Assignment-1

1. Find the time complexity for the following scenarios.

a) `for (i=1; i<=n; i++)` → inner loop runs for 'n' times
`for (j=i; j<=n; j++)` → j=i (i's value)
`printf ("Hi");` j (outer loop runs 'n' times)

$\Rightarrow \begin{array}{r} n \\ +n \\ \hline n^2 \end{array} \Rightarrow O(n^2)$

Time complexity = $O(n^2)$

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

i	j
1	1
3	3
9	9
27	27
:	:
n	n

Time complexity = $1+3+9+27+\cdots n$
$\Rightarrow T(n)$

Gp series of n-terms = $3^0+3^1+3^2+3^3+\cdots 3^{\log n}$

$S_n = a_1\left(\frac{1-r^n}{1-r}\right)$

$= 1\left(\frac{1-3^{\log n+1}}{3-1}\right)$

$= 3^{\log n} = n$

Time complexity = $O(n)$