

# Problem Set 2

Practice problems relating to analysis notations.

## Question 1

Suppose your friend discovers a new algorithm and in his excitement tells you that his algorithm has a lower bound of  $O(n^2)$ . Can you explain why your friend's statement makes no sense?

## Question 2

Does  $O(2^{2n})$  equal  $O(2^n)$  ?

## Question 3

Give an example of an algorithm whose best case is equal to its worst case?

## Question 4

Work out the time complexity for the algorithm given below:

```
void averager(int[] A) {  
  
    float avg = 0.0f;  
    int j, count;  
  
    for (j = 0; j < A.length; j++) {  
        avg += A[j];  
    }  
  
    avg = avg / A.length;  
  
    count = j = 0;  
  
    do {  
  
        while (j < A.length && A[j] != avg) {  
            j++;  
        }  
    }  
}
```

```
        if (j < A.length) {  
            A[j++] = 0;  
  
            count++;  
        }  
    } while (j < A.length);  
}
```

### Question 5

Q

What is the complexity of the below snippet

```
for( int i=0; i<array.length; i++){  
    for(int j=0; j<10000; j++)  
    {  
        // some useful work done here.  
    }  
}
```

☐ A)  $O(n)$

☐ B)  $O(n^2)$

☐ C)  $O(1000*n)$

COMPLETED 0%

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### Question 6

Consider the following snippet of code and determine its running time complexity?

```
void complexMethod(int[] array) {
```

```

int n = array.length;
int runFor = Math.pow(-1, n) * Math.pow(n, 2);

for (int i = 0; i < runFor; i++) {
    System.out.println("Find how complex I am ?")
}
}

```

### Question 7

Determine the time complexity for the following snippet of code

```

void complexMethod(int n, int m) {

    for (int j = 0; j < n; j++) {
        for (int i = 0; i < m % n; i++) {
            System.out.println("")
        }
    }
}

```

For non-java folks,  $m \% n$  notation means  $m$  modulus  $n$ .

### Question 8

Determine the time complexity for the following snippet of code

```

void someMethod(int n) {

    for (int j = 0; j < n; j++) {
        for (int i = 0; i < 3; i++) {
            for (int i = 0; i < n; i++) {
                System.out.println("I have 3 loops");
            }
        }
    }
}

```

### Question 9

Determine the time complexity for the following snippet of code

```

void someMethod(int n, int m) {

```

```
for (int j = 0; j < n; j++) {  
    for (int i = 0; i < m; i++) {  
        System.out.println("I have 2 loops");  
    }  
}  
}
```