

TIME COMPLEXITY QUESTIONS

Question : Find the Time Complexity of the following:

a)

```
1. int i, j, k = 0;
2.     for (i = n / 2; i <= n; i++) {
3.         for (j = 2; j <= n; j = j * 2) {
4.             k = k + n / 2;
5.         }
6.     }
```

- 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. $O(\log_k n)$ (= log_n of base k)
- D. $O(\log n_k)$ (= log_k 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 :

```
class SqrtNum {  
  
    static 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;  
    }  
  
    public static void main(String[] args)  
    {  
        int x = 11;  
        System.out.print(floorSqrt(x));  
    }  
}
```

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;  
    }  
}
```