

Time complexity and Space complexity

Time complexity :- time complexity btata hai ki program ko run karne mai kitna time lagegaa

(input size ek hisab se)

```
eg : -For (int i=0; i<n; i++)  
    {  
        System.out.println(i);  
    }
```

Yaha pr N bar loop chalegaa , to time complexity $O(n)$ hoga.

Common Time Complexities:

Complexity Meaning (Example)

$O(1)$	Constant Time (1 step always)
$O(\log n)$	Logarithmic (e.g. Binary Search)
$O(n)$	Linear (e.g. single loop)
$O(n^2)$	Quadratic (e.g. nested loops)
$O(2^n)$	Exponential (e.g. recursion)

2. Space Complexity :- Space complexity batata hai ki program ko run करने के लिए कितना extra memory (RAM) चाहिए input size के हिसाब से.

Eg :- `int[] arr = new int[n];`

Yaha n size ka array bana rhea hai to space complexity **$O(n)$** . hoga aur recursion used karenge to stack memory bhi count hoga