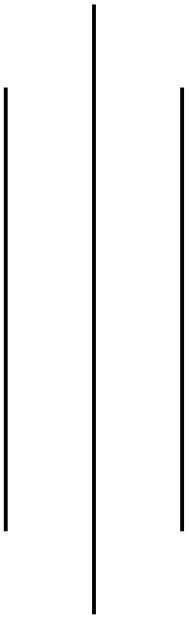
ORCHID INTERNATIONAL College

(Affiliated to Tribhuvan University)

Advanced Java Programming



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1. 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

```
package classwork;
import java.util.Scanner;
public class CS_TC {
	public static void main(String[] args) {
//		Entry Function
		TicketBook tb = new TicketBook();
		int ticket = tb.getInput();
		double amount = tb.totalAmountCalculator();
		System.out.println("\nNo. of Tickets:" + ticket + "\n Cost : " +amount );
}
}

class TicketBook{
	int ticketCount, ticketCost = 400;
	double totalAmount;
	public int getInput() {
		/* Method to get input from the user
		 * Parameters : Void
		 * Returns: ticketCount - no of tickets */
		Scanner s = new Scanner(System.in);
		System.out.println("Enter the no of ticket:");
		this.ticketCount = s.nextInt();
		s.close();
		return this.ticketCount;
	}
	public double totalAmountCalculator() {
		/* Method to calculate the amount
		 * Parameters : None
		 * Returns : Total amount
		 *  */
		if(this.ticketCount > 10) {
			this.totalAmount = 0.9 * (this.ticketCost * this.ticketCount);
		}else {
			this.totalAmount = (this.ticketCost * this.ticketCount);
```

```
                }
                return this.totalAmount;
        }
}
```

```
Enter the no of ticket:
12

No. of Tickets:12
 Cost : 4320.0
```

2. Case Study 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.

```
package classwork;

import java.util.Scanner;

public class CS_Ticket {
        public static void main(String[] args) {
                //Entry Function
                BookTicket tb = new BookTicket();
                tb.ticketInput();
                tb.calculateCost();
                tb.printResult();

}


}
class BookTicket{
```

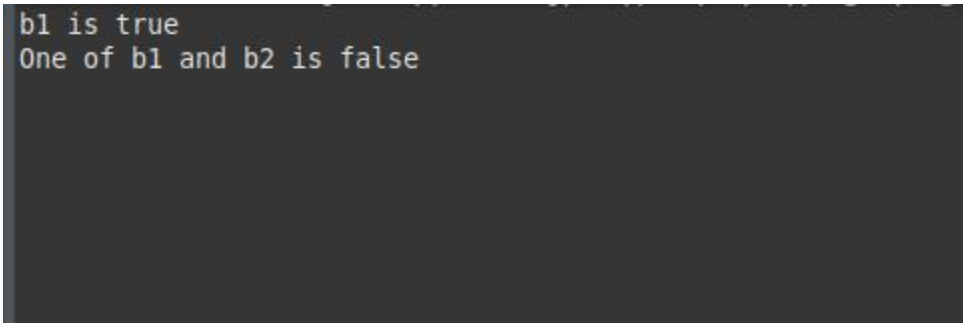
```
	int goldCount, silverCount, goldPrice = 200, silverPrice = 150;
	double totalAmount;
	public void ticketInput() {
		/* Method to get input from the user
		 * Parameters : None
		 * Returns: None */
		Scanner s = new Scanner(System.in);
		System.out.println("Enter the no of gold ticket:");
		this.goldCount = s.nextInt();
		System.out.println("Enter the no of silver ticket:");
		this.silverCount = s.nextInt();
		s.close();
	}
	public void calculateCost() {
		/* Method to calculate the amount
		 * Parameters : None
		 * Returns : None
		 *  */
		this.totalAmount = 1.0 * ((this.goldCount * this.goldPrice) + (this.silverCount *
this.silverPrice));
	}

	public void printResult() {
		/* Method to print the result
		 * Parameters : None
		 * Returns : None
		 *  */
		System.out.println("\nGold ticket(s):"+ this.goldCount +
								"\nSilver Ticket(s)" + this.silverCount +
								"\nTotal Cost:" + this.totalAmount);
}
}
```

```
Enter the no of gold ticket:
4
Enter the no of silver ticket:
6

Gold ticket(s):4
Silver Ticket(s)6
Total Cost:1700.0
```

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

a. *Java Program to Demonstrate Boolean Primitive DataType.*

```
` package classwork;
class Boolean {
// Main driver method
        public static void main(String args[])
        {
                boolean b1 = true, b2= false;
                if(b1 == true) {
                        System.out.println("b1 is true");
                }else {
                        System.out.println("B1 is false");
                }
                if(b1 == true && b2 == true) {
                        System.out.println("both b1  & b2 are true");
                }else {
                        System.out.println("One of b1 and b2 is false");
                }
        }
}
```



b. *Java Program to Illustrate Number Primitive Data Type.*

```
package classwork;


public class Numbers {
        public static void main(String[] args)
        {
                // float
```

```
                double value1 = 10.0, value2 = 9.87f;
                double output = value1 + value2;
                System.out.println("double sum\n"+ value1+"+"+value2+ " =
        "+ output);
                // Integer operation
                int i1 = 10, i2 = 9;
                int op = i1 + i2;
                System.out.println("Integer sum\n"+ i1+"+"+i2+ " = "+ op);
        }
}
```

```
double sum
10.0+9.869999885559082 = 19.869999885559082
Integer sum
10+9 = 19
```

c. *Java Program to Demonstrate Char Primitive Data Type.*

```
class Char {
 public static void main(String args[])
 {
        // Creating and initializing custom character
        char a = 'G';

        // Integer data type is generally
        // used for numeric values
        int i = 89;

        // use byte and short
        // if memory is a constraint
        byte b = 4;

        // this will give error as number is
        // larger than byte range
        // byte b1 = 7888888955;

        short s = 56;
```

```
                // this will give error as number is
                // larger than short range
                // short s1 = 87878787878;

                // by default fraction value
                // is double in java
                double d = 4.355453532;

                // for float use 'f' as suffix as standard
                float f = 4.7333434f;

                //need to hold big range of numbers then we need this data type
                long l = 12121;

                System.out.println("char: " + a);
                System.out.println("integer: " + i);
                System.out.println("byte: " + b);
                System.out.println("short: " + s);
                System.out.println("float: " + f);
                System.out.println("double: " + d);
                System.out.println("long: " + l);
        }
}
```

```
char: C
integer: 89
byte: 4
short: 56
float: 4.7333436
double: 4.355453532
long: 12121
```

d. *Java code to illustrate Addition operator.*

```
package classwork;

class Addition {
        public static void main(String[] args)
        {
                // initializing variables
                int num1 = 20, num2 = 40, sum = 0;
```

```
        // Displaying num1 and num2
        System.out.println("num1 = " + num1);
        System.out.println("num2 = " + num2);
        sum = num1 + num2;
        System.out.println("The sum = " + sum);
    } }
```

Output :-

e. *Java code to illustrate Subtraction operator.*

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

 int num1 = 20, num2 = 10, sub = 0;

        System.out.println("num1 = " + num1);
        System.out.println("num2 = " + num2);

        // subtracting num1 and num2
        sub = num1 - num2;
        System.out.println("Subtraction = " + sub);
    } }
```

f. Java code to illustrate Multiplication operator.

```
package classwork;
```

```
class Multiplication {
  public static void main(String[] args)
  {
        // initializing variables
        int num1 = 20, num2 = 10, mult = 0;

        // Displaying num1 and num2
        System.out.println("num1 = " + num1);
        System.out.println("num2 = " + num2);
        mult = num1 * num2;
        System.out.println("Multiplication = " + mult);
  } }
```

```
num1 = 20
num2 = 10
Multiplication = 200
```

g. Java code to illustrate Division operator.

```
package classwork;
class Division {
    public static void main(String[] args)
    {
        int num1 = 20, num2 = 10, div = 0;
        System.out.println("num1 = " + num1);
        System.out.println("num2 = " + num2);
        div = num1 / num2;
        System.out.println("Division = " + div);
    } }
```

```
num1 = 20
num2 = 10
Division = 2
```

h. Java program to demonstrates the ++ and -- operators.

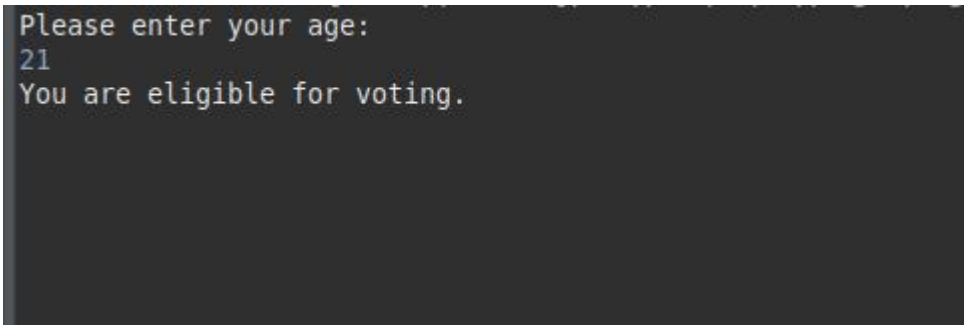
```
public class IncrementDecrement    {
                public static void main(String[] args)
 {
   int number = 50;
   // Display the value in number.
   System.out.println("Number is " + number);
   number++;

   // Display the value in number.
   System.out.println("Now, number is " + number);

   // Decrement number.
   number--;
   // Display the value in number.
   System.out.println("Now, number is " + number);
 } }
```

if Condition

a. Write a program to check if a candidate is eligible for voting or not. (Hint: Check age)

```
import java.util.Scanner;

public class Voting {

public static void main(String[] args)

{

  // Declaring variables

  int age, diff;

  // taking user input
```

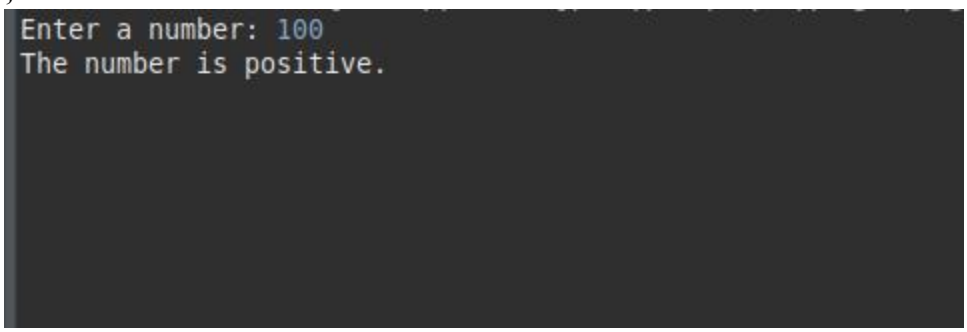
```
Scanner scan = new Scanner(System.in);
System.out.println("Please enter your age: ");
age = scan.nextInt();
// Checking condition for voting.
if(age>=18)
{
   System.out.println("You are eligible for voting.");
}
else
{
diff = (18 - age);
System.out.println("Sorry,You can vote after: "+ diff + " years");
}  }  }
```



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

```
import java.util.Scanner;
public class CheckPositiveOrNegativeExample2
{
public static void main(String[] args)
{
int num;
//object of the Scanner class
Scanner sc = new Scanner(System.in);
System.out.print("Enter a number: ");
//reading a number from the user
num = sc.nextInt();
```

```
//checks the number is greater than 0 or not
if(num>0)
{
System.out.println("The number is positive.");
}
//checks the number is less than 0 or not
else if(num<0)
{
System.out.println("The number is negative.");
}
//executes when the above two conditions return false
else
{
System.out.println("The number is zero.");
}
}
}
```



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

```
public class Main
 {
  public static void main (String[]args)
   {
    int num1 = 50, num2 = 20;
    if (num1 == num2)
      System.out.println ("both are equal");
    else if (num1 > num2)
       System.out.println (num1 + " is  greater");
    else
       System.out.println (num2 + " is  greater");
  }   }
```

```
100001 is  greater
```

d. Write a program to check given number is even or odd. (Hint: use % operator)

```
import java.util.Scanner;

public class EvenOdd {
   public static void main(String[] args) {
      Scanner reader = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int num = reader.nextInt();
      if(num % 2 == 0)
         System.out.println(num + " is even");
      else
         System.out.println(num + " is odd");
   }
}
```

```
Enter a number: 20
20 is even
```

for..loop

a. Write a program to print 10 odd numbers.

```
public class First10OddNaturalNum1 {
    public static void main(String[] args) {
            System.out.println("The First 10 Odd Natural Numbers are");
            for(int i = 1; i <= 10; i++)
            {
                    System.out.println(2 * i - 1);
```

```
        } } }
```

```
The First 10 Odd Natural Numbers are
1
3
5
7
9
11
13
15
17
19
```

b. Write a program to print 10 even numbers.

```
public class First10EvenNaturalNum1 {
    public static void main(String[] args) {
        System.out.println("The First 10 Even Natural Numbers are");
            for(int i = 1; i <= 10; i++) {
               System.out.println(2 * i);
                                        } } }
```

```
The First 10 Even Natural Numbers are
2
4
6
8
10
12
14
16
18
20
```

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

```
public class Factorial {
   public static void main(String[] args) {
      int num = 7;
      long factorial = 1;
      for(int i = 1; i <= num; ++i)
      {
         // factorial = factorial * i;
         factorial *= i;
```

```
        }
        System.out.printf("Factorial of %d = %d", num, factorial);
    }
}
```

```
Factorial of 5 = 120
```

d. Write a program to generate tables of 10.

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

```
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
```

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

```
import java.io.*;
class AddNumber {

    // Function to get sum of digits
    static int getSum(int n)
    {
            int sum;

            // Single line that calculates sum
            for (sum = 0; n > 0; sum += n % 10, n /= 10) ;
            return sum;
    }
    // Driver code
    public static void main(String[] args)
    {
```

```
        int n = 687;

        // Function call
        System.out.println(getSum(n));
    } }
```

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

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

  int num = 123456789, reversed = 0;

  for(;num != 0; num /= 10) {
    int digit = num % 10;
    reversed = reversed * 10 + digit;
  }
  System.out.println("Reversed Number: " + reversed);
} }
```

g. Write a program to generate 10 Fibonacci numbers.

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

  int n = 12, firstTerm = 0, secondTerm = 1;
  System.out.println("Fibonacci Series till " + n + " terms:");

  for (int i = 1; i <= n; ++i) {
    System.out.print(firstTerm + ", ");

    // compute the next term
    int nextTerm = firstTerm + secondTerm;
    firstTerm = secondTerm;
    secondTerm = nextTerm;
  } } }
```

while..loop

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

```
public class First10EvenNaturalNum2 {
   public static void main(String[] args) {
        System.out.println("The First 10 Even Natural Numbers are");
        int i = 1;
        while( i <= 10)
        {
            System.out.println(2 * i);
            i++;
        } } }
```

```
public class First10OddNaturalNum2 {
public static void main(String[] args) {
        System.out.println("The First 10 Odd Natural Numbers are");
        int i = 1;
        while( i <= 10)
        {
                System.out.println(2 * i - 1);
                i++;
} } }
```

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

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

      //declaring and intializing variables
      int num = 5;
      int i = 1;
      int output = 1;

      //counting the factorial using while loop
      while( i <= num ){
         output = output * i;
         //printing the result
      System.out.println("\nFactorial of " + num + " is: " + output);
         i++; //increment i by 1
      }
       System.out.println("\n Output : " + output);
   } }
```

c. Write a program to generate tables of 10.

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

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

```
 import java.util.Scanner;
public class SumOfDigitsExample
{
public static void main(String args[])
{
int number, digit, sum = 0;
Scanner sc = new Scanner(System.in);
```

```
System.out.print("Enter the number: ");
number = sc.nextInt();
while(number > 0)
{
//finds the last digit of the given number
digit = number % 10;
//adds last digit to the variable sum
sum = sum + digit;
//removes the last digit from the number
number = number / 10;
}
System.out.println("Sum of Digits: "+sum);
} }
```

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

```
public class ReverseNumberExample1
    {
      public static void main(String[] args)
          {
            int number = 123456789, reverse = 0;
            while(number != 0)
                {
                  int remainder = number % 10;
                  reverse = reverse * 10 + remainder;
                   number = number/10;
                }
       System.out.println("The reverse of the given number is: " + reverse);
        } }
```

f. Write a program to generate 10 Fibonacci numbers.

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

 int i = 1, n = 12, firstTerm = 0, secondTerm = 1;
 System.out.println("Fibonacci Series till " + n + " terms:");

 while (i <= n) {
  System.out.print(firstTerm + ", ");

  int nextTerm = firstTerm + secondTerm;
  firstTerm = secondTerm;
  secondTerm = nextTerm;
    i++;
} } }
```

do..while loop

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

```
public class First10OddNaturalNum {
    public static void main(String[] args) {
            int i = 1;
            System.out.println("The First 10 Odd Natural Numbers are");
            do {
            System.out.println(2 * i - 1);
            }
                while(++i <= 10);
    }
}


public class First10EvenNaturalNum {
    public static void main(String[] args) {
            int i = 1;
            System.out.println("The First 10 Even Natural Numbers are");
            do  {
                    System.out.println(2 * i );
                }
                    while(++i <= 10);
    }
}
```

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

```
//importing Scanner class
import java.util.Scanner;

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

      //declaring and intializing variables
      int fact = 1;
      int i = 1;

      //creating object of Scanner class
      Scanner sc = new Scanner(System.in);

      //accepting a number from the user
      System.out.println("Enter a number whose factorial is to be found: ");
      int num = sc.nextInt();

      //counting the factorial using do-while loop
      do {
         fact = fact * i;
```

```
            i++;
        } while( i <= num );

        //printing the result
        System.out.println("\nFactorial of " + num + " is: " + fact);
    }
}
```

c. Write a program to generate tables of 10.

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

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

```
 import java.util.Scanner;
public class SumOfDigitsExample
{
public static void main(String args[])
{
int number, digit, sum = 0;
Scanner sc = new Scanner(System.in);
System.out.print("Enter the number: ");
number = sc.nextInt();
do{
digit = number % 10;
sum = sum + digit;
number = number / 10;
}
while(number > 0)  ;
System.out.println("Sum of Digits: "+sum);
}  }
```

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

```
public class ReverseNumberExample1
      {
public static void main(String[] args)
 {
    int number = 123456789, reverse = 0;
    do
    {
       int remainder = number % 10;
      reverse = reverse * 10 + remainder;
      number = number/10;
    }
while(number != 0)   ;
System.out.println("The reverse of the given number is: " + reverse);
              }  }
```

f. Write a program to generate 10 Fibonacci numbers.

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

   int i = 1, n = 12, firstTerm = 0, secondTerm = 1;
   System.out.println("Fibonacci Series till " + n + " terms:");
do
{
   System.out.print(firstTerm + ", ");

    int nextTerm = firstTerm + secondTerm;
    firstTerm = secondTerm;
    secondTerm = nextTerm;
      i++;
}
   while (i <= n); {

   }  }  }
```