

## DAY-1 ASSIGNMENT | 24th December, 2020

1. Find the time complexities of the following scenarios.

a) `for(i=1;i<=n;i++)` ----- n  
`{`  
`for(j=i;j<=n;j++)` ----- n  
`printf("Hi");`  
`}`

- Here the first line of above code 'for(i=1;i<=n;i++)' should iterate for n times, so it alone takes n time to complete.
- And, the second line of code 'for(j=i;j<=n;j++)' should also iterate for n times, so it also takes n time to complete and prints the message 'Hi'.
- The total complexity of the code is  $O(n) * O(n) = O(n^2)$ .

b) `for(i=1;i<=n;i*=3)`  
`{`  
`for(j=1;j<=n;j++)`  
`printf("Hello");`  
`}`

- Here the first line runs  $\log n$  times, so the time complexity is  $O(\log n)$ .
- And line 2, the inner loop will run a max of n-1 times for each outer loop iteration. Time complexity is  $O(n-1) = O(n)$
- Line 3 is of constant complexity  $O(1)$ .
- Total time complexity is  $O(\log n) * O(n) * O(1) = O(n \log n)$ .