

AIM: To perform programs on Basic programming constructs like branching and looping

THEORY:

- If - else

→ Syntax :

```
if (condition) {
```

// Body inside if

}

```
else {
```

// Body inside else

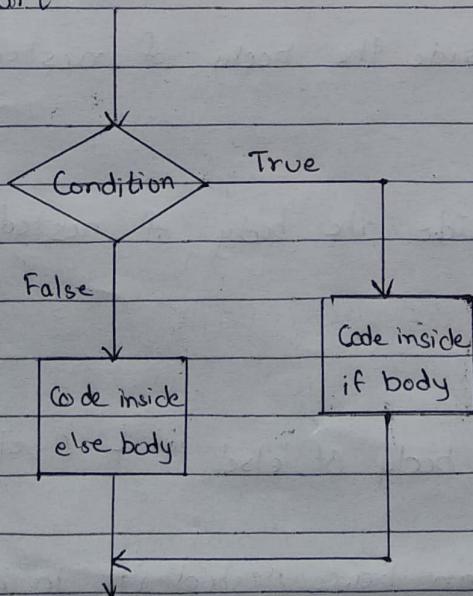
}

If

If condition returning true then the statements inside the body of 'if' are executed and the statements inside body of 'else' are skipped.

If condition returns false statements inside body of only 'else' are executed. For single statement body no braces required.

→ Flowchart :



→ Example:

```
class check()
{
    public static void main(String args[])
    {
        int a = 5;
        if (a > 5)
            System.out.println("No Greater");
        else
            System.out.println("Not Greater");
    }
}
```

Output:

Not Greater

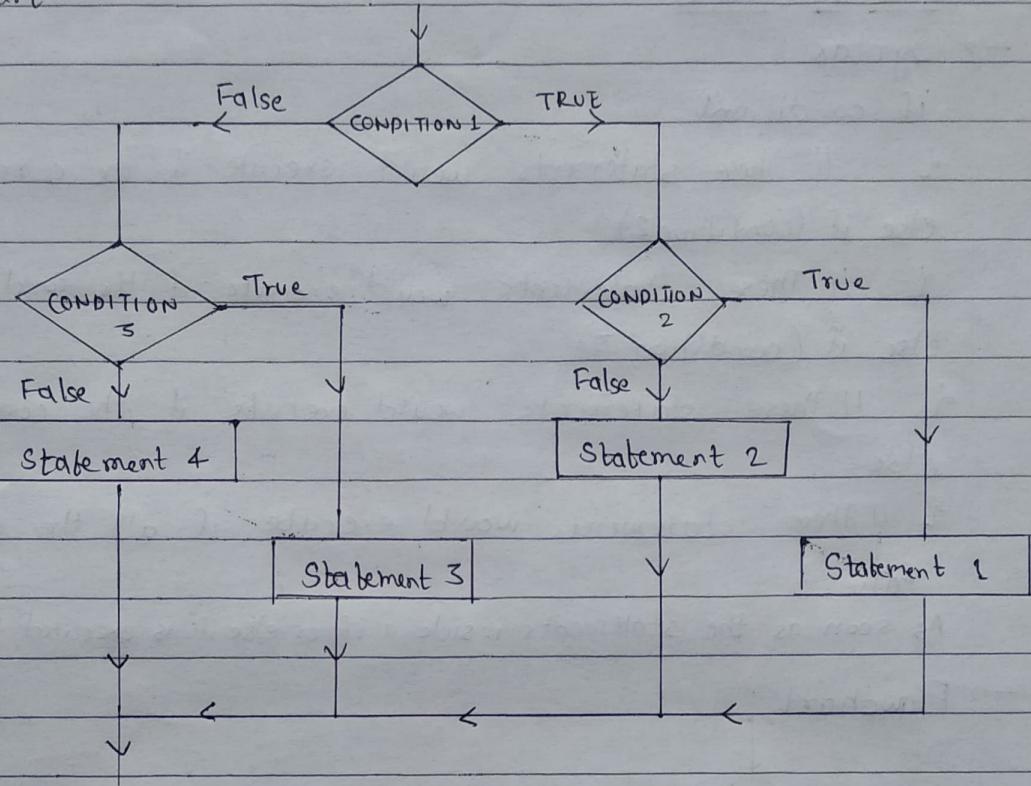
- Nested if...else

→ Syntax:

```
if (condition)
{
    // Nested if else inside body of 'if'
    if (condition 2)
        // Statements inside the body of nested 'if'
    }
    else
        // Statements inside the body of nested 'else'
    }
}
else
{
    // Statements inside body of 'else' if { } else { }
```

Even the else statement can have nested if in its body.

→ Flowchart :



→ Example

Class A

```

public static void main (String args[])
{
    int a=5, b=7;
    if (a!=b)
        if (a < b)
            System.out.println (a + " is less than " + b);
        else
            System.out.println (a + " is greater than " + b);
    }
}
  
```

Output : 5, is less, than 7.

• else if ladder

→ Syntax :

if (condition)

{ // These statements would execute if the condition 1 is true }
else if (condition 2)

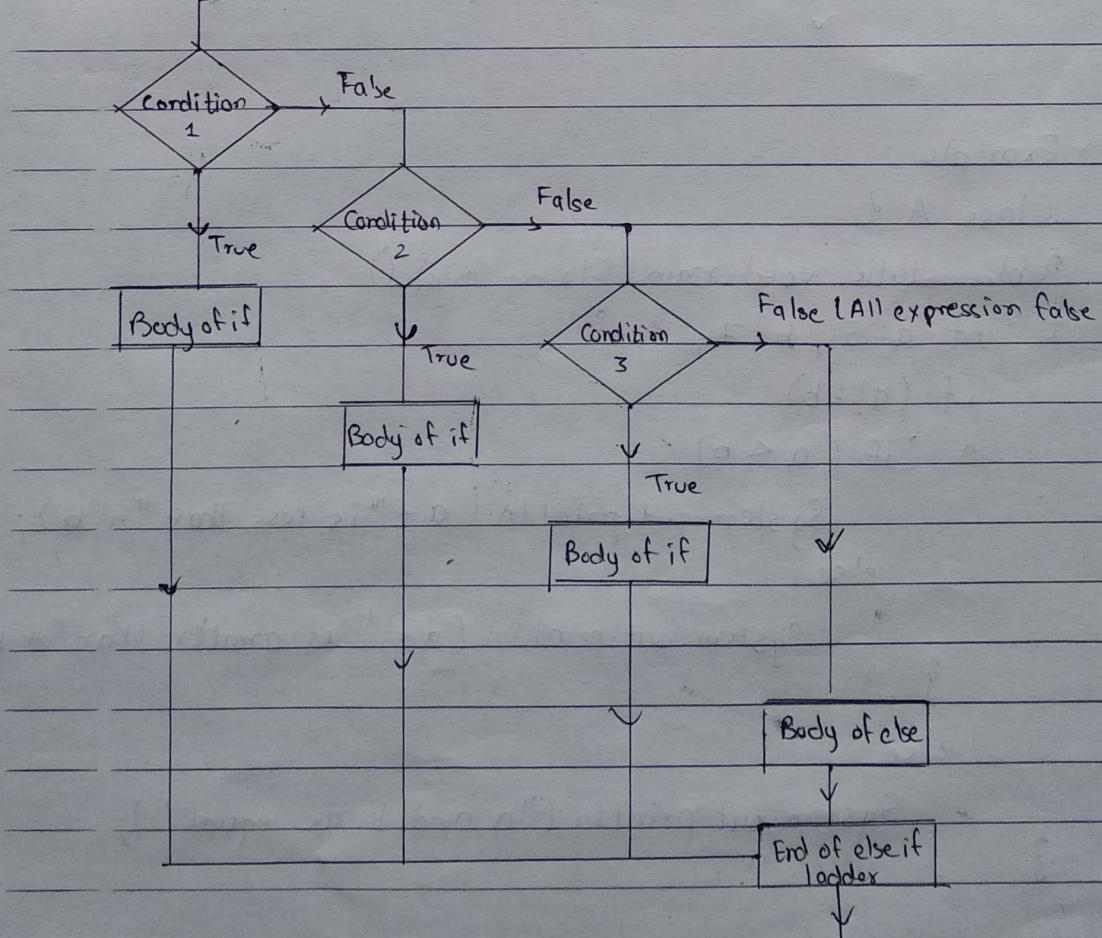
{ // These statements would execute if the condition 2 is true }
else if (condition 3)

{ // These statements would execute if the condition 3 is true }
else

{ // These statements would execute if all the conditions return
false }

As soon as the statements inside a if or else if is executed, following are not executed.

→ Flowchart :



→ Example :

```

class A {
    public static void main (String args[])
    {
        int a = 2, b = 3, c = 5
        if (a > b && b > c)
            System.out.println ("a is greatest");
        else if (a < b && b > c)
            System.out.println ("b is greatest");
        else if (a < b && b < c)
            System.out.println ("c is greatest");
        else
            System.out.println ("Equal");
    }
}

```

Output:

c is greatest.

- Important points :

1. else and else..if are optional, a program having only 'if' statement would run fine.
2. else and else...if cannot be used without 'if'.
3. There can be any number of else...if statement in a else if ladder
4. Logical and relational operators can be used
5. If none conditions are met then else block is executed.

- Switch - case

→ Syntax

switch (variable or an integer expression)

{ case constant :

 // Statements ;

 case constant1 :

 // Statements ;

 default :

 // Statements ;

}

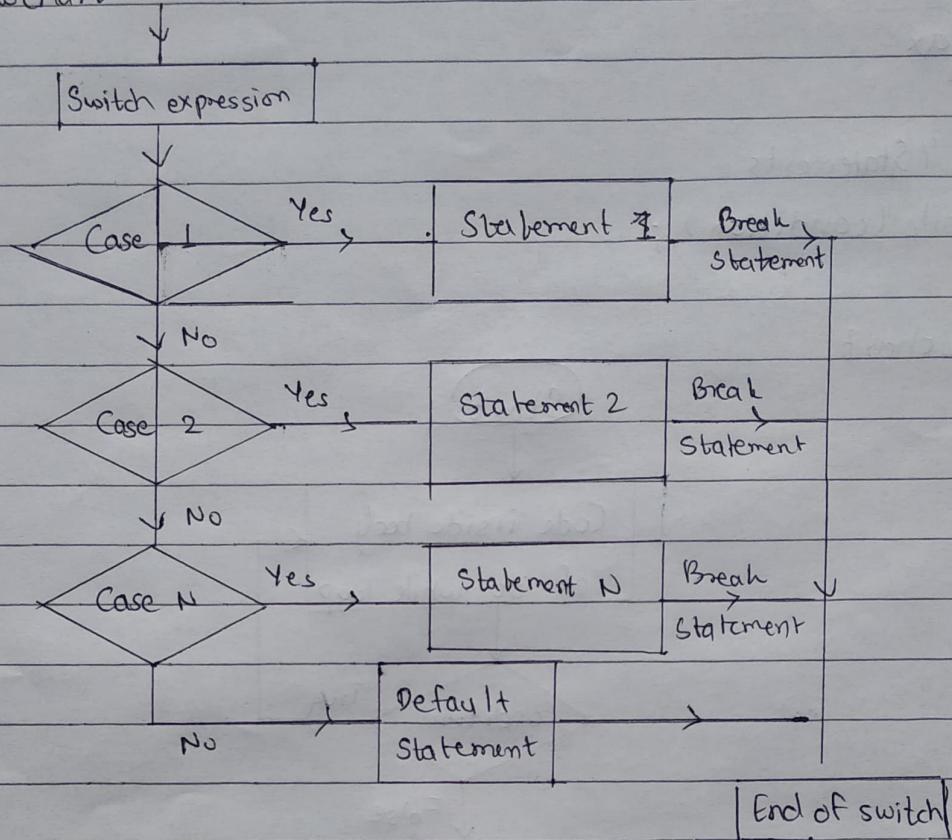
The `case` statement is executed when the variable or integer expression passed in switch statement matches the case's constant. If no constants are matched then default statement gets executed.

Break statements are used when you want your program flow to come out of the switch body.

In case, the break statement is missing all the 'cases' following the 'case' whose constant has matched are executed.

This is known as fall through.

→ Flowchart:



→ Example

Class class A

```

public static void main(String args[])
{
    int a = 5, b = 7, c = 1;
    switch(c)
    {
        case 1: System.out.println("a+b:" + a+b); break;
        case 2: System.out.println("a-b:" + a-b); break;
        default: System.out.println("Wrong choice");
    }
}
  
```

Output

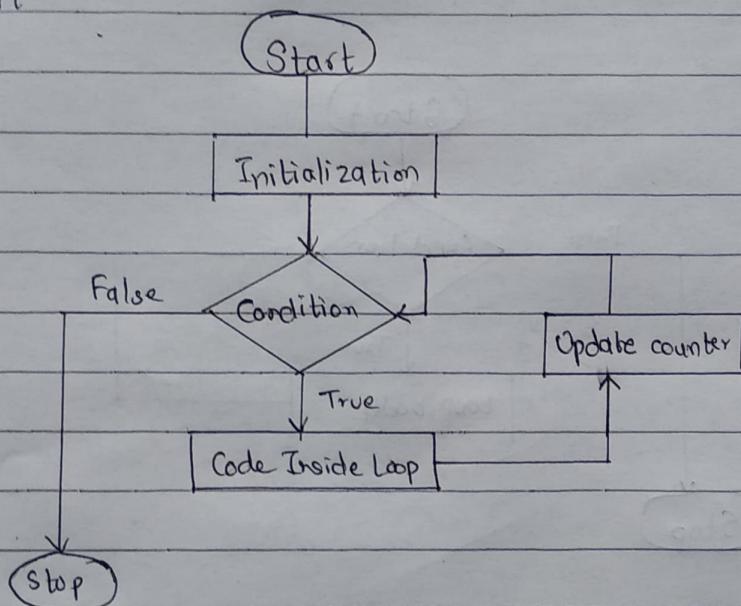
a+b: 12

- For loop

→ Syntax

```
for (initialization; condition test; increment or decrement)
{
    // Statements to be executed repeatedly
}
```

→ Flowchart



→ Example

```
class Ad
public static void main (String args[])
{
    int i;
    for (i=0; i<=5; i++)
        System.out.print (i + " ");
}
```

Output:

0 1 2 3 4 5

- While loop

→ Syntax:

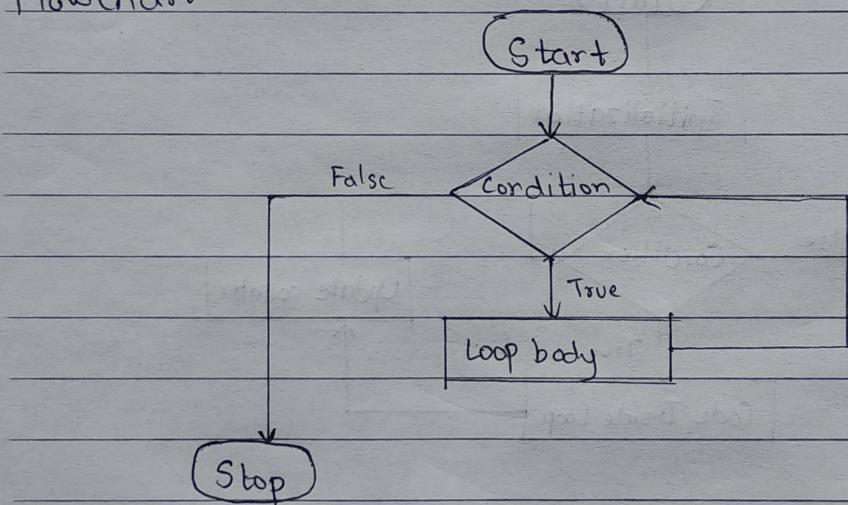
while (condition)

↳ 1) Statements to be executed repeatedly

2) Increment (`++`) or Decrement (`--`) operator

}

→ Flowchart



→ Example

Class A {

 public static void main (String args[])

 { int count = 1;

 while (count <= 4)

 { System.out.print (count + " "); count ++;

 }

}

}

Output :

1 2 3 4

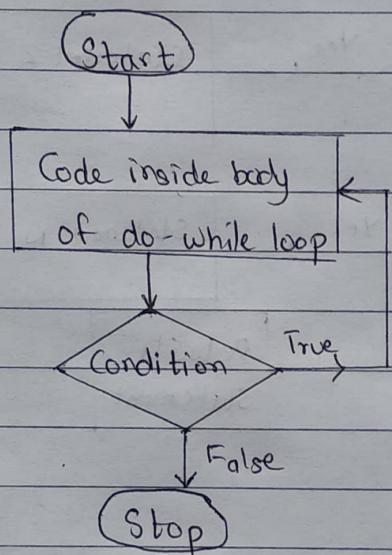
- Do-while loop

→ Syntax:

```
do  
{ // Statements
```

```
} while (condition);
```

→ Flowchart



→ Example

class A

```
{ public static void main (String args[])  
{ int j = 1  
do  
{ System.out.println (" Run once"); j++;  
} while (j <= 0);  
}}
```

Output:

Run once

• Entry Controlled and Exit Controlled Loops

Entry Controlled Loop	Exit Controlled Loop
1) Test condition is checked first, and then loop body will be executed.	1) Loop body will be executed first and then condition is checked
2) If Test condition is false, loop body will not be executed.	2) If Test condition is false, loop body will be executed once.
3) These loops are used when checking of test condition is mandatory before executing body of loop.	3) Exit controlled loop is used when checking of test condition is mandatory after executing body of loop.
4) Eg - for and while loop	4) Eg - do-while loop.

CONCLUSION :

Errors Encountered :

- 1) Wrong syntax of for loop
`for (int i=0, i<10, i++)`
`{ Body }`

Solution Using ';' instead of ',' solves the error

```
for (int i=0; i<10; i++)
{ Body }
```

2) Writing else without if

if ($a < 0$)

{

System.out.println("Negative");

}

else if ($a > 0$)

{ System.out.println ("Positive");

else

{ System.out.println ("Zero"); }

}

Solution Putting braces at right place at end of else if

if ($a < 0$)

{ System.out.println("Negative"); }

else if ($a > 0$)

{ System.out.println ("Positive"); }

else

{ System.out.println ("Zero"); }

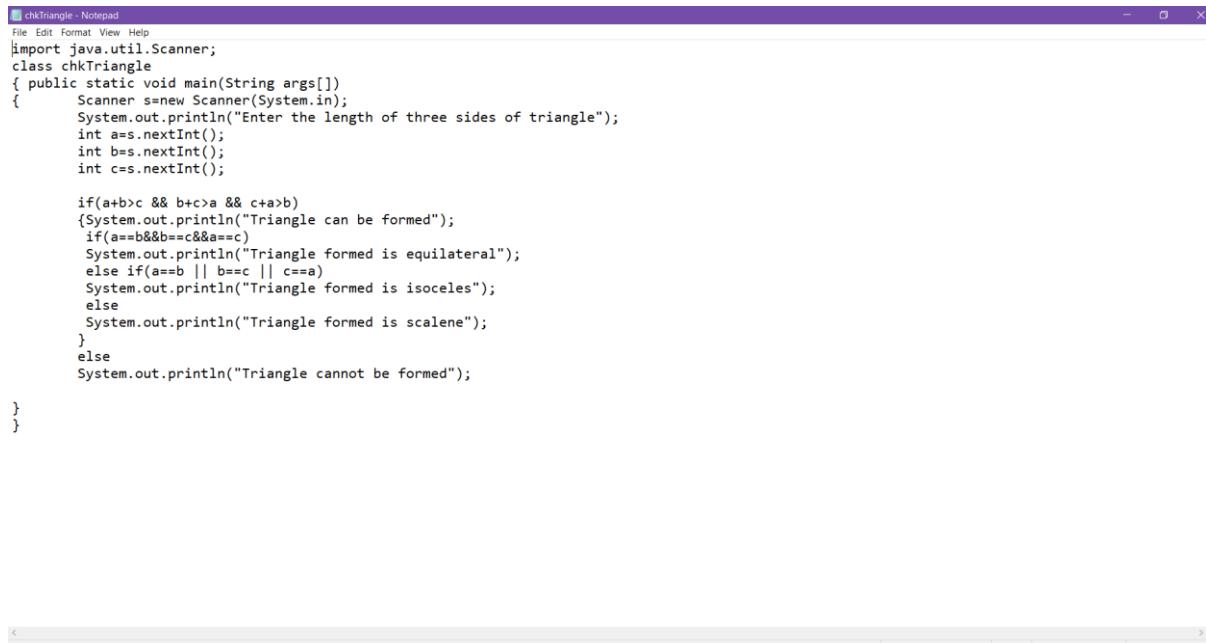
LAB 2: PROGRAMS ON BASIC PROGRAMMING CONSTRUCTS LIKE BRANCHING AND LOOPING

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Decision Making

Q 1. Write a Program to check if the Triangle can be drawn or not if yes give the type of triangle.

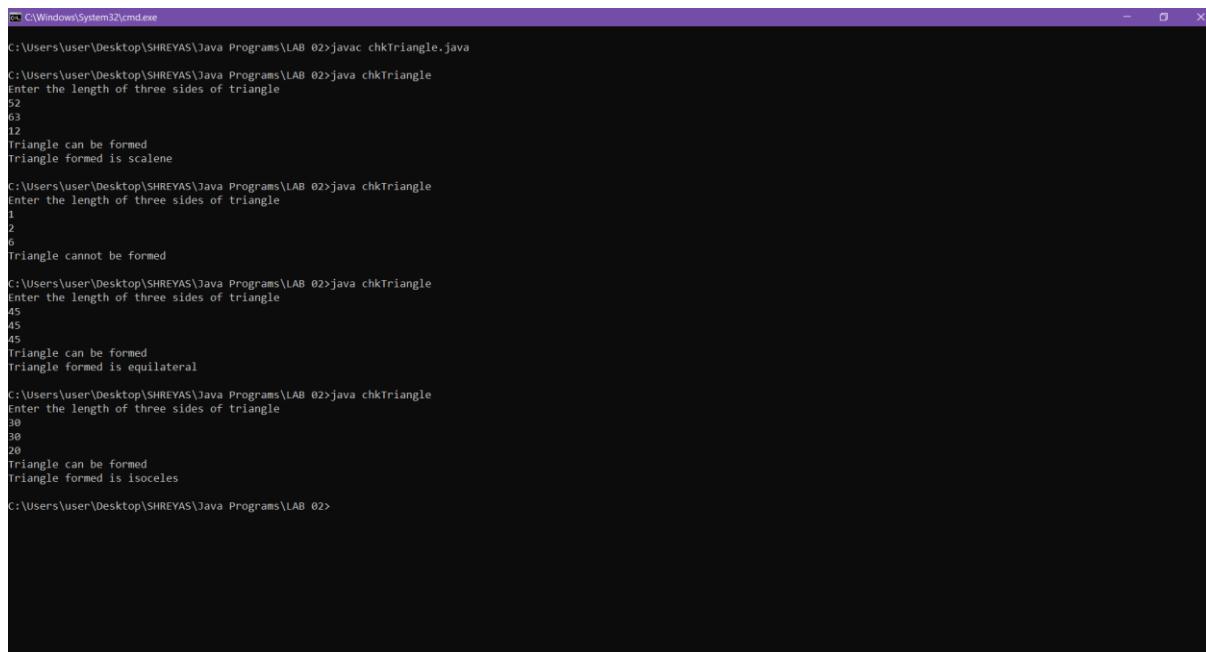
CODE:



```
chkTriangle - Notepad
File Edit Format View Help
import java.util.Scanner;
class chkTriangle
{ public static void main(String args[])
{
    Scanner s=new Scanner(System.in);
    System.out.println("Enter the length of three sides of triangle");
    int a=s.nextInt();
    int b=s.nextInt();
    int c=s.nextInt();

    if(a+b>c && b+c>a && c+a>b)
    {
        System.out.println("Triangle can be formed");
        if(a==b&&b==c&&a==c)
        System.out.println("Triangle formed is equilateral");
        else if(a==b || b==c || c==a)
        System.out.println("Triangle formed is isosceles");
        else
        System.out.println("Triangle formed is scalene");
    }
    else
        System.out.println("Triangle cannot be formed");
}
}
```

OUTPUT



```
C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac chkTriangle.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java chkTriangle
Enter the length of three sides of triangle
52
63
12
Triangle can be formed
Triangle formed is scalene

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java chkTriangle
Enter the length of three sides of triangle
1
2
6
Triangle cannot be formed

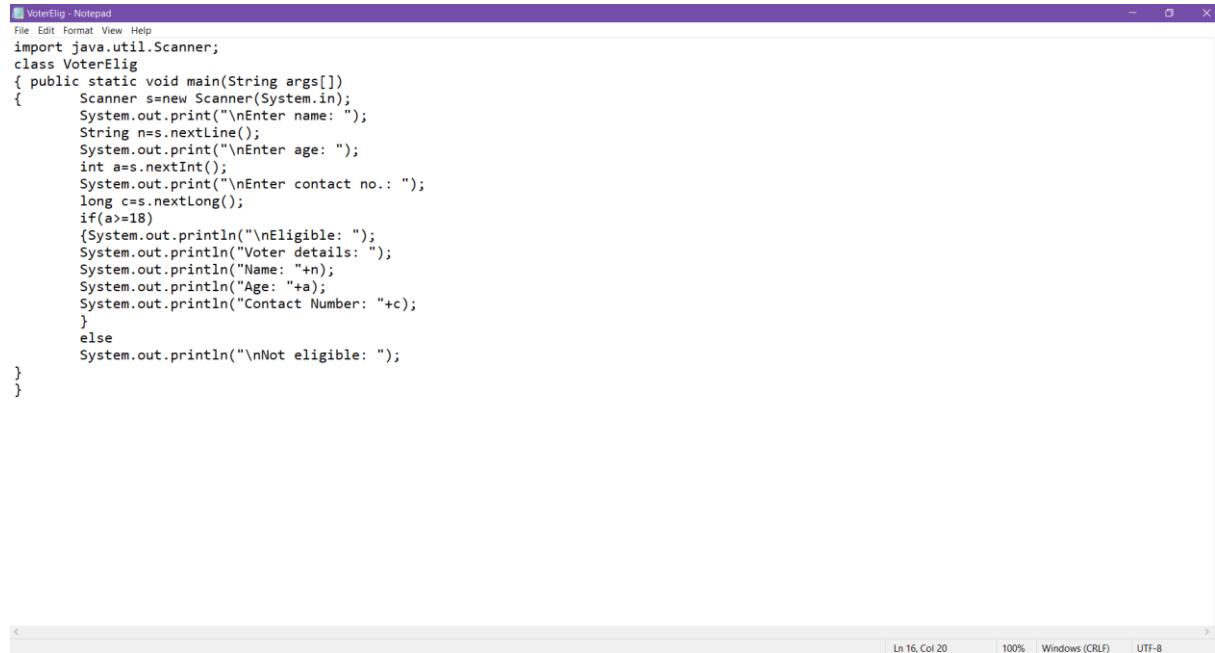
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java chkTriangle
Enter the length of three sides of triangle
45
45
45
Triangle can be formed
Triangle formed is equilateral

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java chkTriangle
Enter the length of three sides of triangle
30
30
20
Triangle can be formed
Triangle formed is isosceles

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>
```

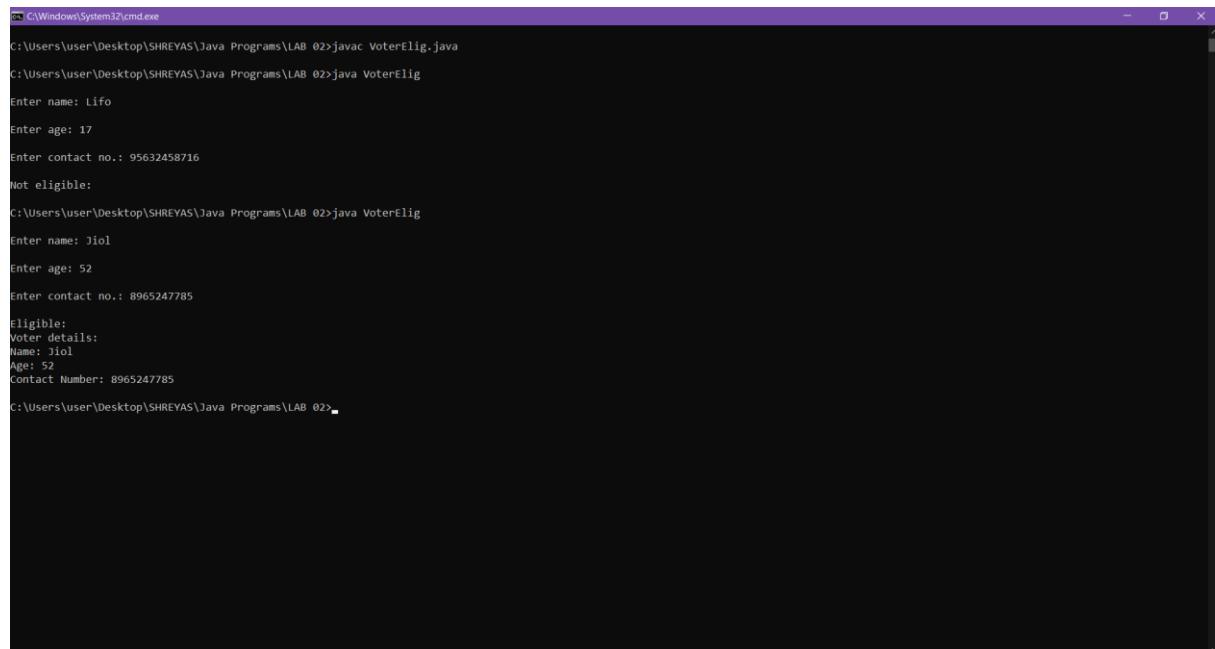
Q 2. Write a Program to check if the Voter is eligible for voting or not if yes print the details like name, age, contact no. etc.

CODE:



```
VoterElig - Notepad
File Edit Format View Help
import java.util.Scanner;
class VoterElig
{ public static void main(String args[])
{ Scanner s=new Scanner(System.in);
  System.out.print("\nEnter name: ");
  String n=s.nextLine();
  System.out.print("\nEnter age: ");
  int a=s.nextInt();
  System.out.print("\nEnter contact no.: ");
  long c=s.nextLong();
  if(a>=18)
  {System.out.println("\nEligible: ");
  System.out.println("Voter details: ");
  System.out.println("Name: "+n);
  System.out.println("Age: "+a);
  System.out.println("Contact Number: "+c);
  }
  else
  System.out.println("\nNot eligible: ");
}
}
```

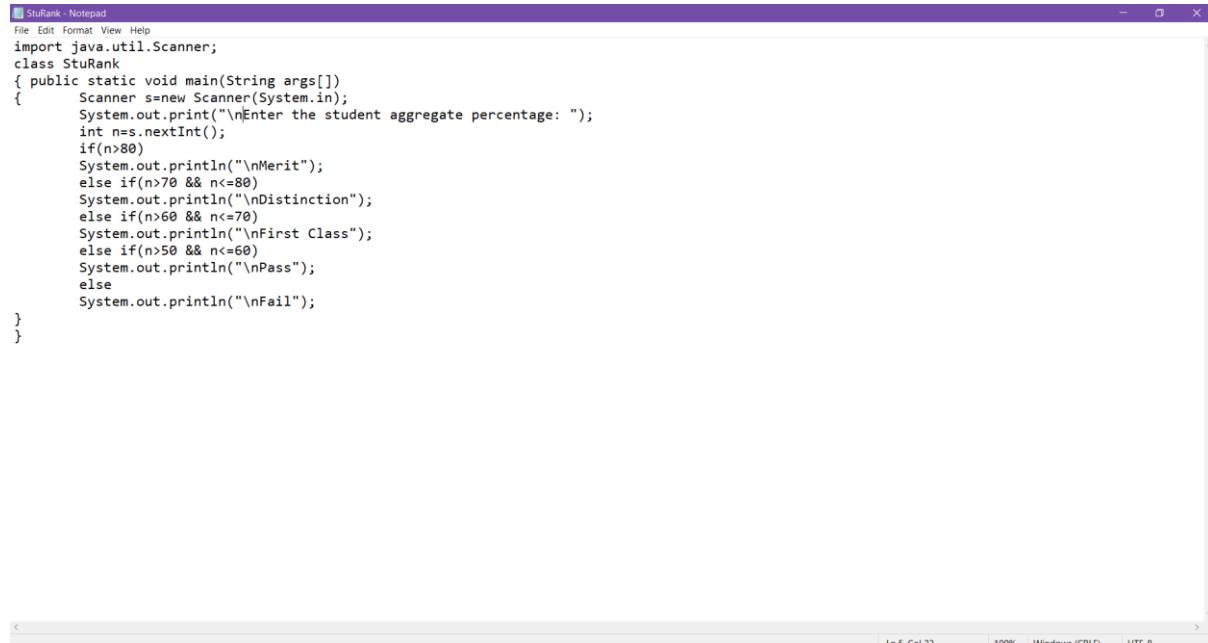
OUTPUT:



```
C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac VoterElig.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java VoterElig
Enter name: Lilo
Enter age: 17
Enter contact no.: 95632458716
Not eligible:
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java VoterElig
Enter name: Jiol
Enter age: 52
Enter contact no.: 8965247785
Eligible:
Voter details:
Name: jiol
Age: 52
Contact Number: 8965247785
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>
```

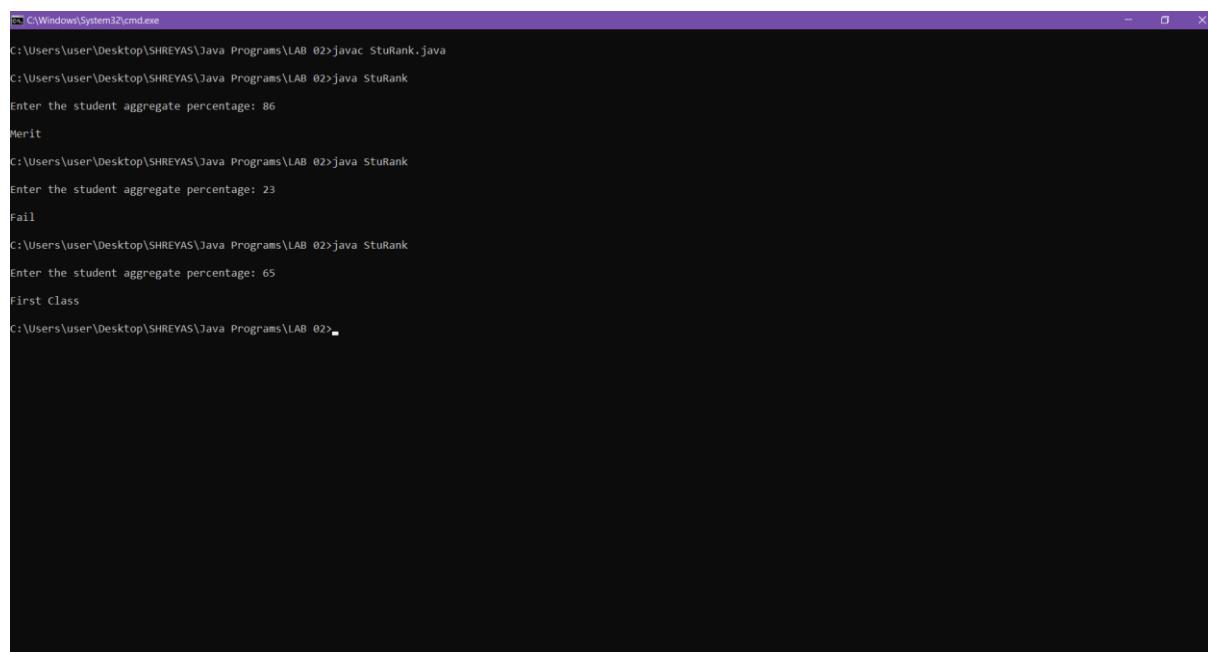
Q3. Write a Program to print the grade of students given aggregate percentage of marks:
above 80 print Merit, between 70-80 print distinction, between 60-70 print first class and so
on...use else-if ladder.

CODE:



```
StuRank - Notepad
File Edit Format View Help
import java.util.Scanner;
class StuRank
{ public static void main(String args[])
{ Scanner s=new Scanner(System.in);
    System.out.print("\nEnter the student aggregate percentage: ");
    int n=s.nextInt();
    if(n>80)
        System.out.println("\nMerit");
    else if(n>70 && n<=80)
        System.out.println("\nDistinction");
    else if(n>60 && n<=70)
        System.out.println("\nFirst Class");
    else if(n>50 && n<=60)
        System.out.println("\nPass");
    else
        System.out.println("\nFail");
}
}
```

OUTPUT:



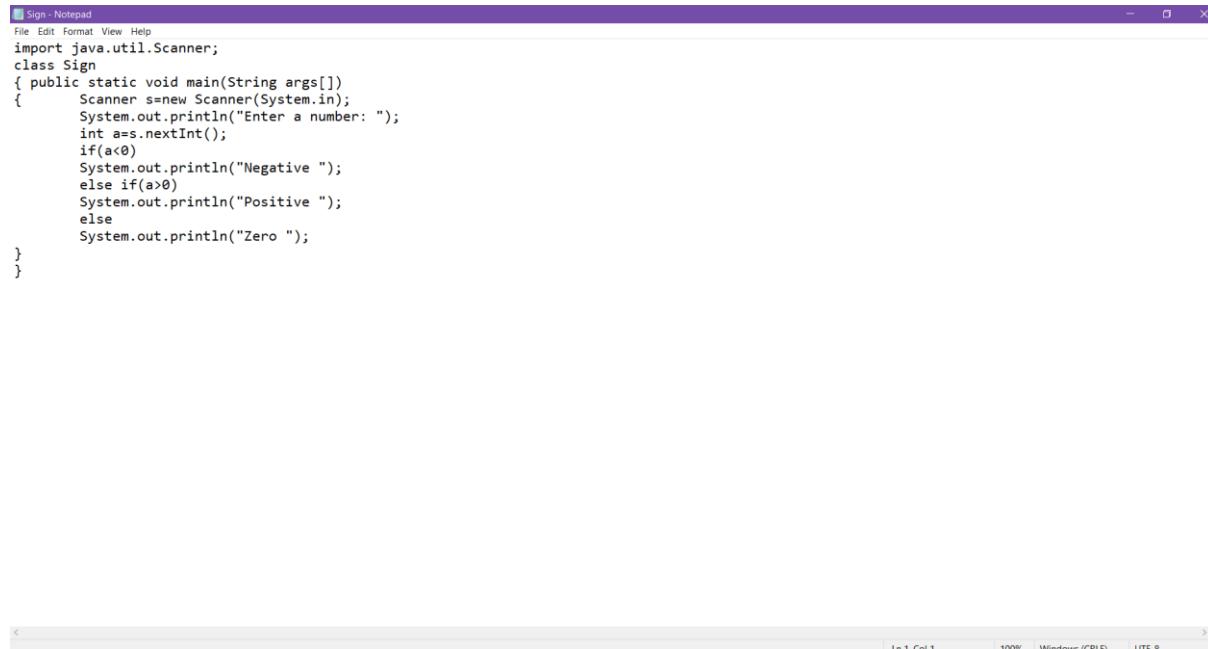
```
C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac StuRank.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java StuRank
Enter the student aggregate percentage: 86
Merit

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java StuRank
Enter the student aggregate percentage: 23
Fail

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java StuRank
Enter the student aggregate percentage: 65
First Class
```

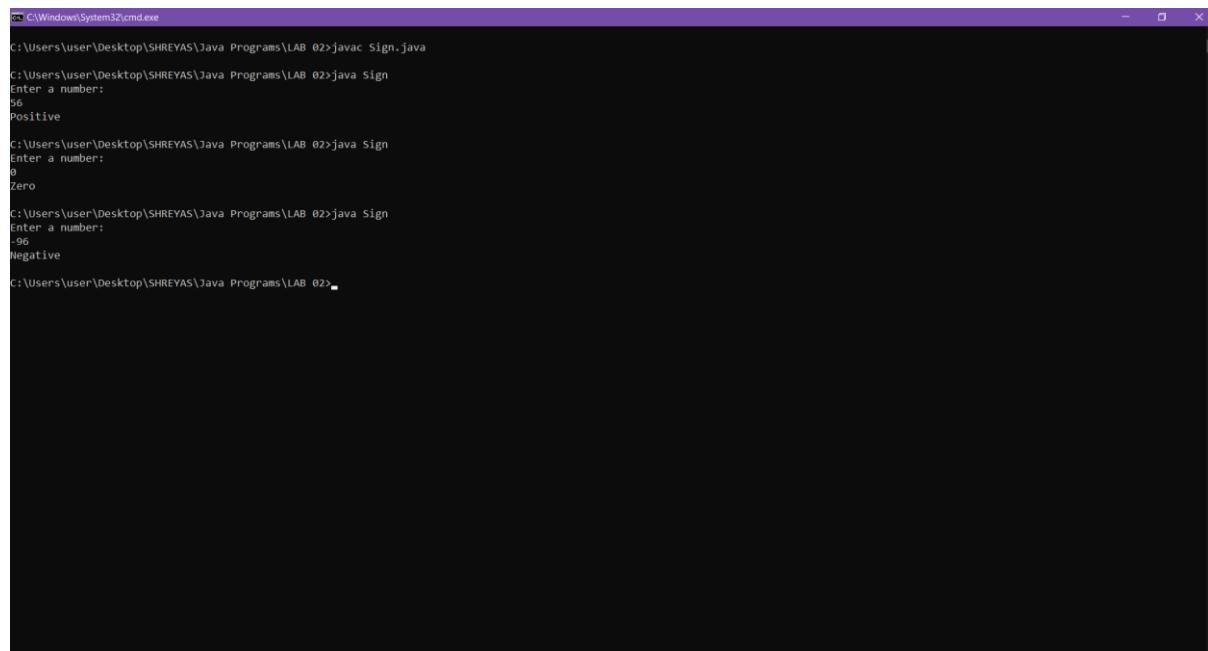
Q.4 Write a Program to check if the given number is positive, negative or zero.

CODE:



```
Sign .Notepad
File Edit Format View Help
import java.util.Scanner;
class Sign
{
    public static void main(String args[])
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter a number: ");
        int a=s.nextInt();
        if(a<0)
            System.out.println("Negative ");
        else if(a>0)
            System.out.println("Positive ");
        else
            System.out.println("Zero ");
    }
}
```

OUTPUT:



```
c:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac Sign.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java Sign
Enter a number:
56
Positive

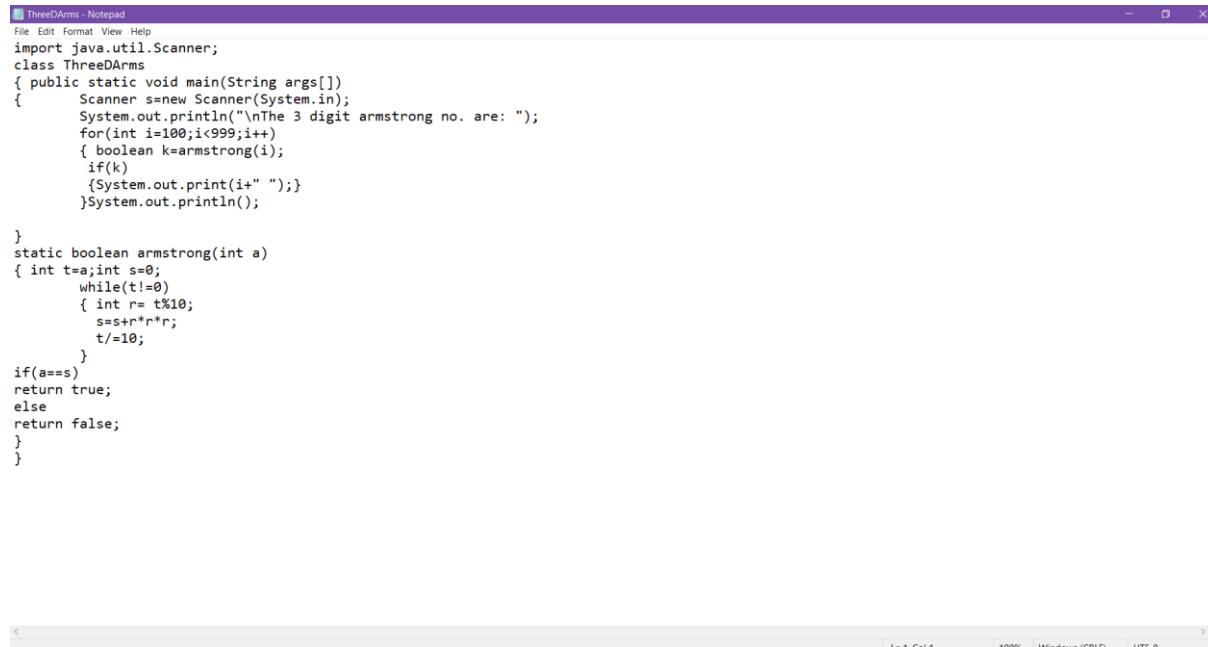
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java Sign
Enter a number:
0
Zero

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java Sign
Enter a number:
-96
Negative
```

Looping

Q.1 Write a Program print all 3 digits Armstrong nos.

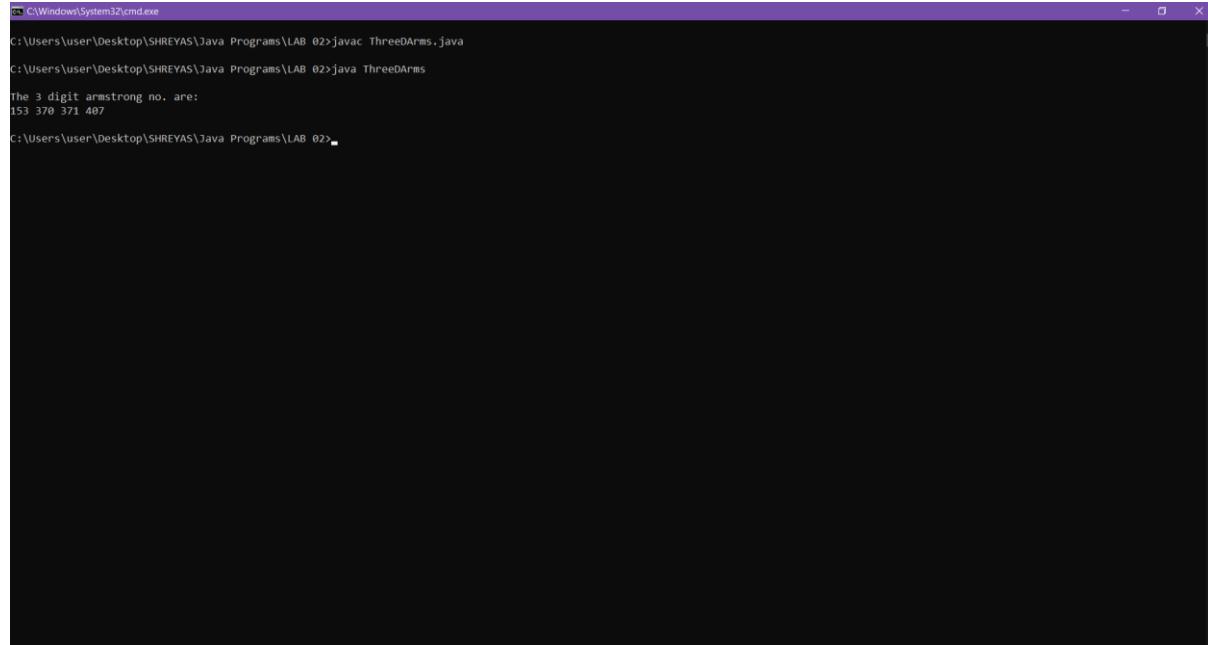
CODE:



```
ThreeDarms - Notepad
File Edit Format View Help
import java.util.Scanner;
class ThreeDarms
{ public static void main(String args[])
{ Scanner s=new Scanner(System.in);
System.out.println("\nThe 3 digit armstrong no. are: ");
for(int i=100;i<999;i++)
{ boolean k=armstrong(i);
if(k)
{System.out.print(i+" ");}
}System.out.println();
}

static boolean armstrong(int a)
{ int t=a;int s=0;
while(t!=0)
{ int r= t%10;
s=s+r*r*r;
t/=10;
}
if(a==s)
return true;
else
return false;
}
}
```

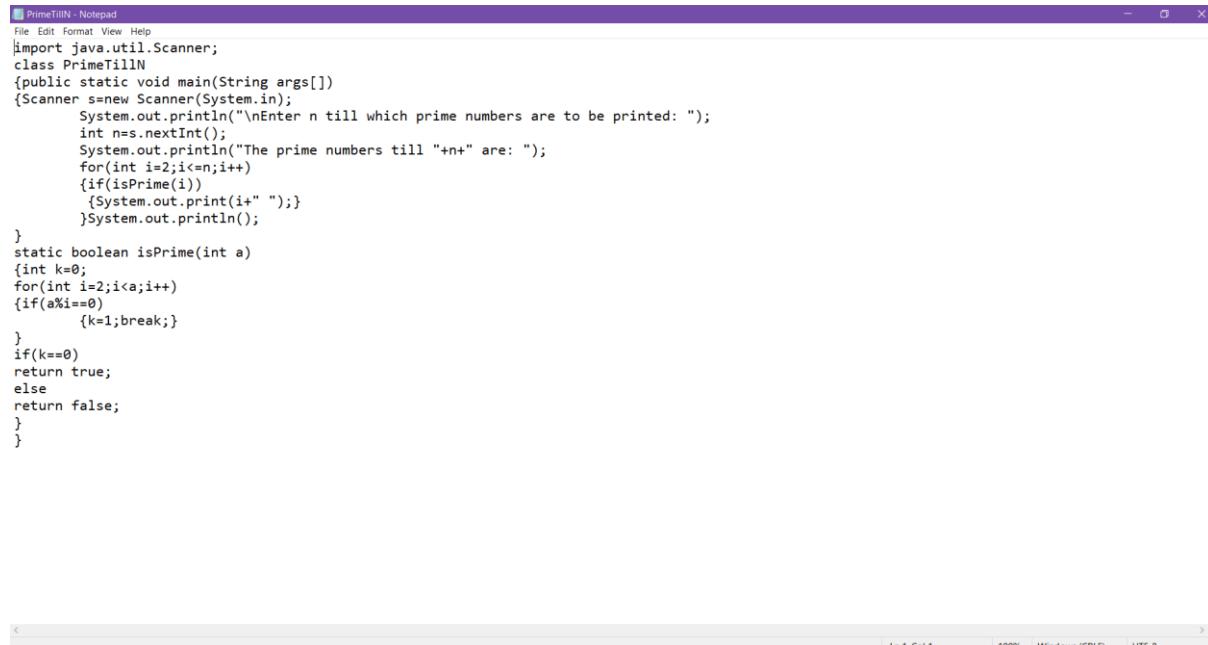
OUTPUT:



```
C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac ThreeDarms.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java ThreeDarms
The 3 digit armstrong no. are:
153 370 371 407
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>
```

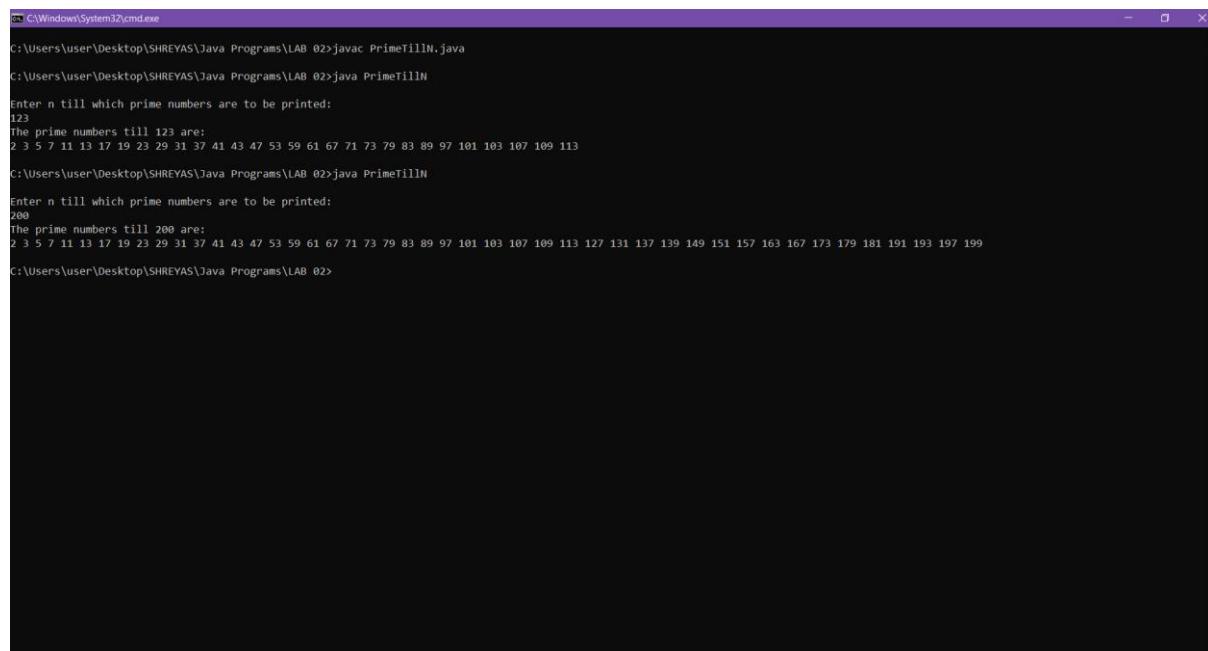
Q.2 Write a Program print first n prime numbers.

CODE:



```
PrimeTillN - Notepad
File Edit Format View Help
import java.util.Scanner;
class PrimeTillN
{public static void main(String args[])
{Scanner s=new Scanner(System.in);
System.out.println("\nEnter n till which prime numbers are to be printed: ");
int n=s.nextInt();
System.out.println("The prime numbers till "+n+" are: ");
for(int i=2;i<n;i++)
{if(isPrime(i))
{System.out.print(i+" ");}
}System.out.println();
}
static boolean isPrime(int a)
{int k=0;
for(int i=2;i<a;i++)
{if(a%i==0)
{k=1;break;}
}
if(k==0)
{return true;
}
else
{return false;
}
}
```

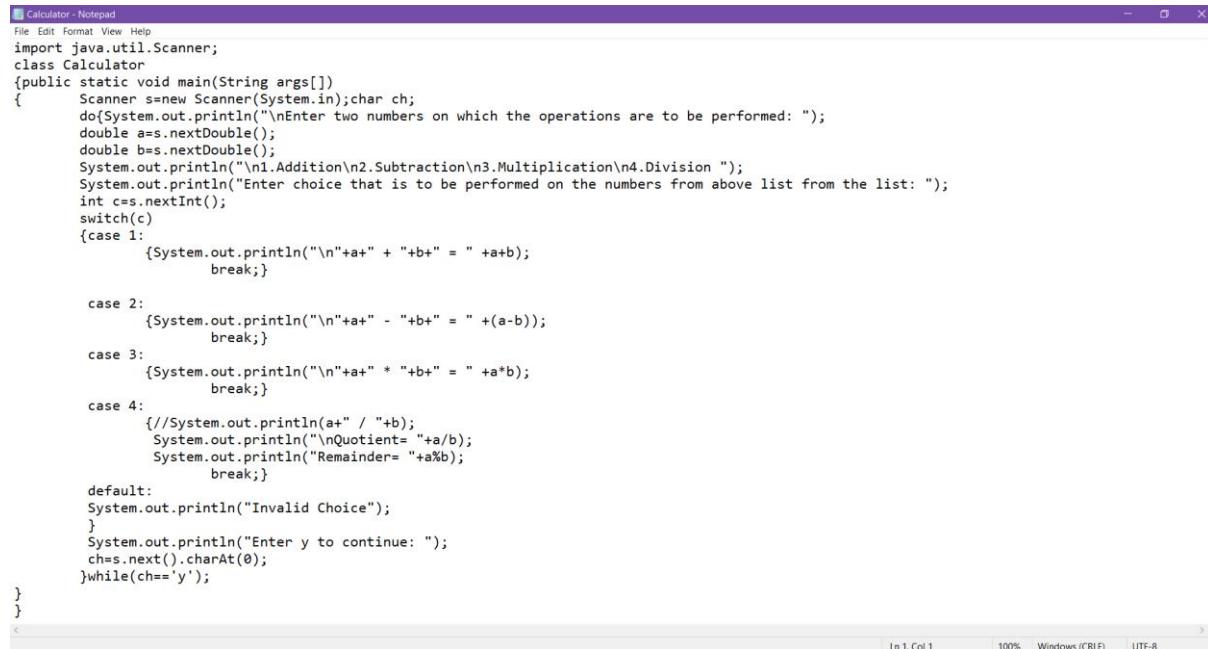
OUTPUT:



```
C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac PrimeTillN.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java PrimeTillN
Enter n till which prime numbers are to be printed:
123
The prime numbers till 123 are:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103 107 109 113
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java PrimeTillN
Enter n till which prime numbers are to be printed:
200
The prime numbers till 200 are:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197 199
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>
```

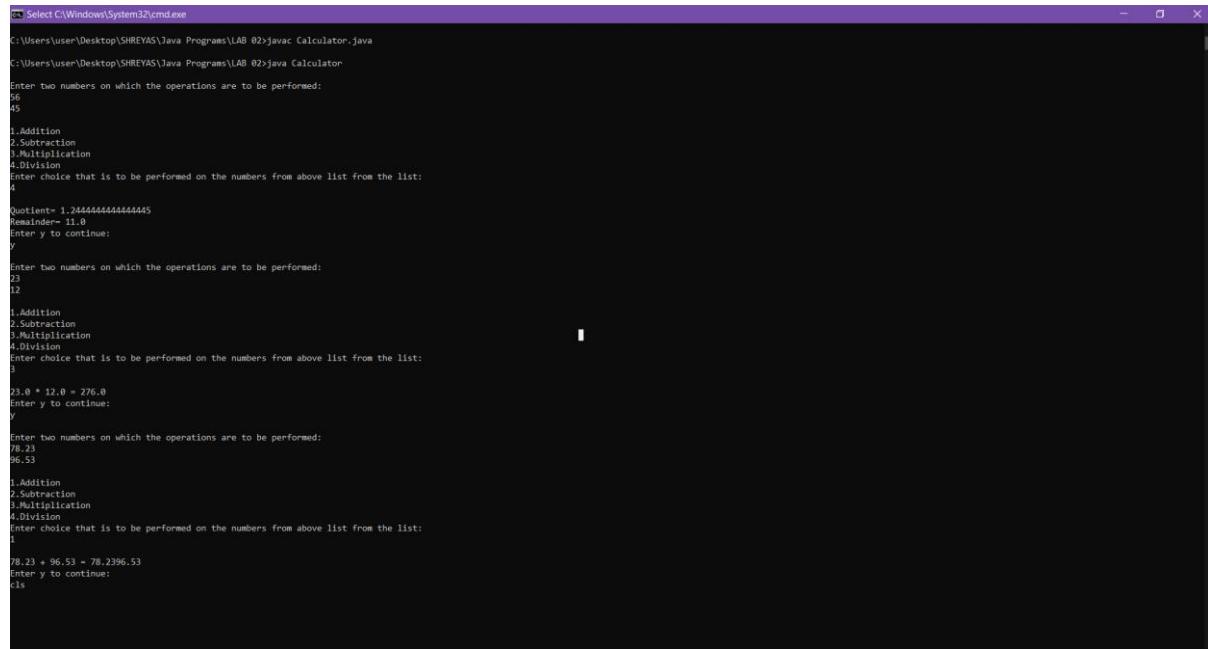
Q.3 Write a Program to simulate a simple calculator using switch case and do-while loop.

CODE:



```
Calculator - Notepad
File Edit Format View Help
import java.util.Scanner;
class Calculator
{public static void main(String args[])
{
    Scanner s=new Scanner(System.in);char ch;
    do{System.out.println("\nEnter two numbers on which the operations are to be performed: ");
    double a=s.nextDouble();
    double b=s.nextDouble();
    System.out.println("\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division ");
    System.out.println("Enter choice that is to be performed on the numbers from above list from the list: ");
    int c=s.nextInt();
    switch(c)
    {case 1:
        {System.out.println("\n"+a+" + "+b+" = " +a+b);
        break;}
    case 2:
        {System.out.println("\n"+a+" - "+b+" = " +(a-b));
        break;}
    case 3:
        {System.out.println("\n"+a+" * "+b+" = " +a*b);
        break;}
    case 4:
        {System.out.println(a+" / "+b);
        System.out.println("\nQuotient= "+a/b);
        System.out.println("Remainder= "+a%b);
        break;}
    default:
        System.out.println("Invalid Choice");
    }
    System.out.println("Enter y to continue: ");
    ch=s.next().charAt(0);
}while(ch=='y');
}
}
```

OUTPUT:



```
cmd Select C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>javac Calculator.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 02>java Calculator
Enter two numbers on which the operations are to be performed:
56
45
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter choice that is to be performed on the numbers from above list from the list:
4
Quotient= 1.2444444444444445
Remainder= 11.0
Enter y to continue:
y
Enter two numbers on which the operations are to be performed:
23
12
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter choice that is to be performed on the numbers from above list from the list:
3
23.0 * 12.0 = 276.0
Enter y to continue:
y
Enter two numbers on which the operations are to be performed:
78.23
96.53
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter choice that is to be performed on the numbers from above list from the list:
1
78.23 + 96.53 = 78.2396.53
Enter y to continue:
cls
```