

DSAAssignment Day - 01

Q.1)

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

output

 $i=1$ n $i=2$ $n-1$ $i=3$ $n-2$ \vdots $i=n$ 1

$$\text{output value} = n + (n-1) + (n-2) + \dots + 1$$

$$= \frac{n(n+1)}{2} - \frac{n^2+n}{2}$$

$$\Rightarrow \boxed{O(n^2)}$$

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

inner loop

$$i = 3^0$$

n

$$i = 3^1$$

n

$n + n + n + \dots (k+1) \text{ times}$

$$i = 3^2$$

n

$$= (k+1) * n$$

:

$$= n \log_3 n + n$$

$$i = 3^k \leq n$$

n

$$\Rightarrow \underline{\underline{O(n \log_3 n)}}$$

$$3^k = n$$

$$k \log_3 3 = \log_3 n$$

$$k = \log_3 n$$

$$\Rightarrow \boxed{O(\log_3 n)}$$