6 - 10 Feb (2 day window)

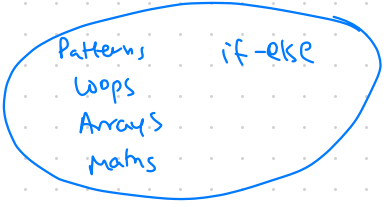
4-5 coding Questions 2-3 hrs

↳ 1 Full Question
↳ 1 Partial Question]

Test · 99% Pass. 1% Fail → Repeat Bag (Month

↳ Question (1) Coding
↳ Easy - Medium

Topics

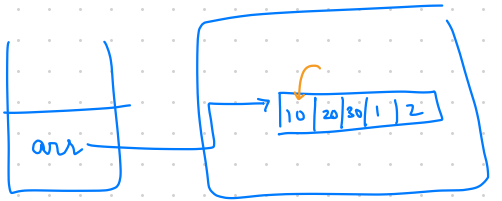


ARRAYS

```
int [ ]  arr  =  new  int [n];
```

arr → stack
new int [n] → Heap

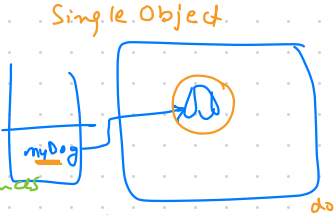
Array
- Primitives
- Objects (array itself stores object references)




```
class Dog {
    color
    ht
    wt
}
```

Single Dog

```
Dog  myDog  =  new  Dog();
```



Multiple Dogs

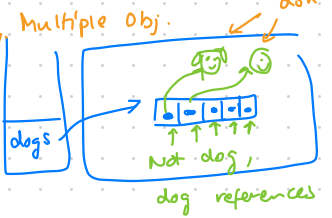
```
Dog [ ]  dogs  =  new  Dog [10];   //empty
```

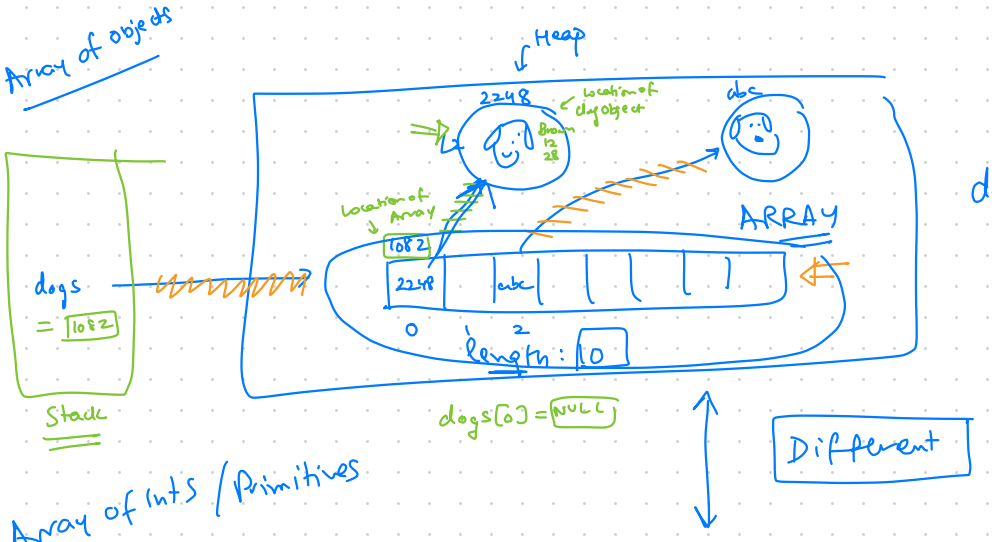
stack — only creates 10 references — Multiple Obj.

L2 → `dogs[0] = new Dog();` ← actual Dog Object

L3 → `dogs[2] = new Dog();`

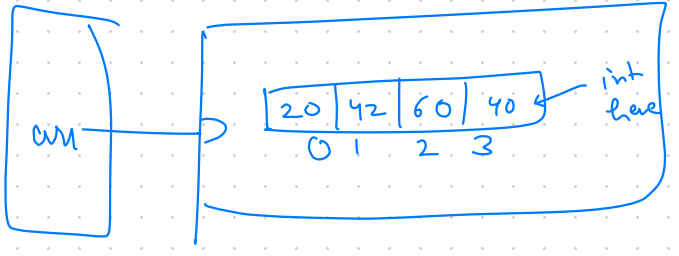
`dogs[0] = null;`





dogs[0] = new Dog()

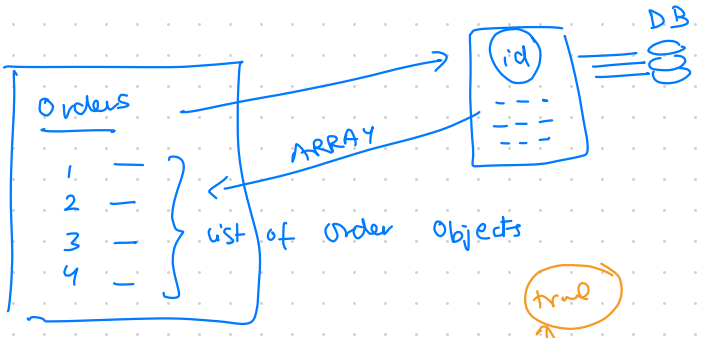
returns the address of the memory where the object is created

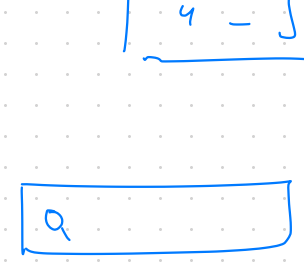


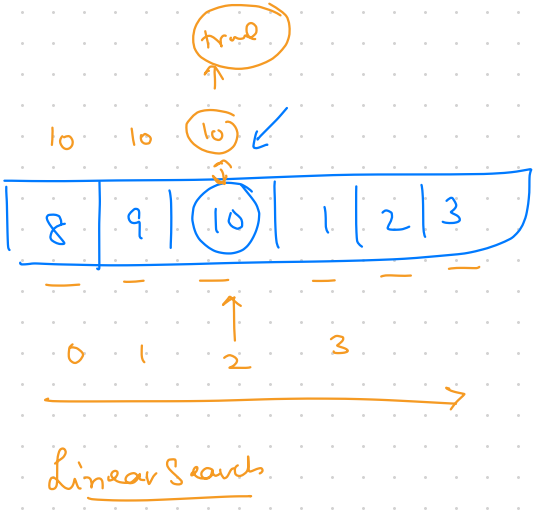
ARRAY → Objects

Array of int → object contain primitives

Array of objects → object ref.


DB
id
Orders
ARRAY
1
2
3
4
List of Order Objects


9
1
2
3
4
5


true
10
10
10
8
9
10
1
2
3
0
1
2
3
Linear Search

Linear Search All

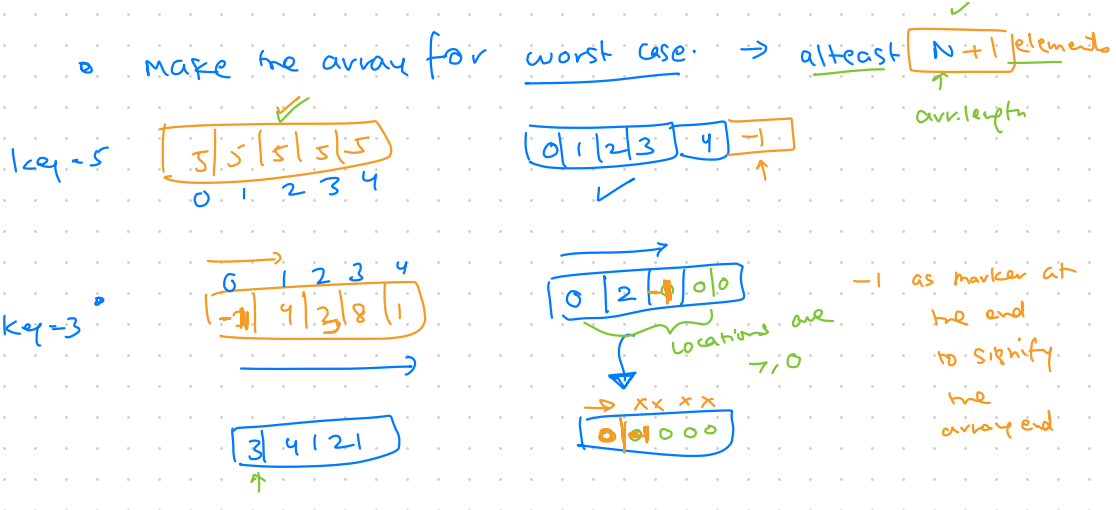
↳ how big?

① Count for(_) ② create [| |] ③ Store the indices for [1|2|5] [2 N]

- Make the array for worst case. → alteast [N+1] elements
  arr.length

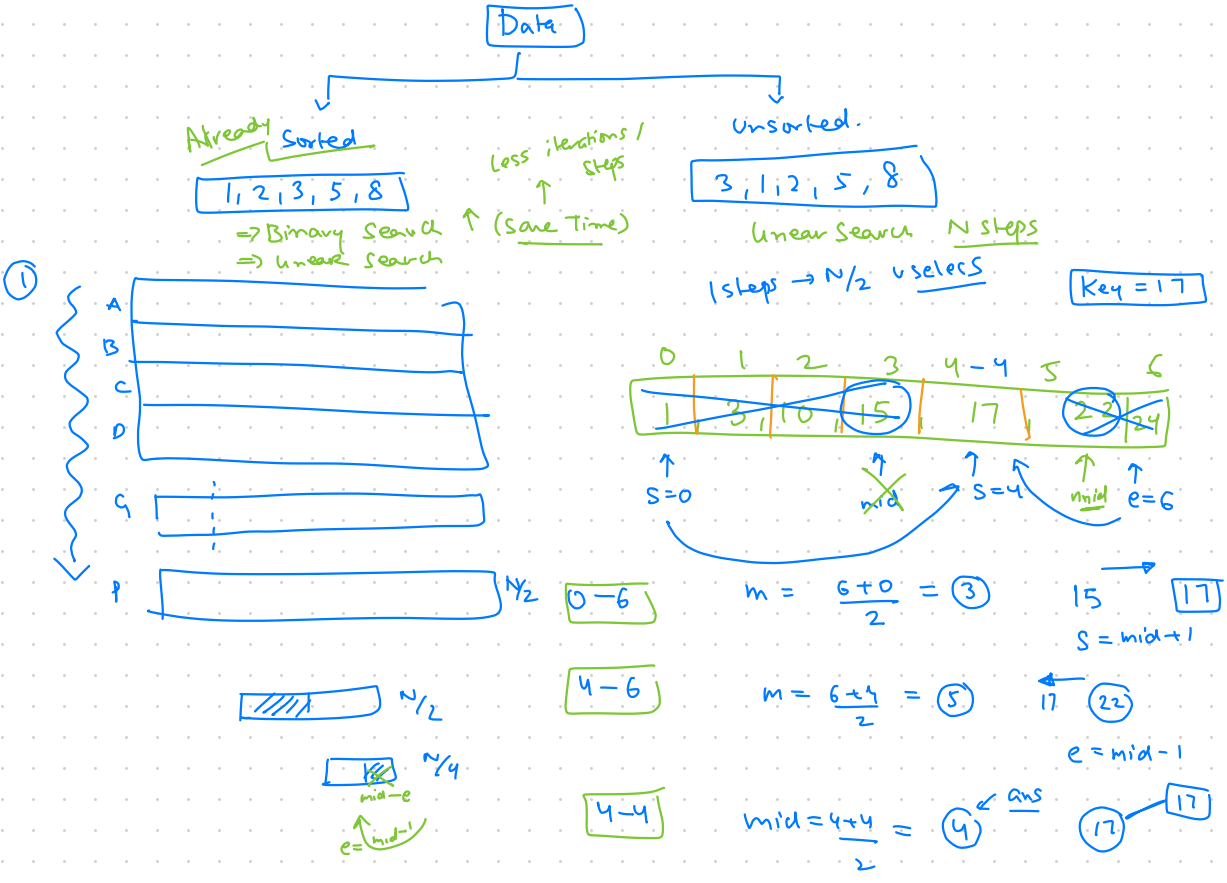
key=5 [5|5|5|5|5] 0 1 2 3 4 [0|1|2|3|4|-1]

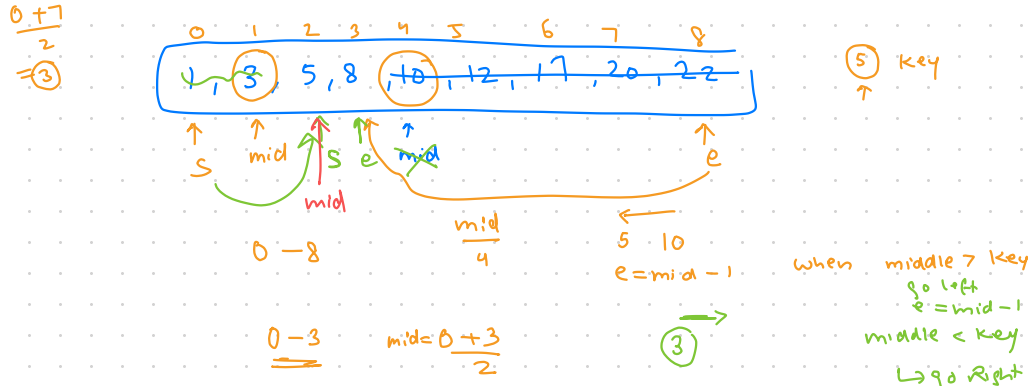
key=3 • 0 1 2 3 4 [-1|4|3|8|1] [0|2|-1|0|0] locations are ≥0 -1 as marker at the end to signify the array end



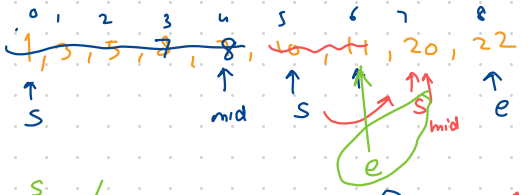
[3|4|2|1] [0|-1|0|0|0]

- ARRAYIST (Dynamic Array) ⇒


Data
Already Sorted
1, 2, 3, 5, 8
=> Binary Search
=> Linear Search
Less iterations / steps
(Same Time)
Unsorted.
3, 1, 2, 5, 8
Linear Search N steps
1 steps → N/2 useless
Key = 17
0 1 2 3 4 5 6
1 3 10 15 17 22 24
s=0
mid
s=4
mid
e=6
A
B
C
D
N/2
0-6
m = 6+0/2 = 3
15
17
s = mid+1
N/2
4-6
m = 6+4/2 = 5
17
22
e = mid-1
N/4
mid-e
e=mid-1
4-4
mid = 4+4/2 = 4
ans
17
17



✓ Part of Question



18

$\log 10^9 = \log_2 (10^3)^3$

$= 3 \log_2 1000 = 3 \times 10 = 30$

BS → $\log_2 10^9 \approx$ 30 steps

10^9 steps

N

N/2

N/4

N/8

1

$m = \frac{8+5}{2} = 6$

$m = \frac{7+8}{2} = 7$

$e = mid - 1$ 6

1 =	$N/2 = N/2^1$
2 =	$N/4 = N/2^2$
3 =	$N/8 = N/2^3$
⋮	⋮
k =	$N/2^k = 1$

$N = 2^k$

$\log_2 N = \log_2 2^k$

$\log_2 N = k \log_2 2$ ($\log_2 2 = 1$)

$\Rightarrow k = \log_2 N$

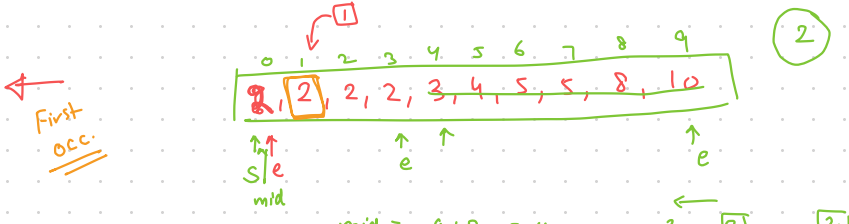
lo Min Break :)

Doubts ✓ Repeating elements (First occ & Last occ)

→ Practical use

✓ Breakpoint

→ Recursion



mid = $\frac{9+0}{2}$ = 4

2 3 2

ans = ~~10~~

mid = $\frac{0+3}{2}$ = 1 ?

2 Store 1 and search in left

mid = $\frac{0+0}{0}$ = 0

2

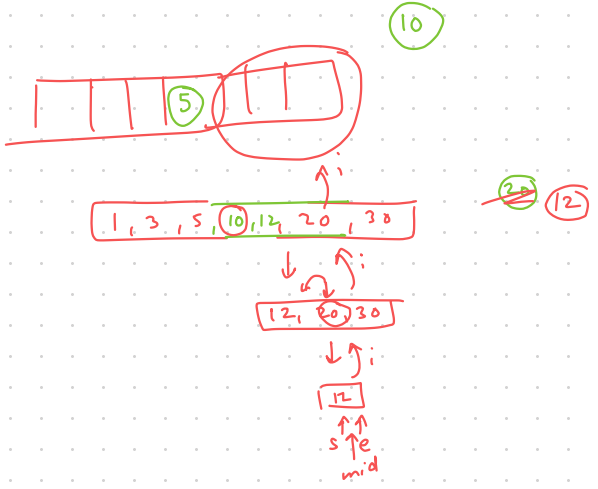
2

Stop

e s

e = mid − 1

e = -1 s = 0


10
5
1, 3, 5, 10, 12, 20, 30
20
12
12, 20, 30
12
s
e
mid

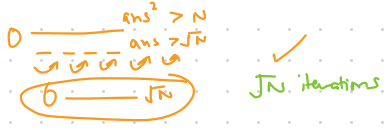
Square Root

without using Lib

20

$\sqrt{N}$

$\sqrt{20} = 4$



$\sqrt{N}$ iterations

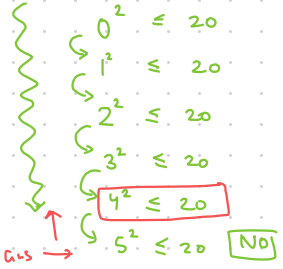
ans = 0

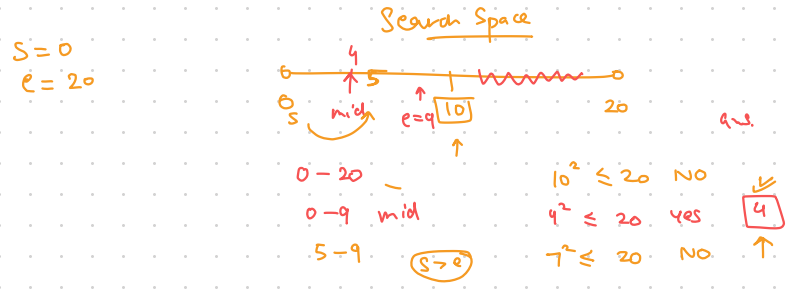
Linear Search

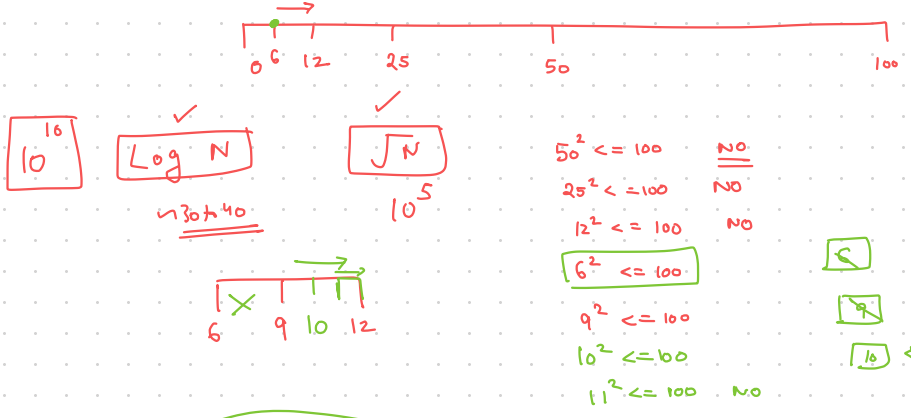
```
while (ans * ans <= N){
    ans = ans + 1;
}
```

3

ans = ans - 1 ,







- 2D Arrays.
- Array Utils
- In-built Sorts