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
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) {
10        x -= 1;
11        myDog.play();
12    }
13
14    int[] numList = {2, 4, 6, 8};
15    System.out.print("Hello ");
16    System.out.println("Dog: " + name);
17
18    System.out.println(numList[1]);
19    if (numList[3] == 8) {
20        System.out.println("potato");
21    }
```

Acknowledgement: This exercise is adapted from page 5 of our textbook Head First Java.

2 Mystery

```
1    /** This is a function (a.k.a. method). It takes an array
2     * of integers and an integer as arguments, and returns an integer. */
3    public static int mystery(int[] inputArray, int k) {
4        int x = inputArray[k];
5        int answer = k;
6        int index = k + 1;
7        while (index < inputArray.length) {
8            if (inputArray[index] < x) {
9                x = inputArray[index];
10               answer = index;
11           }
12           index = index + 1;
13       }
14       return answer;
15   }
16
17   /** Extra for experts. This is another function. It takes an
18    * array of integers and returns nothing at all. */
19   public static void mystery2(int[] inputArray) {
20       int index = 0;
21       while (index < inputArray.length) {
22           int targetIndex = mystery(inputArray, index);
23           int temp = inputArray[targetIndex];
24           inputArray[targetIndex] = inputArray[index];
25           inputArray[index] = temp;
26           index = index + 1;
27       }
28   }
```

- 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.

3 Writing Your First Program

```
/** fib(n) returns the nth Fibonacci number, for n ≥ 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 less. Your answer must be efficient.

```
/** fib2(n, 0, 0, 1) returns the nth Fibonacci number, for n ≥ 0. */
public static int fib2(int n, int k, int f0, int f1) {
```