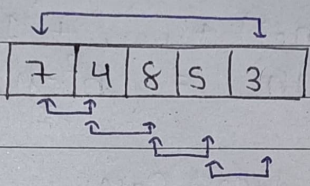
Date 13 Oct 2023 Page

Day-26

Bubble Sort

⇒ In this sorting, we check the adjacent elements.

⇒ 

n = 5

no. of round = n - 1

⇒ R1 | 4 | 7 | 5 | 3 | 8 |

R2 | 4 | 5 | 3 | 7 | 8 |

R3 | 4 | 3 | 5 | 7 | 8 |

R4 | 3 | 4 | 5 | 7 | 8 |

⇒ Ex:

0	1	2	3	4
7	4	8	1	5

n

```
for (i = n-2; i >= 0; i++){
                    4(n-1)(i)
    for (j=0; j<=5; j++){
        if(arr[j] > arr[j+1])
            swap(arr[j], arr[j+1]);
    }
}
```

Date _____ Page _____

Time Complexity

⇒

$i = n-2$	$i = n-3$	----	$i = 0$
$j = 0$ to $n-2$	$j = 0$ to $n-3$		$j = 0$ to 0
$n-1$	$n-2$		1

⇒ $(n-1) + (n-2) + \dots + 1$

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

⇒ $O(n^2)$ → Worst Case

Space Complexity : $O(1)$

⇒ When all the elements are sorted then we don't have to do the swapping.

⇒ So we will take another variable bool swapped = 0 and if any swapping happened then we increase the value of swap.

⇒ After very fast iteration, we check the value of swapped, if it is equal to 0 then break the loop otherwise continue the ~~on~~ normal process of sorting.

Best Case: $\Omega(n)$

Avg. Case: $O(n^2)$, $\theta(n^2)$