



Institute of Distance and Open Learning

Vidya Nagari, Kalina, Santacruz East – 400098.

CERTIFICATE

This is to certify that Mr/Ms. _____
of **Master in Computer Application (MCA)** Semester _____ has
completed the specified term work in the subject of
_____ satisfactorily within this
institute as laid down by University of Mumbai during the academic year
20____ to 20____.

Subject In-charge

External Examiner

Coordinator – M.C.A

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Subject: ADVANCE JAVA

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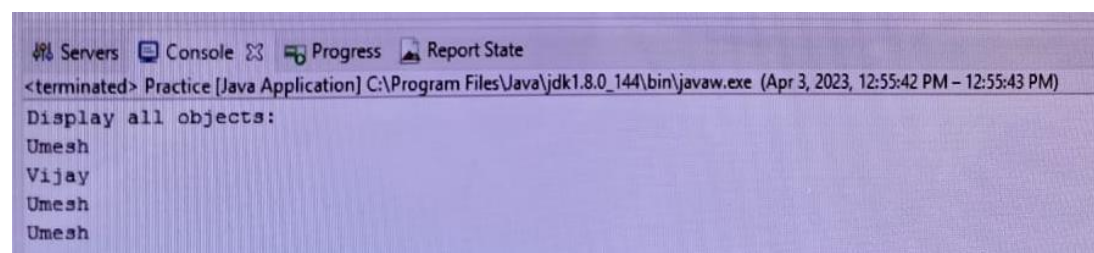
Q.1) Array List

The Array List class implements the List interface. It uses a dynamic array to store the duplicate element of different data types. The Array List class maintains the insertion order and is non-synchronized. The elements stored in the Array List class can be randomly accessed. Consider the following example.

CODE :

```
import java.util.*;
class SampleArrayList
{
public static void main(String args[])
{
ArrayList<String> list=new ArrayList<String>();
//Creating arraylist
list.add("Umesh");//Adding object in arraylist
list.add("Vijay");
list.add("Umesh");
list.add("Umesh");
//Traversing list through Iterator
Iterator itr=list.iterator();
System.out.println("Display all Objects :");
while(itr.hasNext())
{
System.out.println(itr.next());
}
}
}
```

OUTPUT :



The screenshot shows a Java IDE interface with a console window. The console output is as follows:

```
<terminated> Practice [Java Application] C:\Program Files\Java\jdk1.8.0_144\bin\javaw.exe (Apr 3, 2023, 12:55:42 PM - 12:55:43 PM)
Display all objects:
Umesh
Vijay
Umesh
Umesh
```

Q.2) Vector

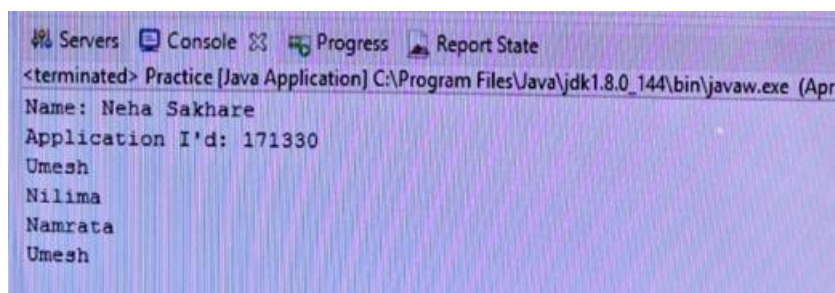
Vector uses a dynamic array to store the data elements. It is similar to ArrayList. However, It is synchronized and contains many methods that are not part of the Collection framework.

1) Write a Java Program Implementation of a Vector class using List Interface.

CODE :

```
import java.util.*;
public class SampleVectorDemo
public static void main(String args[])
{
    Vector<String> v=new Vector<String>();
    v.add("Umesh");
    v.add("Nilima");
    v.add("Namrata");
    v.add("Umesh");
    Iterator<String> itr=v.iterator();
    while(itr.hasNext())
    {
        System.out.println(itr.next());
    }
}
```

OUTPUT :

A screenshot of a Java IDE's console window. The window has tabs for 'Servers', 'Console', 'Progress', and 'Report State'. The 'Console' tab is active, showing the output of a Java application. The text in the console is: '<terminated> Practice [Java Application] C:\Program Files\Java\jdk1.8.0_144\bin\javaw.exe (Apr', 'Name: Neha Sakhare', 'Application I'd: 171330', 'Umesh', 'Nilima', 'Namrata', 'Umesh'. The output shows the names of the elements in the Vector, with 'Umesh' appearing twice, corresponding to the two 'Umesh' entries in the original code.

```
<terminated> Practice [Java Application] C:\Program Files\Java\jdk1.8.0_144\bin\javaw.exe (Apr
Name: Neha Sakhare
Application I'd: 171330
Umesh
Nilima
Namrata
Umesh
```

Q.3) Stack

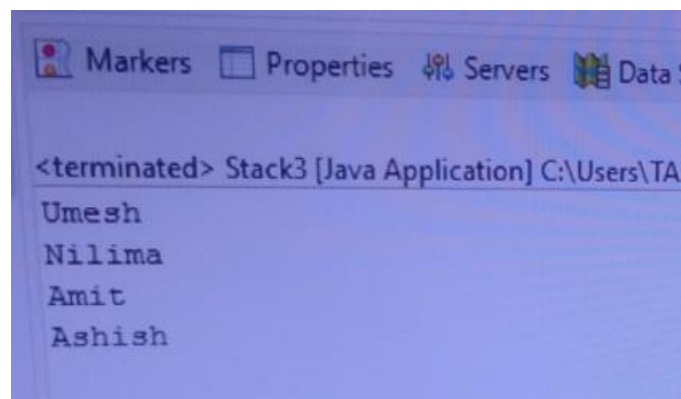
The stack is the subclass of Vector. It implements the last-in-first-out data structure, i.e., Stack. The stack contains all of the methods Of the also provides its methods like boolean push(), boolean peek(), boolean push(object o), which defines its properties.

1) Write a Java Program Implementation of a Stack class using List Interface

Code :

```
import java.util.*;
public class SampleStackDemo
{
    public static void main(String args[])
    Stack<String> stack = new Stack<String>();
    stack.push("Umesh");
    stack.push("Nilima");
    stack.push("Amit");
    stack.push("Ashish");
    stack.push("Garima");
    stack.pop();
    Iterator<String> itr=stack.iterator();
    while(itr.hasNext())
    {
        System.out.println(itr.next());
    }
}
}
```

OUTPUT :



Q.4) Set Interface:

The set is an interface available in the java.util package. The set interface extends the Collection interface. An unordered collection or list in which duplicates are not allowed is referred to as a collection interface. The set interface is used to create the mathematical set. The set interface use collection interface's methods to avoid the insertion of the same elements. SortedSet and NavigableSet are two interfaces that extend the set implementation.

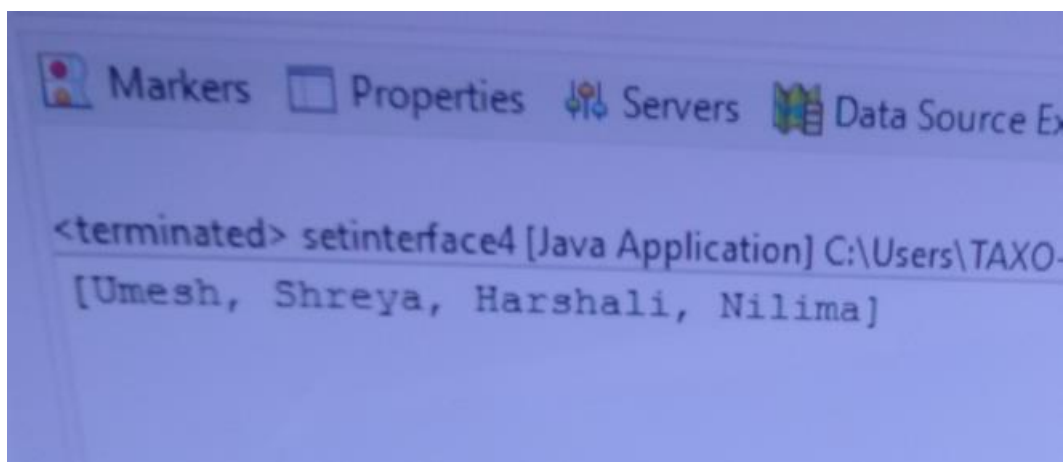
Program on set Interface implement on Linked Hash Set class.

DemoLinkedHashSet.java

Code :

```
import java.util.*;
public class DemoLinkedHashSet
{
    public static void main(String[] args)
    {{
        // creating LinkedHashSet using the Set
        Set<String> data = new LinkedHashSet<String>();
        Data.add("Umesh");
        Data.add("Shreya");
        Data.add("Harshali");
        Data.add("Nilima");
        System.out.println(data);
    }
}
```

Output :



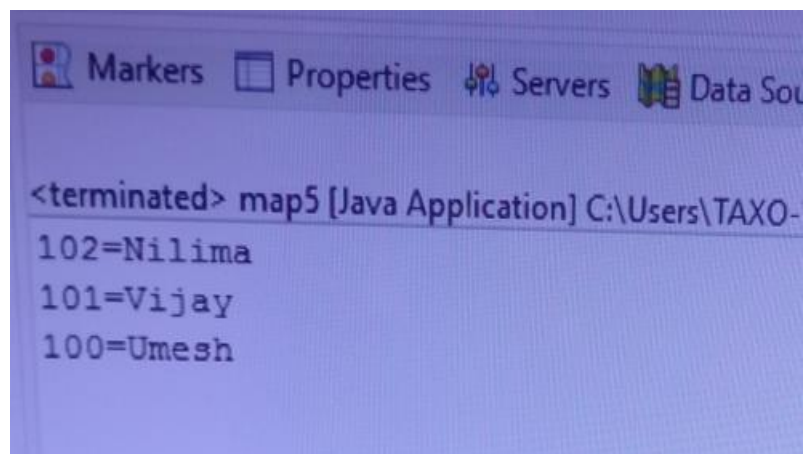
Q.5) Java Map Example: comparingByKey() in Descending Order

CODE :

```
import java.util.*;
class DemoMapExample3
{
public static void main(String args[])
{
Map<Integer,String> map=new
HashMap<Integer, String>();
map.put(100,"Umesh");
map.put(101,"Vijay");
map.put(102,"Nilima");
//Returns a Set view of the mappings contained in this
map
map.entrySet()

//Returns a sequential Stream with this collection as its
source
.stream(
//Sorted according to the provided Comparator
.sorted(Map.Entry.comparingByKey(Comparator.reverseOr
der()))
//Performs an action for each element of this stream
}
}
```

Output :



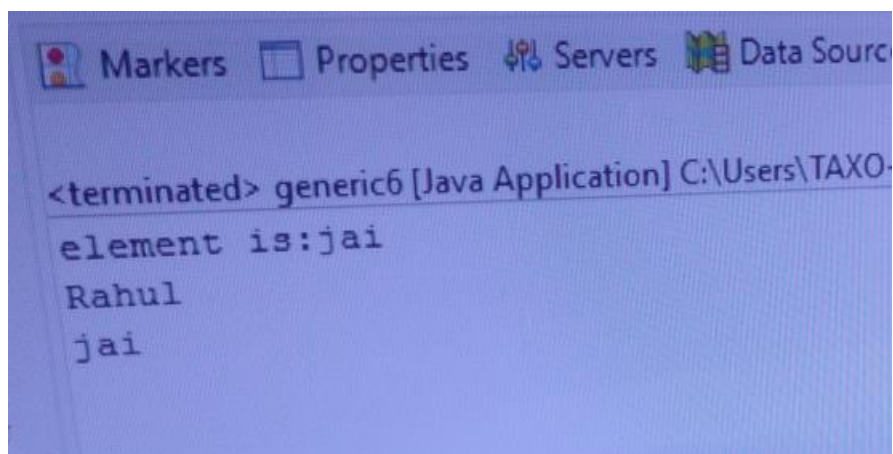
Q.6) Generics in Java:

In java we are using the ArrayList class, but you can use any collection class such as ArrayList, LinkedList, HashSet, TreeSet, HashMap, Comparator etc.

CODE :

```
import java.util.*;
class DemoGenerics 1
public static void main(String args[])
{
}
ArrayList<String> list=new ArrayList<String>();
list.add("rahul");
list.add("jai");
//list.add(32);//compile time error
String s list.get(1);//type casting is not required
System.out.println("element is: "+s);
Iterator<String> itr=list.iterator();
while(itr.hasNext())
{
System.out.println(itr.next());
}
}
}
```

OUTPUT :

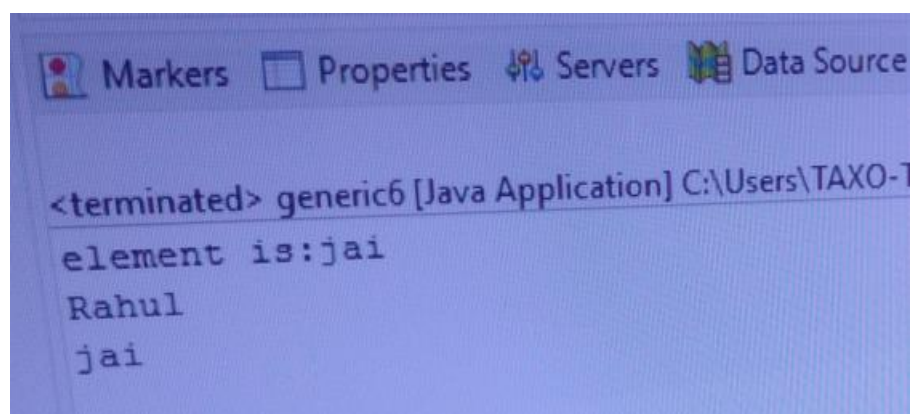


Q.7) WAP of Unbounded Wildcards

CODE :

```
import java.util.Arrays;
import java.util.List;
public class Unbounded Wildcard
{
    public static void display(List<?> list)
    {
        for(Object o:list)
        {
            System.out.println(o);
        }
    }
    public static void main(String[] args)
    {
        List<Integer> 11=Arrays.asList(1,2,3);
        System.out.println("displaying the Integer values");
        display(11);
        List<String> 12=Arrays.asList("One","Two","Three");
        System.out.println("displaying the String values");
    }
    display(12);
}
}
```

OUTPUT :

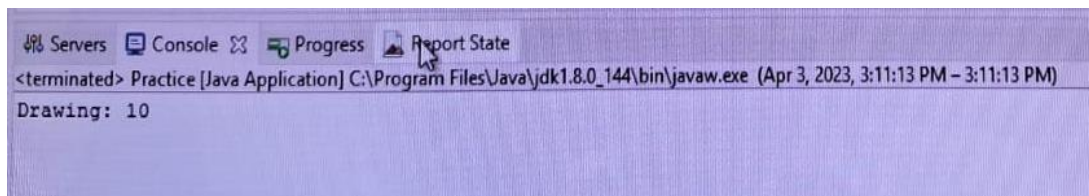


Q.8) WAP of Functional Interface using Lambda Expression Example

CODE :

```
@FunctionalInterface //It is optional
interface Drawable
{
    public void draw();
}
public class DemoLambdaExpressionExample
{
    public static void main(String[] args)
    {
        int width=10;
        //with lambda
        Drawable d2=()->{
            System.out.println("Drawing "+width);
        };
        d2.draw();
    }
}
```

Output :

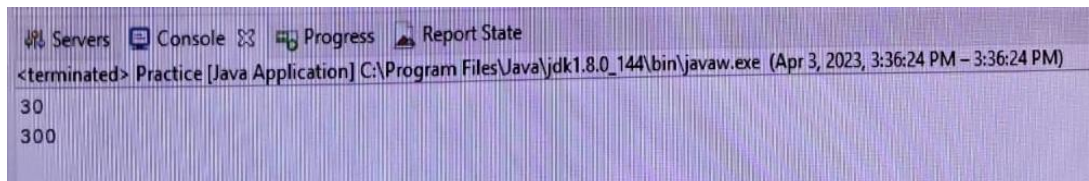


Q.9) Lambda Expression Example: Multiple Parameters

CODE :

```
interface Addable
{
    int add(int a,int b);
}
public class DemoLambdaExpressionExample
{
    public static void main(String[] args)
    {
        // Multiple parameters in lambda expression
        Addable ad1=(a,b)->(a+b);
        System.out.println(ad1.add(10,20));
        // Multiple parameters with data type in lambda expression
        Addable ad2=(int a,int b)->(a+b);
        System.out.println(ad2.add(100,200));
    }
}
```

OUTPUT :



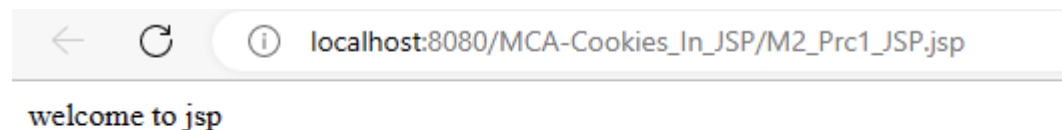
The screenshot shows an IDE console window with a dark background. At the top, there are tabs for 'Servers', 'Console', 'Progress', and 'Report State'. Below the tabs, the console output is displayed. The first line shows '<terminated> Practice [Java Application] C:\Program Files\Java\jdk1.8.0_144\bin\javaw.exe (Apr 3, 2023, 3:36:24 PM - 3:36:24 PM)'. The second line shows the output '30'. The third line shows the output '300'.

Q.10) WAP of scriptlet tag to execute java source code in JSP.

CODE :

```
<%@ 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>Example of JSP Tag</title>
</head>
<body>
<% out.print("welcome to jsp"); %>
</body>
</html>
```

OUTPUT :

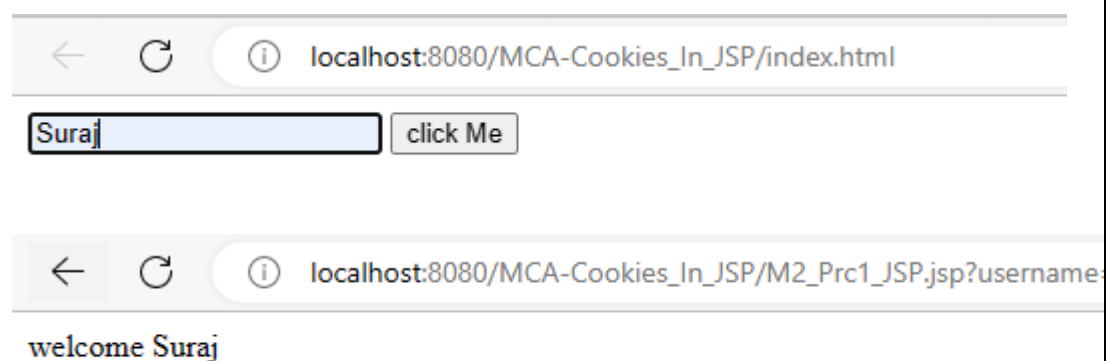


Q.11) WAP of JSP scriplet tag that prints the username.

CODE :

Index.html	M2_Prc1_JSP.jsp
<pre> <!DOCTYPE html> <html> <head> <meta charset="ISO-8859-1"> <title>Insert title here</title> </head> <body> <form action="M2_Prc1_JSP.jsp" > <input type="text" name="username"> <input type="submit" value="click Me">
 </form> </body> </html> </pre>	<pre> <%@ 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>Example of JSP Tag</title> </head> <body> <% String name=request.getParameter("username"); out.print("welcome "+ name); %> </body> </html> </pre>

OUTPUT :

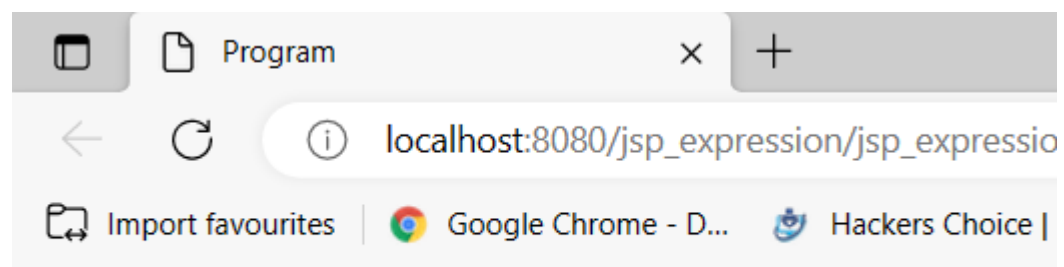


Q.12) WAP to create JSP expression tag to simply displaying a message

CODE :

```
<html>
<head>
<title>Program</title>
</head>
<body>
<%= "Welcome to Department of MCA" %>
</body>
</html>
```

OUTPUT:



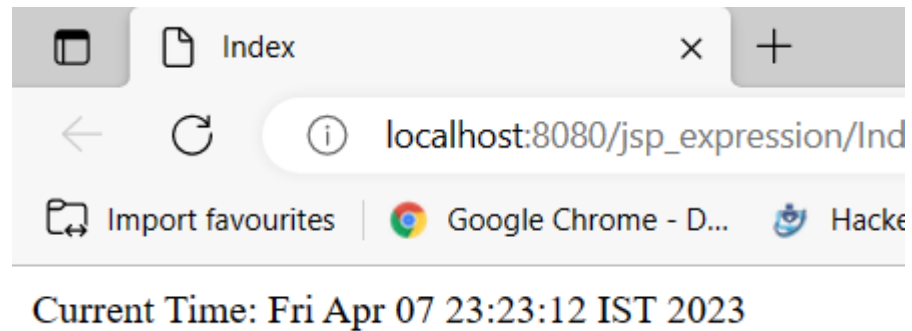
Welcome to Department of MCA

Q.13) WAP of JSP scriptlet tag that prints current time.

CODE:

```
<html>
<head>
<title>Index</title>
</head>
<body>
Current                               Time:                               <%=
java.util.Calendar.getInstance().getTime() %>
</body>
</html>
```

OUTPUT:



Q.14) WAP of JSP declaration tag that declares method (CUBE Program).

CODE:

```
<%@ 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>
<%!
int cube(int n )
{
return n*n*n;
}

%>
<%= "Cube of 3 is:" + cube(3) %>
</body>
</html>
```

OUTPUT:

Cube of 3 is:27

Q.15) WAP of jsp:forward action tag without parameter.

CODE :

Index.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>
<h2> This is Index PAge </h2>
<jsp:forward page = "printdate.jsp"/>
</body>
</html>
```

Printdare.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>

<% out.print("Today
is:"+java.util.Calendar.getInstance().getTime()); %>

</body>
</html>
```

OUTPUT :

Today is:Wed Apr 05 22:37:33 IST 2023

Q.16) WAP of jsp:forward action tag with parameter.

CODE :

```
<%@ 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>
<h2>Index Page </h2>

<jsp:forward page="printdate1.jsp" >
<jsp:param name="name" value="Mumbai University IDOL MCA " />
</jsp:forward>
</body>
</html>
```

Printdate1.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>
<% out.print("Today is:"+java.util.Calendar.getInstance().getTime());
%>
<%= request.getParameter("name") %>
</body>
</html>
```

OUTPUT :

Today is:Wed Apr 05 22:40:42 IST 2023 Mumbai University IDOL MCA

Q.17) WAP of simple example of Java Bean Class.

CODE :

```
public class Student implements java.io.Serializable{

private int id;
private String name;

public Student ()
{}

public void setId(int id)
{
    this.id=id;
}
public int getId()
{
return id;
}

public void setName(String name)
{
    this.name=name;
}

public String getName()
{
return name;
}

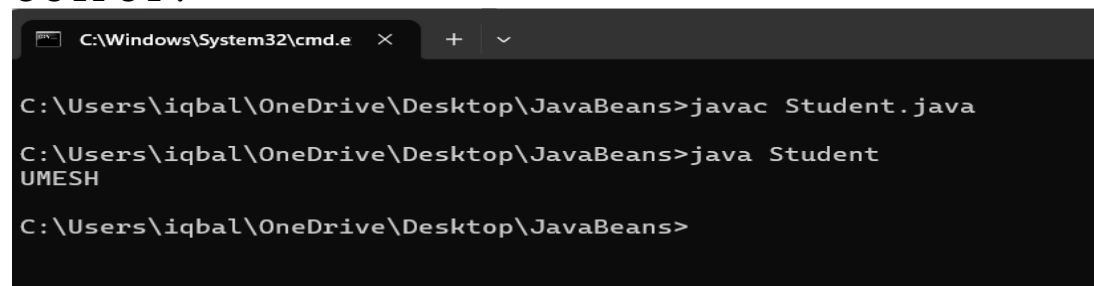
    public static void main(String[] args) {

        Student s = new Student();
        s.setName("UMESH");
        System.out.println(s.getName());

    }

}
```

OUTPUT :



```
C:\Windows\System32\cmd.e  x  +  v

C:\Users\iqbal\OneDrive\Desktop\JavaBeans>javac Student.java

C:\Users\iqbal\OneDrive\Desktop\JavaBeans>java Student
UMESH

C:\Users\iqbal\OneDrive\Desktop\JavaBeans>
```

Q.18) WAP of Import Attribute.

CODE:

```
<html>  
<body>  
<%@ page import="java.util.Date" %>  
Today is: <%= new Date() %>  
</body>  
</html>
```

OUTPUT:

Today is: Fri Apr 07 22:11:28 IST 2023

Q.19) WAP of Is Error Page.

CODE :

```
<html>
<body>
<%@ page isErrorPage="true" %>
Sorry and exception occured!<br/>
The Exception is: <%= exception %>
</body>
</html>
```

OUTPUT :

Sorry and exception occured!
The Exception is: null

Q.20) WAP of Example of JSP Taglib Directive.

CODE :

```
<%@ page language="java" contentType="text/html;
charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ taglib prefix="mytag"
uri="http://java.sun.com/jsp/jstl/core"%>
<html>
<!DOCTYPE html>

<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
<h1>
<mytag:out value="This is an Example of Taglib Directive"/>
</h1>
</body>
</html>
```

OUTPUT :

This is an Example of Taglib Directive

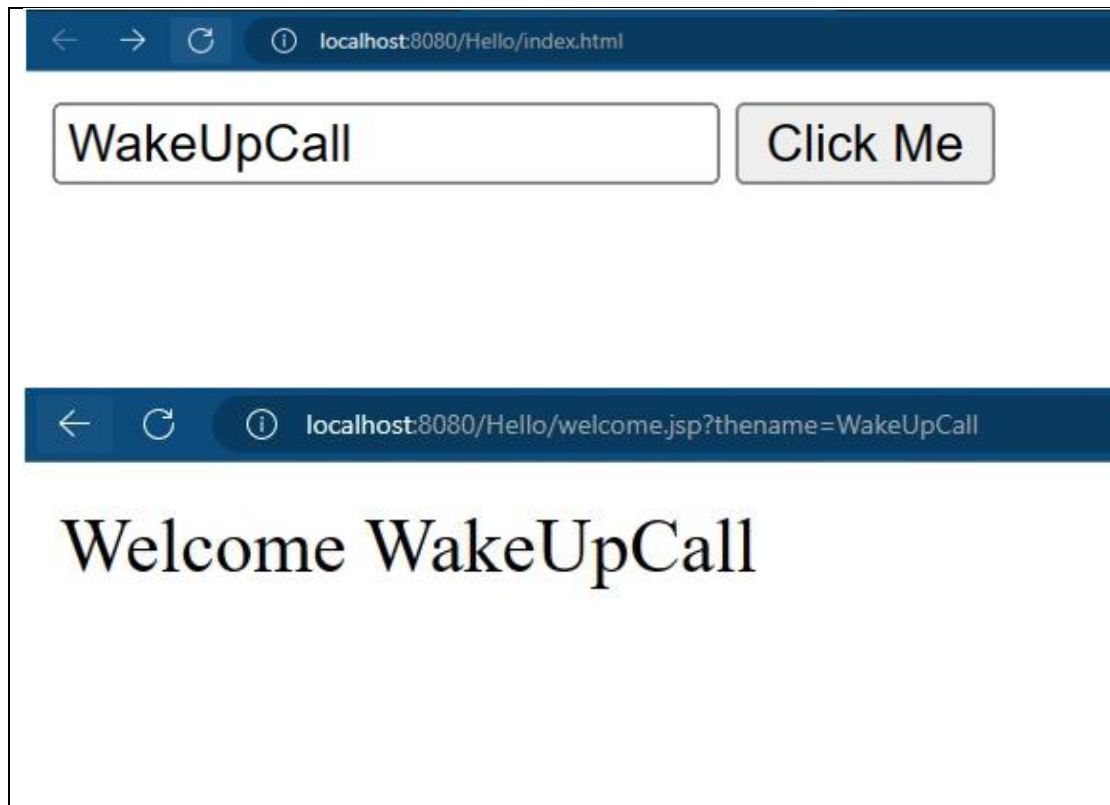
Q.21) WAP of Example of JSP Request Implicit Object.

CODE:

```
// index.html
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>FormPage</title>
</head>
<body>
    <form action="welcome.jsp">
        <input type="text" name="thename">
        <input type="submit" value="Click Me"> <br>
    </form>
</body>
</html>

// welcome.jsp
<%@ page language="java" contentType="text/html;
charset=UTF-8"
    pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>WelcomePage</title>
</head>
<body>
    <% String name = request.getParameter("thename");
        out.print("Welcome" + name); %>
</body>
</html>
```

OUTPUT:



Q.22) WAP of Example of JSP Response Implicit Object.

CODE :

```
// index.html ----->
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>FormPage</title>
</head>
<body>
    <form action="welcome">
        <input type="text" name="thename">
        <input type="submit" value="go"><br/>
    </form>
</body>
</html>

// welcome.jsp ----->
<%@ page language="java" contentType="text/html;
charset=UTF-8"
    pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>WelcomePage</title>
</head>
<body>
    <%
        out.print("Welcome " + request.getParameter("thename")
+ "\n");
        String driver = config.getInitParameter("dname");
        out.println("Driver name is= " + driver);
    %>

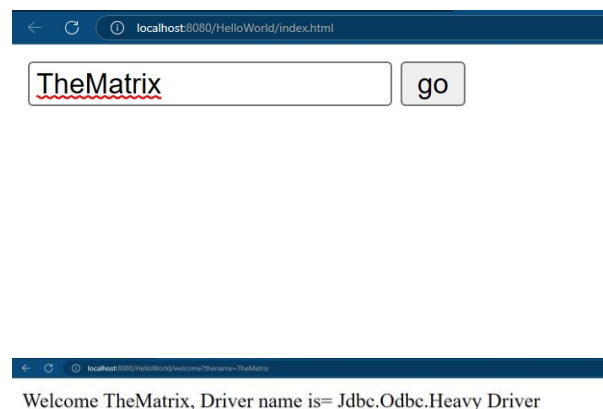
</body>
</html>
```

```
// web.xml ----->
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns="http://xmlns.jcp.org/xml/ns/javaee"
xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee
http://xmlns.jcp.org/xml/ns/javaee/web-app_4_0.xsd"
id="WebApp_ID" version="4.0">
    <servlet>
        <servlet-name>Faizan Sayyed</servlet-name>
        <jsp-file>/welcome.jsp</jsp-file>

        <init-param>
            <param-name>dname</param-name>
            <param-value>Jdbc.Odbc.Heavy Driver</param-
value>
        </init-param>
    </servlet>

    <servlet-mapping>
        <servlet-name>Faizan Sayyed</servlet-name>
        <url-pattern>/welcome</url-pattern>
    </servlet-mapping>
</web-app>
```

OUTPUT :



Q.23) WAP of JSP PageContext Implicit Object.

CODE:

Index.html <pre> <!DOCTYPE html> <html> <head> <meta charset="ISO-8859-1"> <title>Insert title here</title> </head> <body> <form action = "implicitObject.jsp"> <input type="text" name="uname"> <input type="submit" value="go">
 </form> </body> </html> </pre>	second.jsp <pre> <%@ 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>Insert title here</title> </head> <body> <% String name = (String)pageContext.getAttri bute("user", PageContext.SESSION_SCO PE); out.print("Hell"+name); %> </body> </html> </pre>
implicitObject.jsp <pre> <%@ 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"> </head> <body> <% String name= request.getParameter("uname"); out.println("Welcome "+name); pageContext.setAttribute("user",name,PageCont ext.SESSION_SCOPE); %> Second <u>j</u>sp page </body> </html> </pre>	

OUTPUT:

The image displays three sequential browser window screenshots. The first screenshot shows a browser at 'localhost:8080/MCA_Prectical/index.html' with a text input field containing 'Suraj' and a 'go' button. The second screenshot shows the browser at 'localhost:8080/MCA_Prectical/implicitObject.jsp?uname=Suraj+' displaying the text 'Welcome Suraj' followed by a blue underlined link 'Second jsp page'. The third screenshot shows the browser at 'localhost:8080/MCA_Prectical/second.jsp' displaying the text 'HellSuraj'.

localhost:8080/MCA_Prectical/index.html

Suraj go

localhost:8080/MCA_Prectical/implicitObject.jsp?uname=Suraj+

Welcome Suraj [Second jsp page](#)

localhost:8080/MCA_Prectical/second.jsp

HellSuraj

Q.24) WAP of Cookies.

CODE:

Action_cookie.jsp	Action_cookie_main.jsp
<pre> <%@ 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>Guru Cookie</title> </head> <body> <form action="Action_cookie_main.jsp" method="GET"> Username: <input type="text" name="username">
 Email: <input type="text" name="email" /> <input type="submit" value="Submit"/> </form> </body> </html> </pre>	<pre> <%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%> <% Cookie username = new Cookie("username",request.getParameter("use name")); 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); %> <!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>Cookies in JSP</title> </head> <body> Username: <%=request.getParameter ("username")%> Email: <%=request.getParameter ("email")%> </body> </html> </pre>

OUTPUT:

The output consists of two screenshots from a web browser. The first screenshot shows the URL `localhost:8080/MCA-Cookies_In_JSP/Action_cookie.jsp` and a form with fields for "Username:" (containing "Suraj") and "Email:" (containing "sgy9065@gmail.com"), followed by a "Submit" button. The second screenshot shows the URL `localhost:8080/MCA-Cookies_In_JSP/Action_cookie_main.jsp?username=Suraj&email=sgy9065%40g` and displays the result: "Username: Suraj Email: sgy9065@gmail.com".