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
int size = 27;
String name = "Fido";
Dog myDog = new Dog(name, size);
int x = size - 5;
if (x < 15) {
    myDog.bark(8);
}
while (x > 3) {
    x -= 1;
    myDog.play();
}
int[] numList = {2, 4, 6, 8};
System.out.print("Hello ");
System.out.println("Dog: " + name);
System.out.println(numList[1]);
if (numList[3] == 8) {
    System.out.println("potato");
}
```

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

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

3 Writing Your First Program

```java
/** fib(n) returns the n-th Fibonacci number, for n ≥ 0.
 * The Fibonacci sequence is 0, 1, 1, 2, 3, 5, 8, 13, 21, ... */
public static int fib(int n) {
}
```

Extra for experts: Complete `fib2` in 5 lines or less. Your answer must be efficient.

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