

## Time & Space Complexity (Assignment Questions)

Question : Find the Time Complexity of the following:

a)

```
a. int i, j, k = 0;
b.     for (i = n / 2; i <= n; i++) {
c.         for (j = 2; j <= n; j = j * 2) {
d.             k = k + n / 2;
e.         }
f.     }
```

- A.  $O(n)$
- B.  $O(N \log N)$
- C.  $O(n^2)$
- D.  $O(n^2 \log n)$

b)

```
for(int i=0;i<n;i++)
    i*=k
```

Here, k is some constant value

- A.  $O(n)$
- B.  $O(k)$
- C.  $O(\log_k n)$  (= logn of base k)
- D.  $O(\log n_k)$  (= logk of base n)

c)

Algorithm A and B have a worst-case running time of  $O(n)$  and  $O(\log n)$ , respectively. Therefore, algorithm B always runs faster than algorithm A.

- A. True
- B. False

d) Find the time & space complexity of floorSqrt function in the following code to calculate square root of a number :

```
int floorSqrt(int x)
{
    if (x == 0 || x == 1)
        return x;

    int i = 1, result = 1;

    while (result <= x) {
        i++;
        result = i * i;
    }

    return i - 1;
}

int main()
{
    int x = 11;

    cout << floorSqrt(x);

    return 0;
}
```

e) Find the time & space complexity of the following code:

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