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.

```java
String disagree = "no";
int x = 7;
Singer queen = new Singer("Queen");

while (x > 0) {
    x -= 1;
    queen.sing(disagree);
}

String[] phrases = {"Oh", "mamma mia", "let me go"};
System.out.print(phrases[0]);
for (int i = 0; i < 3; i += 1) {
    System.out.print(" " + phrases[1]);
}
System.out.print(" " + phrases[2]);
```

2 Writing Your First Program

```java
/** fib(N) returns the Nth Fibonacci number, for N \geq 0.
   * The Fibonacci sequence is 0, 1, 1, 2, 3, 5, 8, 13, 21, ... */
public static int fib(int N) {
    // (use other side for more space)
Extra for experts: Complete fib2 in 5 lines or fewer. Your answer must avoid redundant computation.

    public static int fib2(int n, int k, int f0, int f1)
```
/** This is a function (a.k.a. method). It takes an array of integers as an argument, and returns an integer. */

public static int mystery(int[] inputArray, int k) {
    int x = inputArray[k];
    int answer = k;
    int index = k + 1;
    while (index < inputArray.length) {
        if (inputArray[index] < x) {
            x = inputArray[index];
            answer = index;
        }
        index = index + 1;
    }
    return answer;
}

/** Extra for experts. This is another function. It takes an array of integers and returns nothing at all. */

public static void mystery2(int[] inputArray) {
    int index = 0;
    while (index < inputArray.length) {
        int targetIndex = mystery(inputArray, index);
        int temp = inputArray[targetIndex];
        inputArray[targetIndex] = inputArray[index];
        inputArray[index] = temp;
        index = index + 1;
    }
}

• What does mystery return if inputArray is the array 3, 0, 4, 6, 3, and k is 2?

• Describe, in English, what mystery returns.

• Extra for experts: What does mystery2 do if inputArray is the array 3, 0, 4, 6, 3? Describe, in English, what mystery2 does to the array.