2. [10] The method below takes two integers as input and returns an int. Provide ONE example of how to call the method. The output of getPoints() with the value of the two int parameters will be the number of points you will earn for this question, up to a maximum of 10.

```java
private static int getPoints(int x, int y) {
    if (x < 0 || y < 0)
        return 0;
    else {
        int z = 3;
        int points = 0;
        if (++x > y) {
            return z - x;
        }
        else { // EC
            z = y - --x;
            if (y > z && y < 7) {
                for (int a = 0; a < y - x; a++) {
                    points++;
                }
                return points;
            }
            else {
                int b = 0;
                while (++b < 1000) {
                    if (b > 10)
                        break;
                    if (x == y - b) {
                        points = x;
                    }
                }
            }
        }
    }
    return points;
}
```

Answer: x = 10, y = 20
2b [Extra Credit: 10] What is the maximum value for getPoints() if the code enters the block with the EC comment and what x,y values are required to return it?

Answer: x = 2, y = 6, points = 5
3. [10] We saw in class that multiple threads can produce indeterminate program results under certain conditions. Why does this happen?

Answer: A race condition occurs when two threads share the same data and they both attempt to read-then-update it at the same time.
4. [5] Why are the hashCode and equals methods important to add to any class whose instances are placed into a java.util List, Set, or Map?

Answer: These methods are called by Collection methods to determine the equality between different object instances. Without proper equals and hashCode methods, methods like 'get', 'contains', and 'remove' will not work correctly.

```java
public abstract class Question5 {
    int x = 10;

    protected abstract void tryThis(int b);

    public static void main(String[] args) {
        Question5 w = new Another();
        w.tryThis(10);
        w.andThis(10);
    }

    protected void andThis(int x) {
        tryThis(x);
    }
}

class Another extends Question5 {
    protected void tryThis(int b) {
        int a = 12;

        System.out.println("X = " + x);

        if (x == b) {
            System.out.println("a = " + a);
        } else {
            System.out.println("b = " + b);
        }
    }

    protected void andThis() {
        System.out.println("And This?");
        super.andThis(5);
    }
}

Answer: Try running it!
```
7. [10] What are java.io streams and why are they useful?

Answer: IO streams are used for all program input and output in some manner or another. They manage the IO of unstructured raw byte data for sockets, files, pipes between threads, URLs, and object serialization, among others.
8. [15] What are the differences between:

   a. A class and an instance?

   Answer: A class is a program construct used as a factory for creating instances of the type named by the class declaration. The instances contain conceptual copies of the methods and member variables. The class contains its own copy of each static method and variable. There is just one such copy for each Class.

   b. A static variable and a non-static variable?

   Answer: See 'a' above regarding Class/instance variance.

   c. A local variable and an instance variable?

   Answer: An instance variable has scope that spans all the methods of a class. It goes out of scope when all references to the instance cease to exist. Local variables exist only in the block in which they are declared and go out of scope at the end of the block.