Class 3.1 - Binary Search

Wednesday, July 9, 2025 9:12 PM

[3, 4, 2, 0, 10, 11]

key = 10

Linear search

```
for(i=0; i<n; i++){
    if(arr[i]==key)
        ret i
}
ret -1;
```

O(n)

A, C — discard (input)

Binary search

→ Searching technique where we try our input space in every iteration

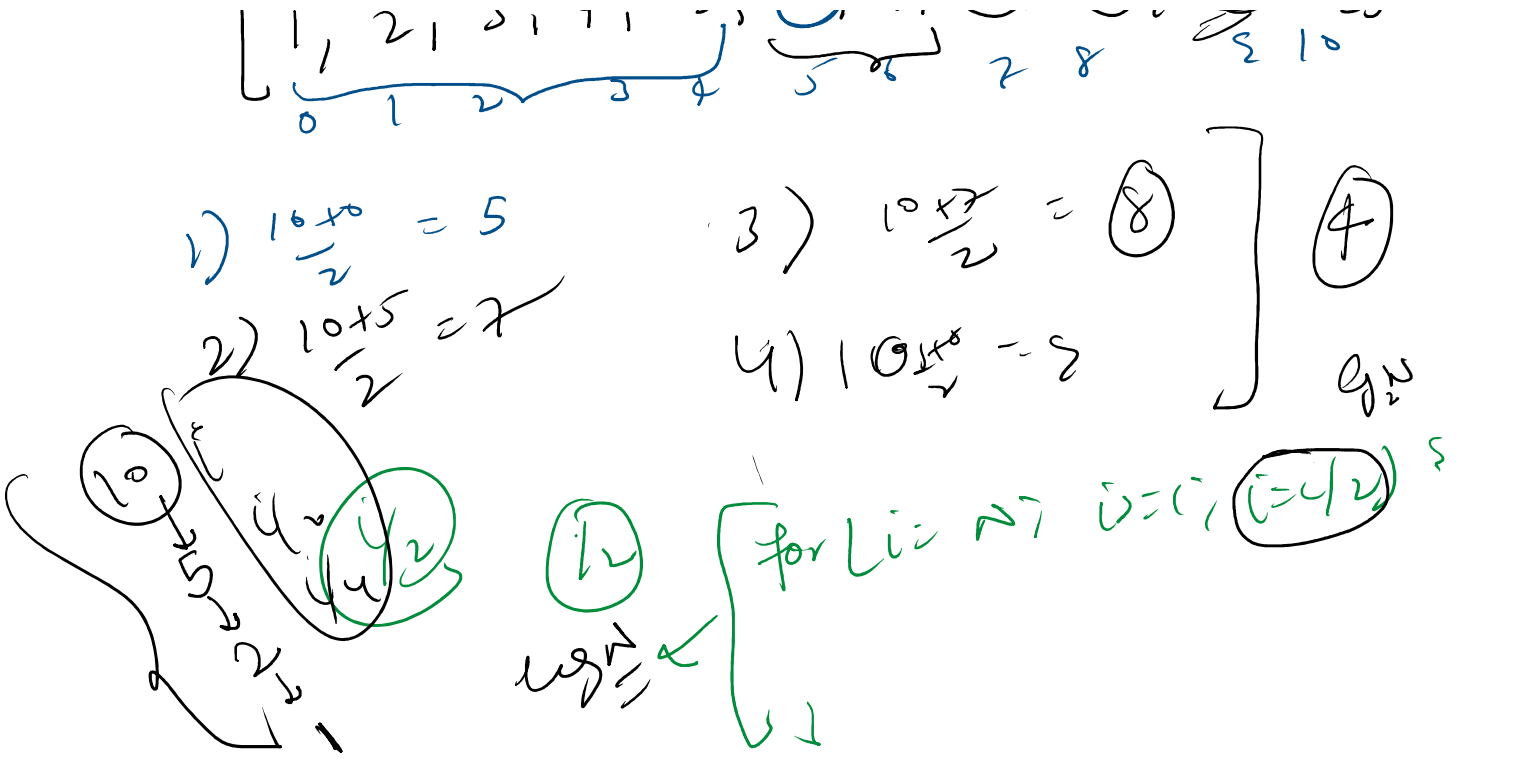
[2, 5, 7, 10, 14, 16]

(s+e)/2

key = 10

10 iterations

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]



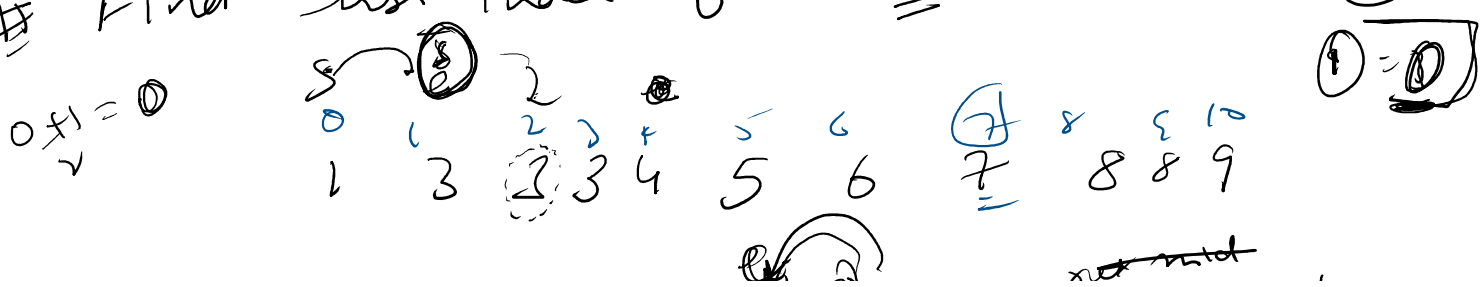
T.C $-O(\log_2 N)$

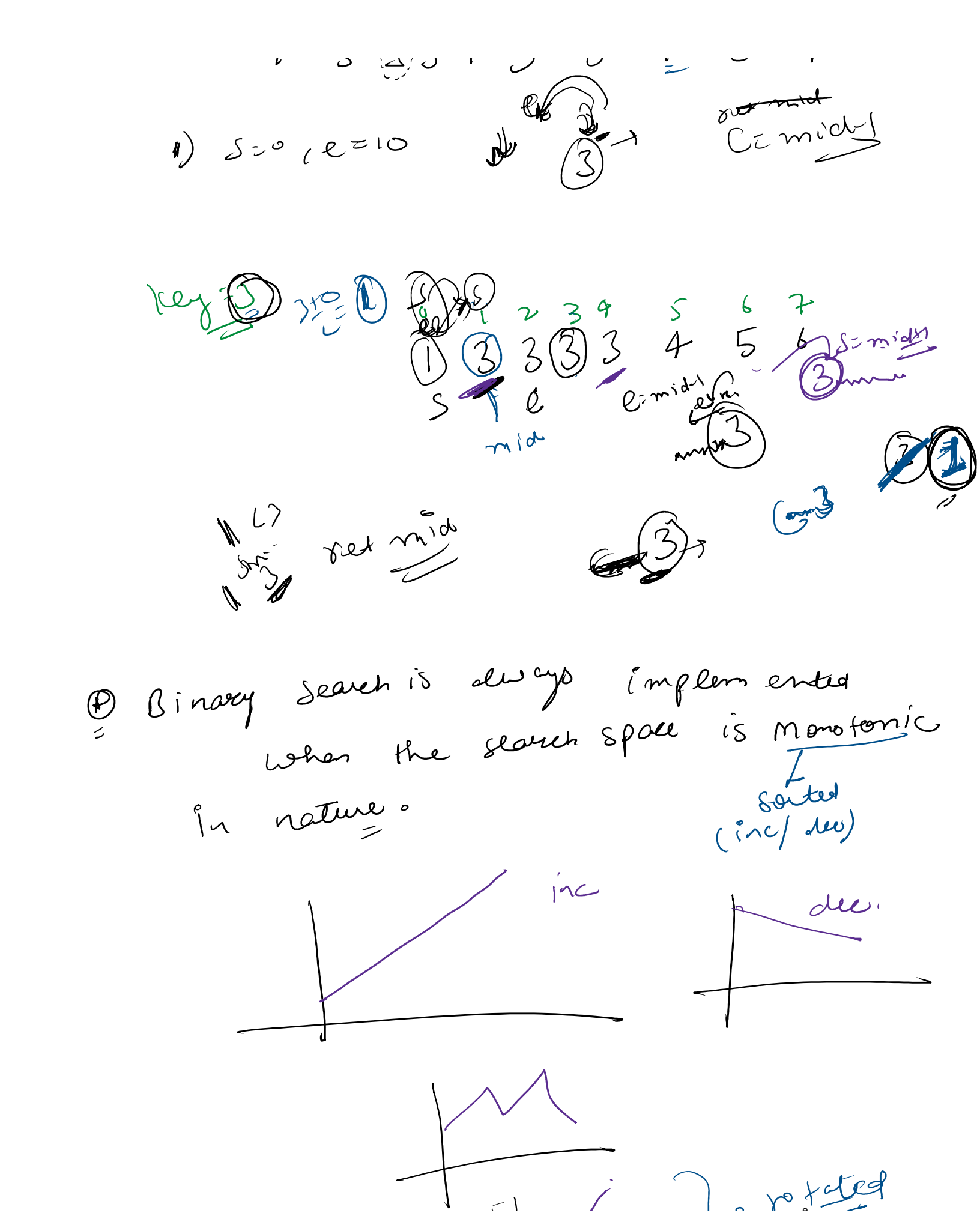
(A) Array + $\log N$ → Binary Search

Significance of 's'

(A) If the key is not present in the array, then the value of 's' gives the correct index if we insert that key.

Find first index of a value

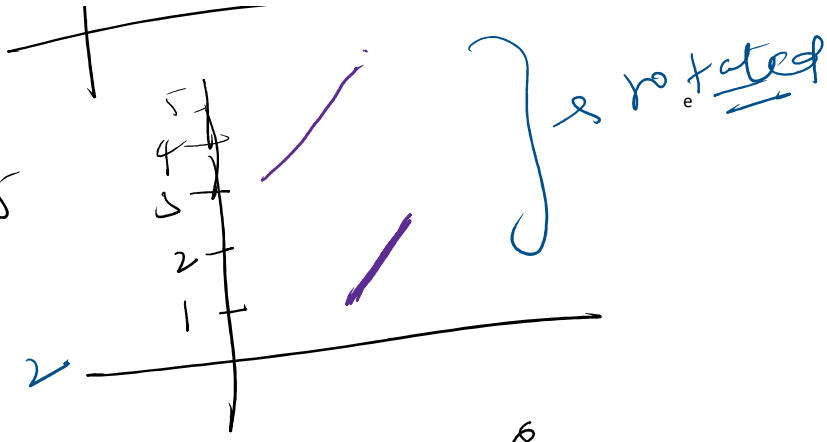


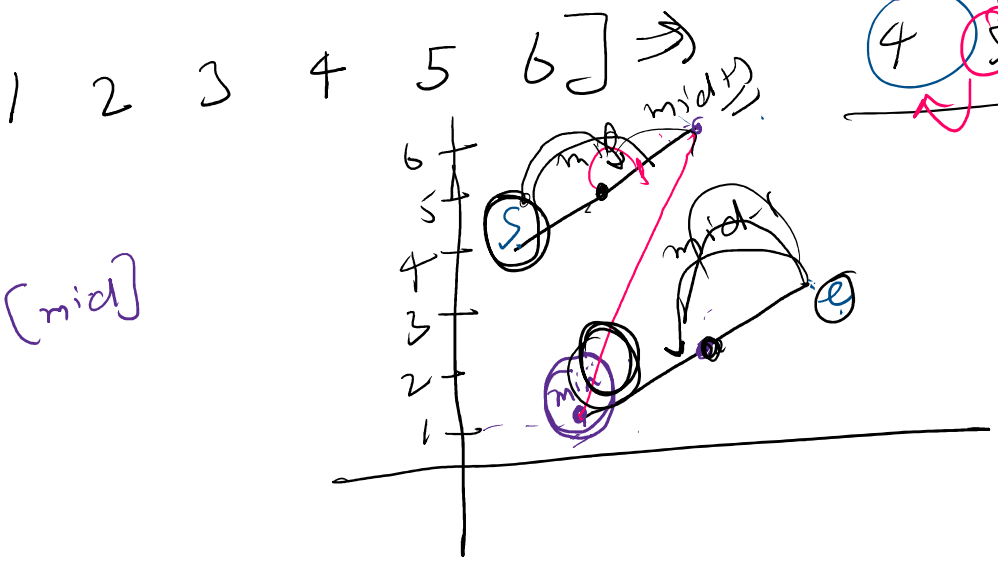


Binary search is always implemented when the search space is monotonic in nature.

sorted (inc/dec)

rotated






```
if (arr[mid] < arr[mid-1])
    ret mid;
```