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'.
- For printing 'HI", it takes O(1) time
- 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 because it makes a series 3, 3^2, 3^3,……..,3^k(Assume last is k).
- Let us suppose that i>n
  Now, k = (log n) to base 3.
  So the time complexity is O(logn).
- 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) base 3.