JNAN VIKAS MANDAL'S

PADMASHREE DR. R.T.DOSHI DEGREE COLLEGE OF INFORMATION TECHNOLOGY

MOHANLAL RAICHAND MEHTA COLLEGE OF COMMERCE

DIWALIMAA DEGREE COLLEGE OF SCIENCE

CERTIFICATE

This is to certify that the Mr./Miss. _____ having Roll No_____ of B.Sc. CS Semester III has completed the practical work in the subject of **Java Based Application Development** under the guidance of **Prof Janhavi Kshirsagar** during the Academic year 2023-24 being the partial requirement for the fulfillment of the curriculum of Degree of Bachelor of Science in Computer Science, University of Mumbai.

Place: **Date:**

Sign of Subject In Charge

Sign of External Examiner

Sign of H.O.D

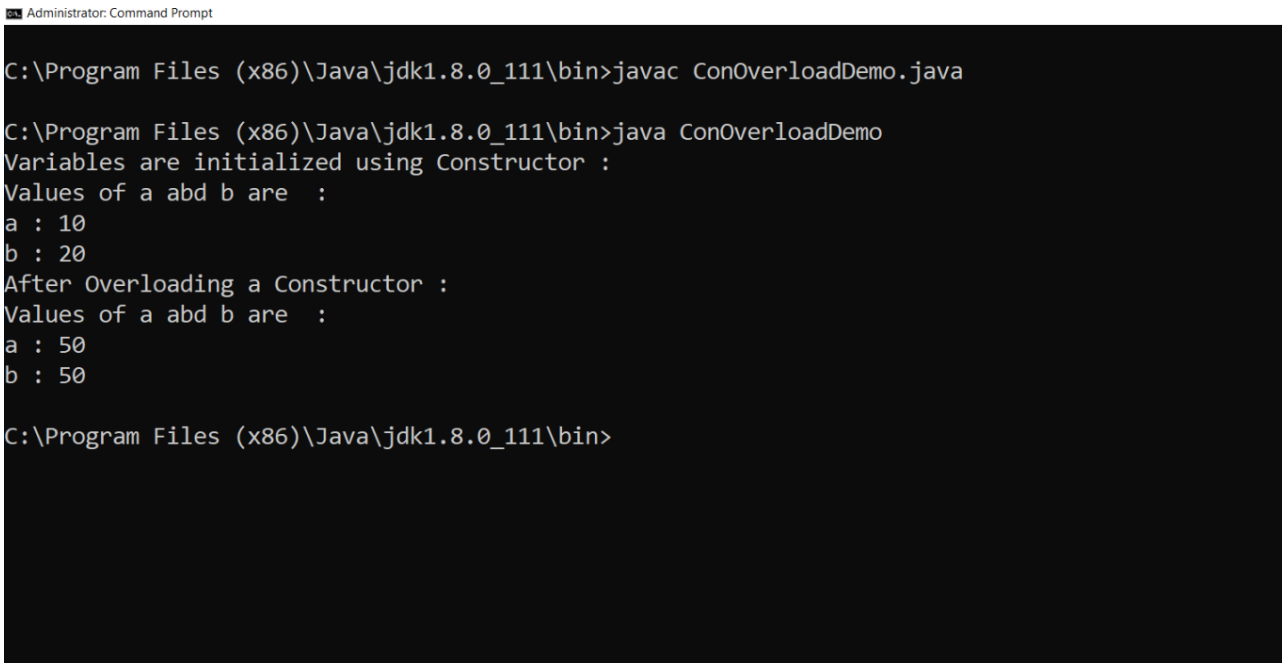
Sr.no	Practical	Date	Sign
1	a. Write a program to create a class and implement the concepts of Constructor Overloading, Method Overloading, Static methods		
	b. Write a program to implement the concept of Inheritance and Method Overriding		
2.	a. Write a program to implement the concepts of Abstract classes and methods		
	b. Write a program to implement the concept of interfaces		
3.	Write a program to define user-definedd exceptions and raise them as per the requirements		
4.	Write a program to demonstrate the methods of: a. List interface b. Set interface		
5.	a. Write a Program in Java Using Swing to illustrate the use of JButton. b. Write a Program in Java Using Swing to illustrate the use of JTextField. c. Write a Program in Java Using Swing to illustrate the use of JList.		
6.	a. Write a JDBC program that displays the data of a given table b. Write A Program in Java using JDBC to insert record in Employee table using PreparedStatement c. Write a JDBC program to insert / update / delete records into a given table		
7.	a. Write a Program Using Servlet to find the factorial of a number. Enter number through num.html b. Write a program to enter the username and password. If entered username and password is correct redirect to other page otherwise display the error message		
8	a. Write a Program using JSP to Check whether the number is Palindrome or Not. b. Write a jsp Program to insert data into database		
9.	Write Java application to encoding and decoding JSON in Java.		

Practical No : 1
Write a program to create a class and implement the concepts of Constructor Overloading, Method Overloading, Static methods

Constructor Overloading :

```
class Number
{
	int a,b;
	Number()
	{
		a=0;
		b=0;
	}
	Number(int x,int y)
	{
		a=x;
		b=y;
	}
	Number(int z)
	{
		a=b=z;
	}
	void put()
	{
		System.out.println("Values of a abd b are  : ");
		System.out.println("a : "+a);
		System.out.println("b : "+b);
	}
}
class ConOverloadDemo
{
	public static void main(String args[])
	{
		Number N1=new Number(10,20);
		System.out.println("Variables are initialized using Constructor : ");
		N1.put();
		Number N2=new Number(50);
		System.out.println("After Overloading a Constructor : ");
		N2.put();
	}
}
```

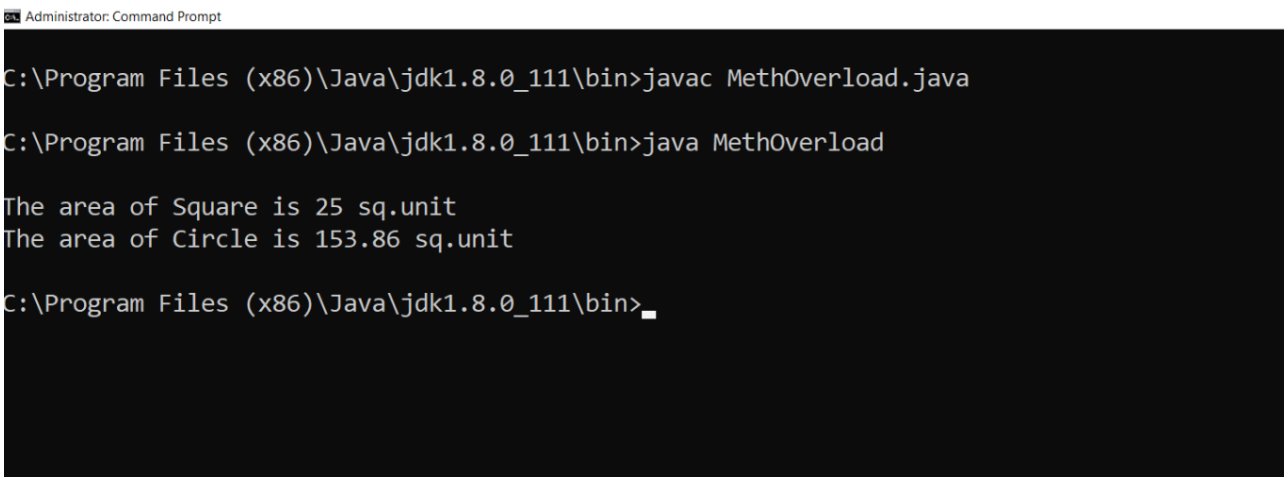
Output :


Administrator: Command Prompt
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>javac ConOverloadDemo.java
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>java ConOverloadDemo
Variables are initialized using Constructor :
Values of a abd b are :
a : 10
b : 20
After Overloading a Constructor :
Values of a abd b are :
a : 50
b : 50
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>

Method Overloading :

```
class Area
{
	int area(int x)
	{
		int a1;
		a1=x*x;
		return a1;
	}
	double area(double r,double p)
	{
		double a2;
		a2=p*r*r;
		return a2;
	}

}
class MethOverload
{
	public static void main(String args[])
	{
		Area O = new Area();
		int a1;
		double a2;
		a1=O.area(5);
		a2=O.area(7.0,3.14);
		System.out.println();
		System.out.println("The area of Square is "+a1+" sq.unit");
		System.out.println("The area of Circle is "+a2+" sq.unit");
	}
}
```

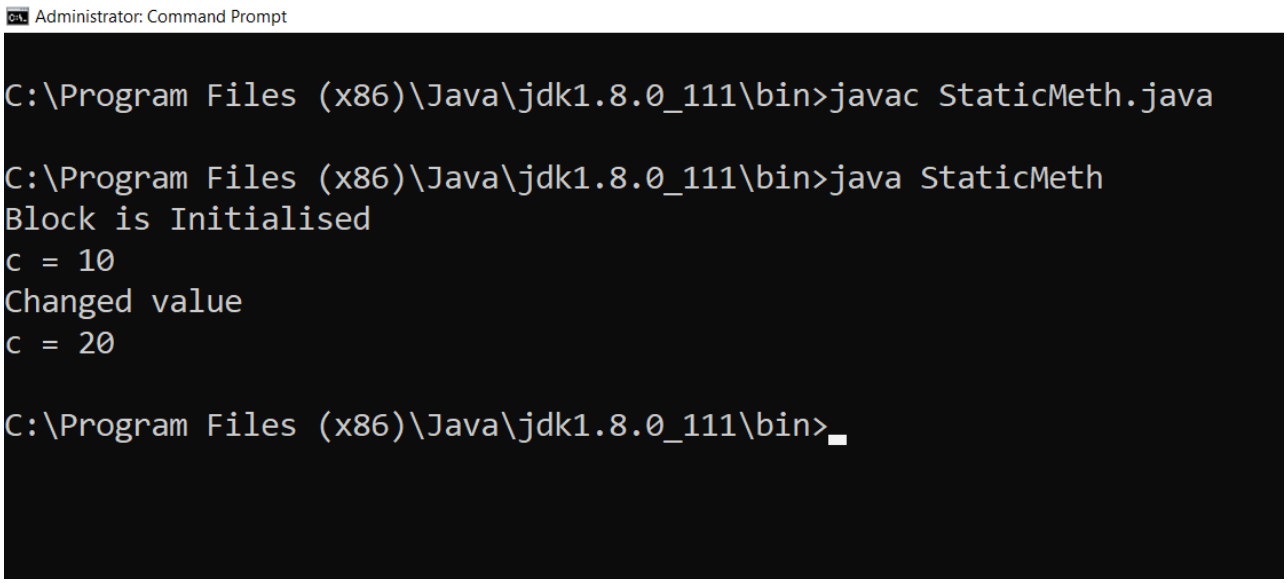
Output:



Static Methods :

```
class StaticMeth
{
	static int c=10;
	static void put()
	{

		System.out.println("Changed value");
		c=c+10;
		System.out.println("c = "+c);
	}
	static
	{
		System.out.println("Block is Initialised");
		System.out.println("c = "+c);
	}

	public static void main(String args[])
	{
		put();
	}
}
```

Output :

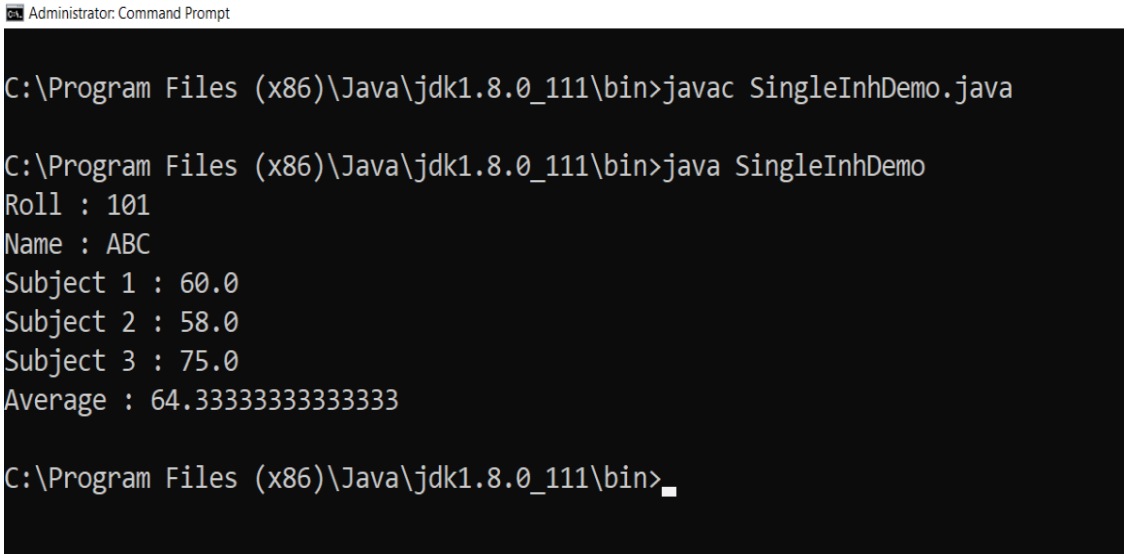


b. Write a program to implement the concept of Inheritance and Method Overriding

Single Inheritance :

```
class Stud
{
	int r;
	String n;
	void get()
	{
		r=101;
		n="ABC";
	}
	void put()
	{
		System.out.println("Roll : "+r);
		System.out.println("Name : "+n);
	}
}
class Result extends Stud
{
	double m1,m2,m3,a;
	void get_marks()
	{
		m1=60;
		m2=58;
		m3=75;
	}
	void put_marks()
	{
		a=(m1+m2+m3)/3;
		System.out.println("Subject 1 : "+m1);
		System.out.println("Subject 2 : "+m2);
		System.out.println("Subject 3 : "+m3);
		System.out.println("Average : "+a);
	}
}
class SingleInhDemo
{
	public static void main(String args[])
	{
		Result R1=new Result();
		R1.get();
		R1.put();
		R1.get_marks();
		R1.put_marks();
	}
}
```

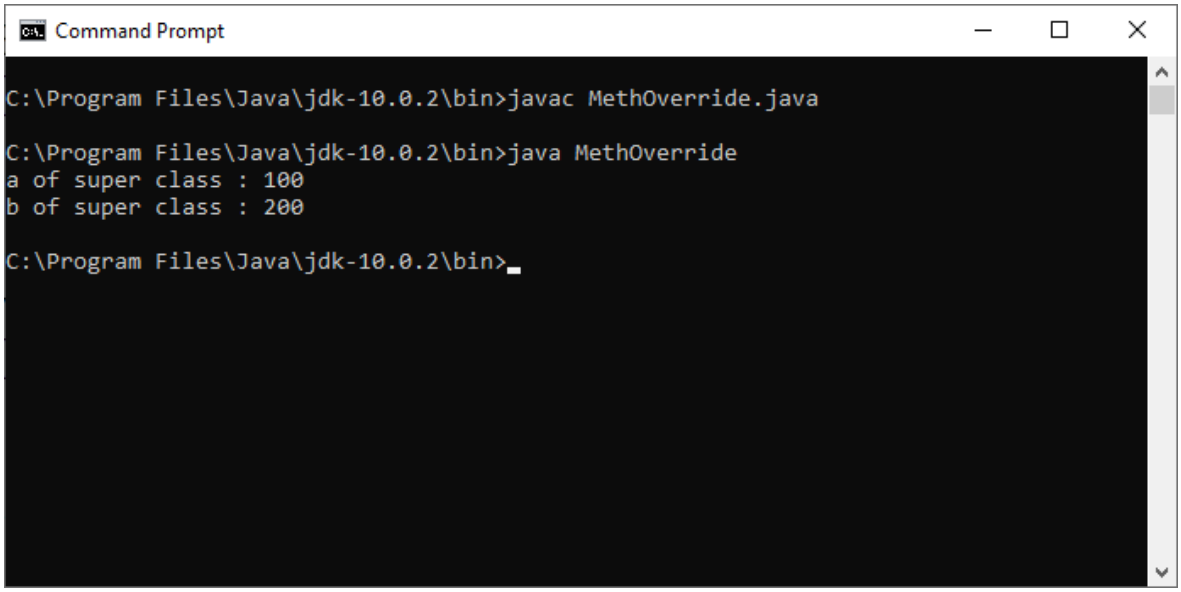
Output :


Administrator: Command Prompt
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>javac SingleInhDemo.java
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>java SingleInhDemo
Roll : 101
Name : ABC
Subject 1 : 60.0
Subject 2 : 58.0
Subject 3 : 75.0
Average : 64.33333333333333
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>

a. Method Overriding :

```
class A
{
	int a;
	A()
	{
		a=0;
	}
	A(int x)
	{
		a=x;
	}
	void show()
	{
		System.out.println("a of super class : "+a);
	}
}
class B extends A
{
	int b;
	B()
	{
		super();
		b=0;
	}
	B(int x,int y)
	{
		super(x);
		b=y;
	}
	void show()
	{
		super.show();
		System.out.println("b of super class : "+b);
	}
}


class MethOverride
{
	public static void main(String agrs[])
	{
		B obj = new B(100,200);
		obj.show();
	}
}
```

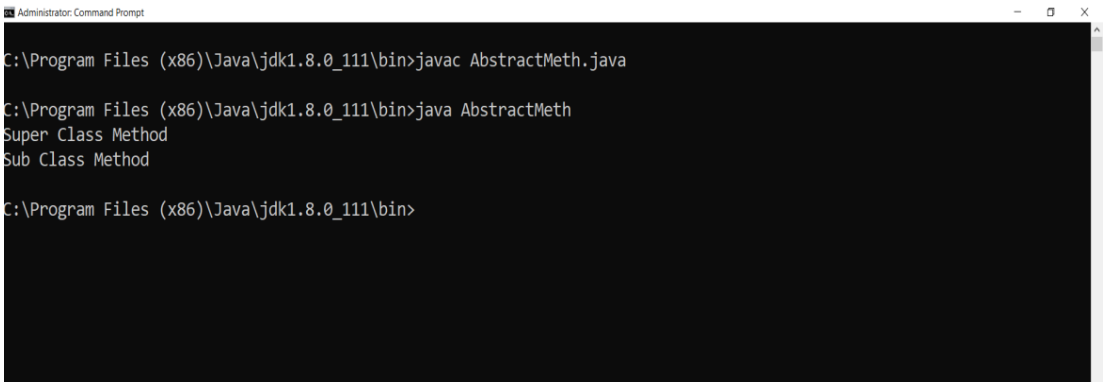
Output:


Command Prompt
C:\Program Files\Java\jdk-10.0.2\bin>javac MethOverride.java
C:\Program Files\Java\jdk-10.0.2\bin>java MethOverride
a of super class : 100
b of super class : 200
C:\Program Files\Java\jdk-10.0.2\bin>

a. **Abstract Classes and Methods :**

```
abstract class A
{
	abstract void show();
	void display()
	{
		System.out.println("Super Class Method");
	}
}
class B extends A
{
	void show()
	{
		System.out.println("Sub Class Method");
	}
}
class AbstractMeth
{
	public static void main(String args[])
	{
		B b = new B();
		b.display();
		b.show();
	}
}
```

Output :



b. Write a program to implement the concept of interfaces

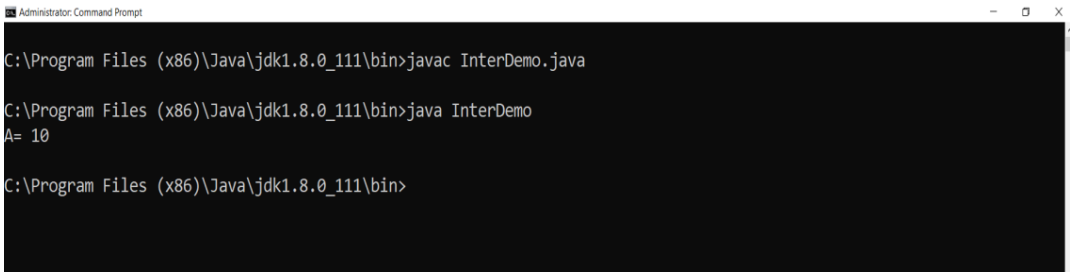
Interface :

```
interface DispInter
{
	void print(int n);
}
```

Class Implementing Interface :

```
class Demo implements DispInter
{
	public void print(int a)
	{
		System.out.println("A= "+a);
	}
}
class InterDemo
{
	public static void main(String args[])
	{
		DispInter I=new Demo();
		I.print(10);
	}
}
```

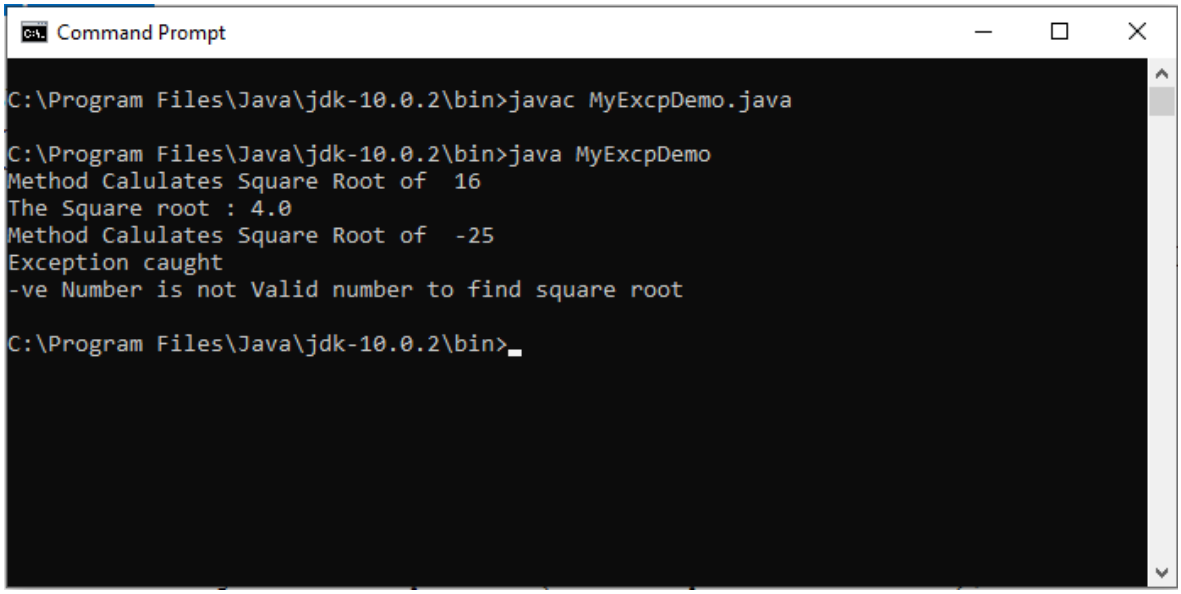
Output:



Practical 3.
Write a program to define user defined exceptions and raise them as per the requirements

```
class MyExcp extends Exception
{
	int a;
	MyExcp(int x)
	{
		a=x;
	}
	public String toString()
	{
		return("-ve Number is not Valid number to find square root  ");
	}
}
class MyExcpDemo
{
	static void Root(int a) throws MyExcp
	{
		double r;
		System.out.println("Method Calulates Square Root of  "+a);
		if(a<0)
		{
			throw new MyExcp(a);
		}
		r=Math.sqrt(a);
		System.out.println("The Square root : "+r);
	}
	public static void main(String args[])
	{
		try
		{
			Root(16);
			Root(-25);
		}
		catch(MyExcp e)
		{
			System.out.println("Exception caught");
			System.out.println(e);
		}
	}
}
```

Output :

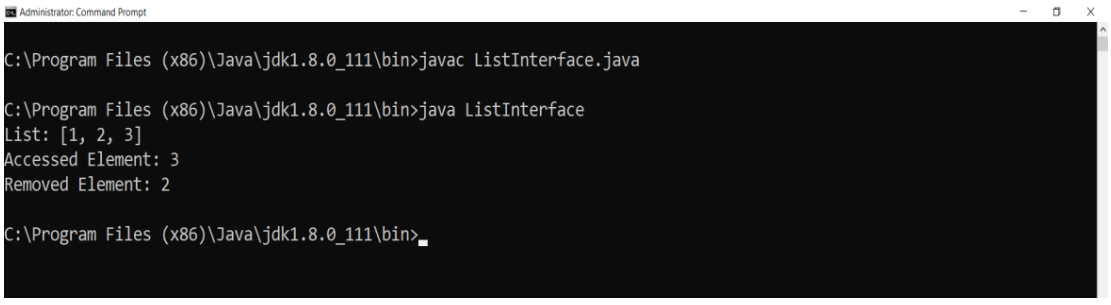

Command Prompt
C:\Program Files\Java\jdk-10.0.2\bin>javac MyExcpDemo.java
C:\Program Files\Java\jdk-10.0.2\bin>java MyExcpDemo
Method Calulates Square Root of 16
The Square root : 4.0
Method Calulates Square Root of -25
Exception caught
-ve Number is not Valid number to find square root
C:\Program Files\Java\jdk-10.0.2\bin>

4. Write a program to demonstrate the methods of:

a. List interface

```
import java.util.List;
import java.util.ArrayList;

class ListInterface
{

   public static void main(String[] args)
   {
      List<Integer> numbers = new ArrayList<>();
      numbers.add(1);
      numbers.add(2);
      numbers.add(3);
      System.out.println("List: " + numbers);
      int number = numbers.get(2);
      System.out.println("Accessed Element: " + number);
      int removedNumber = numbers.remove(1);
      System.out.println("Removed Element: " + removedNumber);
   }
}
```

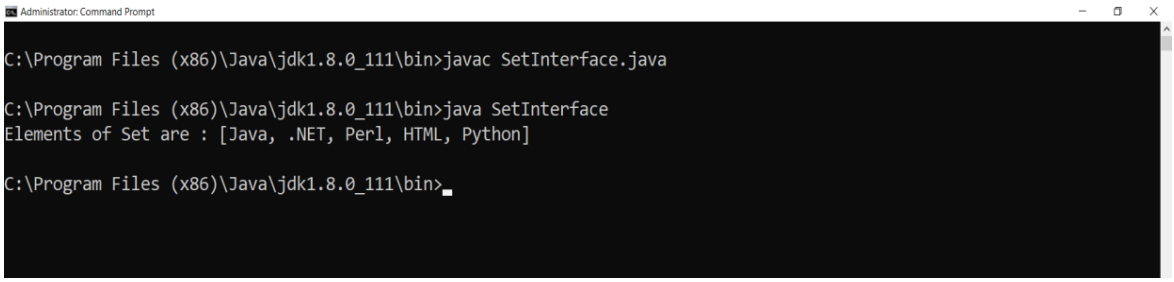
Output :



b. Set Interface

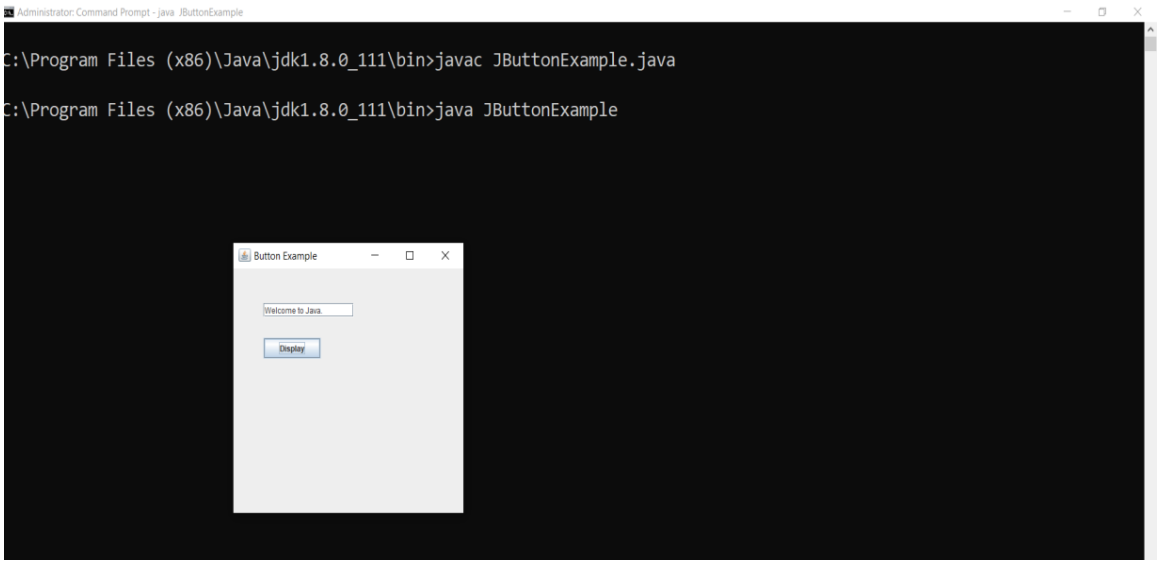
```
import java.util.*;

public class SetInterface
{

   public static void main(String[] args)
   {

      Set<String> Set1 = new HashSet<String>();
      Set1.add("Java");
      Set1.add("Python");
      Set1.add(".NET");
      Set1.add("Perl");
      Set1.add("HTML");
      System.out.println("Elements of Set are : "+Set1);
   }
}
```

Output :



5 a. Write a Program in Java Using Swing to illustrate the use of JButton.

```
import java.awt.event.*;
import javax.swing.*;

public class JButtonExample
 {
        public static void main(String[] args)
         {
                JFrame f=new JFrame("Button Example");
                final JTextField tf=new JTextField();
                tf.setBounds(50,50, 150,20);
                JButton b=new JButton("Display");
                b.setBounds(50,100,95,30);
                b.addActionListener(new ActionListener()
                {
                        public void actionPerformed(ActionEvent e)
                        {
                                tf.setText("Welcome to Java.");
                        }
                });
                f.add(b);f.add(tf);
                f.setSize(400,400);
                f.setLayout(null);
                f.setVisible(true);
        }
}
```

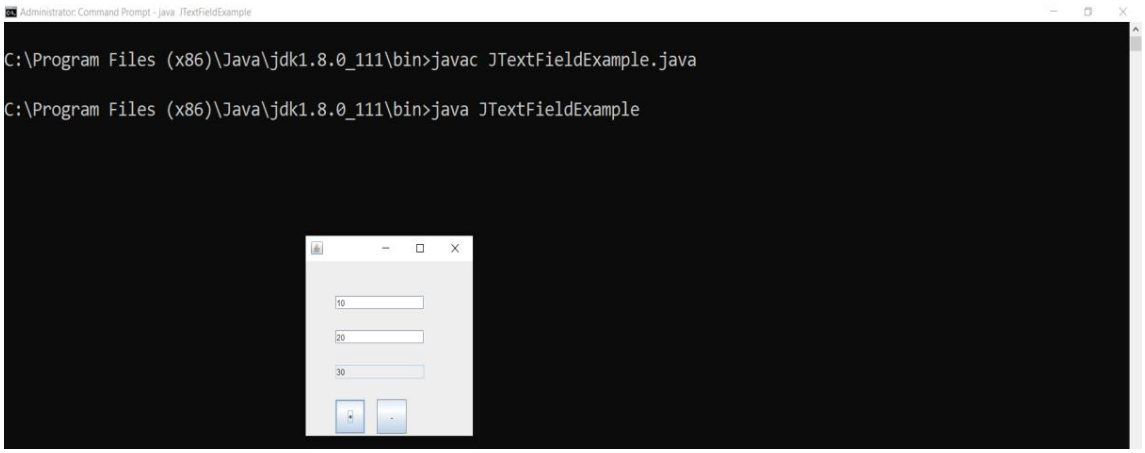


5 b. Write a Program in Java Using Swing to illustrate the use of JTextField.

```
import javax.swing.*;
import java.awt.event.*;
public class JTextFieldExample implements ActionListener
{
	JTextField tf1,tf2,tf3;
	JButton b1,b2;
	JTextFieldExample()
	{
		JFrame f= new JFrame();
		tf1=new JTextField();
		tf1.setBounds(50,50,150,20);
		tf2=new JTextField();
		tf2.setBounds(50,100,150,20);
		tf3=new JTextField();
		tf3.setBounds(50,150,150,20);
		tf3.setEditable(false);
		b1=new JButton("+");
		b1.setBounds(50,200,50,50);
		b2=new JButton("-");
		b2.setBounds(120,200,50,50);
		b1.addActionListener(this);
		b2.addActionListener(this);
		f.add(tf1);
		f.add(tf2);
		f.add(tf3);
		f.add(b1);
		f.add(b2);
		f.setSize(300,300);
		f.setLayout(null);
		f.setVisible(true);
	}
	public void actionPerformed(ActionEvent e)
	{
		String s1=tf1.getText();
		String s2=tf2.getText();
		int a=Integer.parseInt(s1);
		int b=Integer.parseInt(s2);
		int c=0;
		if(e.getSource()==b1)
		{
			c=a+b;
		}
		else
```

```
                    if(e.getSource()==b2)
                    {
                                c=a-b;
                    }
                String result=String.valueOf(c);
                tf3.setText(result);
        }
public static void main(String[] args)
        {
                new JTextFieldExample();
        }
}
```

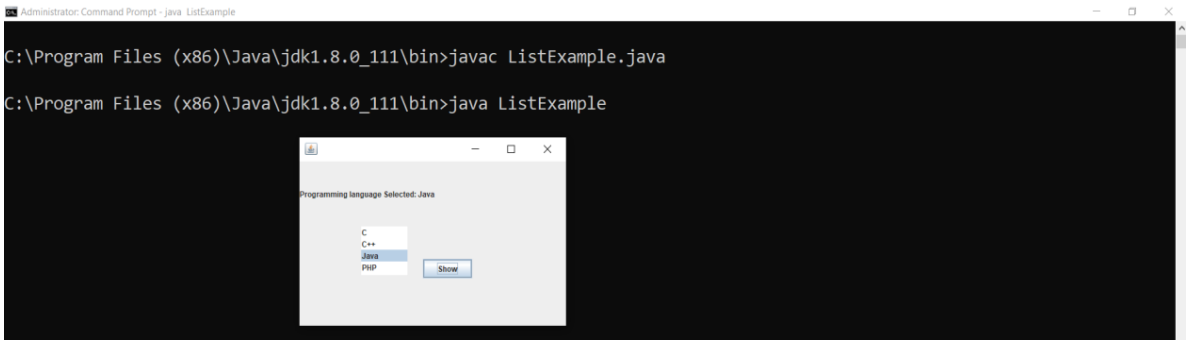
Output :



5 c. Write a Program in Java Using Swing to illustrate the use of JList.

```
import javax.swing.*;
import java.awt.event.*;
public class ListExample
{
	ListExample()
	{
		JFrame f= new JFrame();
		final JLabel label = new JLabel();
		label.setSize(500,100);
		JButton b=new JButton("Show");
		b.setBounds(200,150,80,30);
		final DefaultListModel<String> l1 = new DefaultListModel<>();
		l1.addElement("C");
		l1.addElement("C++");
		l1.addElement("Java");
		l1.addElement("PHP");
		final JList<String> list1 = new JList<>(l1);
		list1.setBounds(100,100, 75,75);
			f.add(list1);
		f.add(b);
		f.add(label);
		f.setSize(450,300);
		f.setLayout(null);
		f.setVisible(true);
		b.addActionListener(new ActionListener()
		{
				public void actionPerformed(ActionEvent e)
				{
					String data = "";
					if (list1.getSelectedIndex() != -1)
				{
					data = "Programming language Selected: " +
list1.getSelectedValue();
					label.setText(data);
					}
				}
		});
	}
	public static void main(String args[])
	{
		 new ListExample();
	}
}
```

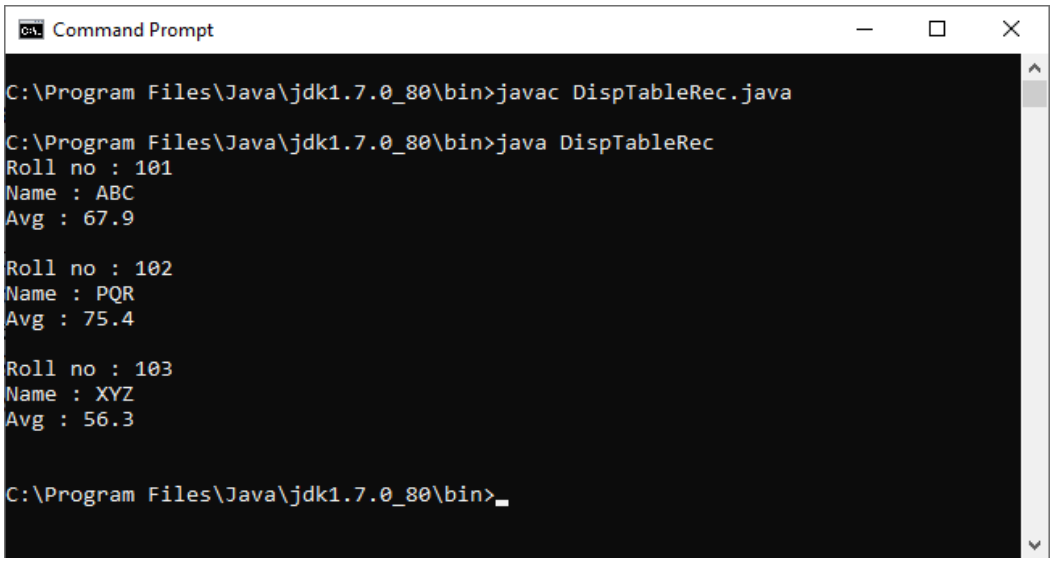
Output :


Administrator: Command Prompt - java ListExample
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>javac ListExample.java
C:\Program Files (x86)\Java\jdk1.8.0_111\bin>java ListExample
Programming language Selected: Java
C
C++
Java
PHP
Show

6. a Write a JDBC program that displays the data of a given table

```
import java.io.*;
import java.sql.*;

public class DispTableRec
{
    public static void main(String args[])
    {
            try
            {
                    Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
                    Connection c=DriverManager.getConnection("jdbc:odbc:DSN123");
                    Statement s=c.createStatement();
                    ResultSet rs=s.executeQuery("select *from Stud_Info");
                    while(rs.next())
                    {
                            int rn=rs.getInt("Roll");
                            String n=rs.getString("Name");
                            double a=rs.getDouble("Avg");
                            System.out.println("Roll no : "+rn);
                            System.out.println("Name : "+n);
                            System.out.println("Avg : "+a);
                            System.out.println();
                    }

                    s.close();
                    c.close();
            }
            catch(Exception e)
            {
                    System.out.println(e);
            }}
}
```

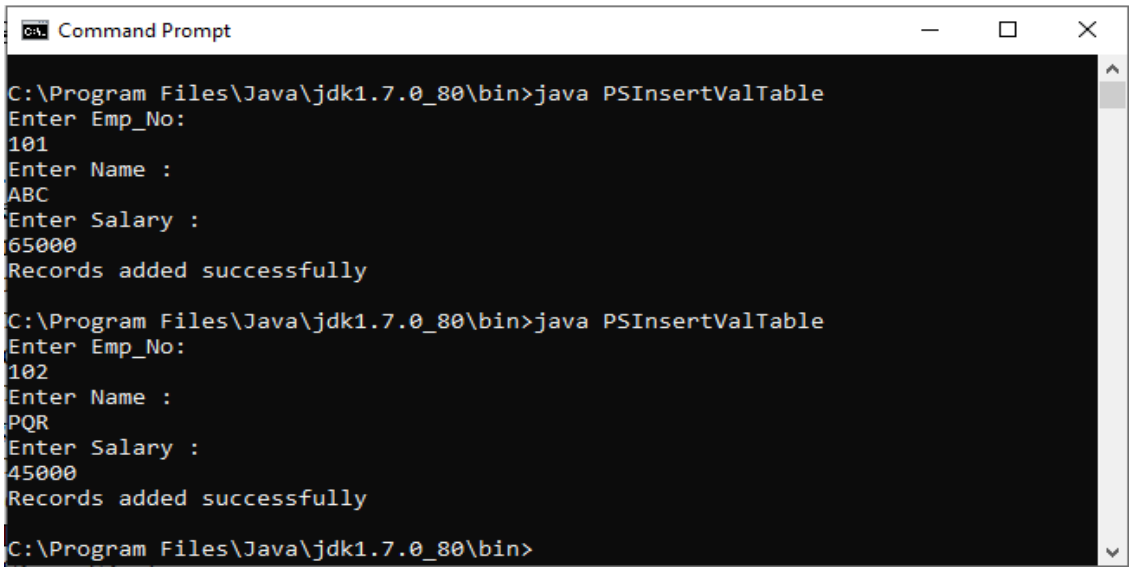
Output :


Command Prompt
C:\Program Files\Java\jdk1.7.0_80\bin>javac DispTableRec.java
C:\Program Files\Java\jdk1.7.0_80\bin>java DispTableRec
Roll no : 101
Name : ABC
Avg : 67.9
Roll no : 102
Name : PQR
Avg : 75.4
Roll no : 103
Name : XYZ
Avg : 56.3
C:\Program Files\Java\jdk1.7.0_80\bin>

b. Write A Program in Java using JDBC to insert record in Employee table using PreparedStatement

```
import java.io.*;
import java.sql.*;
public class PSInsertValTable
{
	public static void main(String args[])
	{
		try
		{
			Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
			Connection c=DriverManager.getConnection("jdbc:odbc:DSN1601");
			PreparedStatement ps=c.prepareStatement("Insert into Employee values(?,?,?)");
			BufferedReader br= new BufferedReader(new InputStreamReader(System.in));
			System.out.println("Enter Emp_No: ");
			int eno=Integer.parseInt(br.readLine());
			System.out.println("Enter Name : ");
			String n=br.readLine();
			System.out.println("Enter Salary : ");
			double s=Double.parseDouble(br.readLine());
			ps.setInt(1,eno);
			ps.setString(2,n);
			ps.setDouble(3,s);
			ps.executeUpdate();
			System.out.println("Records added successfully");
			ps.close();
			c.close();
		}
		catch(Exception e)
		{
			System.out.println(e);
		}}}
```

Output:



7. . Write a Program using Servlet to find the factorial of a number. Enter number through num.html

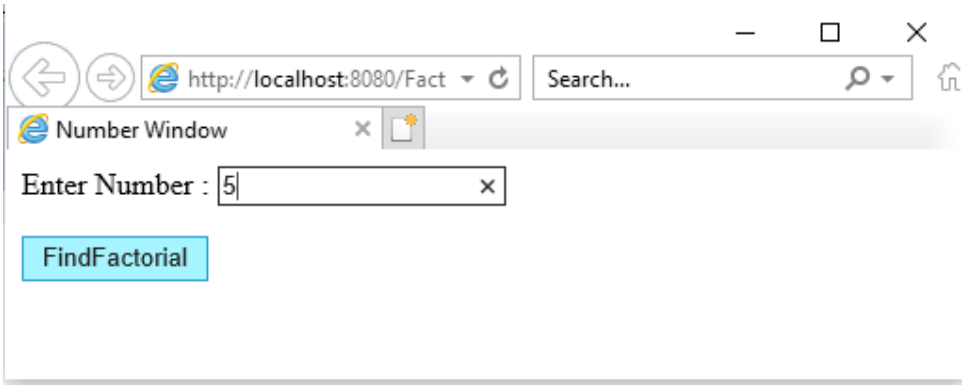
Num.html

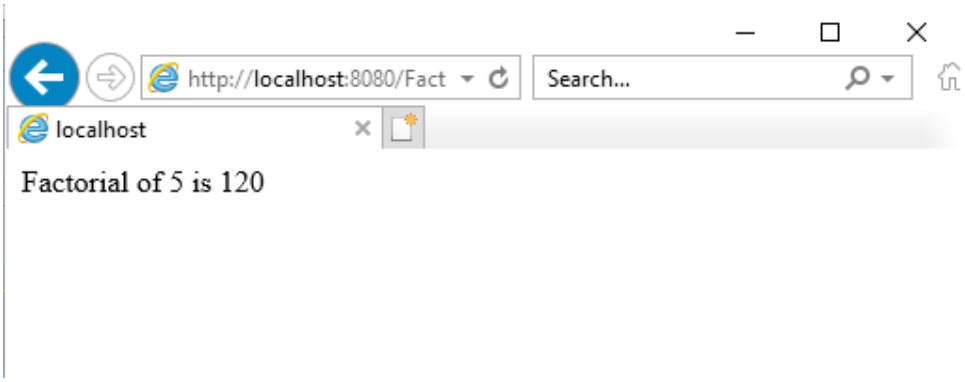
```
<html>
   <head>
      <title>Number Window</title>
      <meta charset="UTF-8">
      <meta name="viewport" content="width=device-width, initial-scale=1.0">
   </head>
   <body>
      <form method="get" action="FactServlet">
      <p> Enter Number : <input type="text" name="txtn"></p>
      <p><input type="submit" value="FindFactorial"></p>
      </form>
   </body>
</html>
```

FactServlet.java

```
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;


 public class FactServlet extends HttpServlet
 {
         public void doGet(HttpServletRequest request, HttpServletResponse response)
                 throw ServletException, IOException
        {
                  response.setContentType("text/html;charset=UTF-8");
        try
        {
                  PrintWriter out = response.getWriter();
                  int n=Integer.parseInt(request.getParameter("txtn"));
                  int f=1;
                  for(int i=1;i<=n;i++)
                          f=f*i;
                  out.println("Factorial of "+n+" is "+f);
        }
        catch(Exception e)
        {
                  System.out.println(e);
        }
   }

}
```

Output :


http://localhost:8080/Fact
Search...
Number Window
Enter Number : 5
FindFactorial


http://localhost:8080/Fact
Search...
localhost
Factorial of 5 is 120

7. b. Write a program to enter the username and password. If entered username and password is correct redirect to other page otherwise display the error message

i) LoginData.html

```
<html>
<head>
<title>Login Form</title>
</head>
<body>
<form method="get" action="SendRedirectServlet">
<p>UserName : <input type="text" name="uname"></p>
<p>Password : <input type="text" name="pass"></p>
<p><input type="submit" value="Login"></p>
</form>
</body>
</html>
```

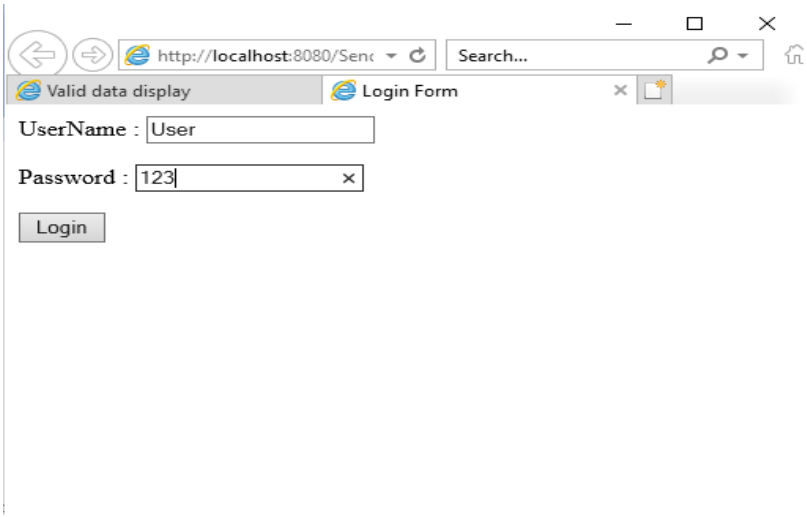
ii) SendRedirect.java

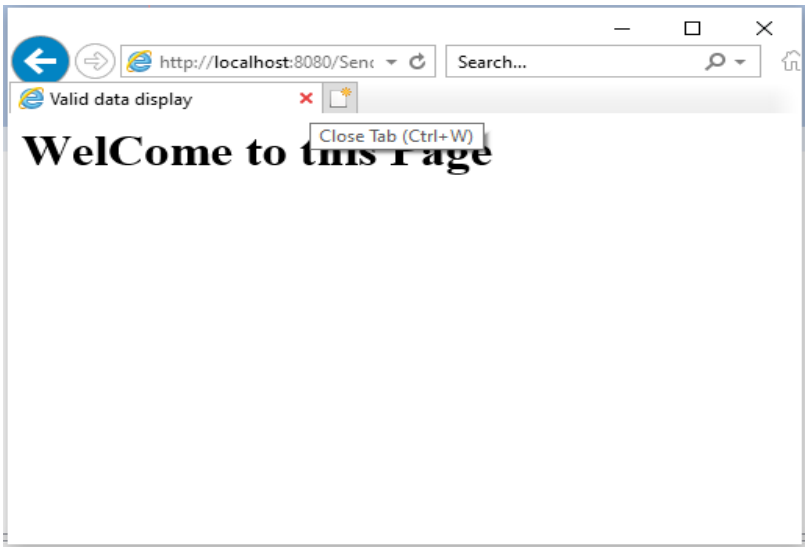
```
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class SendRedirectServlet extends HttpServlet
{
        public void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException
        {
            response.setContentType("text/html;charset=UTF-8");
            try
            {
                PrintWriter out = response.getWriter();
                String user1=request.getParameter("uname");
                String pass1=request.getParameter("pass");
                if(user1.equals("User") && pass1.equals("123"))
                    response.sendRedirect("Data.html");
                else
                    out.println("Wrong Username and password");
            }
            catch(Exception e)
            {
                System.out.println(e);
            }
    }
}
```

iii) Data.html

```
<html>
<title>Valid data display</title>
</head>
<body>
	<h1>WelCome to this Page</h1>
</body>
</html>
```

Output :





8. Write a Program to Check whether the number is Palindrome or Not

i)Palindrom1.html

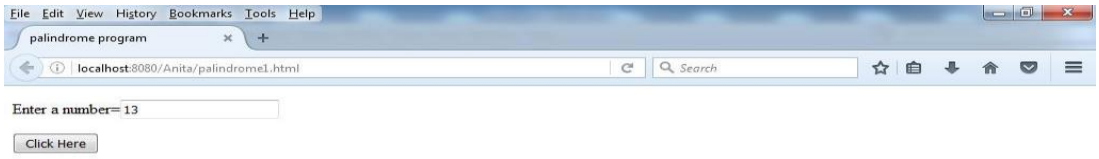
```
<html>
<head>
<title>palindrome program</title>
</head>
<body>
<form method="get" action="palindrome.jsp">
<p>Enter a number=<input type="text" name="num"></p>
<p><input type="submit" value="Click Here">
</form>
</body>
</html>
```

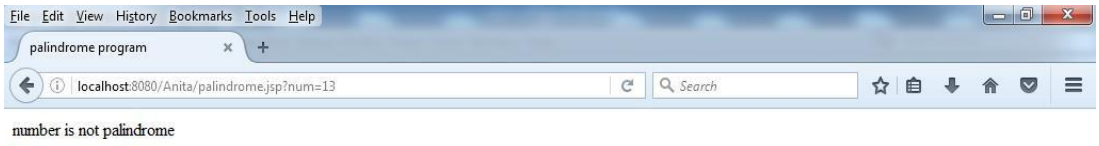
ii)Palindrome.jsp

```
<html>
<head>
<title> palindrome program</title>
</head>
<body>
<%
intnum,rem,rev=0,n;
num=Integer.parseInt(request.getParameter("num"));
        n=num;
while(num>0)
          {
rem=num%10;
rev=(rev*10)+rem;
num=num/10;
```

```
        }
if(n==rev)
        {
out.println("Number is Palindrome");

        }
else
        {
out.println("number is not palindrome");

        }
        %>
</body>
</html>
```

OUTPUT:





b.Write a jsp Program to insert data into database

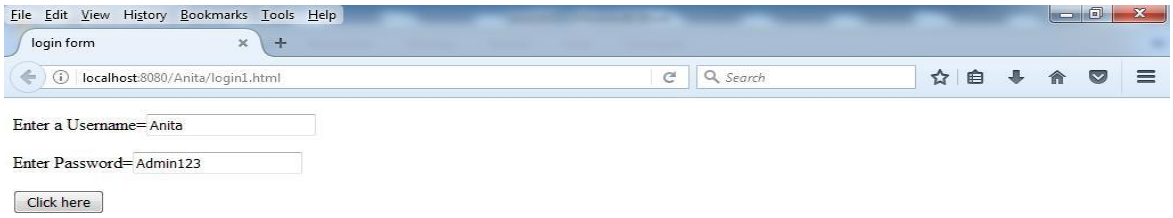
i)Login.html

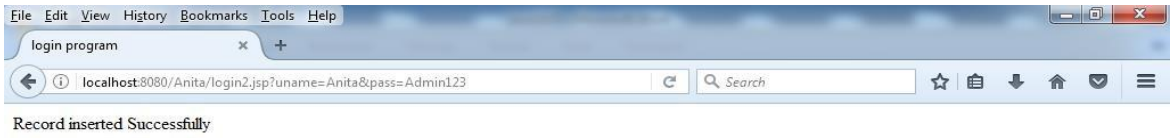
```
<html>
<head>
<title> login form </title>
</head>
<body>
<form method="get" action="login2.jsp">
<p>Enter a Username=<input type="text" name="uname"></p>
<p>Enter Password=<input type="text" name="pass"></p>
<input type="submit" value="Click here">
</form>
</body>
</html>
```

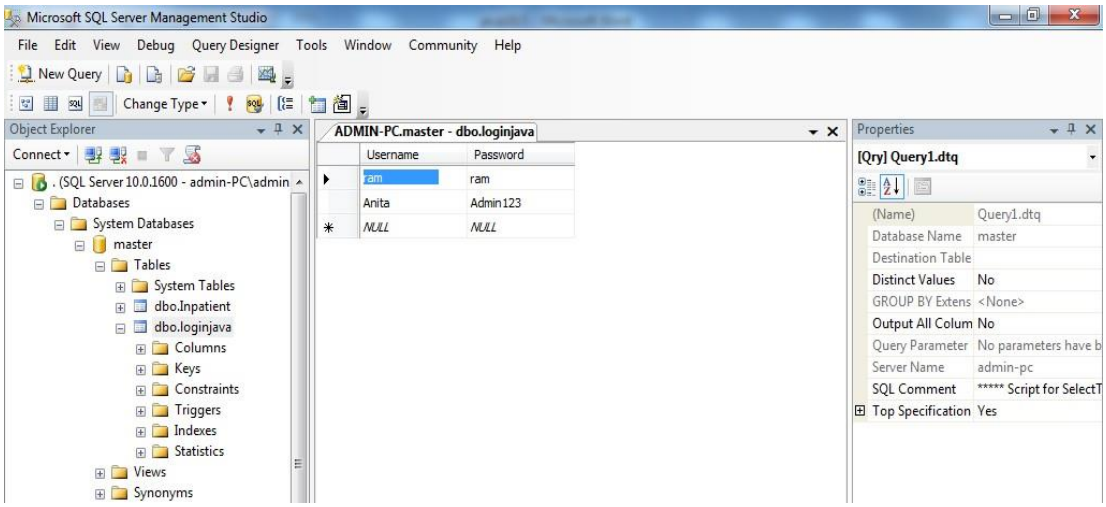
ii)Login.jsp

```
<html>
<head>
<title>login program</title>
</head>
<body>
<%@page import="java.sql.*"%>
<%
try
    {
Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
    Connection con=DriverManager.getConnection("jdbc:odbc:ds15");
PreparedStatementps =con.prepareStatement("insert into loginjava values(?,?)");
ps.setString(1,request.getParameter("uname"));
ps.setString(2,request.getParameter("pass"));
ps.executeUpdate();
out.println("Record inserted Successfully");
    }
catch(Exception e)
    {
System.out.println(e);
    }
    %>
</body>
</html>
```

OUTPUT :


File Edit View History Bookmarks Tools Help
login form
localhost:8080/Anita/login1.html
Search
Enter a Username= Anita
Enter Password= Admin123
Click here


File Edit View History Bookmarks Tools Help
login program
localhost:8080/Anita/login2.jsp?uname=Anita&pass=Admin123
Search
Record inserted Successfully


Microsoft SQL Server Management Studio
File Edit View Debug Query Designer Tools Window Community Help
New Query
Change Type
Object Explorer
Connect
. (SQL Server 10.0.1600 - admin-PC\admin
Databases
System Databases
master
Tables
System Tables
dbo.Inpatient
dbo.loginjava
Columns
Keys
Constraints
Triggers
Indexes
Statistics
Views
Synonyms
ADMIN-PC.master - dbo.loginjava
Username
Password
ram
ram
Anita
Admin123
NULL
NULL
Properties
[Qry] Query1.dtq
(Name) Query1.dtq
Database Name master
Destination Table
Distinct Values No
GROUP BY Extens <None>
Output All Colum No
Query Parameter No parameters have b
Server Name admin-pc
SQL Comment ***** Script for SelectT
Top Specification Yes

9. Write Java application to encoding and decoding JSON in Java.

Encode JSON :

```
import org.json.simple.JSONObject;

class JsonwithJava
 {
 public static void main(String argu[])
 {
  JSONObject o1 = new JSONObject();
  o1.put("name", "Alex");
  o1.put("roll", new Integer(12));
  o1.put("total_marks", new Double(684.50));
  obj.put("pass", new Boolean(true));
  System.out.print(o1);
 }
}
```

Decode :

```
import org.json.simple.JSONObject;
import org.json.simple.JSONValue;

public class JsonDecodeExample1
 {
 public static void main(String[] args) {
  String s = "{\"name\":\"Alex\",\"marks\":648.50,\"roll\":12}";
  Object o1 = JSONValue.parse(s);
  JSONObject jsonObj = (JSONObject) o1;
  String name = (String) jsonObj.get("name");
  double marks = (Double) jsonObj.get("marks");
  Integer roll = (Integer) jsonObj.get("roll");
  System.out.println(name + " " + marks + " " + roll);
 }
}
```