ASSIGNMENT QUESTIONS :

1) what is the time complexity of following code ?

```
int a=0;
for (int i=0; i<n; i++)
{
    for (int j=n; j>i; j--)
    {
        a= a+i+j;
    }
}
```

Sol→ The above code runs total no. of times

N+(N-1)+(N-2)+..... 1+0

N*(N+1)/2

1/2 * N^2 + 1/2 * N

i.e. O(N^2) times.

2) what is the time complexity of following code?

```
int count = 0;
for (int i=1; i<=n; i* 2)
{
    for (int j=1; j<=i; j++)
    {
        count = count + 1;
    }
}
```

Sol→ Line 1: The time complexity become O(log n)
Line 2: The time complexity become O(n-1) = O(n)
Line 3: constant complexity O(1)

Total = O(log n) * O(n) * O(1) = O(n log n)

(3) Find the best case, average case and the worst case of Linear Search Algorithm.

Sol→ In Computer Science, best, worst and average cases of a given algorithm express what the resources ~~use~~ usage is at least, at most and on average, respectively. Usually the resource being considered is running time. i.e. time complexity, but could also be memory or other resources. ~~Best case is the function.~~
BEST CASE: which perform minimum number of steps on input data of n element.
Algorithm ⇒ O(1)

WORST CASE: which perform the maximum number of steps on input data of size n.
Algorithm ⇒ O(n) iterative

AVERAGE CASE: which performs an average number of steps on input data n elements.
Algorithm ⇒ O(n/2)