Module 3

BLR

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- 3.5 years DSA Mentor
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  - Boss Coder Academy {Jn}
  - Acelo Infs ~ 2 years

- 2023 CSE, MSIT

Expectations.

- Active in the chat, unmute themselves.
- M3 cake walk X
- Arrays, Linked list, OOPs', Recursion

Module 3

Algo
- Binary Search {3}

DS
- Stacks {3}
- Queues {2}

DS (Theory)
- Hashing {4}

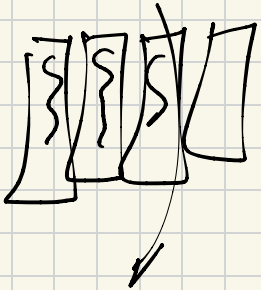
DS
- Binary Trees {4}

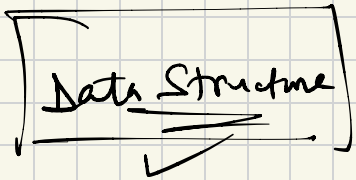
Hashing (Theory) → HashMap {DS}, HashSet {DS}

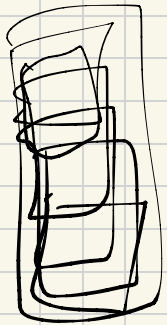
Data Structure and Algo

way to structure your data in such a way that accessibility is eased

finding any book is quick







Algorithm:

Q Prepare Tea?

Surrounding!

~~Home~~

train

- Boil water
- add sugar tea leaf
- add milk

Tea

you take hot water

tea bag, milk powder

outcome: Tea

Module 3

Easy Ques [Lc], [gfg]

100

30 Hard

50 Medium

20 Easy

Doubt?

→ Daily class timings

8pm → 11 pm {15-20 min Break}

→ Placements

M3 - M4 {Ready}

→ LL, ArrayList, OOP's, recursion.

→ Approach ques. in interviews.

→ NDA

Gym, LC

30 - 40

M1 M2 M3

Learn → revise (Sunday) → Notes → 10 days → 1 Month → Module test

Memorize → ques

Concept

Pattern → among que → revise patterns

Dry Run → clearity

Binary Search

	0	1	2	3	4	5	6
int[] arr =	1,	2,	5,	7,	9,	12,	15

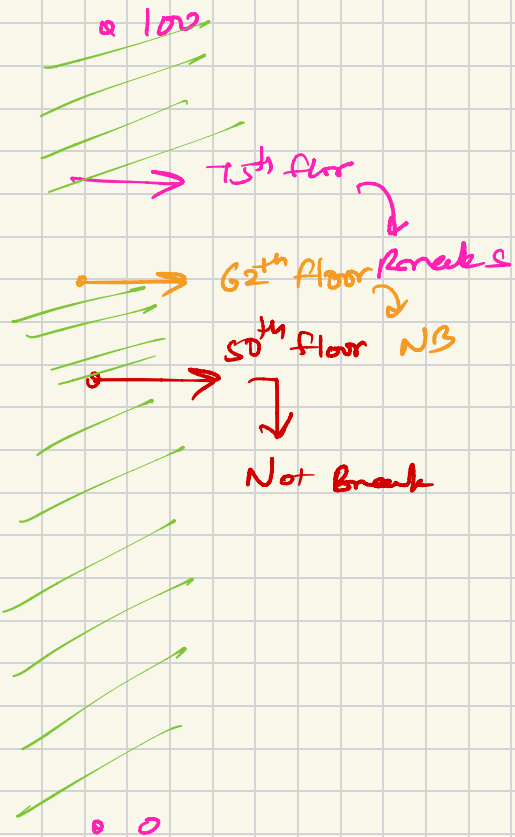
target = 9

Brute force

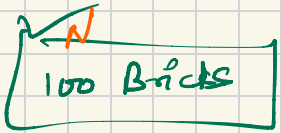
```
for (int i = 0 -> n)
{
    if ( arr[i] == target)
        return i;
}
```

TC: O(n)
SC: O(1)

Puzzle



min^n floor from which, if you throw a brick it will break.



using 1st Brick, eliminated 50 floors

" 2nd Brick, eliminated 25 floors

" 3rd brick eliminated 12 floors

↓

using k^{th} brick, eliminate 1 floor

No. of throw	1	2	3	4	k^{th}
floors eliminated	$\frac{N}{2}$	$\frac{N}{4}$	$\frac{N}{8}$	$\frac{N}{16}$	1
	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$	$\downarrow$
	$\frac{N}{2^1}$	$\frac{N}{2^2}$	$\frac{N}{2^3}$	$\frac{N}{2^4}$	$\frac{N}{2^k}$

$$\frac{N}{2^k} = 1$$

$$2^k = N$$

taking $\log_2$

$$\log_2 2^k = \log_2 N$$

$$k \cancel{\log_2 2} = \log_2 N$$

$$\boxed{k = \log_2 N}$$

I took $\boxed{\log_2 N}$ → throws, bricks

$\rightarrow 10^6$

$\log_2 10^6 = 6 \log_2 10 \rightarrow 3.1$

$\approx \boxed{18}$

$\boxed{\text{super fast}}$

int[] arr = { 1, 2, 5, 7, 9, 12, 15 }

0 1 2 3 4 5 6

sorted!

mid

si

ei

target = 9

Binary Search!

- arr[mid] == target — return mid!
- arr[mid] < target — {Eliminate left half}
- arr[mid] > target — {Eliminate right side}

TC: $O(\log_2 N)$

SC: $O(1)$

Binary Search