Date 16 Oct 2023 Page

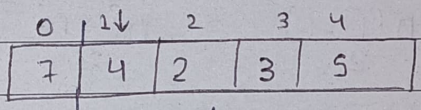
Day-29

Insertion Sort

⇒ Insertion Sort is like arranging cards.

=⇒ When we play cards game and arrange the cards by checking every particular card.

=⇒ In the same way, we arrange the elements in insertion sort.



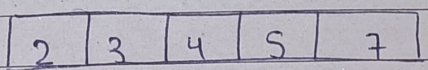
n elements

(1-0) Round 1: 4 7 | 2 3 5 then round = n-1

(2-0) R2: 2 4 7 | 3 5

(3-0) R3: 2 3 4 7 | 5

(4-0) R4:



↳ This shows that the elements before the indexing are sorted now you have to find the correct position of the current index element.

⇒

```
for( i=1; i<n; i++){
    for(j=i; j>0; j--){
        if(arr[j] < arr[j-1]{
            swap[arr[j], arr[j-1]);}
        else
            break;
    }
}
```

Date Page

Space Complexity: O(1)

Time Complexity:

=>

i = 1	i = 2	----	i = n-1
j = 1 to 1	j = 2 to 1	----	j = n-1 to 1
1	2	----	n-1

=> $1 + 2 + \ldots + n-1$

= $\frac{n(n-1)}{2} = \frac{n^2 + n}{2}$

=> $O(n^2)$ → Worst Case

$O(n)$, $\Omega(n)$ → Best Case

$O(n^2)$, $\Theta(n^2)$ → Avg. Case