CS 1083
Introduction to Programming I for Computer Scientists
Midterm 2

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NAME:_____________________

Instructions
1. Do all of the 4 problems
3. You have 50 minutes for the exam
4. Show all your work
5. Do not separate midterm papers

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1. (20 pts) What is printed by the following program? Show all your work for partial credit.

```java
public class PrintWithNumbers {
    public static void main(String[] args) {
        double x = 4, y = 3, z = 5, t = 4;
        x = y + z;
        System.out.println("1: x = " + x);
        x = t + x * y;
        System.out.println("2: x = " + x);
        x = Math.pow(y - 1, t - 2);
        System.out.println("3: x = " + x);
        x = Math.sqrt(z + t);
        System.out.println("4: x = " + x);
        x = mystery(y, z);
        System.out.println("5: x = " + x);
        x = mystery(z, y);
        System.out.println("6: x = " + x);
        x = mystery(6, mystery(5, 4));
        System.out.println("7: x = " + x);
        x = 12 % 5;
        System.out.println("8: x = " + x);
    }

    public static double mystery(double x, double y) {
        if (x < y)
            return y;
        else
            return x;
    }
}
```

The output will be:

```
1: x = 7
2: x = 44
3: x = 4.0
4: x = 5.0
5: x = 5.0
6: x = 5.0
7: x = 6.0
8: x = 2.0
```
2. (20 pts) What is printed by the following program? Show all your work for partial credit.

```java
public class PrintWithIfStatement {
    public static void main(String[] args) {
        int i;

        for (i=1; i<=8; i++) {
            if (i<5 && i>2)
                System.out.println(i+" Apple");
            else if (i==2 || i==6)
                System.out.println(i+" Orange");
            else if (i/2 < 3)
                System.out.println(i+" Banana");
            else
                System.out.println(i+" Pear");
        }
    }
}
```
3. (30 pts) Complete the following method that takes a string as a parameter and removes all the space characters in the string. For example, "This is a sample string," is converted to "Thisisasamplestring."

```java
public static String Convert(String s) {
    int count = 0;
    String str = "";
    for (int i = 0; i < s.length(); i++) {
        if (s.charAt(i) != ' ')
            str += s.charAt(i);
        else if (count <= 2)
            str += ' '; // Add a space
        count++;
    }
    return str;
}
```

This is a sample string

This is a sample string

String str = "This is a sample string."
for (int i = 0; i < s.length(); i++)
    if (s.charAt(i) != ' ')
        str += s.charAt(i);
    else if (count <= 2)
        str += ' '; // Add a space
    count++;

return(str)
4. (30 pts) Complete the following program to find the first non-repeating character in a string.
Use the countchar(s,c) method that computes the number of occurrences of character c in
string s. For example, in string "apple banana orange", first nonrepeating character is 'l'
since 'a' and 'p' are repeated later in the string.

```java
public class FrequentCharacter {
    public static void main(String[] args) {
        String str1 = "apple banana orange";
        char ch = ' '; 
        int i;
        boolean found = false;

        // Fix the for loop condition
        for (i = 0; i < str1.length(); i++) {
            char ch = str1.charAt(i);
            if (countChar(str1, ch) == 1) {
                found = true;
                break;
            }
        }

        System.out.println("First nonrepeating character is '" + ch + "'");
    }

    public static int countChar(String s, char c) {
        int count = 0;
        for (int i = 0; i < s.length(); i++) {
            if (c == s.charAt(i)) {
                count++;
            }
        }
        return count;
    }

    // Fix the for loop to check non-repeating
    for (i = str1.length() - 1; i >= 0; i--)
        if (countChar(str1, str1.charAt(i)) == 1) {
            ch = str1.charAt(i);
        }
```