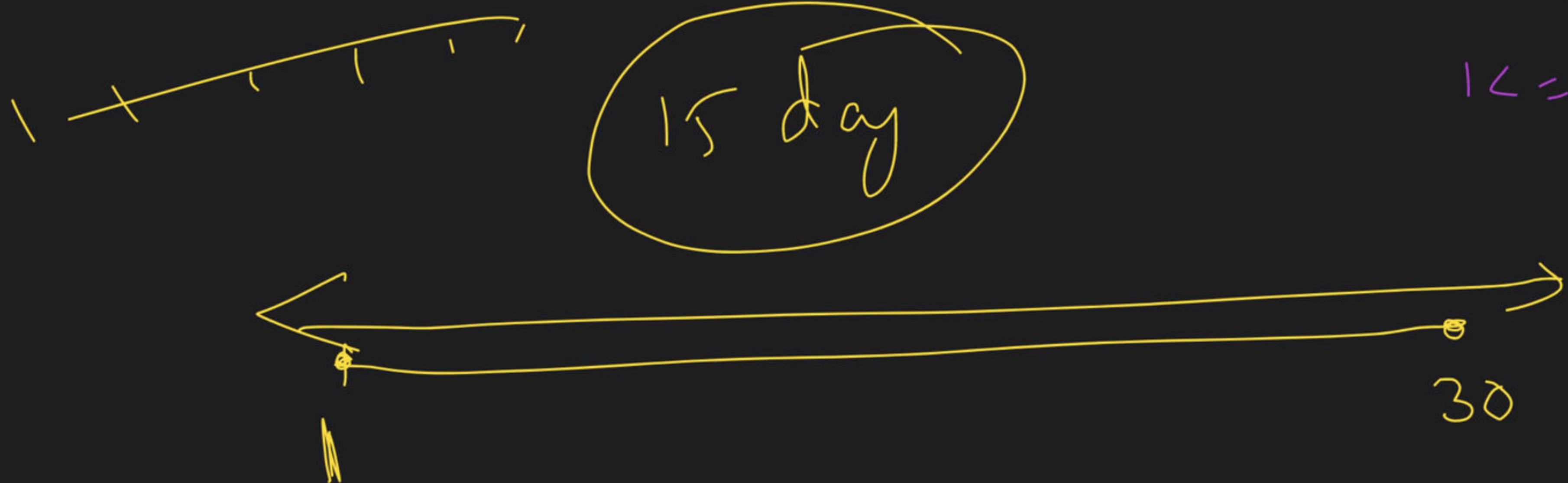
$$K = 3$$

$$8 \geq 0$$

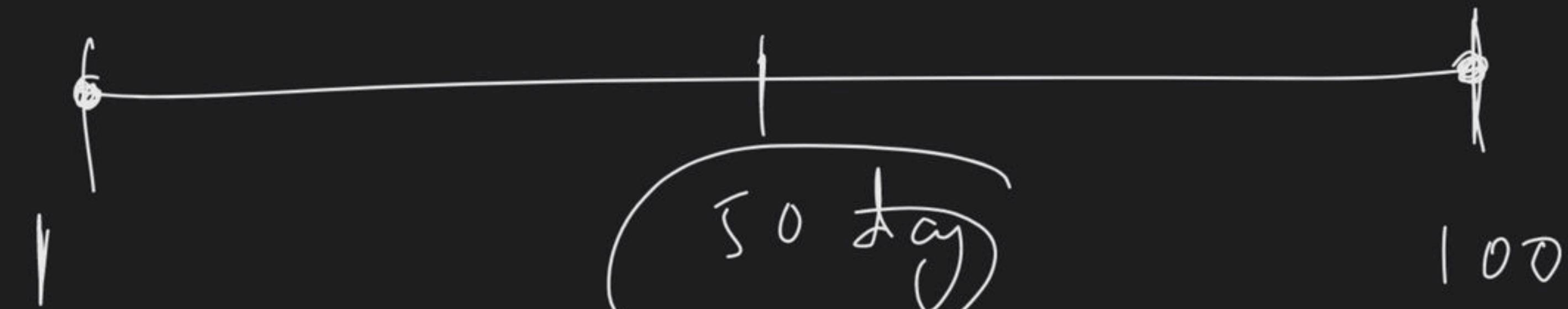
7 | 7 | 7 | 7 | 1 | 1 | 12 | -

w = 3

l <= 3



$\Rightarrow$



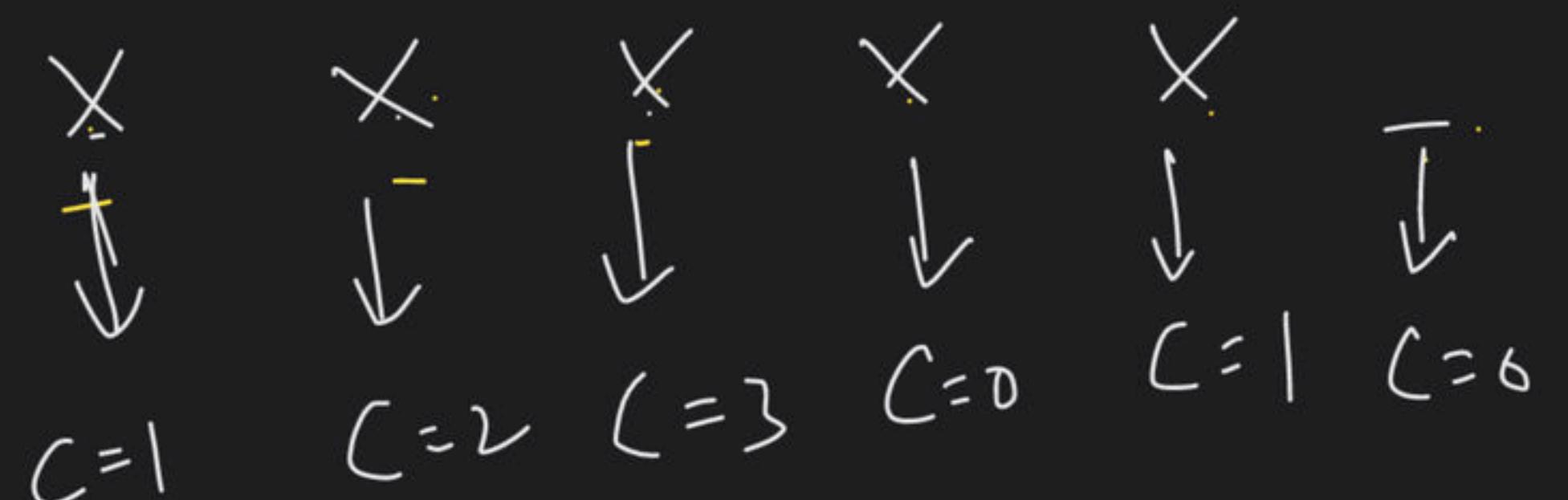
✓ Bouquets



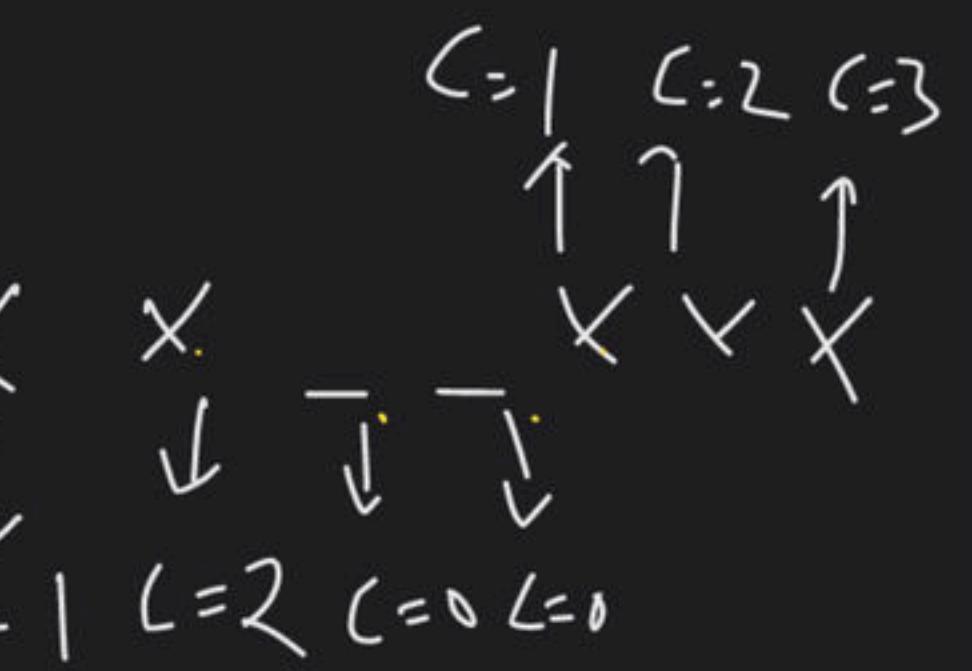
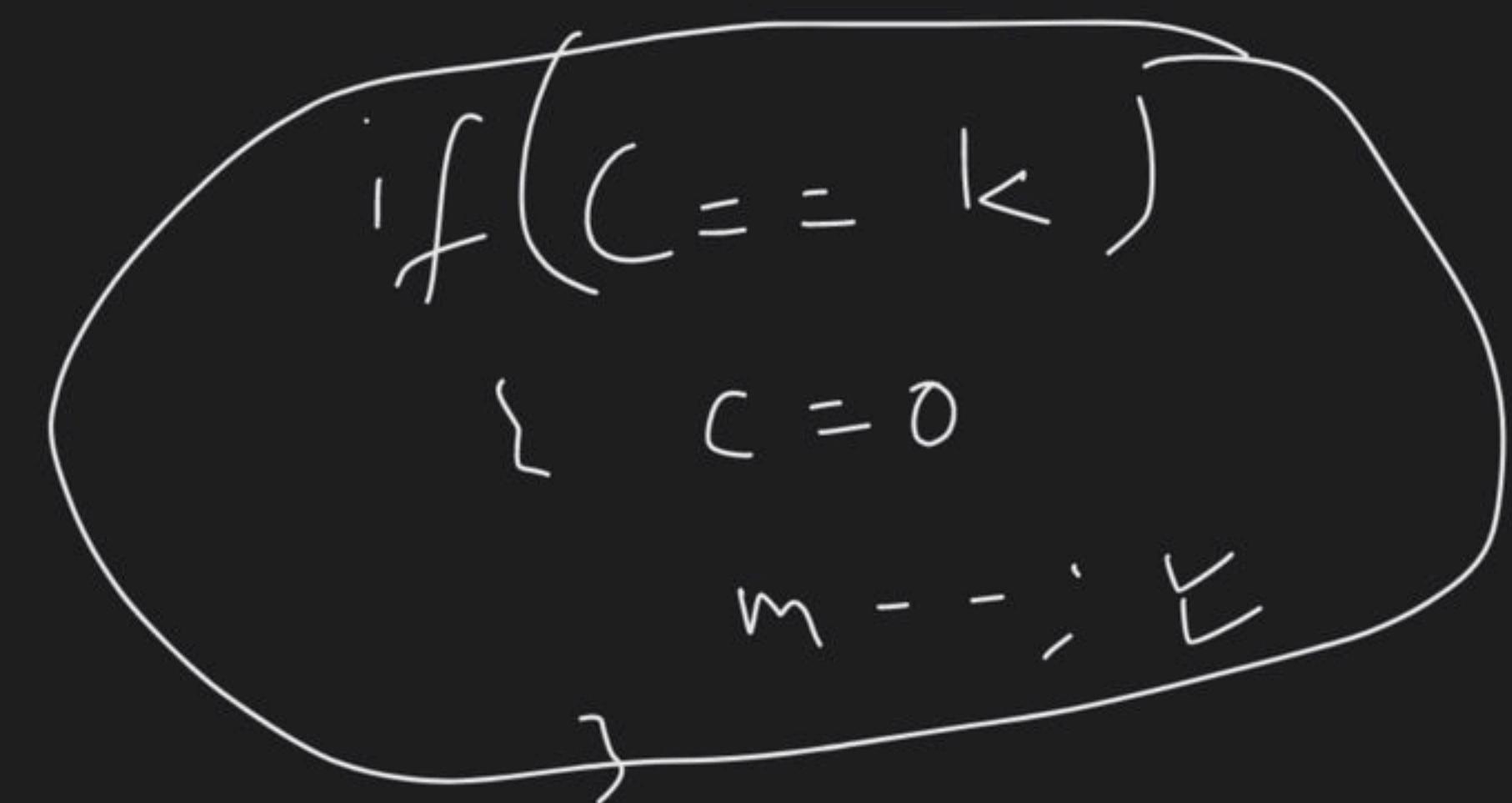
$| < \Rightarrow \Rightarrow \textcircled{G}$

$k = 3, m = 4$

Day 0  $\Rightarrow$



$C = 0$



if (Non-Bloomed)

{  
    C = 0  
}

①

Search Space  $\rightarrow$  Days

②

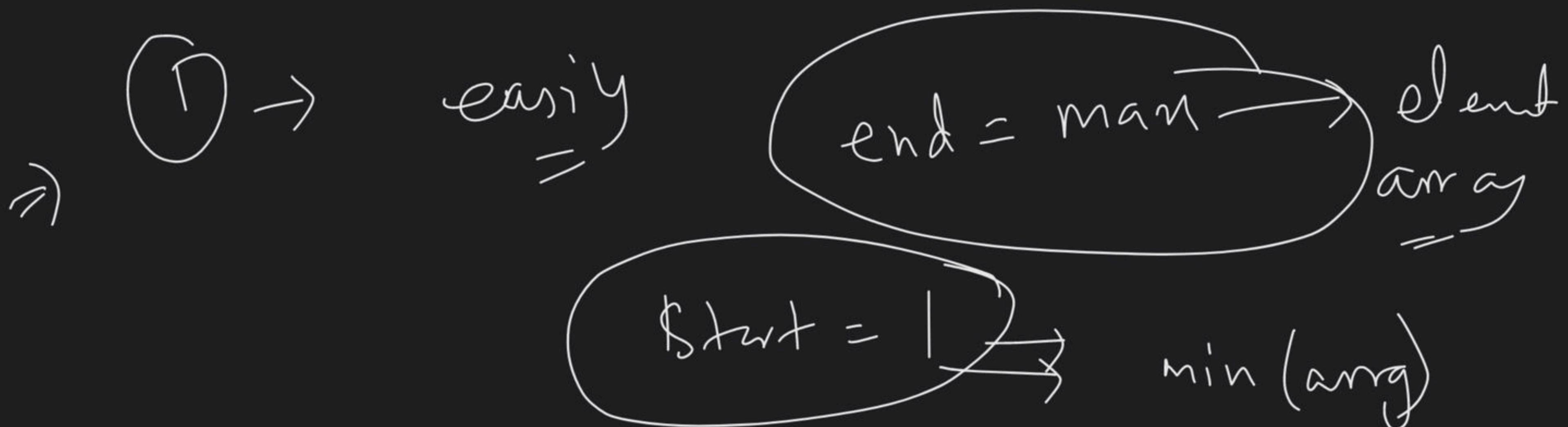
- Monotonic  
 $\equiv$

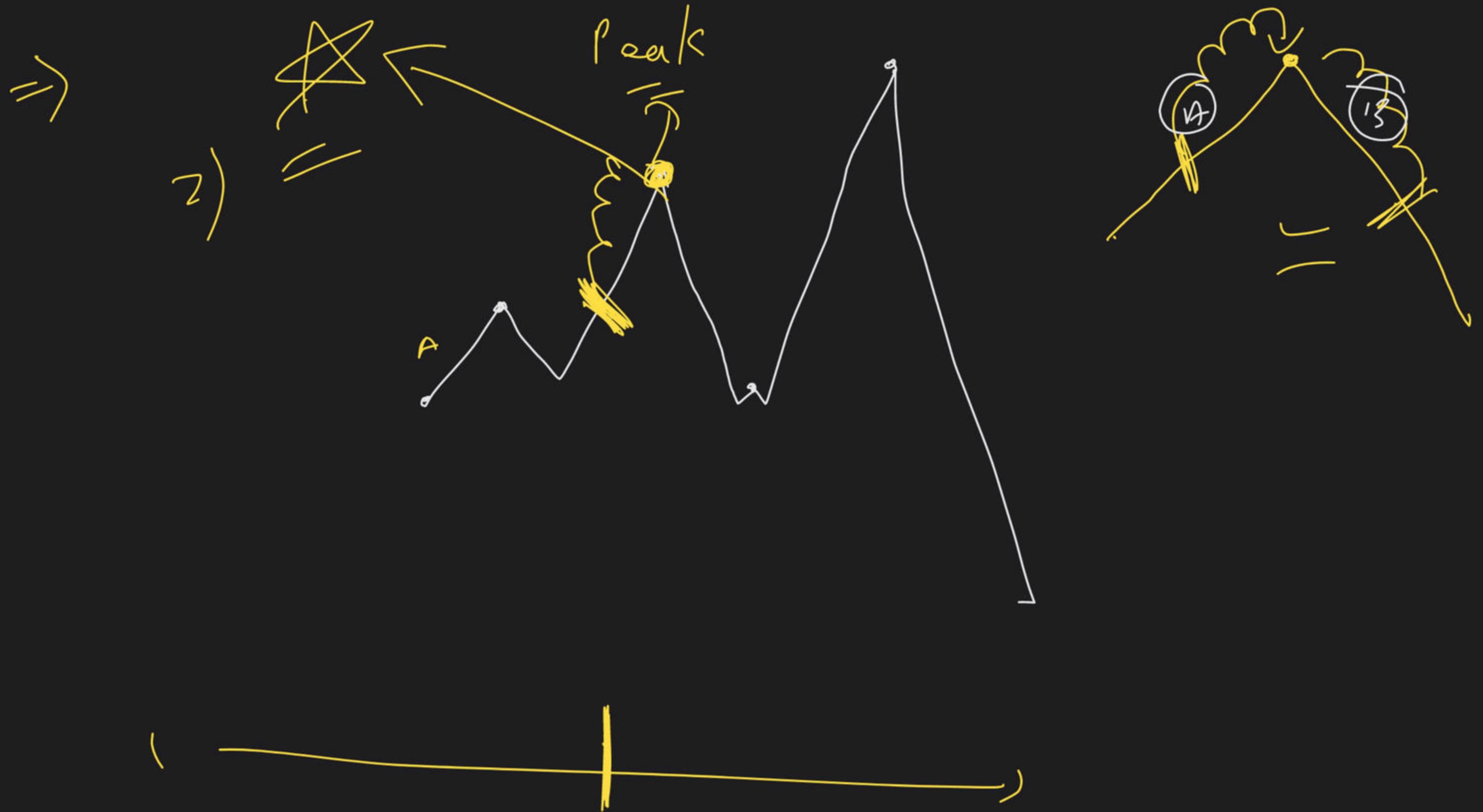
③

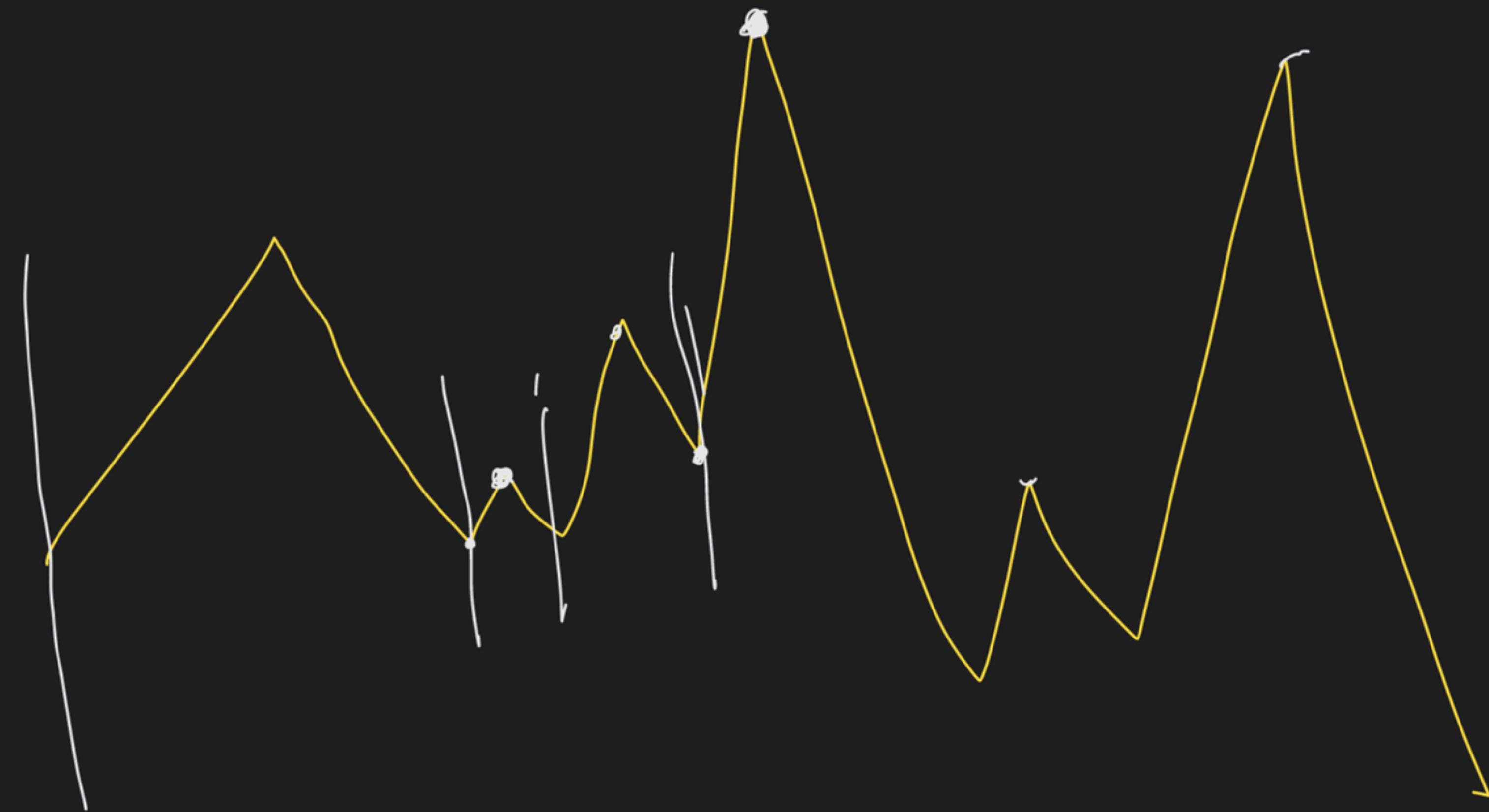
Given days  $\rightarrow$  Predicate  $f^n$

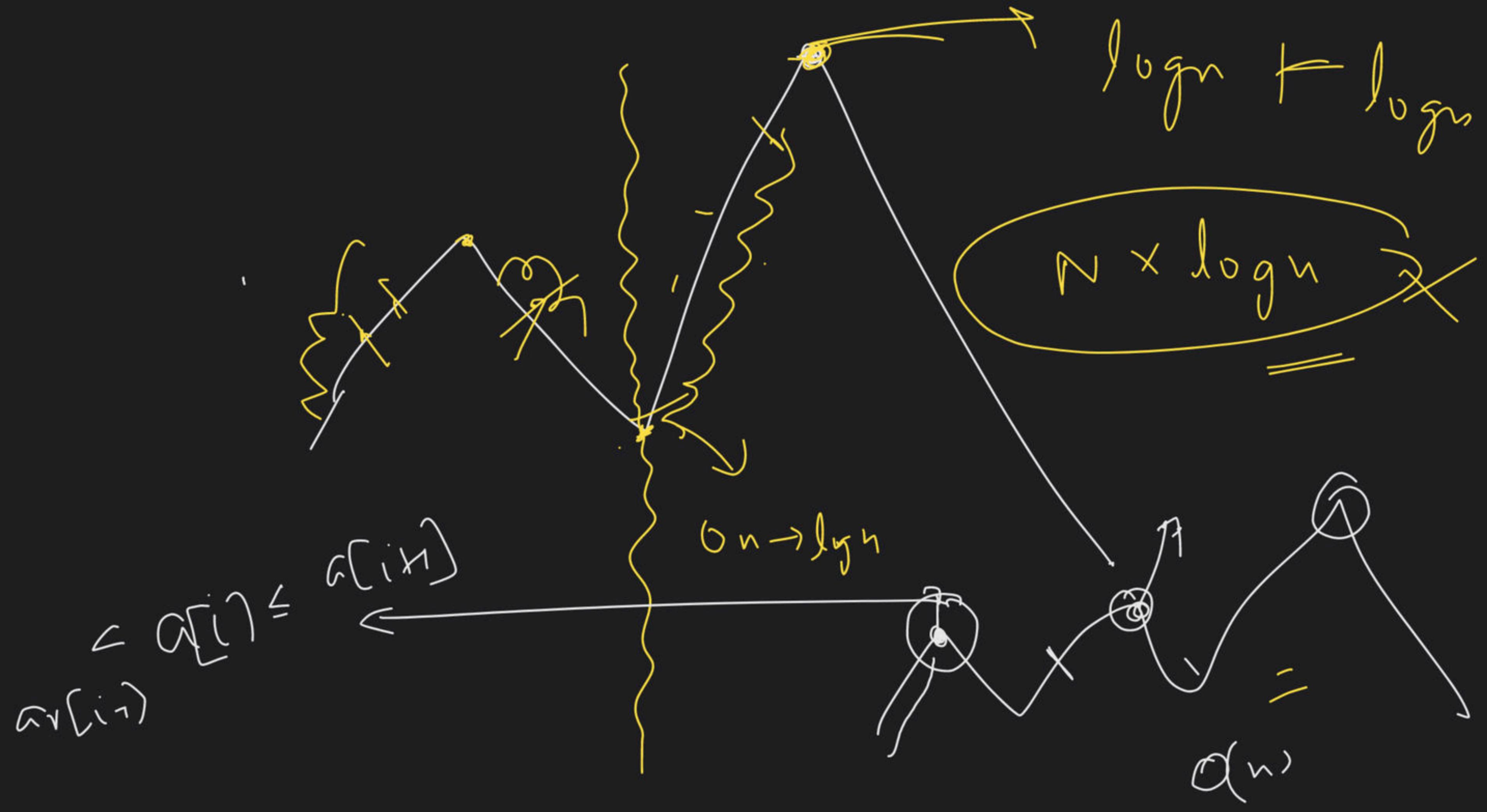
$m \rightarrow$  Bouquet  $\checkmark$

2 | 3 | 4 | x | x | 7 | 8 | 2 | 1 | 10 | 1









Lc - 162

Find Peak Element

Code will be given