Name: _____

Write all of your responses on these exam pages. If you need extra space please use the backs of the pages.

1 Short Answer (5 Points Each)

1. What is a sentinel value.

2. What are the three types of loops? For each type state if they are precondition or postcondition and what type of control they use.

3. What is priming a loop?

4. Write a method named `CircleArea` that will bring in a single decimal parameter named `radius` and return the area of a circle with that radius.

5. Write a method named `NiftySequence` that will bring in a single integer parameter named `n` and return $\frac{n}{2}$ if n is even and $3n + 1$ if n is odd.

6. Write a method named `maximum` that will bring in three decimal parameters and return the maximum of the values.

2 Program Traces (7 Points Each)

For each of the following segments of code write the output of the program.

1.

```
1 int i = 1;
2 for (int k = 0; k < 5; k++) {
3     for (int j = 1; j < k; j++) {
4         i = i + j;
5     }
6     System.out.println(i);
7 }
```

Program Output

2.

```
1  int t = 3;
2  int q = 15;
3  while (q > t) {
4      if (t > 5) {
5          t--;
6          q = 2 * q / 3;
7      }
8      System.out.println(q + "  " + t);
9      t += q / 4;
10     q--;
11 }
```

Program Output

3.

```
1  public static int doThis(int a, int b, int c) {
2      return a + b / c;
3  }
4
5  public static void main(String[] args) {
6      int b = 4;
7      int c = 7;
8      for (int a = 3; a < 7; a++) {
9          b = doThis(b, c, a);
10         c = doThis(c, b, a);
11         System.out.println(a + " " + b + " " + c);
12     }
13 }
```

Program Output

4.

```
1  String s = "";
2  for (int k = -1; k < 5; k++) {
3      s = "*" + s;
4      System.out.println(s);
5  }
6
7  for (int k = 2; k < 8; k++) {
8      s = s.substring(1);
9      System.out.println(s);
10 }
```

Program Output

3 Coding (25 Points Each)

1. Write a program that will take numeric values from the user until the user inputs negative number. Assume the user will type in values between 0 and 1,000,000,000 until they input a negative number to stop the process. The program should then report the average, minimum, and maximum of the values input. A run of the program is below.

```
Input a number from 0 to 1000000000 (< 0 to quit): 3.5
Input a number from 0 to 1000000000 (< 0 to quit): 7.9
Input a number from 0 to 1000000000 (< 0 to quit): 15.6
Input a number from 0 to 1000000000 (< 0 to quit): 0.4
Input a number from 0 to 1000000000 (< 0 to quit): 6.3
Input a number from 0 to 1000000000 (< 0 to quit): -1

Maximum = 15.6
Minimum = 0.4
Average = 6.739999999999999
```

Program

```
import java.util.Scanner;

public class Exam02_2 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);









    }
}
```

2. Write a program that will ask the user for the number of dice rolls they would like to do. The program should then roll three dice that many times. The three dice are all different in the number of sides (faces)they have. One die is the regular 6 sided die with values between 1 and 6, one die is a 20 sided die with values between 1 and 20, and the third die is a 4 sided die with values between 1 and 4. Each time the program rolls the dice it will take the sum of the face values of the roll. It will count the number of rolls that are even and the number of rolls that are odd. At the end it will display the two counts. The dice rolls and the sum calculation will be in a method called `rollDice` which will roll the dice and return the sum of the roll back to the main. The main will do the rest. A run of the program is below.

```
Input number of rolls: 100000
The number of even rolls was 50146
The number of odd rolls was 49854
```

Main Program

```
import java.util.Scanner;

public class Exam02_2 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);









    }
}
```

rollDice Method