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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Easy Difficulty Level Difficult

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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;
    }
}
```
Solution:

1: $x = 8.0$
2: $x = 28.0$
3: $x = 4.0$
4: $x = 3.0$
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>7)
                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");
        }
    }
}
```

Solution:

1 Banana
2 Orange
3 Banana
4 Apple
5 Banana
6 Orange
7 Pear
8 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."

Solution:

```java
public static String Convert(String s) {
    String str = "";
    for (int i=0; i<s.length(); i++) {
        if (s.charAt(i) != ' ')
            str = str + s.charAt(i);
    }
    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.

Solution:

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

        for (i = 0; i < str1.length() && found == false; i++) {
            ch = str1.charAt(i);
            if (countChar(str1, ch) == 1) {
                found = true;
            }
        }
        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;
    }
}
```