

# Assignment Day 1 | 24th December 2020

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## Question 1

1.) Find the time complexity for the following scenarios

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

Ans : -

Time complexity is nothing but the number of instructions executed in your program. Now, in your program you have two loops. Outer loop will iterate  $i=0$  to  $i=N-1$ , which is total of  $N$  instructions that is  $O(N)$ . Since you also have a inner loop which will again iterate from  $j=i+1$  to  $j=N-1$  for each  $i$ .

Hence, time complexity will be  $O(N^2)$ .

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

Ans:-

Number of times, we can double a number till it is less than  $n$  would be  $\log(n)$ .

Let's take the examples here.

So,  $j$  would run for  $O(\log n)$  steps.

$i$  runs for  $n/3$  steps.

So, total steps =  $O(n/3 * \log(n)) = O(n \cdot \log n)$ .

