



Bharati Vidyapeeth's
Institute of Management & Information Technology

C.B.D. Belapur, Navi Mumbai 400614

Vision:

Providing high quality, innovative and value-based education in information technology to build competent professionals.

Mission

M1. Technical Skills:-To provide solid technical foundation theoretically as well as practically capable of providing quality services to industry.

M2. Development: -Department caters to the needs of students through comprehensive educational programs and promotes lifelong learning in the field of computer Applications.

M3. Ethical leadership:-Department develops ethical leadership insight in the students to succeed in industry, government and academia.

CERTIFICATE

This is to certify that the journal is the work of Mr. / Ms.

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Subject-in-charge

Principal

Date: _____

External Examiner

Date: _____

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MCAL12: Advanced Java Lab

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Assignment 1

Java Generics

1. Write a Java Program to demonstrate a Generic Class.

2. Write a Java Program to demonstrate Generic Methods.
3. Write a Java Program to demonstrate Wildcards in Java Generics.

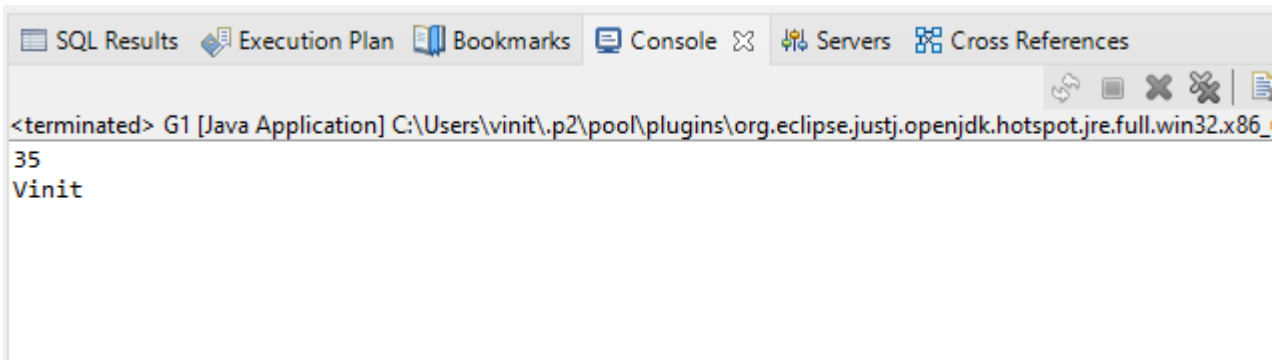
Problem Statement 1 : Write a Java Program to demonstrate a Generic Class.

Code :

```
class geg<T>
{
    T obj;
    geg(T obj){this.obj = obj;}
    public T get() {returnthis.obj;}
}
class G1
{
    publicstaticvoid main (String[] args)
    {
        geg<Integer>i=new geg<Integer>(35);
        System.out.println(i.get());

        geg<String> s =
new geg<String>("Vinit");
        System.out.println(s.get());
    }
}
```

Output :



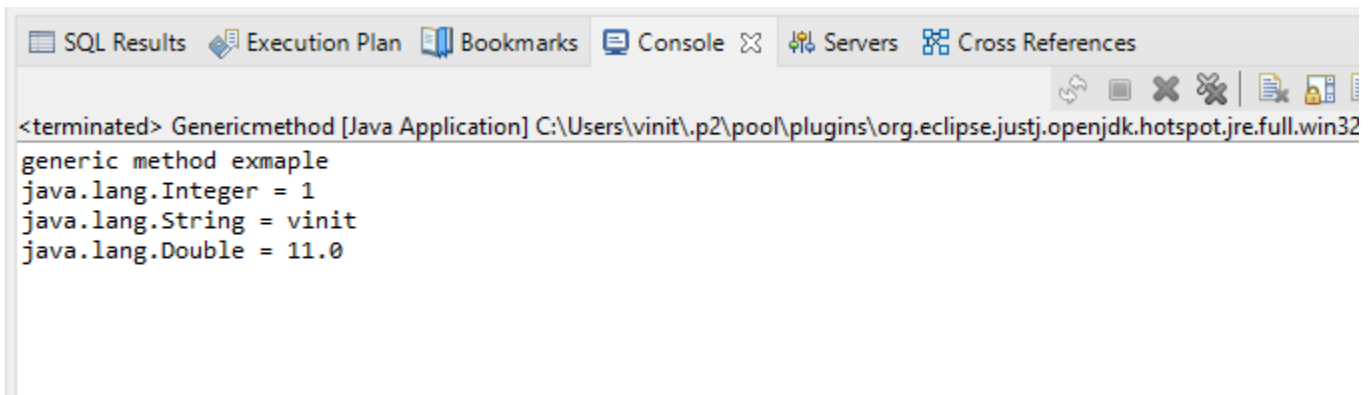
Problem Statement 2 : Write a Java Program to demonstrate Generic Methods.

Code :

```
public class Genericmethod
{
    void display()
    {
        System.out.println("generic method exmaple");
    }
    <T>void gdisplay (T e)
    {
        System.out.println(e.getClass().getName() + " = " + e);
    }
    public static void main(String[] args)
    {
        Genericmethod g1=new Genericmethod();
        g1.display();

        g1.gdisplay(1);
        g1.gdisplay("vinit");
        g1.gdisplay(11.0);
    }
}
```

Output :

The screenshot shows the Eclipse IDE's console window. The title bar includes tabs for SQL Results, Execution Plan, Bookmarks, Console, Servers, and Cross References. The Console tab is active, displaying the output of a Java application. The output text is as follows:

```
<terminated> Genericmethod [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32
generic method exmaple
java.lang.Integer = 1
java.lang.String = vinit
java.lang.Double = 11.0
```

Problem Statement 3 : Write a Java Program to demonstrate Wildcards in Java Generics.

Code :

```
import java.util.*;

public class Wildcardex {

    // Upper bounded

    private static double sum(List<? extends Number> list) {

        double sum = 0.0;

        for (Number i : list) {

            sum = sum + i.doubleValue();

        }

        return sum;

    }

    // Lower Bounded

    private static void show(List<? super Integer> list) {

        list.forEach((x) -> {

            System.out.print(x + " ");

        });

    }

    public static void main(String[] args) {

        System.out.println("Upper Bounded : ");

        List<Integer> list1 = Arrays.asList(4, 2, 7, 5, 1, 9);

        System.out.println("List 1 Sum : " + sum(list1));

        List<Double> list2 = Arrays.asList(4.7, 2.4, 7.3, 5.4, 1.5, 9.2);

        System.out.println("List 2 Sum : " + sum(list2));

        System.out.println("\nLower Bounded : ");

        List<Integer> list3 = Arrays.asList(4, 2, 7, 5, 1, 9);

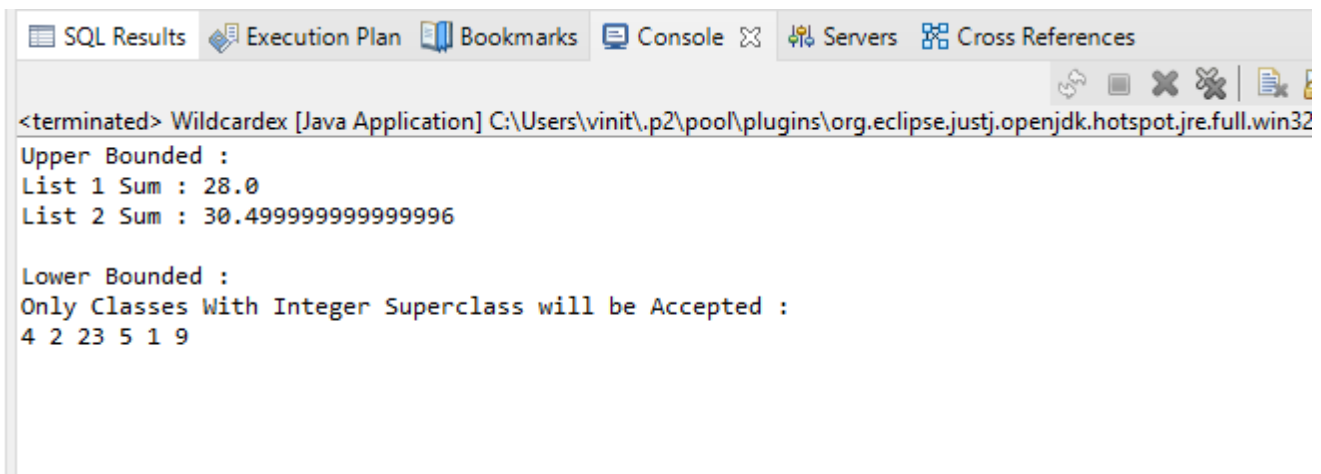
        System.out.println("Only Classes With Integer Superclass will be Accepted : ");

        show(list3);

    }

}
```


Output :



The screenshot shows the Eclipse IDE's console window. The title bar indicates the application is 'Wildcardex [Java Application]' running at 'C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32'. The console output is as follows:

```
<terminated> Wildcardex [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32
Upper Bounded :
List 1 Sum : 28.0
List 2 Sum : 30.499999999999996

Lower Bounded :
Only Classes With Integer Superclass will be Accepted :
4 2 23 5 1 9
```

Assignment 2

List Interface

1. Write a Java program to create List containing list of items of type String and use for- --each loop to print the items of the list.
2. Write a Java program to create List containing list of items and use ListIterator interface to print items present in the list. Also print the list in reverse/ backward direction.

Problem Statement 1 : Write a Java program to create List containing list of items of type String and use for- each loop to print the items of the list.

Code :

```
package listeg;
import java.util.*;
public class Array1 {
    public static void main(String[] args) {
        ArrayList<String>list=new ArrayList<String>();

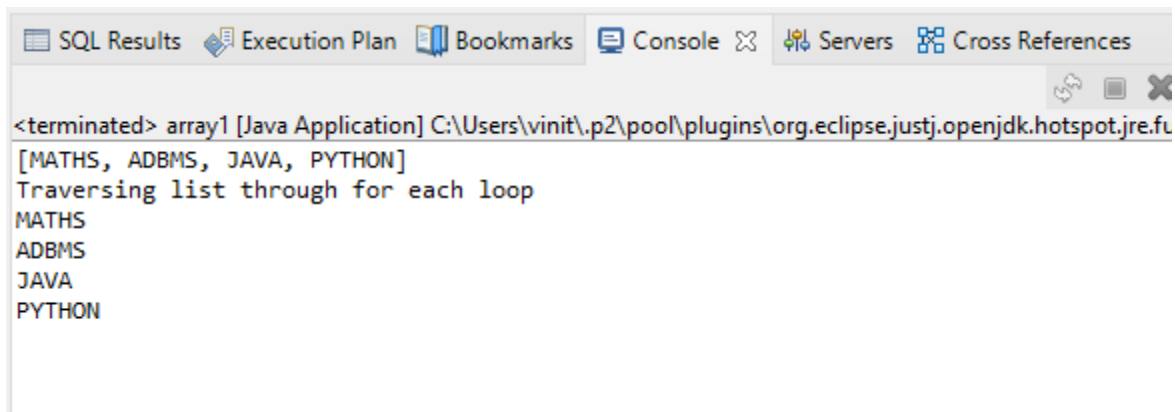
        list.add("MATHS");
        list.add("ADBMS");
        list.add("JAVA");
        list.add("PYTHON");

        System.out.println(list);

        System.out.println("Traversing list through for each loop");
        for(String subject:list)
            System.out.println(subject);

    }
}
```

Output :

The screenshot shows the Eclipse IDE's console window. At the top, there are tabs for 'SQL Results', 'Execution Plan', 'Bookmarks', 'Console', 'Servers', and 'Cross References'. The 'Console' tab is active. The output text in the console is as follows:
<terminated> array1 [Java Application] C:\Users\vinit\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.fu
[MATHS, ADBMS, JAVA, PYTHON]
Traversing list through for each loop
MATHS
ADBMS
JAVA
PYTHON

Problem Statement 2 : Write a Java program to create List containing list of items and use ListIterator interface to print items present in the list. Also print the list in reverse/ backward direction.

Code :

```
package listeg;
import java.util.*;
public class Reverse {

    public static void main(String[] args) {
        List<String> mylist = new ArrayList<String>();

        mylist.add("Vinit");
        mylist.add("Rahul");
        mylist.add("Owesh");
        mylist.add("Vinayak");
        mylist.add("Akash");

        System.out.println("Traversing through iterator");
        System.out.println("Original List:");
        Iterator itr=mylist.iterator();
        while(itr.hasNext()) {
            System.out.println(itr.next());

        }
        Collections.reverse(mylist);
        System.out.println(); //space between two lines
        System.out.println("Reversed List:");
        Iterator itr1=mylist.iterator();
        while(itr1.hasNext()) {

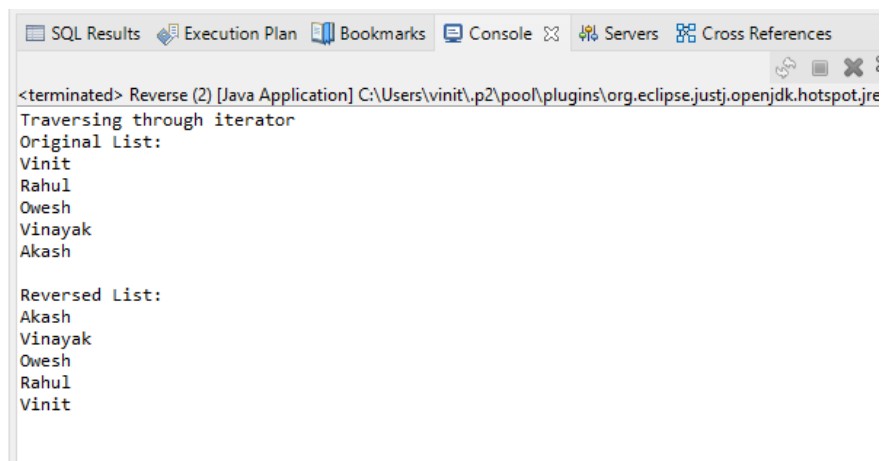
            System.out.println(itr1.next());

        }

    }

}
```

Output :



```
<terminated> Reverse (2) [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre
Traversing through iterator
Original List:
Vinit
Rahul
Owesh
Vinayak
Akash

Reversed List:
Akash
Vinayak
Owesh
Rahul
Vinit
```

Assignment 3

Set Interface

1. Write a Java program to create a Set containing list of items of type String and print the items in the list using Iterator interface. Also print the list in reverse/ backward direction.
2. Write a Java program using Set interface containing list of items and perform the following operations:
 - a. Add items in the set.
 - b. Insert items of one set in to other set.
 - c. Remove items from the set
 - d. Search the specified item in the set

Problem Statement 1 : Write a Java program to create a Set containing list of items of type String and print the items in the list using Iterator interface. Also print the list in reverse/ backward direction.

Solution :

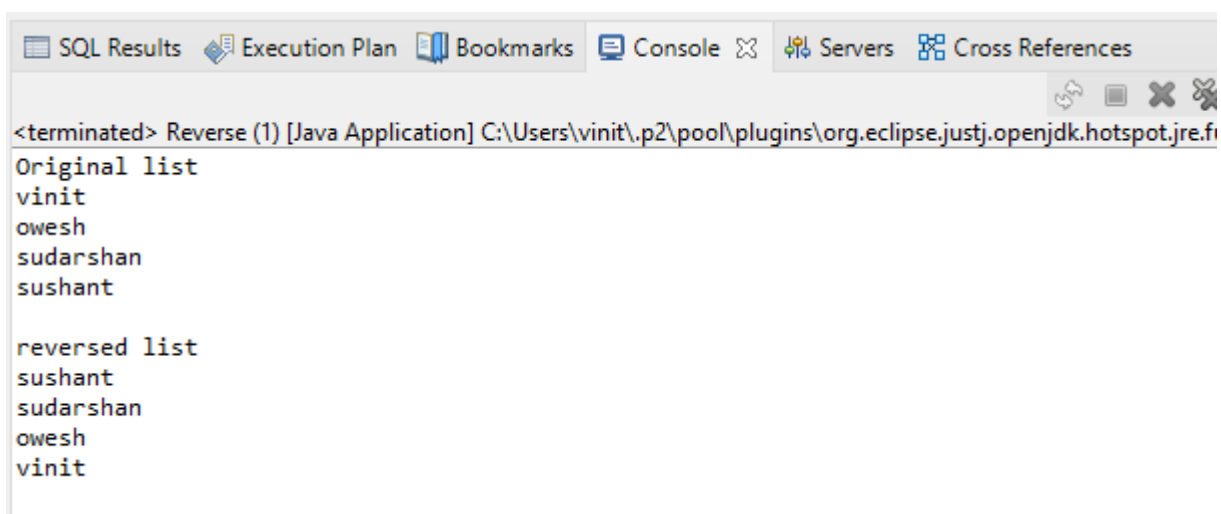
```
import java.util.*;
public class Reverse {
    public static void main(String[] args) {
        // Let us create a list of strings
        List<String> mylist = new ArrayList<String>();
        mylist.add("vinit");
        mylist.add("owesh");
        mylist.add("sudarshan");
        mylist.add("sushant");
        System.out.println("Original list ");

        Iterator<String> itr=mylist.iterator();//getting the Iterator
        while(itr.hasNext()){check if iterator has the elements
        System.out.println(itr.next());
        }
        Collections.reverse(mylist);
        System.out.println(" ");
        System.out.println("reversed list ");

        Iterator<String> itr1=mylist.iterator();//getting the Iterator
        while(itr1.hasNext()){check if iterator has the elements

        System.out.println(itr1.next());
        }
        }
    }
```

Output :



```
<terminated> Reverse (1) [Java Application] C:\Users\vinit\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.f
Original list
vinit
owesh
sudarshan
sushant

reversed list
sushant
sudarshan
owesh
vinit
```

Problem Statement2 : Write a Java program using Set interface containing list of items and perform the following operations:

- a. Add items in the set.
- b. Insert items of one set in to other set.
- c. Remove items from the set
- d. Search the specified item in the set

Solution :

```
import java.util.*;
publicclass set1 {
publicstaticvoid main(String[] args) {
// TODO Auto-generated method stub
Set<Integer> s = new LinkedHashSet<Integer>();
s.add(69);
s.add(57);
s.add(10);
s.add(18);
s.add(90);
s.add(151);
Set<Integer> s1 = new LinkedHashSet<Integer>();
s1.add(70);
s1.add(35);

s.addAll(s1);
System.out.println("Set1: " + s);
System.out.println("Set2: " + s1);
System.out.println();
System.out.println("After Adding set2 into set1: " + s);
s.remove(10);
s.remove(18);
System.out.println("Set after removing elements: " + s);
System.out.println();
System.out.println("Does the Set contains: 57? "
+ s.contains(57));
System.out.println("Does the Set contains: 18? "
+ s.contains(18));
}
}
```

Output :

SQL Results Execution Plan Bookmarks Console Servers Cross References

<terminated> set1 [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wir

Set1: [69, 57, 10, 18, 90, 151, 70, 35]

Set2: [70, 35]

After Adding set2 into set1: [69, 57, 10, 18, 90, 151, 70, 35]

Set after removing elements: [69, 57, 90, 151, 70, 35]

Does the Set contains: 57? true

Does the Set contains: 18? false

Assignment 4

Map Interface

1. Write a Java program using Map interface containing list of items having keys and associated values and perform the following operations:

- a. Add items in the map.
- b. Remove items from the map
- c. Search specific key from the map
- d. Get value of the specified key
- e. Insert map elements of one map in to other map.
- f. Print all keys and values of the map.

Solution :

```
import java.util.*;
publicclass mapinterface {
    publicstaticvoid main(String[] args) {
        // TODO Auto-generated method stub
        Map<Integer, String> map = new HashMap<>();
        map.put(1,"Vinit");
        map.put(2,"Owesh");
        map.put(3,"Sudarshan");
        map.put(4,"Sushant");
        map.put(5,"Ashish");
        System.out.println();
        Map<Integer, String> map1 = new HashMap<>();
        map1.put(6,"Shruti");
        map1.put(7,"Prachi");
        map1.put(8,"Shradhha");
        System.out.println("Map 1");
        for (Map.Entry<Integer, String> e : map.entrySet())
            System.out.println(e.getKey() + " " + e.getValue());
        System.out.println();
        System.out.println("Map 2");
        for (Map.Entry<Integer, String> e : map1.entrySet())
            System.out.println(e.getKey() + " " + e.getValue());
        System.out.println("Insert map into another map");
        Map<Integer, String> map2 = new HashMap<>();
        map2.putAll(map);
        map2.putAll(map1);
        System.out.println(map2);
        System.out.println();
        System.out.println("Remove items from the map");
        map.remove((3));
        for (Map.Entry<Integer, String> e : map.entrySet())
            System.out.println(e.getKey() + " "+ e.getValue());
        System.out.println();
        System.out.println();
    }
}
```

```

System.out.println("Search specific key from the map");
System.out.println("Is the key '2' present? " +
    map.containsKey(2));
System.out.println("Is the key '6' present? " +
    map.containsKey(6));
System.out.println();
System.out.println("Get value of the specified key");
String val = (String)map.get(2);
System.out.println(val);
System.out.println();
}
}

```

Output :

```

<terminated> mapinterface [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64...
Map 1
1 Vinit
2 Owesh
3 Sudarshan
4 Sushant
5 Ashish

Map 2
6 Shruti
7 Prachi
8 Shradhha
Insert map into another map
{1=Vinit, 2=Owesh, 3=Sudarshan, 4=Sushant, 5=Ashish, 6=Shruti, 7=Prachi, 8=Shradhha}

Remove items from the map
1 Vinit
2 Owesh
4 Sushant
5 Ashish

Search specific key from the map
Is the key '2' present? true
Is the key '6' present? false

Get value of the specified key
Owesh

```

Assignment 5

Lambda Expressions

1. Write a Java program using Lambda Expression to print “Hello World!”.
2. Write a Java program using Lambda Expression with single parameter.
3. Write a Java program using Lambda Expression with multiple parameters to add two numbers.
4. Write a Java program using Lambda Expression to calculate the following:
 - a. Convert Fahrenheit to Celcius
 - b. Convert Kilometers to Miles.
5. Write a Java program using Lambda Expression with or without return keyword.
6. Write a Java program using Lambda Expression to concatenate two strings.

Problem Statement 1 :Write a Java program using Lambda Expression to print “Hello World!”.

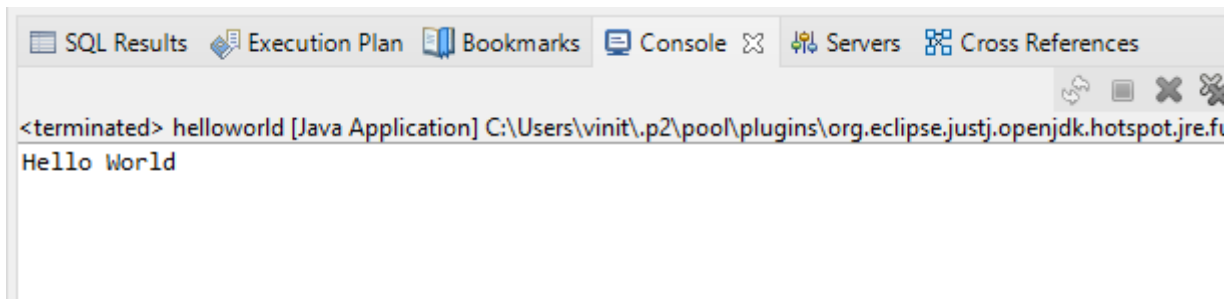
Solution :

```
package Lambdaexpression;

interface HelloWorld1 {
    String sayHello(String name);
}

public class helloworld {
    public static void main(String args[]){
        HelloWorld1 helloWorld = (String name) -> { return "Hello " + name; };
        System.out.println(helloWorld.sayHello("World"));
    }
}
```

Output :

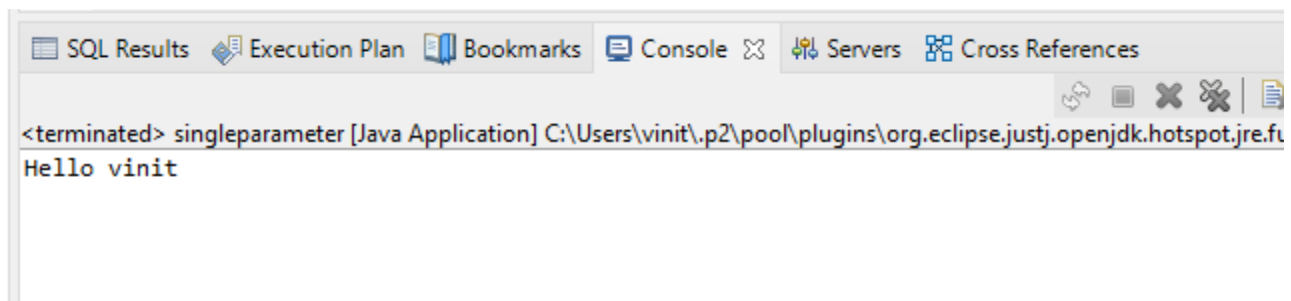


Problem Statement 2 :Write a Java program using Lambda Expression with single parameter.

Solution :

```
package Lambdaexpression;
interface Say{
public String say(String name);
}
public class singleparameter{
public static void main(String[] args) {
    Say s1=(name)->{
return "Hello "+name;
    };
    System.out.println(s1.say("vinit"));
}
}
```

Output :



Problem Statement 3 : Write a Java program using Lambda Expression with multiple parameters to add two numbers.

Solution :

```
package Lambdaexpression;
interface Add{
int add(int a,int b);
}

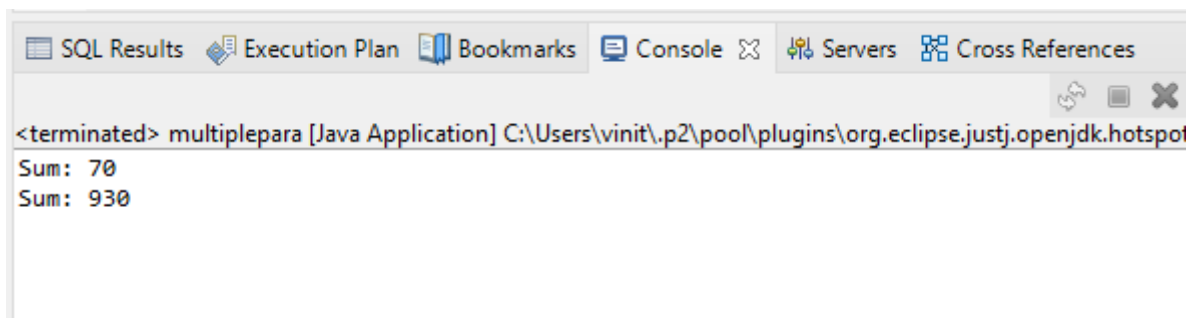
Public class multiplepara{
Public static void main(String[] args) {

    Add ad1=(a,b)->(a+b);
    System.out.println("Sum: " +ad1.add(50,20));

    Add ad2=(int a,int b)->(a+b);
    System.out.println("Sum: " +ad2.add(700,230));
}

}
```

Output :



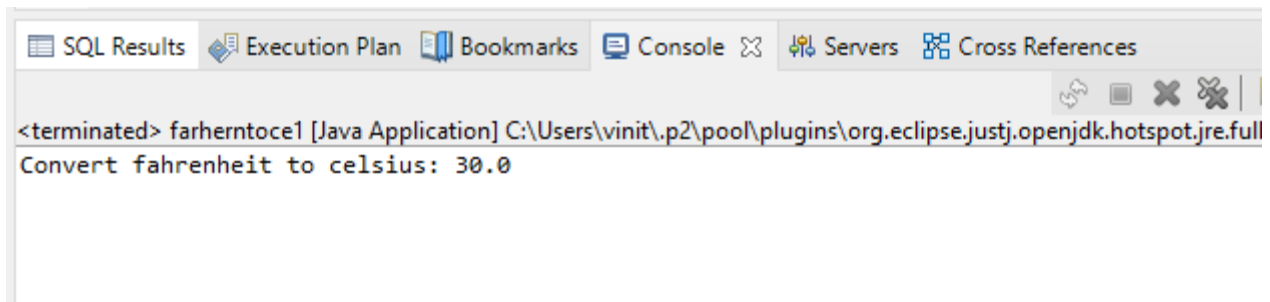
Problem Statement 4 : Write a Java program using Lambda Expression to calculate the following:

- a. Convert Fahrenheit to Celsius

Solution :

```
package Lambdaexpression;
interface temp
{
    Public double convert(double temp);
}
Public class farherntocele {
    Public staticvoid main(String[] args) {
        temp t1=(double a)->{
            return((a-32)* 5/9);
        };
        System.out.print("Convert fahrenheit to celsius: "+ t1.convert(86));
    }
}
```

Output :

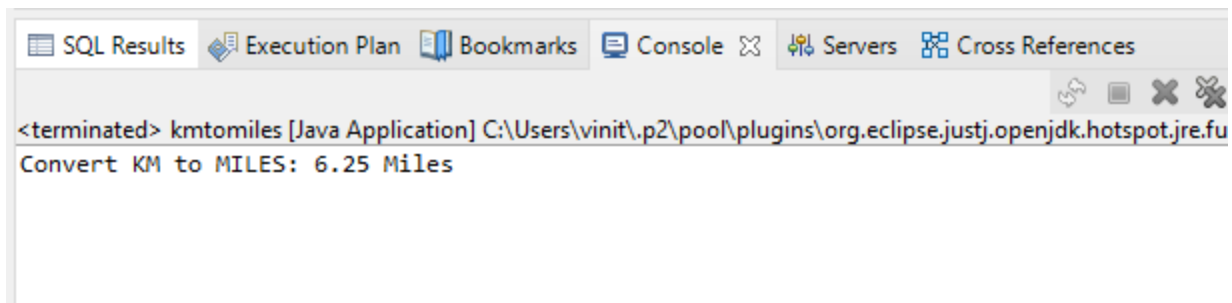


b. Convert Kilometers to Miles.

Solution :

```
package Lambdaexpression;
interface temp1
{
    public double convert(double temp);
}
public class kmtomiles {
    public static void main(String[] args) {
        temp t1 = (double a) -> {
            return a / 1.6;
        };
        System.out.print("Convert KM to MILES: " + t1.convert(10) + " Miles");
    }
}
```

Output :



Problem Statement 5 : Write a Java program using Lambda Expression with or without return keyword.

Solution :

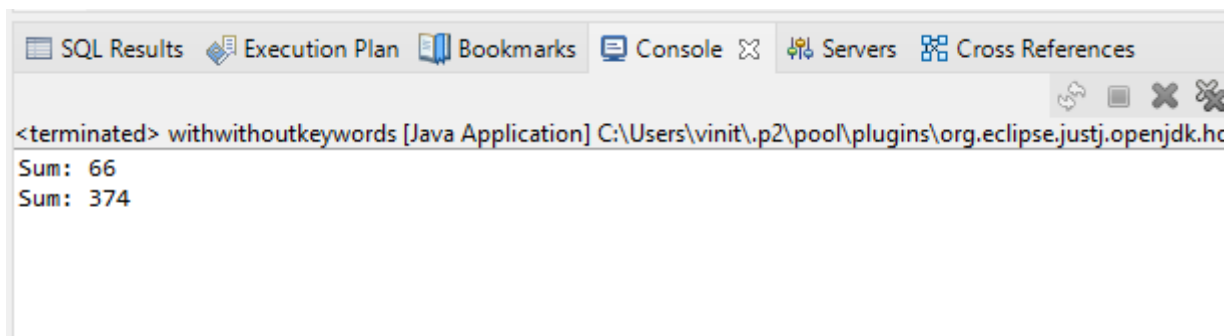
```
package Lambdaexpression;
interface Add2{
int add(int a,int b);
}

Public class withwithoutkeywords {
Public static void main(String[] args) {

    // without return keyword
    Add2 ad1=(a,b)->(a+b);
    System.out.println("Sum: " +ad1.add(43,23));

    // with return keyword
    Add2 ad2=(int a,int b)->
    {
return (a+b);
    };
    System.out.println("Sum: " +ad2.add(54,320));
    }
}
```

Output :

The screenshot shows the Eclipse IDE's Console window. The title bar includes tabs for SQL Results, Execution Plan, Bookmarks, Console, Servers, and Cross References. The Console output shows the program has terminated and printed two lines: "Sum: 66" and "Sum: 374". The path to the application is visible as C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hc.

```
<terminated> withwithoutkeywords [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hc
Sum: 66
Sum: 374
```

Problem Statement 6 : Write a Java program using Lambda Expression to concatenate two strings.

Solution :

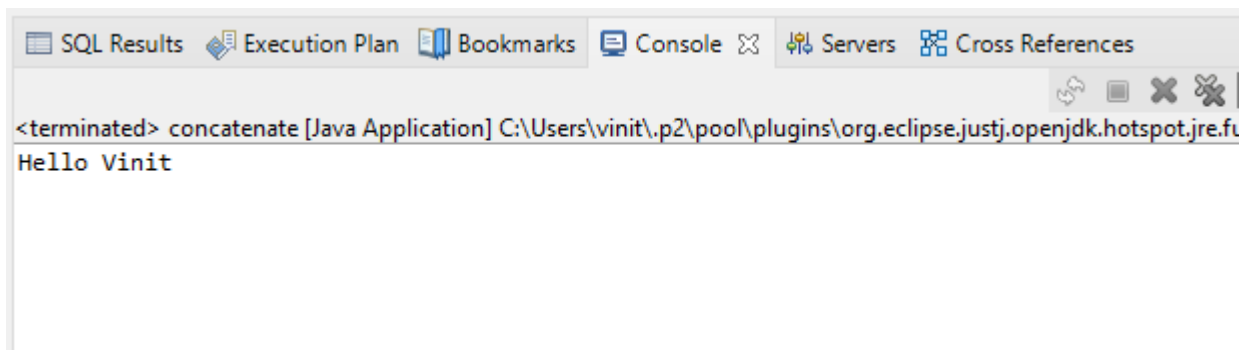
```
package Lambdaexpression;

interface conc1 {
    public String concat(String a,String b);
}

Public class concatenate {

    public static void main(String[] args) {
        conc1 s1 = (String a,String b)->{
            return (a+b);
        };
        System.out.println(s1.concat("Hello"," Vinit"));
    }
}
```

Output :



Assignments 6

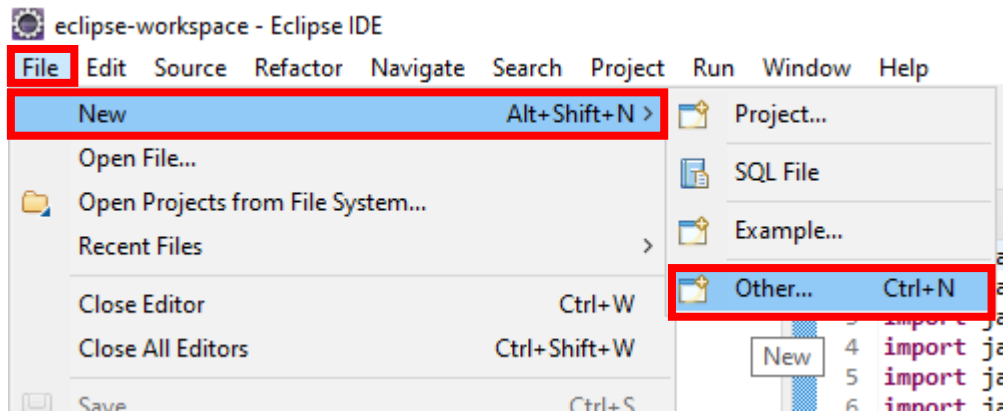
Web Application Development using JSP

1. Create a Telephone directory using JSP and store all the information within a database, so that later could be retrieved as per the requirement. Make your own assumptions.
2. Write a JSP page to display the Registration form (Make your own assumptions)
3. Write a JSP program to add, delete and display the records from StudentMaster (RollNo, Name, Semester, Course) table.
4. Design loan calculator using JSP which accepts Period of Time (in years) and Principal Loan Amount. Display the payment amount for each loan and then list the loan balance and interest paid for each payment over the term of the loan for the following time period and interest rate:
 - a. 1 to 7 year at 5.35%
 - b. 8 to 15 year at 5.5%
 - c. 16 to 30 year at 5.75%
5. Write a program using JSP that displays a webpage consisting Application form for change of Study Center which can be filled by any student who wants to change his/ her study center. Make necessary assumptions
6. Write a JSP program that demonstrates the use of JSP declaration, scriptlet, directives, expression, header and footer.
7. Write a JSP program that demonstrates the use of session or cookies.

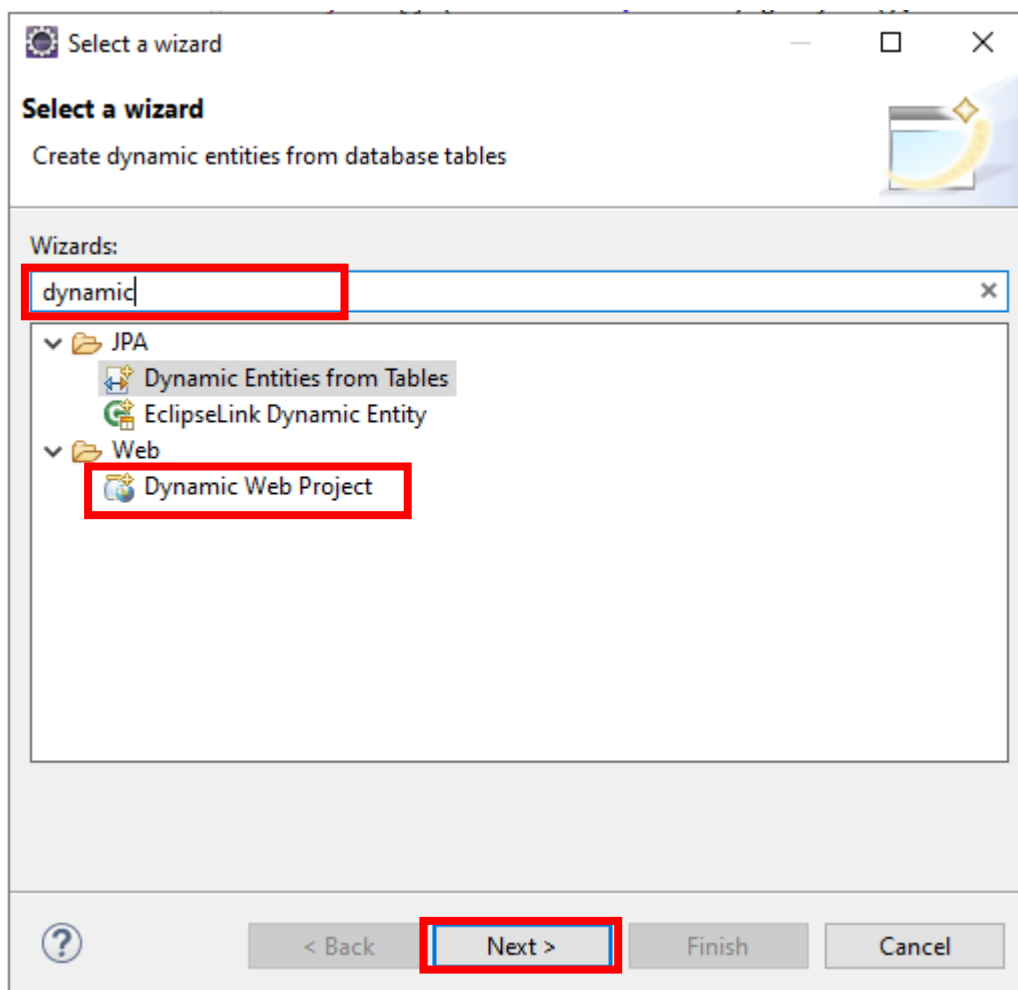
Steps to create Dynamic Web Project

Step 1: Create a new Dynamic Web Project

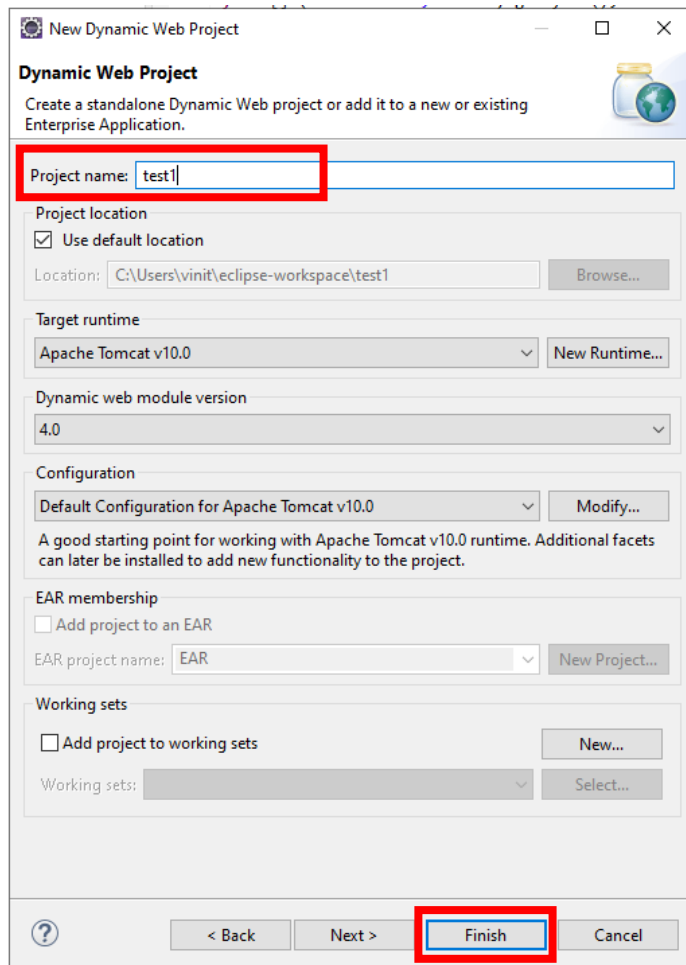
1.1. Click on File – New - Other



1.2. Search for 'Dyanmic' and Select 'Dynamic Web Project'. Then Click on Next



1.3. Enter Project Name of your wish, and click on Finish.



New Dynamic Web Project

Dynamic Web Project
Create a standalone Dynamic Web project or add it to a new or existing Enterprise Application.

Project name:

Project location
☒ Use default location
Location:

Target runtime

Dynamic web module version

Configuration

A good starting point for working with Apache Tomcat v10.0 runtime. Additional facets can later be installed to add new functionality to the project.

EAR membership
☐ Add project to an EAR
EAR project name:

Working sets
☐ Add project to working sets
Working sets:

This creates your Dynamic Web project.

Problem Statement 1. Create a Telephone directory using JSP and store all the information within a database, so that later could be retrieved as per the requirement. Make your own assumptions.

Database table (phone1) :

```
CREATE TABLE phone1
(
id SERIAL PRIMARY KEY,
name varchar(50),
no varchar(50)
);
```

Index.jsp :

```
<% @page import="java.sql.*" %>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";

Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");

if(request.getParameter("delete")!=null)
{
int id=Integer.parseInt(request.getParameter("delete"));

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("delete from phone1 where id=? "); // delete query
pstmt.setInt(1,id);
pstmt.executeUpdate(); //execute query

con.close(); //close connection
}
}
catch(Exception e)
{
out.println(e);
}
%>
<html>

<head>
```

```

<title>JSP:Insert, Update, Delete </title>

</head>

<body>

<br>
<br>
<center>
<h1><a href="add.jsp">CLICK HERE TO ADD A NEW MOBILE NUMBER</a></h1>
</center>
<br>
<center>
<table border='1' cellpadding='23'>
</center>
<tr>
<th>ID</th>
<th>NAME</th>
<th>MOBILE NUMBER</th>
<th>UPDATE</th>
<th>DELETE</th>
</tr>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";

Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("select * from phone1"); //select query

ResultSet rs=pstmt.executeQuery(); //execute query and set in resultset object rs.

while(rs.next())
{
%>
<tr>
<td><%=rs.getInt(1)%></td>
<td><%=rs.getString(2)%></td>
<td><%=rs.getString(3)%></td>
<td><a href="update.jsp?edit=<%=rs.getInt(1)%> ">Edit</a></td>
<td><a href="delete=<%=rs.getInt(1)%> ">Delete</a></td>

</tr>
<%
}

```

```

    }
    catch(Exception e)
    {
        out.println(e);
    }

```

```
%>
```

```
</table>
```

```
</body>
```

```
</html>
```

Add.jsp :

```
<% @ page import="java.sql.*" %>
```

```
<%
```

```
try
```

```
{
```

```
String driver ="org.postgresql.Driver";
```

```
String url ="jdbc:postgresql://localhost:5432/postgres";
```

```
String username ="postgres";
```

```
String password ="admin";
```

```
Connection con =null;
```

```
Class.forName(driver).newInstance();
```

```
con = DriverManager.getConnection(url,username,password);
```

```
System.out.println("Opened database successfully");
```

```
if(request.getParameter("btn_add")!=null) //check button click event not null
```

```
{
```

```
String name,no;
```

```
name=request.getParameter("txt_name");//txt_name
```

```
no=request.getParameter("txt_no");//txt_owner
```

```
PreparedStatement pstmt=null; //create statement
```

```
pstmt=con.prepareStatement("insert into phone1(name,no)values(?,?)"); // insert query
```

```
pstmt.setString(1,name);
```

```
pstmt.setString(2,no);
```

```
pstmt.executeUpdate(); //execute query
```

```
con.close(); //close connection
```

```
out.println("Insert Successfully...! Click Home page."); // after insert record successfully message
```

```
}
```

```
}
```

```
catch(Exception e)
```

```
{
```

```
out.println(e);
```

```
}
```



```

%>

<html>

<head>

<title>JSP:Insert, Update, Delete using MySQL</title>

<!-- javascript for form validation-->
<script>

function validate()
{
var name = document.myform.txt_name;
var no = document.myform.txt_no;
if (name.value == "")
{
window.alert("please enter a name ?");
name.focus();
return false;
}
if (no.value == "")
{
window.alert("please enter a mobile number ?");
name.focus();
return false;
}

}

</script>
</head>
<body>
<form method="post" name="myform" onsubmit="return validate();">
<center>
<h1>Insert Record</h1>
</center>
<table>
<tr>
<td><b>Name: </b></td>
<td><input type="text" name="txt_name"></td>
</tr>
<tr>
<td><b>Phone number:</b></td><b></b>
<td><input type="text" name="txt_no"></td>
</tr>
<tr>
<td><input type="submit" name="btn_add" value="Insert"></td>
</tr>
</table>
<center>
<h1><a href="index.jsp">Home page</a></h1>
</center>

```

</form>

</body>

</html>

Update.jsp :

```
<% @ page import="java.sql.*" %>
```

```
<%
```

```
try
```

```
{
```

```
String driver="org.postgresql.Driver";
```

```
String url="jdbc:postgresql://localhost:5432/postgres";
```

```
String username="postgres";
```

```
String password="admin";
```

```
Connection con=null;
```

```
Class.forName(driver).newInstance();
```

```
con=DriverManager.getConnection(url,username,password);
```

```
System.out.println("Opened database successfully");
```

```
if(request.getParameter("btn_update")!=null) //check button click event not null
```

```
{
```

```
int hide,name,no;;
```

```
String name_up,no_up;
```

```
hide=Integer.parseInt(request.getParameter("txt_hide")); //it is hidden id get for update record
```

```
name_up=request.getParameter("txt_name");
```

```
no_up=request.getParameter("txt_no"); //txt_name
```

```
PreparedStatement pstmt=null; //create statement
```

```
pstmt=con.prepareStatement("update phone1 set name=?,no=? where id=?"); // update query
```

```
pstmt.setString(1,name_up);
```

```
pstmt.setString(2,no_up);
```

```
pstmt.setInt(3,hide);
```

```
pstmt.executeUpdate(); //execute query
```

```
con.close(); //connection close
```

```
out.println("Update Successfully...! Click Back link."); //after update record successfully message
```

```
}
```

```
}
```

```
catch(Exception e)
```

```
{
```

```
out.println(e);
```

```
}
```

```

%>

<html>

<head>

<title>JSP:Insert, Update, Delete using MySQL</title>

<!-- javascript for form validation-->
<script>

function validate()
{
var name = document.myform.txt_name;
var no = document.myform.txt_no;

if (rno.value == "")
{
window.alert("please enter name ?");
name.focus();
return false;
}
if (name.value == "")
{
window.alert("please enter number ?");
name.focus();
return false;
}
}

</script>

</head>

<body>

<form method="post" name="myform" onsubmit="return validate();">

<center>
<h1>Update Record</h1>
</center>

<table>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";

```

```

String password ="admin";

Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");

if(request.getParameter("edit")!=null)
{
int id=Integer.parseInt(request.getParameter("edit"));

String name,no;

PreparedStatement pstmt=null; // create statement

pstmt=con.prepareStatement("select * from phone1 where id=?"); // sql select query
pstmt.setInt(1,id);
ResultSet rs=pstmt.executeQuery(); // execute query store in resultset object rs.

while(rs.next())
{
id=rs.getInt(1);
name=rs.getString(2);
no=rs.getString(3);

%>
<tr>
<td>Name</td>
<td><input type="text" name="txt_name" value="<%=name%>"></td>
</tr>
<tr>
<td>Mobile Number</td>
<td><input type="text" name="txt_no" value="<%=no%>"></td>
</tr>
<tr>
<td><input type="submit" name="btn_update" value="Update"></td>
</tr>

<input type="hidden" name="txt_hide" value="<%=id%>">
<%
}
}
}
catch(Exception e)
{
out.println(e);
}
%>
</table>

<center>
<h1><a href="index.jsp">Back</a></h1>
</center>

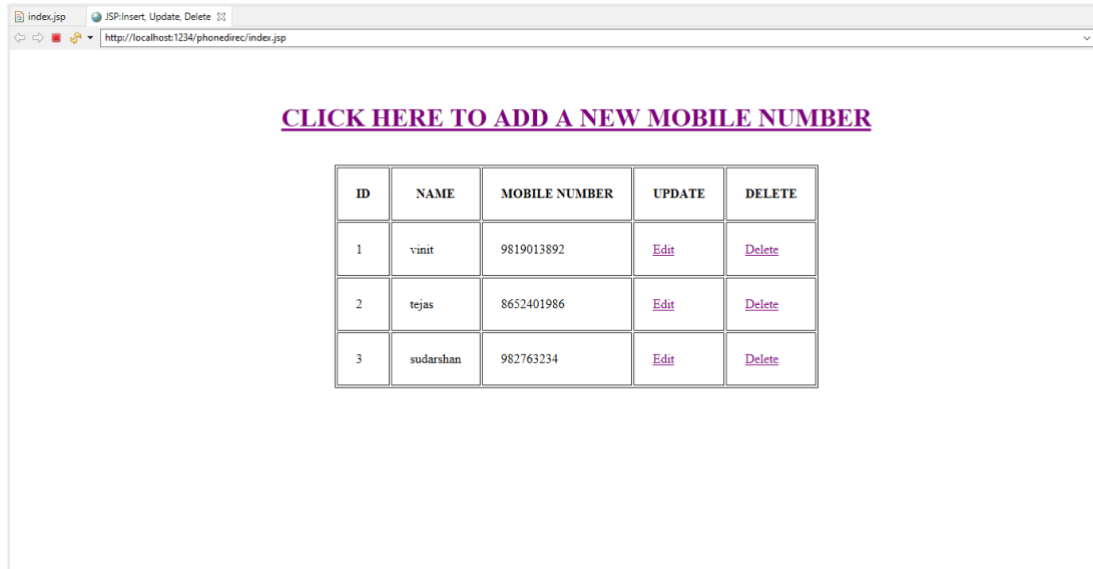
```

</form>

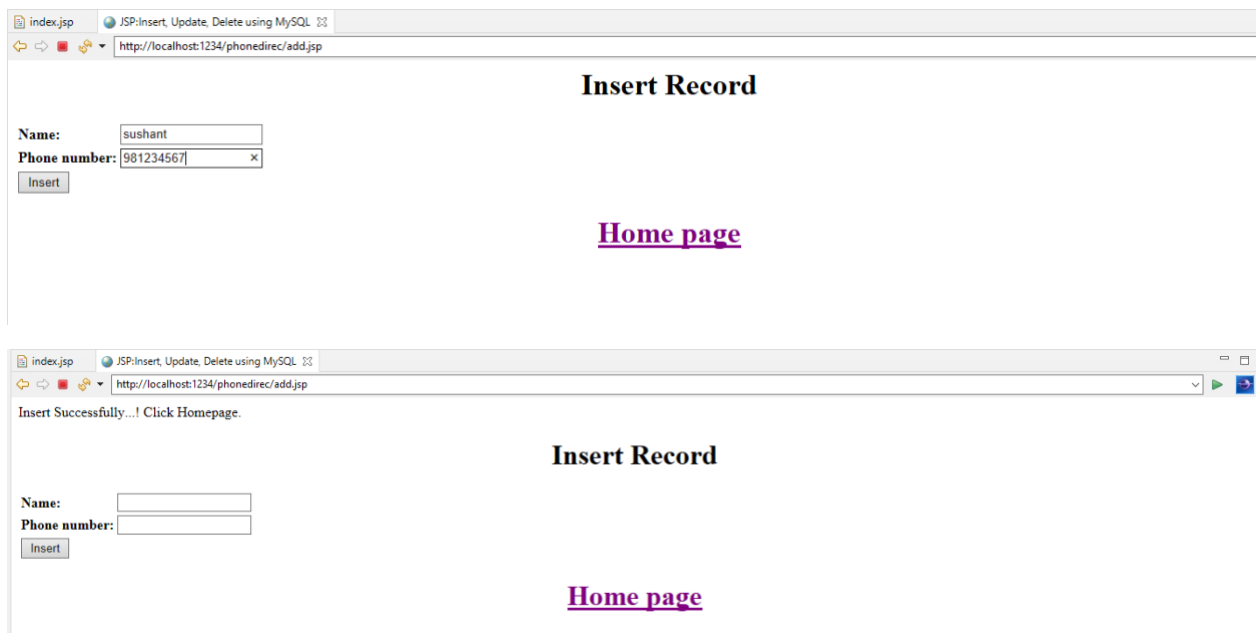
</body>

</html>

Output:



- Adding new record to database



- New record successfully added to the database

index.jsp JSP:Insert, Update, Delete http://localhost:1234/phonedirec/index.jsp

[CLICK HERE TO ADD A NEW MOBILE NUMBER](#)

ID	NAME	MOBILE NUMBER	UPDATE	DELETE
1	vinit	9819013892	Edit	Delete
2	tejas	8652401986	Edit	Delete
3	sudarshan	982763234	Edit	Delete
6	sushant	981234567	Edit	Delete

Data Output	Explain	Messages	Notifications
<div> <div></div> <div>id</div> <div>[PK] integer</div> <div></div> </div>	<div> <div></div> <div>name</div> <div>character varying (50)</div> <div></div> </div>	<div> <div></div> <div>no</div> <div>character varying (50)</div> <div></div> </div>	
1	1	vinit	9819013892
2	2	tejas	8652401986
3	3	sudarshan	98276234
4	4	sushant	981234567

Problem Statement 2. Write a JSP page to display the Registration form (Make your own assumptions)

Database table (studentreg1) :

```
CREATE TABLE studentreg1
(
id SERIAL PRIMARY KEY,
first_name varchar(50),
last_name varchar(50),
phn_number varchar(20),
address varchar(20),
course varchar(20),
college_name varchar(20)
);
```

Add.jsp :

```
<% @ page import="java.sql.*" %>
```

```
<%
```

```
try
```

```
{
```

```
String driver ="org.postgresql.Driver";
```

```
String url ="jdbc:postgresql://localhost:5432/postgres";
```

```
String username ="postgres";
```

```
String password ="admin";
```

```
Connection con =null;
```

```
Class.forName(driver).newInstance();
```

```
con = DriverManager.getConnection(url,username,password);
```

```
System.out.println("Opened database successfully");
```

```
if(request.getParameter("btn_add")!=null) //check button click event not null
```

```
{
```

```
String first_name,last_name,phn_number,address,course,college_name;
```

```
first_name=request.getParameter("txt_first_name"); //txt_name
```

```
last_name=request.getParameter("txt_last_name"); //txt_owner
```

```
phn_number=request.getParameter("txt_phn_number");
```

```
address=request.getParameter("txt_address");
```

```
course=request.getParameter("txt_course");
```

```
college_name=request.getParameter("txt_college_name");
```

```
PreparedStatement pstmt=null; //create statement
```

```
pstmt=con.prepareStatement("insert into
```

```
studentreg1(first_name,last_name,phn_number,address,course,college_name)values(?,?,?,?,?,?); // insert query
```

```
pstmt.setString(1,first_name);
```

```
pstmt.setString(2,last_name);
```

```
pstmt.setString(3,phn_number);
```

```
pstmt.setString(4,address);
```

```
pstmt.setString(5,course);
```

```

pstmt.setString(6,college_name);
pstmt.executeUpdate(); //execute query
con.close(); //close connection
out.println("Insert Successfully...!"); // after insert record successfully message

}

}
catch(Exception e)
{
out.println(e);
}

%>

<html>

<head>

<!-- javascript for form validation-->
<script>

function validate()
{
var first_name = document.myform.txt_first_name;
var last_name = document.myform.txt_last_name;
var phn_number = document.myform.txt_phn_number;
var address = document.myform.txt_address;
var course = document.myform.txt_course;
var college_name = document.myform.txt_college_name;
if (first_name.value == "")
{
window.alert("please enter a first name ?");
name.focus();
return false;
}
if (last_name.value == "")
{
window.alert("please enter a last name ?");
name.focus();
return false;
}
if (phn_number.value == "")
{
window.alert("please enter a mobile number ?");
name.focus();
return false;
}
if (address.value == "")
{
window.alert("please enter address ?");
name.focus();
return false;
}
}

```



```

if (course.value == "")
{
window.alert("please enter course ?");
name.focus();
return false;
}
if (college_name.value == "")
{
window.alert("please enter college name ?");
name.focus();
return false;
}

}

</script>

</head>

<body bgcolor="deea94">

<div align="center">
<form method="post" name="myform" onsubmit="return validate();">

<center>
<h1><u>STUDENT REGISTRATION FORM</u></h1>
</center>

<br>
<table>
<tr>
<td><b>First Name: </b></td>
<td><input type="text" name="txt_first_name"></td>
</tr>

<tr>
<td><b>Last Name:</b></td></b>
<td><input type="text" name="txt_last_name"></td>
</tr>

<tr>
<td><b>Phone number:</b></td></b>
<td><input type="text" name="txt_phn_number"></td>
</tr>

<tr>
<td><b>Address:</b></td></b>
<td><input type="text" name="txt_address"></td>
</tr>

<tr>
<td><b>Course:</b></td></b>
<td><input type="text" name="txt_course"></td>
</tr>

```

```

<tr>
<td><b>College Name:</b></td></b>
<td><input type="text" name="txt_college_name"></td>
</tr>

<tr>
<td><br><input type="submit" name="btn_add" value="Submit"></br></td>
</tr>

</table>

<center>

<p><a><span>&#8595;</span><u>Click Below to list all the</u><span>&#8595;</span></a></p>
<p><a href="index.jsp">Registered Students Details</a></p>
</center>
</form>
</div>
</body>
</html>

```

Index.jsp :

```

<% @page import="java.sql.*" %>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";

Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");

if(request.getParameter("delete")!=null)
{
int id=Integer.parseInt(request.getParameter("delete"));

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("delete from studentreg1 where id=? "); // delete query
pstmt.setInt(1,id);
pstmt.executeUpdate(); //execute query

con.close(); //close connection
}
}
catch(Exception e)
{
out.println(e);
}
}

```

```

%>
<html>

<head>
<title>JSP:Insert, Update, Delete </title>
</head>

<body bgcolor="F9CDAD">
<br>
<br>
<br>
<center>
<h1><u>DETAILS OF REGISTERED STUDENTS</u></h1>
</center>
<br><br>
<center>
<table border='1' cellpadding='23'>
</center>
<tr>
<th>ID</th>
<th>First Name</th>
<th>Last Name</th>
<th>Mobile Number</th>
<th>Address</th>
<th>Course</th>
<th>College Name</th>
</tr>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";

Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("select * from studentreg1"); //select query

ResultSet rs=pstmt.executeQuery(); //execute query and set in resultset object rs.

while(rs.next())
{
%>
<tr>
<td><%=rs.getInt(1)%></td>
<td><%=rs.getString(2)%></td>
<td><%=rs.getString(3)%></td>
<td><%=rs.getString(4)%></td>
<td><%=rs.getString(5)%></td>

```

```

<td><%=rs.getString(6)%></td>
<td><%=rs.getString(7)%></td>
</tr>
<%
}

}
catch(Exception e)
{
out.println(e);
}
%>
</table>
</body>
</html>

```

OUTPUT :

ID	First Name	Last Name	Mobile Number	Address	Course	College Name
8	vinit	mhatre	9819013892	Panvel	MCA	BVP
9	Owesh	khatri	8652401986	Thane	MCA	BVP
10	Sudarshan	Bhagat	9000032452	Nerul	MCA	BVP
11	Keshav	Patil	9827773212	Mumbai	BCA	SIES

Data Output	Explain	Messages	Notifications			
<div><div><div></div><div>id</div><div>[PK] integer</div></div></div>	<div><div><div></div><div>first_name</div><div>character varying (50)</div></div></div>	<div><div><div></div><div>last_name</div><div>character varying (50)</div></div></div>	<div><div><div></div><div>phn_number</div><div>character varying (20)</div></div></div>	<div><div><div></div><div>address</div><div>character varying (20)</div></div></div>	<div><div><div></div><div>course</div><div>character varying (20)</div></div></div>	<div><div><div></div><div>college_name</div><div>character varying (20)</div></div></div>
1	8 vinit	mhatre	9819013892	Panvel	MCA	BVP
2	9 Owesh	khatri	8652401986	Thane	MCA	BVP
3	10 Sudarshan	Bhagat	9000032452	Nerul	MCA	BVP
4	11 Keshav	Patil	9827773212	Mumbai	BCA	SIES

Problem Statement 3. Write a JSP program to add, delete and display the records from StudentMaster (RollNo, Name, Semester, Course) table.

Database table(student1):

```
CREATE TABLE student1
(
id SERIAL PRIMARY KEY,
rno varchar(50),
name varchar(50),
semester varchar(50),
course varchar(50)
);
```

Index.jsp :

```
<% @page import="java.sql.*" %>

<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";
Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");
if(request.getParameter("delete")!=null)
```

```
{
int id=Integer.parseInt(request.getParameter("delete"));

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("delete from student1 where id=? "); // delete query

pstmt.setInt(1,id);

pstmt.executeUpdate(); //execute query

con.close(); //close connection

}

}

catch(Exception e)

{

out.println(e);

}

%>

<html>

<head>

<title>JSP:Insert, Update, Delete </title>

</head>

<body>

<center>

<h1><a href="add.jsp">Add Record</a></h1>

</center>

<table>

<tr>

<th>ID</th>

<th>Roll No</th>

<th>Name</th>
```

<th>Sem</th>

<th>Course</th>

<th>Update</th>

<th>Delete</th>

</tr>

<%

try

{

String driver ="org.postgresql.Driver";

String url ="jdbc:postgresql://localhost:5432/postgres";

String username ="postgres";

String password ="admin";

Connection con =null;

Class.forName(driver).newInstance();

con = DriverManager.getConnection(url,username,password);

PreparedStatement pstmt=null; //create statement

pstmt=con.prepareStatement("select * from student1"); //select query

ResultSet rs=pstmt.executeQuery(); //execute query and set in resultset object rs.

while(rs.next())

{

%>

<tr>

<td><%=rs.getInt(1)%></td>

<td><%=rs.getString(2)%></td>

<td><%=rs.getString(3)%></td>

<td><%=rs.getString(4)%></td>

<td><%=rs.getString(5)%></td>

Trishna Tamanna Biswal(B-6)

```

<td><a href="update.jsp?edit=<%=rs.getInt(1)%> ">Edit</a></td>

<td><a href="?delete=<%=rs.getInt(1)%> ">Delete</a></td>

</tr>

<%

}

}

catch(Exception e)

{

out.println(e);

}

%>

</table>

</body>

</html>

```

Add.jsp :

```

<% @ page import="java.sql.*" %>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";
Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");
if(request.getParameter("btn_add")!=null) //check button click event not null
{
String rno,name,semester,course;
rno=request.getParameter("txt_rno");
name=request.getParameter("txt_name"); //txt_name
semester=request.getParameter("txt_sem"); //txt_owner
course=request.getParameter("txt_course"); //txt_owner
PreparedStatement pstmt=null; //create statement
pstmt=con.prepareStatement("insert into student1(rno,name,semester,course)values(?,?,?,?)"); // insert query

```



```

pstmt.setString(1,rno);
pstmt.setString(2,name);
pstmt.setString(3,semester);
pstmt.setString(4,course);
pstmt.executeUpdate(); //execute query
con.close(); //close connection
out.println("Insert Successfully...! Click Back link."); // after insert record successfully message
}
}
catch(Exception e)
{
out.println(e);
}
%>
<html>
<head>
<title>JSP:Insert, Update, Delete using MySQL</title>

```

```

<!-- javascript for form validation-->
<script>
function validate()
{
var rno = document.myform.txt_rno;
var name = document.myform.txt_name;
var semester = document.myform.txt_sem;
var course = document.myform.txt_course;
if (rno.value == "")
{
window.alert("please enter rno ?");
name.focus();
return false;
}
if (name.value == "")
{
window.alert("please enter name ?");
name.focus();
return false;
}
if (semester.value == "")
{
window.alert("please enter sem ?");
owner.focus();
return false;
}
if (course.value == "")
{
window.alert("please enter course ?");
owner.focus();
return false;
}
}
</script>
</head>

```

```

<body>
<form method="post" name="myform" onsubmit="return validate();">
<center>
<h1>Insert Record</h1>
</center>
<table>
<tr>
<td>Roll No</td>
<td><input type="text" name="txt_rno"></td>
</tr>
<tr>
<td>Name</td>
<td><input type="text" name="txt_name"></td>
</tr>
<tr>
<td>Sem</td>
<td><input type="text" name="txt_sem"></td>
</tr>
<tr>
<td>Course</td>
<td><input type="text" name="txt_course"></td>
</tr>
<tr>
<td><input type="submit" name="btn_add" value="Insert"></td>
</tr>
</table>
<center>
<h1><a href="index.jsp">Back</a></h1>
</center>
</form>
</body>
</html>

```

Update.jsp :

```

<% @ page import="java.sql.*" %>

<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";
Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");
if(request.getParameter("btn_update")!=null) //check button click event not null
{
int hide,rno,name,semester,course;;
String rno_up,name_up,semester_up,course_up;
hide=Integer.parseInt(request.getParameter("txt_hide")); //it is hidden id get for update record
rno_up=request.getParameter("txt_rno");

```

```

name_up=request.getParameter("txt_name"); //txt_name
semester_up=request.getParameter("txt_semester");
course_up=request.getParameter("txt_course");
PreparedStatement pstmt=null; //create statement
pstmt=con.prepareStatement("update student1 set rno=?,name=?, semester=?, course=? where id=?"); // update query
pstmt.setString(1,rno_up);
pstmt.setString(2,name_up);
pstmt.setString(3,semester_up);
pstmt.setString(4,course_up);
pstmt.setInt(5,hide);
pstmt.executeUpdate(); //execute query
con.close(); //connection close
out.println("Update Successfully...! Click Back link."); //after update record successfully message
}
}
catch(Exception e)
{
out.println(e);
}
%>
<html>
<head>
<title>JSP:Insert, Update, Delete using MySQL</title>

<!-- javascript for form validation-->
<script>

function validate()
{
var rno = document.myform.txt_rno;
var name = document.myform.txt_name;
var semester = document.myform.txt_semester;
var course = document.myform.txt_course;
if (rno.value == "")
{
window.alert("please enter rno ?");
name.focus();
return false;
}
if (name.value == "")
{
window.alert("please enter name ?");
name.focus();
return false;
}
if (semester.value == "")
{
window.alert("please enter sem ?");
owner.focus();
return false;
}
if (course.value == "")
{
window.alert("please enter course ?");
}
}
Trishna Tamanna Biswal(B-6)

```

```

owner.focus();
return false;
}}
</script>
</head>
<body>

<form method="post" name="myform" onsubmit="return validate();">
<center>
<h1>Update Record</h1>
</center>
<table>
<%
try
{
String driver ="org.postgresql.Driver";
String url ="jdbc:postgresql://localhost:5432/postgres";
String username ="postgres";
String password ="admin";
Connection con =null;
Class.forName(driver).newInstance();
con = DriverManager.getConnection(url,username,password);
System.out.println("Opened database successfully");
if(request.getParameter("edit")!=null)
{
int id=Integer.parseInt(request.getParameter("edit"));
String rno,name,semester,course;
PreparedStatement pstmt=null; // create statement
pstmt=con.prepareStatement("select * from student1 where id=?"); // sql select query
pstmt.setInt(1,id);
ResultSet rs=pstmt.executeQuery(); // execute query store in resultset object rs.
while(rs.next())
{
id=rs.getInt(1);
rno=rs.getString(2);
name=rs.getString(3);
semester=rs.getString(4);
course=rs.getString(5);
%>
<tr>
<td>Roll NO</td>
<td><input type="text" name="txt_rno" value="<%=rno%>"></td>
</tr>
<tr>
<td>Name</td>
<td><input type="text" name="txt_name" value="<%=name%>"></td>
</tr>
<tr>
<td>Sem</td>
<td><input type="text" name="txt_semester" value="<%=semester%>"></td>
</tr>
<tr>
<td>Course</td>
<td><input type="text" name="txt_course" value="<%=course%>"></td>

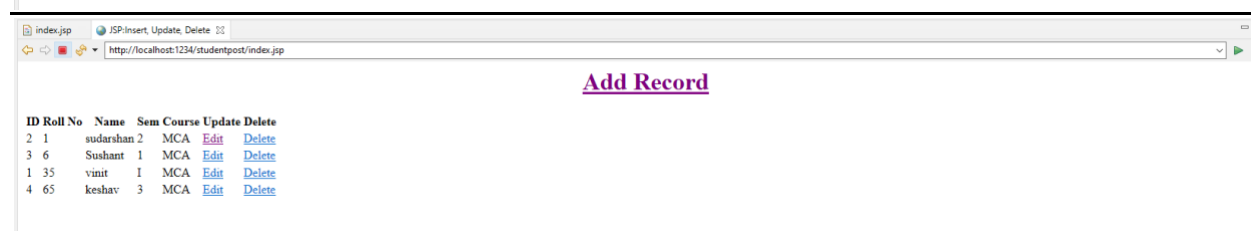
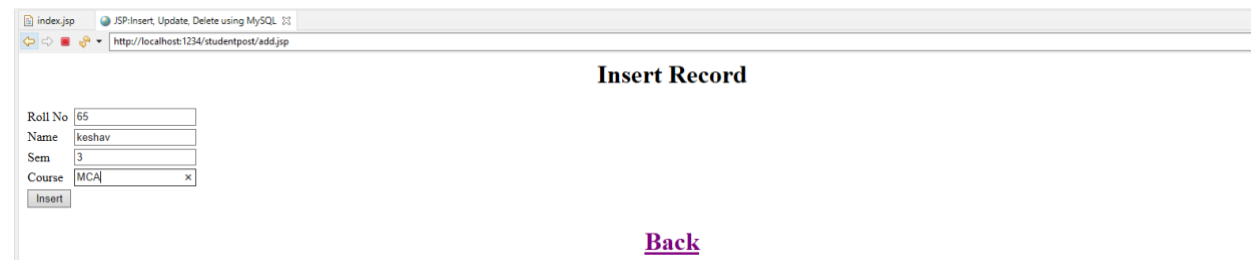
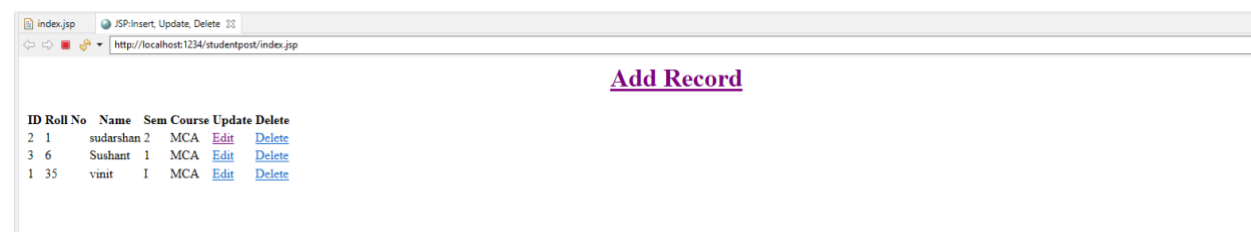
```

```

</tr>
<tr>
<td><input type="submit" name="btn_update" value="Update"></td>
</tr>
<input type="hidden" name="txt_hide" value="<%=id%>">
<%
}
}
}
catch(Exception e)
{
out.println(e);
}
%>
</table>
<center>
<h1><a href="index.jsp">Back</a></h1>
</center>
</form>
</body></html>

```

Output:



Data Output

Explain

Messages

Notifications

	id [PK] integer	rno character varying (50)	name character varying (50)	semester character varying (50)	course character varying (50)
1	2	1	sudarshan	2	MCA
2	3	6	Sushant	1	MCA
3	1	35	vinit	1	MCA
4	4	65	keshav	3	MCA

Problem Statement 4. Design loan calculator using JSP which accepts Period of Time (in years) and Principal Loan Amount. Display the payment amount for each loan and then list the loan balance and interest paid for each payment over the term of the loan for the following time period and interest rate:

- a. 1 to 7 year at 5.35%**
- b. 8 to 15 year at 5.5%**
- c. 16 to 30 year at 5.75%**

Cal.jsp :

```
<% @page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>JSP Page</title>
</head>
<body><br><br><center>
<form action="test.jsp "><pre>
<h1>Principle :: <input type="text" name="principle" value="0 " ><br>
    No. of Years :: <input type="text" name="year" value="0 " ><br>
    Rate of Interest :: <input type="text" name="interest" value="0 " > %<br>
<br>
<input type="submit" value="Submit"></h1>

</pre></form></center>
</body>
</html>
```

Test.jsp:

```
<% @page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>JSP Page</title>
</head>
<body><br><br><center><pre><H1>
<%
```

```
String ns= request.getParameter("principle");
String ns1= request.getParameter("year");
String ns2= request.getParameter("interest");
int n1=Integer.parseInt(ns);
int n2=Integer.parseInt(ns1);
Trishna Tamanna Biswal(B-6)
```

```

float n3 = Float.valueOf(ns2);

double si=((n1*n2*n3)/100);
double x;
x=n1+si;

double r = (n3)/(12*100);

int mon;
mon=((n2)*12);
double emi= (n1*r*Math.pow(1+r,mon))/(Math.pow(1+r,mon)-1);

%>
<%
out.println("Principle =      "+n1);
out.println(" Years =      "+n2);
out.println(" Rate of Interest = "+n3);
out.println("<br> ");
out.println("Loan Amount =      "+n1);
out.println(" Interest Paid = "+si);
out.println(" Total Loan Amount = "+x);
out.println("<br> ");
out.print(" Loan Tenure in months= " +mon);
out.println("<br> ");
out.print(" EMI is= "+emi+"\n");

%>
</H1>
</pre>
</center>
</body></body>
</html>

```

Output:

Principle ::

No. of Years ::

Rate of Interest :: %

a. 1 to 7 year at 5.35%

```
cal.jsp marks.jsp JSP Page 00
http://localhost:1234/Marksal/marks.jsp?principle=30000&year=4&interest=5.35

Principle = 30000
Years = 4
Rate of Interest = 5.35

Loan Amount = 30000
Interest Paid = 6420.0
Total Loan Amount = 36420.0

Loan Tenure in months= 48
EMI is= 695.6452973299158
```

```
cal.jsp marks.jsp JSP Page 00
http://localhost:1234/Marksal/marks.jsp?principle=30000&year=10&interest=5.5

Principle = 30000
Years = 10
Rate of Interest = 5.5

Loan Amount = 30000
Interest Paid = 16500.0
Total Loan Amount = 46500.0

Loan Tenure in months= 120
EMI is= 325.5788306695736
```

c. 16 to 30 year at 5.75%

```
cal.jsp marks.jsp JSP Page 00
http://localhost:1234/Marksal/marks.jsp?principle=30000&year=15&interest=5.75

Principle = 30000
Years = 15
Rate of Interest = 5.75

Loan Amount = 30000
Interest Paid = 25875.0
Total Loan Amount = 55875.0

Loan Tenure in months= 180
EMI is= 249.12302778152468
```


Problem Statement 5. Write a program using JSP that displays a webpage consisting Application form for change of Study Center which can be filled by any student who wants to change his/ her study center. Make necessary assumptions

```
<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Study Center</title>
<link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap-icons@1.4.0/font/bootstrap-icons.css">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.0-beta2/dist/css/bootstrap.min.css" rel="stylesheet"
integrity="sha384-BmbxuPwQa2lc/FVzBcNJ7UAyJxM6wquijl61tLrc4wSX0szH/Ev+nYRRuWlolflfl"
crossorigin="anonymous">

</head>
<body>
<center>

<h1>Change of Study Center</h1>

<form action="main.jsp" method="post">

<table>
<tr>
<td>UID No.</td>
<td><input type="text" name="uid" required/></td>
</tr>
<tr>
<td>
Current Center
</td>
<td>
<select name="currentCenter" required>
<option selected disabled hidden></option>
<option value="MUMBAI">MUMBAI</option>
<option value="PUNE">PUNE</option>
<option value="GUJRAT">GUJRAT</option>
</select>
</td>
</tr>
<tr>
<td>
New Center
</td>
<td>
<select name="newCenter" required>
<option selected disabled hidden></option>
<option value="MUMBAI">MUMBAI</option>
<option value="PUNE">PUNE</option>
<option value="GUJRAT">GUJRAT</option>
</select>
</td>
</tr>
</table>
</body>
</html>
```

```

</td>
</tr>

</table>
<input type="submit" value="Submit"/>
</form>

</center>

<%

if(request.getParameter("uid") != null&& request.getParameter("currentCenter") != null&&
request.getParameter("newCenter") != null){
out.println("<center><br>Your request to change Study Center from <br>" +
request.getParameter("currentCenter") + " to " + request.getParameter("newCenter") + "<br> has been sent to the
Administrator.</center>");
}

%>

</body>
</html>

```

Output:



main.jsp Study Center

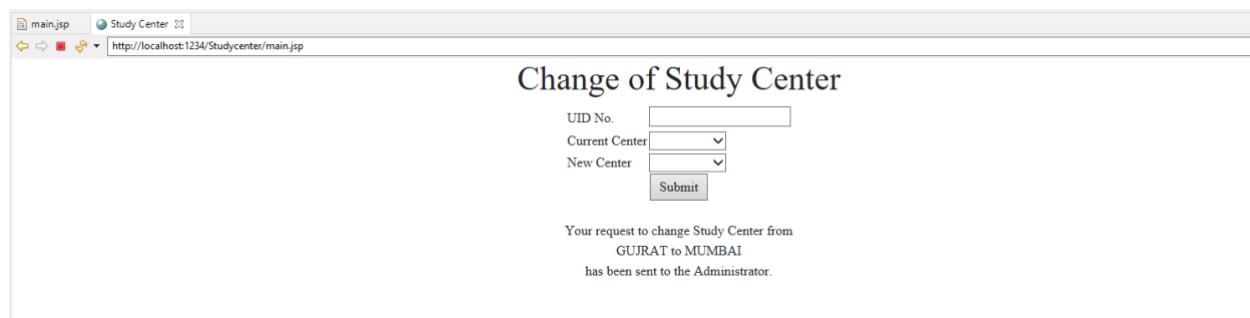
http://localhost:1234/Studycenter/main.jsp

Change of Study Center

UID No.

Current Center

New Center



main.jsp Study Center

http://localhost:1234/Studycenter/main.jsp

Change of Study Center

UID No.

Current Center

New Center

Your request to change Study Center from
GUJRAT to MUMBAI
has been sent to the Administrator.

Problem Statement 6. Write a JSP program that demonstrates the use of JSP declaration, scriptlet, directives, expression, header and footer.

Main.jsp :

```
<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>JSP EXAMPLE</title>
</head>
<body>
<% @ include file = "header.jsp" %>
<center>
<%! int data=50; %>
<%= "Value of the variable is:"+data %>
<%!
double circle(int n){ return 3.14*n*n;}
%></br>
<%= "Area of circle is:"+ circle(3) %></br>
<%!
int rectangle(int l,int b){ return l*b;}
%>
<%= "Area of rectangle is:"+rectangle(3,4
) %></br>
<%!
int perimeter(int x,int y){
    int peri=2*(x+y);
    return peri;}
%>
<%= "Perimeter of rectanlge:"+perimeter(5,6
) %></br>
<p>Thanks for visiting my page.</p>
</center>
<% @ include file = "footer.jsp" %>
</body>
</html>
```

Header.jsp :

```
<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>

<%!
int pageCount = 0;
void addCount() {
    pageCount++;
    Trishna Tamanna Biswal(B-6)
```

```

}
%>
<% addCount(); %>
<html>
<head>
<title>JSP declaration, scriptlet, directives, expression, header and footer Example</title>
</head>
<body>
<center>
<h2><u>The include Directive Example</u></h2>
<p><b>This site has been visited <%= pageCount %> times.</b></p>
</center>
<br/><br/>

</body>
</html>

```

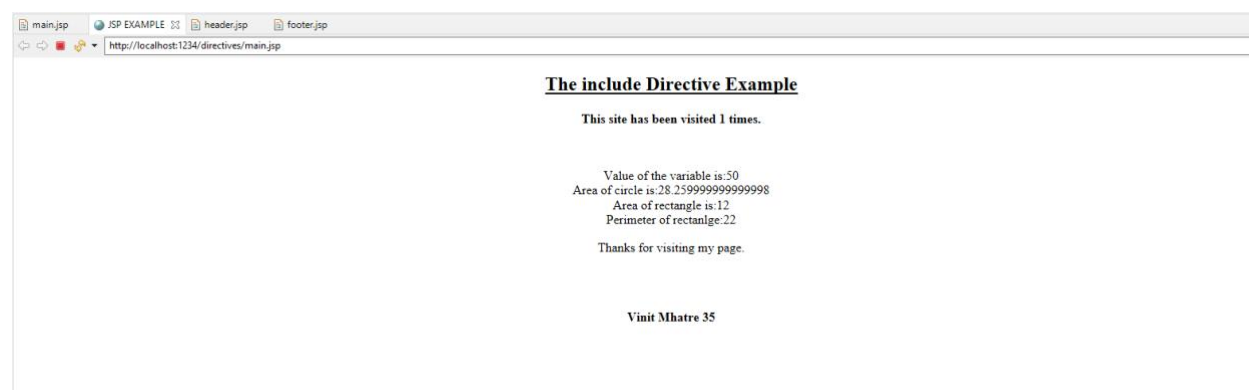
Footer.jsp:

```

<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
<br/><br/>
<center><p><b>Vinit Mhatre 35</b></p></center></body></html>

```

Output:



Problem Statement 7. Write a JSP program that demonstrates the use of session or cookies.

Cookie.jsp :

```
<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
pageEncoding="ISO-8859-1"%>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Cookie</title>
</head>
<body><center>
<br><br><br><br><br>
<form action="action.jsp" method="GET">
<h1>Program that demonstrates the use of session or cookies.</h1>
Username: <input type="text" name="username">
<br><br>
Email: <input type="text" name="email" />
<br><br>
<input type="submit" value="Submit" />
</center>
</form>
</body>
</html>
```

Action.jsp :

```
<% @ page language="java" contentType="text/html; charset=ISO-8859-1"
pageEncoding="ISO-8859-1"%>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<%
```

```
Cookie username = new Cookie("username",
request.getParameter("username"));
Cookie email = new Cookie("email",
request.getParameter("email"));
```

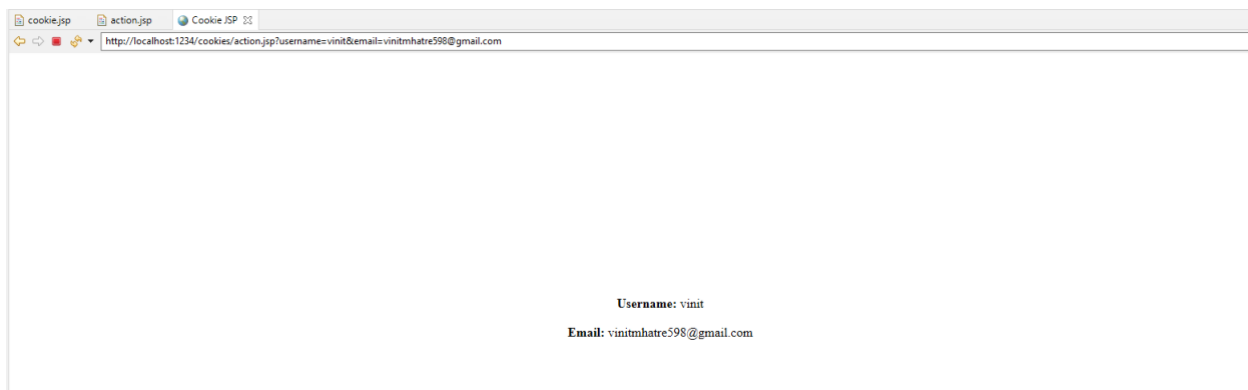
```
username.setMaxAge(60*60*10);
email.setMaxAge(60*60*10);
```

```
// Add both the cookies in the response header.
response.addCookie( username );
response.addCookie( email );
%>
```

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>Cookie JSP</title>
</head>
<body>
<br><br><br><br><br><br><br><br><br><br><br><br><br><br>
<center>
<b>Username:</b>
<%= request.getParameter("username")%><br><br>
<b>Email:</b>
Trishna Tamanna Biswal(B-6)
```

```
<%= request.getParameter("email")%>
</center>
</body>
</html>
```

Output:



Assignment No. 7

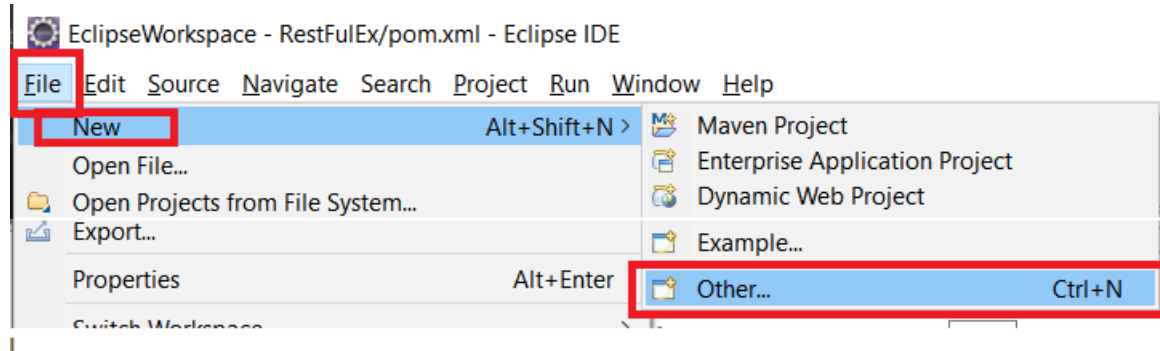
Spring Framework

1. Write a program to print “Hello World” using spring framework.
2. Write a program to demonstrate dependency injection via setter method.
3. Write a program to demonstrate dependency injection via Constructor.

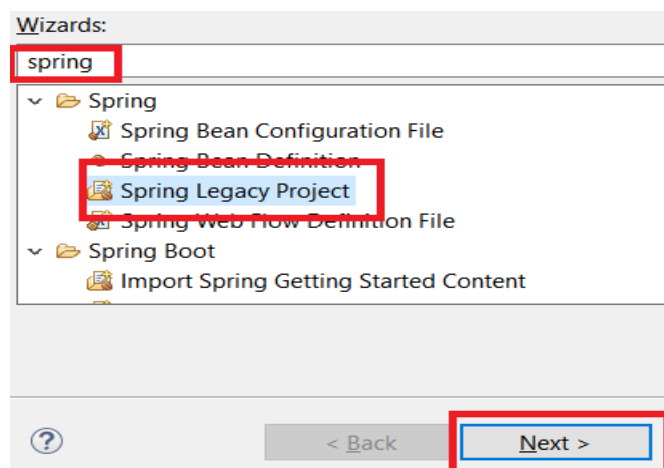
Steps to Create Spring Legacy Project

Step 1 : Creating Spring Legacy Project.

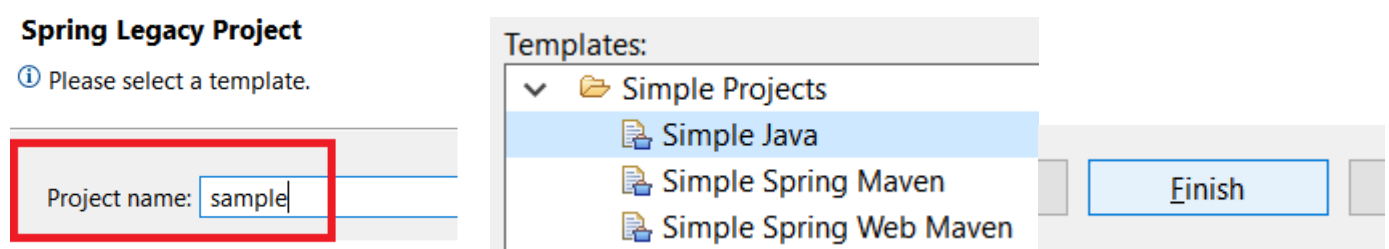
1.1 : Open Eclipse. Go To File > New > Other.



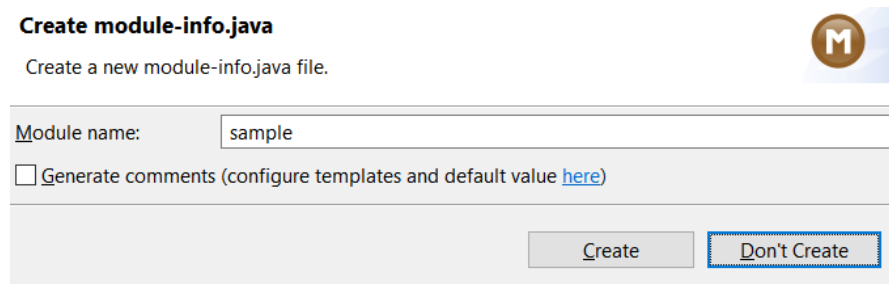
1.2 : Search for 'spring' and Select 'Spring Legacy Project'. Then Click on Next.



1.3 : ChooseProject Name of your wish, below there select **Simple Java** & simply Finish.

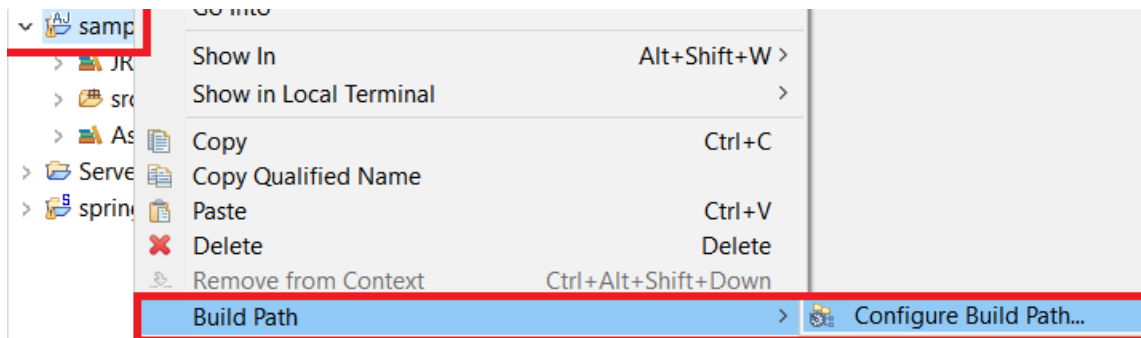


1.4 : If asked for Creating module-info.java file, click on **Don't Create**.

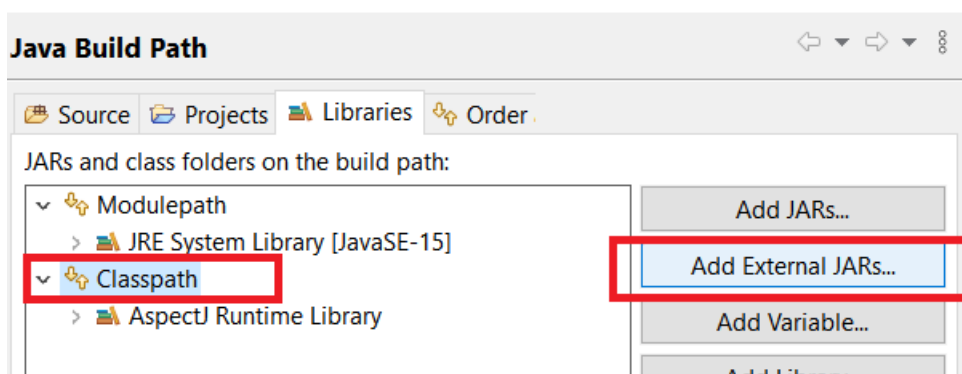


Step 2 : Adding the Spring Libraries.

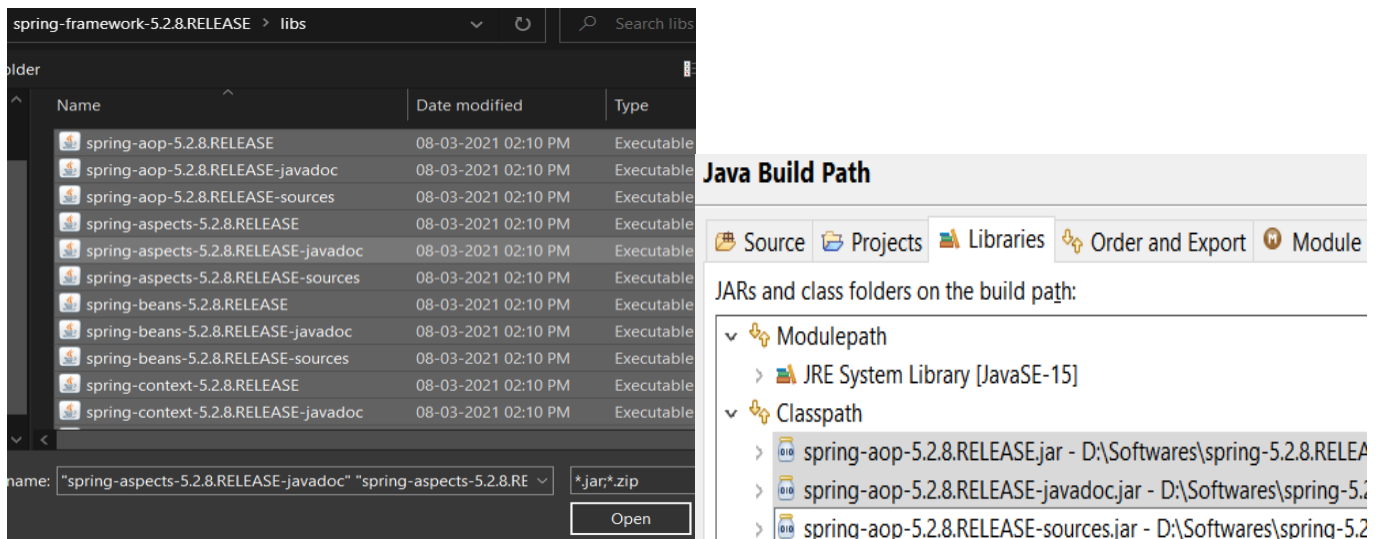
2.1 : Right click on your Newly created Spring Legacy project, Choose Build Path > Configure Build Path.



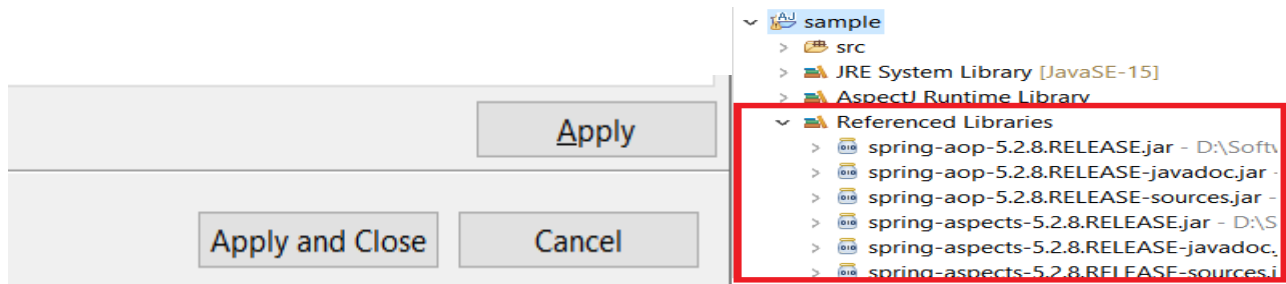
2.2 On Java Build Path wizard, Choose **Classpath** and then select **Add External JARs**.



2.3 : Choose all the Spring Libraries you've downloaded, and click on OPEN. This will add all libraries to Classpath.



2.4 Finally click on Apply & Close, now you are ready to work with Spring Legacy Project.



Problem Statement 1 : Write a program to print “Hello World” using spring framework.

Solution :

HelloWorld.java

```
package spring1;

publicclass HelloWorld {

    String name;

    public String getName() {
        return name;
    }

    publicvoid setName(String name) {
        this.name = name;
    }

    @Override
    public String toString() {
        return "Hello World, I'm " + name + ".";
    }
}
```

appctx3.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="hw" class="spring1.HelloWorld">
        <property name="name" value="Vinit"/>
    </bean>

</beans>
```

TestHelloWorld.java

```
package spring1;

import org.springframework.context.support.ClassPathXmlApplicationContext;

public class TestHelloWorld {

    public static void main(String[] args) {

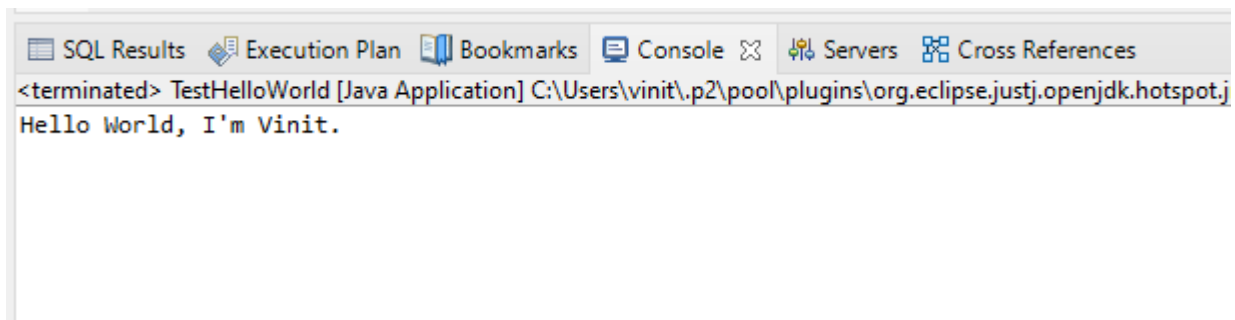
        ClassPathXmlApplicationContext app = new
ClassPathXmlApplicationContext("appctx3.xml");
        HelloWorld hw = (HelloWorld) app.getBean("hw");

        System.out.println(hw.toString());

    }

}
```

Output :



Problem Statement 2 : Write a program to demonstrate dependency injection via setter method.

Solution:

Account.java

```
package spring1;

public class Account {

    int id;
    String name;
    int balance;

    public Account(int id, String name, int balance) {
        super();
        this.id = id;
        this.name = name;
        this.balance = balance;
    }
    public int getId() {
        return id;
    }
    public void setId(int id) {
        this.id = id;
    }
    public String getName() {
        return name;
    }
    public void setName(String name) {
        this.name = name;
    }
    public int getBalance() {
        return balance;
    }
    public void setBalance(int balance) {
        this.balance = balance;
    }
    @Override
    public String toString() {
        return "Account [id=" + id + ", name=" + name + ", balance=" + balance + "];"
    }
}
```

appctx2.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="Account" class="spring1.Account">

        <constructor-arg name="id" value="1"></constructor-arg>
        <constructor-arg name="name" value="vinit"></constructor-arg>
        <constructor-arg name="balance" value="69000"></constructor-arg>

    </bean>

</beans>
```

AccountTest.java

```
package spring1;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Accounttest {

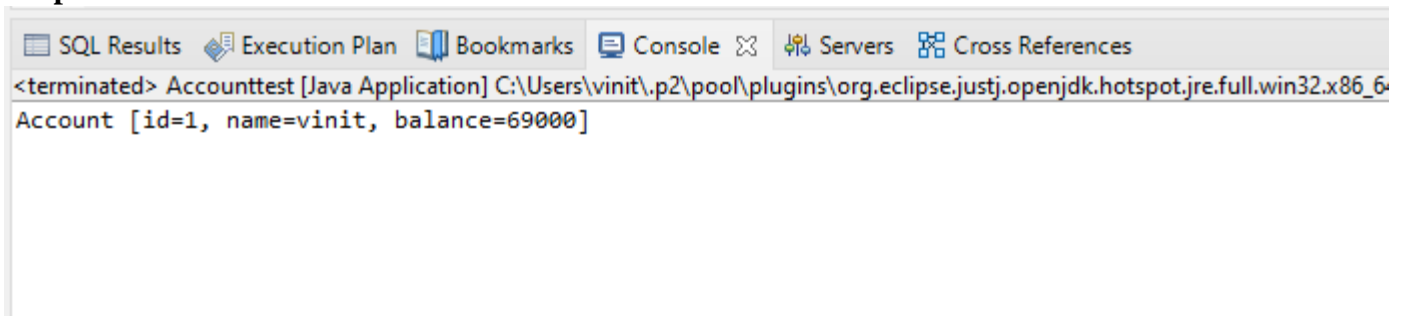
    public static void main(String[] args) {

        ApplicationContext con = new ClassPathXmlApplicationContext("appctx2.xml");
        Account acc = (Account) con.getBean("Account");

        System.out.println(acc.toString());

    }
}
```

Output :



Problem Statement 3 : Write a program to demonstrate dependency injection via Constructor.

Solution:

Singer.java

```
package spring1;

public class Singer {
    String name;
    int age;
    public String getName() {
        return name;
    }
    public void setName(String name) {
        this.name = name;
    }
    public int getAge() {
        return age;
    }
    public void setAge(int age) {
        this.age = age;
    }
    void displayInfo()
    {
        System.out.println("Name:" + name + " Age:" + age);
    }
}
```

appctx.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">
    <bean id="Singer" class="spring1.Singer">
        <property name="name" value="vinit"></property>
        <property name="age" value="21"></property>
    </bean>

</beans>
```

SingerTest.java

```
package spring1;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

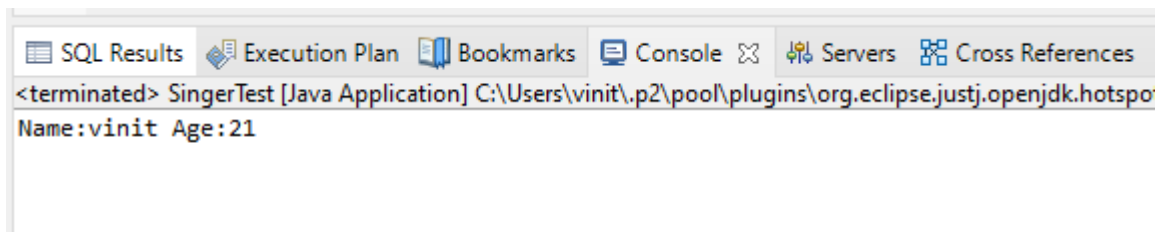
public class SingerTest {

    private static ApplicationContext ctx;
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        ctx=new ClassPathXmlApplicationContext("appctx.xml");
        Singer singer=(Singer)ctx.getBean("Singer");
        singer.displayInfo();

    }

}
```

Output :



Assignment No 8

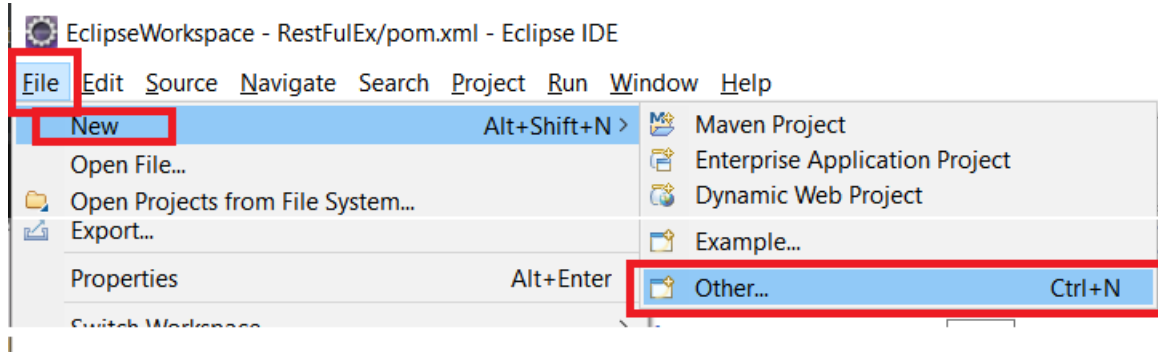
Aspect Oriented Programming

1. Write a program to demonstrate Spring AOP – before advice.
2. Write a program to demonstrate Spring AOP – after advice.
3. Write a program to demonstrate Spring AOP – around advice.
4. Write a program to demonstrate Spring AOP – after returning advice.
5. Write a program to demonstrate Spring AOP – after throwing advice.
6. Write a program to demonstrate Spring AOP – pointcuts.

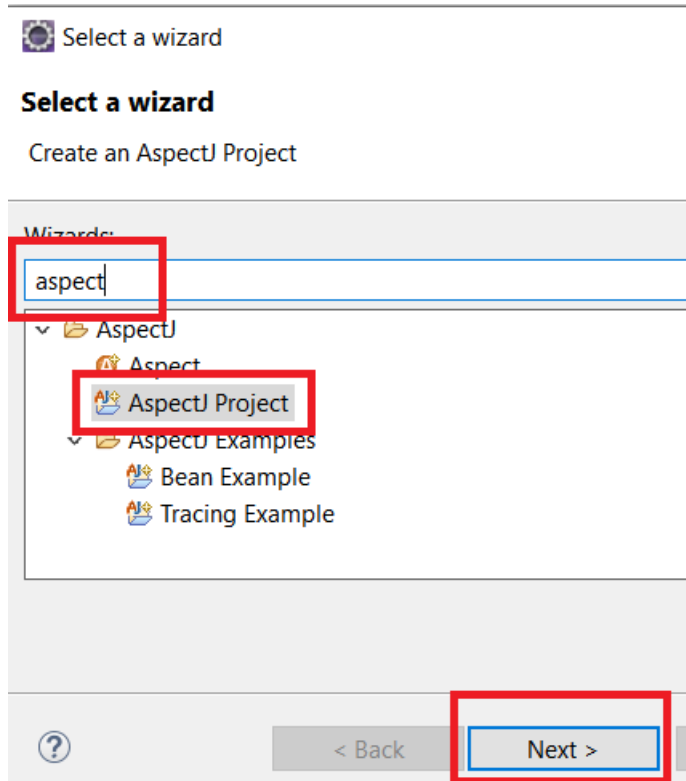
Steps to Create an AOP Project

Step 1 : Creating AspectJ Project.

1.1 : Open Eclipse. Go To File > New > Other.



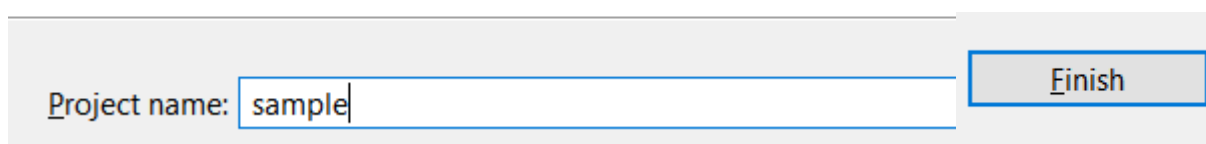
1.2 : Search for 'aspect' and Select 'AspectJ Project'. Then Click on Next.



1.3 : Enter Project Name of your wish, and click on Finish.

Create an AspectJ Project

Create an AspectJ Project in the workspace or in an external location



1.4 : If asked to create module-info.java file, select 'Don't Create'.

Create module-info.java



Create a new module-info.java file.

Module name:

sample

☐ Generate comments (configure templates and default value [here](#))

Create

Don't Create

1.5 : Finally if you are asked to Open Java Perspective, just choose **NO**.



Open the Java perspective?

This perspective is designed to support Java development. It offers a Package Explorer, a Type Hierarchy, and Java-specific navigation actions.

☐ Remember my decision

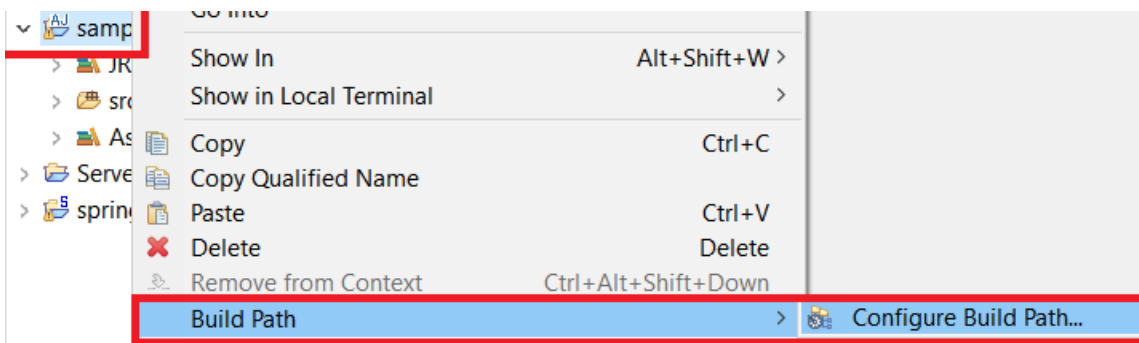
Open Perspective

No

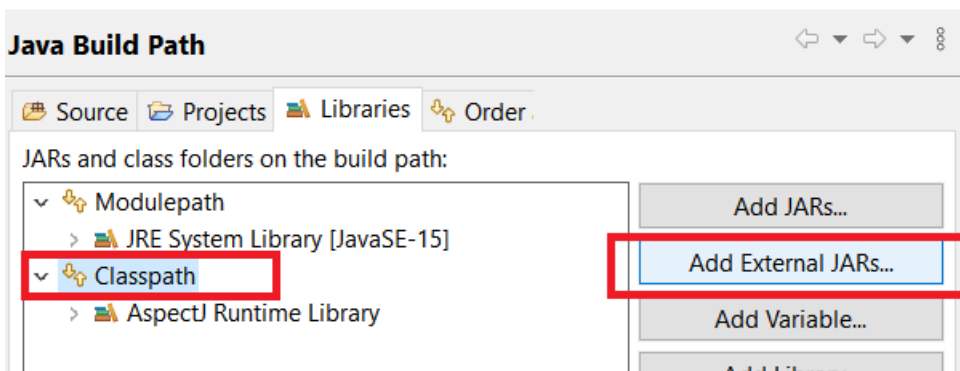
This creates your AspectJ project.

Step 2 : Adding the Spring Libraries.

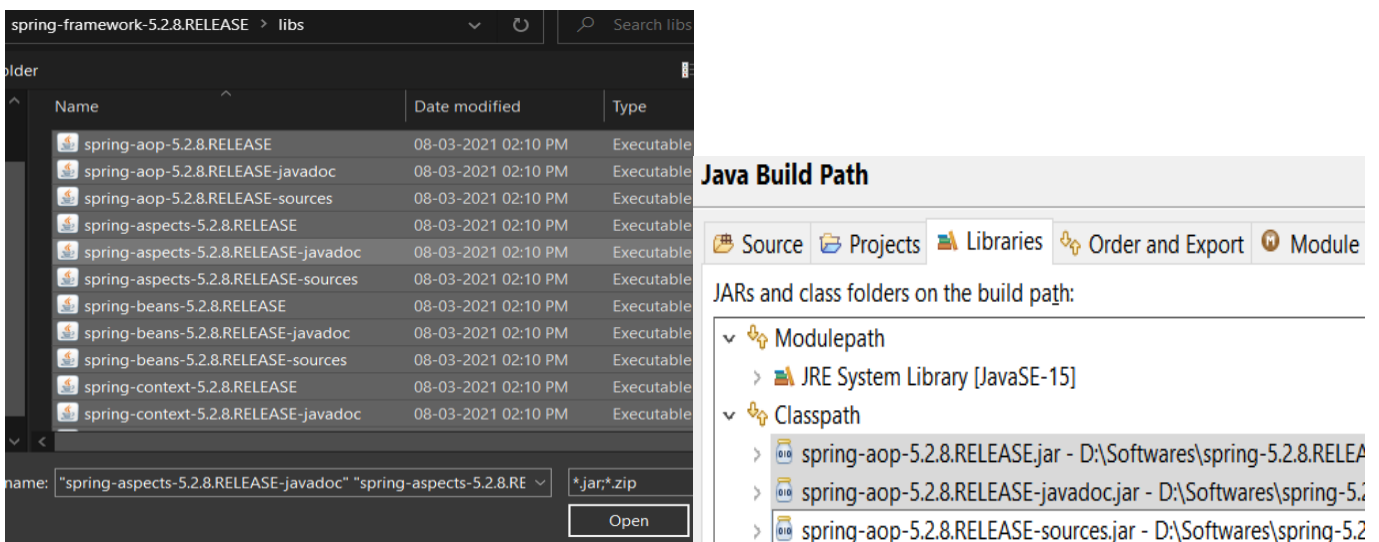
2.1 : Right click on your Newly created AspectJ project, Choose Build Path > Configure Build Path.



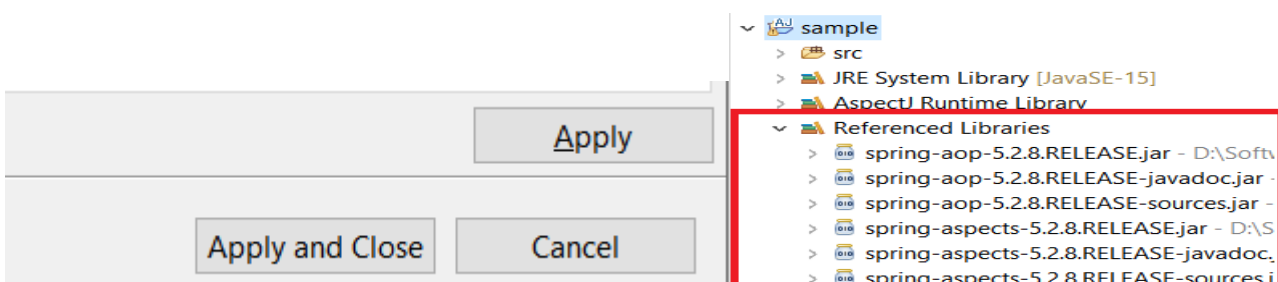
2.2 On Java Build Path wizard, Choose **Classpath** and then select **Add External JARs**.



2.3 : Choose all the Spring Libraries you've downloaded, and click on OPEN. This will add all libraries to Classpath.



2.4 Finally click on Apply & Close, now you are ready to work with Aspects in Spring.



Problem Statement 1 : Write a program to demonstrate Spring AOP – before advice.

Solution :

beforeaop.java

```
package bvimit.edu;

import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Before;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class beforeaop {

    @Pointcut("execution(int beforeoperation.*(..))")
    public void p(){}

    @Before("p()")
    public void myadvice(JoinPoint jp)
    {
        System.out.println("before advice");
    }
}
```

beforeoperation.java

```
package bvimit.edu;

public class beforeoperation {
    public void msg() {System.out.println("method 1");}
    public int m(){System.out.println("method 2 with return");return 2;}
    public int k(){System.out.println("method 3 with return");return 3;}
}
```

aopctx1.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="opBean" class="bvimit.edu.beforeoperation"></bean>

    <bean id="trackMyBean" class="bvimit.edu.beforeaop"></bean>

    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>
```

</beans>

beforetest.java

```
package bvimit.edu;
```

```
import org.springframework.context.ApplicationContext;
```

```
import org.springframework.context.support.ClassPathXmlApplicationContext;
```

```
public class beforetest {
```

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

```
        ApplicationContext context = new ClassPathXmlApplicationContext("aopctx1.xml");
```

```
        beforeoperation e = (beforeoperation) context.getBean("opBean");
```

```
        System.out.println("calling m1.....");
```

```
        e.msg();
```

```
        System.out.println("calling m2.....");
```

```
        e.m();
```

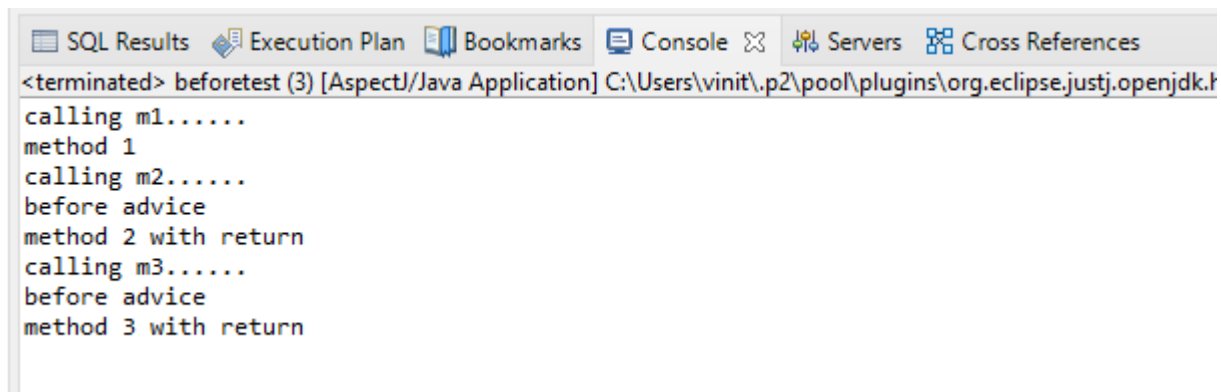
```
        System.out.println("calling m3.....");
```

```
        e.k();
```

```
    }
```

```
}
```

Output :



```
SQL Results Execution Plan Bookmarks Console Servers Cross References
<terminated> beforetest (3) [AspectJ/Java Application] C:\Users\vinit\.p2\pool\plugins\org.eclipse.justj.openjdk.f
calling m1.....
method 1
calling m2.....
before advice
method 2 with return
calling m3.....
before advice
method 3 with return
```

Problem Statement 2 : Write a program to demonstrate Spring AOP – after advice.

Solution :

Afteraopdata.java

```
package bvimit.edu;

import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.After;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class afteraopdata {

    @Pointcut("execution(int afteroperation.*(..))")
    public void p(){}

    @After("p()")
    public void myadvice(JoinPoint jp)
    {
        System.out.println("after advice");
    }
}
```

afteroperation.java

```
package bvimit.edu;

public class afteroperation {
    public void msg() {System.out.println("method 1");}
    public int m(){System.out.println("method 2 with return");return 2;}
    public int k(){System.out.println("method 3 with return");return 3;}
}
```

aopctx.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="opBean" class="bvimit.edu.afteroperation"></bean>

    <bean id="trackMyBean" class="bvimit.edu.afteraopdata"></bean>

    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>
</beans>
```

aftertest.java

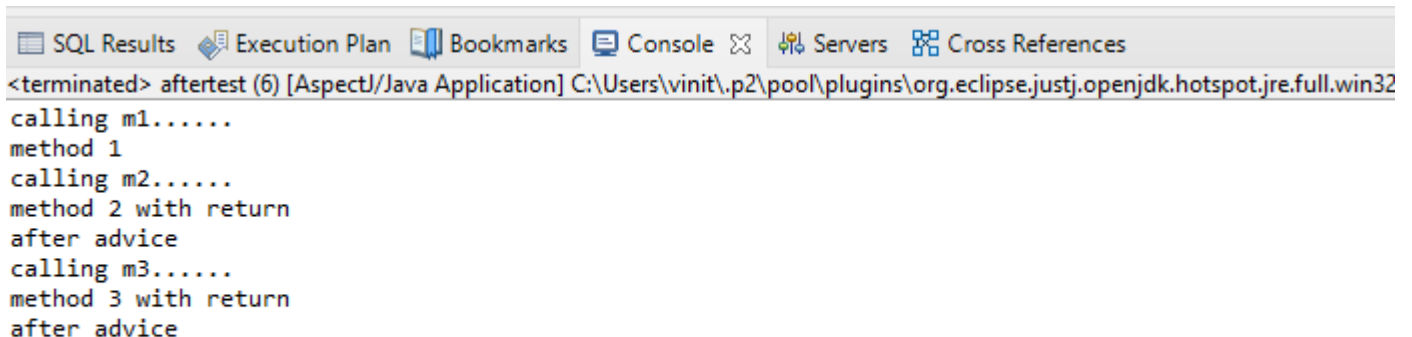
```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class aftertest {

    public static void main(String[] args) {
        ApplicationContext context = new ClassPathXmlApplicationContext("aopctx.xml");
        afteroperation e = (afteroperation) context.getBean("opBean");
        System.out.println("calling m1.....");
        e.msg();
        System.out.println("calling m2.....");
        e.m();
        System.out.println("calling m3.....");
        e.k();
    }
}
```

Output :



The screenshot shows the Eclipse IDE's Console window. The title bar includes tabs for SQL Results, Execution Plan, Bookmarks, Console, Servers, and Cross References. The console output is as follows:

```
<terminated> aftertest (6) [AspectJ/Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32
calling m1.....
method 1
calling m2.....
method 2 with return
after advice
calling m3.....
method 3 with return
after advice
```


Problem Statement 3 : Write a program to demonstrate Spring AOP – around advice.

Solution :

Bankaopdata.java

```
package bvimit.edu;

import org.aspectj.lang.ProceedingJoinPoint;
import org.aspectj.lang.annotation.Around;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class Bankaopdata {

    @Pointcut("execution(* Bank.*(..))")
    public void a() {}

    @Around("a()")
    public Object myadvice(ProceedingJoinPoint p) throws Throwable
    {
        System.out.println("Around concern Before calling actual method");
        Object obj=p.proceed();
        System.out.println("Around Concern After calling actual method");
        return obj;
    }
}
```

Bank.java

```
package bvimit.edu;

public class Bank {
    public void welcome() {System.out.println("welcome to bank");}
    public int icici() {System.out.println("icici bank interest rate");return 7;}
    public int pnb() {System.out.println("pnb bank interest rate");return 6;}
}
```

Bankaopdata.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="opBean" class="bvimit.edu.Bank"></bean>
    <bean id="trackMyBean" class="bvimit.edu.Bankaopdata"></bean>

    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>
</beans>
```

Banktest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

publicclass Banktest {

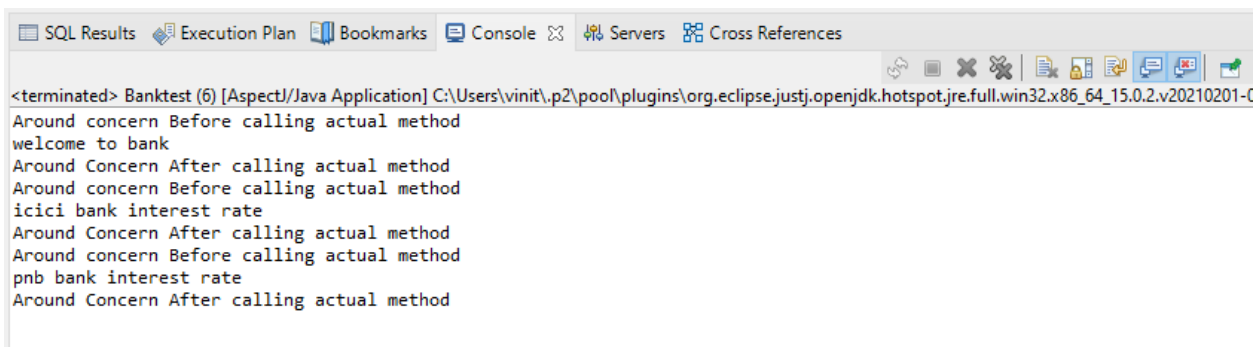
    privatestatic ApplicationContext context;

    publicstaticvoid main(String[] args) {
        context = new ClassPathXmlApplicationContext("Bankaopdata.xml");

        Bank e =(Bank) context.getBean("opBean");
        System.out.println("Calling welcome method...");
        e.welcome();
        System.out.println("Calling icici method...");
        e.icici();
        System.out.println("Calling pnb method...");
        e.pnb();
    }

}
```

Output :



```
<terminated> Banktest (6) [AspectJ/Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201-
Around concern Before calling actual method
welcome to bank
Around Concern After calling actual method
Around concern Before calling actual method
icici bank interest rate
Around Concern After calling actual method
Around concern Before calling actual method
pnb bank interest rate
Around Concern After calling actual method
```

Problem Statement 4 : Write a program to demonstrate Spring AOP – after returning advice.

Solution :

Bankaopdata.java

```
package bvimit.edu;

import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.ProceedingJoinPoint;
import org.aspectj.lang.annotation.AfterReturning;
import org.aspectj.lang.annotation.Around;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Pointcut;

@Aspect
public class Bankaopdata {

    @AfterReturning(
        pointcut = "execution(* Bank.*(..))",
        returning = "result")
    public void myadvice(JoinPoint jp, Object result)
    {
        System.out.println("AfterReturning concern");
        System.out.println("Result in advice" + result);
    }
}
```

Bank.java

```
package bvimit.edu;

public class Bank {
    public void welcome() {System.out.println("welcome to bank");}
    public int icici() {System.out.println("icici bank interest rate");return 7;}
    public int pnb() {System.out.println("pnb bank interest rate");return 6;}
}
```

Bankaopdata.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="opBean" class="bvimit.edu.Bank"></bean>
    <bean id="trackMyBean" class="bvimit.edu.Bankaopdata"></bean>

    <bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>
</beans>
```

Banktest.java

```
package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

publicclass Banktest {

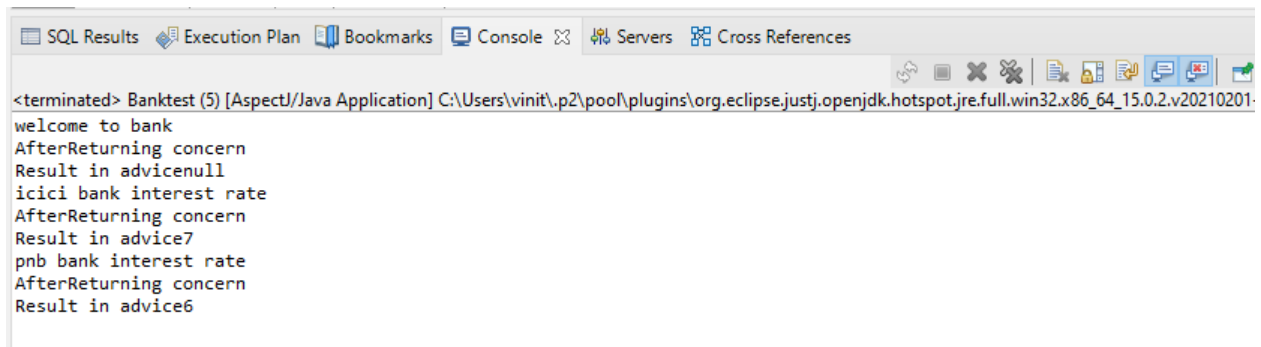
    privatestatic ApplicationContext context;

    publicstaticvoid main(String[] args) {
        context = new ClassPathXmlApplicationContext("Bankaopdata.xml");

        Bank e =(Bank) context.getBean("opBean");
        //System.out.println("Calling welcome method...");
        e.welcome();
        //System.out.println("Calling icici method...");
        e.icici();
        //System.out.println("Calling pnb method...");
        e.pnb();
    }

}
```

Output :



```
<terminated> Banktest (5) [AspectJ/Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201...
welcome to bank
AfterReturning concern
Result in advicenull
icici bank interest rate
AfterReturning concern
Result in advice7
pnb bank interest rate
AfterReturning concern
Result in advice6
```

Problem Statement 5 : Write a program to demonstrate Spring AOP – after throwing advice.

Solution :

Operationaop_at.java

```
package bvimit.edu;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.AfterThrowing;
import org.aspectj.lang.annotation.Aspect;

@Aspect
public class Operationaop_at {
    @AfterThrowing(
        pointcut = "execution(* Operation_at.*(..))", throwing = "error")
    public void myadvice(JoinPoint jp, Throwable error)
    {
        System.out.println("AfterThrowing concern");
        System.out.println("Exception is: "+error);
        System.out.println("end of after throwing advice....");
    }
}
```

Operation_at.java

```
package bvimit.edu;
public class Operation_at {

    public void validate(int att)throws Exception{
        if(att<75) {
            throw new ArithmeticException("Not eligible for exam");
        }
        else {
            System.out.println("Eligible for exam");
        }
    }
}
```

validctx.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

<bean id="opBean" class="bvimit.edu.Operation_at"></bean>

<bean id="trackMyBean" class="bvimit.edu.Operationaop_at"></bean>

<bean
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean><
/beans>
```

TestValidation.java

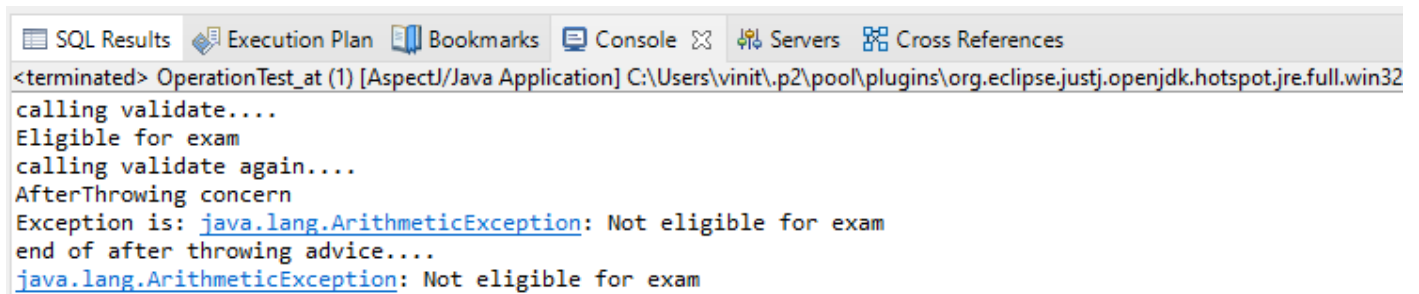
```
package bvimit.edu;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class OperationTest_at {
private static ApplicationContext context;
    public static void main(String[] args) {
ApplicationContext context = new ClassPathXmlApplicationContext("validctx.xml");
        Operation_at op = (Operation_at) context.getBean("opBean");
        System.out.println("calling validate....");
        try {
            op.validate(85);
        } catch (Exception e) { System.out.println(e); }

        System.out.println("calling validate again....");

        try {
            op.validate(25);
        } catch (Exception e) { System.out.println(e); }
    }
}
```

Output :



```
<terminated> OperationTest_at (1) [AspectJ/Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32
calling validate...
Eligible for exam
calling validate again...
AfterThrowing concern
Exception is: java.lang.ArithmeticException: Not eligible for exam
end of after throwing advice...
java.lang.ArithmeticException: Not eligible for exam
```

Problem Statements 6: Write a program to demonstrate Spring AOP –pointcuts.

Solution:

Operation_pc.java

```
package bvimit.edu;
publicclass Operation_pc {

    publicvoid msg() {System.out.println("method 1");}
    publicint m() {System.out.println("method 2 with return");return 2;}
    publicint k() {System.out.println("method 3 with return");return 3;}
}
```

Aopdata_pc.java

```
package bvimit.edu;
import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.After;
import org.aspectj.lang.annotation.Pointcut;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Before;
@Aspect
public class Aopdata_pc {

    @Pointcut("execution(int Operation.*(..))")
    public void p(){}

    @After("p()")
    public void myadvice(JoinPoint jp)
    {
        System.out.println("After advice");
    }

    @Pointcut("execution(* Operation.*(..))")
    public void i(){}

    @Before("i()")
```



```

    public void myadvice1(JoinPoint jp)
    {
        System.out.println("Before advice");
    }
}

```

Test_pc.java

```

package bvimit.edu;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class Test_pc {

    public static void main(String[] args) {

        ApplicationContext context = new ClassPathXmlApplicationContext("aopctx_pc.xml");

        Operation_pc e=(Operation_pc)context.getBean("opBean");

        System.out.println("calling m1...");

        e.msg();

        System.out.println("calling m2...");

        e.m();

        System.out.println("calling m3...");

        e.k();

    }

}

```

aopctx_pc.xml

```

<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="opBean" class="bvimit.edu.Operation_pc"></bean>

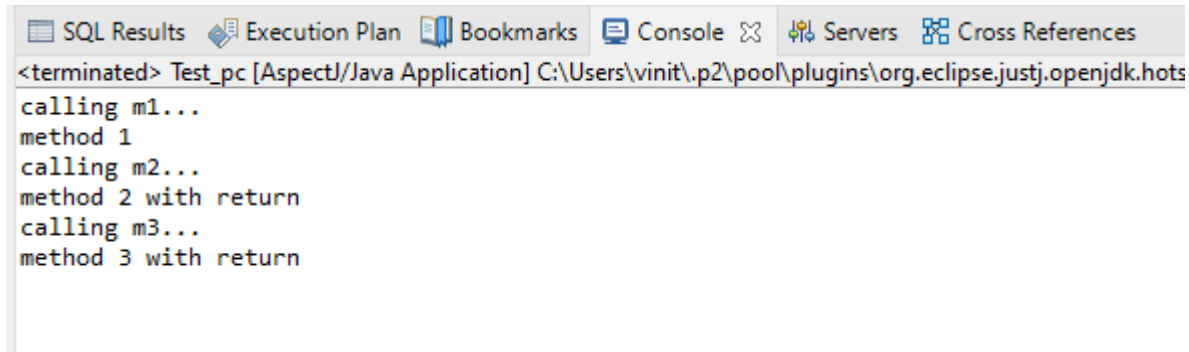
```

```
<bean id="trackMyBean" class="bvimit.edu.Aopdata_pc"></bean>
```

```
<bean  
class="org.springframework.aop.aspectj.annotation.AnnotationAwareAspectJAutoProxyCreator"></bean>
```

```
</beans>
```

Output:



```
<terminated> Test_pc [AspectJ/Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full\jre\bin\java.exe  
calling m1...  
method 1  
calling m2...  
method 2 with return  
calling m3...  
method 3 with return
```

Assignment No 9

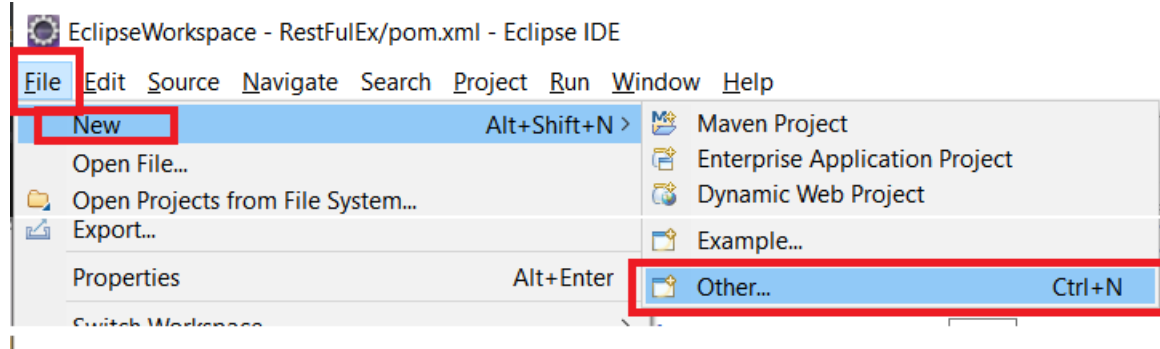
Spring JDBC

1. Write a program to insert, update and delete records from the given table.
2. Write a program to demonstrate PreparedStatement in Spring JdbcTemplate.
3. Write a program in Spring JDBC to demonstrate ResultSetExtractor Interface.
4. Write a program to demonstrate RowMapper interface to fetch the records from the database.

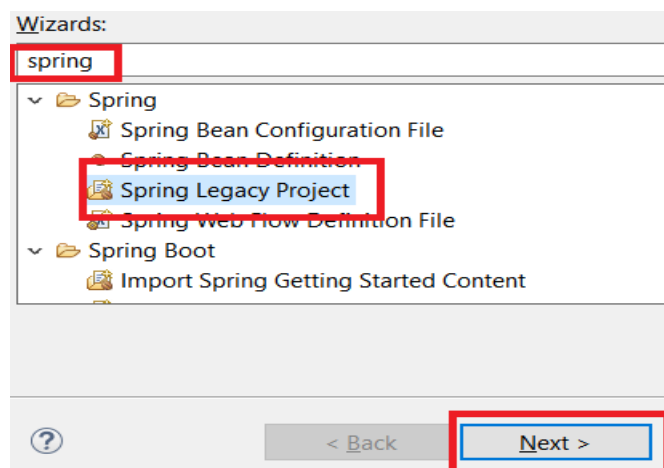
Steps to Create Spring Legacy Project

Step 1 : Creating Spring Legacy Project.

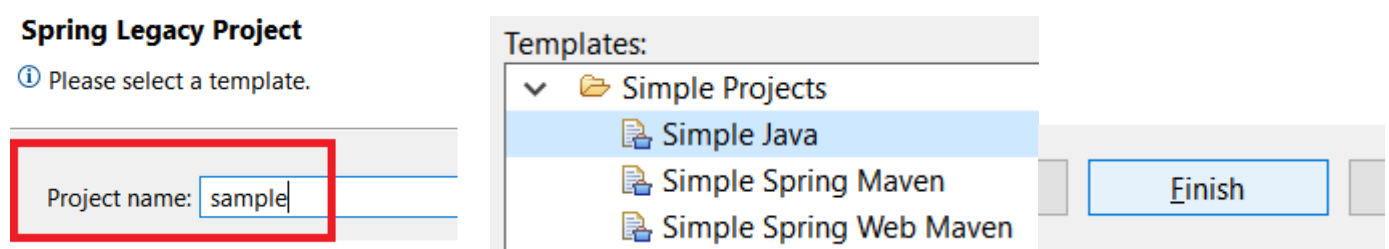
1.1 : Open Eclipse. Go To File > New > Other.



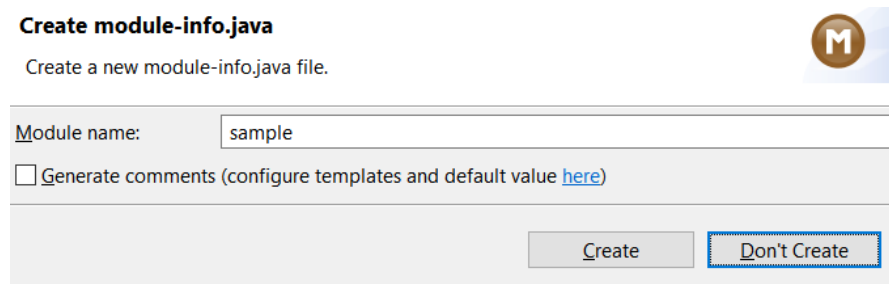
1.2 : Search for 'spring' and Select 'Spring Legacy Project'. Then Click on Next.



1.3 : Choose Project Name of your wish, below there select **Simple Java** & simply Finish.

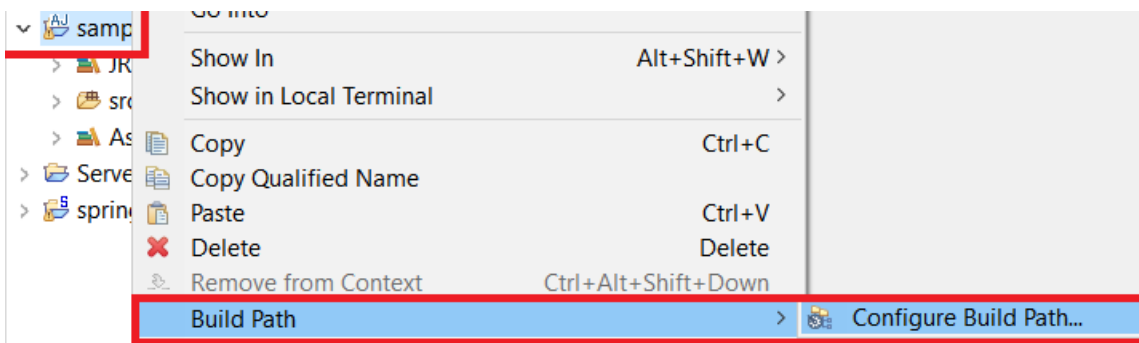


1.4 : If asked for Creating module-info.java file, click on **Don't Create**.

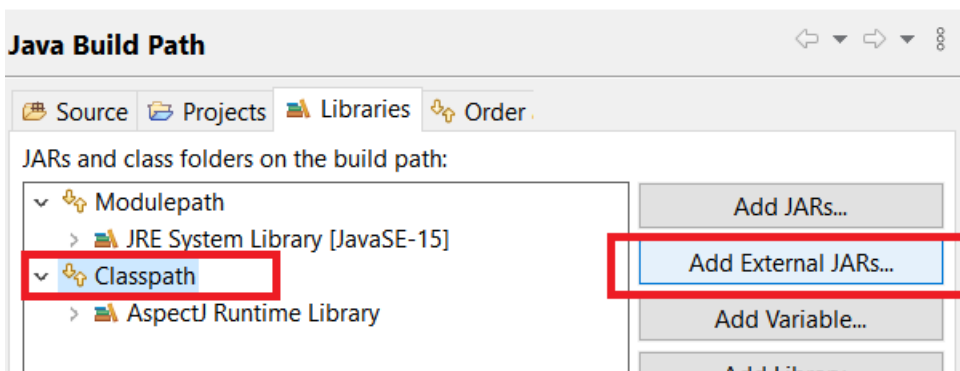


Step 2 : Adding the Spring Libraries.

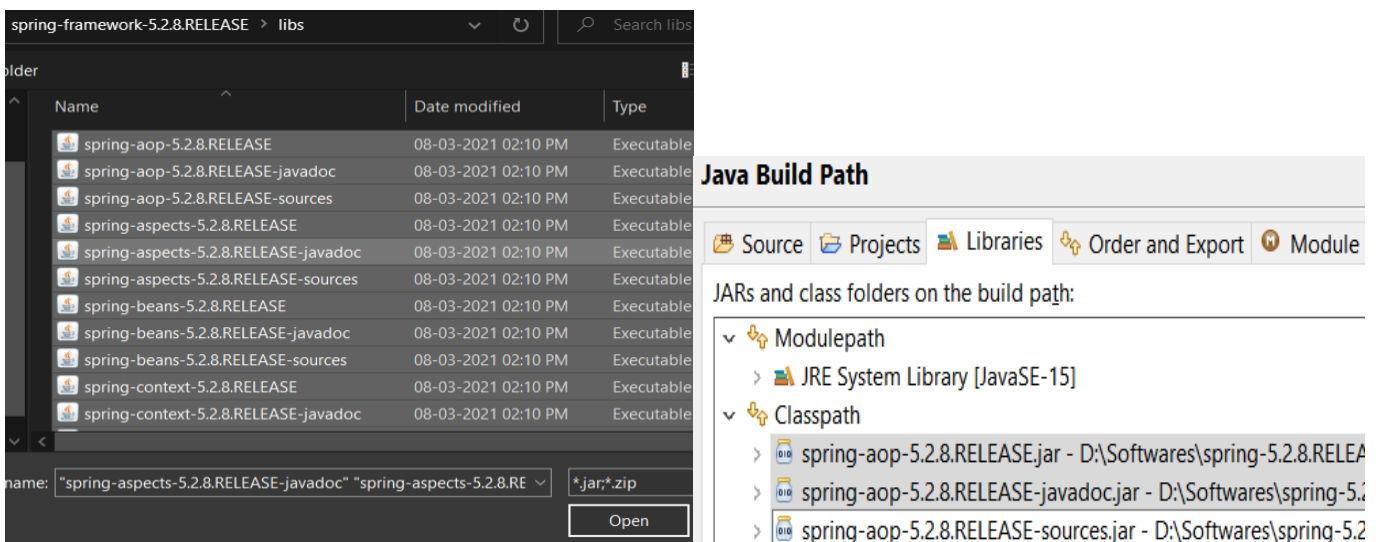
2.1 : Right click on your Newly created Spring Legacy project, Choose Build Path > Configure Build Path.



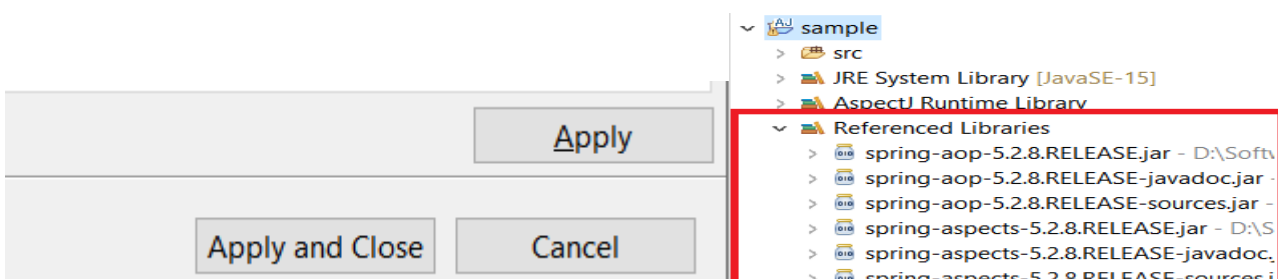
2.2 On Java Build Path wizard, Choose **Classpath** and then select **Add External JARs**.



2.3 : Choose all the Spring Libraries you've downloaded, and click on OPEN. This will add all libraries to Classpath.



2.4 Finally click on Apply & Close, now you are ready to work with Spring Legacy Project.



Problem Statement 1 : Write a program to insert, update and delete records from the given table.

Solution :

Movie1.java

```
package org.me;

public class Movie1 {

    int mid;
    String title;
    String actor;
    public Movie1(int mid, String title, String actor) {
        super();
        this.mid = mid;
        this.title = title;
        this.actor = actor;
    }
    public Movie1() {
        super();
        // TODO Auto-generated constructor stub
    }
    public int getMid() {
        return mid;
    }
    public void setMid(int mid) {
        this.mid = mid;
    }
    public String getTitle() {
        return title;
    }
    public void setTitle(String title) {
        this.title = title;
    }
    public String getActor() {
        return actor;
    }
    public void setActor(String actor) {
        this.actor = actor;
    }
}
```

MovieDAO.java

```
package org.me;

import org.springframework.jdbc.core.*;
publicclass MovieDAO {
    JdbcTemplate jdbcTemplate;

    publicvoid setJdbcTemplate(JdbcTemplate jdbcTemplate) {
        this.jdbcTemplate = jdbcTemplate;
    }
    publicint insMovie(Movie1 m1)
    {
        String insSql="insert into mymovies1
values("+m1.getMid()+",""+m1.getTitle()+",""+m1.getActor()+")";

return jdbcTemplate.update(insSql);
    }

    publicint updateMovie(Movie1 m1){
        String query="update mymovies1 set title='"+m1.getTitle()+"',actor='"+m1.getActor()+"' where
mid='"+m1.getMid()+"' ";
return jdbcTemplate.update(query);
    }

    publicint deleteMovie(Movie1 m1){
        String query="delete from mymovies1 where mid='"+m1.getMid()+"' ";
return jdbcTemplate.update(query);
    }
}
```

appctx.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="ds" class="org.springframework.jdbc.datasource.DriverManagerDataSource">
        <property name="driverClassName" value="org.postgresql.Driver" />
        <property name="url" value="jdbc:postgresql://localhost:5432/postgres" />
        <property name="username" value="postgres" />
        <property name="password" value="admin" />
    </bean>

    <bean id="jdbcTemplate" class="org.springframework.jdbc.core.JdbcTemplate">
        <property name="dataSource" ref="ds"></property>
    </bean>

    <bean id="mymovie" class="org.me.MovieDAO">
        <property name="jdbcTemplate" ref="jdbcTemplate"></property>
    </bean></beans>
```

MovieTest.java

```
package org.me;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class MovieTest {
    private static ApplicationContext appCon;

    public static void main(String[] args) {
        // TODO Auto-generated method stub

        appCon = new ClassPathXmlApplicationContext("appctx.xml");
        MovieDAO m1=(MovieDAO)appCon.getBean("mymovie");

        //insert query
        Movie1 t1=new Movie1(10,"Mirzapur","P");
        System.out.println(m1.insMovie(t1));

        //update query

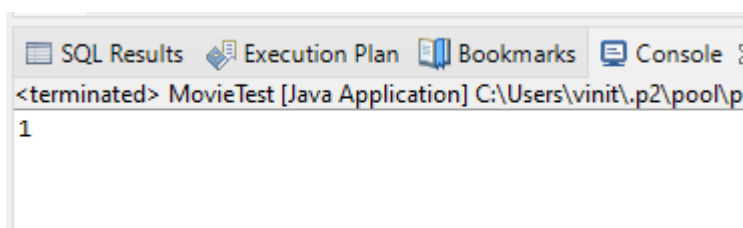
        //int status=m1.updateMovie(new Movie1(10,"war","hritik"));
        // System.out.println(status);

        //delete

        // Movie1 t2=new Movie1();
        //t2.setMid(5);
        //int status=m1.deleteMovie(t2);
        // System.out.println(status);

    }
}
```

Output :



Database :

```
CREATE TABLE mymovies1
```

```
(
```

```
mid int,
```

```
title varchar(50),
```

```
actor varchar(50),
```

```
PRIMARY KEY (mid)
```

```
);
```

Final Table After Execution :

Data Output				Explain	Messages	Notifications
	mid [PK] integer		title character varying (50)		actor character varying (50)	
1	10		war		hritik	
2	11		Mirzapur		P	

Problem Statement 2 : Write a program to demonstrate PreparedStatement in Spring JdbcTemplate.

Solution :

Movie1.java

```
package org.me;

public class Movie1 {

    int mid;
    String title;
    String actor;
    public Movie1(int mid, String title, String actor) {
        super();
        this.mid = mid;
        this.title = title;
        this.actor = actor;
    }
    public Movie1() {
        super();
    }
    public int getMid() {
        return mid;
    }
    public void setMid(int mid) {
        this.mid = mid;
    }
    public String getTitle() {
        return title;
    }
    public void setTitle(String title) {
        this.title = title;
    }
    public String getActor() {
        return actor;
    }
    public void setActor(String actor) {
        this.actor = actor;
    }
}
```

MovieDAO1.java

```
package org.me;

import java.sql.PreparedStatement;
import java.sql.SQLException;

import org.springframework.dao.DataAccessException;
import org.springframework.jdbc.core.JdbcTemplate;

Trishna Tamanna Biswal(B-6)
```

```

import org.springframework.jdbc.core.PreparedStatementCallback;

public class MovieDAO1 {

    JdbcTemplate jdbcTemplate;

    public void setJdbcTemplate(JdbcTemplate jdbcTemplate) {

        this.jdbcTemplate = jdbcTemplate;

    }

    public Boolean saveMovieByPreparedStatement(final Movie1 e){

        String query="insert into movies values(?,?,?)";

        return jdbcTemplate.execute(query,new PreparedStatementCallback<Boolean>(){

            @Override

            public Boolean doInPreparedStatement(PreparedStatement ps)

                throws SQLException, DataAccessException {

                ps.setInt(1,e.getMid());

                ps.setString(2,e.getTitle());

                ps.setString(3,e.getActor());

                return ps.execute();

            }

        });

    }

}

```

appctx1.java

```

<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="ds" class="org.springframework.jdbc.datasource.DriverManagerDataSource">
    <property name="driverClassName" value="org.postgresql.Driver" />
    <property name="url" value="jdbc:postgresql://localhost:5432/postgres" />
    <property name="username" value="postgres" />
    <property name="password" value="pass" />
    </bean>

    <bean id="jdbcTemplate" class="org.springframework.jdbc.core.JdbcTemplate">
    <property name="dataSource" ref="ds"></property>

```

</bean>

```
<bean id="mymovie" class="org.me.MovieDAO1">
<property name="jdbcTemplate" ref="jdbcTemplate"></property>
</bean>
</beans>
```

MovieTest1.java

```
package org.me;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class MovieTest1 {

    private static ApplicationContext appCon;

    public static void main(String[] args) {

        // TODO Auto-generated method stub

        appCon = new ClassPathXmlApplicationContext("appctx1.xml");

        MovieDAO1 m1=(MovieDAO1)appCon.getBean("mymovie");

        m1.saveMovieByPreparedStatement(new Movie1(5,"Bhaijaan","Slemon"));

    }

}
```

Output :

Data Output		Explain	Messages	Notifications
	mid [PK] integer		title character varying (50)	actor character varying (50)
1	10		war	hritik
2	11		Mirzapur	P
3	4		Inception	Cobb
4	5		Bhaijaan	Slemon

Problem Statement 3 : Write a program in Spring JDBC to demonstrate ResultSetExtractor Interface.

Solution :

Movie2.java

```
package org.me;

public class Movie2 {

    int mid;
    String title;
    String actor;
    public int getMid() {
        return mid;
    }
    public void setMid(int mid) {
        this.mid = mid;
    }
    public String getTitle() {
        return title;
    }
    public void setTitle(String title) {
        this.title = title;
    }
    public String getActor() {
        return actor;
    }
    public void setActor(String actor) {
        this.actor = actor;
    }
    public String toString(){
        return mid+" "+title+" "+actor;
    }
}
```

MovieDAO2.java

```
package org.me;

import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.ArrayList;
import java.util.List;
import org.springframework.dao.DataAccessException;
import org.springframework.jdbc.core.JdbcTemplate;
import org.springframework.jdbc.core.ResultSetExtractor;

public class MovieDAO2 {

    Trishna Tamanna Biswal(B-6)
```

```

JdbcTemplate jdbcTemplate;

public void setJdbcTemplate(JdbcTemplate jdbcTemplate) {
    this.jdbcTemplate = jdbcTemplate;
}

public List<Movie2> getAllMovie(){
    return jdbcTemplate.query("select * from mymovies1",new
ResultSetExtractor<List<Movie2>>(){
        @Override
        public List<Movie2> extractData(ResultSet rs) throws SQLException,
            DataAccessException {

            List<Movie2> list=new ArrayList<Movie2>();
            while(rs.next()){
                Movie2 e=new Movie2();
                e.setMid(rs.getInt(1));
                e.setTitle(rs.getString(2));
                e.setActor(rs.getString(3));
                list.add(e);
            }
            return list;
        }
    });
}
}

```

appctx2.java

```

<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="ds" class="org.springframework.jdbc.datasource.DriverManagerDataSource">
    <property name="driverClassName" value="org.postgresql.Driver" />
    <property name="url" value="jdbc:postgresql://localhost:5432/postgres" />

```

```

<property name="username" value="postgres" />
<property name="password" value="password" />
</bean>

<bean id="jdbcTemplate" class="org.springframework.jdbc.core.JdbcTemplate">
<property name="dataSource" ref="ds"></property>
</bean>

<bean id="mymovie" class="org.me.MovieDAO2">
<property name="jdbcTemplate" ref="jdbcTemplate"></property>
</bean>
</beans>

```

MovieTest2.java

```

package org.me;

import java.util.List;

import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class MovieTest2 {

    private static ApplicationContext appCon;

    public static void main(String[] args) {

        appCon = new ClassPathXmlApplicationContext("appctx2.xml");

        MovieDAO2 m1=(MovieDAO2)appCon.getBean("mymovie");

        List<Movie2> list=m1.getAllMovie();

        for(Movie2 e:list)

            System.out.println(e);

    }

}

```

Output :

SQL Results Execution Plan Bookmarks Console Servers Cross References
<terminated> MovieTest2 [Java Application] C:\Users\vinit\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.

10 war hritik
11 Mirzapur P
4 Inception Cobb
5 Bhaijaan Slemon

	mid [PK] integer	title character varying (50)	actor character varying (50)
1	10	war	hritik
2	11	Mirzapur	P
3	4	Inception	Cobb
4	5	Bhaijaan	Slemon

Problem Statement 4 : Write a program to demonstrate RowMapper interface to fetch the records from the database.

Solution :

Movie3.java

```
package org.me;

public class Movie3 {

    int mid;
    String title;
    String actor;
    public Movie3(int mid, String title, String actor) {
        super();
        this.mid = mid;
        this.title = title;
        this.actor = actor;
    }

    public Movie3() {
        super();
        // TODO Auto-generated constructor stub
    }
    public int getMid() {
        return mid;
    }
    public void setMid(int mid) {
        this.mid = mid;
    }
    public String getTitle() {
        return title;
    }
    public void setTitle(String title) {
        this.title = title;
    }
    public String getActor() {
        return actor;
    }
    public void setActor(String actor) {
        this.actor = actor;
    }
}
```

MovieDAO3.java

```
package org.me;

import java.sql.ResultSet;
import java.sql.SQLException;
import java.util.List;

import org.springframework.jdbc.core.JdbcTemplate;
import org.springframework.jdbc.core.RowMapper;

public class MovieDAO3 {
    JdbcTemplate jdbcTemplate;

    public void setJdbcTemplate(JdbcTemplate jdbcTemplate) {
        this.jdbcTemplate = jdbcTemplate;
    }

    public List<Movie2> getAllEmployeesRowMapper(){
        return jdbcTemplate.query("select * from mymovies1",new RowMapper<Movie2>(){
            @Override
            public Movie2 mapRow(ResultSet rs, int rownumber) throws SQLException {
                Movie2 e=new Movie2();
                e.setMid(rs.getInt(1));
                e.setTitle(rs.getString(2));
                e.setActor(rs.getString(3));
                return e;
            }
        });
    }
}
```

appctx3.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd">

    <bean id="ds" class="org.springframework.jdbc.datasource.DriverManagerDataSource">
        <property name="driverClassName" value="org.postgresql.Driver" />
        <property name="url" value="jdbc:postgresql://localhost:5432/postgres" />
        <property name="username" value="postgres" />
        <property name="password" value="password" />
    </bean>

    <bean id="jdbcTemplate" class="org.springframework.jdbc.core.JdbcTemplate">
        <property name="dataSource" ref="ds"></property>
    </bean>

    <bean id="mymovie" class="org.me.MovieDAO3">
        <property name="jdbcTemplate" ref="jdbcTemplate"></property>
    </bean>
</beans>
```

MovieTest3.java

```
package org.me;

import java.util.List;
import org.springframework.context.ApplicationContext;
import org.springframework.context.support.ClassPathXmlApplicationContext;

public class MovieTest3 {

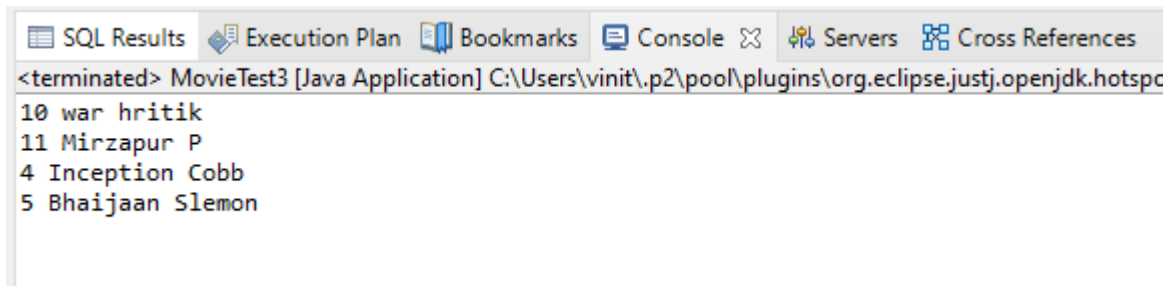
    private static ApplicationContext appCon;

    public static void main(String[] args) {

        appCon = new ClassPathXmlApplicationContext("appctx3.xml");
        MovieDAO3 m1=(MovieDAO3)appCon.getBean("mymovie");
        List<Movie2> list=m1.getAllEmployeesRowMapper();

        for(Movie2 e:list)
            System.out.println(e);
    }
}
```

Output :



The screenshot shows the Eclipse IDE interface. The top toolbar includes 'SQL Results', 'Execution Plan', 'Bookmarks', 'Console', 'Servers', and 'Cross References'. The 'SQL Results' tab is active, displaying a table with 4 rows and 3 columns: 'mid', 'title', and 'actor'. The 'Console' tab is also visible, showing the output of the SQL query: '10 war hritik', '11 Mirzapur P', '4 Inception Cobb', and '5 Bhaijaan Slemon'.

	mid [PK] integer	title character varying (50)	actor character varying (50)
1	10	war	hritik
2	11	Mirzapur	P
3	4	Inception	Cobb
4	5	Bhaijaan	Slemon

Assignment No 10
Spring Boot and RESTful Web Services

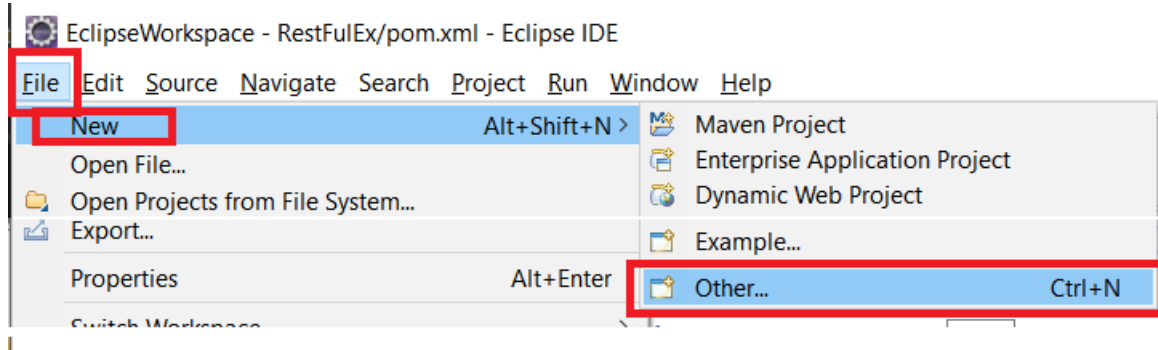
1. Write a program to create a simple Spring Boot application that prints a message.
2. Write a program to demonstrate RESTful Web Services with spring boot

Steps to Create a Spring Boot Project

Note : Make sure you have installed the Spring Plugin in Eclipse Itself.

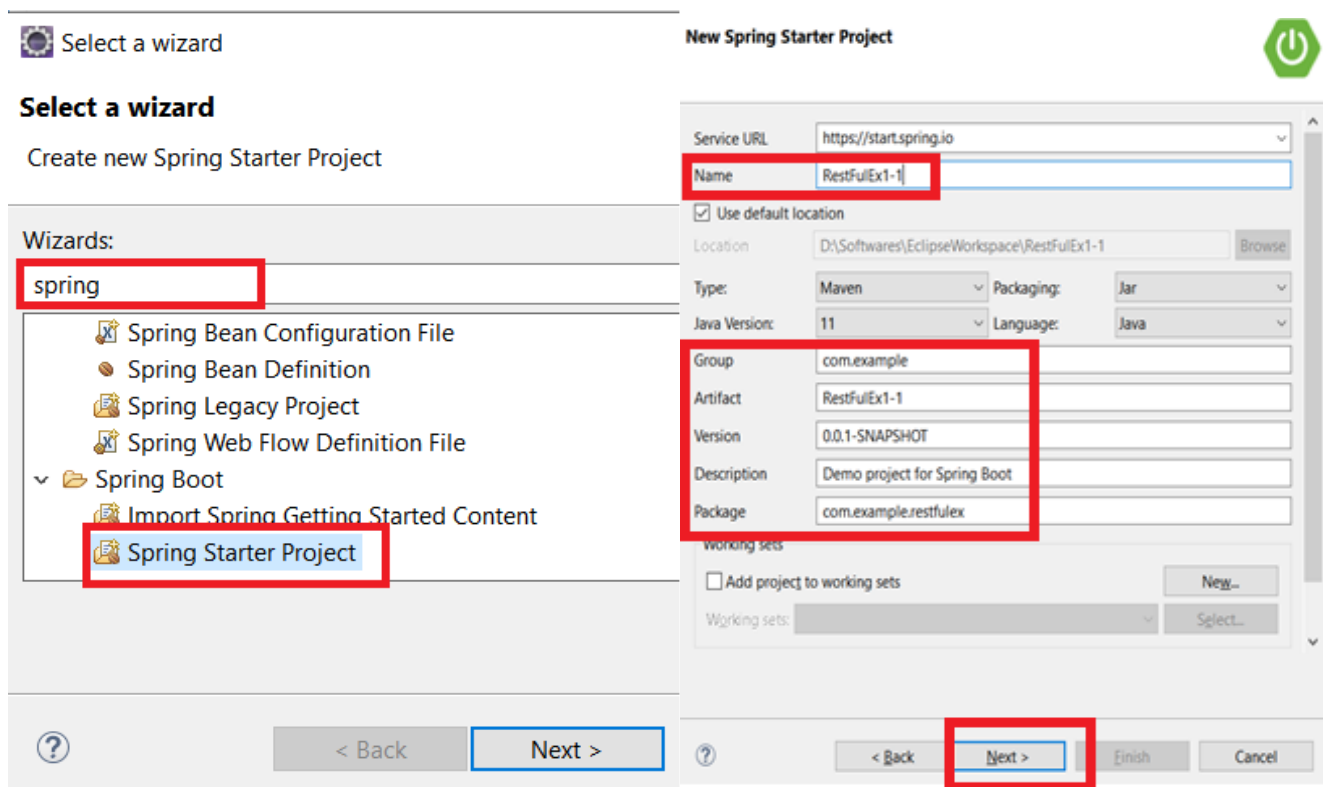
Step 1 :

1.1 : Open Eclipse. Go To File > New > Other.

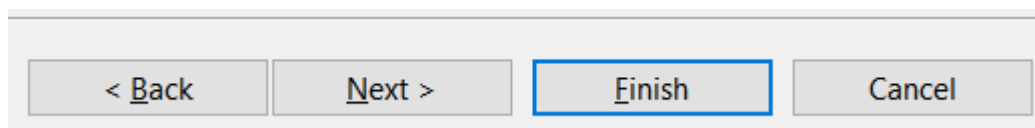


1.2 : Search for 'Spring' and Select 'Spring Starter Project'. Then Click on Next.

On Next Wizard, Choose your Project Name, and other parameters such as Group ID, Artifact ID. Then Choose Next.



1.3 On next wizards, just click on "Finish", once it is available.



Step 2 : Go to <https://start.spring.io/>

Select All the Options specific to your Machine and Java Version.

The screenshot shows the Spring Boot project generator interface. Several options are highlighted with red boxes:

- Project:** The "Maven Project" radio button is selected.
- Language:** The "Java" radio button is selected.
- Spring Boot:** The "2.4.4" radio button is selected.
- Project Metadata:** The entire section is highlighted, including:
 - Group: com.example
 - Artifact: demo
 - Name: demo
 - Description: Demo project for Spring Boot
 - Package name: com.example.demo
 - Packaging: "Jar" radio button is selected.
- Java:** The "8" radio button is selected.
- Dependencies:** The entire section is highlighted, showing "No dependency selected" and an "ADD ..." button.

Selection of Dependencies is to be done as per Project Requirement :

For Ex. Lets add Spring Web Dependency.

The screenshot shows the search results for "spring web" in the Spring Boot project generator. The results are displayed in a green box with the following information:

- Spring Web** (WEB)
- Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.

Click On Generate, a zip file will be downloaded.

Dependencies

ADD ...

Spring Web


WEB

Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.

GENERATE

EXPLORE

SHARE...

 demo.zip
[Open file](#) ...

Unzip the downloaded zip file and open the pom.xml file inside the demo folder.

Copy the Contents of the pom.xml file & paste it in the pom.xml file of our created project from step 1.

- RestFulEx [boot]
 - > Spring Elements
 - > src/main/java
 - > src/main/resources
 - > src/test/java
 - > JRE System Library [JavaSE]
 - > Maven Dependencies
 - > src
 - > target
 - HELP.md
 - mvnw
 - mvnw.cmd
 - pom.xml**

Save the file, an automatic download process will start, wait till its completed.

Now you are good to go and develop Spring Boot Applications.

Problem Statement 1 : Write a program to create a simple Spring Boot application that prints a message.

Solution :

BoothelloApplication.java

```
package com.example.demo;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class BoothelloApplication {

    public static void main(String[] args) {
        SpringApplication.run(BoothelloApplication.class, args);
    }

}
```

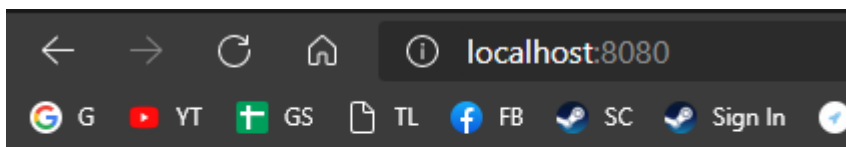
HelloWorldController.java

```
package com.example.demo;

import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RestController;

@RestController
public class HelloWorldController {
    @RequestMapping("/")
    public String hello()
    {
        return "Vinit is here !";
    }
}
```

Output :



Vinit is here !

Problem Statement 2 : Write a program to demonstrate RESTful Web Services with spring boot

Solution :

HelloWorldBean.java

```
package com.example.demo;

publicclass HelloWorldBean {

    public String message;
    //constructor of HelloWorldBean
    public HelloWorldBean(String message)
    {
        this.message=message;
    }
    //generating getters and setters
    public String getMessage()
    {
        return message;
    }
    publicvoid setMessage(String message)
    {
        this.message = message;
    }
    @Override
    //generate toString
    public String toString()
    {
        return String.format ("HelloWorldBean [message=%s]", message);
    }
}
```

HelloWorldController.java

```
package com.example.demo;

import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.RestController;
//Controller
@RestController
public class HelloWorldController
{
    //using get method and hello-world as URI
    @GetMapping(path="/hello-world")
    public String helloWorld()
    {
        return "Vinit is here!";
    }
    @GetMapping(path="/hello-world-bean")
    public HelloWorldBean helloWorldBean()
    {
        return new HelloWorldBean("Kaise ho? xD"); //constructor of HelloWorldBean  } }
}
```

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RestfulwebserviceApplication.java

```
package com.example.demo;

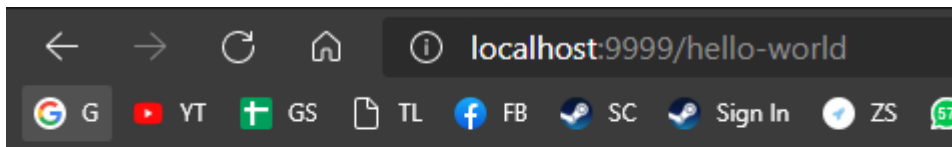
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class RestfulwebserviceApplication {

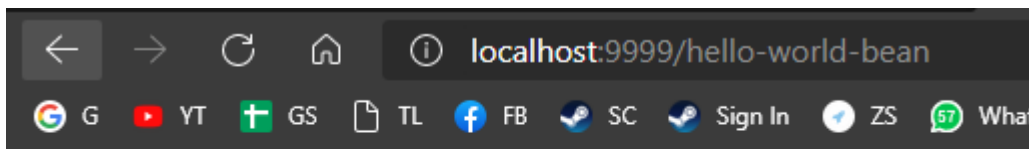
    public static void main(String[] args) {
        SpringApplication.run(RestfulwebserviceApplication.class, args);
    }

}
```

Output :



Vinit is here!



```
{"message": "Kaise ho? xD"}
```

Testing API with PostMan.

EndPoint : <http://localhost:9999/hello-world-bean>

