Group A

1. A do-while loop is executed:

   At least once

   At least twice

   At most once

   Ans: At least once.

2. What can be done using one type of loop can also be done using the other two types of loops, True or False? Justify your answer.

   Ans: It is false because for loop is used when you want to run the loop for preset number of times. On the other hand, while loop can be used a number of times as an iterative loop which is not possible in for loop.

3. Write an equivalent while() loop for the following for() loop

```
int s=0;
for(int x=1; x<=25; x+=2)
s+=x;
```

Code:

```
public class Equivalentwhile {
    public static void main(String[]args) {
        int s = 0,x = 1;
        while(x <= 25) {
            s += x;
            x++;
        }
        System.out.println(s);
    }
}
```

Output: 325

Group B

1. Write a program to print numbers from 1 to 10.

   Code:

```java
public class Print1to10{
    public static void main(String[]args){
        int i;
        for(i=1; i<=10; i++) {
            System.out.println(i);
        }
    }
}
```

   Output:

```
1
2
3
4
5
6
7
8
9
10
```

2. Write a program to calculate the first 10 natural number sum.

   Code:

```java
public class Sumof10nnumbers {
    public static void main(String[]args) {
        int i=1, sum=0;
        while(i<=10){
            sum = sum + i;
            i++;
        }
        System.out.println("The sum of first 10 natural number is "+sum);
    }
}
```

Output:

```
The sum of first 10 natural number is 55
```

3. Write a program that prompts the user to input a positive integer. It should then print the multiplication table of that number.

   Code:

```java
import java.util.Scanner;
public class Multiplicationtable  {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int m, n, i;
        System.out.println("Upto where you want to go:");
        n = sc.nextInt();
        System.out.println("Enter number for multiplication:");
        m = sc.nextInt();
        for(i=1; i<=n; i++){
            System.out.printf("%d x %d = %d %n",m,i,m*i);
        }
    }
}
```

Output:

```
Upto where you want to go:
10
Enter number for multiplication:
2
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
2 x 4 = 8
2 x 5 = 10
2 x 6 = 12
2 x 7 = 14
2 x 8 = 16
2 x 9 = 18
2 x 10 = 20
```

4. Write a program to find the factorial value of any number entered through the keyboard.

   Code:

```java
import java.util.Scanner;
public class Factorial {
    public static void main (String[]args) {
        Scanner sc = new Scanner(System.in);
        int i=1, f = 1, n;
        System.out.println("Enter number for factorial");
        n = sc.nextInt();
        while(i<=n){
            f = f*i;
            i++;
        }
        System.out.printf("The factorial of %d is %d", n, f);
    }
}
```

   Output:

```
Enter number for factorial
4
The factorial of 4 is 24
```

5. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. (Do not use Java built-in method) [Home Task]

Code:

```
import java.util.Scanner;
public class PowerRaise  {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int i=1,a,b, sum=1;
        System.out.println("Enter number:");
        a = sc.nextInt();
        System.out.println("Enter number to raise:");
        b = sc.nextInt();
        while(i<=b){
            sum *= a;
            i++;
        }
        System.out.printf("%d power %d is %d", a,b,sum);
        }
    }
```

Output:

```
Enter number:
2
Enter number to raise:
4
2 power 4 is 16
```

6. Write a program to enter the numbers till the user wants and at the end, it should display the count of positive, negative, and zeros entered.
   Code:

```java
public class Tilluserwants  {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int p=0, n=0, z=0;
        System.out.println("Enter Y to start counting or N to stop the program:");
        char end = sc.next().charAt(0);
        System.out.println(end);
        while(end == 'Y'|| end == 'y'){
            System.out.printf("Enter any integer:");
            int i = sc.nextInt();
            if(i>0){
                p++;
            }
            else if(i<0){
                n++;
            }
            else {
                z++;
            }
            System.out.println("Enter Y to continue or N to stop:");
            end = sc.next().charAt(0);
        }
        System.out.printf("Positive integer count is %d.%nNegative integer count is %d.%nZero integer count is %d.",p,n,z);
        }
    }
```

Output:

```
Enter Y to start counting or N to stop the program:
y
y
Enter any integer:12
Enter Y to continue or N to stop:
y
Enter any integer:0
Enter Y to continue or N to stop:
y
Enter any integer:-12
Enter Y to continue or N to stop:
n
Positive integer count is 1.
Negative integer count is 1.
Zero integer count is 1.
```

7. Write a program to print the Fibonacci series of n terms where n is input by the user:

   0 1 1 2 3 5 8 13 24 .....

   Code:

```java
public class Febonacci {
    public static void main (String[]args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter number: ");
        int n = sc.nextInt();
        int fno = 0;
        int sno = 1;
        for(int i=3; i<=n; i++){
            int thirdno = fno+sno;
            System.out.printf(fno+",");
            fno = sno;
            sno = thirdno;
        }
    }
}
```

Output:

```
Enter number:
10
0,1,1,2,3,5,8,13,
```

8. Write a program to print the following:

```
    *
   ***
  *****
 *******
*********
```

i)

Code:

```java
public class Fullpyramid{
    public static void main(String[]args) {
        int rows = 5, col = 0;
        for (int i = 1; i<=rows; i++, col=0) {
            for (int j = 1; j<=rows - i; j++) {
                System.out.print("  ");
            }
            while(col !=2 * i - 1) {
                System.out.print("* ");
                col++;
            }
            System.out.println();
        }
    }
}
```

Output:

```
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
```

ii)

```
       1
      222
     33333
    4444444
  555555555
```

Code:

```java
public class Numberpyramid{
    public static void main(String[]args) {
        int rows = 5, col = 0, j;
        for (int i = 1; i<=rows; i++, col=0) {
            for ( j = 1; j<=rows - i; j++) {
                System.out.print("  ");
            }

            while(col !=2*i-1) {
                System.out.print(i+" ");
                col++;
            }
            System.out.println();
        }
    }
}
```

Output:

```
        1
      2 2 2
    3 3 3 3 3
  4 4 4 4 4 4 4
5 5 5 5 5 5 5 5 5
```

iii)

1

212

32123

4321234

543212345

Code:

```java
public class threepyramid{
    public static void main(String[]args) {
        int rows = 5,j;
        for (int i = 1; i<=rows; i++) {
            for ( j = 1; j<=rows - i; j++) {
                System.out.print("  ");
            }
            for (j=i; j>=1; j--) {
                System.out.print(j+" ");
            }
            for (j=2;j<=i;j++) {
                System.out.print(j+" ");
            }
            System.out.println();
            }
        }
    }
```

Output:

```
        1
      2 1 2
    3 2 1 2 3
  4 3 2 1 2 3 4
5 4 3 2 1 2 3 4 5
```

[HomeTask]

Group C

1. Write a program that:

(a) Uses a loop to include all the even numbers between 100 and 200.

Code:

```
import java.util.Scanner;
public class Add {
    public static void main(String[]args) {
        Scanner sc = new Scanner(System.in);
        int i, n, add=0, sum=0;
        for (i=100; i<=200; i++) {
            if (i%2 == 0){
                add += i;
            }
        }
        System.out.println("The sum of all even numbers between 100 and 200 is " + add);
}
}
```

Output: The sum of all even numbers between 100 and 200 is 7650

b) Sums a series of (positive) integers entered by the user, excluding all numbers that are Greater than 100.

Code:

```
import java.util.Scanner;
public class Sum {
    public static void main(String[]args) {
        Scanner sc = new Scanner(System.in);
         System.out.print("Enter positive number or less than 100:");
        int n = sc.nextInt();
        int sum = 0;
        while (n>0 && n<100){
        sum += n;
        n = sc.nextInt();
        }
        System.out.print("The sum of positive integers is " + sum);
    }
}
```

```
Enter positive number or less than 100:19
10
20
200
The sum of positive integers is 49
```

Output:

(c) Solves (a) but this time using an infinite loop, break and continue statements.

Code:

```
import java.util.Scanner;
public class Sum {
    public static void main(String[]args) {
        Scanner sc = new Scanner(System.in);
         System.out.print("Enter positive number or less than 100:");
        int n = sc.nextInt();
        int sum = 0;
        while (n != 0){
        if (n>0 && n<100){
            sum += n;
        }
        System.out.println("Enter any number to continue or press 0 to stop;");
        n = sc.nextInt();
        }
        System.out.print("The sum of positive integers less than 100 is " + sum);
    }
}
```

Output:

```
Enter positive number or less than 100:20
Enter any number to continue or press 0 to stop;
100
Enter any number to continue or press 0 to stop;
54
Enter any number to continue or press 0 to stop;
0
The sum of positive integers less than 100 is 74
```

(d) Prompts the user to enter any number of positive and negative integer values, then

Displays the number of each type that was entered.

Code:

```
import java.util.Scanner;
public class Numbertype {
    public static void main(String[]args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Press Y to start the loop:");
        char n = sc.next().charAt(0);
        while(n == 'y' || n == 'Y') {
            System.out.printf("Enter any integer.%n");
            int i = sc.nextInt();
            if(i>0) {
                System.out.printf("%d is a positive number.", i);
            }
            else if(i<0) {
                System.out.printf("%d is a negative number.", i);
            }
            else {
                System.out.printf("%d is a non-negative number.", i);
            }
            System.out.printf("Press y to continue or n to stop.");
            n = sc.next().charAt(0);
        }
    }
}
```

Output:

```
Press Y to start the loop:
y
Enter any integer.
19
19 is a positive number.Press y to continue or n to stop.y
Enter any integer.
-2
-2 is a negative number.Press y to continue or n to stop.
```

[HomeTask]

2. The following while loop is meant to multiply a series of integers input by the user until a sentinel value of 0 is entered. Indicate any errors in the code given. See if you can fix the program and get it running.

```
public class Main { public static void
main(String[] args) { int num; int
product = 1;
String a = System.console().readLine("Enter first number");
num = Integer.parseInt(a); while (num != 0) { a =
System.console().readLine("Enter first number"); num =
Integer.parseInt(a); product = product * num;
}
System.out.printf("product = %d", product);
}
}
```

Code:

```
import java.util.Scanner;
public class Sentinalcheck{
    public static void main(String[]args){
        Scanner sc = new Scanner(System.in);
        int num, product = 1;
        System.out.println("Enter any integer value");
        num = sc.nextInt();
        while (num != 0) {
            product *= num;
            System.out.println("Enter 0 to end or other integer to continue")
            num = sc.nextInt();
        }
        System.out.printf("product =%d", product);
    }
}
```

Output:

```
Enter any integer value
2
Enter 0 to end or other integer to continue
3
Enter 0 to end or other integer to continue
0
product =6
```

3. For each of the following, indicate which a definite loop is, and which an indefinite loop is, Explain your reasoning.

(a)

```
public class Main { public static void
main(String[] args) { int num;
String a = System.console().readLine("Enter a non-zero value:");
num = Integer.parseInt(a); while (num == 0) { a =
System.console().readLine("Enter a non-zero value:"); num =
Integer.parseInt(a);
}
}
}
```

Ans: keeps going until the value is set to 0, it is an endless loop.

(b)

```
public class Main {
public static void main(String[] args) {
int n = 0;
while (n < 10){
System.out.print("%f\n", Math.pow(2, n));
n = n + 1;
}
}
}
```

Ans: It goes from 0 to 10 with a 1 increment, hence it is a clear loop. The loop ends once n approaches 10..

Group D

1. Write a program that determines how many of each coin a vending machine should dispense for

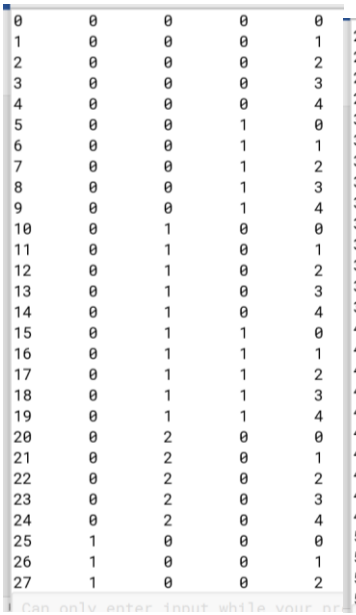
Different amounts of change. You should print a row for each value of change between 0 and 99 and

Columns for the change required. [HomeTask]

For example, the start of the table should look like the following:

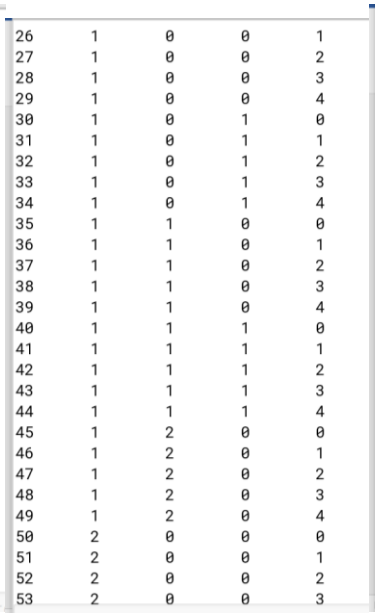
Change	50p	20p	10p	5p	2p	1p
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	0	2	0
5	0	0	0	1	0	0

```
 * @author (your name)
 * @version (a version number or a date)
 */
import java.util.*;
public class vending
{
    //vending machine
public static void main (String[] args ){
int quarterValue = 25;
int dimeValue = 10;
int nickelValue = 5;
int pennyValue = 1;
for(int change = 0; change <=99; change++){
    int numQuarters = change / quarterValue ;
    int remainingChange = change % quarterValue;
    int numDimes = remainingChange / dimeValue;
     remainingChange = remainingChange % dimeValue;
    int numNickel = remainingChange / nickelValue;
     remainingChange = remainingChange % nickelValue;
    int numPennies = remainingChange;
    System.out.println(change + "\t" + numQuarters + "\t" + numDimes + "\t" + numNickel + "\t" + numPennies);
}
}
```



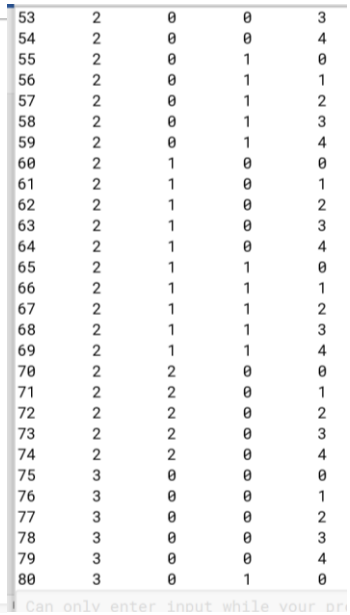
0	0	0	0	0
1	0	0	0	1
2	0	0	0	2
3	0	0	0	3
4	0	0	0	4
5	0	0	1	0
6	0	0	1	1
7	0	0	1	2
8	0	0	1	3
9	0	0	1	4
10	0	1	0	0
11	0	1	0	1
12	0	1	0	2
13	0	1	0	3
14	0	1	0	4
15	0	1	1	0
16	0	1	1	1
17	0	1	1	2
18	0	1	1	3
19	0	1	1	4
20	0	2	0	0
21	0	2	0	1
22	0	2	0	2
23	0	2	0	3
24	0	2	0	4
25	1	0	0	0
26	1	0	0	1
27	1	0	0	2

Can only enter input while your pr



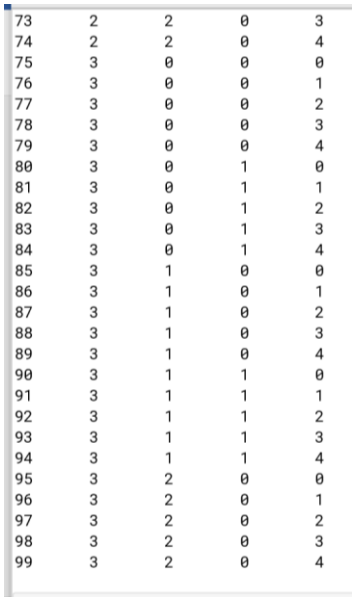
26	1	0	0	1
27	1	0	0	2
28	1	0	0	3
29	1	0	0	4
30	1	0	1	0
31	1	0	1	1
32	1	0	1	2
33	1	0	1	3
34	1	0	1	4
35	1	1	0	0
36	1	1	0	1
37	1	1	0	2
38	1	1	0	3
39	1	1	0	4
40	1	1	1	0
41	1	1	1	1
42	1	1	1	2
43	1	1	1	3
44	1	1	1	4
45	1	2	0	0
46	1	2	0	1
47	1	2	0	2
48	1	2	0	3
49	1	2	0	4
50	2	0	0	0
51	2	0	0	1
52	2	0	0	2
53	2	0	0	3

Can only enter input while your pr



53	2	0	0	3
54	2	0	0	4
55	2	0	1	0
56	2	0	1	1
57	2	0	1	2
58	2	0	1	3
59	2	0	1	4
60	2	1	0	0
61	2	1	0	1
62	2	1	0	2
63	2	1	0	3
64	2	1	0	4
65	2	1	1	0
66	2	1	1	1
67	2	1	1	2
68	2	1	1	3
69	2	1	1	4
70	2	2	0	0
71	2	2	0	1
72	2	2	0	2
73	2	2	0	3
74	2	2	0	4
75	3	0	0	0
76	3	0	0	1
77	3	0	0	2
78	3	0	0	3
79	3	0	0	4
80	3	0	1	0

Can only enter input while your pr



73	2	2	0	3
74	2	2	0	4
75	3	0	0	0
76	3	0	0	1
77	3	0	0	2
78	3	0	0	3
79	3	0	0	4
80	3	0	1	0
81	3	0	1	1
82	3	0	1	2
83	3	0	1	3
84	3	0	1	4
85	3	1	0	0
86	3	1	0	1
87	3	1	0	2
88	3	1	0	3
89	3	1	0	4
90	3	1	1	0
91	3	1	1	1
92	3	1	1	2
93	3	1	1	3
94	3	1	1	4
95	3	2	0	0
96	3	2	0	1
97	3	2	0	2
98	3	2	0	3
99	3	2	0	4

2. Write a program to compute the cosine of x. The user should supply x and a positive integer n. We compute the cosine of x using the series and the computation should use all terms in the series up through the term involving in cos x = 1 - $x^2/2!$ + $x^4/4!$ - $x^6/6!$ ..... [HomeTask]s

```java
import java.io.*;

public class GDQ2
{
    static final double PI = 3.142;
    public static void main(String[] args)
    {
    double x, ret, val;

    x = 60.0;
    val =(int)PI / 180.0;
    ret = Math.cos(x * val);
    System.out.print("The cosine of " +
                           x + " is ");
    System.out.print(ret);
    System.out.println(" degrees");

    x = 90.0;
    val = (int)PI / 180.0;
    ret = Math.cos( x*val );
    System.out.print("The cosine of " + x + " is ");
    System.out.print(ret);
    System.out.println(" degrees");
}
}
```

```
The cosine of 60.0 is 0.5403023058681398 degrees
The cosine of 90.0 is 0.0707372016677029 degrees
```