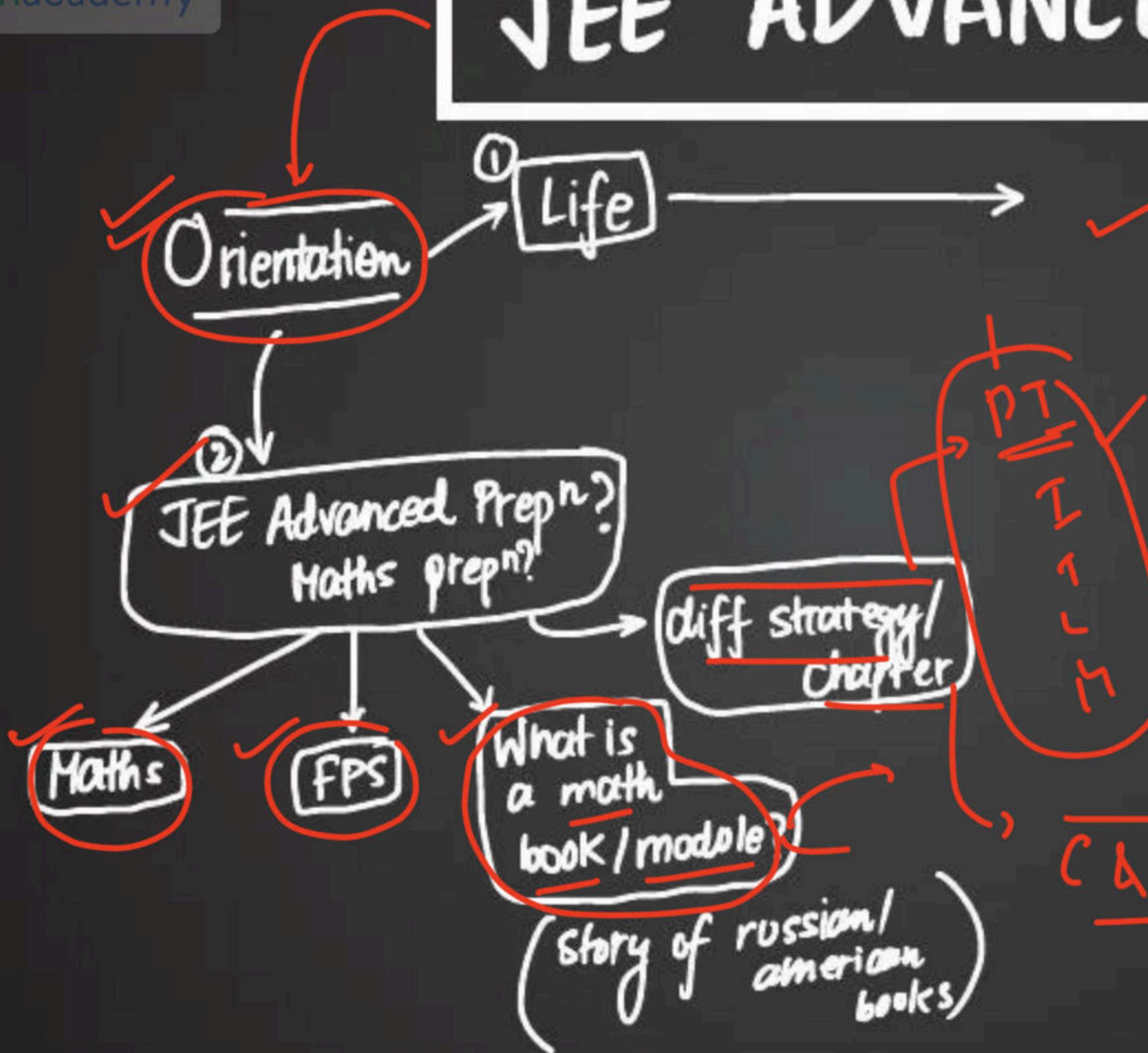


F.

Arithmetic and the beginning of mathematics

Course on Mathematics for JEE 2026

JEE ADVANCED 2026

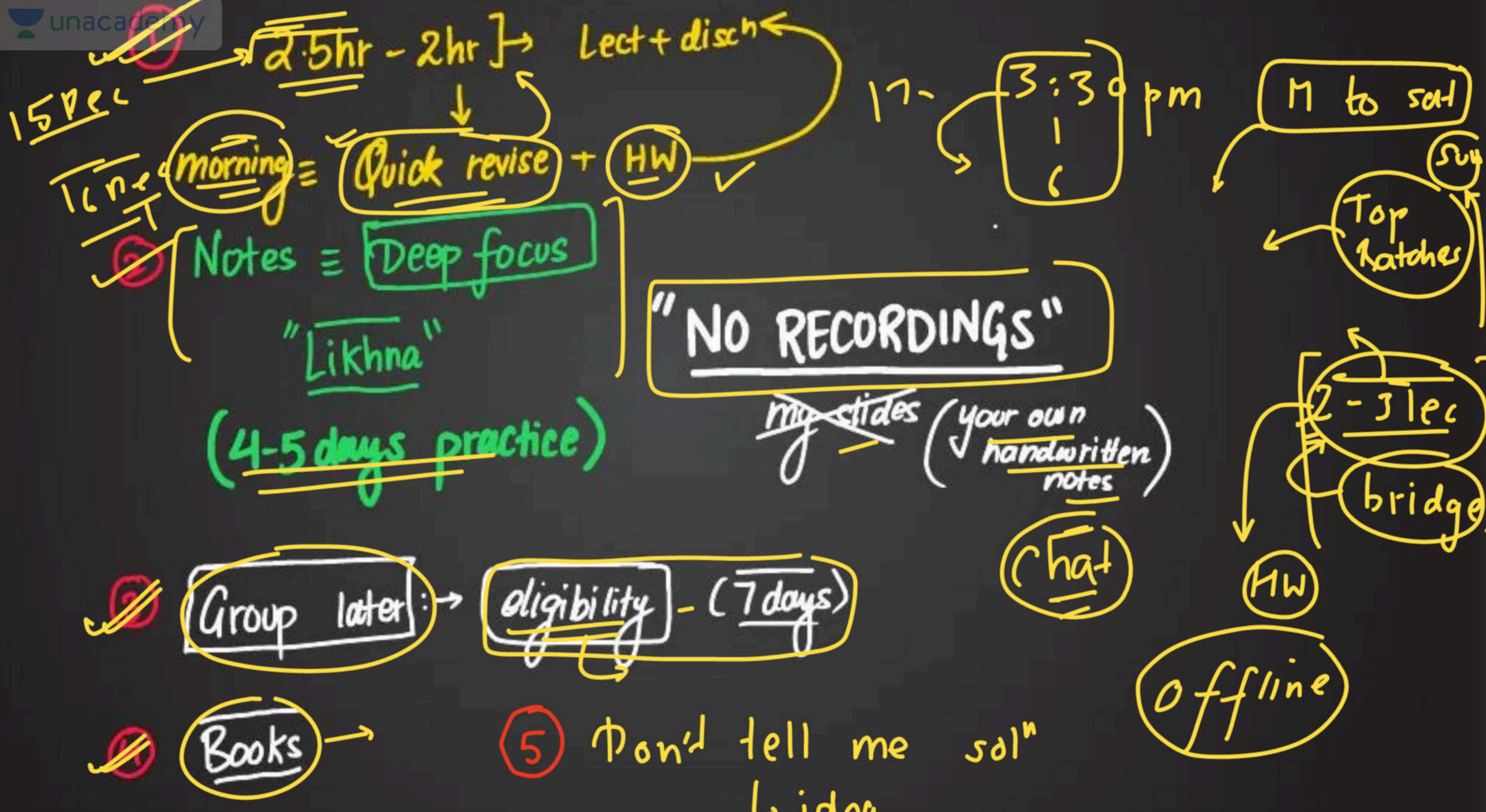


AN EYE OPENER FOR JEE/NEET! This is how to stop planning and actuall...

2.2 lakh views · 1 year ago

Choice >>> Gyaan
(understanding)

C&P, AOP, Fxns



A problem

① Branches

② scope



refn

JMA
if

unique idea

B

1700

I

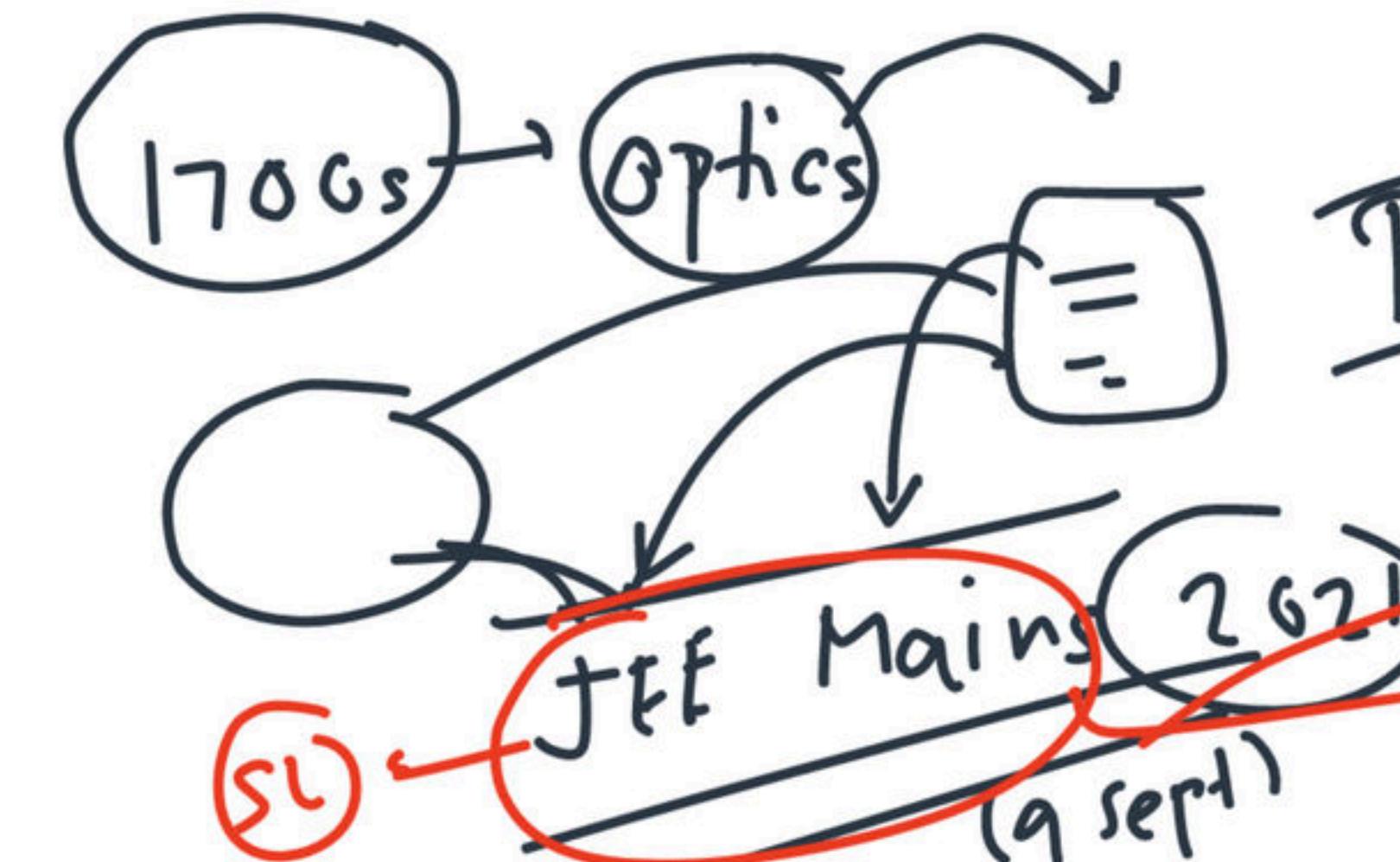
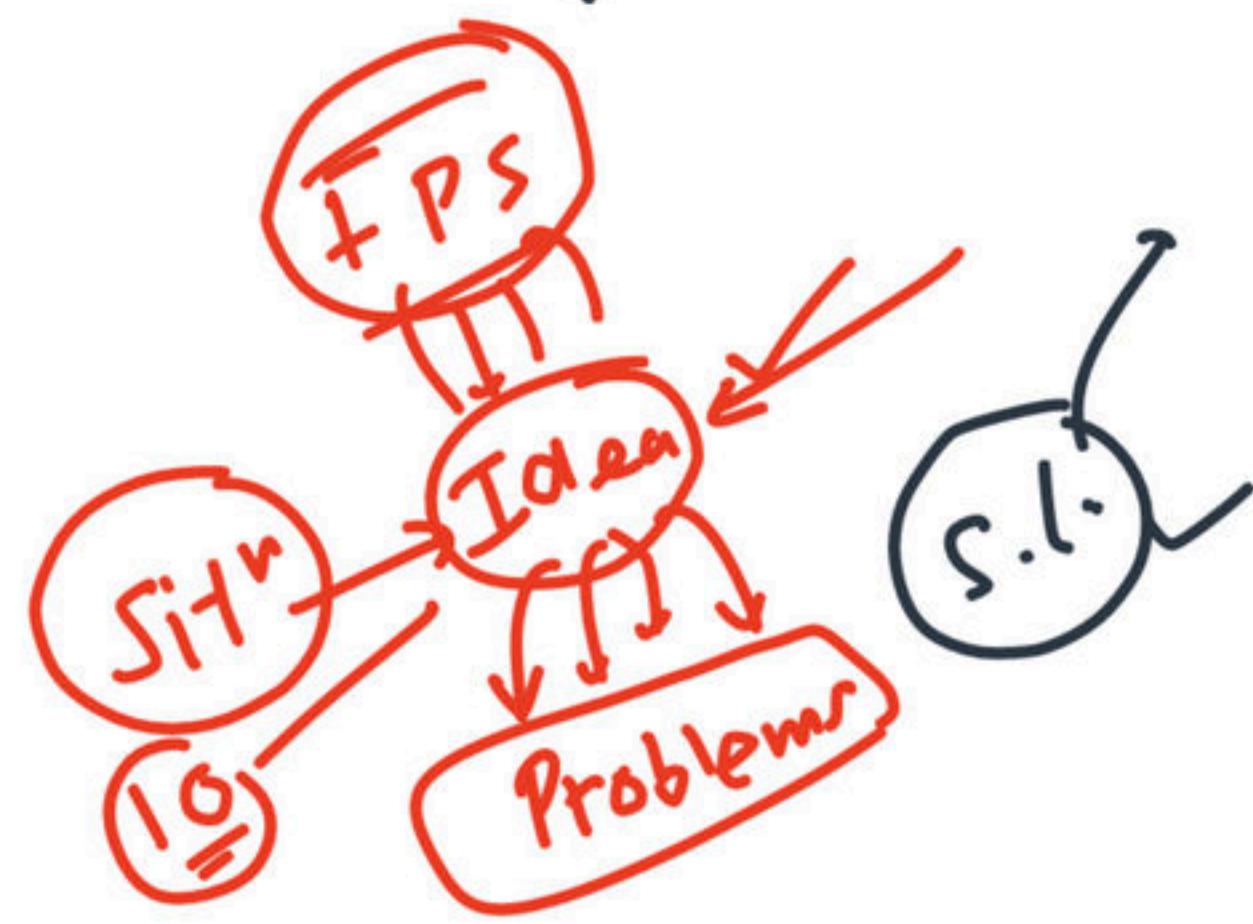
②

short -

math

physics

+ idea



calc
Trigo

1

Out of Box /DR/ CIN/

P.S.

A red ink drawing on a black background. The drawing consists of a large circle containing the handwritten text "GM 7621". Inside the circle, there is a complex web of intersecting red lines forming a grid-like pattern. A small, curved arrow points downwards from the top right corner of the circle.

11

Teach / Books

8

15

Merry

sooy

98

P. S. S.

ideas - 

1

Ideas

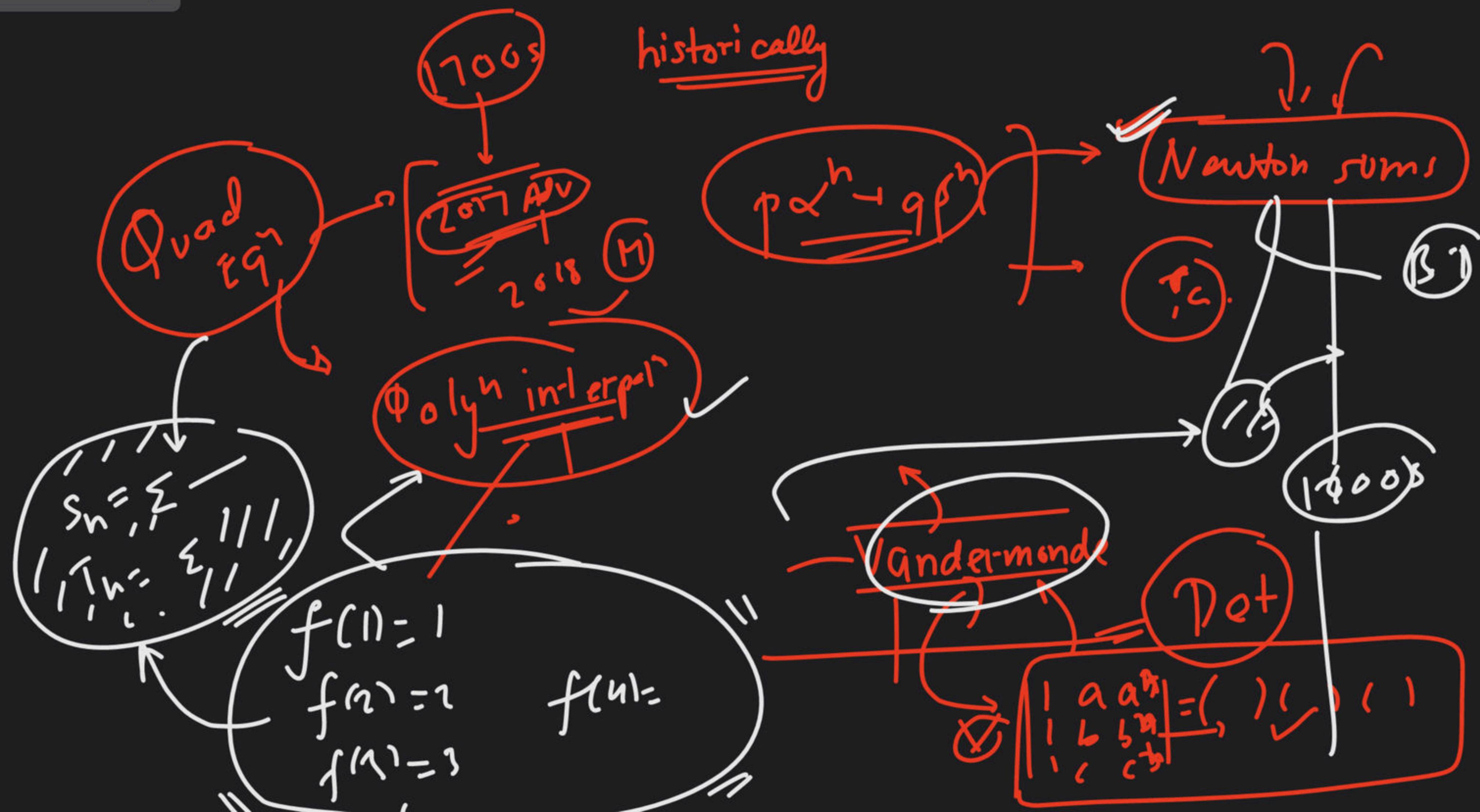
105

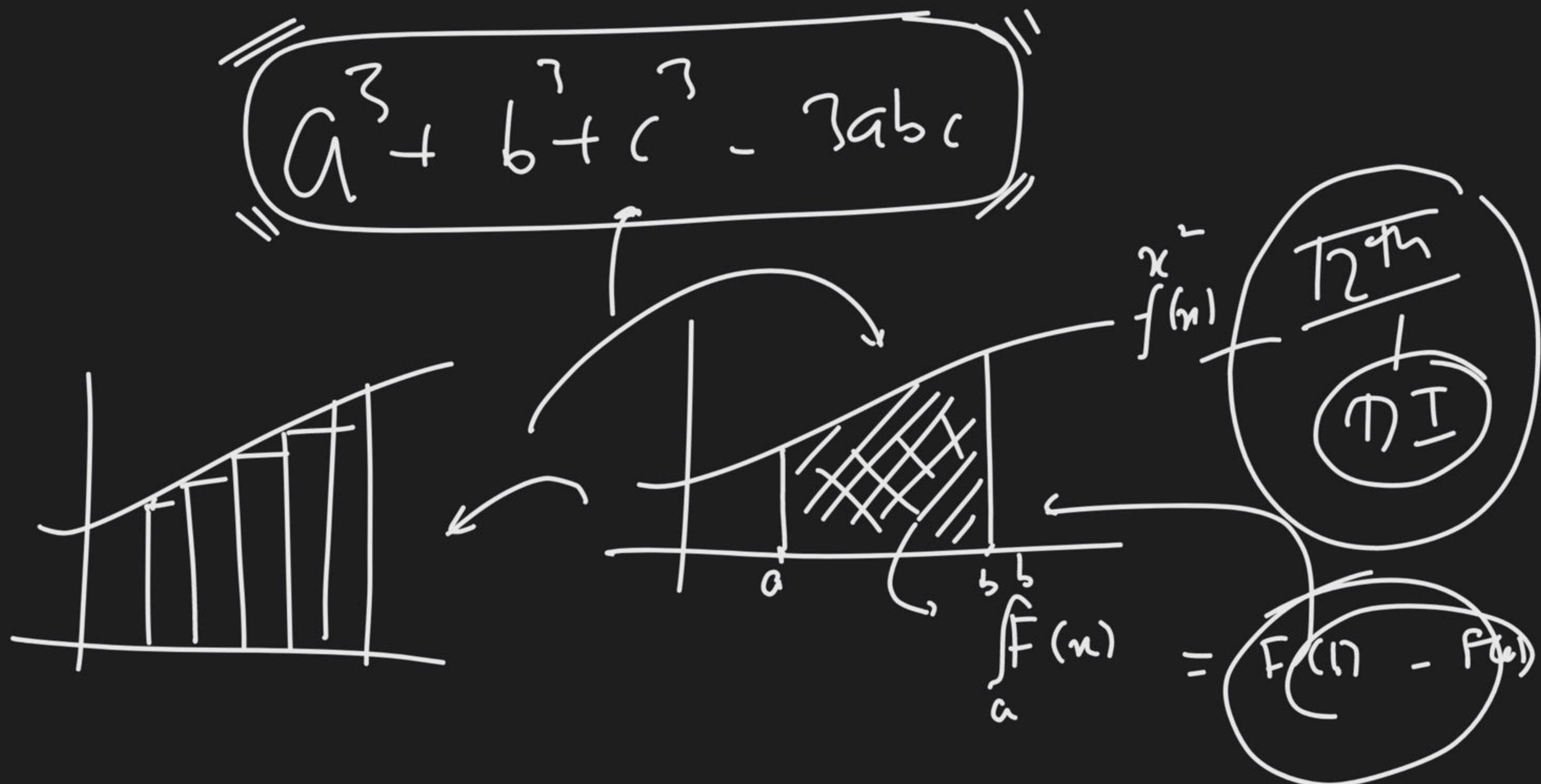
Adv
Adverb
Adv
Adverb

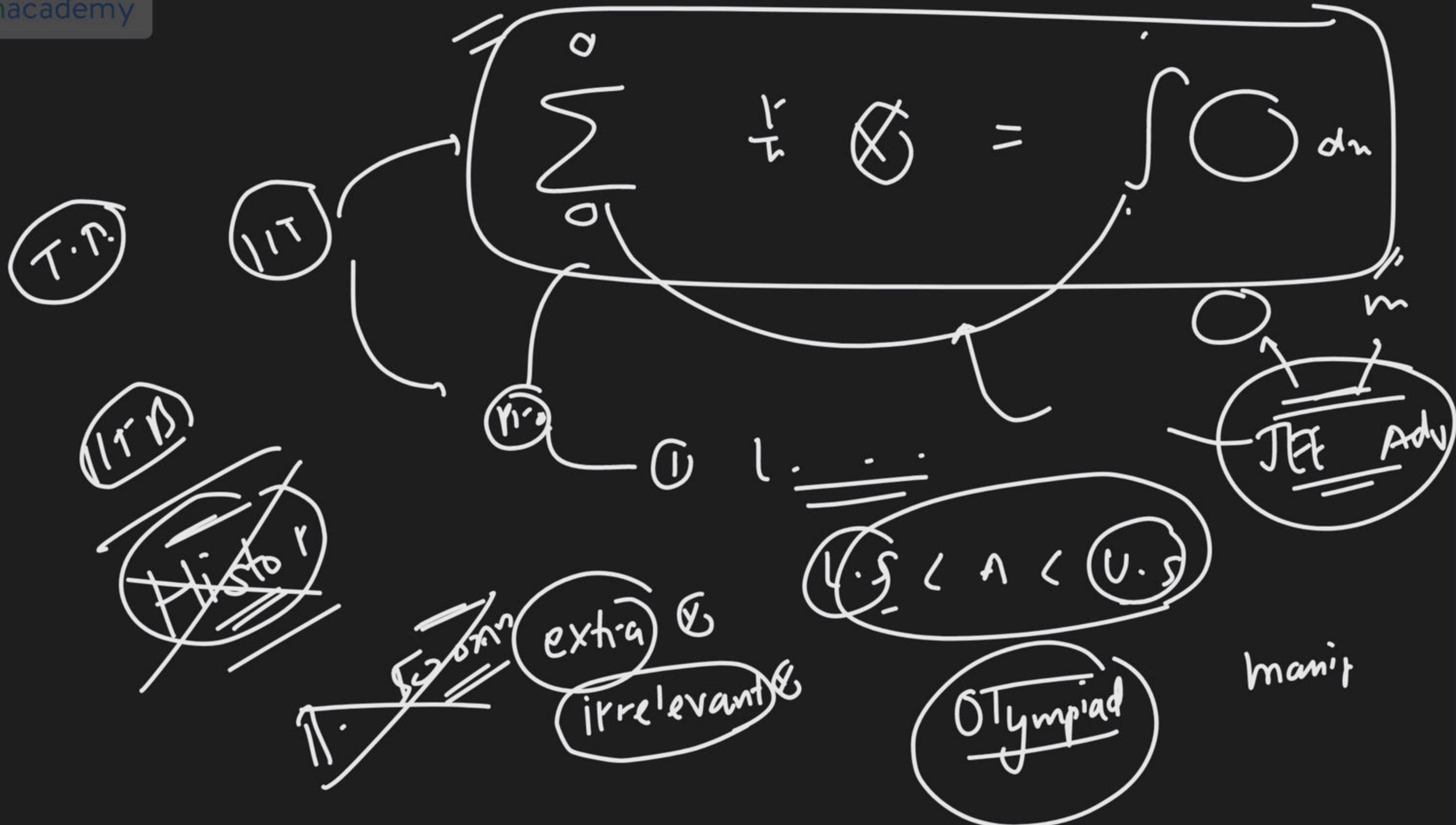
unique

905

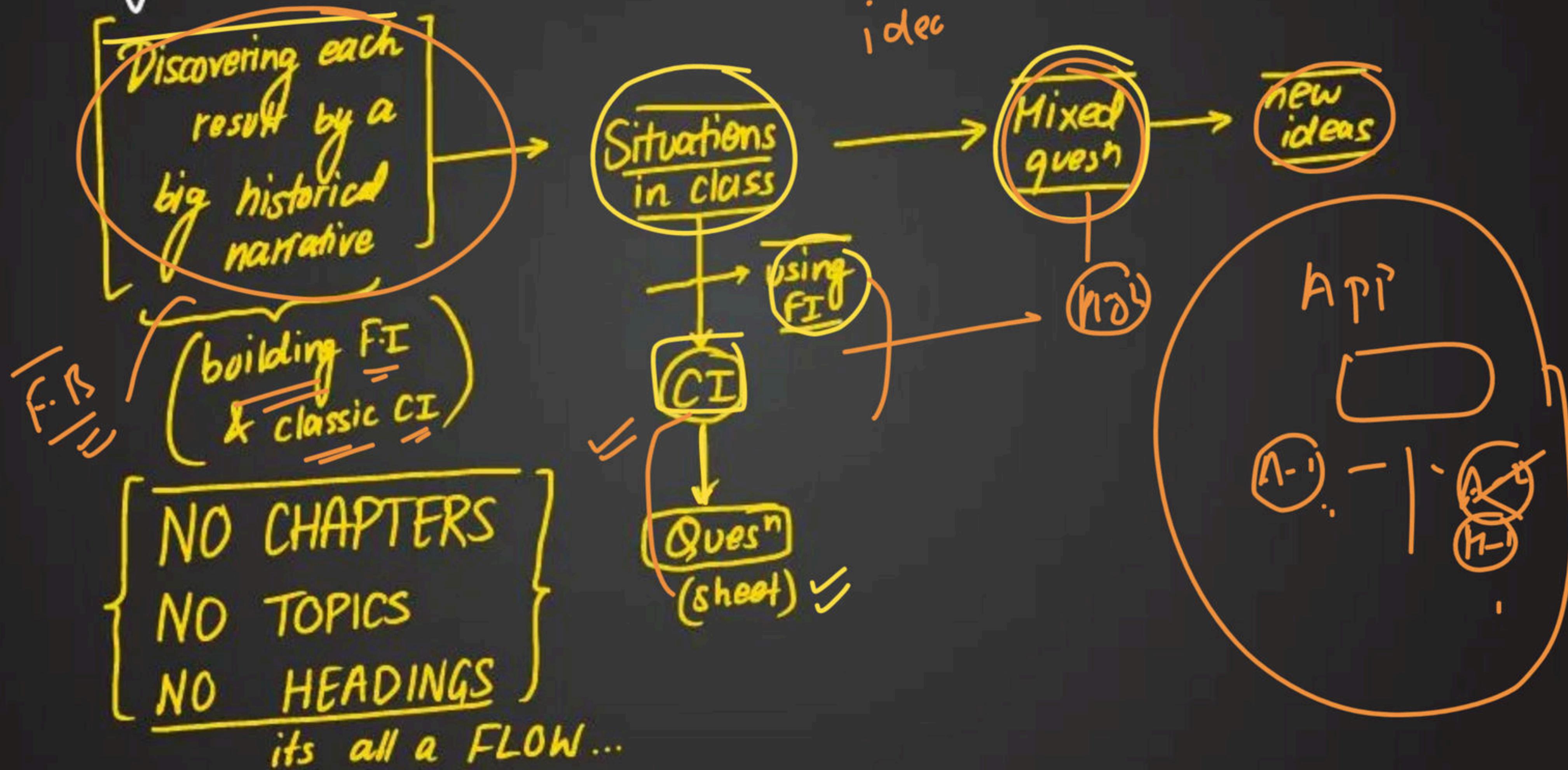
2







My teaching methodology =



My teaching methodology =

~~any math problem
(in JEE syllabus)~~

Algebraic / Exp-log manip

~~Exercícios~~ Trigo manip^a

~~② Geometric transf'n~~

~~Calculus version (L,D,I) manip~~

~~5~~ Matrix manip'n

~~Logic & Proof = Attentive eyes~~

Number Theoretical skills

Number Theory

Information processing

Applications

Information Conceptual applications

Counting —, Com!

5

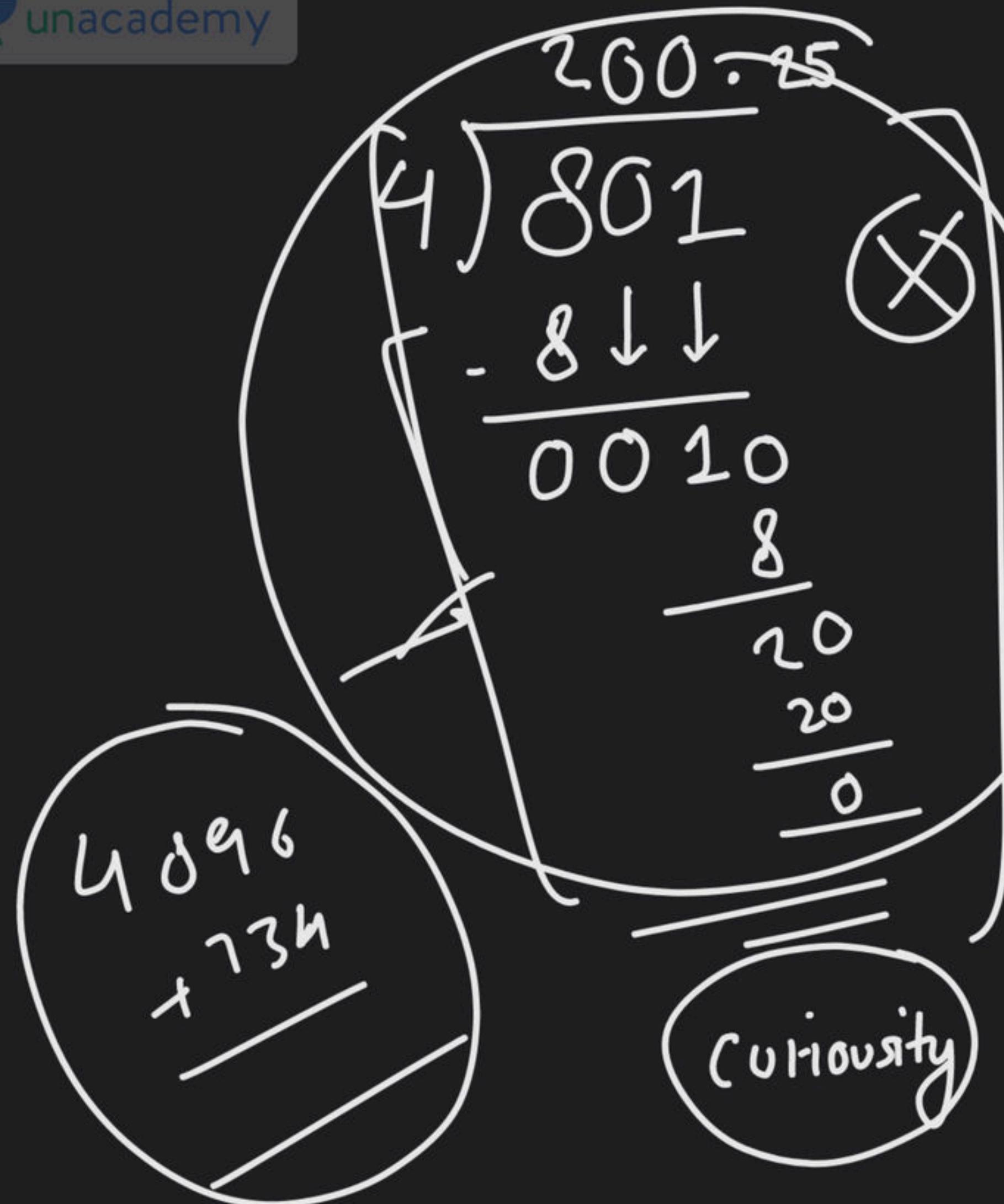
151 / CM

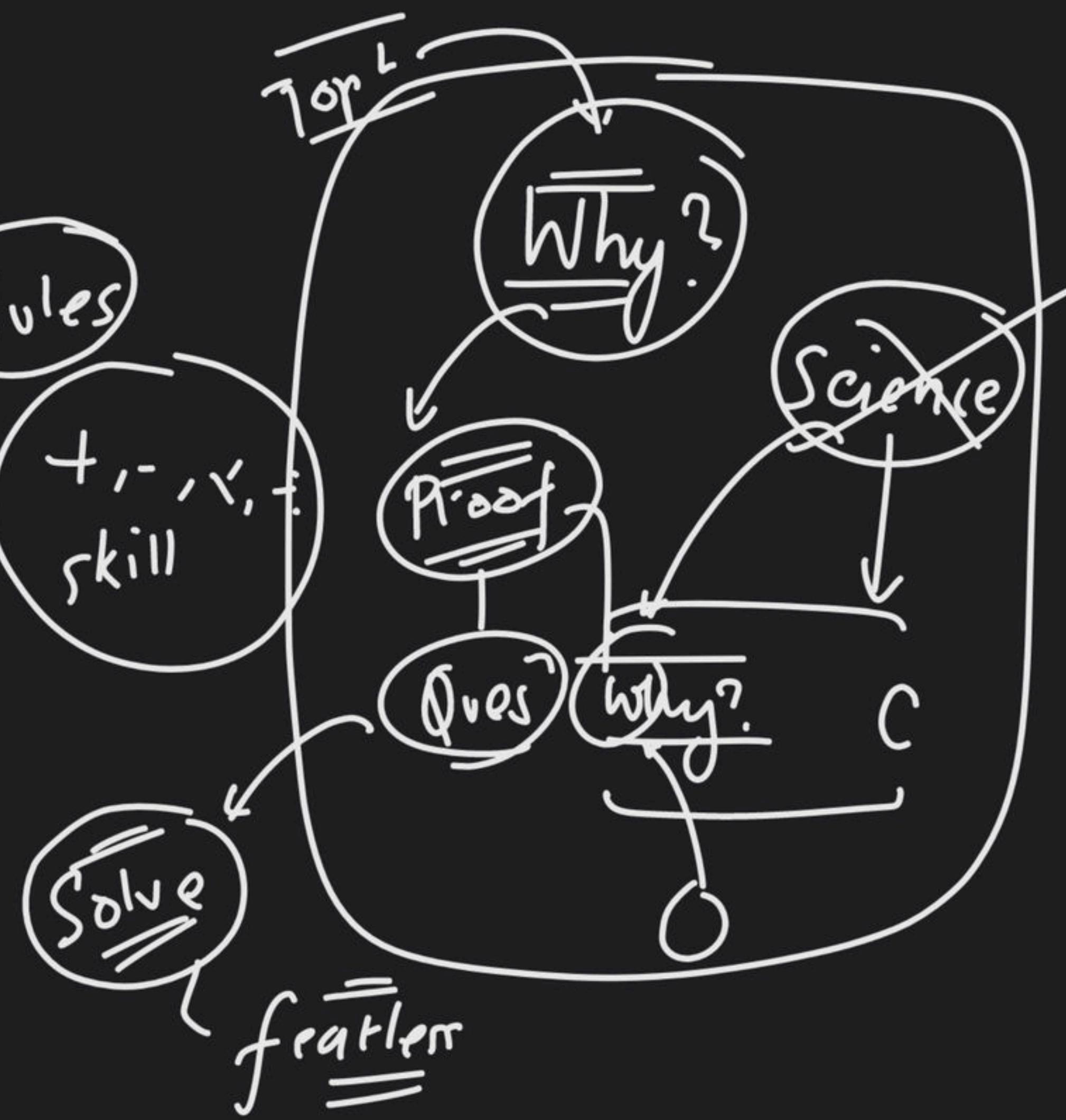
toughest easiest

The diagram consists of two circles drawn with orange outlines on a black background. The top circle is larger and contains the letters "C.G.". An orange arrow points from the left towards the top circle. The bottom circle is smaller and contains the letters "FPS". An orange arrow points from the left towards the bottom circle.

A stylized orange logo consisting of the letters 'FPS' enclosed within a circle, with horizontal lines extending from the top and bottom of the letters.

The diagram consists of three circles connected by arrows. The top circle contains the text "C.G.". An orange arrow points from the left towards the middle circle, which contains the text "FPS". Another orange arrow points from the middle circle towards the right circle, which contains the text "TOPPERS".


$$200 \div 25$$
$$\begin{array}{r} 8 \\ \hline 200 \\ - 20 \\ \hline 0 \end{array}$$
$$4096 \times 734$$



$$a^{\frac{1}{2}} \cdot a^{\sqrt{3}} = a^{\frac{1}{2} + \sqrt{3}}$$

~~$$a^m \cdot a^n = a^{m+n}$$~~

$$a^{\frac{1}{2}} \cdot a^{\frac{1}{2}} \cdot \dots$$

min

$$\underbrace{aaa \dots}_{m} \cdot \underbrace{aaa \dots}_{n} = a^{m+n}$$

Divis

$$896 \times$$

$$a^{\frac{1}{2}}$$

$$= a a \dots$$

$$= a^{m+n}$$

Arihmet
Nu. The

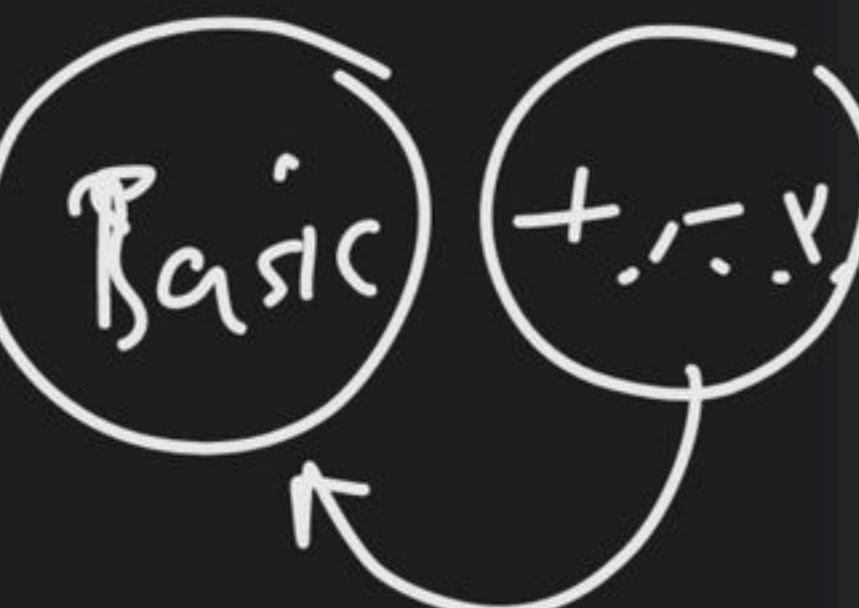
13

6dd
prime

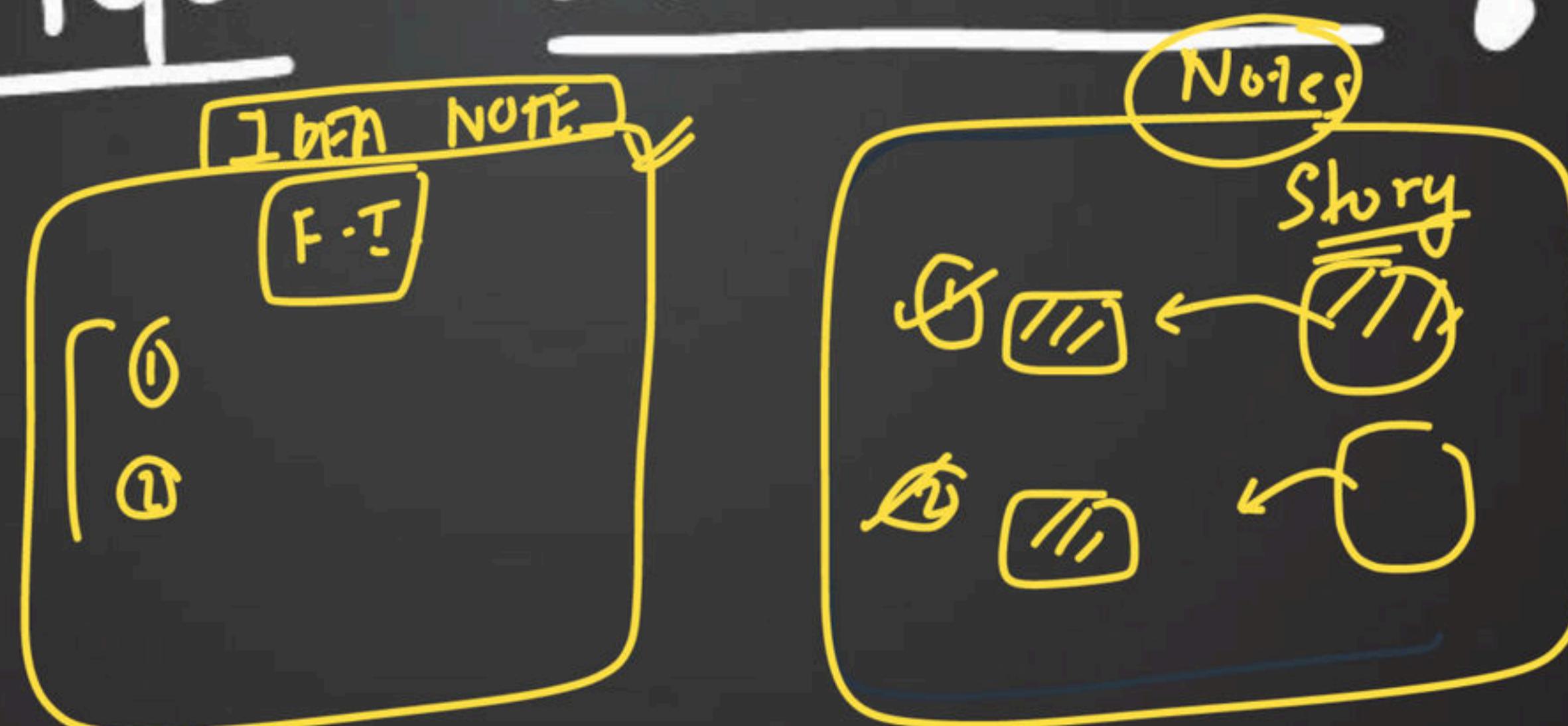
$$\begin{array}{r} 9 + 1 \\ 10 + 3 = \\ \hline 17 - 4 = \end{array}$$

$$2^3 + 2^2 + 0 \cdot 2^1 + 2^0 \rightarrow \underline{\underline{(1101)}}$$

number



FORGET EVERYTHING!



2.5 million
years
ago



You came out as
first baby!

I.

Kuch na kuch try karte raho bas!

~ pen chatte rehne chahiye!

~ until you see the light from
the end of the tunnel

uni

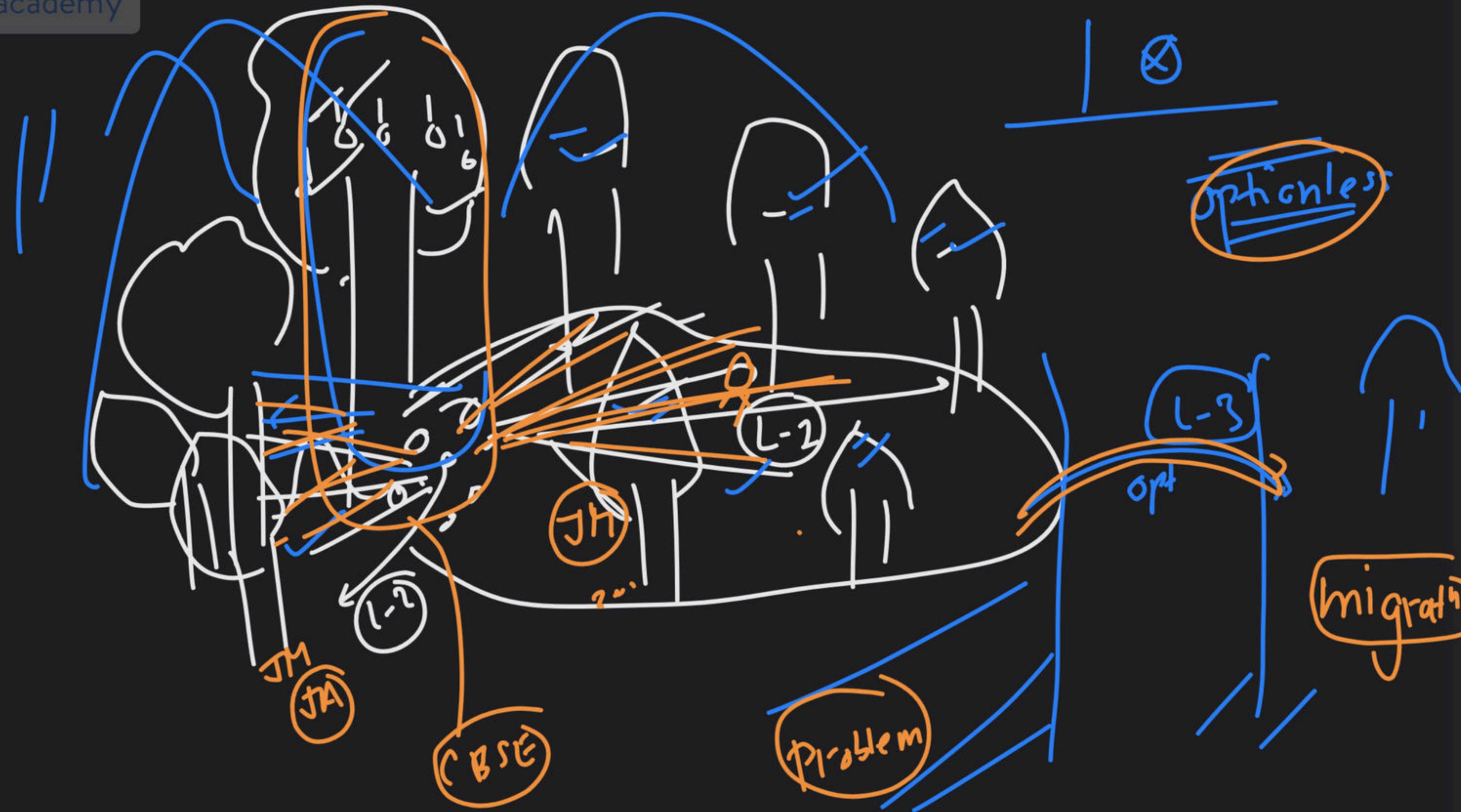
Unique

F.

baache

② cal-
I

T



1996

$$\frac{a^2 + b^2}{1+ab}$$

JEE Main



~~I~~

HUNGER TO SOLVE!

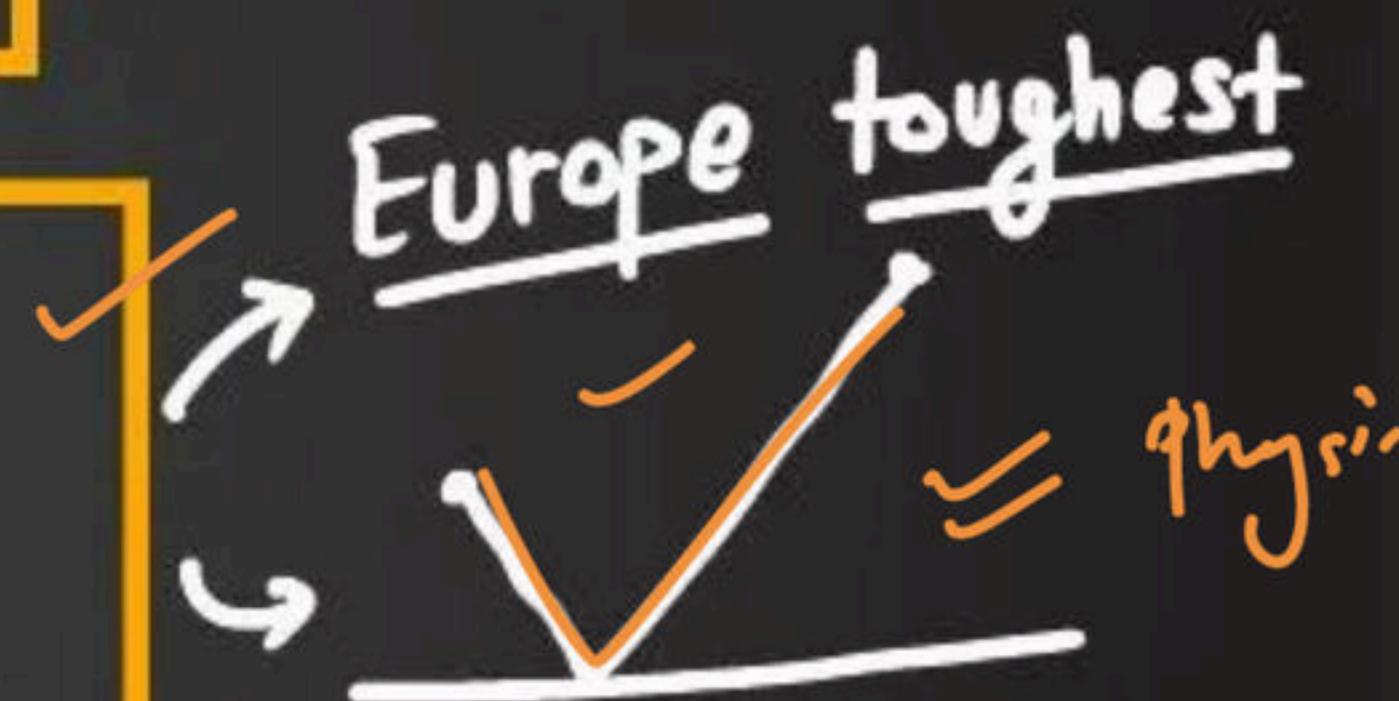
Do you have that!?

~~What's
new~~

~~II~~

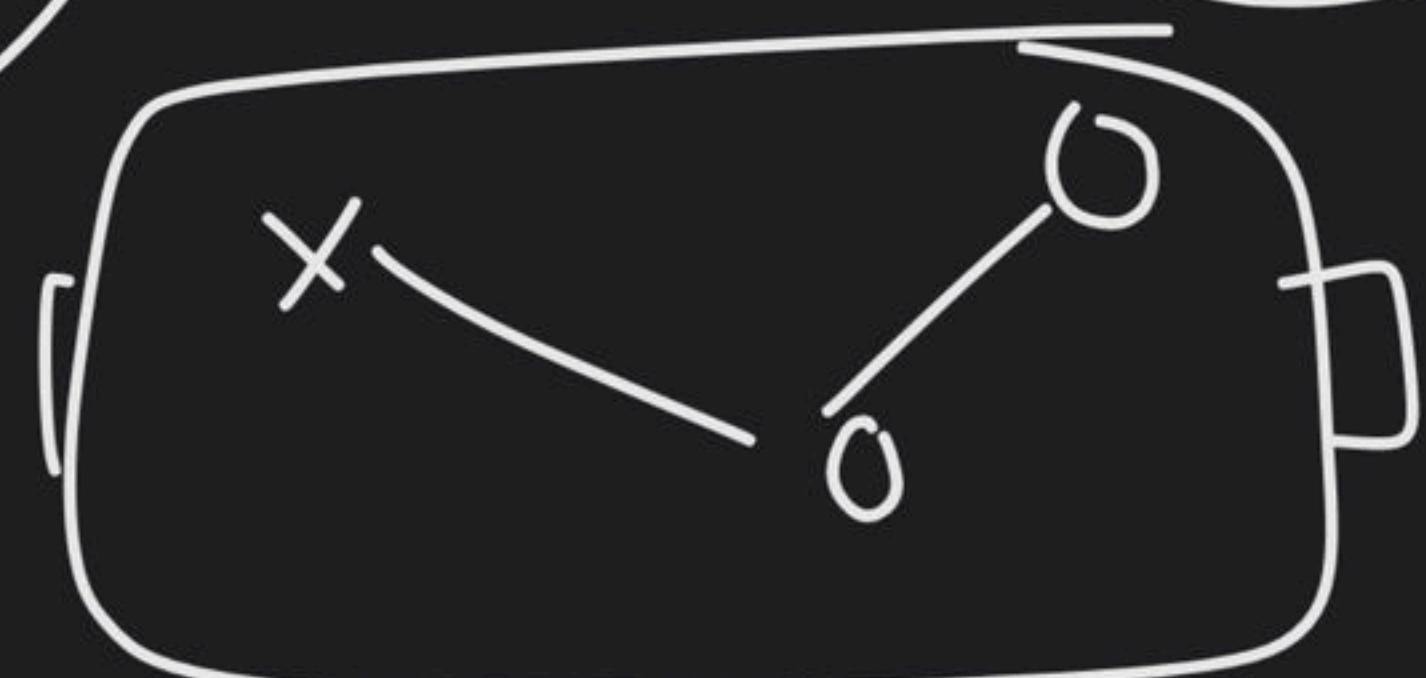
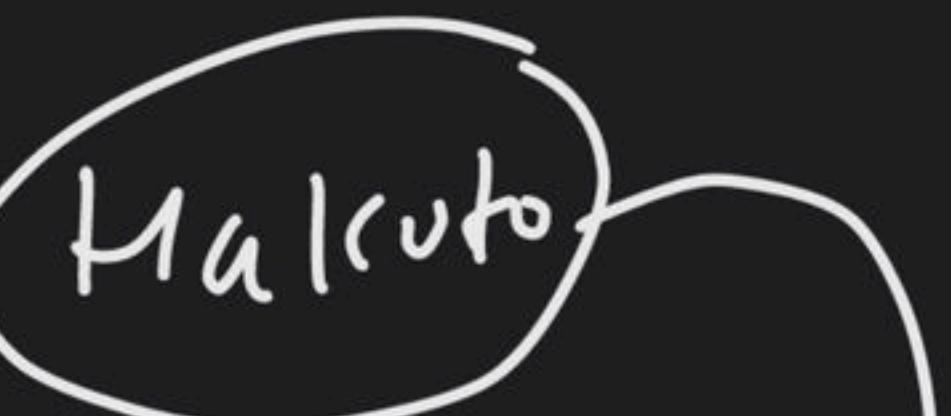
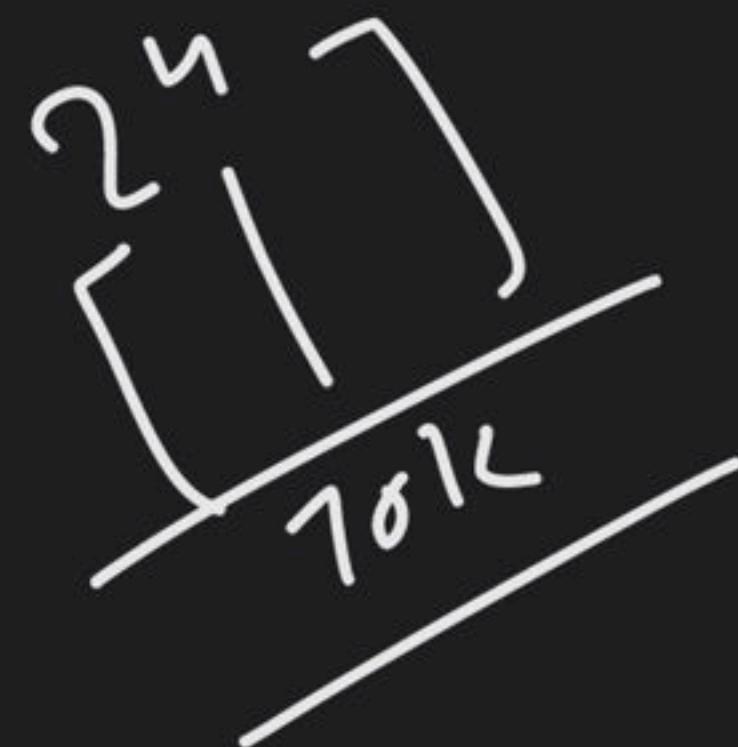
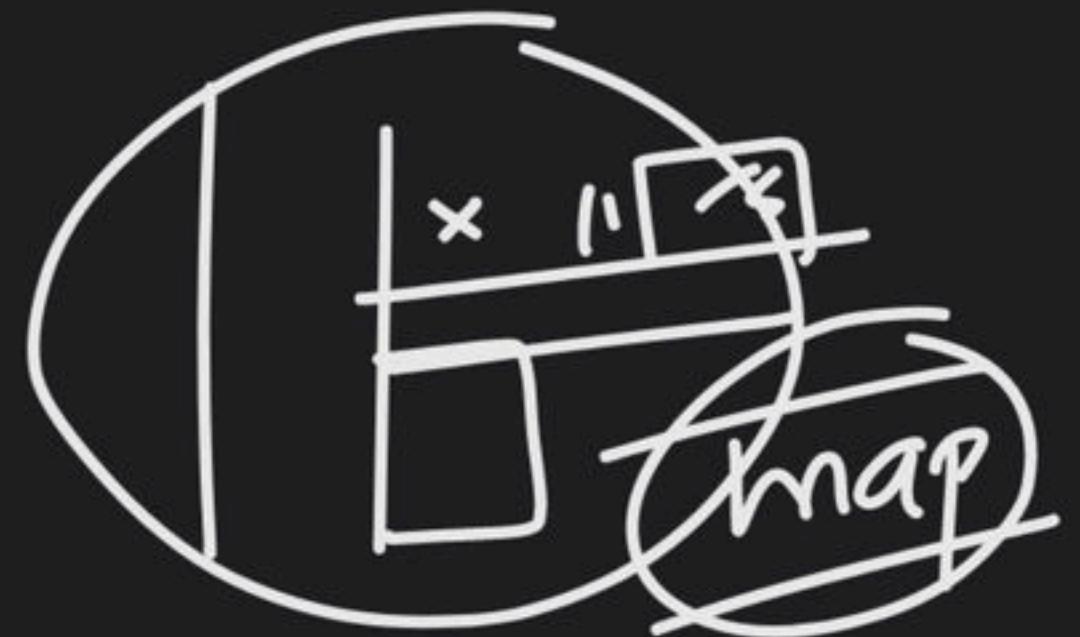
Expand your scope!

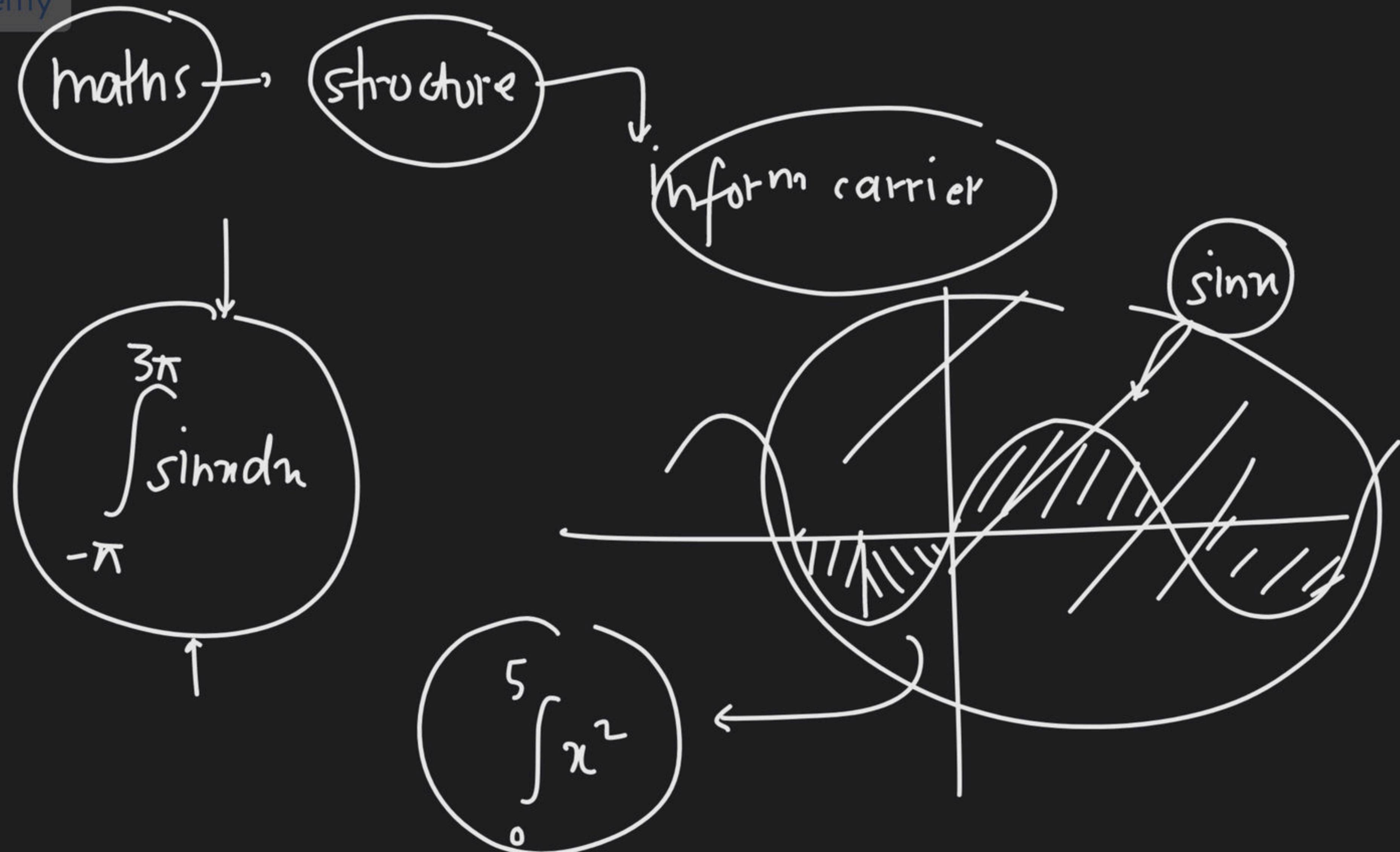
↳ Drop the resistance
~ optionless!
choose it!



IMO 1996

③ Dāngōi:

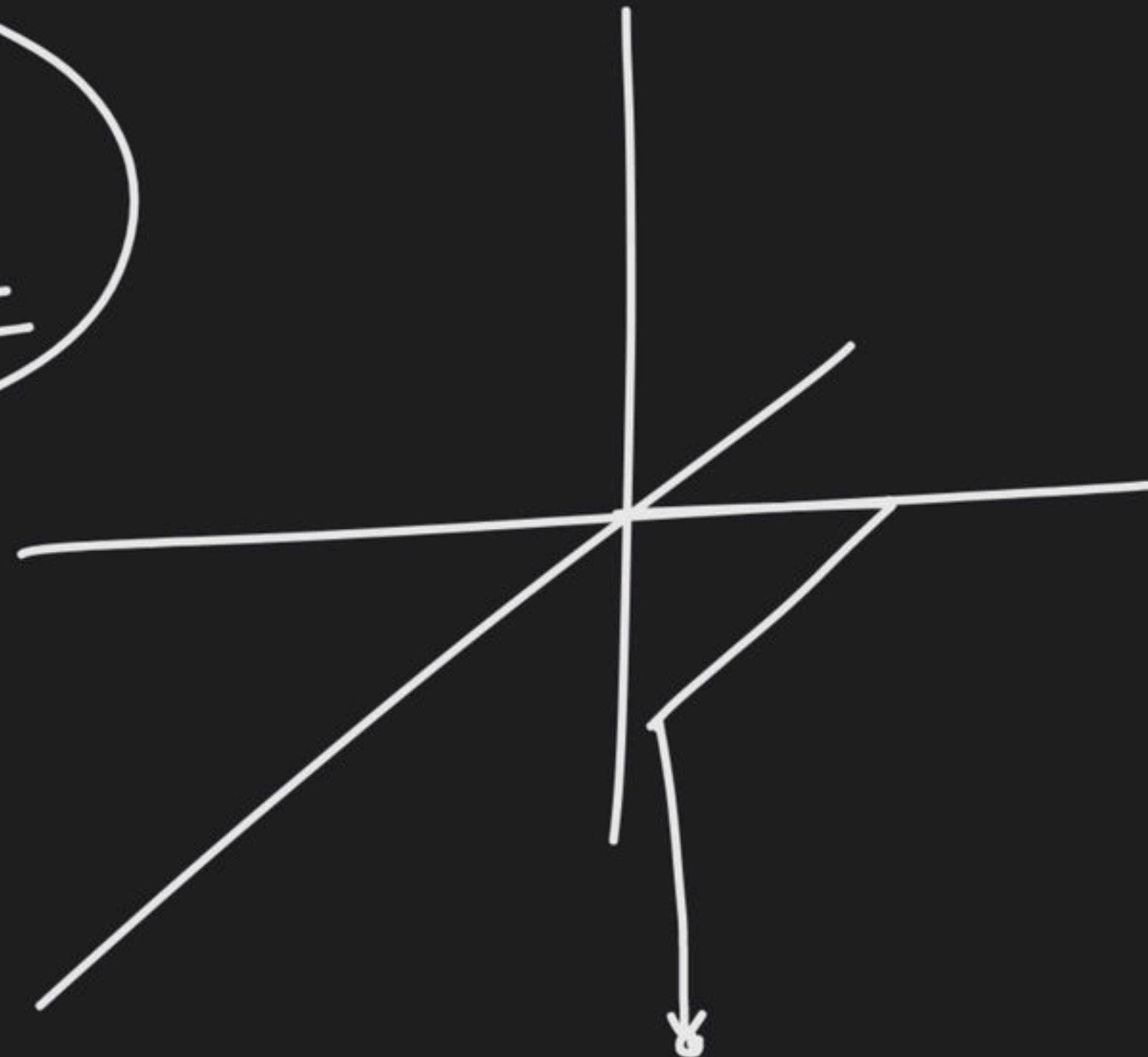




$$4\hat{i} + 5\hat{j} - 3\hat{k}$$

$\left[\begin{matrix} \text{ } \\ \text{ } \end{matrix} \right]$

$\text{h} \times = \beta$



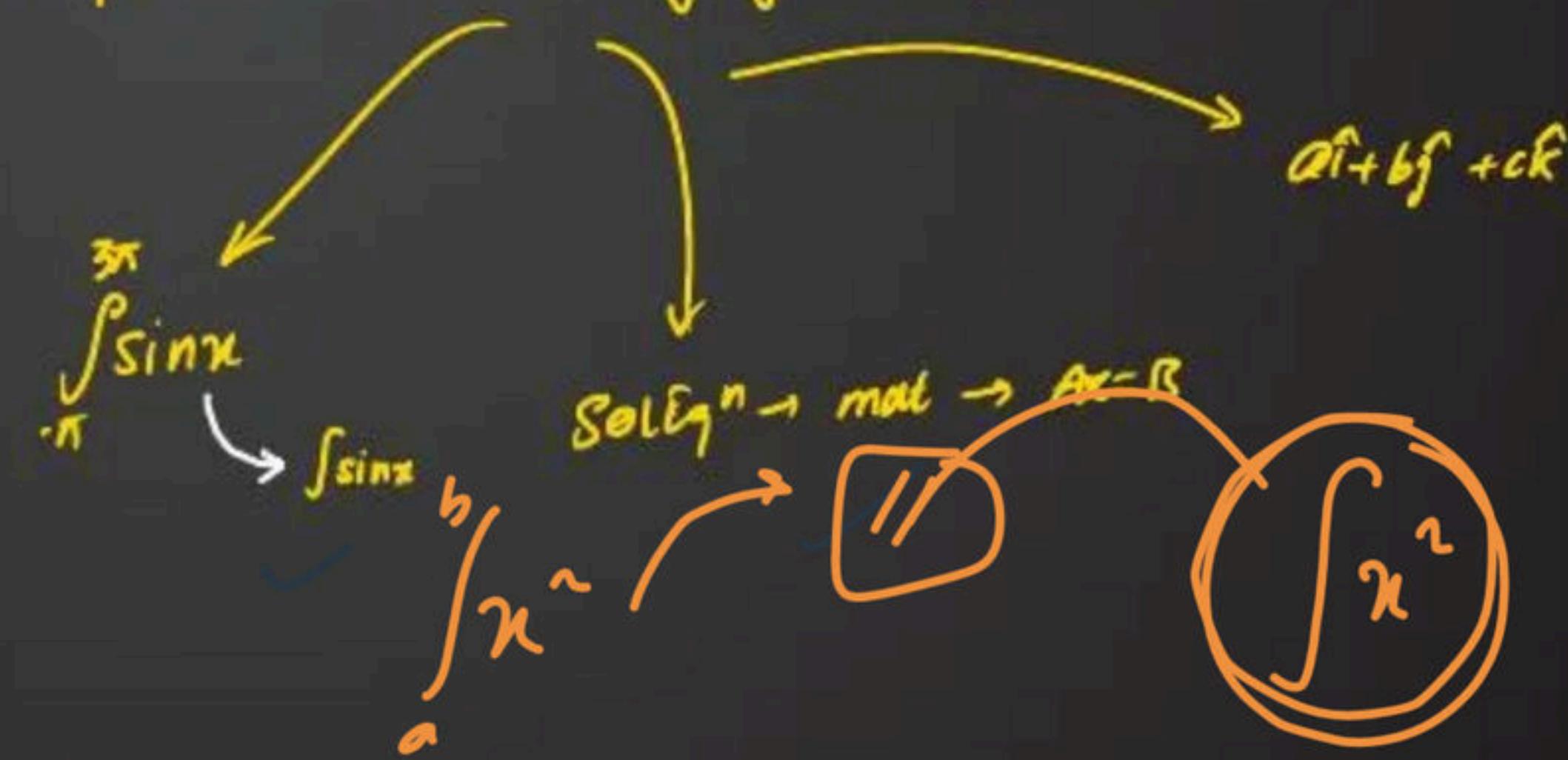
IV

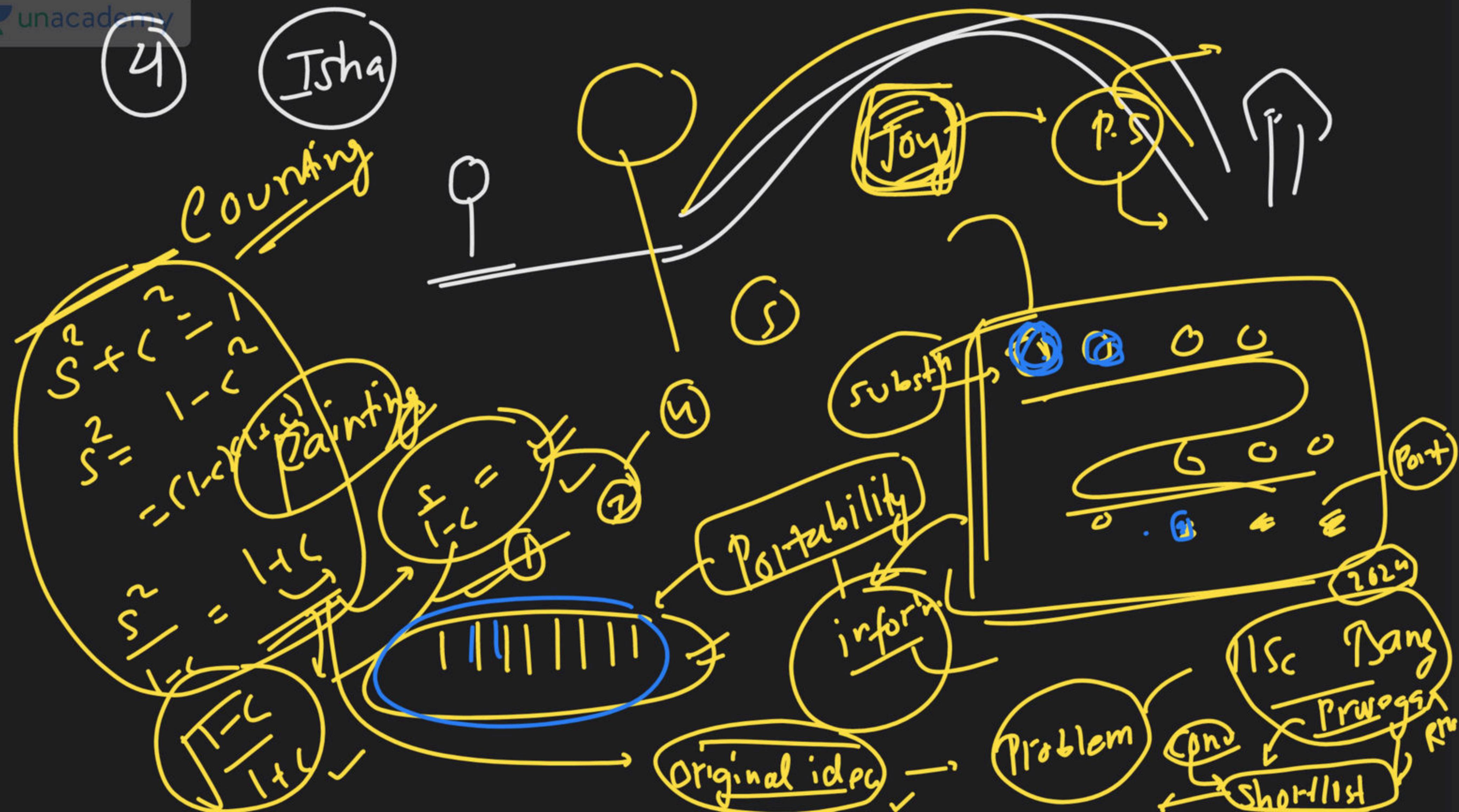
SUBSTITUTION

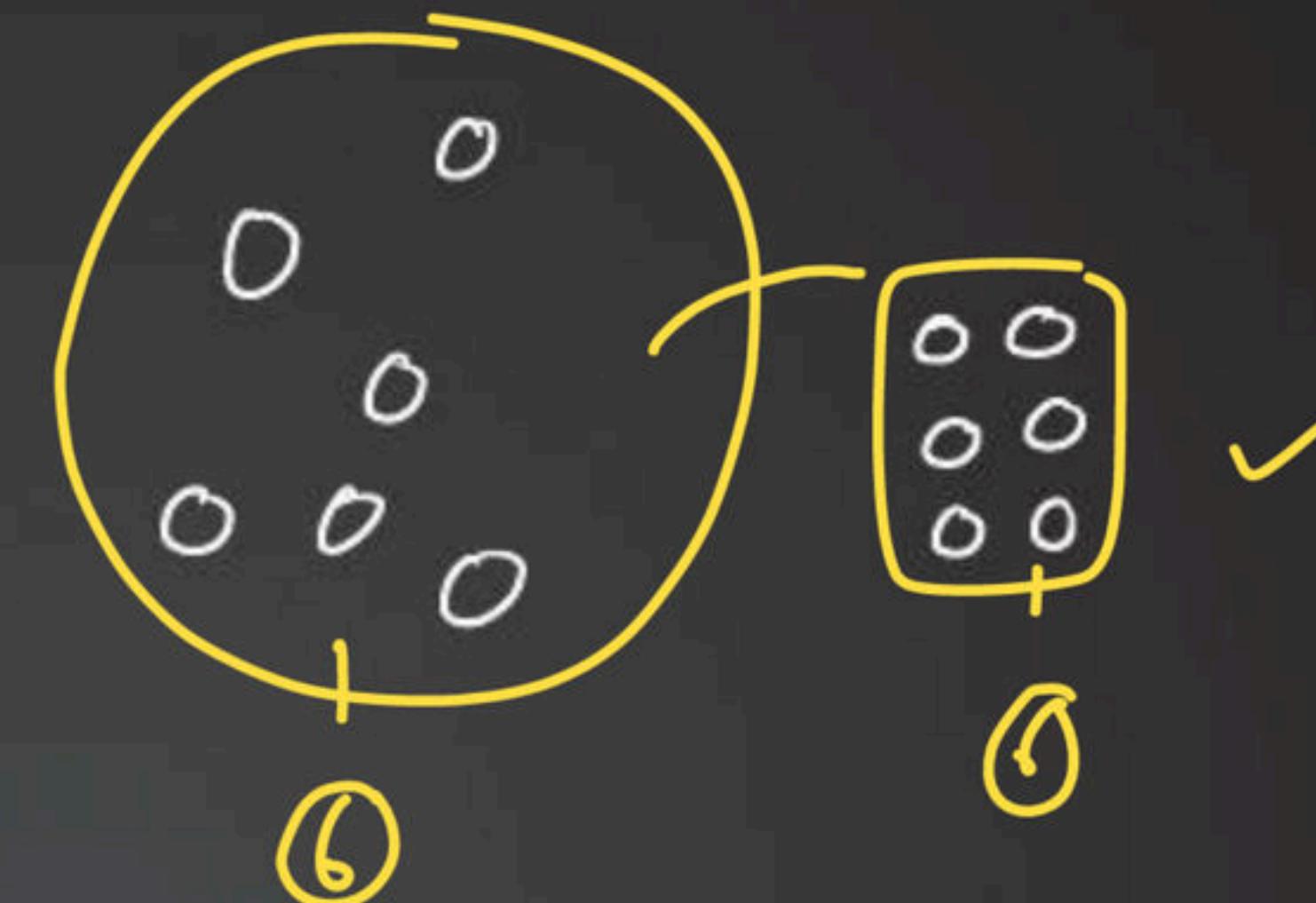
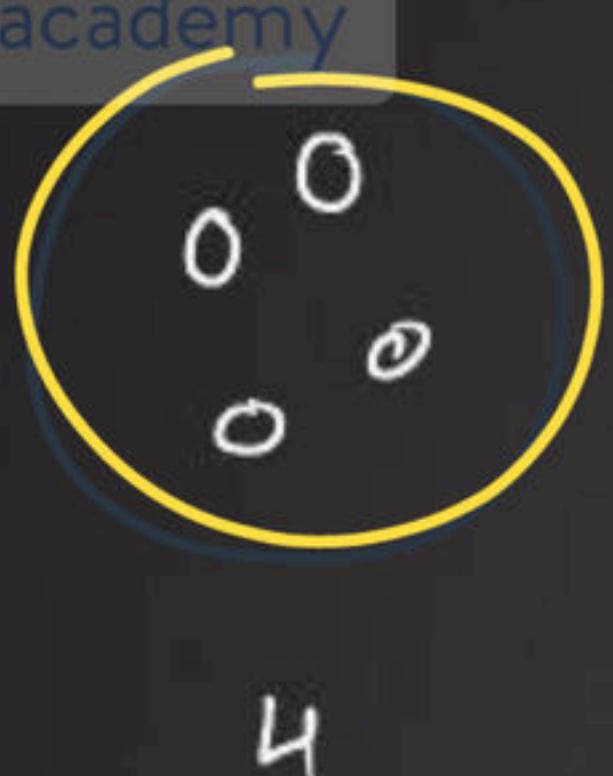
We substitute / represent a complex situation , & then work over that representation instead!

LANGUAGE
maps
sports

↳ All maths structures are just very nicely made representations , very good information carriers!







① Number sense

② Gets better by patterns



ISHANGO BONE (18000 BC)

(II)

*JOY ~ useless playing
with things*

*Problem
Solving*

(IV)

PORTABILITY

$$n \neq 0 \rightarrow \frac{1}{n} = -1$$

$$\frac{1}{n}$$

Break
3:55PM

- Substitute the substitutions further to carry uncomfortable substitutions in your mind comfortably!

- There shouldn't be loss of information just to make it portable!

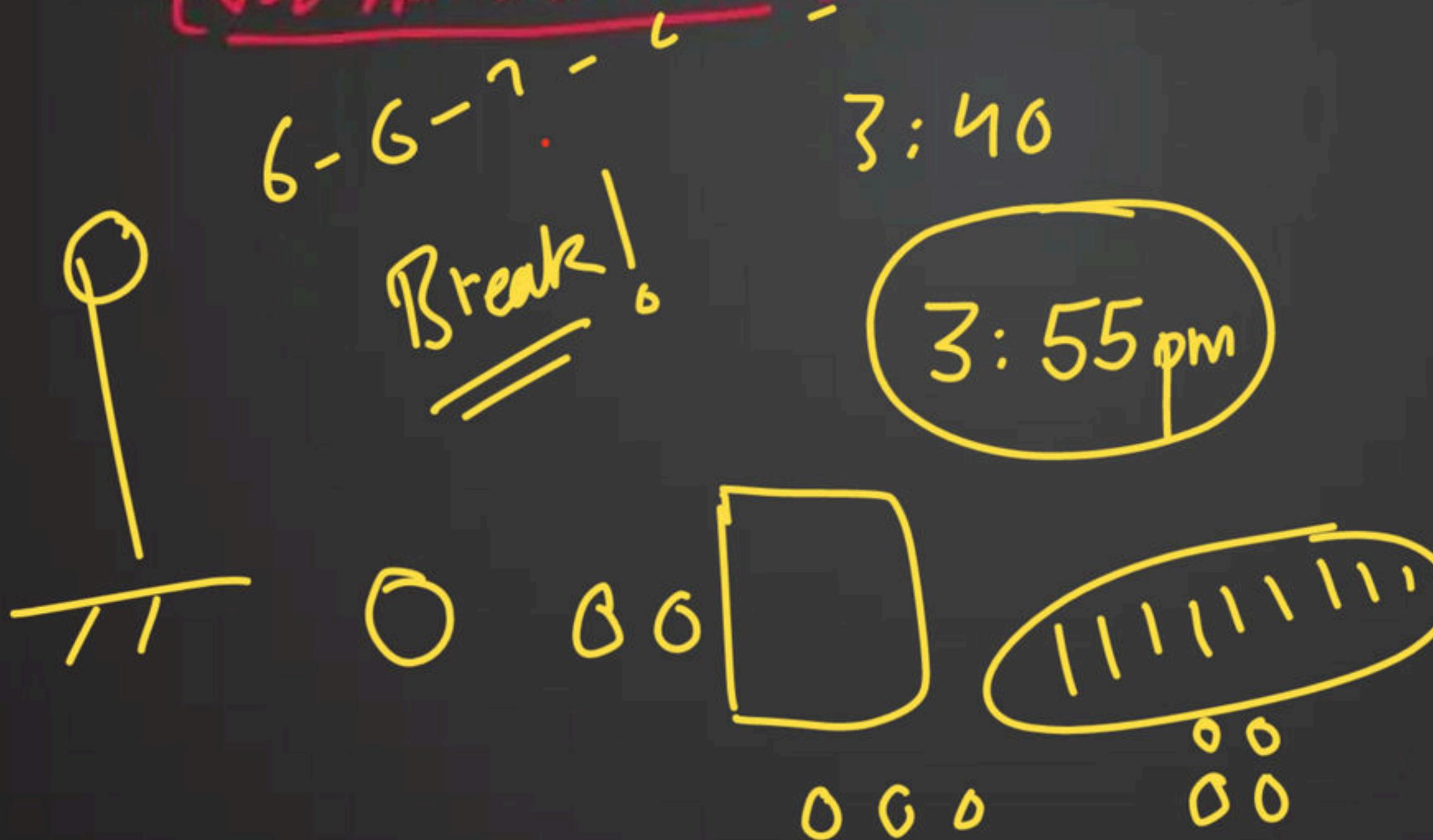
e.g. rocks falling on the way

$$x^2 = t \rightarrow t \in [0, \infty)$$

$$f(n) = \frac{\sum_{k=0}^n \sin\left(\frac{k+1}{n+2}\pi\right) \cdot \sin\left(\frac{k+2}{n+2}\pi\right)}{\sum_{k=0}^n 2\sin^2\left(\frac{k+1}{n+2}\pi\right)}$$



(JEE Advanced 2019)

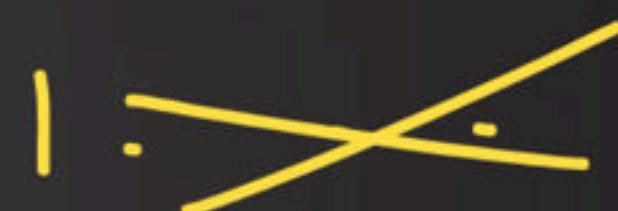


$$\begin{aligned}
 f(n) &= \frac{\sum_{k=0}^n \sin\left(\frac{k+1}{n+2}\pi\right) \cdot \sin\left(\frac{k+2}{n+2}\pi\right)}{\sum_{k=0}^n 2\sin^2\left(\frac{k+1}{n+2}\pi\right)} \\
 &= \frac{\sum_{k=0}^n \cos\frac{\pi}{n+2} - \cos\left(\frac{(2k+3)\pi}{n+2}\right)}{\sum_{k=0}^n 2\sin^2\left(\frac{k+1}{n+2}\right)\pi} \\
 &= \frac{(n+1)\cos\frac{\pi}{n+2} - \frac{\cos\left(\frac{(n+3)\pi}{n+2}\right)\pi \cdot \sin\left(\frac{(n+1)\pi}{n+2}\right)\pi}{\sin\frac{\pi}{n+2}}}{(n+1) - \frac{\cos\pi \cdot \sin\left(\frac{n+1}{n+2}\pi\right)}{\sin\left(\frac{\pi}{n+2}\right)}} \\
 &= \frac{(n+1)\cos\left(\frac{\pi}{n+2}\right) + \cos\left(\frac{(n+3)\pi}{n+2}\right)\pi}{(n+1)+1} \\
 &= \cos\left(\frac{\pi}{n+2}\right)
 \end{aligned}$$

Back to the bone!

t tt ttt tttt

it may fall down
during the path!



Rhythm

III

BREAKING
INTO
KNOWN CHUNKS!

Grouping

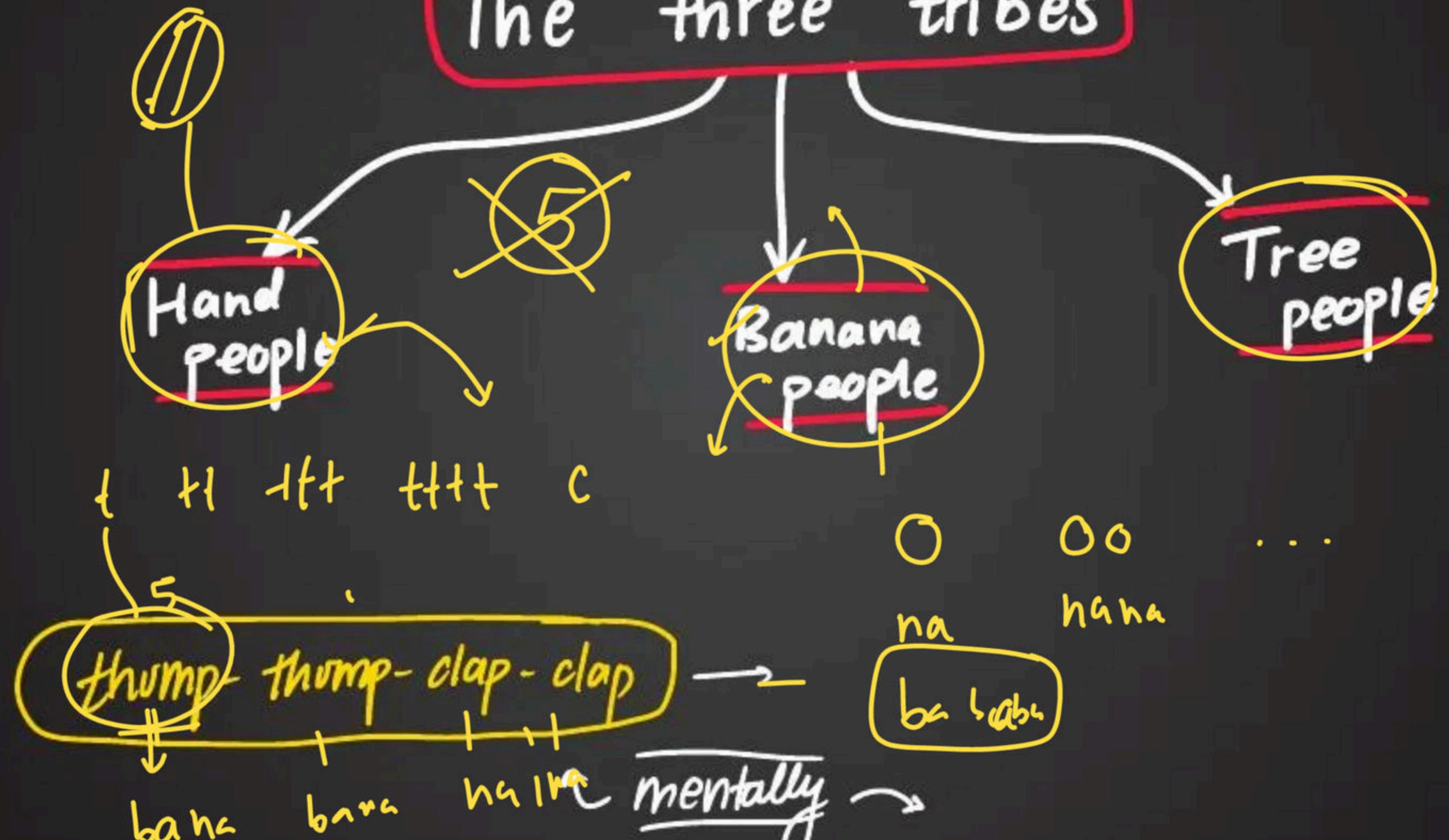
Base

t-t-c-c-c



we can remember
music
dance

The three tribes



→ ~~t t c c c~~ ~~5 5 7 . .~~

13 13 /

n, nn, nnn, b
σ σσ σσσ

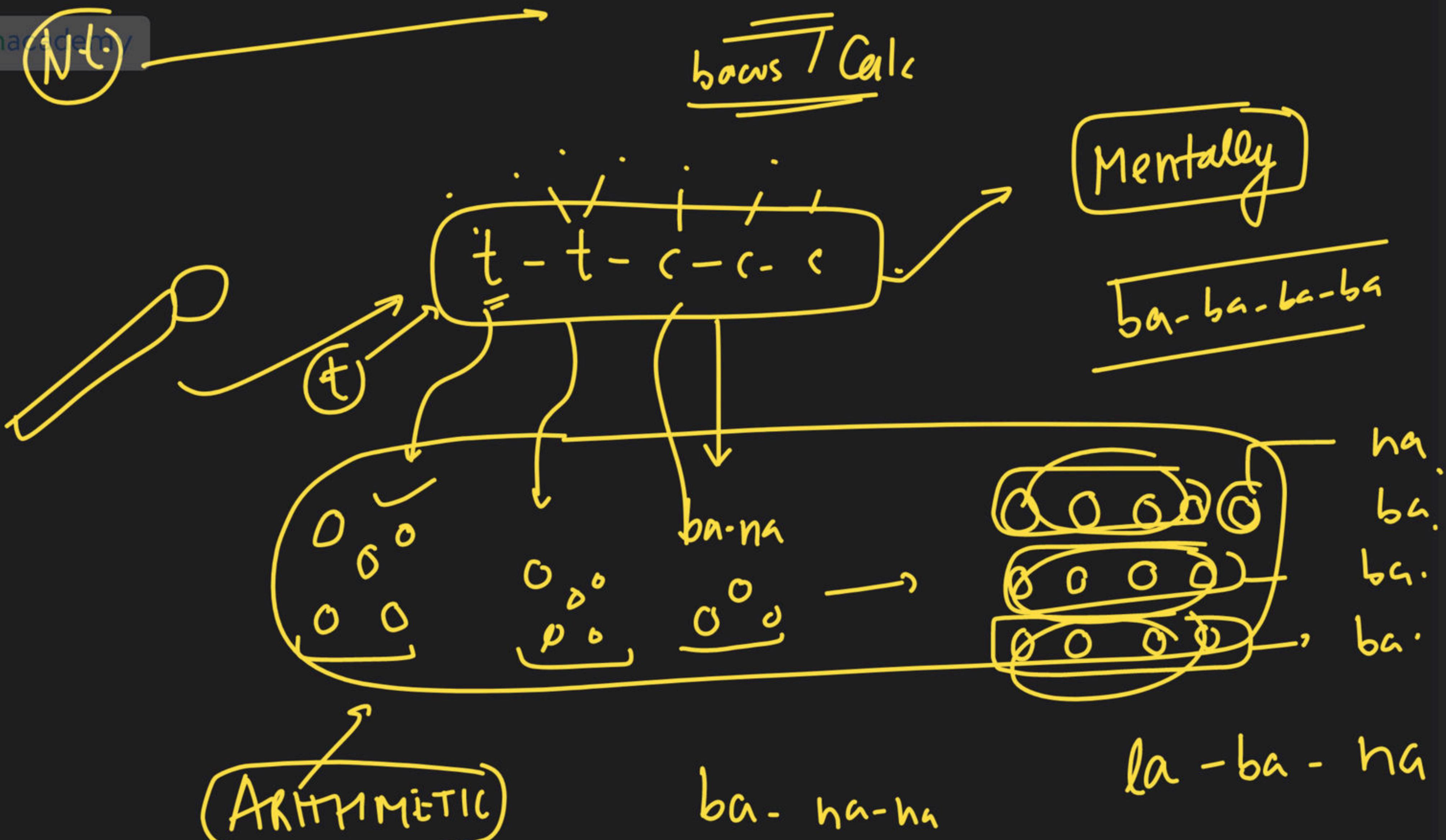
~~b b b n~~



C, A, T



NL



nice

ba-ba-ba

ba-na-na-nq

Yt-t-ic

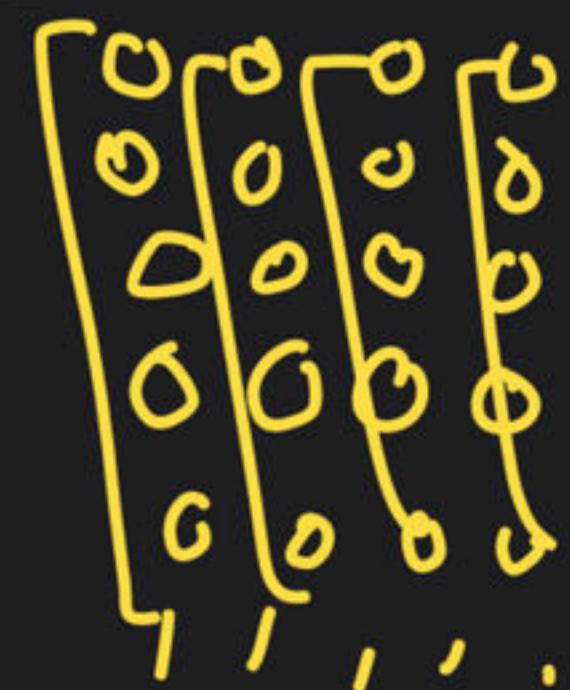
b-b-b

30

37

ba-ba-na-na → t-t t-t-t

t-ic



ba-ba-ba-ba-ba = t-t-t-t

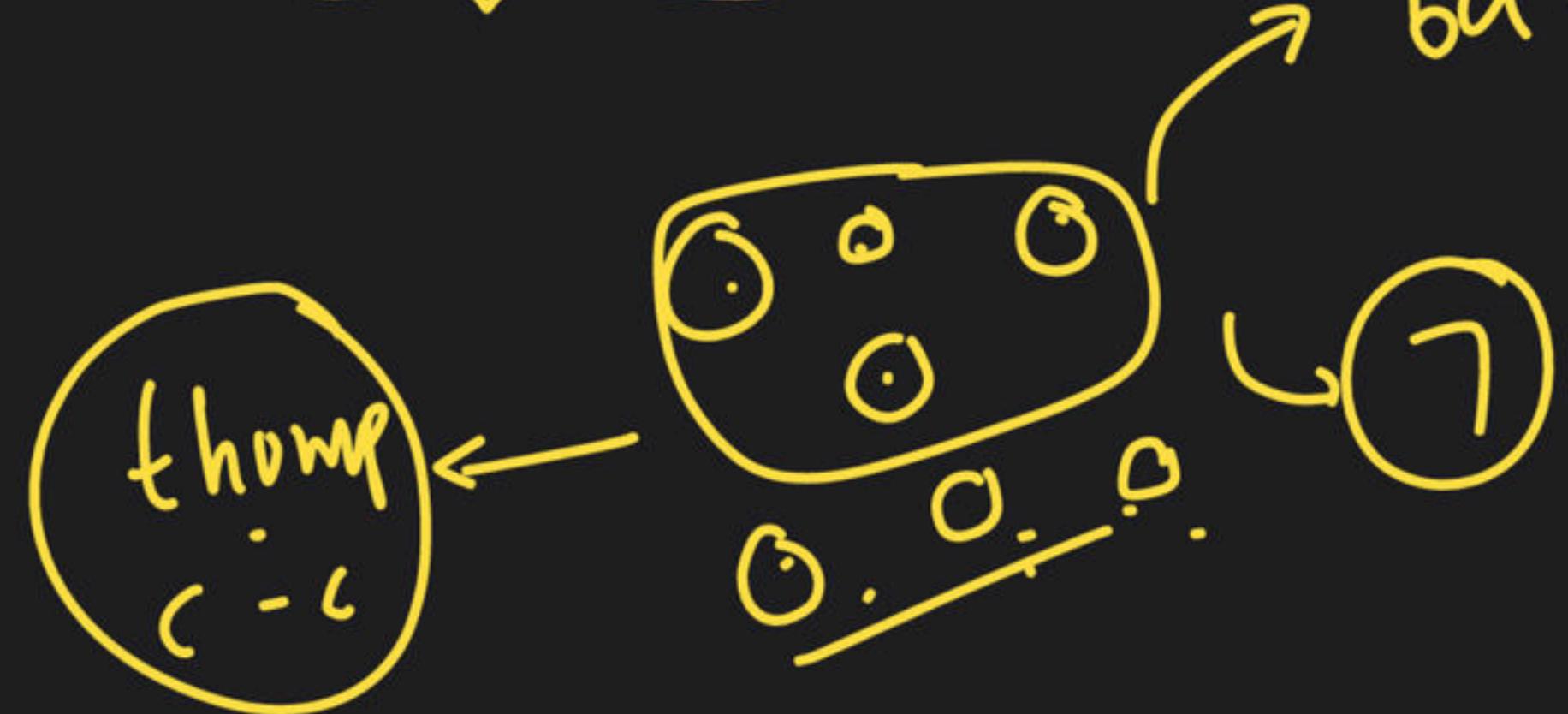
la-ba



la - ba - ha

ha, n - h, n - h - n, b,
b, n, b - n - h

ba n - n - n



Let a_1, a_2, a_3, \dots be a sequence of positive integers in arithmetic progression with common difference 2. Also, let b_1, b_2, b_3, \dots be a sequence of positive integers in geometric progression with common ratio 2. If $a_1 = b_1 = c$, then the number of all possible values of c , for which the equality $2(a_1 + a_2 + \dots + a_n) = b_1 + b_2 + \dots + b_n$ holds for some positive integer n , is

$$C = \frac{2^n - 2^{n-1}}{2n^2 - 2n}$$

$n \in \mathbb{N} \rightarrow C \in \mathbb{N}$

(JEE Advanced 2020)
10th

Let the set $C = \{(x, y) \mid x^2 - 2^y = 2023, x, y \in \mathbb{N}\}$. Then

$$\sum_{(x,y) \in C} (x + y) \text{ is equal to } \dots$$

N1

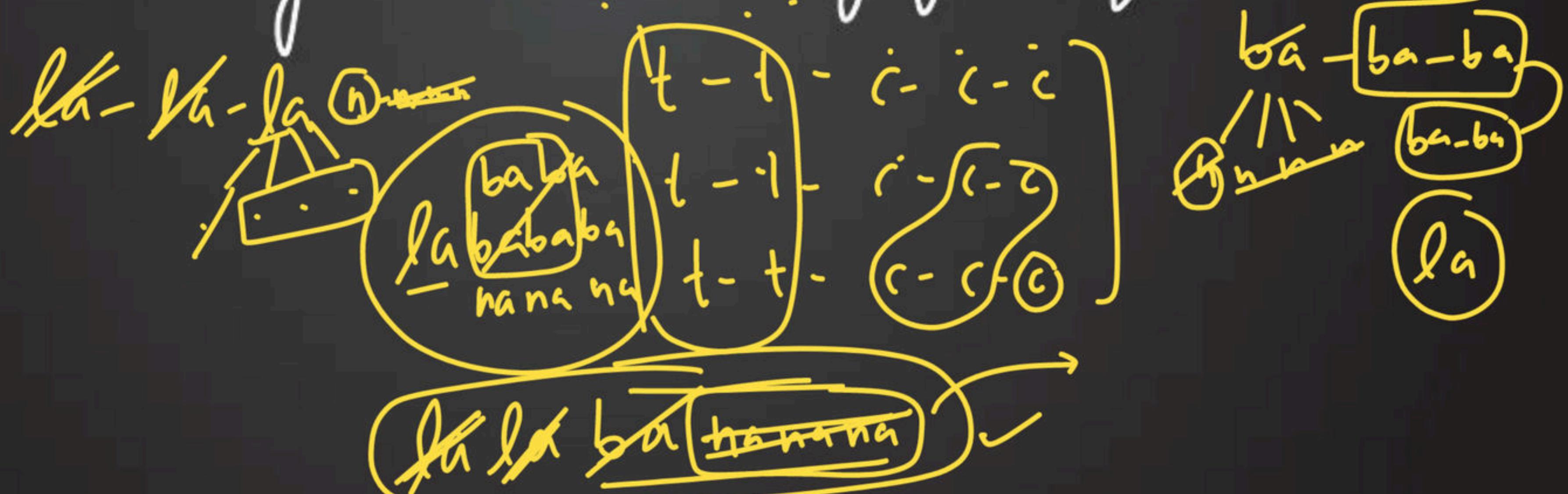
(JEE Mains 2024)

37





You are a Banana tribesman with la-la-la bananas to trade for tools and wooden beads. Each tool costs thump-thump-clap-clap-clap bananas, and a single banana is worth two wooden beads. After buying three tools (& eating one banana for launch), how many beads (in Tree language) can you afford?



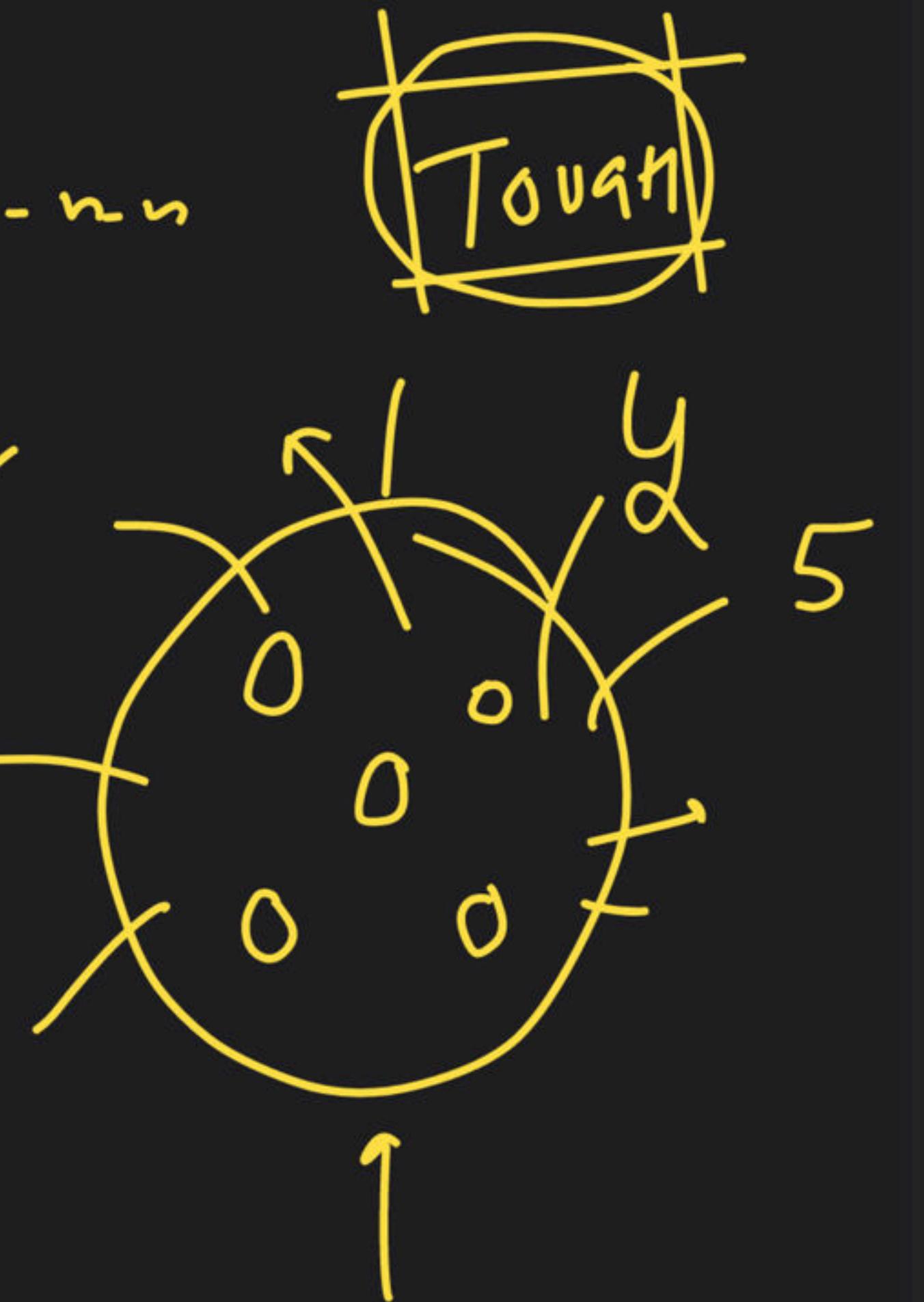


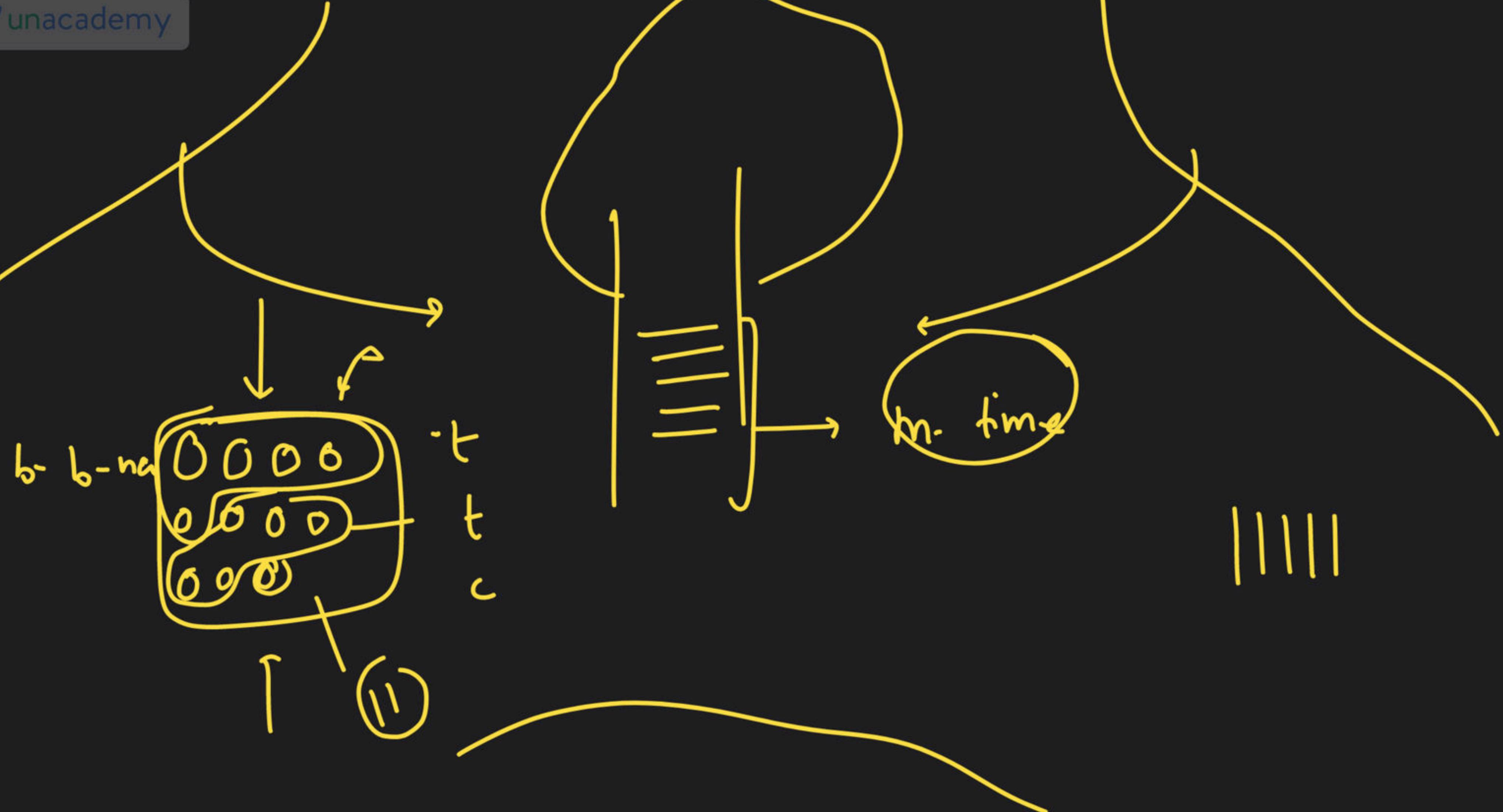
 = ba - n - n n

 ABV

✓

2-





18000 years ago → ICE AGE → Caves

Agriculture ← Wheat!! ← lot of edible food ✕

First time in human history,
HUMANS SETTLED DOWN! (Near the rivers)

Variable

5 packet

1lt

C-12

comparison

U lt V V V
unit

U U U - U

5g milk

1g glass

ba-ha glasses

1kg

VIII

Try to observe,
What's "constant", "unchanging",
"stable" etc. in a
constantly changing, variable,
seemingly "impossible" thing!

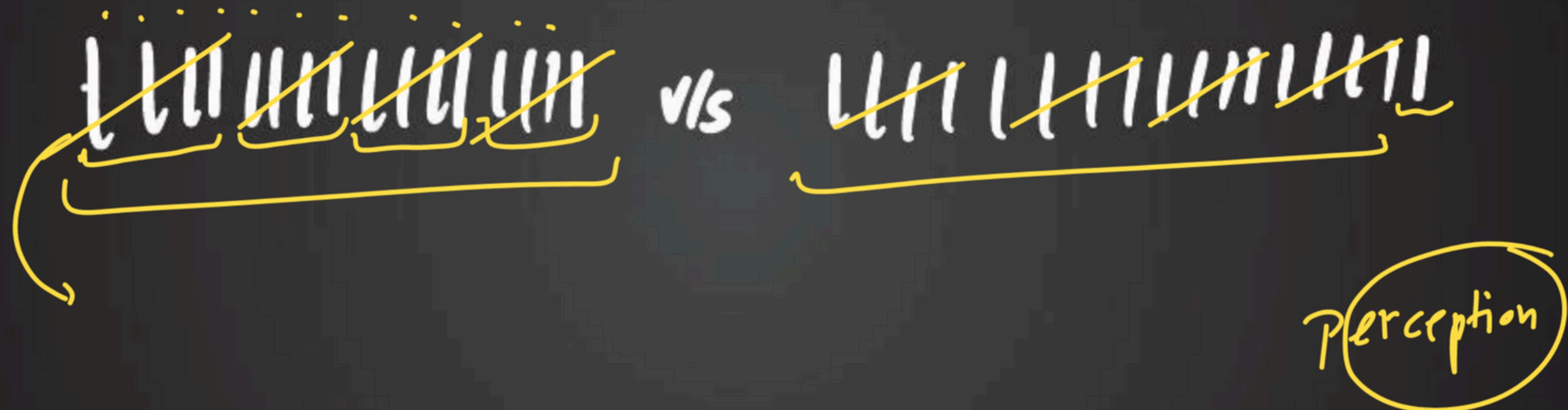


6



la-ba-na





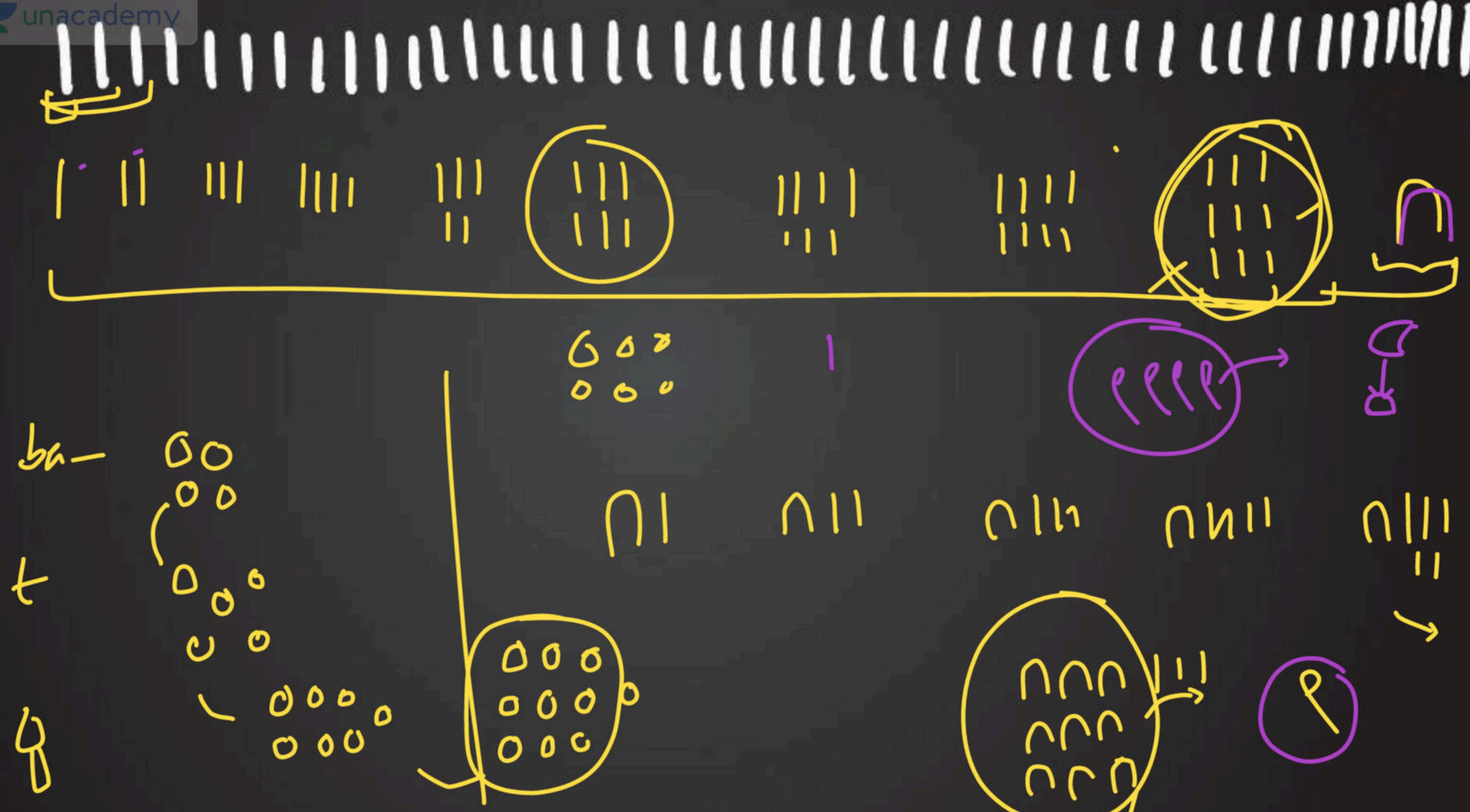
ИИ ИИ ИИ ИИ ИИ
ИИ ИИ ИИ ИИ ИИ

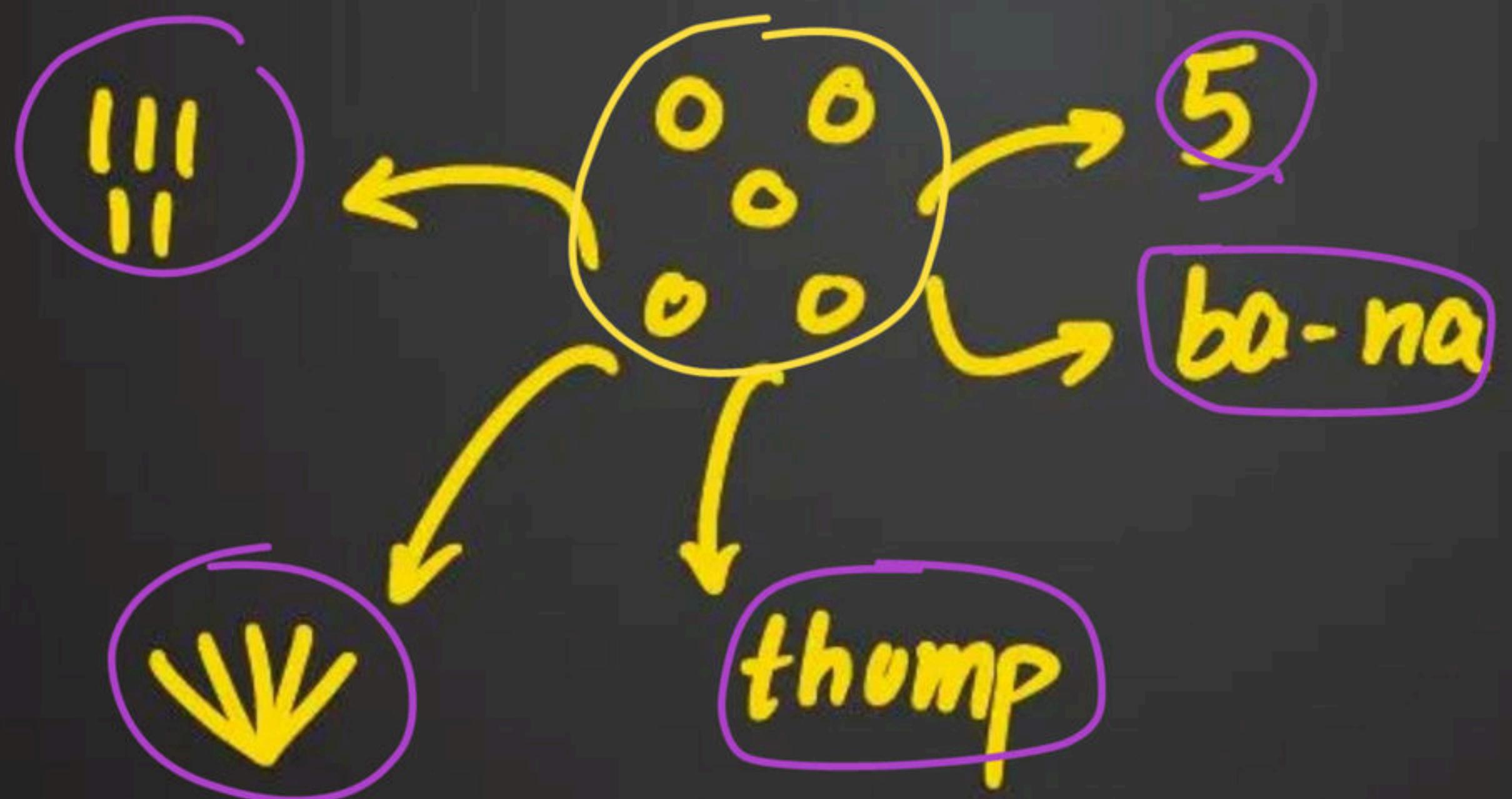


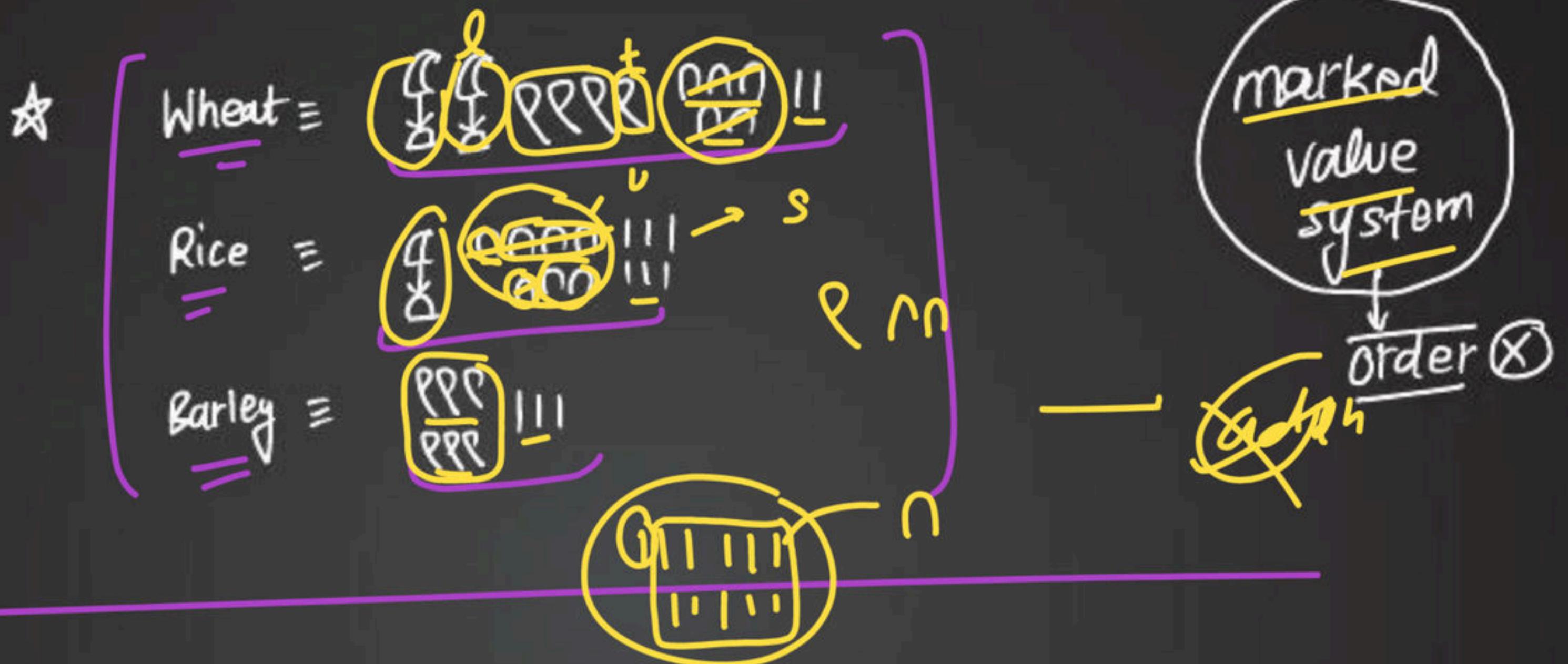
VS

ИИ ИИ ИИ ИИ ИИ
ИИ ИИ ИИ ИИ ИИ

ОООО







stones

प्राचीन संस्कृत

||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| ||||| |||||

| | | | |

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||| | |



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X

XI

XII

XIII

XV

XVI

XXXXXX

L

CCCCC
P

M



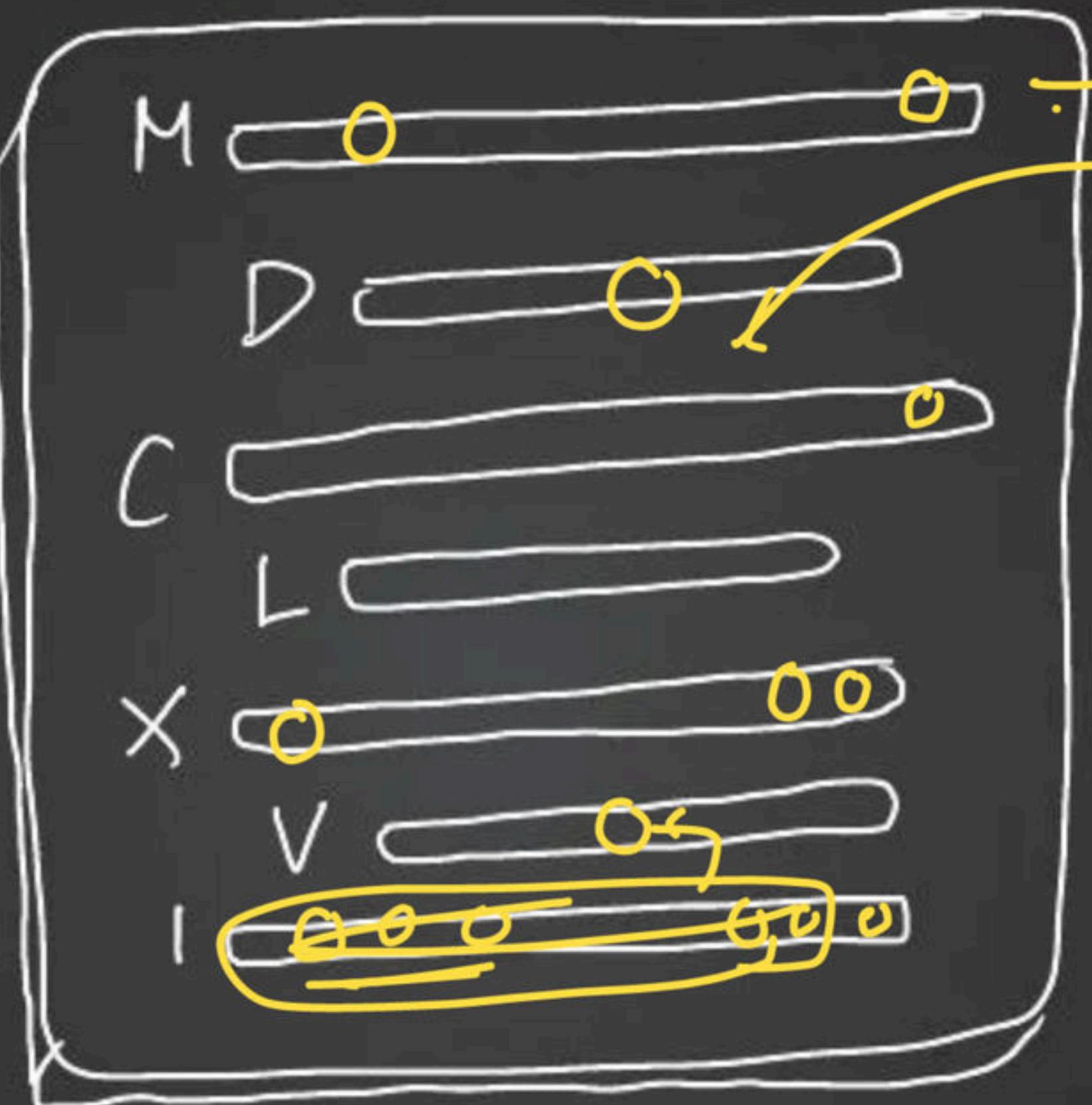
Koman Tabula (abacus)

order:

~~M D C~~ ~~X X V~~ flasks
of oil

⇒ M CCC L X II

⇒ M CC D X X III



M D C → X X V

CAT

(X X M D M C V I X)

|||||

\\ \\ \\ \\ \\
V ✓

throughout
the world

INDIA!

|||

Number Language

Portable
in our
heads!

easy & fast
to write

grouping size

(too
small)

(too
large)

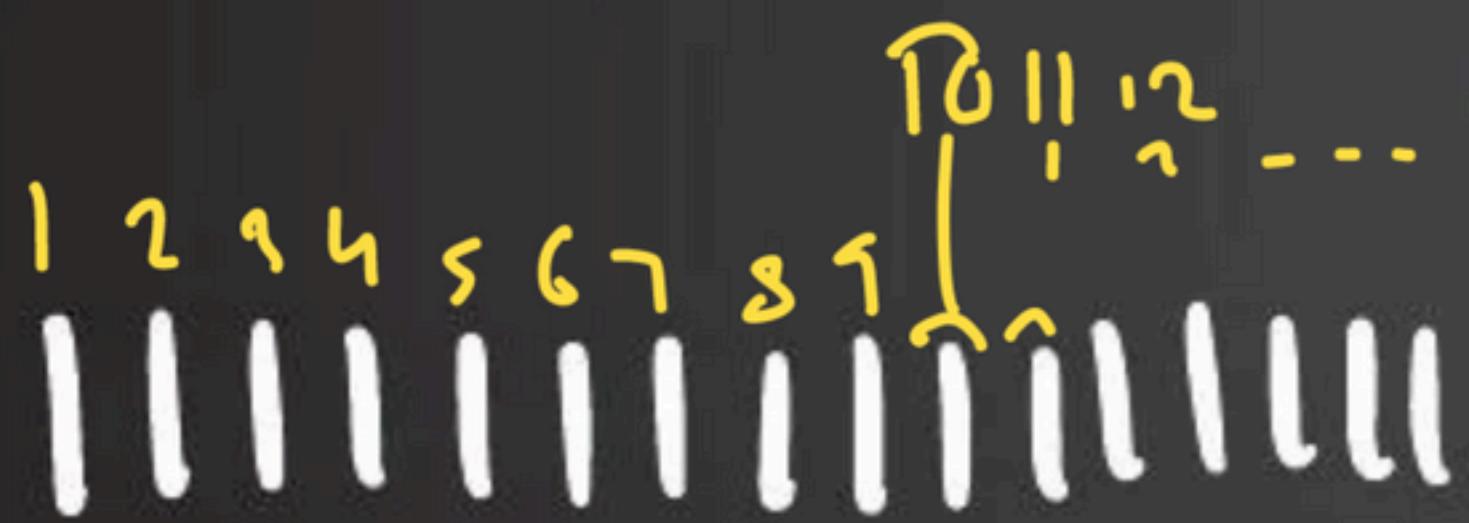
Abacus / Calculator

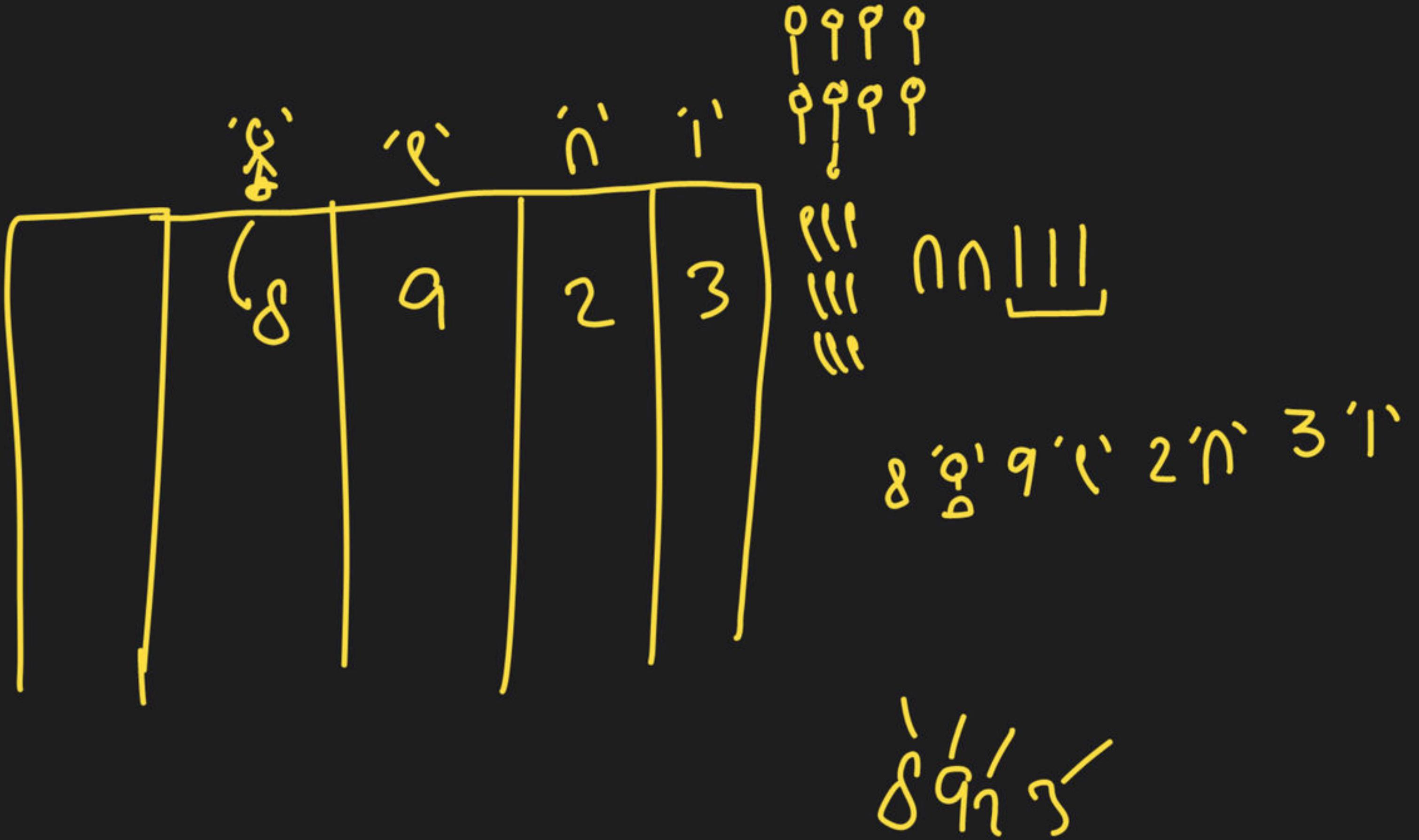
portable

fragile

big

2 2 3 8 4 6 6 8 9
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
1 2 3 4 5 6 7 8 9





$$\begin{array}{r}
 5642 \\
 -927 \\
 \hline
 6569
 \end{array}$$

try
fudge the bars!!

$$\begin{array}{r}
 5642 \\
 -927 \\
 \hline
 5
 \end{array}$$

5	5	9	2	
9	2	7		



$$2 + 7 = 9$$

Digit Sum

Play!

Remember
the
table

fingers
or
|||||

la-la



2	1	1
1		
3		

$$\begin{array}{r}
 8 + 6 + 7 + 2 + 4 + 3 \\
 - \\
 \hline
 32
 \end{array}$$

12 12 12

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

$$13 =$$

$$10$$

$$\left. \begin{array}{l} 9 = 8 + 1 \\ 7 + 2 \\ 6 + 3 \\ 5 + 4 \end{array} \right\}$$

$$7 + 2$$

how
to
handle
this?

also x it

2	7	7	4
7	2	5	

2 thov 7 tens 4 left overs

2	0	7	4
7	2	5	

$$\begin{array}{r}
 2 \quad 74 \\
 \times 725 \\
 \hline
 2799
 \end{array}$$

$$\begin{array}{r}
 2 \quad 0074 \\
 \times 7025 \\
 \hline
 \end{array}$$

8|9|0|3

8193763794723654

~~— ↪ ↤~~

symbols

753581854713

"Adv 2026 student
Feedback"

3:30pm

↑
T.

can handle anything!

n × -:
alg
no. theor



Doubling!

No one comes even close to
Indians in this!

Recipe: ||| packets

Double :

Double :

7 times:

} other worlds

I
think in roman!?

Indians analysed some patterns:

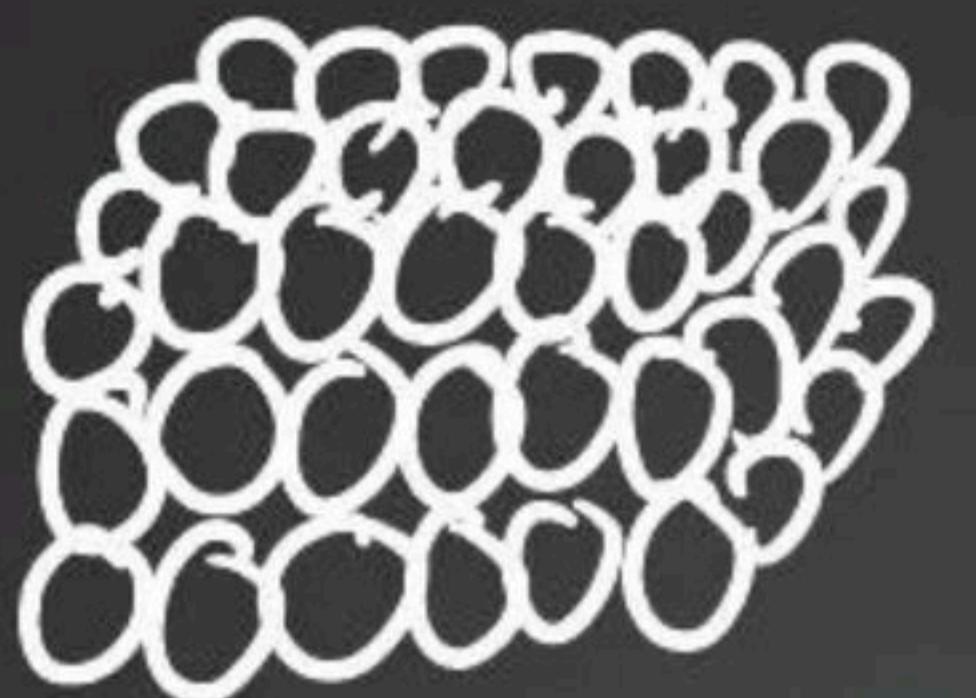
①

$$5+5+5+5+5+5+5 = \underbrace{7 \times 5}_{\text{counter}}$$

diff things

7 apples in 5 baskets \longleftrightarrow 5 apples in 7 baskets





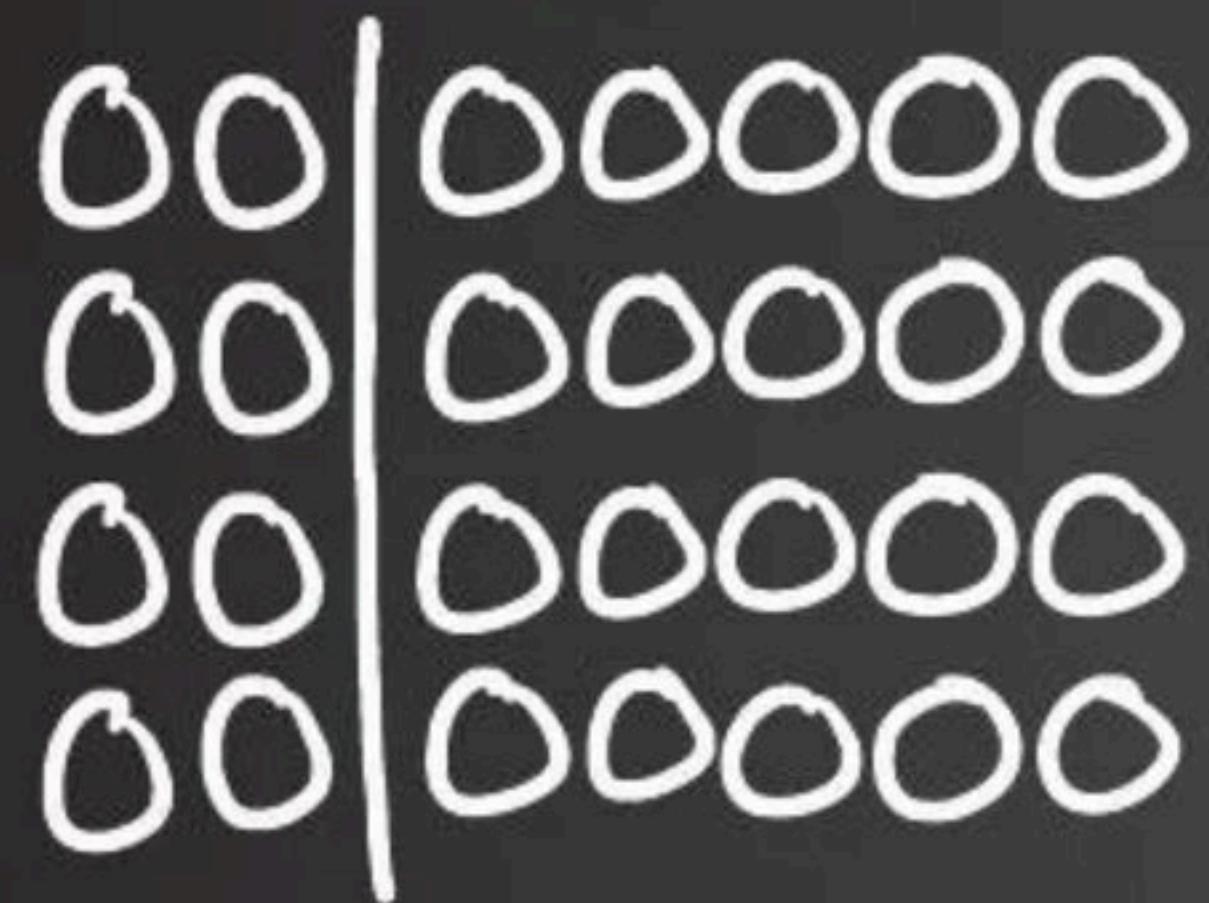
$$6 \times 4 \times 3$$

$$7 \times 8 \times 2 \times 5 \times 6$$

II 5 apples + 3 apples = $(5+3)$ apples = 8 apples

5 thirty + 3 thirty
seven sevens = $(5+3)$ t.s =

$$5 \times 37 + 3 \times 37 = 8 \times 37$$

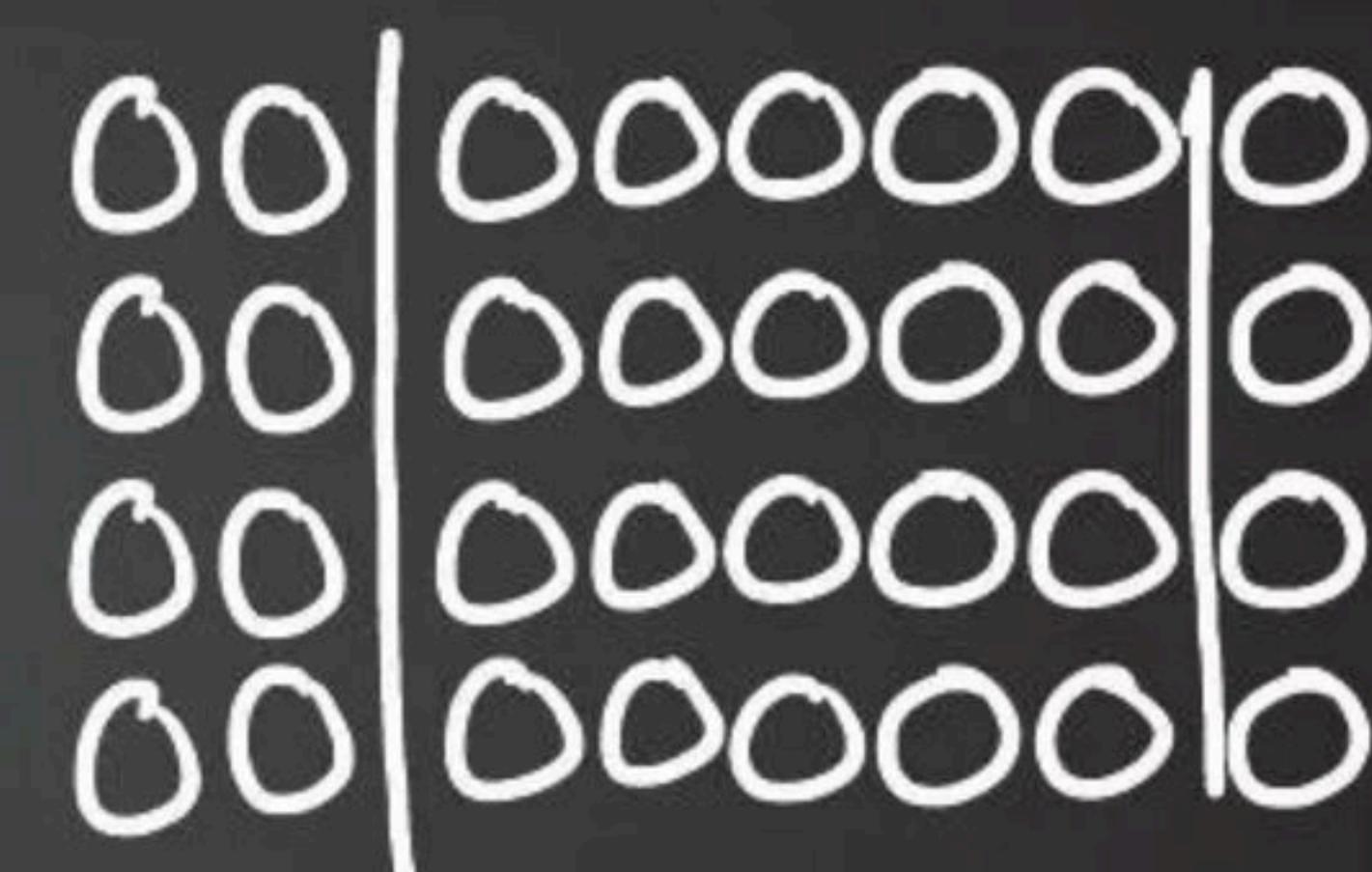


4x2

4x5

2x4

5x4



000	000000 00
000	000000 00
<hr/>	
000	000000 00
000	000000 00
000	000000 00

you can chop the way you wish to!

()C LC)C)

III

If you multiply the grouping size itself?

RR RRR IIII → 10 times

$$\begin{array}{r} | & | & | & | & | \\ 1 & 4 & 7 & | & 7 \\ \hline 1 & 4 & 7 & | & | \end{array}$$

$\times 10$
 $\times 10$

30

$$200 \times 30$$

$$= 2 \times 3 \times 10 \times 10 \times 10$$

$$173 \times 254$$

$$(100 + 10 + 3)(200 + 50 + 4)$$



Sharing!

Grapping of 10 was a cultural choice

$10^3, 10^2, 10^1, 10^0$



