Computer Science I — Spring 2016

Final Exam

This exam should have six pages. Closed book and notes.
No calculators or computers allowed.

Problem 1: [10 points]

Below, define a static method called largest that takes three integers as inputs and returns the largest of the three.
Problem 2: [16 points]

Below is some modestly mysterious map code that makes use of the Die class we’ve seen so often. Describe briefly, in plain English, what the mystery method does. What would be a good, descriptive name for this method?

```java
public static int mystery(Die x, Die y) {
    int a;
    int b;
    int c = 0;
    do {
        a = x.roll();
        b = y.roll();
        c = c + 1;
    } while(a != b && c < 1000);

    if (c >= 1000) {
        return -1;
    } else {
        return c;
    }
}
```
Problem 5: [18 points]

On the Keypad assignment, the constructor was passed a string containing the characters to be mapped onto a 2D array of “keys”. The resulting Keypad could behave in unpredictable ways if the same character appeared on more than one key, however, so it would have been nice to verify that there were no duplicate characters in the input string. Below, define a static method called `containsDuplicates` that takes a `String` as its input and returns `true` if it contains duplicate characters anywhere within the string (`false` otherwise). For full credit, don’t use any methods from the `String` class except `charAt`. 
Problem 6: [20 points]

The selection sort method we wrote in class (and that you worked with in lab) is shown below, with some portions omitted. Fill in the six blanks with the appropriate missing code.

```java
public static void selectionSort(int[] nums) {
    for(int start=0; start<nums.length-1; start=start+1) {
        int indexOfMin = _____________;

        for(int i=start+1; i<_________; i=i+1) {
            if (nums[i] < nums[indexOfMin]) {
                indexOfMin = i;
            }
        }
        int temp = nums[__________];
        nums[__________] = nums[__________];
        nums[__________] = temp;
    }
}
```