

Group A

1. A do-while loop is executed:

At least once

At least twice

At most 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.

- Yes, what can be done using one type of loop can also be done using the other two types of loops.

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

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

```
int s=0,x=1;
while(x<=25){
    x+=2;
    s+=x;
}
```

Group B

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

```
class GroupB1{  
    public static void main(String[] args){  
        int i;  
        for (i=1;i<=10;i++){  
            System.out.println(i);  
        }  
    }  
}
```

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

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

```
class GroupB2{  
    public static void main(String[] args){  
        int i;  
        int sum=0;  
        for (i=1;i<=11;i++){  
            sum=sum+i;  
        }  
        System.out.println(sum);  
    }  
}
```

```
66
```

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

```
import java.util.Scanner;

class GroupB3{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);

        System.out.print("Enter a positive integer: ");
        int num=in.nextInt();

        int i,ans;

        for (i=1;i<=10;i++){
            ans=num*i;
            System.out.println(num+"*"+i+"="+ans);
        }
    }
}
```

Enter a positive integer: 100

100*1=100

100*2=200

100*3=300

100*4=400

100*5=500

100*6=600

100*7=700

100*8=800

100*9=900

100*10=1000

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

```
import java.util.Scanner;
class GroupB4{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        int i;
        int sum=1;
        System.out.print("Enter number: ");
        int num=in.nextInt();
        for (i=1;i<=num;i++){
            sum=sum*i;
        }
        System.out.println(sum);
    }
}
```

```
Enter number: Enter number: 11
39916800
```

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]

```
import java.util.Scanner;
class GroupB5{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        System.out.print("Enter number: ");
        int num=in.nextInt();
        System.out.print("Enter power: ");
        int pow=in.nextInt();
        System.out.println("The answer is : "+Math.pow(num,pow));
    }
}
```

```
Enter number: Enter number: 11
Enter power: 2
The answer is : 121.0
```

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.

```
import java.util.Scanner;
class GroupB6{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        double num;
        int pn=0,nn=0,z=0;
        char c;
        int i=1;
        do{
            System.out.print("Enter a number: ");
            num=in.nextDouble();
            if(num>0){
                pn=pn+i;
            }else if(num<0){
                nn=nn+i;
            }else{
                z=z+i;
            }
            System.out.print("Press Y to continue putting data: ");
            c=in.next().charAt(0);
        }while((c=='Y') || (c=='y'));
        System.out.printf("%nIn the data you entered %nPositive numbers : "
            +pn+"%nNegative numbers : "+nn+"%nZeros : "+z);
    }
}
```

```
Enter a number: 100
Press Y to continue putting data: Y
Enter a number: -2
Press Y to continue putting data: Y
Enter a number: 9
Press Y to continue putting data: Y
Enter a number: -14
Press Y to continue putting data: Y
Enter a number: 33
Press Y to continue putting data: Y
Enter a number: 11
Press Y to continue putting data: N
```

```
In the data you entered
Positive numbers : 4
Negative numbers : 2
Zeros : 0
```

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

0 1 1 2 3 5 8 13 24

```
import java.util.Scanner;
class GroupB7{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        int n1=0,n2=1,n3=1,n;
        System.out.printf("%nEnter a number: ");
        n=in.nextInt();
        System.out.print(n1+" "+n2);
        do{
            System.out.print(" "+n3);
            n1=n2;
            n2=n3;
            n3=n1+n2;
        }while(n3<=n);
    }
}
```

Enter a number: 123

0 1 1 2 3 5 8 13 21 34 55 89

8. Write a program to print following:

i) *

```
public class Groupb8A {  
    public static void main(String[] args) {  
        for (int i = 0; i < 5; i++) {  
            for (int j = 0; j < 4 - i; j++) {  
                System.out.print(" ");  
            }  
            for (int j = i; j >= 0; j--) {  
                System.out.print("*");  
            }  
            for (int j = 1; j <= i; j++) {  
                System.out.print("*");  
            }  
            System.out.println();  
        }  
    }  
}
```

*

* * *

* * * * *

* * * * * *

* * * * * * * *

ii) 1
222
33333
4444444
555555555

```
class Groupb8B{  
    public static void main(String[] args){  
        for(int i=0;i<5;i++){  
            for(int j=0;j<4-i;j++){  
                System.out.print(" ");  
            }  
            for(int j=i;j>=0;j--){  
                System.out.print(i+1);  
            }  
            for(int j=1;j<=i;j++){  
                System.out.print(i+1);  
            }  
            System.out.println();  
        }  
    }  
}
```

1

222

33333

4444444

555555555

iii) 1
212
32123
4321234
543212345

```
public class Groupb8C {  
    public static void main(String[] args) {  
        for (int i = 0; i < 5; i++) {  
            for (int j = 0; j < 4 - i; j++) {  
                System.out.print(" ");  
            }  
            for (int j = i; j >= 0; j--) {  
                System.out.print(j + 1);  
            }  
            for (int j = 1; j <= i; j++) {  
                System.out.print(j + 1);  
            }  
            System.out.println();  
        }  
    }  
}
```

1
212
32123
4321234
543212345

Group C

1. Write a program that:

(a) Uses a loop to add up all the even numbers between 100 and 200, inclusive..

```
class gC1a{
    public static void main(String[] args){
        int i,sum=0;
        for(i=100;i<=200;i=i+2){
            sum=sum+i;
        }
        System.out.println("The sum of all even numbers between 100 to 200 is: "+sum);
    }
}
```

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

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

```
import java.util.Scanner;

class gC1b{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        int num;
        char c;
        int sum=0;
        do{
            System.out.print("Enter a number smaller then 100: ");
            num=in.nextInt();
            if(num<=100&&num>=0){
                sum=sum+num;
            }
            System.out.print("Press Y to continue adding number: ");
            c=in.next().charAt(0);
        }while((c=='Y') || (c=='y'));
        System.out.println("The total sum is: "+sum);
    }
}
```

Enter a number smaller then 100: 99

Press Y to continue adding number: Y

Enter a number smaller then 100: 1

Press Y to continue adding number: N

The total sum is: 100

```

class gC1c{
    public static void main(String[] args){
        int i,sum=0;
        for(i=100;i<=200;i=i+2){
            sum=sum+i;
        }
        System.out.println("The sum of all even numbers between 100 to 200 is: "+sum);
    }
}

```

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

(d) Prompts the user to enter any number of positive and negative integer values, then
Displays the number of each type that were entered.

```

import java.util.Scanner;
class gC1d{
    public static void main(String[] args){
        Scanner in=new Scanner(System.in);
        double num;
        int pn=0,nn=0,z=0;
        char c;
        int i=1;
        do{
            System.out.print("Enter a number: ");
            num=in.nextDouble();
            if(num>0){
                pn=pn+1;
            }else if(num<0){
                nn=nn+1;
            }else{
                z=z+1;
            }
            System.out.print("Press Y to continue putting data: ");
            c=in.next().charAt(0);
        }while((c=='Y') || (c=='y'));
        System.out.printf("%nIn the data you entered %nPositive numbers : "
            +pn+"%nNegative numbers : "+nn+"%nZeros : "+z);
    }
}

```

```

Enter a number: 123
Press Y to continue putting data: Y
Enter a number: 345
Press Y to continue putting data: Y
Enter a number: -23
Press Y to continue putting data: Y
Enter a number: 22
Press Y to continue putting data: Y
Enter a number: -12
Press Y to continue putting data: N

```

```

In the data you entered
Positive numbers : 3
Negative numbers : 2
Zeros : 0

```

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);  
    }  
}
```

```
import java.util.Scanner;  
public class gb2 {  
    public static void main(String[] args) {  
        Scanner in=new Scanner(System.in);  
        double num;  
        double product = 1;  
        System.out.println("Enter first number: ");  
        num=in.nextDouble();  
        while (num != 0) {  
            product = product * num;  
            System.out.println("Enter next number: ");  
            num=in.nextDouble();  
        }  
        System.out.println("product = "+product);  
    }  
}
```

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

```
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);  
        }  
    }  
}
```

This is an indefinite loop because the code stops only when the user inputs a non-zero number like he is asked to do.

If the user inputs a zero value, the code inside the while(num==0) keeps on running.

(b)

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

This is a definite loop because the while loop stops when the value of n exceeds the value of 10.

The value of n is 0 in the beginning of the program, but each time the code runs, a value is added to n and so after the program runs 10 times, the value of n exceeds 10 and the code stops running.

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.

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

```
public class gD1 {  
    public static void main(String[] args) {  
        System.out.printf("\nchange\t50p\t20p\t10p\t5p\t2p\t1p\n");  
        for (int change = 0; change <= 99; change++) {  
            int fiftyp = change / 50;  
            int twentyp = (change % 50) / 20;  
            int tenp = ((change % 50) % 20) / 10;  
            int fivep = (((change % 50) % 20) % 10) / 5;  
            int twop = (((((change % 50) % 20) % 10) % 5) / 2);  
            int onep = ((((((change % 50) % 20) % 10) % 5) % 2) / 1);  
            System.out.printf("%d\t%d\t%d\t%d\t%d\t%d\t%d\n", change, fiftyp, twentyp, tenp, fivep, twop, onep);  
        }  
    }  
}
```

71	1	1	0	0	0	1
72	1	1	0	0	1	0
73	1	1	0	0	1	1
74	1	1	0	0	2	0
75	1	1	0	1	0	0
76	1	1	0	1	0	1
77	1	1	0	1	1	0
78	1	1	0	1	1	1
79	1	1	0	1	2	0
80	1	1	1	0	0	0
81	1	1	1	0	0	1
82	1	1	1	0	1	0
83	1	1	1	0	1	1
84	1	1	1	0	2	0
85	1	1	1	1	0	0
86	1	1	1	1	0	1
87	1	1	1	1	1	0
88	1	1	1	1	1	1
89	1	1	1	1	2	0
90	1	2	0	0	0	0
91	1	2	0	0	0	1
92	1	2	0	0	1	0
93	1	2	0	0	1	1
94	1	2	0	0	2	0
95	1	2	0	1	0	0
96	1	2	0	1	0	1
97	1	2	0	1	1	0
98	1	2	0	1	1	1
99	1	2	0	1	2	0

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 x^n $\cos x = 1 - x^2/2! + x^4/4! - x^6/6! \dots$

```

import java.util.Scanner;
public class gd2 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Enter n: ");
        int n = input.nextInt();
        System.out.println("Enter x: ");
        double x = input.nextDouble();
        x = x * (Math.PI / 180.0);
        double cosValue = 1;
        boolean flag = false;
        for (int i = 2; i <= n; i += 2) {
            int factorial = 1;
            for (int j = 1; j <= i; j++) {
                factorial *= j;
            }
            double powerValue = Math.pow(x, i);
            if (i == 1) {
                powerValue = x;
            }
            if (flag) {
                cosValue += powerValue / factorial;
            } else {
                cosValue -= powerValue / factorial;
            }
            flag = !flag;
        }
        System.out.println(cosValue);
    }
}

```