

## Assignment 1

### Day 1

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

i	j
1	n
2	n-1
.	.
.	.
n-1	2
n	1

So, it shows that  $n+(n-1)+(n-2)+\dots+1$  which gives  $n(n-1)/2$ .  
 Hence, the Time complexity is  $O(n^2)$ .

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b) for(i = 1; i <=n ; i\*=3)  
       for(j=1; j<=n; j++)  
           print("Hi")

| i     | j |
|-------|---|
| 1     | n |
| 3     | n |
| 9     | n |
| 27    | n |
| .     | . |
| .     | . |
| $3^k$ | n |

In 1st loop, it goes for  $3^k = n$ . To find time complexity, 1st find k. Applying log on both sides,  $k = \log n$  (with base 3).

In 2nd loop, it goes for n times.

Time complexity goes for log n with n.

Hence, the Time complexity is  $O(n * \log n)$