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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. (25 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 a=4, b=2, c=1;
        char ch1 = '2', ch2 = 'a';
        int d;

        System.out.println("1: a = "+a);
        a = Math.sqrt(a+b*c+3);
        System.out.println("2: a = "+a);
        a = Math.min(b,c);
        System.out.println("3: a = "+a);
        a = Math.pow(b,c+1);
        System.out.println("4: a = "+a);

        if (Character.isDigit(ch1))
            System.out.println("5: ch1 = "+ch1);
        if (Character.isLowerCase(ch1))
            System.out.println("6: ch1 = "+ch1);

        d = Character.getNumericValue(ch1);
        System.out.println("7: d = "+d);

        ch2 = Character.toUpperCase(ch2);
        System.out.println("8: ch2 = "+ch2);
    }
}
```

**Solution:**

1: a = 4.0
2: a = 3.0
3: a = 1.0
4: a = 4.0
5: ch1 = 2
7: d = 2
8: ch2 = A
2. (25 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, d, j = 3;
        for (i = 1; i <= 8; i++) {
            if (i > 4) {
                d = mystery1(i, j);
            } else {
                d = mystery2(i, j);
            }
            System.out.println("I=\+i\+ D=\+d\);
            j = j + 1;
        }
    }

    public static int mystery1 (int a, int b) {
        if (a > b)
            return (a * b);
        else
            return (b * b);
    }

    public static int mystery2 (int a, int b) {
        if (a > b)
            return (a - b);
        else
            return (a + b);
    }
}
```

Solution:

I=1 D=4
I=2 D=6
I=3 D=8
I=4 D=10
I=5 D=49
I=6 D=64
I=7 D=81
I=8 D=100
3. (25 pts) Complete the following method that takes a string as a parameter and converts every number in the string to a ‘*’. For example, ”It costs $100” is converted to ”It costs $***”

Solution:

```java
public static String Convert(String s)
{
    String str = "";
    for (int i=0; i<s.length(); i++) {
        if (Character.isDigit(s.charAt(i)))
            str = str + "*";
        else
            str = str + s.charAt(i);
    }
    return(str);
}
```
4. (25 pts) Complete the following program to find the most frequent 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 "This is a sample string", most frequent character is 's' and it appears 4 times.

Solution:

```java
public class FrequentCharacter {
    public static void main(String[] args) {
        String str1 = "Find the most frequent character";
        int max = 0;
        char ch, maxch;
        int i;

        maxch = str1.charAt(0);
        for (i=0; i<str1.length(); i++) {
            ch = str1.charAt(i);
            if (countChar(str1, ch) > max) {
                max = countChar(str1, ch);
                maxch = ch;
            }
        }
        System.out.println("Most frequent Character is "+maxch);
        System.out.println("It appears "+max+ " times");
    }

    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;
    }
}
```