

Name:

SID:

## CS 61B Discussion Quiz 1

Write your name and SID above. Detach this page from your discussion handout, and turn it in when your TA instructs you to do so. **These quizzes are used as attendance.**

### Questions

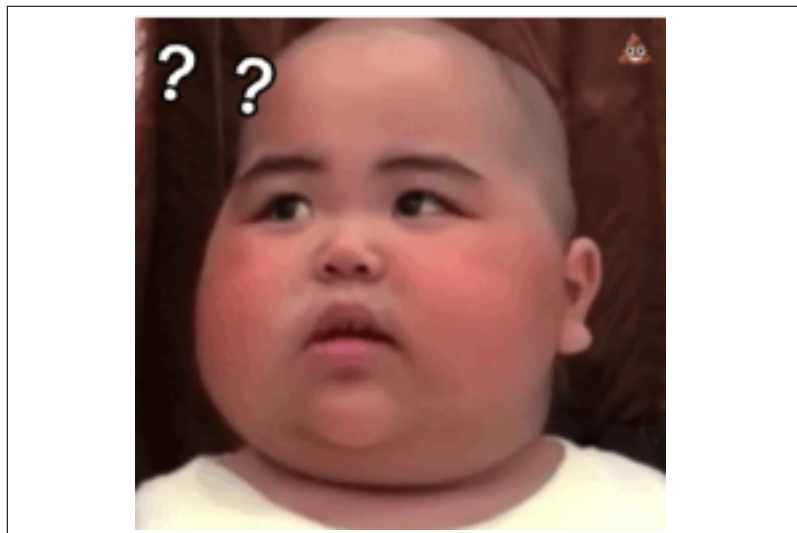
1. Tell us a little about yourself.

I am a second-year MS student at Duke ECE department.

2. What do you expect to learn from the course?

Data structures, algorithms, Java (foundations of leetcode)

3. Please draw how you feel today in the box below. :)



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## 1 Our First Java Program

Below is our first Java program of the semester. Next to each line, write out what you think the code will do when run. *This exercise is adapted from Head First Java.*

```
1  int size = 27;
2  String name = "Fido";
3  Dog myDog = new Dog(name, size);
4  int x = size - 5;
5  if (x < 15) {
6      myDog.bark(8);
7  }
8
9  while (x > 3) {    play 19 times
10     x -= 1;
11     myDog.play();
12 }
13
14 int[] numList = {2, 4, 6, 8};
15 System.out.print("Hello "); Hello
16 System.out.println("Dog: " + name); Dog: Fido
17
18 System.out.println(numList[1]); 4
19 if (numList[3] == 8) {
20     System.out.println("potato"); potato
21 }
```

## 2 Mystery

This is a function (a.k.a. method). It takes an array of integers and an integer as arguments, and returns an integer.

```
1  public static int mystery(int[] inputArray, int k) {
2      int x = inputArray[k];
3      int answer = k;
4      int index = k + 1;
5      while (index < inputArray.length) {
6          if (inputArray[index] < x) {
7              x = inputArray[index];
8              answer = index;
9          }
10         index = index + 1;
11     }
12     return answer;
13 }
```

Describe in English what mystery returns if `inputArray = [3, 0, 4, 6, 3]` and `k = 2`.

*Extra:* This is another function. It takes an array of integers and returns nothing.

```
1 public static void mystery2(int[] inputArray) {
2     int index = 0;
3     while (index < inputArray.length) {
4         int targetIndex = mystery(inputArray, index);
5         int temp = inputArray[targetIndex];
6         inputArray[targetIndex] = inputArray[index];
7         inputArray[index] = temp;
8         index = index + 1;
9     }
10 }
```

Describe what `mystery2` does if `inputArray = [3, 0, 4, 6, 3]`.

sorting by ascending order -> [0, 3, 3, 4, 6]

### 3 Writing Your First Program

Implement `fib` which takes in an integer `n` and returns the  $n$ th Fibonacci number.

The Fibonacci sequence is 0, 1, 1, 2, 3, 5, 8, 13, 21, ....

```
public static int fib(int n) {
```

```
    public static int fib (int n) {
        if (n <= 1) {
            return n;
        }
        return fib(n - 1) + fib(n - 2);
    }
```

```
}
```

*Extra:* Implement `fib` in 5 lines or fewer. Your answer must be efficient.

```
public static int fib2(int n, int k, int f0, int f1) {
```

```
    public static int fib2 (int n, int k, int f0, int f1) {
        if (n == k) {
            return f0;
        }
        return fib2(n, k + 1, f1, f0 + f1); // Tail recursion
    }
```

```
}
```