

Data Types and Operations

1. Write programs to use all the data types and given arithmetic operations.

Program

```
public class Main {
    public static void main(String[] args) {
        int i1 = 4, i2 = 2, ia = i1, ib = i2;
        float f1 = 8, f2 = 3, fa = f1, fb = f2;
        double d1 = 4.5, d2 = 3.2, da = d1, db = d2;
        char c1 = 's', c2 = 'm', ca = c1, cb = c2;

        System.out.println("Addition:");
        System.out.println("int: \t\t" + i1 + " + " + i2 + " = " + (i1 + i2));
        System.out.println("float: \t\t" + f1 + " + " + f2 + " = " + (f1 + f2));
        System.out.println("double: \t\t" + d1 + " + " + f2 + " = " + (d1 + d2));
        System.out.println("char: \t\t" + c1 + " + " + c2 + " = " + (c1 + c2));

        System.out.println("\nSubtraction:");
        System.out.println("int: \t\t" + i1 + " - " + i2 + " = " + (i1 - i2));
        System.out.println("float: \t\t" + f1 + " - " + f2 + " = " + (f1 - f2));
        System.out.println("double: \t\t" + d1 + " - " + f2 + " = " + (d1 - d2));
        System.out.println("char: \t\t" + c1 + " - " + c2 + " = " + (c1 - c2));

        System.out.println("\nMultiplication:");
        System.out.println("int: \t\t" + i1 + " * " + i2 + " = " + (i1 * i2));
        System.out.println("float: \t\t" + f1 + " * " + f2 + " = " + (f1 * f2));
        System.out.println("double: \t\t" + d1 + " * " + f2 + " = " + (d1 * d2));
        System.out.println("char: \t\t" + c1 + " * " + c2 + " = " + (c1 * c2));

        System.out.println("\nDivision:");
        System.out.println("int: \t\t" + i1 + " / " + i2 + " = " + (i1 / i2));
        System.out.println("float: \t\t" + f1 + " / " + f2 + " = " + (f1 / f2));
        System.out.println("double: \t\t" + d1 + " / " + f2 + " = " + (d1 / d2));
        System.out.println("char: \t\t" + c1 + " / " + c2 + " = " + (c1 / c2));

        i1++; f1++; d1++; c1++;
        System.out.println("\nIncrement:");
        System.out.println("int: \t\t" + ia + " ++ = " + i1);
        System.out.println("float: \t\t" + fa + " ++ = " + f1);
        System.out.println("double: \t\t" + da + " ++ = " + d1);
        System.out.println("char: \t\t" + ca + " ++ = " + c1);

        i2--; f2--; d2--; c2--;
```

```

        System.out.println("\nDecrement:");
        System.out.println("int: \t\t\t" + ib + "-- = " + i2);
        System.out.println("float: \t\t\t" + fb + "-- = " + f2);
        System.out.println("double: \t\t" + db + "-- = " + d2);
        System.out.println("char: \t\t\t" + cb + "-- = " + c2);

    }
}

```

Output

The image displays three screenshots of a Java IDE's Run console, showing the output of a program. Each screenshot has a toolbar on the left with icons for Run, Step Over, Step Into, Step Out, Breakpoints, Run and Debug, and a magnifying glass. The console output is as follows:

Run: Main

```

Addition:
int:      4 + 2 = 6
float:    8.0 + 3.0 = 11.0
double:   4.5 + 3.0 = 7.7
char:     s + m = 224

Subtraction:
int:      4 - 2 = 2
float:    8.0 - 3.0 = 5.0
double:   4.5 - 3.0 = 1.2999999999999998

```

Run: Main

```

char:     s - m = 6

Multiplication:
int:      4 * 2 = 8
float:    8.0 * 3.0 = 24.0
double:   4.5 * 3.0 = 14.4
char:     s * m = 12535

Division:
int:      4 / 2 = 2

```

Run: Main

```

float:    8.0 / 3.0 = 2.6666667
double:   4.5 / 3.0 = 1.40625
char:     s / m = 1

Increment:
int:      4++ = 5
float:    8.0++ = 9.0
double:   4.5++ = 5.5
char:     s++ = t

```

2. Write program to perform all the arithmetic operations given in the table.

Arithmetic Operators
+ → Addition
- → Subtraction
* → Multiplication
/ → Division
++ → Increment operator
-- → Decrement operator

Program

```
import java.util.Scanner;
```

```
public class Arithmetic {
    public static void main(String[] args){
        Scanner input = new Scanner(System.in);
        System.out.println("\n Enter 1 for Addition \n Enter 2 for Subtraction \n Enter 3 for
        Multiplication \n Enter 4 for Division \n Enter 5 for Increment \n Enter 6 for Decrement \n
        Enter your choice:");
        int choice = input.nextInt();
        switch (choice){
            case 1:
                System.out.println("Enter the 1st number:");
                int num1 = input.nextInt();
                System.out.println("Enter the 2nd number:");
                int num2= input.nextInt();
                int result = num1+num2;
                System.out.println("Result is :" + result);
                break;
            case 2:
                System.out.println("Enter the 1st number:");
                num1= input.nextInt();
                System.out.println("Enter the 2nd number:");
                num2 = input.nextInt();
                result= num1-num2;
                System.out.println("Result is :" + result);
                break;
            case 3:
                System.out.println("Enter the 1st number:");
                num1 = input.nextInt();
```

```

        System.out.println("Enter the 2nd number:");
        num2 = input.nextInt();
        result = num1*num2;
        System.out.println("Result is :" + result);
        break;
    case 4:
        System.out.println("Enter the 1st number:");
        num1 = input.nextInt();
        System.out.println("Enter the 2nd number:");
        num2 = input.nextInt();
        result = num1/num2;
        System.out.println("Result is :" + result);
        break;
    case 5:
        System.out.println("Enter the number:");
        num1= input.nextInt();
        num1= ++num1;
        System.out.println("Result is :" + num1);
        break;
    case 6:
        System.out.println("Enter the number:");
        num1= input.nextInt();
        num1 = --num1;
        System.out.println("Result is :" + num1);
        break;
    default:
        System.out.println("Invalid input");
    }
}
}
}

```

Output

```

Run: Arithmetic x
Enter 1 for Addition
Enter 2 for Subtraction
Enter 3 for Multiplication
Enter 4 for Division
Enter 5 for Increment
Enter 6 for Decrement |
Enter your choice:
Enter the 1st number:

```

```
Run: Arithmetic X
Enter your choice:
1
Enter the 1st number:
2
Enter the 2nd number:
3
Result is :5

Process finished with exit code 0
```

```
Run: Arithmetic X
Enter your choice:
2
Enter the 1st number:
5
Enter the 2nd number:
3
Result is :2

Process finished with exit code 0
```

```
Run: Arithmetic X
Enter your choice:
3
Enter the 1st number:
2
Enter the 2nd number:
3
Result is :6

Process finished with exit code 0
```

```
Run: Arithmetic X
Enter your choice:
4
Enter the 1st number:
6
Enter the 2nd number:
3
Result is :2

Process finished with exit code 0
```

```
Run: Arithmetic x
Enter 4 for Division
Enter 5 for Increment
Enter 6 for Decrement
Enter your choice:
5
Enter the number:
5
Result is :6
Process finished with exit code 0
```

```
Run: Arithmetic x
Enter 4 for Division
Enter 5 for Increment
Enter 6 for Decrement
Enter your choice:
6
Enter the number:
2
Result is :1
Process finished with exit code 0
```

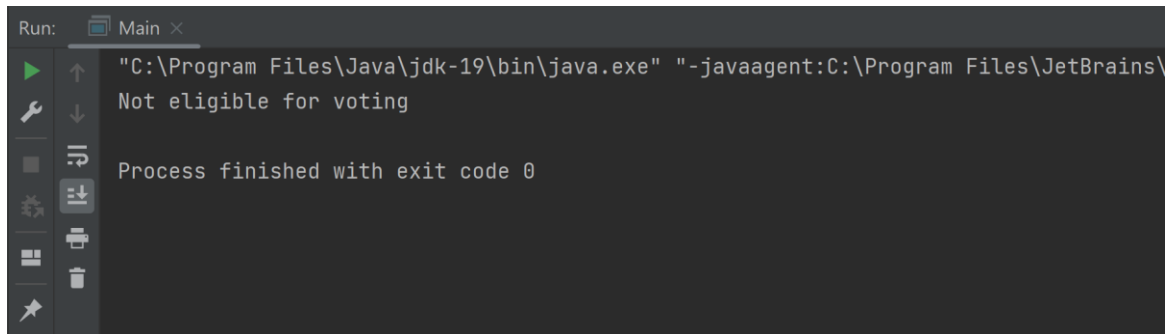
If Condition

1. Write a program to check if a candidate is eligible for the voting or not.

Program

```
public class Main {  
    public static void main (String args[]) {  
        int age = 15;  
        if (age < 18) {  
            System.out.println("Not eligible for voting");  
        } else {  
            System.out.println("Eligible for voting");  
        }  
    }  
}
```

Output

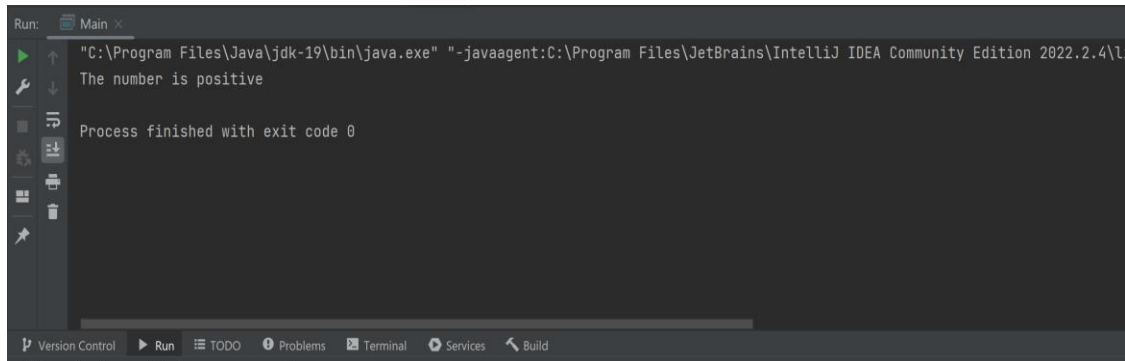


2. Write a program to check if a number is positive or negative.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num = 10;  
  
        if (num < 0) {  
            System.out.println("The number is negative");  
        } else {  
            System.out.println("The number is positive");  
        }  
    }  
}
```

Output

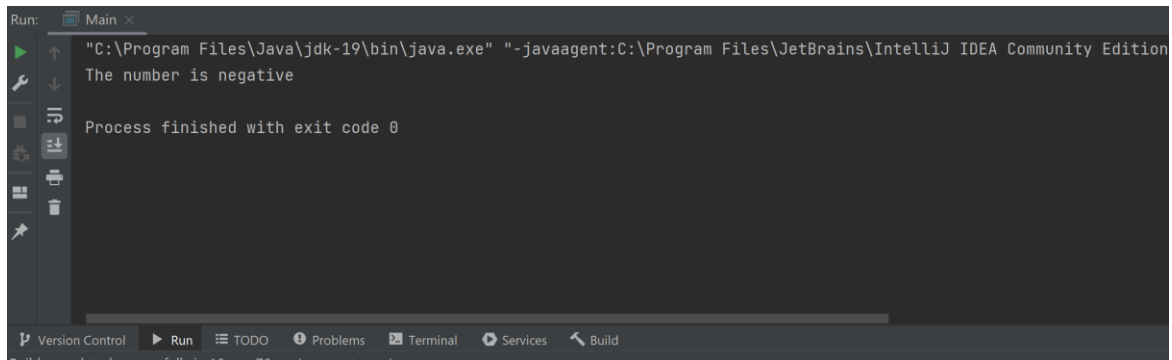


3. Extend the previous program to check whether the given number is positive, zero or negative.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num=10;  
  
        if(num<0){  
            System.out.println("The number is negative");  
        }  
        else if(num>0){  
            System.out.println("The number is positive");  
        }  
        else if(num==0){  
            System.out.println("The number is equal");  
        }  
        else{  
            System.out.println("Invalid input");  
        }  
    }  
}
```


Output

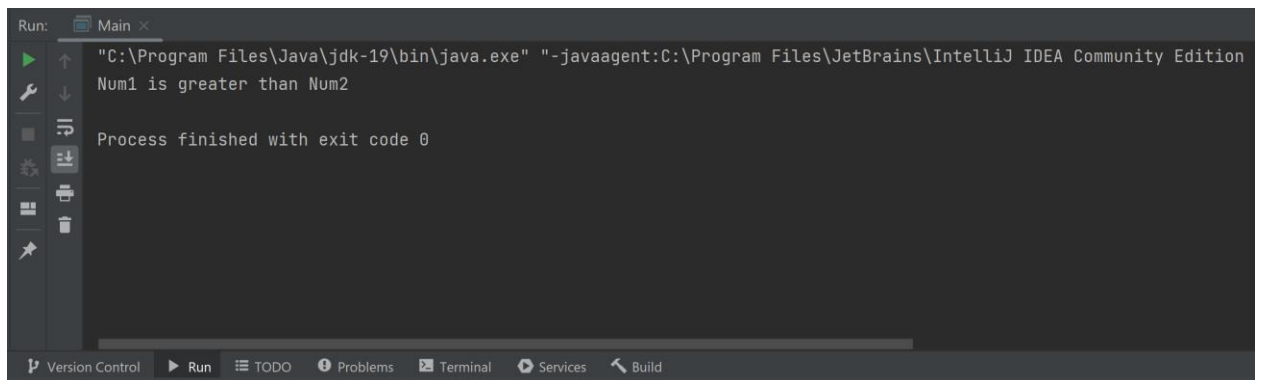


4. Write a program to find largest of two numbers.

Program

```
public class Main {
    public static void main(String[] args) {
        int num1=10;
        int num2=5;
        if(num1>num2){
            System.out.println("Num1 is greater than Num2");
        }else{
            System.out.println("Num2 is greater than Num1");
        }
    }
}
```

Output




5. Write a program to check given number is even or odd.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num=10;  
        if(num%2==0){  
            System.out.println("The number is even");  
        }else{  
            System.out.println("The number is odd");  
        }  
    }  
}
```

Output



The screenshot shows the 'Run' console of an IDE. The title bar says 'Run: Main x'. The console output is as follows:

```
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ  
The number is even  
Process finished with exit code 0
```


For Loop

- 1. Write a program to print 10 even numbers and 10 odd numbers.**

Program

```
public class Main {
    public static void main(String[] args) {
        for (int i = 0; i < 10; i++) {
            if (i % 2 == 0) {
                System.out.println("Even number" + i);
            } else {
                System.out.println("Odd number" + i);
            }
        }
    }
}
```

Output



```
Run: Main x
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\...
Even number0
Odd number1
Even number2
Odd number3
Even number4
Odd number5
Even number6
Odd number7
Even number8
Odd number9
Even number10
Odd number11
Even number12
Odd number13
Even number14
Odd number15
Even number16
Odd number17
Even number18
Odd number19
```

- 2. Write a program to find factorial of a number.**

Program

```
public class Main {
    public static void main(String args[]){
        int i,fact=1;
        int num=15;
```

```

        for(i=1;i<=num;i++){
            fact=fact*i;
        }
        System.out.println("Factorial of "+num+" is: "+fact);
    }
}

```

Output



The screenshot shows the Run console in IntelliJ IDEA. The command executed is `"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ"`. The output is `Factorial of 15 is: 2004310016`. Below the output, it says `Process finished with exit code 0`.

3. Write a program to generate tables of 10.

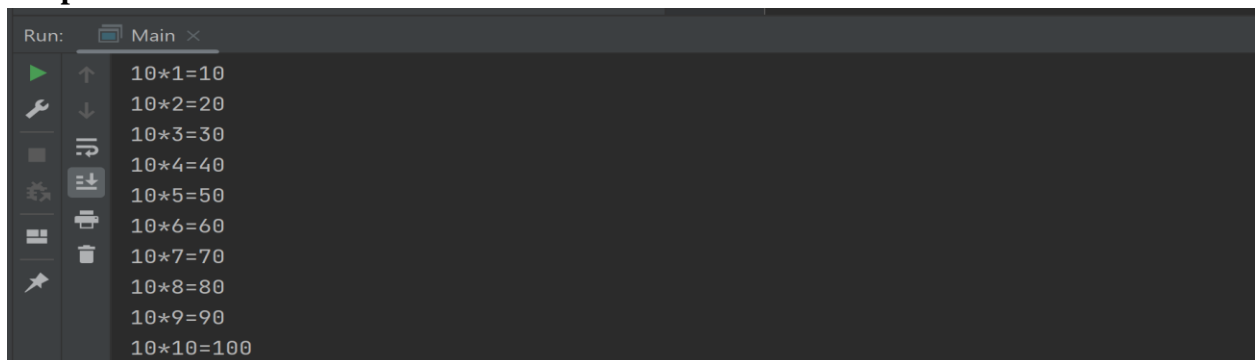
Program

```

public class Main {
    public static void main(String[] args) {
        int num=10;
        int result;
        for(int i=0;i<=10;i++){
            result=i*num;
            System.out.println("10*"+i+"="+result);
        }
    }
}

```

Output



The screenshot shows the Run console in IntelliJ IDEA. The command executed is `"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ"`. The output is a list of multiplication results for 10 multiplied by numbers from 1 to 10: `10*1=10`, `10*2=20`, `10*3=30`, `10*4=40`, `10*5=50`, `10*6=60`, `10*7=70`, `10*8=80`, `10*9=90`, and `10*10=100`.

4. Write a program to add the digits of a number.

Program

```
public class Main {  
    public static void main(String[] args) {  
        String digit="3653653";  
        int len=digit.length();  
        int sum=0;  
  
        for(int i=0;i<len;i++){  
            sum+=Integer.parseInt(Character.toString(digit.charAt(i)));  
        }  
        System.out.println(sum);    }  
}
```

Output

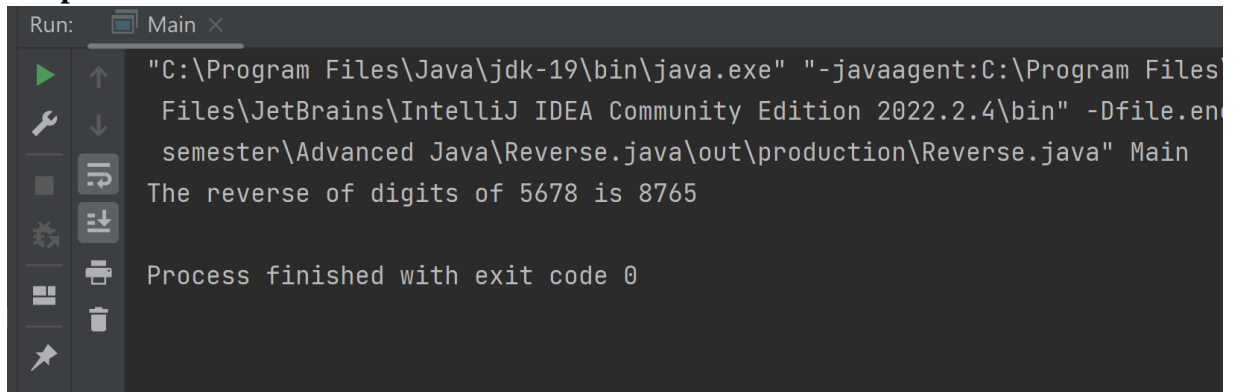


5. Write a program to reverse the digits of a number.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num=5678,rev=0;  
        for (int i = num; i != 0; i /= 10)  
        {  
            int x = i % 10;  
            rev = rev * 10 + x;  
        }  
        System.out.println("The reverse of digits of " + num + " is " + rev);  
    }  
}
```

Output



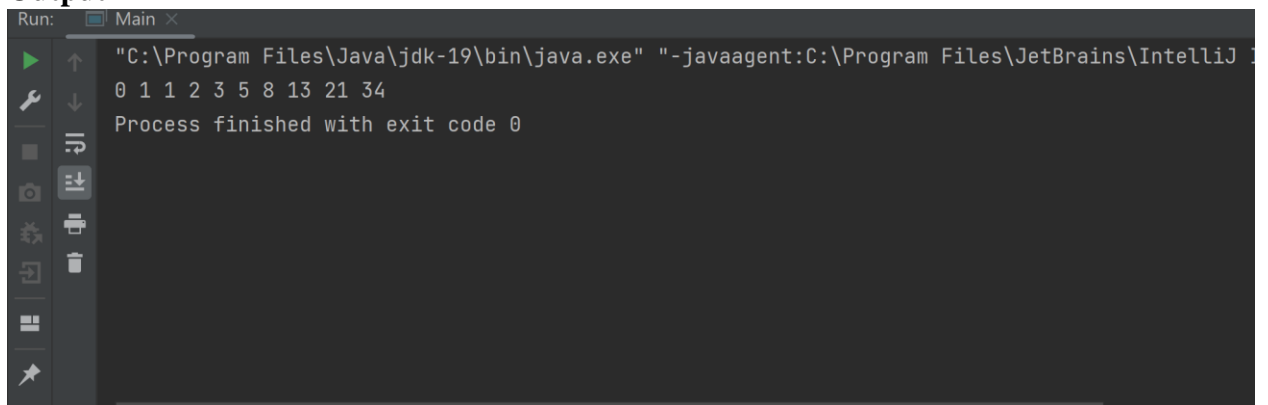
```
Run: Main ×
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 semester\Advanced Java\Reverse.java\out\production\Reverse.java" Main
The reverse of digits of 5678 is 8765
Process finished with exit code 0
```

6. Write a program to generate 10 Fibonacci numbers.

Program

```
public class Main {
    public static void main(String[] args) {
        int a=0,b=1;
        int c,count=10;
        System.out.print(a+" "+b);
        for(int i=2;i<count;i++){
            c=a+b;
            System.out.print(" "+c);
            a=b;
            b=c;
        }
    }
}
```

Output



```
Run: Main ×
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 0 1 1 2 3 5 8 13 21 34
Process finished with exit code 0
```

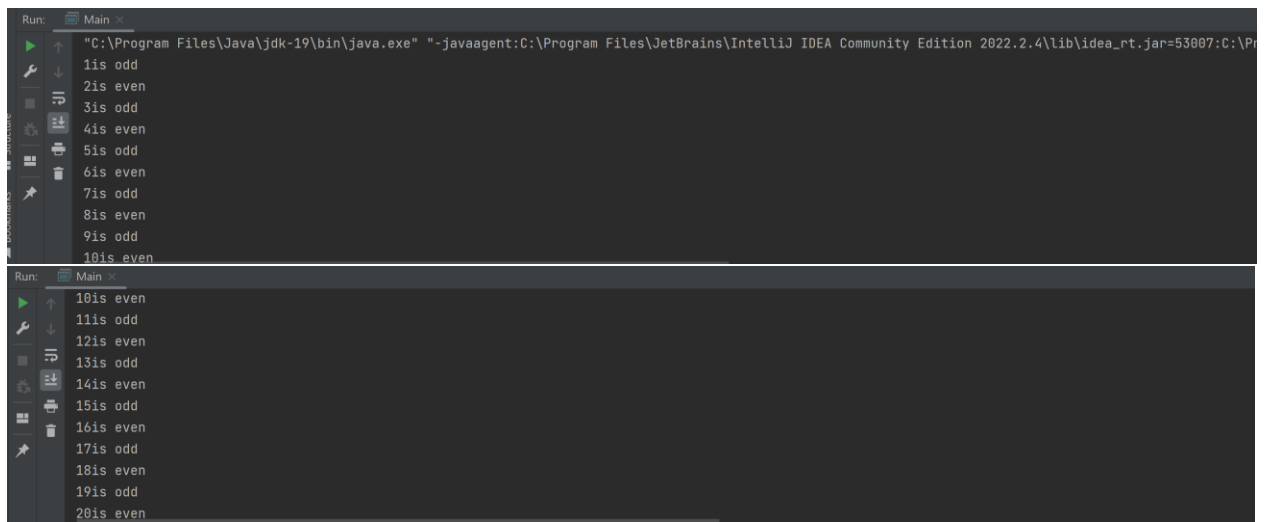
While Loop

1. Write a program to print 10 even numbers and 10 odd numbers.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num=0;  
        while(num<20){  
            num++;  
            if(num%2==0){  
                System.out.println(num + "is even ");  
            }else{  
                System.out.println(num +"is odd");  
            }  
        }  
    }  
}
```

Output



```
Run: Main x  
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\lib\idea_rt.jar=53007:C:\Pr  
11s odd  
21s even  
31s odd  
41s even  
51s odd  
61s even  
71s odd  
81s even  
91s odd  
101s even  
111s odd  
121s even  
131s odd  
141s even  
151s odd  
161s even  
171s odd  
181s even  
191s odd  
201s even
```

2. Write a program to find factorial of a number.

Program

```
public class Main {  
    public static void main(String[] args) {
```

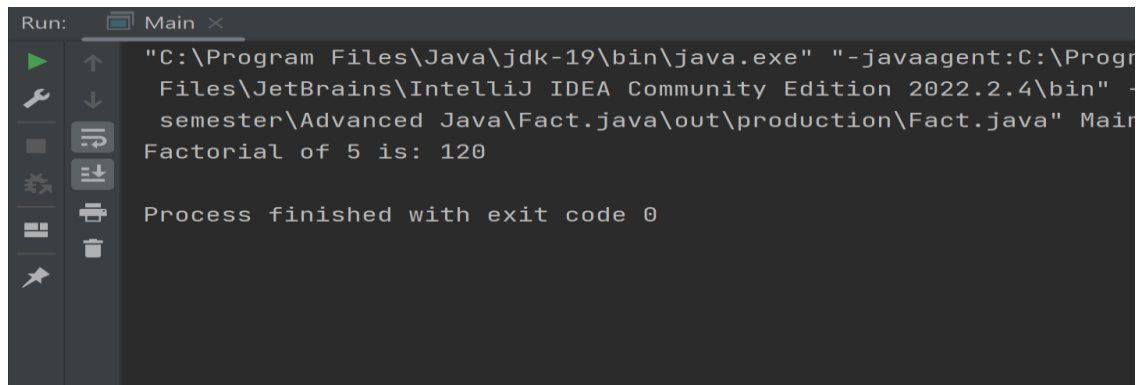
```

        int fact=1;
        int i=1,num=5;
        while(i<=num){
            fact=fact*i;
            i++;

        }
        System.out.println("Factorial of "+num+" is: "+fact);
    }
}

```

Output



```

Run: Main x
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Progr
Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -
semester\Advanced Java\Fact.java\out\production\Fact.java" Main
Factorial of 5 is: 120

Process finished with exit code 0

```

3. Write a program to generate tables of 10.

Program

```

public class Main {
    public static void main(String[] args) {
        int num=10;
        int i=1;
        while(i<11){
            System.out.printf("%d * %d = %d \n", num, i, num * i);
            i++;

        }

    }
}

```


Output



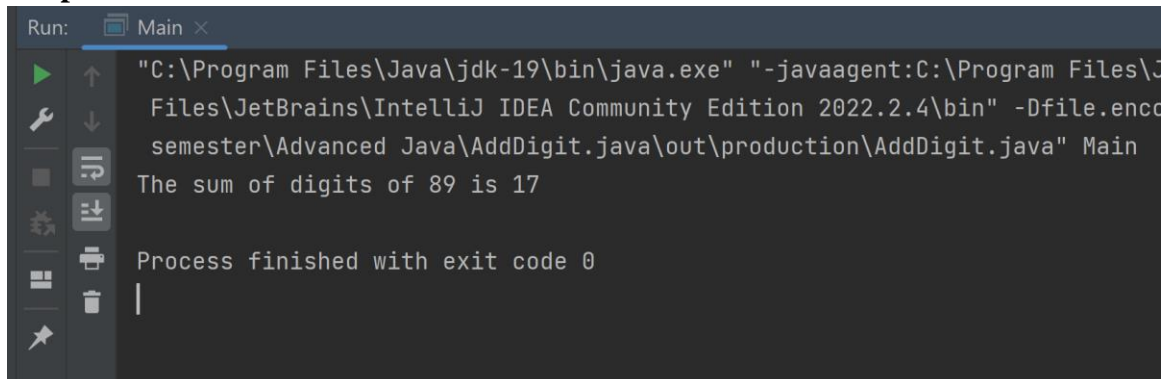
```
Run: Main ×
10 * 1 = 10
10 * 2 = 20
10 * 3 = 30
10 * 4 = 40
10 * 5 = 50
10 * 6 = 60
10 * 7 = 70
10 * 8 = 80
10 * 9 = 90
10 * 10 = 100
```

4. Write a program to add the digits of a number.

Program

```
public class Main {
    public static void main(String[] args) {
        int n = 89, sum = 0, i = n;
        while (i != 0) {
            int x = i % 10;
            sum += x;
            i /= 10;
        }
        System.out.println("The sum of digits of " + n + " is " + sum);
    }
}
```

Output



```
Run: Main ×
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\J
Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.enco
semester\Advanced Java\AddDigit.java\out\production\AddDigit.java" Main
The sum of digits of 89 is 17
Process finished with exit code 0
```

5. Write a program to reverse the digits of a number.

Program

```
public class Main {
    public static void main(String[] args) {
        int rev=0,num=59,i=num;

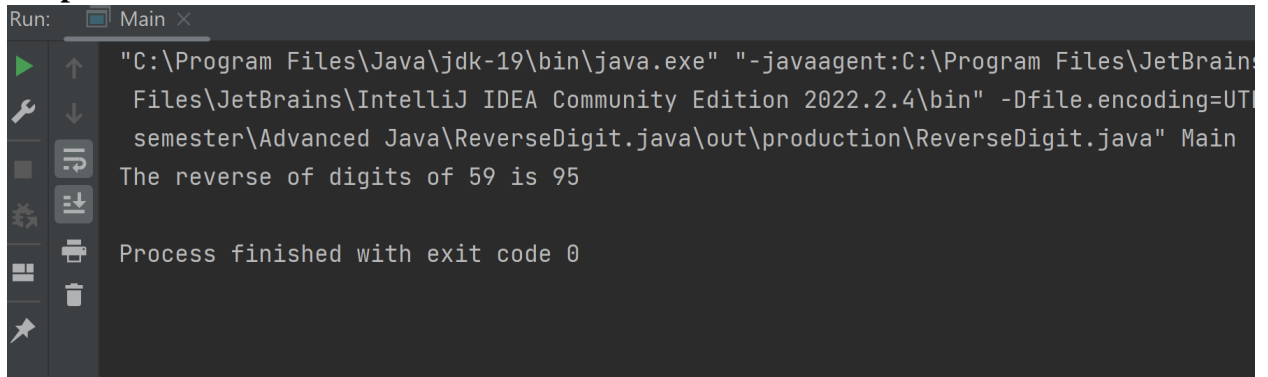
        while (i != 0)
```

```

    {
        int x = i % 10;
        rev = rev * 10 + x;
        i /= 10;
    }
    System.out.println("The reverse of digits of " + num + " is " + rev);
}
}

```

Output



```

Run: Main ×
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 -cp C:\Users\user\Idea\workspace\semester\Advanced Java\ReverseDigit.java\out\production\ReverseDigit.java Main
The reverse of digits of 59 is 95
Process finished with exit code 0

```

6. Write a program to generate 10 Fibonacci numbers.

Program

```

public class Main {
    public static void main(String[] args) {
        int a = 0, b = 1;
        int c, count = 10;
        int i = 0;

        while (i < count) {
            System.out.print(a + " ");

            c = a + b;
            a = b;
            b = c;

            i++;
        }
    }
}

```

Output

The screenshot shows the 'Run' tab in IntelliJ IDEA. The command being executed is:
`"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin\idea_rt.jar" -Dfile.encoding=UTF-8 -Dsun.stdout.encoding=UTF-8 -Dsun.stderr.encoding=UTF-8 semester\Advanced Java\Fibo.java\out\production\Fibo.java" Main`
The output displayed is:
`0 1 1 2 3 5 8 13 21 34`
Below the output, it states: "Process finished with exit code 0".
On the left side of the console, there is a vertical toolbar with icons for Run, Debug, View Log, Attach Debugger, Copy, Paste, and Close.

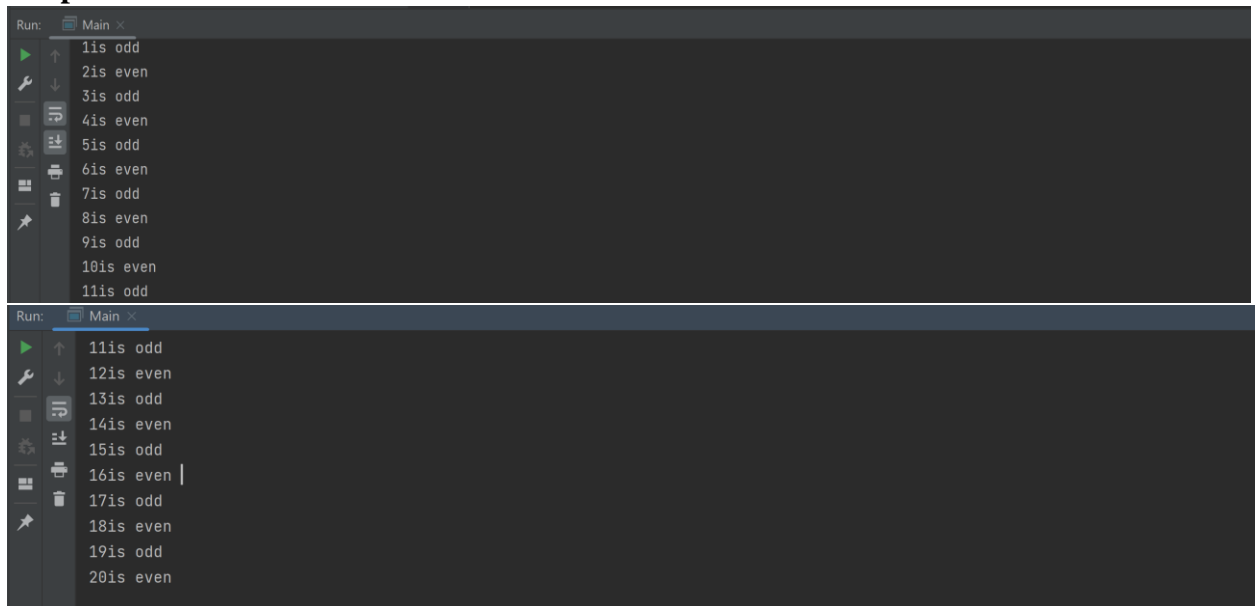
Do-While Loop

1. Write a program to print 10 even numbers and 10 odd numbers.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int num=0;  
        do{  
            num++;  
            if(num%2==0){  
                System.out.println(num + "is even ");  
            }else{  
                System.out.println(num +"is odd");  
            }  
        }while(num<20);  
    }  
}
```

Output



2. Write a program to find factorial of a number.

Program

```
public class Main {  
    public static void main(String[] args) {
```

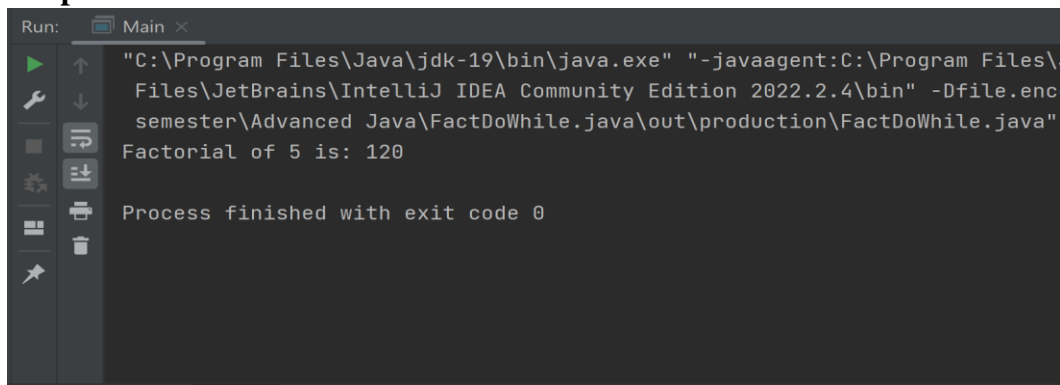
```

    int fact=1;
    int i=1,num=5;
    do{
        fact=fact*i;
        i++;

    }while(i<=num);
    System.out.println("Factorial of "+num+" is: "+fact);
}
}

```

Output



The screenshot shows the Run console in IntelliJ IDEA. The command executed is: `"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\user\Idea\workspace\Advanced Java\FactDoWhile.java\out\production\FactDoWhile.java`. The output is: `Factorial of 5 is: 120`. Below the output, it says: `Process finished with exit code 0`. The left sidebar shows the Run configuration for 'Main'.

3. Write a program to generate tables of 10.

Program

```

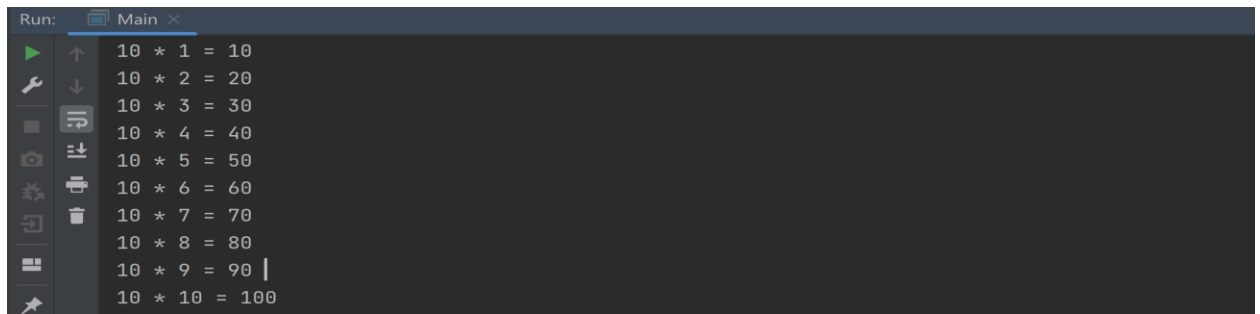
public class Main {
    public static void main(String[] args) {
        int num=10;
        int i=1;
        do{
            System.out.printf("%d * %d = %d \n", num, i, num * i);
            i++;

        }while(i<11);

    }
}

```

Output



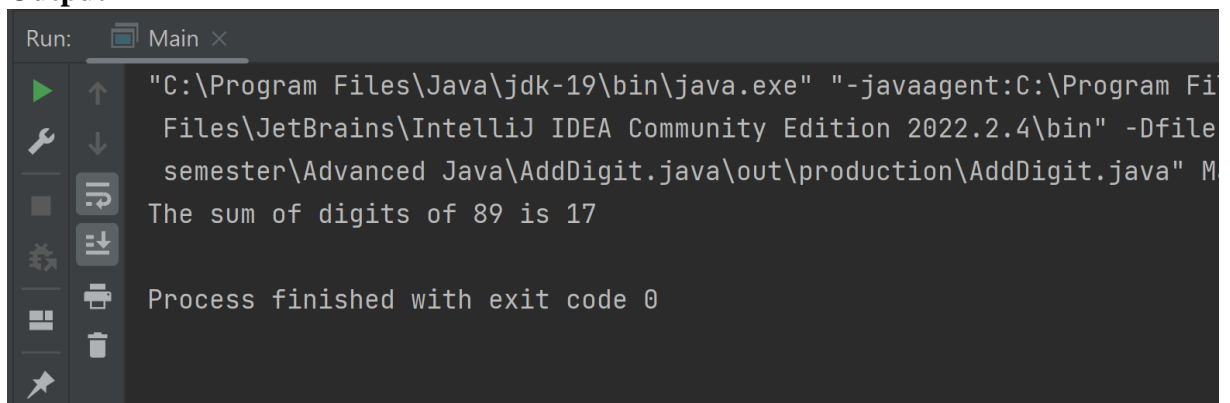
```
Run: Main ×
10 * 1 = 10
10 * 2 = 20
10 * 3 = 30
10 * 4 = 40
10 * 5 = 50
10 * 6 = 60
10 * 7 = 70
10 * 8 = 80
10 * 9 = 90
10 * 10 = 100
```

4. Write a program to add the digits of a number.

Program

```
public class Main {
    public static void main(String[] args) {
        int n = 89, sum = 0, i = n;
        do {
            int x = i % 10;
            sum += x;
            i /= 10;
        } while (i != 0);
        System.out.println("The sum of digits of " + n + " is " + sum);
    }
}
```

Output



```
Run: Main ×
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Fi
Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile
semester\Advanced Java\AddDigit.java\out\production\AddDigit.java" M
The sum of digits of 89 is 17
Process finished with exit code 0
```

5. Write a program to reverse the digits of a number.

Program

```
public class Main {
    public static void main(String[] args) {
        int rev=0,num=59,i=num;
```

Output



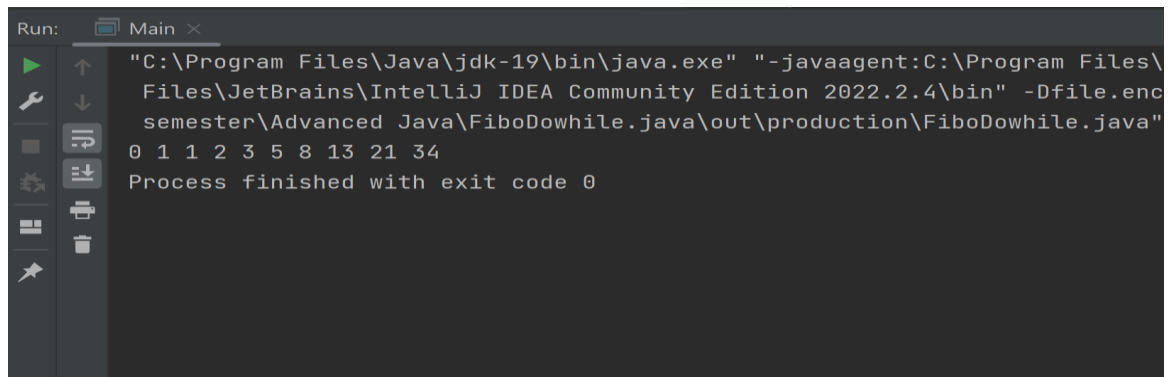
```
public class Main {
    public static void main(String[] args) {
        int a = 0, b = 1;
        int c, count = 10;
        int i = 0;

        do {
            System.out.print(a + " ");

            c = a + b;
            a = b;
            b = c;

            i++;
        } while (i < count);
    }
}
```

Output



The screenshot shows the 'Run' console window of an IDE. The title bar reads 'Run: Main x'. On the left is a vertical toolbar with icons for running, debugging, and other actions. The main area contains the following text:

```
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\
Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.enc
semester\Advanced Java\FiboDowhile.java\out\production\FiboDowhile.java"
0 1 1 2 3 5 8 13 21 34
Process finished with exit code 0
```

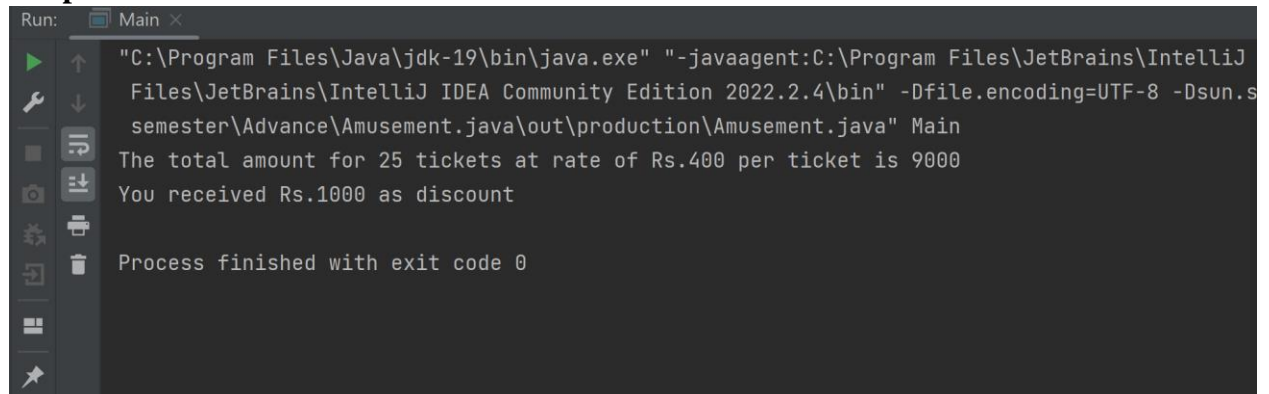

Case Study

1. An Amusement Park company wants one application for their billing counter to enable ticket sale. Assume the Amusement Park authorities approached Max to get this application developed. This application should have ticket prize as Rs 400 per person and if a person buys more than 10 tickets then person is eligible for 10 percent discount. Calculate the total bill or amount according to the number of tickets that are sold.

Program

```
public class Main {  
    public static void main(String[] args) {  
        int price = 400;  
        int number = 25;  
  
        int amount, discount;  
  
        if (number > 10) {  
            amount = price * number;  
            discount = amount * 10 / 100;  
            amount = amount - discount;  
        } else {  
            amount = price * number;  
            discount = 0;  
        }  
  
        System.out.println("The total amount for " + number + " tickets at rate of Rs." +  
            price + " per ticket is " + amount);  
        System.out.println("You received Rs." + discount + " as discount");  
    }  
}
```

Output



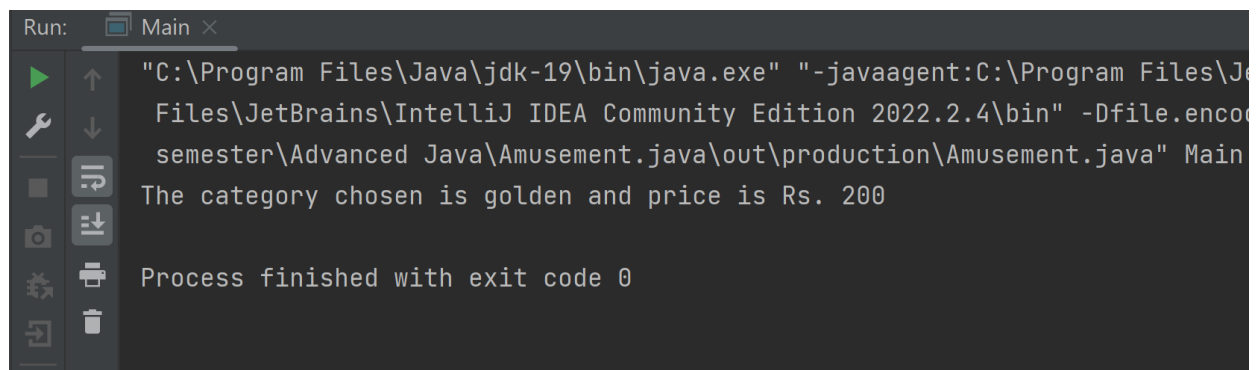
```
Run: Main x  
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ  
Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 -Dsun.s  
semester\Advance\Amusement.java\out\production\Amusement.java" Main  
The total amount for 25 tickets at rate of Rs.400 per ticket is 9000  
You received Rs.1000 as discount  
Process finished with exit code 0
```

2. John and Paul went to watch a movie in theatre where they need to buy two tickets. There are two types of tickets, one Golden category and other as silver category. If they buy tickets for silver category, then per person a ticket should cost Rs.150 and for golden category ticket should cost them Rs.200 each. Considering this scenario, write a program for theatre ticket booking application scenario.

Program

```
public class Main {  
    public static void main(String[] args) {  
        String category = "golden";  
  
        int price = 0;  
  
        if(category.equals("golden"))  
        {  
            price = 200;  
        }  
        else if (category.equals("silver"))  
        {  
            price = 150;  
        }  
  
        System.out.println("The category chosen is " + category + " and price is Rs. " +  
price);  
    }  
}
```

Output



```
Run: Main ×  
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.2.4\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\user\IdeaProjects\semester\Advanced Java\Amusement.java\out\production\Amusement.java Main  
The category chosen is golden and price is Rs. 200  
Process finished with exit code 0
```