Group A

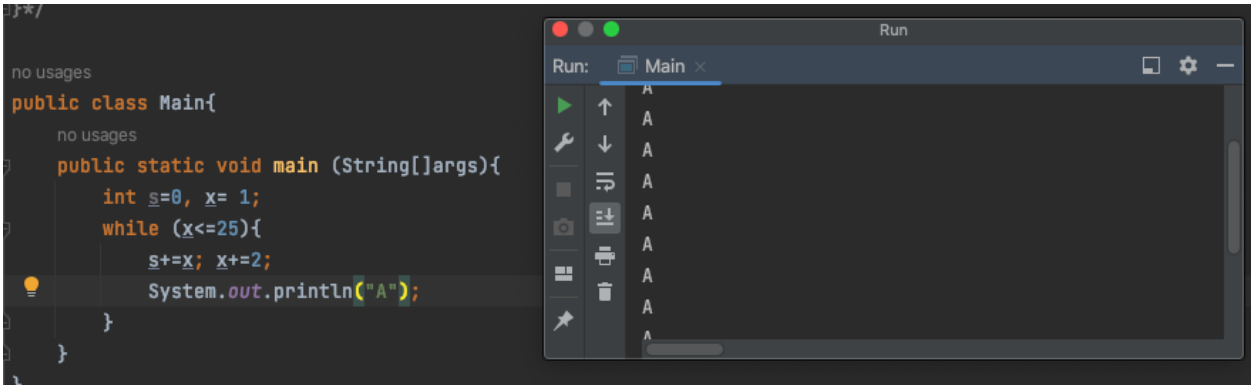
1. A do-while loop is executed:

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 = Yes, all the loops basically do the same thing, but the execution method is different for every one of them.
The for loop is used when the number if iterations of the fooling loop is known beforehand.
The while loop is used when the number of iterations is not known beforehand.
Whereas, the do-while loop is also like the while loop, only the code within the loop is always executed at least once, and Boolean condition is evaluated after each repetition of the loop.

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



Group B

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

```java
public class cc{
    public static void main(String [] args){
     //decline varaibles
     int i = 1 , n =10 ;
     //while loop from 1 to 10
     while (i <=n ){
         System.out.println(i);
         i++;
     }

    }
}
```

Output:

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

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

```
public class cc{
    public static void main(String [] args){
int i, num = 10, sum = 0;
//executes until the condition returns true
for(i = 1; i <= num; ++i)
{
//adding the value of i into sum variable
sum = sum + i;
}
//prints the sum
System.out.println("Sum of First 10 Natural Numbers is = " + sum);
}
}
```

Output:

```
Sum of First 10 Natural Numbers is = 55
```

Can only enter input while your program is runnin

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;
public class cc{
    public static void main(String [] args){
    //
    System.out.println("enter positive num");
    Scanner sc = new Scanner(System.in);
    int num = sc.nextInt();
    if (num >0 ){
    for (int i =1; i<=10; i++){
        System.out.println(num * i);
    }

    }
    while (num <0){
        System.out.println("please enter positive num ");
        num = sc.nextInt();
        for( int i =1;i<=10; i++){
        System.out.println(num * i);
        }

    }
}
}
```

Output:

```
enter positive num
-1
please enter positive num
2
2
4
6
8
10
12
14
16
18
20
```

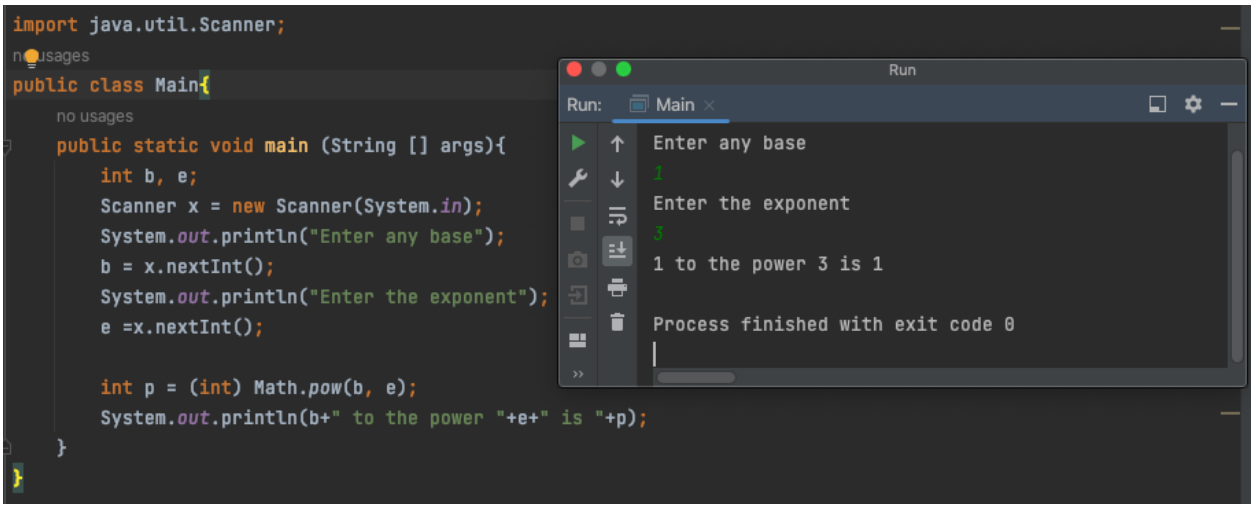
4. Write a program to find the factorial value of any number entered through the keyboard.

```
import java.util.*;
public class cc{
   public static void main(String [] args){
        System.out.println("Enter Factorial number");
        Scanner sc = new Scanner (System.in);
        int number = sc.nextInt();
        int fact=1;
        for(int i=1; i<=number; i++){
      fact=fact*i;
  }
  System.out.println("Factorial of "+number+" is: "+fact);

   }
}
```

Output:

```
Enter Factorial number
5
Factorial of 5 is: 120
```

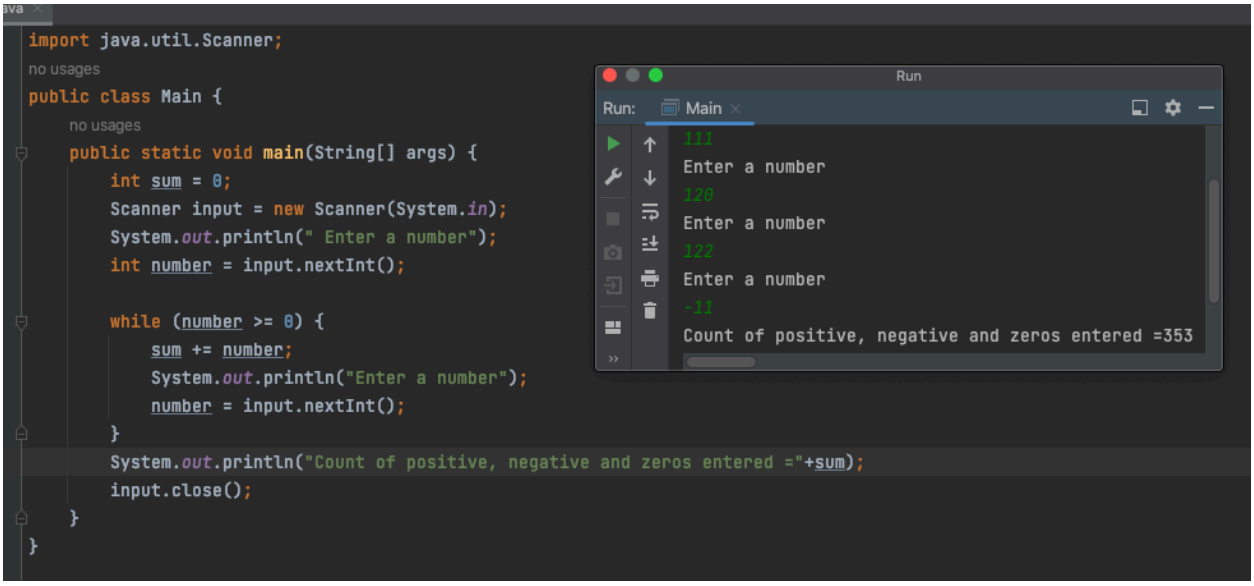
5. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another. (Do not use Java built-in method) [Home Task]



```java
import java.util.Scanner;
no usages
public class Main{
    no usages
    public static void main (String [] args){
        int b, e;
        Scanner x = new Scanner(System.in);
        System.out.println("Enter any base");
        b = x.nextInt();
        System.out.println("Enter the exponent");
        e =x.nextInt();

        int p = (int) Math.pow(b, e);
        System.out.println(b+" to the power "+e+" is "+p);
    }
}
```

```
Run
Run: Main
Enter any base
1
Enter the exponent
3
1 to the power 3 is 1

Process finished with exit code 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.

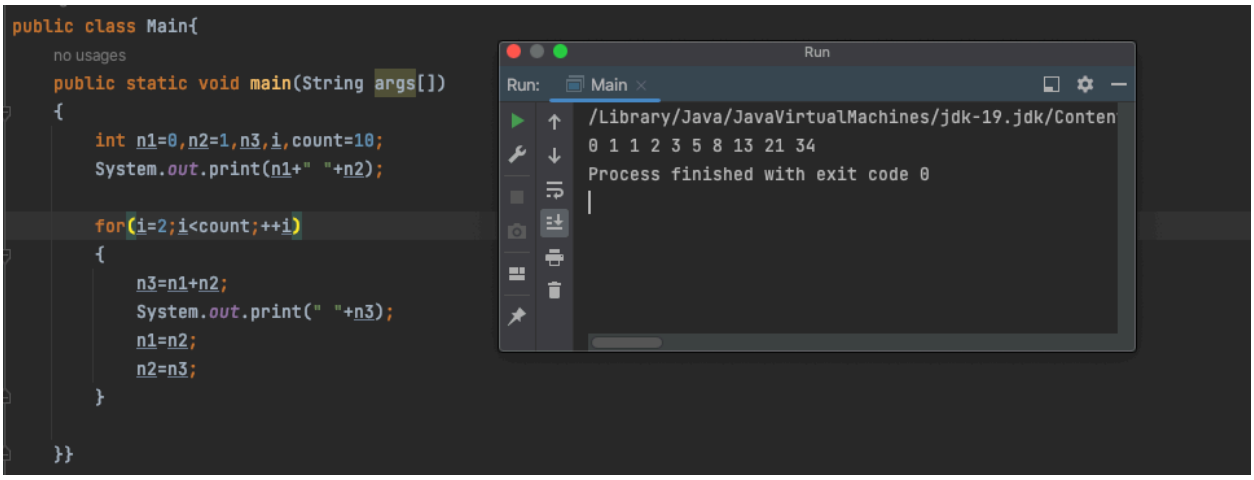


```java
import java.util.Scanner;
no usages
public class Main {
    no usages
    public static void main(String[] args) {
        int sum = 0;
        Scanner input = new Scanner(System.in);
        System.out.println(" Enter a number");
        int number = input.nextInt();

        while (number >= 0) {
            sum += number;
            System.out.println("Enter a number");
            number = input.nextInt();
        }
        System.out.println("Count of positive, negative and zeros entered ="+sum);
        input.close();
    }
}
```

```
Run
Run: Main
111
Enter a number
120
Enter a number
122
Enter a number
-11
Count of positive, negative and zeros entered =353
```

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

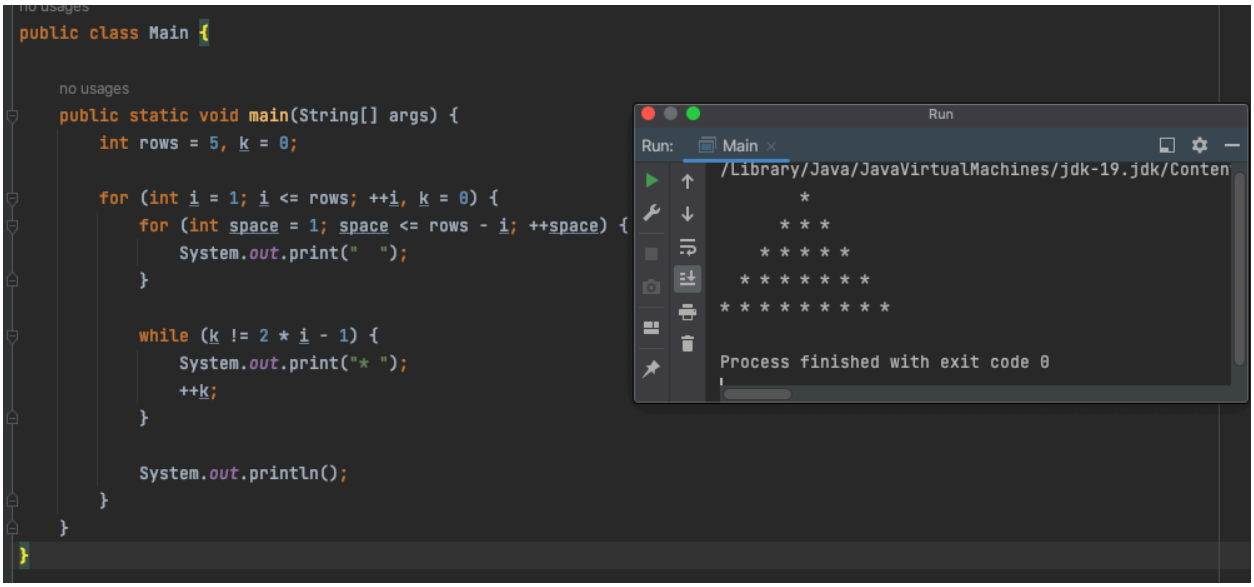


```
public class Main{
    no usages
    public static void main(String args[])
    {
        int n1=0,n2=1,n3,i,count=10;
        System.out.print(n1+" "+n2);

        for(i=2;i<count;++i)
        {
            n3=n1+n2;
            System.out.print(" "+n3);
            n1=n2;
            n2=n3;
        }

    }}
```

```
Run
Run:  Main
/Library/Java/JavaVirtualMachines/jdk-19.jdk/Conten
0 1 1 2 3 5 8 13 21 34
Process finished with exit code 0
```

8. Write a program to print following:

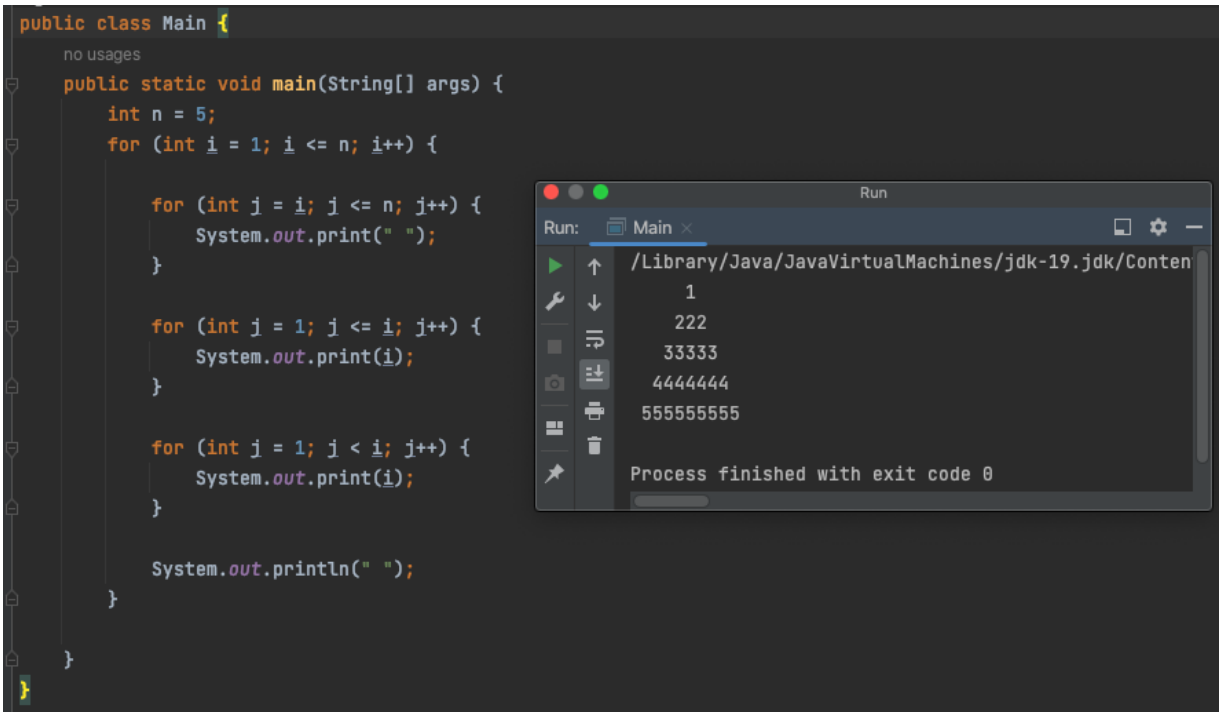
```
        *
       ***
      *****
     *******
    *********
```



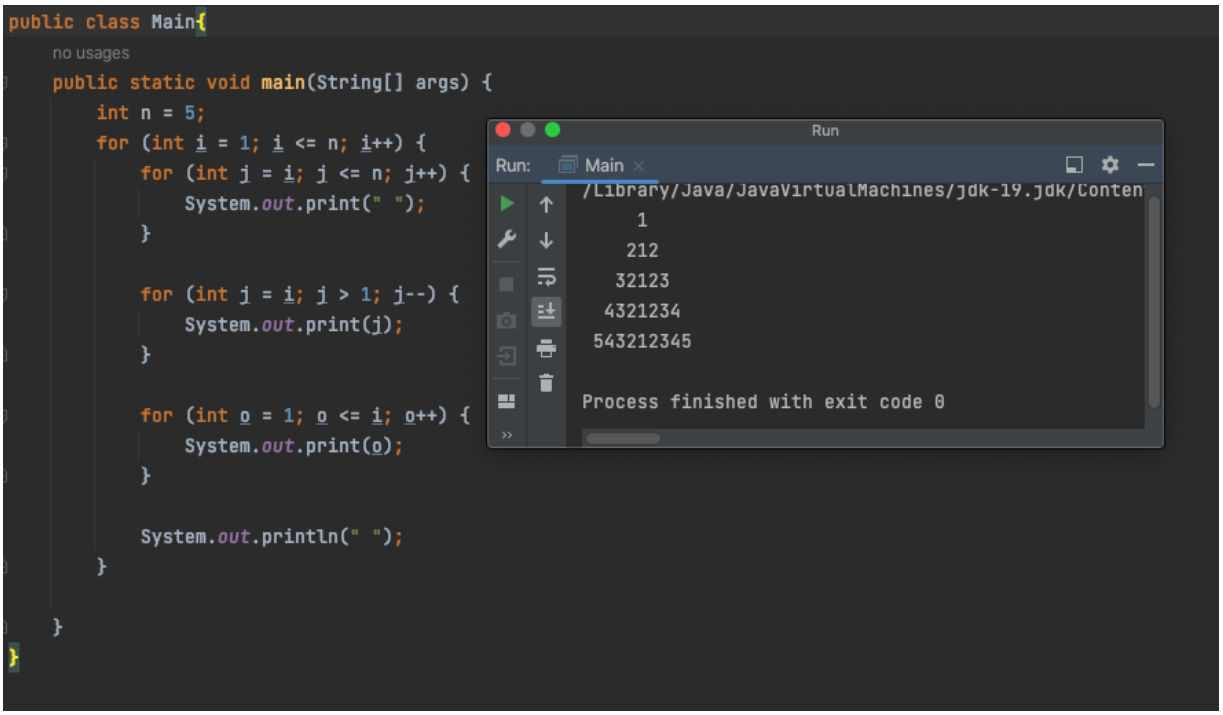
```
public class Main {

    no usages
    public static void main(String[] args) {
        int rows = 5, k = 0;

        for (int i = 1; i <= rows; ++i, k = 0) {
            for (int space = 1; space <= rows - i; ++space) {
                System.out.print("  ");
            }

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

            System.out.println();
        }
    }
}
```

```
Run
Run:  Main
/Library/Java/JavaVirtualMachines/jdk-19.jdk/Conten
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *

Process finished with exit code 0
```

1
222
33333
4444444
555555555



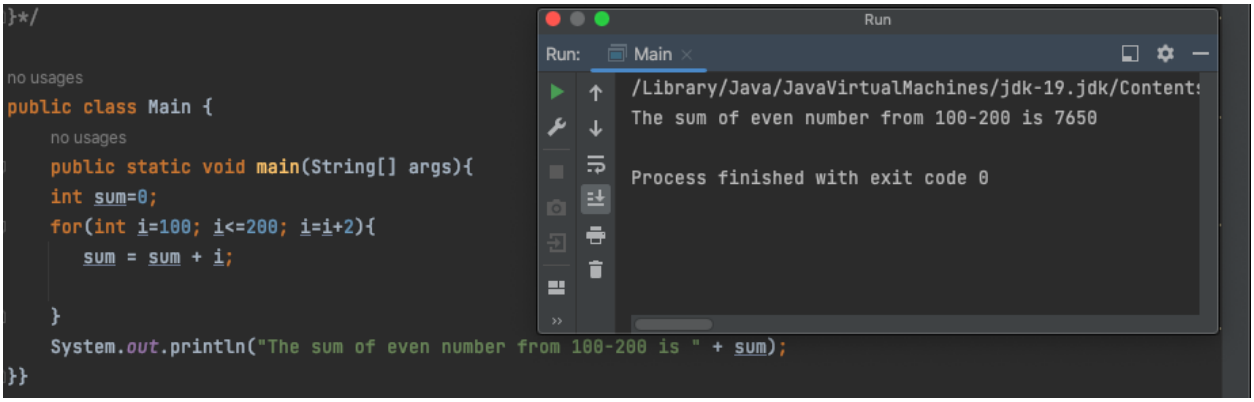
1
212
32123
4321234
543212345



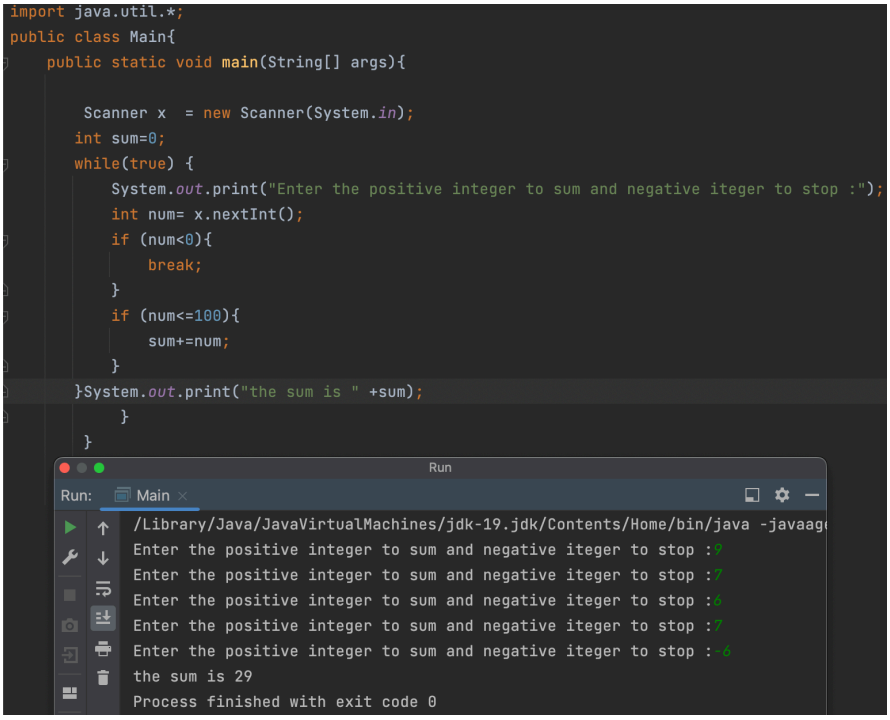
Group C

1. Write a program that:

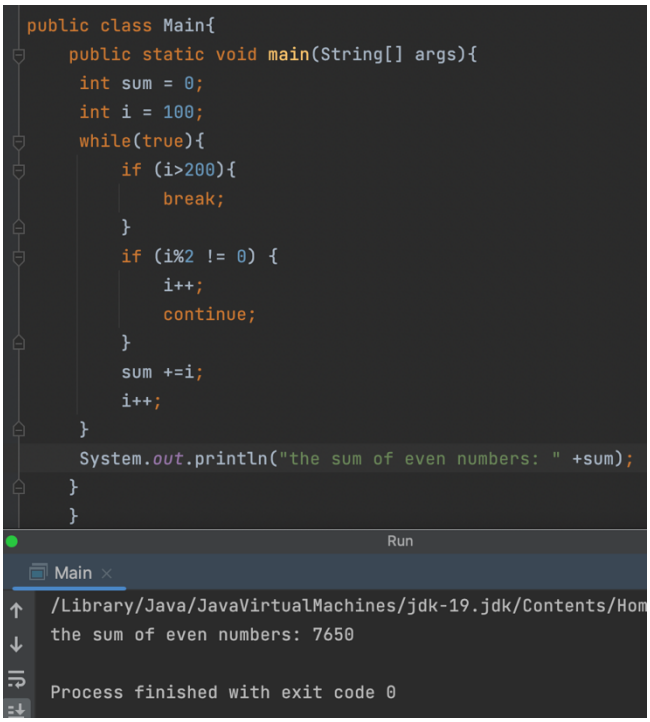
(a) Uses a loop to add up all the even numbers between 100 and 200, inclusive.



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



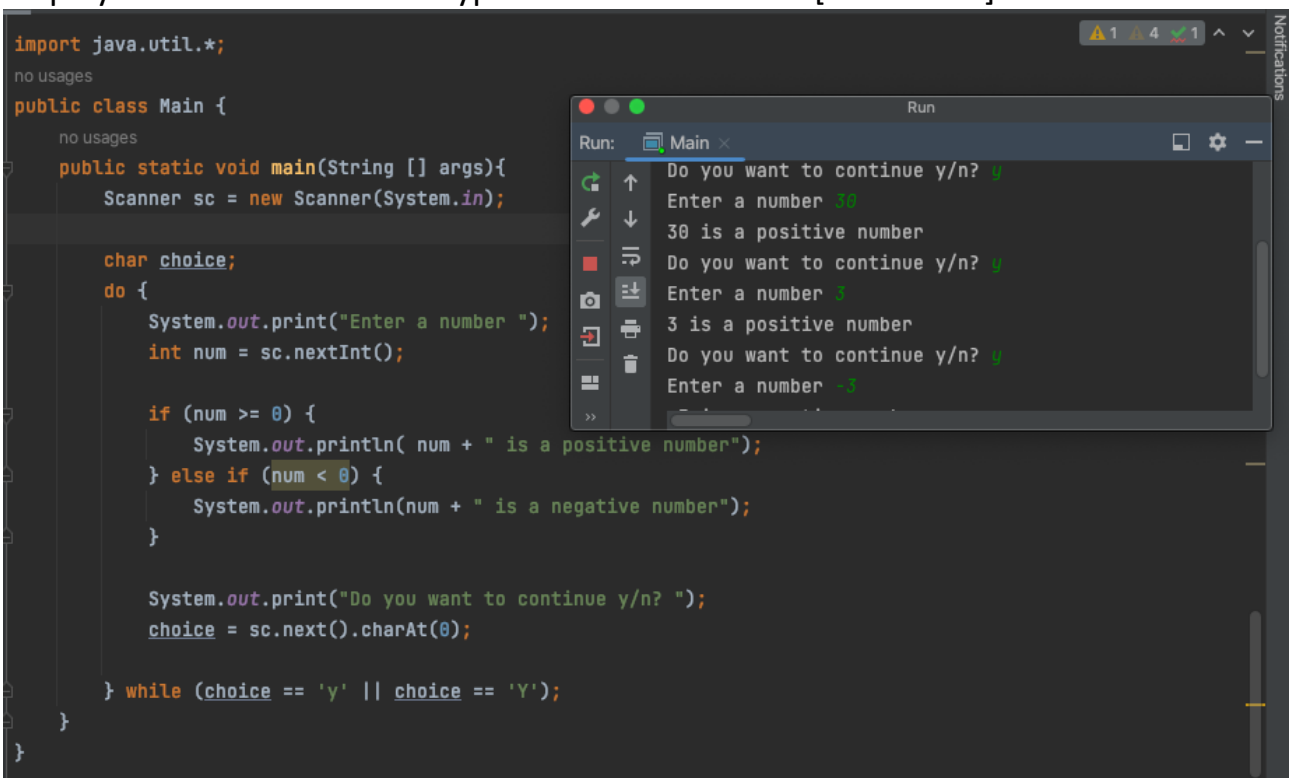
(c) Solves (a) but this time using an infinite loop, break and continue statements.



```java
public class Main{
    public static void main(String[] args){
     int sum = 0;
     int i = 100;
     while(true){
         if (i>200){
             break;
         }
         if (i%2 != 0) {
             i++;
             continue;
         }
         sum +=i;
         i++;
     }
     System.out.println("the sum of even numbers: " +sum);
    }
    }
```

```
Run
Main
/Library/Java/JavaVirtualMachines/jdk-19.jdk/Contents/Hom
the sum of even numbers: 7650

Process finished with exit code 0
```

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

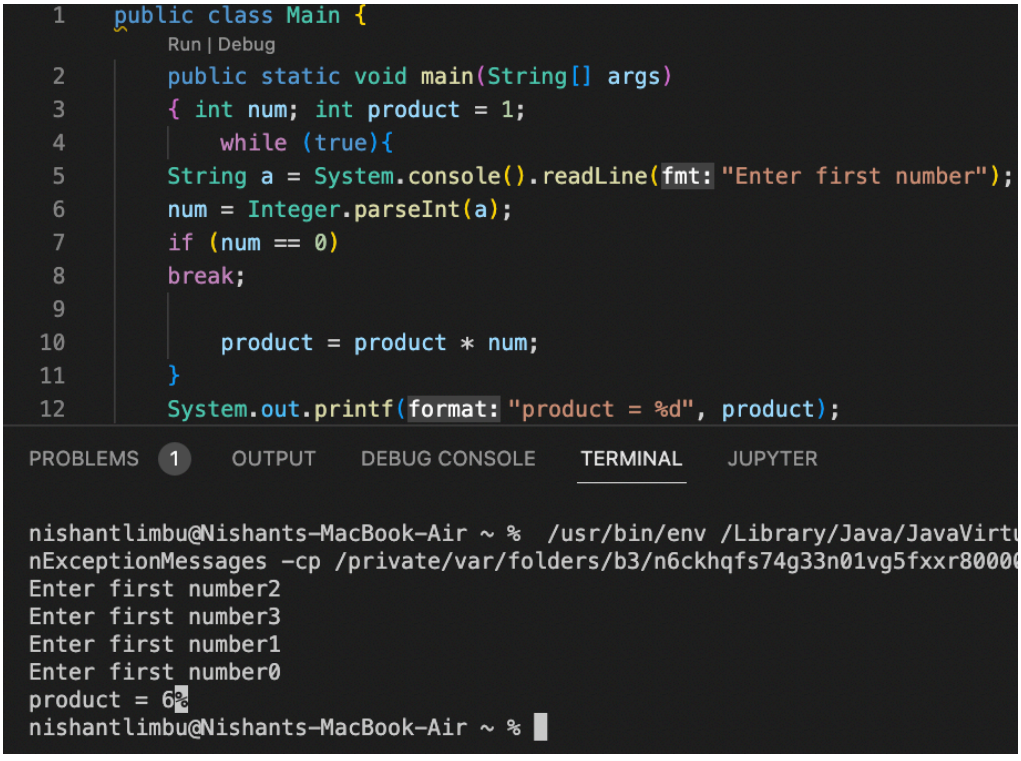


```java
import java.util.*;
no usages
public class Main {
    no usages
    public static void main(String [] args){
        Scanner sc = new Scanner(System.in);

        char choice;
        do {
            System.out.print("Enter a number ");
            int num = sc.nextInt();

            if (num >= 0) {
                System.out.println( num + " is a positive number");
            } else if (num < 0) {
                System.out.println(num + " is a negative number");
            }

            System.out.print("Do you want to continue y/n? ");
            choice = sc.next().charAt(0);

        } while (choice == 'y' || choice == 'Y');
    }
}
```

```
Run
Run: Main
Do you want to continue y/n? y
Enter a number 30
30 is a positive number
Do you want to continue y/n? y
Enter a number 3
3 is a positive number
Do you want to continue y/n? y
Enter a number -3
```

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);
}
}
```



3. For each of the following, indicate which a definite loop is, and which an indefinite loop, 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= This is an indefinite loop because the program runs forever until 0 is entered and then the loop is broken.

(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;
}
}
}
```

Ans= This is a definite loop because the loop stops after certain times of repetition i.e. in this program it is repeated 9 times.

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

```java
public class money {
    2 usages
    private static final int QUATER_VALUE = 25;
    2 usages
    private static final int DIME_VALUE = 10;
    2 usages
    private static final int NICKEL_VALUE = 5;
    private static final int PENNY_VALUE = 1;

    public static void main(String[] args){
        //print a header row
        System.out.println("Change\tQuaters\tDimes\tNickles\tPennies");
        //loop through all the possible value of change
        for (int change = 0; change<=99; change++) {
            int numQuaters = change / QUATER_VALUE;
            int remainingChange = change % QUATER_VALUE;
            int numDIMES = remainingChange / DIME_VALUE;
            remainingChange = remainingChange % DIME_VALUE;
            int numNickles = remainingChange / NICKEL_VALUE;
            remainingChange = remainingChange % NICKEL_VALUE;
            int numPennies = remainingChange;
            //print the result for this amount of change
            System.out.println(change + "\t"+numQuaters+ "\t" +numNickles+ "\t" +numPennies);
        }
    }
}
```

Change	Quaters	Dimes	Nickles	Pennies
0	0	0	0	
1	0	0	1	
2	0	0	2	
3	0	0	3	
4	0	0	4	
5	0	1	0	
6	0	1	1	
7	0	1	2	
8	0	1	3	
9	0	1	4	
10	0	0	0	
11	0	0	1	
12	0	0	2	
13	0	0	3	
14	0	0	4	
15	0	1	0	
16	0	1	1	
17	0	1	2	
18	0	1	3	
19	0	1	4	
20	0	0	0	
21	0	0	1	
22	0	0	2	
23	0	0	3	
24	0	0	4	
25	1	0	0	
26	1	0	1	
27	1	0	2	
28	1	0	3	
29	1	0	4	
30	1	1	0	
31	1	1	1	
32	1	1	2	

```
67  2   1   2
68  2   1   3
69  2   1   4
70  2   0   0
71  2   0   1
72  2   0   2
73  2   0   3
74  2   0   4
75  3   0   0
76  3   0   1
77  3   0   2
78  3   0   3
79  3   0   4
80  3   1   0
81  3   1   1
82  3   1   2
83  3   1   3
84  3   1   4
85  3   0   0
86  3   0   1
87  3   0   2
88  3   0   3
89  3   0   4
90  3   1   0
91  3   1   1
92  3   1   2
93  3   1   3
94  3   1   4
95  3   0   0
96  3   0   1
97  3   0   2
98  3   0   3
99  3   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 xn
cos x = 1 - x
2
/2! + x4
/4! - x
6
/6! ..... [HomeTask]s

```java
import java.util.*;public class Last {
    public static void main(String[] args){
        int i = 0;
        int j = 0;
        int fact = 0;
        int sign = -1;
        float p = 0;
        float sum = 0;
        Scanner x = new Scanner(System.in);
        System.out.println("Enter value of a ");
        float a = x.nextFloat();
        System.out.print("Enter the value of b ");
        int b =  x.nextInt();
        for (i = 2; i<=b; i+=2) {
            p = 1;
            fact = 1;
            for (j = 1; j<=i; j++) {
                p = p*a;
                fact = fact * j;
            }
            sum += sign * p/fact;
            sign = -1*sign;

        }double sum2 = 1+sum;
        System.out.println("cos "+a+"="+sum2);
    }
}
```

```
Run:  Last
Enter value of a
45
Enter the value of b 3
cos 45.0=-1011.5

Process finished with exit code 0
```