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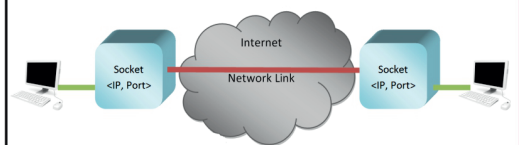
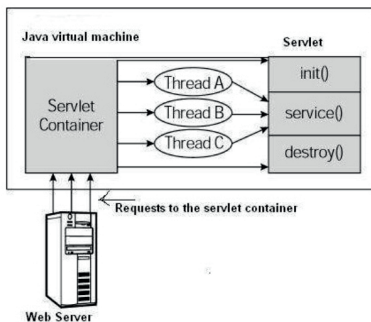
Name _____

Roll No. _____ Year 20 _____ 20 _____

Exam Seat No. _____

COMPUTER GROUP | SEMESTER - V | DIPLOMA IN ENGINEERING AND TECHNOLOGY

A LABORATORY MANUAL FOR ADVANCED JAVA PROGRAMMING (22517)



MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI
(Autonomous) (ISO 9001 : 2015) (ISO / IEC 27001 : 2013)

VISION

To ensure that the Diploma level Technical Education constantly matches the latest requirements of technology and industry and includes the all-round personal development of students including social concerns and to become globally competitive, technology led organization.

MISSION

To provide high quality technical and managerial manpower, information and consultancy services to the industry and community to enable the industry and community to face the changing technological and environmental challenges.

QUALITY POLICY

We, at MSBTE are committed to offer the best in class academic services to the students and institutes to enhance the delight of industry and society. This will be achieved through continual improvement in management practices adopted in the process of curriculum design, development, implementation, evaluation and monitoring system along with adequate faculty development programmes.

CORE VALUES

MSBTE believes in the followings:

- Education industry produces live products.
- Market requirements do not wait for curriculum changes.
- Question paper is the reflector of academic standards of educational organization.
- Well designed curriculum needs effective implementation too.
- Competency based curriculum is the backbone of need based program.
- Technical skills do need support of life skills.
- Best teachers are the national assets.
- Effective teaching learning process is impossible without learning resources.

A Laboratory Manual

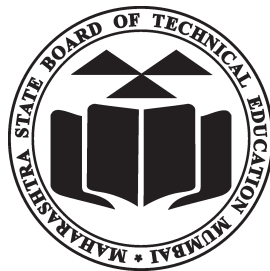
for

**Advanced Java
Programming**

(22517)

Semester-V

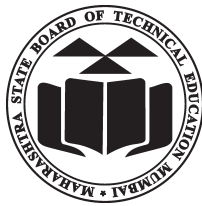
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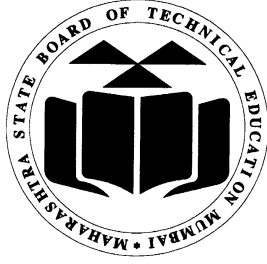
Maharashtra State

Board of Technical Education, Mumbai

(Autonomous) (ISO:9001:2015) (ISO/IEC 27001:2013)



Maharashtra State Board of Technical Education,
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(Printed on May,2019)



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Certificate**

This is to certify that Mr. / Ms.
Roll No., of Fifth Semester of Diploma in
..... of Institute,
.....
(Code:) has completed the term work satisfactorily in course
Advanced Java Programming (22517) for the academic year 20..... to
20..... as prescribed in the curriculum.

Place:

Enrollment No:.....

Date:

Exam. Seat No:

Subject Teacher

Head of the Department

Principal



Preface

The primary focus of any engineering laboratory/field work in the technical education system is to develop the much-needed industry relevant competencies and skills. With this in view, MSBTE embarked on this innovative ‘I’ Scheme curricula for engineering Diploma programmes with outcome-based education as the focus and accordingly, relatively large amount of time is allotted for the practical work. This displays the great importance of laboratory work making each teacher, instructor and student to realize that every minute of the laboratory time need to be effectively utilized to develop these outcomes, rather than doing other mundane activities. Therefore, for the successful implementation of this outcome-based curriculum, every practical has been designed to serve as a ‘*vehicle*’ to develop this industry identified competency in every student. The practical skills are difficult to develop through ‘chalk and duster’ activity in the classroom situation. Accordingly, the ‘I’ scheme laboratory manual development team designed the practicals to *focus* on *outcomes*, rather than the traditional age-old practice of conducting practical’s to ‘verify the theory’ (which may become a byproduct along the way).

This laboratory manual is designed to help all stakeholders, especially the students, teachers and instructors to develop in the student the pre-determined outcomes. It is expected from each student that at least a day in advance, they have to thoroughly read the concerned practical procedure that they will do the next day and understand minimum theoretical background associated with the practical. Every practical in this manual begins by identifying the competency, industry relevant skills, course outcomes and practical outcomes which serve as a key focal point for doing the practical. Students will then become aware about the skills they will achieve through procedure shown there and necessary precautions to be taken, which will help them to apply in solving real-world problems in their professional life.

This manual also provides guidelines to teachers and instructors to effectively facilitate student-centered lab activities through each practical exercise by arranging and managing necessary resources in order that the students follow the procedures and precautions systematically ensuring the achievement of outcomes in the students.

Advanced Java Programming is used as mainstream programming language in application development. This course aims to design and develop Java based applications. Using Advanced Java programming, students will be able to develop web applications, GUI, applications as well as network-based applications. Students will be able to write the programs like applet, Servlets, connections to Databases using JDBC and socket programming.

Although all care has been taken to check for mistakes in this laboratory manual, yet it is impossible to claim perfection especially as this is the first edition. Any such errors and suggestions for improvement can be brought to our notice and are highly welcome.

Programme Outcomes (POs) to be achieved through Practical's of this Course:

Following programme outcomes are expected to be achieved significantly out of the ten programme outcomes and Information Technology programme specific outcomes through the practical's of the course on **Advanced Java Programming**.

PO 1. Basic knowledge: Apply knowledge of basic mathematics, science and basic engineering to solve the problems related to application of computers and communication services in storing, manipulating and transmitting data, often in the context of a business or other enterprise.

PO 2. Discipline knowledge: Apply Computer Engineering knowledge to solve broad-based Computer Engineering related problems.

PO 3. Experiments and practice: Plan to perform experiments, practices and to use the results to solve Computer Engineering related problems.

PO 4. Engineering tools: Apply appropriate Computer Engineering related techniques/ tools with an understanding of the limitations.

PO 5. The engineer and society: Assess societal, health, safety and legal issues and the consequent responsibilities relevant to practice in the field of Computer Engineering.

PO 6. Environment and sustainability: Apply Computer related engineering solutions for sustainable development practices in environmental contexts.

PO 7. Ethics: Apply ethical principles for commitment to professional ethics, responsibilities and norms of practice in the field of Information Technology.

PO 8. Individual and team work: Function effectively as a leader and team member in diverse/ multidisciplinary teams.

PO 9. Communication: Communicate effectively in oral and written form.

PO 10. Life-long learning: Engage in independent and life-long learning along with the technological changes in the IT and allied industry.

Practical - Course Outcome Matrix

Course Outcome:							
a. Develop program using GUI framework (AWT and Swing) b. Handle events of AWT and Swing Components. c. Develop programs to handle events in Java Programming. d. Develop Java Programs using Networking Concepts. e. Develop programs using Database. f. Develop programs using Servlets.							
S. No.	Title of the Practical	CO a.	CO b.	CO c.	CO d.	CO e.	CO f.
* 1	Write a program to demonstrate the use of AWT components like Label, TextField, TextArea, Button, Checkbox, RadioButton etc.	√	-	-	-	-	-
* 2	Write a program to design a form using the components List and Choice.	√	-	-	-	-	-
* 3	Write a program to design simple calculator with the use of GridLayout	√	-	-	-	-	-
* 4	Write a program to create a two-level card deck that allows the user to select component of Panel using CardLayout	√	-	-	-	-	-
* 5	Write a program using AWT to create a menubar where menubar contains menu items such as File, Edit, View and create a submenu under the File menu: New and Open.	√	-	-	-	-	-
* 6	Write a program using swing to display a ScrollPane and JComboBox in an JApplet with the items – English, Marathi, Hindi, Sanskrit.	√	√	-	-	-	-
* 7	Write a program to create a Jtree.	-	√	-	-	-	-
8	Write a program to create a JTable.	-	√	-	-	-	-
9	Write a program to launch a JProgressBar	-	√	-	-	-	-
* 10	Write a program to demonstrate status of key on Applet window such as KeyPressed, KeyReleased, KeyUp, KeyDown	√	√	√	-	-	-
* 11	Write a program to demonstrate various mouse events using MouseListener and MouseMotionListener interface	√	√	√	-	-	-
* 12	Write a program to demonstrate the use of JTextField and JPasswordField using Listener Interface	√	√	√	-	-	-

13	Write a program to demonstrate the use of WindowAdapter class.	√	√	√	-	-	-
* 14	Write a program to demonstrate the use of InetAddress class and its factory methods.	-	-	-	√	-	-
* 15	Write a program to demonstrate the use of URL and URLConnection class and its methods	-	-	-	√	-	-
16	Write a program to implement chat Server using Server Socket and Socket class.	-	-	-	√	-	-
17	Write a program to demonstrate use of Datagram Socket and Datagram Packet	-	-	-	√	-	-
* 18	Write a program to insert and retrieve the data from database using JDBC	-	-	-	-	√	-
19	Write a program to demonstrate the use of PreparedStatement and ResultSet interface	-	-	-	-	√	-
20	Write a program to update and delete a record from a database table.	-	-	-	-	√	-
21	Write a program to demonstrate the use of HttpServlet as a parameterized servlet	√	-	-	-	-	√
* 22	Write a Servlet program to send username and password using HTML forms and authenticate the user	√	-	-	-	-	√
23	Write a program to create Session using HttpSession class	√	-	-	-	-	√
24	Write a program to implement Session tracking using Cookies.	√	-	-	-	-	√

List of Industry Relevant Skills

The following industry relevant skills of the competency “Apply advanced Java Programming Concepts” are expected to be developed in you by performing practical’s of this laboratory manual.

1. Create GUI Applications.
2. Handle events using event delegation model.
3. Write and execute programs for web based as well as window-based applications.
4. Write and execute programs for networking.
5. Write and execute programs to store the data in database to perform CRUD operations.
6. Write and execute programs for client server using Servlets.

Brief Guidelines to Teachers

Hints regarding strategies to be used

1. Teacher shall explain prior concepts to the students before starting each experiment.
2. For practical's requiring tools to be used, teacher should provide the demonstration of the practical emphasizing the skills, which the student should achieve.
3. Involve students in the activities during the conduct of each experiment.
4. Teachers should give opportunity to students for hands-on after the demonstration.
5. Assess the skill achievement of the students and COs of each unit.
6. Teacher is expected to share the skills and competencies to be developed in the students.
7. Teacher should ensure that the respective skills and competencies are developed in the students after the completion of the practical exercise.
8. Teacher may provide additional knowledge and skills to the students even though that may not be covered in the manual but are expected from the students by the industries.
9. Teacher may suggest the students to refer additional related literature of the reference books/websites/seminar proceedings etc.
10. During assessment teacher is expected to ask questions to the students to tap their knowledge and skill related to that practical.

Instructions for Students

Student shall read the points given below for understanding the theoretical concepts and practical applications.

1. Students shall listen carefully the lecture given by teacher about importance of subject, learning structure, course outcomes.
2. Students shall organize the work in the group of two or three members and make a record of all observations.
3. Students shall understand the purpose of experiment and its practical implementation.
4. Students shall write the answers of the questions during practical.
5. Student should feel free to discuss any difficulty faced during the conduct of practical.
6. Students shall develop web based and window-based applications as expected by the industries.
7. Student shall attempt to develop related hands on skills and gain confidence.
8. Students shall refer technical magazines; websites related to the scope of the subjects and update their knowledge and skills.
9. Students shall develop self-learning techniques.
10. Students should develop habit to submit the write-ups on the scheduled dates and time.

Content Page
List of Practical's and Progressive Assessment Sheet

Sr. No.	Title of the practical	Page No.	Date of performance	Date of submission	Assessment Marks (50)	Dated sign. of teacher	Remarks (if any)
1.	Write a program to demonstrate the use of AWT components like Label, Textfield, TextArea, Button, Checkbox, RadioButton etc.	1					
2.	Write a program to design a form using the components List and Choice.	6					
3.	Write a program to design simple calculator with the use of GridLayout	12					
4.	Write a program to create a two-level card deck that allows the user to select component of Panel using CardLayout	19					
5.	Write a program using AWT to create a menu bar where menu bar contains menu items such as File, Edit, View and create a submenu under the File menu: New and Open.	25					
6.	Write a program using swing to display a ScrollPane and JComboBox in an Japplet with the items – English, Marathi, Hindi, Sanskrit.	31					
7.	Write a program to create a Jtree.	37					
8.	Write a program to create a JTable.	42					

9.	Write a program to launch a JProgressBar	48					
10.	Write a program to demonstrate status of key on Applet window such as KeyPressed, KeyReleased, KeyUp, KeyDown	53					
11.	Write a program to demonstrate various mouse events using MouseListener and MouseMotionListener interface	58					
12.	Write a program to demonstrate the use of JTextField and JPasswordField using Listener Interface	63					
13.	Write a program to demonstrate the use of WindowAdapter class.	69					
14.	Write a program to demonstrate the use of InetAddress class and its factory methods.	75					
15.	Write a program to demonstrate the use of URL and URLConnection class and its methods	80					
16.	Write a program to implement chat Server using Server Socket and Socket class.	85					
17.	Write a program to demonstrate use of DatagramSocket and Datagram Packet	90					
18.	Write a program to insert and retrieve the data from database using JDBC	95					

19.	Write a program to demonstrate the use of PreparedStatement and ResultSet interface.	102					
20.	Write a program to update and delete a record from a database table.	110					
21.	Write a program to demonstrate the use of HttpServlet as a parameterized servlet	116					
22.	Write a Servlet program to send username and password using HTML forms and authenticate the user	123					
23.	Write a program to create Session using HttpSession class.	130					
24.	Write a program to implement Session tracking using Cookies.	137					
Total Marks							

- To be transferred to Proforma of CIAAN-2017.

Practical No. 1: Write a program to demonstrate the use of AWT components.

I. Practical Significance:

Text Field, Text Area, Button, Checkbox, Radio Buttons(Check Box Group) are the AWT components. Used to design the GUI in java. A component is object having representation that can be displayed on the screen to interact with the user.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications

The practical is expected to develop the following skills:

1. Able to design form using required AWT components
2. Able to understand the different Components available in AWT

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework AWT.

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of AWT components.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

AWT is a java programming language class library. Components are visible objects that can interact with the user. Containers (Frame, Panel, Applet) are used to hold components using in a specific layout.

Using applet window, design following AWT components using add() method of components class. Following are some AWT components

1. Label: Creates a label that displays a string.
2. TextField Creates and accepts a single-line text from user.
3. TextArea Creates and accepts multiple line text from user.

4. Button creates a push button.
5. Checkbox Creates a check box which is used to select multiple options.
6. CheckboxGroup creates a group of checkbox to act as radio button.

To Create TextArea

```
TextArea ta=new TextArea(String str,int nooflines)
```

To create RadioButton(CheckBoxGroup):

```
CheckBox cb1, cb2;
CheckBoxGroup cbg;
Cb1=new CheckBox("Male",cbg,true);
Cb2=new CheckBox("Female",cbg,false);
```

VIII. Resources required

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Computer System	Computer (i3-i5 preferable RAM > 2GB)	As per Batch Size	For All Experiments
2	Operating System	Windows/Linux		
3	Development Software	JDK 1.5 Onwards		

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Computer System			
2	Operating System			
3	Development Software			

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Design an applet/application to demonstrate the use of Radio Button and Checkbox.
2. Design an applet/application to create form using Text Field, Text Area, Button and Label.

XI. Result (Output of Code):

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related (35)	Product Related (15)	Total (50)	

Practical No. 2: Write a program to design a form using the components List and Choice.

I. Practical Significance:

The List and Choice components lets the user choose one option from list of available options A Choice is displayed in a compact form that requires you to pull it down to see the list of available choices. Only one item may be selected from a Choice. A List may be displayed in such a way that several List items are visible. A List supports the selection of one or more List items.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications and web Application

The practical is expected to develop the following skills:

1. Able to develop an applet/application using Choice and List components.

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing).

V. Practical Outcome (PrOs)

Write a program to design a form using the components List and Choice.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

List: Creates a list from which the user can choose list items.

Constructors:

List () // allows only one item to be selected

List (int numRows) // no of entries will always be visible

List (int numRows, Boolean multiple Select)// if it is true then user select multiple items. If it is false then only one item may be selected

Choice

The Choice class is used to create a pop-up list of items from which the user may choose. When the user clicks on it, the whole list of choices pops up and new selection can be made. Choice defines the default constructor, which creates an empty list. To add a selection to the list, call add ().

VIII. Resources required (Additional) –

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write Java Program to show following output.

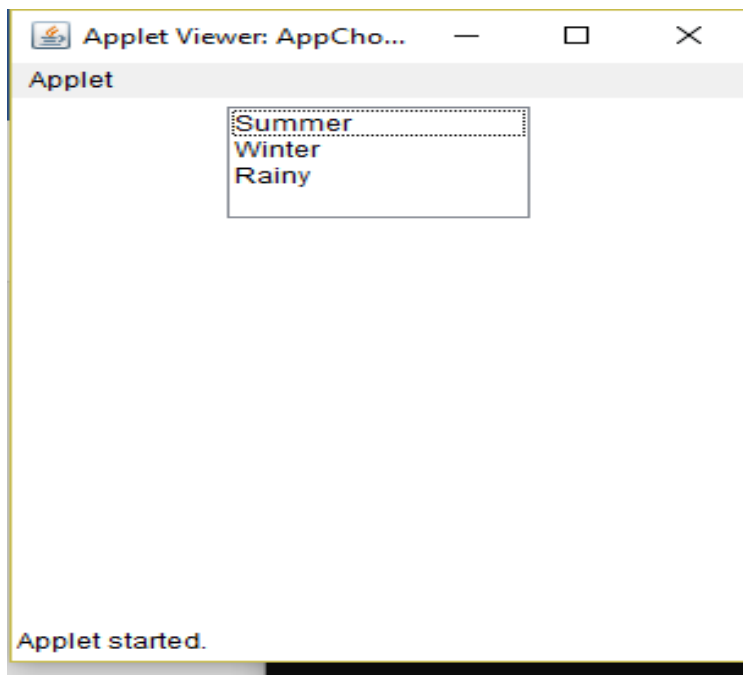


Figure 1

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XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write the name of components used in following output

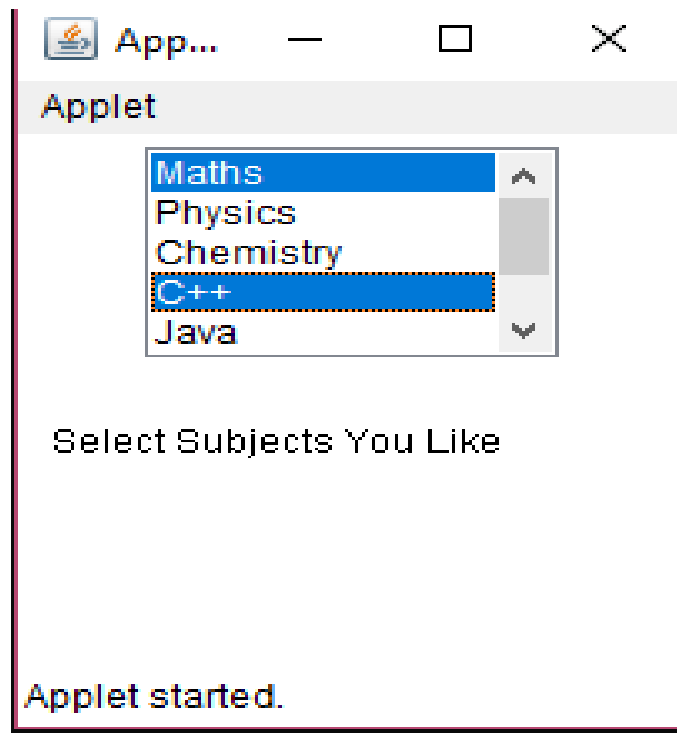


Figure 2

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 3: Write a program to design simple calculator with the use of Grid Layout.

I. Practical Significance:

A layout manager automatically arranges your controls within a window. While it is possible to lay out Java controls by hand, too, you generally won't. It is very tedious to manually lay out a large number of components

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications

The practical is expected to develop the following skills:

1. Able to apply different layouts to Applet, Frame and Panel
2. Able to demonstrate the use of different types of Layout Manager

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing).

V. Practical Outcome (PrOs)

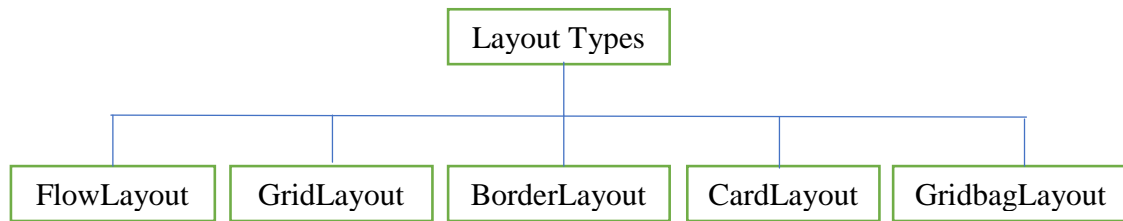
Write a program to design simple calculator with the use of GridLayout.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Layout Manager is a facility that determines how components should be arranged when they are added to the container. Layout Manager is an interface that is implemented by all the classes of layout managers. There are following classes that represent the layout managers.



Understand the default layout for different containers such as Applet, Frame, Panel.

Grid Layout is used to make a bunch of components equal in size and displays them in the requested number of rows and columns. One component is displayed in each rectangle.

The list of Constructor for GridLayout are:

1. GridLayout(): creates a grid layout with one column per component in a row.
2. GridLayout(int rows, int columns): creates a grid layout with the given rows and columns but no gaps between the components.
3. GridLayout(int rows, int columns, int hgap, int vgap): creates a grid layout with the given rows and columns along with given horizontal and vertical gaps if we give setLayout(null) the default layout is disabled. then we have to use setBounds method to layout the components.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write java Program to Demonstrate Grid of 5* 5
2. Write a program to display The Number on Button from 0 to 9.

XI. Result (Output of Code):

.....
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.....
.....

XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Give name of default Layout for Different container
2. List the names of BorderLayout regions.
3. Write the default horizontal and vertical gap in FlowLayout
4. Write the use of Insets in border layout.

XIII. Exercise

1. Write a program to generate following output



Figure 3

2. Write a program to generate following output using Border Layout

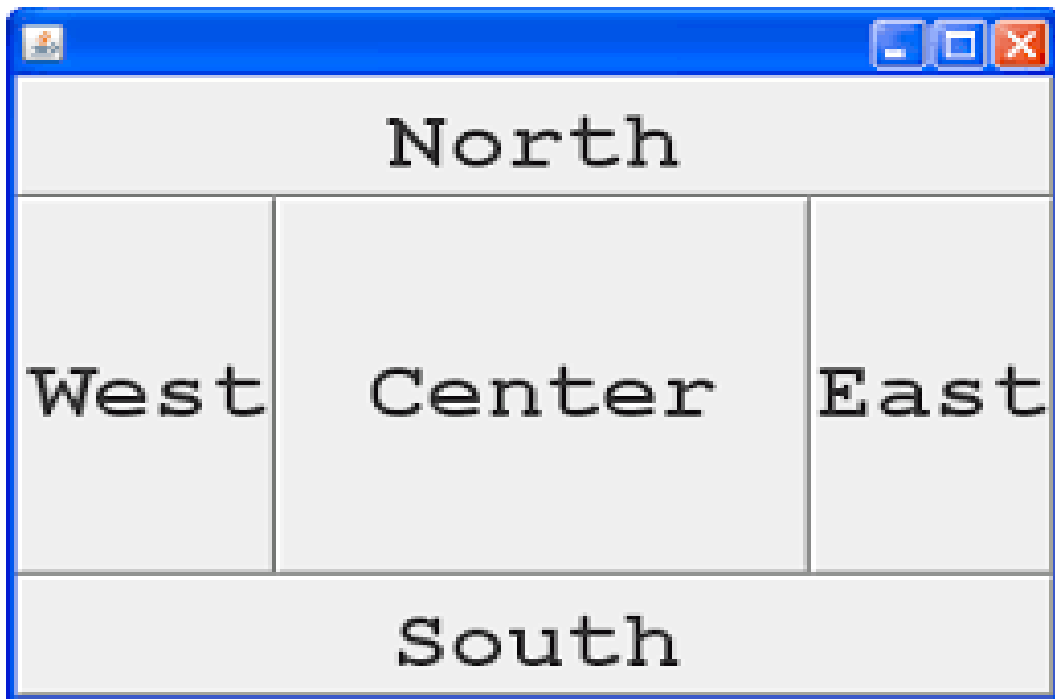


Figure 4

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 4: Use of CardLayout to write a program to create a two-level card deck that allows the user to select an operating system.

I. Practical Significance:

The CardLayout class manages the components in such a manner that only one component is visible at a time. It treats each component as a card hence known as CardLayout.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications

The practical is expected to develop the following skills:

1. Able to apply different layouts to Applet, Frame and Panel
2. Able to demonstrate the use of different types of Layout Manager

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing).

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of Border layout showing four buttons at four sides of an applet with captions “left”, “right”, “top” and “bottom”

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Constructors of CardLayout class

1. **CardLayout():** creates a card layout with zero horizontal and vertical gap.
2. **CardLayout(int hgap, int vgap):** creates a card layout with the given horizontal and vertical gap.

Commonly used methods of CardLayout class

1. **public void next (Container parent):** is used to flip to the next card of the given container.

2. **public void previous (Container parent):** is used to flip to the previous card of the given container.
3. **public void first (Container parent):** is used to flip to the first card of the given container.
4. **public void last (Container parent):** is used to flip to the last card of the given container.
5. **public void show (Container parent, String name):** is used to flip to the specified card with the given name.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

Execute the following Program and write the output.

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

public class CardLayoutExample extends JFrame implements ActionListener
{
    CardLayout card;
    JButton b1, b2, b3;
    Container c;
    CardLayoutExample()
    {
        c=getContentPane();
        card=new CardLayout(40,30);
        //create CardLayout object with 40 hor space and 30 ver space
        c.setLayout(card);
        b1=new JButton("Apple");
        b2=new JButton("Boy");
        b3=new JButton("Cat");
        b1.addActionListener(this);
        b2.addActionListener(this);
        b3.addActionListener(this);
        c.add("a",b1);c.add("b",b2);c.add("c",b3);
    }
}
```

```
public void actionPerformed(ActionEvent e)
{
    card.next(c);
}
public static void main(String[] args)
{
    CardLayoutExample cl=new CardLayoutExample();
    cl.setSize(400,400);
    cl.setVisible(true);
    cl.setDefaultCloseOperation(EXIT_ON_CLOSE);
}
}
```

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. State difference between GridLayout and GridBagLayout.
2. Explain constructor of GridbagLayout.

(Space for answer)

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XIII. Exercise

1. Write Java program to display following output.

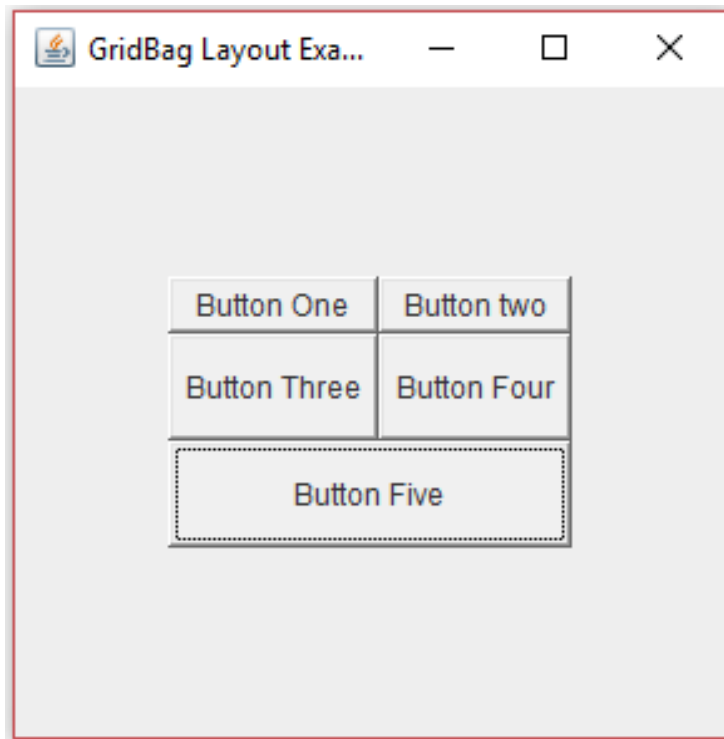


Figure 5

2. Write Java Program to display following output.

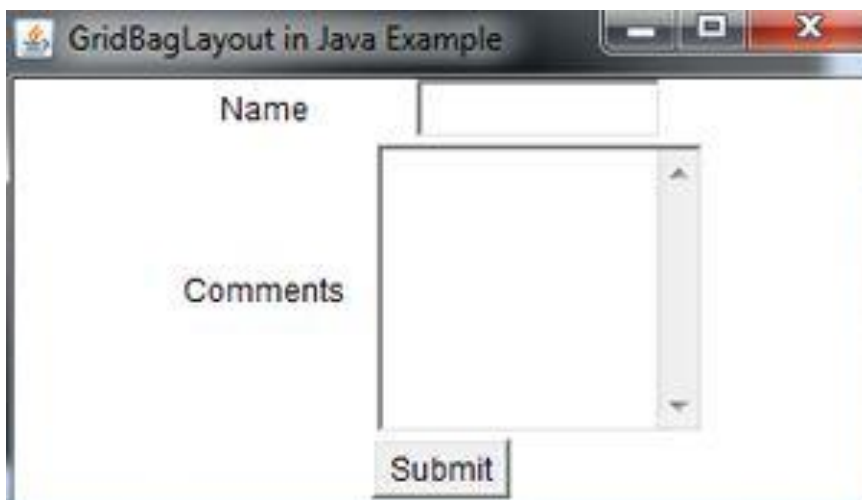


Figure 6

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 5: Write a program using AWT to create a menu bar where menu bar contains menu items such as File, Edit, View and create a submenu under the File menu: New and Open.

I. Practical Significance:

The Menu Bar lets the user to select different menu options from the list of available menu items and perform operations on the selected menu item.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications

The practical is expected to develop the following skills:

1. Able to develop Menu, Menu Bar and Menu Items
2. Able to write a program using Menu Bar and assign shortcuts

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing)

V. Practical Outcome (PrOs)

Write a program using AWT to create a menu bar where menu bar contains menu items such as File, Edit, View and create a submenu under the File menu: New and Open.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

A top-level window can have a menu bar associated with it. A menu bar displays a list of top-level menu choices. Each choice is associated with a drop-down menu.

This concept is implemented in the AWT by the following classes: **Menu Bar**, **Menu**, and **Menu Item**

To create a menu bar, first create an instance of Menu Bar. This class only defines the default constructor. Next, create instances of Menu that will define the selections displayed on the bar.

Menu() // creates an empty menu.

Menu(String optionName) // name of the menu selection

Menu(String optionName, boolean removable) // If removable is true, the menu can be removed and allowed to float free. Otherwise, it will remain attached to the menu bar.

Individual menu items are of type MenuItem. It defines these constructors:

1. MenuItem()
2. MenuItem(String itemName) // the name shown in the menu
3. MenuItem(String itemName, MenuShortcut keyAccel) // keyAccel is the menu shortcut for this item

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program which creates Menu of different colors and disable menu item for Black color.


```
        mn.add(m1);
        mn.add(m2);
        mn.add(m3);
        mn.addSeparator();
        mn.add(m4);
        mb.add(mn);
    }
    public static void main(String[] args)
    {
        MenuDemo1 md=new MenuDemo1();
        md.setVisible(true);
    }
}
```

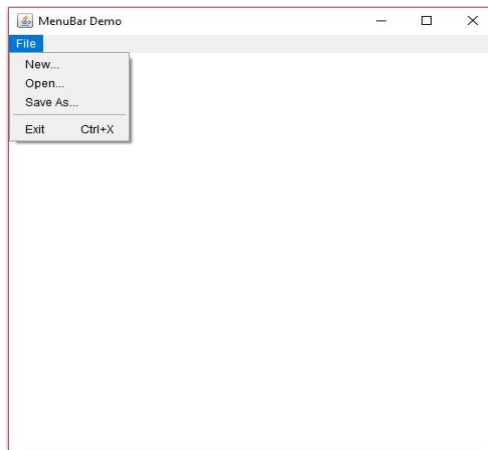


Figure 7
(Space for Answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

**Practical No. 6: Write a program using swing to display a
ScrollPane and JComboBox in an JApplet with
the items – English, Marathi, Hindi, Sanskrit.**

I. Practical Significance:

The Swing Components are very useful to design interactive application and it provide rich look and feel to the components. Swing components are light weight and platform independent. Swing supplies additional controls such as TabbedPane, ScrollPane, Trees and Tables. JFrame and JApplets are used to design windows and web applications.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications using swing components

The practical is expected to develop the following skills:

1. Able to Implement the JComboBox and JScrollPane
2. Able to write the program using JApplet/JFrame

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing)

V. Practical Outcome (PrOs)

Write a program using swing to display a ScrollPane and JComboBox in an JApplet with the items – English, Marathi, Hindi, Sanskrit..

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Fundamentals to swing is JApplet class which extends Applet. JApplet supports various panes such as content pane, glass pane and the root pane. When adding a component to an instance of JApplet, call add () method for the content pane of JApplet object.

JComboBox is a combination of a TextField and a dropdown list. JComboBox extends JComponent class. It normally displays single entry however it can also display drop down list that allows the user to select option.

Constructors of JComboBox

1. JComboBox()
2. JComboBox(Vector v)

A JScrollPane is used to make a scrollable view of a component. A container that provides horizontal and/or vertical scroll bars for another component.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program code to generate the following output

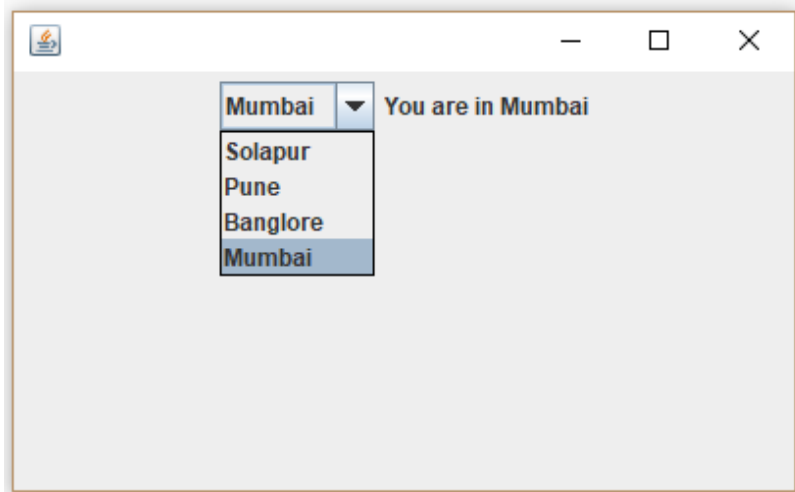


Figure 8

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. State the difference between AWT and Swing
2. State the features of Swing
3. Name the method to obtain ContentPane in swing.

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No.7: Write a program to create a JTree.

I. Practical Significance:

Tree is used to represent the hierarchical view of the data. The tree control shows the data in tree like structure such as root and its leaves.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications using swing components

The practical is expected to develop the following skills:

1. Able to implement the JTree with its methods.
2. Able to write the program using JTree.

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing)

V. Practical Outcome (PrOs)

Write a program to create a Jtree

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

JTree is a complex component. It has a 'root node' at the top most which is a parent for all nodes in the tree. It inherits JComponent class.

Constructors of JTree class

JTree(Hashtable ht) : The first form creates a tree in which each element of the hash table ht is a child node.

JTree(Object obj[]): Each element of the array obj is a child node.

JTree(TreeNode tn):The tree node tn is the root of the tree.

JTree(Vector v):It uses the elements of vector v as child nodes.

Various Methods of JTree class :

1. getPathForLocation(): It is used to translate a mouse click on a specific point of the tree to a tree path.

Syntax : TreePath getPathForLocation(int x,int y) where (x,y) are the coordinates at which the mouse is clicked. The return value is as TreePath object that encapsulates information about the tree node that was selected by the user.

TreeNode interface :It declares methods that obtain information about a tree node.

MutableTreeNode interface : It extends TreeNode.It declares methods that can insert and remove child nodes or change the parent node.

DefaultMutableTreeNode class implements the MutableTreeNode interface.

It represents a node in a tree.

DefaultMutableTreeNode(Object obj):Here,obj is the object to be enclosed in this tree node. The new tree node doesn't have a parent or children. To create hierarchy of tree nodes the add() can be used as

void add(MutableTreeNode child) :added child to the current node.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Develop a program to demonstrate the use of tree component in swing.
2. Write a program code to generate the following output

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related(35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 8: Write a program to create a JTable

I. Practical Significance:

A table is a component that displays rows and columns of data. Students will be able to use JTable class in Java which extends JComponent. The cursor can be dragged on column boundaries to resize column.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications using swing components

The practical is expected to develop the following skills:

1. Able to implement the JTable with respective rows and columns.
2. Able to write the program using JTable and perform various operations on it.

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing)

V. Practical Outcome (PrOs)

Write a program to create a JTable on applet window/Frame

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Tables are implemented by the JTable class, which extends JComponent.

Constructors of JTable:

1. JTable() : Creates a table with empty cells
2. JTable(Object data[][], Object colHeads[])

Here, data is a two-dimensional array of the information to be presented, and colHeads

is a one-dimensional array with the column headings.

Here are the steps for using a table in an applet:

1. Create a JTable object.

2. Create a JScrollPane object. (The arguments to the constructor specify the table and the policies for vertical and horizontal scroll bars.)
3. Add the table to the scroll pane.
4. Add the scroll pane to the content pane of the applet.

VIII. Resources required (Additional)–

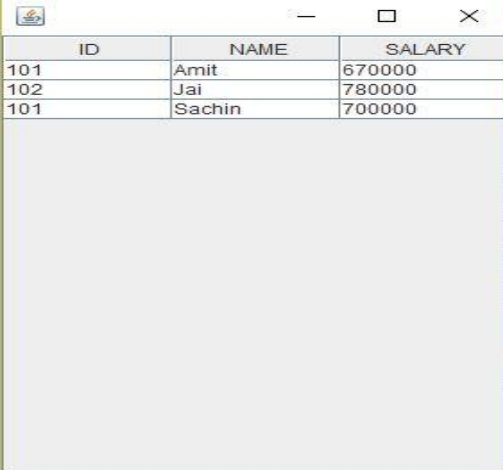
Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Develop a program to demonstrate the use of JTable.
2. Write a program code to generate the following output



ID	NAME	SALARY
101	Amit	670000
102	Jai	780000
101	Sachin	700000

Figure 10

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Name the superclass of JTable component.
2. How rows are inserted in table.
3. How to add JTable to JPanel ?

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related(35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 9: Write a program to launch a JProgressBar

I. Practical Significance:

The JProgressBar class is used to display the progress of the task. Students will be able to use JProgressBar to see the progress of the any task.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop standalone applications using swing components

The practical is expected to develop the following skills:

1. Able to implement the JProgressBar with its orientation.
2. Able to write the program using JProgressBar.

IV. Relevant Course Outcome(s)

Develop programs using GUI Framework (AWT and Swing)

V. Practical Outcome (PrOs)

Write a program to launch a JProgressBar

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The JProgressBar class is used to display the progress of the task. We usually see the progress bar while installation of some software is going on. It inherits JComponent class.

Commonly used Constructors:

JProgressBar (): It is used to create a horizontal progress bar without progress string.

JProgressBar (int min, int max): It is used to create a horizontal progress bar with the specified minimum and maximum value.

JProgressBar(int orient) : It is used to create a progress bar with the specified orientation, it can be either Vertical or Horizontal by using SwingConstants.VERTICAL and SwingConstants.HORIZONTAL constants.

`JProgressBar(int orient, int min, int max)` : It is used to create a progress bar with the specified orientation, minimum and maximum value.

Commonly Used Methods:

`Void addChangeListener(ChangeListener)` : Used to add `ChangeListener` to progress bar.

`int getMaximum()` : Get the Maximum value of progress bar.

`int getMinimum()` : Get the Minimum value of progress bar.

`void setStringPainted(boolean b)` : It is used to determine whether string should be displayed.

`void setString(String s)` : It is used to set value to the progress string.

`void setOrientation(int orientation)` : It is used to set the orientation, it may be either vertical or horizontal by using `SwingConstants.VERTICAL` and `SwingConstants.HORIZONTAL` constants.

`void setValue(int value)` : It is used to set the current value on the progress bar.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program code to generate the following output

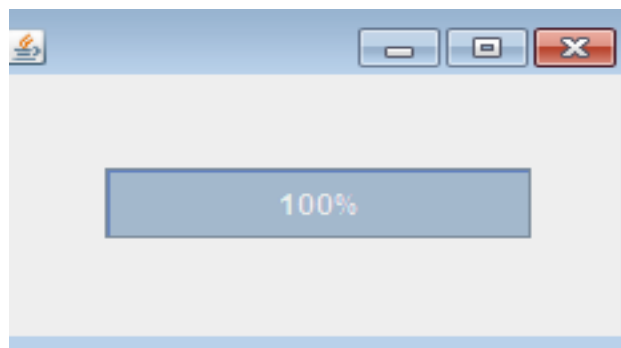


Figure 11

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 10: Write a program to demonstrate status of key on Applet window such as KeyPressed, KeyReleased, KeyUp, KeyDown.

I. Practical Significance:

A KeyEvent is generated when keyboard input occurs. When key is pressed, released or typed, key event is generated. Students will be able to understand the method to register an object and handle various key of Keyboards.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

Using this Practical, students will be able to generate different events .Also, they are able to implement various methods for appropriate listener class and write and execute programs accordingly.

IV. Relevant Course Outcome(s)

- Handle Events of AWT and Swing Components.
- Develop programs to handle events in Java Programming.

V. Practical Outcome (PrOs)

Write a program to demonstrate status of key on Applet window such as KeyPressed, Key Released, KeyUp, and KeyDown

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

When keyboard input is occurred, a KeyEvent is generated. There are mainly three types of key events that are recognized by integer constants as follows:

KEY_PRESSED, KEY_RELEASED, KEY_TYPED

When key is pressed or released, first two events are generated. When character is pressed, the last event occurs. All Keys do not generate character. E.g. Shift Key

InputEvent is super class of KeyEvent.

The class which processes the KeyEvent should implement KeyListener interface.

The object of that class must be registered with a component. The object can be registered using the addKeyListener () method.

Methods of KeyListener interface:

void keyPressed(KeyEvent e) : Invoked when a key is pressed

void keyReleased(KeyEvent e) : Invoked when a key has been released

void keyTyped(KeyEvent e) : Invoked when a key has been typed

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program to generate KeyEvent when a key is pressed and display “Key Pressed” message.
2. Develop a program which will implement special keys such as function keys and arrow keys.

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Name any four Event Listener interfaces.
2. State the situation when all three events of KeyListener interface are generated?

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 11: Write a program to demonstrate various mouse events using MouseListener and MouseMotion listener interface.

I. Practical Significance:

The MouseListener and MouseMotionListener interface are used to implement the different types of events that are created when the mouse is clicked, dragged, dropped, released, entered and exited in a component.

These two interfaces lets the user to handle the events and perform some action in that event.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

Develop web and stand-alone applications using advanced concepts of Java.

The practical is expected to develop the following skills:

1. Able to implement the events of MouseListener
2. Able to implement the events of MouseMotionListener.

IV. Relevant Course Outcome(s)

Develop Programs to handle events in java programming.

V. Practical Outcome (PrOs)

Write a program to demonstrate various mouse events using MouseListener and MouseMotionListener interface

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The java's MouseListener interface allows the user to handle the events when the user performs some events using mouse. The events are MouseClicked, MousePressed, MouseEntered, MouseExited, and Mouse released.

The list of available methods are:

1. void mouseClicked(MouseEvent me)

2. void mouseEntered(MouseEvent me)
3. void mouseExited(MouseEvent me)
4. void mousePressed(MouseEvent me)
5. void mouseReleased(MouseEvent me)

In the similar way we can handle the events when mouse is moved or dragged. The MouseMotion Interface defines the following methods.

1. void mouseDragged(MouseEvent me)
2. void mouseMoved(MouseEvent me)

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Debug the following Program code and write the output.

```
import java.applet.Applet;
import java.awt.*;
import java.awt.event.*;

/* <APPLET CODE = "MouseDemo" WIDTH=300 HEIGHT=200> </APPLET> */
public class MouseDemo extends Applet implements MouseListener
{
    Label l;
    public void init()
    {
        setLayout(null);
        l=new Label("Hello Mouse");
        l.setBounds(50,150,200,100);
        add(l);
    }
    public void mousePressed(MouseEvent e)
    {
        l.setText("Mouse Pressed no. of clicks:" + e.getClickCount() + " at
        position" + e.getX() + ","+ e.getY());
    }
    public void mouseReleased(MouseEvent e)
    {
        l.setText("Mouse Released; # of clicks:"+e.getClickCount());
    }
}
```

```
public void mouseEntered(MouseEvent e)
{
    l.setText("Mouse Entered");
}
public void mouseExited(MouseEvent e)
{
    l.setText("Mouse exited");
}
public void mouseClicked(MouseEvent e)
{
    l.setText("mouse clicked(# of clicks:"+e.getClickCount());
}
}
```

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. List various methods of MouseListener and MouseMotionListener
2. Do all components generate the MouseEvent
3. Write the steps to obtain the coordinates of MouseEvent
4. Write the steps to register for MouseEvent

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com/java-mouselistener>
2. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students / Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 12: Write a program to demonstrate the use of JTextField and JPasswordField using Listener Interface.

I. Practical Significance:

A password is used to authenticate the user to gain the access to website application or device. The TextField control is used to accept the input from user. An interface is used to implement the methods as per the users requirements and achieve the concept of multiple inheritance in java.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

The practical is expected to develop the following skills:

1. Able to develop an application using JTextField
2. Able to develop an application using JPasswordField

IV. Relevant Course Outcome(s)

Handle events of AWT and Swing Components

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of JTextField and JPasswordField using Listener Interface

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

JPasswordField:

The JPasswordField allows the user to enter the input text in the form of password characters. It inherits the JTextField class.

Constructors for JPasswordField:

JPasswordField()	Constructs a new JPasswordField, with a default document, null starting text string, and 0 column width.
JPasswordField (int columns)	Constructs a new empty JPasswordField with the specified number of columns.
JPasswordField (String text)	Constructs a new JPasswordField initialized with the specified text.
JPasswordField (String text, int columns)	Construct a new JPasswordField initialized with the specified text and columns.

The JTextField: It allows the user to input the single line of text in JTextField component. Only single line of text can be entered in the JTextField component of Swing control.

Constructors defined by the JTextField class are

Constructor	Description
JTextField()	Creates a new TextField
JTextField (String text)	Creates a new TextField initialized with the specified text.
JTextField (String text, int columns)	Creates a new TextField initialized with the specified text and columns.
JTextField (int columns)	Creates a new empty TextField with the specified number of columns.

VIII. Resources required (Additional) –

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program using JPasswordField to set the password character as '#' instead of '*'

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write the use of setEchoChar() method with suitable example.
2. Write the advantages of using JPasswordField over JTextField
3. Which component can be used to accept the multiline input from user.

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 13: Write a program to demonstrate the use of WindowAdapter class

I. Practical Significance:

In listener interfaces implementation it is mandatory to implement all the methods defined by the particular interface. To overcome this problem and to implement only required methods java programming supports the concept of Adapter class. It lets the user to implement only required methods.

This practical focuses on different types of Adapter classes and their practical implementation.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

The practical is expected to develop the following skills:

1. Understand the concept and different types of adapter classes in java.
2. Develop an application using Adapter Class.

IV. Relevant Course Outcome(s)

Handle events of AWT and Swing Components

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of WindowAdapter class

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

An Adapter class is class which will allow the user to simplify the method implementation. For example consider we are implementing the WindowListener interface in this case we need to define all the methods of the WindowListener interface such as listed below

1. void windowActivated(WindowEvent we)
2. void windowClosed(WindowEvent we)
3. void windowClosing(WindowEvent we)
4. void windowDeactivated(WindowEvent we)

5. void windowDeiconified(WindowEvent we)
6. void windowIconified(WindowEvent we)
7. void windowOpened(WindowEvent we)

Programmer need to give either empty implementation of the methods defined by the WindowListener. To overcome this problem and to allow the user to implement only required methods java provides a facility that is Adapter classes. Some of the Adapter classes provided by the java language are listed below.

1. ComponentAdapter
2. ContainerAdapter
3. FocusAdapter
4. KeyAdapter
5. MouseAdapter
6. MouseMotionAdapter
7. WindowAdapter

These adapter classes allows the user to implement only required methods.

VIII. Resources required (Additional) –

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

Debug the following code and write the output of following code.

```
import java.awt.*;
import java.awt.event.*;
public class WindowDemo
{
    Frame f;
    WindowDemo()
    {
        f=new Frame("Window Adapter");
        f.addWindowListener(new WindowAdapter()
        {
            public void windowClosing(WindowEvent e)
            {
                f.dispose();
            }
        }
    }
}
```

```
        };  
        f.setSize(400,400);  
        f.setLayout(null);  
        f.setVisible(false);  
    }  
    public static void main(String[] args)  
    {  
        new WindowDemo();  
    }  
}
```

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write the use of Adapter class
2. Write the differences between Adapter class and Listener Interface
3. Write the use of anonymous inner class.

(Space for answer)

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XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com/java-adapter-classes>
2. The complete reference Java 2 by Herbert schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 14: Write a program to demonstrate the use of InetAddress class and its factory methods.

I. Practical Significance:

Java provides support for communication between two or more computers by the way of socket programming. It provides the classes for both the protocols that is UDP and TCP. Socket lets the user to create a client server communication in the network and share the data/information in it.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop a program using InetAddress class

The practical is expected to develop the following skills:

1. Able to use the factory methods of InetAddress class
2. Able to write program using different constructors of the InetAddress class.

IV. Relevant Course Outcome(s)

Develop java programs using networking components

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of InetAddress class and its factory methods

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The java's InetAddress encapsulates an IP address and used by the other networking classes such as Socket, ServerSocket, URL, DatagramSocket, DatagramPacket. It is used to represent both numerical and the domain name of the machine. InetAddress can handle both IPV4 and IPV6. The InetAddress class has no visible constructors and it uses the following factory methods.

1. static InetAddress getLocalHost() throws UnknownHostException
2. static InetAddress getByName(String hostName) throws UnknownHostException
3. static InetAddress[] getAllByName(String hostName) throws unknownHostException

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Execute the following code and write the output

```
import java.io.*;
import java.net.*;
public class InetDemo
{
    public static void main(String[] args)
    {
        try
        {
            InetAddress ip=InetAddress.getByName("localhost");
            System.out.println("Host Name: "+ip.getHostName());
            System.out.println("IP Address: "+ip.getHostAddress());
        }
        catch(Exception e){System.out.println(e);}
    }
}
```

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write any four differences between IPV4 and IPV6
2. Write the use of getByName() and getAllByName() method.
3. Write the steps to assign IP address to your machine

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com/InetAddress-class>
2. <https://www.onlyjavatech.com/inetaddress-class-in-java>
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 15: Write a program to demonstrate the use of URL and URLConnection class and its methods

I. Practical Significance:

The Uniform resource locator in java allows the user to access the particular file or resource which might be stored on any local or remote machine. The URL specifies the complete path by which user can access file. It contains protocol address, port number and location of the particular resource.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop a program using URL and URLConnection class

The practical is expected to develop the following skills:

1. Able to identify different types of ports and protocols
2. Able to develop an application using URL and URLConnection class.

IV. Relevant Course Outcome(s)

Develop java programs using networking components

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of URL and URLConnection class and its methods

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The URL provides easy to understand format to uniquely identify or address information on the internet. URLs are ample; every browser uses them to identify information on the Web. **URL** class provides a simple, concise API to access information across the Internet using URLs.

URLConnection is a class which is used to access the attributes of remote resource. Once we made a connection to the remote resource, we are ready to use URLConnection to check the properties of remote object before actually transporting it locally.

The URL and URLConnection classes are good enough for simple programs that want to connect to HTTP servers to fetch content.

List of URL Class Methods and Constructors:

1. public URL (String protocol, String host, int port, String file) throws MalformedURLException
2. public URL (String protocol, String host, String file) throws MalformedURLException
3. public URL(String url) throws MalformedURLException
4. public URL(URL context, String url) throws MalformedURLException

Methods:

1. public String getPath()
2. public String getAuthority()
3. public String getHost()
4. public String getFile()

List of URLConnection class Methods and Constructors:

The openConnection() method returns a java.net.URLConnection, an abstract class whose subclasses represent the various types of URL connections.

Methods:

1. Object getContent()
2. String getContentEncoding()
3. int getContentLength()
4. String getContentType()
5. public URL getURL()

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Execute the following code and write the output


```
import java.net.*;
class URLLDemo
{
    public static void main(String args[]) throws MalformedURLException
    {
        URL hp = new URL("https://www.javatpoint.com/javafx-tutorial");
        System.out.println("Protocol: " + hp.getProtocol());
        System.out.println("Port: " + hp.getPort());
    }
}
```


XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 16: Write a program to implement chat Server using Server Socket and Socket Class.

I. Practical Significance:

Java provides the socket programming approach for communication between the client and server. A user can write the code for both client and server as well for UDP & TCP datagram packets. By using java's network communication feature we can create interactive application to communicate within a network.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

The practical is expected to develop the following skills:

1. Able to develop an application using Socket and ServerSocket class
2. Able to create a chat application in client server environment.

IV. Relevant Course Outcome(s)

Develop java programs using networking components

V. Practical Outcome (PrOs)

Write a program to implement chat server using ServerSocket and Socket class.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices

VII. Minimum Theoretical Background

The ServerSocket class is used to create servers that listen for either local port or remote client programs to connect to them on published ports.

Constructors for ServerSocket class

1. public ServerSocket(int port) throws IOException
2. public ServerSocket(int port, int backlog) throws IOException
3. public ServerSocket(int port, int backlog, InetAddress address) throws IOException
4. public ServerSocket() throws IOException

Methods for ServerSocket class

1. public int getLocalPort()
2. public Socket accept() throws IOException
3. public void setSoTimeout(int timeout)
4. public void bind(SocketAddress host, int backlog)

The java.net.Socket class is used to communicate between client and server. The client can obtain object by creating its instance whereas the server obtains a Socket object from the return value of the accept() method.

Constructors for Socket class:

1. public Socket(String host, int port) throws UnknownHostException, IOException.
2. public Socket(InetAddress host, int port) throws IOException
3. public Socket(String host, int port, InetAddress localAddress, int localPort) throws IOException.
4. public Socket(InetAddress host, int port, InetAddress localAddress, int localPort) throws IOException.
5. public Socket()

Methods for Socket class:

1. public void connect(SocketAddress host, int timeout) throws IOException
2. public InetAddress getInetAddress()
3. public int getPort()
4. public int getLocalPort()
5. public void close() throws IOException

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program to check credentials of users (Client will send user id and password to server and server will authenticate the client using equals())

XI. Result (Output of Code):

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XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write the default port of used by various services such as FTP, SMTP, HTTP.
2. Write the constructor to allow the server for waiting queue
3. Write the function of Connect(), Bind()

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XIV. References/ Suggestions for Further Reading

1. <https://docs.oracle.com/javase/tutorial/networking/sockets/definition.html>
2. https://www.tutorialspoint.com/java/java_networking.htm
3. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 17: Write a program to demonstrate use of DatagramSocket and DatagramPacket

I. Practical Significance:

The User Datagram Protocol (UDP) is connectionless, and unreliable protocol by which the user can send short messages called datagrams. The java provides DatagramSocket and DatagramPacket class to implement the concept of user datagram protocol. By using these classes we can transfer the data asynchronous manner.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

Develop web and stand-alone applications using advanced concepts of Java.

The practical is expected to develop the following skills:

1. Able to create chat application using DatagramSocket and DatagramPacket
2. Able to understand the implementation details of UDP in java.

IV. Relevant Course Outcome(s)

Develop Java programs using networking concepts

V. Practical Outcome (PrOs)

Write a program to demonstrate use of DatagramSocket and Datagram Packet

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The Java DatagramSocket class is used to send and receive the datagrams it is connection less socket. That is there is no guarantee of message delivery.

It has following constructors

1. DatagramSocket()
2. DatagramSocket(int port)
3. DatagramSocket(int port, InetAddress address)

The Java DatagramPacket is class that can be used to send the packets. If you send multiple packet, it may arrive in any order. Additionally, packet delivery is not guaranteed.

It has following constructors

1. DatagramPacket(byte[] barr, int length)
2. DatagramPacket(byte[] barr, int length, InetAddress address, int port)

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Execute the following Program and write the output.

```
import java.net.*;
```

```
public class DgramRec
```

```
{
```

```
    public static void main(String[] args) throws Exception
```

```
    {
```

```
        DatagramSocket ds = new DatagramSocket(3000);
```

```
        byte[] buf = new byte[1024];
```

```
        DatagramPacket dp = new DatagramPacket(buf, 1024);
```

```
        ds.receive(dp);
```

```
        String str = new String(dp.getData(), 0, dp.getLength());
```

```
        System.out.println(str);
```

```
        ds.close();
```

```
    }
```

```
}
```

```
import java.net.*;
```

```
public class DGramSender
```

```
{
```

```
    public static void main(String[] args) throws Exception
```

```
    {
```

```
        DatagramSocket ds = new DatagramSocket();
```

```
        String str = "Java is Easy!!!!";
```

```
        InetAddress ip = InetAddress.getByName("127.0.0.1");
```

```
        DatagramPacket dp = new DatagramPacket(str.getBytes(), str.length(),
```

```
        ip, 3000);
```

```
        ds.send(dp);
```

```
        ds.close();
```

```
    }
```


XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com/DatagramSocket-and-DatagramPacket>
2. The complete reference Java 2 by Herbert Schildt

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 18: Write a program to insert and retrieve data from database using JDBC.

I. Practical Significance:

ODBC isn't appropriate for direct use from the Java programming language because it uses a C interface. The JDBC API was modeled after ODBC, but, because JDBC is a Java API, it offers a natural Java interface for working with SQL. JDBC is needed to provide a "pure Java" solution for application development.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to apply the JDBC to create table , and insert data in a table.
2. Able to demonstrate the use of various JDBC driver and tier application.

IV. Relevant Course Outcome(s)

Develop programs using JDBC

V. Practical Outcome (PrOs)

Write a program to insert and retrieve data from database using JDBC

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

JDBC API enables the application to interact with the different types of databases.

It is possible to publish vital information from a remote database on a webpage using the Java applet. JDBC is a low level API is used to invoke or call SQL command directly. The required SQL statements are passed as a 'string' to java methods.

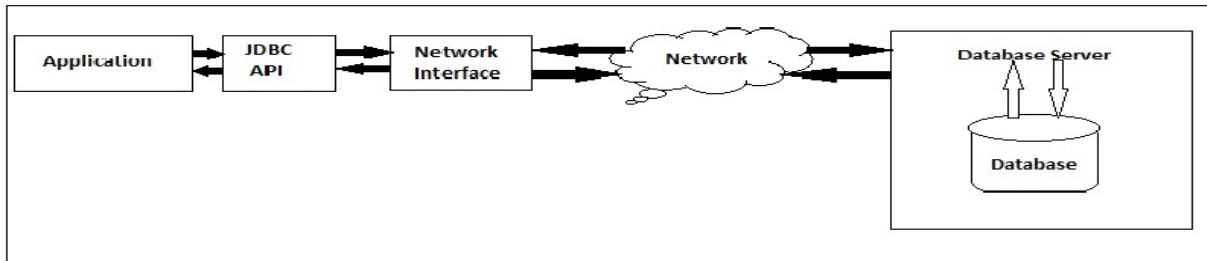


Figure 12

Some of the current JDK add more features to JDBC that is embedded SQL which makes direct mapping of relational databases to java classes. Embedded SQL enables mixing of java into a SQL statement These statements are translated into JDBC calls using SQL processor. In this type of direct mapping, each row of the table becomes an instance of class and each column value corresponds to an attribute of that instance.

❖ **JDBC DRIVERS:-**

1. JDBC-ODBC Bridge: -.
2. Native-API: - partly java Driver: -
3. JDBC-Network pure java driver:
4. Native_protocol (100%) pure Java drivers: -

❖ **STEPS FOR USING JDBC**

There are seven steps for using JDBC to access a database.

1. Import the Package: -
2. Register Driver or If register then load driver using Class.forName()-
3. Connect to Database:-
4. Create a Statement:-
5. .Execute the Statement:-
6. Retrieve the Results: -

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	MS-Access	MS-Office 2010		
2	My-Sql Server	My-Sql Sever above 5.5		

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to create a Student Table in database and insert a record in a Student table.
2. Write the output of following code
- 3.

```
// Create DSN Named as MSBTE using Administrative tool from control Panel.  
// This program uses types I driver JDBC ODBC bridge.
```

```
import java.sql*;  
class JdbcDemo  
public static void main (String args[])  
{  
    try  
    {  
        DriverManager.registerDriver(new sun.jdbc.odbc.JdbcOdbcDriver());  
        System.out.println(" Driver loaded");  
        String url= "jdbc:odbc:MSBTE";  
        Connection cn= DriverManager.getConnection(url);  
        System.out.println("Connection to the database created");  
        Statement st= cn.createStatement();  
        String str= "select* from student";  
        ResultSet rs=st.executeQuery(str);  
        String text=" ";  
        System.out.println("Roll Number \t Name");  
        while(rs.next())  
        {  
            text= text+rs.getInt(1)+"\t"+rs.getString(2)+"\n";  
        }  
        System.out.print(text);  
        St.close();  
        cn.close();  
    }  
    catch (SQLException s)  
        {System.out.println("sql error");}  
}
```

XI. (Output of Code):

.....
.....
.....
.....

XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. List the advantages of JDBC over ODBC?
2. Write the Use of Class.forName()?
3. Write the steps to establish DSN oriented connection and DSNLess connection.

(Space for answer)

.....
.....

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. <ftp://ftp.icm.edu.pl/packages/javasoft-docs/jdk1.1/jdbc.pdf>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 19: Write a program to demonstrate the use of PreparedStatement and ResultSet interface.

I. Practical Significance:

A Java JDBC PreparedStatement is a special kind of Java JDBC Statement object with some useful additional features. Remember, we need a Statement in order to execute either a query or an update. We can use a Java JDBC PreparedStatement instead of a Statement and benefit from the features of the PreparedStatement.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to apply JDBC to insert update modify and delete the data from Database.
2. Able to demonstrate the use of PreparedStatement and ResultSet Interface.

IV. Relevant Course Outcome(s)

Develop programs using JDBC

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of PreparedStatement and ResultSet interface.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

PreparedStatement Interface

PreparedStatement helps us in preventing SQL injection attacks because it automatically escapes the special characters. PreparedStatement allows us to execute dynamic queries with parameter inputs. PreparedStatement provides different types of setter methods to set the input parameters for the query. PreparedStatement is faster than Statement. It becomes more visible when we reuse the PreparedStatement or use its batch processing methods for executing multiple queries. PreparedStatement helps us in writing object Oriented code with setter methods whereas with Statement we

have to use String Concatenation to create the query. If there are multiple parameters to set, writing Query using String concatenation looks very ugly and error prone. PreparedStatement returns FORWARD_ONLY ResultSet, so we can only move in forward direction. Unlike Java Arrays or List, the indexing of PreparedStatement variables starts with 1.

One of the limitation of PreparedStatement is that we can't use it for SQL queries with IN clause because PreparedStatement doesn't allow us to bind multiple values for single placeholder (?).

Methods of Prepared Statements.

1. public void setInt(int paramIndex, int value):-sets the integer value to the given parameter index.
2. public void setString(int paramIndex, String value) :-sets the String value to the given parameter index.
3. public void setFloat(int paramIndex, float value):- sets the float value to the given parameter index.
4. public void setDouble(int paramIndex, double value):-sets the double value to the given parameter index.
5. public int executeUpdate() :-executes the query. It is used for create, drop, insert, update, delete etc.
6. public ResultSet executeQuery() :-executes the select query. It returns an instance of ResultSet.

ResultSet Interface

The SQL statements that read data from a database query, return the data in a result set. The SELECT statement is the standard way to select rows from a database and view them in a result set. The *java.sql.ResultSet* interface represents the result set of a database query.

A ResultSet object maintains a cursor that points to the current row in the result set. The term "result set" refers to the row and column data contained in a ResultSet object.

The methods of the ResultSet interface can be broken down into three categories –

- **Navigational methods:** Used to move the cursor around.
- **Get methods:** Used to view the data in the columns of the current row being pointed by the cursor.
- **Update methods:** Used to update the data in the columns of the current row. The updates can then be updated in the underlying database as well.

is movable based on the properties of the ResultSet. These properties are designated when the corresponding Statement The cursor that generates the ResultSet is created.

JDBC provides the following connection methods to create statements with desired ResultSet –

- **createStatement(int RSType, int RSConcurrency);**
- **prepareStatement(String SQL, int RSType, int RSConcurrency);**
- **prepareCall(String sql, int RSType, int RSConcurrency);**

The methods of the ResultSet interface can be broken down into three categories –

- **Navigational methods:** Used to move the cursor around.

- **Get methods:** Used to view the data in the columns of the current row being pointed by the cursor.
- **Update methods:** Used to update the data in the columns of the current row. The updates can then be updated in the underlying database as well.

JDBC provides the following connection methods to create statements with desired ResultSet –

- **createStatement(int RSType, int RSConcurrency);**
- **prepareStatement(String SQL, int RSType, int RSConcurrency);**
- **prepareCall(String sql, int RSType, int RSConcurrency);**

The first argument indicates the type of a ResultSet object and the second argument is one of two ResultSet constants for specifying whether a result set is read-only or updatable.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	MySQL Server	5.5		
2	JDK	1.6		

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to update row of student table from MSBTE database using Mysql 5.5 a database server.
2. Write the output of following JDBC code. Use Mysql server 5.5 as database server

```
import java.sql
public class PreparedStmtEx
{
    public static void main(String args[])
    {
        try
        {
            Class.forName("com.mysql.jdbc.Driver");
            Connection
            con=DriverManager.getConnection("jdbc:mysql://localhost:33
            06/YourDBname","DBuserna me","DBpassword");
            //keep "" empty if not given during installation
            PreparedStatement stmt=con.prepareStatement("insert into
            student values(?,?,?);");
```



```
        stmt.setInt(1,101);
        //1 specifies the first parameter(1st ? symbol) in the query
        stmt.setString(2,"Abhishek");
        //2 specifies the second parameter(2nd ? symbol) in the query
        stmt.setString(3,"Yadav");
        //3 specifies the third parameter(3rd ? symbol) in the query
        int i=stmt.executeUpdate();
        System.out.println(i+" records inserted");
        con.close();
    }
    catch(Exception e)
    {
        System.out.println(e);}
}
```


1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. JDBC Developer's Resource by Art Taylor JDBC Developer's Resource by Art Taylor

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 20: Write a program to update and delete a record from a database table.

I. Practical Significance:

The UPDATE command is used to modify the records in the table. Upon executing this command the record values are modified based on values passed in the query. Along with WHERE clause you can update the specific records from the table.

The SQL DELETE command is used to delete rows that are no longer required from the database tables. It deletes the whole row from the table. Delete command comes in handy to delete temporary or obsolete data from your database.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to Apply the JDBC to update and Delete a record
2. Able to Demonstrate the use of Update and Delete with where clause.

IV. Relevant Course Outcome(s)

Develop programs using JDBC

V. Practical Outcome (PrOs)

Write a program to update and delete a record from a database table

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

DML statements are SQL statements that manipulate data. DML stands for Data Manipulation Language. The SQL statements that are in the DML class are INSERT, UPDATE and DELETE. Some people also lump the SELECT statement in the DML classification.

The SQL UPDATE Statement

The UPDATE statement is used to modify the existing records in a table.

UPDATE Syntax

```
UPDATE table_name
SET column1 = value1, column2 = value2,
WHERE condition;
```

SET statement is used to set new values to the particular column and the **WHERE** clause is used to select the rows for which the columns are needed to be updated. If we have not used the WHERE clause then

The SQL DELETE Statement

The DELETE statement is used to delete existing records in a table.

DELETE Syntax

```
DELETE FROM table_name WHERE condition;
```

the columns in **all** the rows will be updated.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Mysql Database server	5.5		
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a program to delete a record from a table.
2. Write the output of following JDBC code.

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
public class UpdateQuery
{
    public static void main(String [] args)
    {
        try
        {
            Class.forName("com.mysql.jdbc.Driver");
            Connection
            con=DriverManager.getConnection("jdbc:mysql://localhost:33
            06/Ddemodatabase","root","root");
```

```
        PreparedStatement st = con
        .prepareStatement("update student set roll_no=3 where
        name='Abhishek'");
        st.executeUpdate();
    }
    catch(Exception ex)
    {
        System.out.println(ex);
    }
}
}
```

XI. Result (Output of Code):

.....

.....

.....

.....

XII. Practical Related Questions

Note: Below given are few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.

1. Write ACID properties of Transaction.
2. Write the use of DDL DML and DCL
3. Write the use of Delete Cascade.
4. Write the use of Update Cascade.

(Space for answer)

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related(35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 21: Write a program to demonstrate the use of Generic Servlet as a parameterized servlet

I. Practical Significance:

Servlets are the Java programs that run on the Java-enabled web server or application server. They are used to handle the request obtained from the web server, process the request, produce the response, and then send response back to the web server.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to apply the servlet for dynamic web application.
2. Able to demonstrate the use of servlet for parameter received from client.

IV. Relevant Course Outcome(s)

Develop programs using Servlet

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of HttpServlet as a parameterized servlet

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Servlets are the Java programs that run on the Java-enabled web server or application server. They are used to handle the request obtained from the web server, process the request, produce the response, and then send response back to the web server.

The Servlet Container

Servlet container, also known as **Servlet engine** is an integrated set of objects that provide run time environment for Java Servlet components.

In simple words, it is a system that manages Java Servlet components on top of the Web server to handle the Web client requests.

The ServletRequest class includes methods that allow you to read the names and

values of parameters that are included in a client request.

Steps to Develop Servlet

Install Apache Tomcat 8.0

To develop servlet basic steps are

1. Create and compile the servlet source code.
D:\Sanjay_LabManual>javac HelloMSBTE.java -classpath "C:\Program Files\Apache Software Foundation\Tomcat 8.0\lib\servlet-api.jar"
2. Copy created .class file HelloMSBTE.class in web Container i.e
C:\Program Files\Apache Software Foundation\Tomcat 8.0\ webapps\ examples\ WEB-INF\classes
3. Start Tomcat.
To start Tomcat, select Start Tomcat in the Start | Programs menu, or run startup.bat from the C:\Program Files\Apache Software Foundation\Tomcat 8.0\bin
4. Start a Web browser and request the servlet.
<http://localhost:8080/examples/servlets/servlet/HelloMSBTE>

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Web Server Software	Apache Tomcat 8.0 with JRE.		
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to display following output in browser Window.

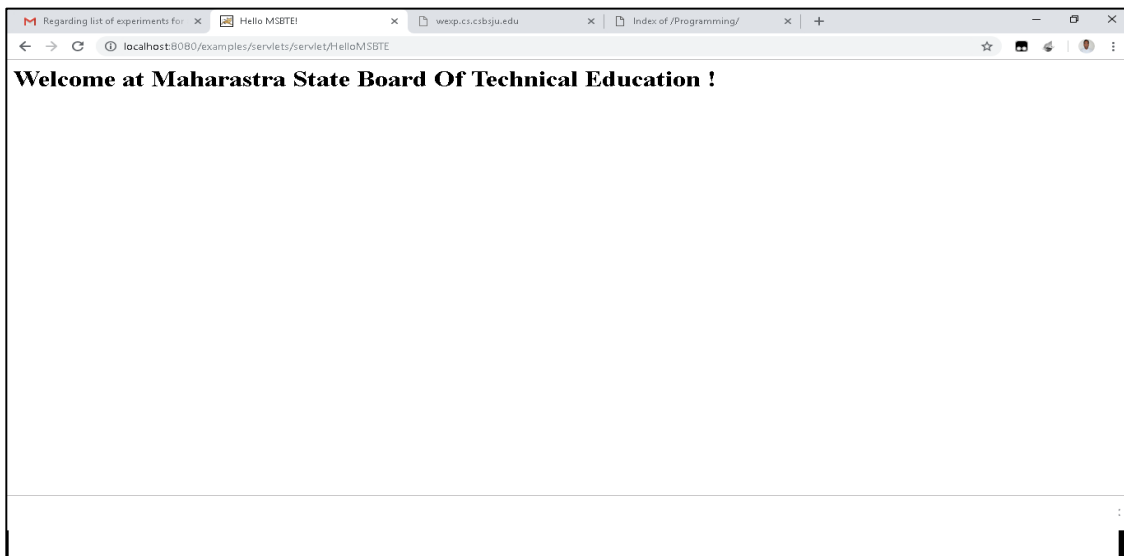


Figure 12

2. Write the output of following code considering below HTML is front end and servlet as back end

```
<html>
  <body>
    <center>
      <form name="Form1" method="post"
        action="http://localhost:8080/examples/servlet/PostParametersServlet">
        <table>
          <tr>
            <td><B>Employee</td>
            <td><input type=textBox name="e" size="25" value=""></td>
          </tr>
          <tr>
            <td><B>Phone</td>
            <td><input type=textBox name="p" size="25" value=""></td>
          </tr>
        </table>
        <input type=submit value="Submit">
      </body>
</html>
```

```
import java.io.*;
import java.util.*;
import javax.servlet.*;
```

```
public class PostParametersServlet extends GenericServlet
{
    public void service(ServletRequest request, ServletResponse response)
    throws ServletException, IOException
    {
```

```
    PrintWriter pw = response.getWriter();
    // Get enumeration of parameter names.
    Enumeration e = request.getParameterNames();
    // Display parameter names and values.
    while(e.hasMoreElements())
    {
        String pname = (String)e.nextElement();
        pw.print(pname + " = ");
        String pvalue = request.getParameter(pname);
        pw.println(pvalue);
    }
    pw.close();
}
}
```

(Space for Answer)

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert Schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 22: Write a Servlet program to send username and password using HTML forms and authenticate the user.

I. Practical Significance:

There is a possibility of developing 'n' types of servlets, like `httpservlet`, `ftpservlet`, `smtpservlet` etc. for all these protocol specific servlet classes `GenericServlet` is the common super class containing common properties and logics. So, `GenericServlet` is not a separate type of servlet.

As of now Servlet API is giving only one subclass to `GenericServlet` i.e `HttpServlet` class because all web servers are designed based on the protocol `http`.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to apply the servlet program for dynamic web application.
2. Able to demonstrate the use of servlet for parameter received from client.

IV. Relevant Course Outcome(s)

Develop programs using Servlet.

V. Practical Outcome (PrOs)

Write a program to demonstrate the use of `HttpServlet` as a parameterized servlet

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Generic servlets extend `javax.servlet.GenericServlet` - It is protocol independent servlet. `GenericServlet` is a base class servlet from which all other Servlets are derived. `GenericServlet` supports for HTTP, FTP and SMTP protocols. It implements the `Servlet` and `ServletConfig` interface. It has only `init()` and `destroy()` method of `ServletConfig` interface in its life cycle. It also implements the `log` method of `ServletContext` interface.

HTTP servlets extend javax.servlet.HttpServlet - HttpServlet is HTTP dependent servlet. The HTTP protocol is a set of rules that allows Web browsers and servers to communicate. When Web browsers and servers support the HTTP protocol, Java-based web applications are dependent on HTTP Servlets. HttpServlet is Extended by Generic Servlet. It provides an abstract class for the developers for extend to create their own HTTP specific servlets.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Web Server Software	Apache Tomcat 8.0 with JRE.		
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to send the username to server and server will send the length of username to client.
2. Write the output of following code considering below HTML is front end and servlet as back end

loginpage.html

```
<html>
  <body>
    <form action="
      http://localhost:8080/examples/servlets/servlet/AthonticationServlet"
      method="POST">
      User Name:<input type="text" name="username"><br>
      Password:<input type="password" name="password" ><br>
      <input type="submit">
    </form>
  </body>
</html>
```

```
//AthonticationServlet.java
```

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

```
import javax.servlet.http.HttpServletResponse;

public class AthenticationServlet extends HttpServlet
{
    protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException
    {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();
        String pass="abhishek12345";
        String username,password;
        username=request.getParameter("username");
        password=request.getParameter("password");
        if(username.equals(uname) && password.equals(pass))
        {
            out.println("Login Successfull");
        }
        else
        {
            out.println("Login Unsuccessfull");
        }
    }
}
```

(Space for Answer)

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 23: Write a Servlet program to Create Session using HttpSession Interface.

I. Practical Significance:

container creates a session id for each user. The container uses this id to identify the particular user. An object of HttpSession can be used to perform two tasks:

1. bind objects
2. view and manipulate information about a session, such as the session identifier, creation time, and last accessed time.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to develop a servlet program to retrieve the session ID.
2. Able to develop Servlet program to track the user session

IV. Relevant Course Outcome(s)

Develop programs using Servlet.

V. Practical Outcome (PrOs)

Write a Servlet program to Create Session using HttpSession class.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

The Http Servlet Request interface provides two methods to get the object of HttpSession:

1. **public HttpSession getSession():**Returns the current session associated with this request, or if the request does not have a session, creates one.
2. **public HttpSession getSession(boolean create):**Returns the current HttpSession associated with this request or, if there is no current session and create is true, returns a new session

Commonly used methods of HttpSession interface

1. **public String getId():**Returns a string containing the unique identifier value.
2. **public long getCreationTime():**Returns the time when this session was created, measured in milliseconds since midnight January 1, 1970 GMT.
3. **public long getLastAccessedTime():**Returns the last time the client sent a request associated with this session, as the number of milliseconds since midnight January 1, 1970 GMT.
4. **public void invalidate():**Invalidates this session then unbinds any objects bound to it.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Web Server Software	Apache Tomcat 8.0 with JRE.		
2				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to Session id and Session time in Browser Window.
2. Write the output of following code considering below HTML is front end and servlet as back end

```
<html>
  <body>
    <form action="
      http://localhost:8080/examples/servlet/SessionServlet">
      Name:<input type="text" name="userName"/><br/>
      <input type="submit" value="go"/>
    </form>
  </body>
</html>
```

```
//SessionServlet.java
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

public class SessionServlet extends HttpServlet
{
    public void doGet(HttpServletRequest request, HttpServletResponse response)
    {
        try
```

```
        {
            response.setContentType("text/html");
            PrintWriter out = response.getWriter();
            String n=request.getParameter("userName");
            out.print("Welcome "+n);
            HttpSession session=request.getSession();
            session.setAttribute("uname",n);
            out.print("<a href='servlet2'>visit</a>");
            out.close();
        }
    catch (Exception e) {System.out.println(e);}
}
}
```

(Space for Answer)

XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

Practical No. 24: Write a Servlet program to implement session tracking using Cookies.

I. Practical Significance:

Session Tracking is a way to maintain state (data) of an user. It is also known as session management in servlet. Http protocol is a stateless so we need to maintain state using session tracking techniques. Each time user requests to the server, server treats the request as the new request. So we need to maintain the state of an user to recognize to particular user. HTTP is stateless that means each request is considered as the new request.

II. Relevant Program Outcomes (POs)

- **Basic knowledge:** Apply knowledge of basic mathematics, sciences and basic engineering to solve the computer group related problems.
- **Discipline knowledge:** Apply Computer Programming knowledge to solve the computer group related problems.
- **Experiments and practice:** Plan to perform experiments and practices to use the results to solve the computer group related problems.
- **Engineering tools:** Apply relevant Computer programming / technologies and tools with an understanding of the limitations.
- **Individual and Team work:** Function effectively as a leader and team member in diverse/multidisciplinary teams.
- **Communication:** Communicate effectively in oral and written form.

III. Competency and Practical skills

To develop Dynamic web Application

The practical is expected to develop the following skills:

1. Able to apply the servlet for session tracking.
2. Able to demonstrate the use of session tracking with various methods.

IV. Relevant Course Outcome(s)

Develop programs using Servlet

V. Practical Outcome (PrOs)

Write a Servlet program to implement session tracking using Cookies.

VI. Relevant Affective domain related Outcome(s)

1. Follow precautionary measures.
2. Follow naming conventions.
3. Follow ethical practices.

VII. Minimum Theoretical Background

Cookies

A webserver can assign a unique session ID as a cookie to each web client and for subsequent requests from the client they can be recognized using the received cookie.

This may not be an effective way because many time browser does not support a cookie, so I would not recommend to use this procedure to maintain the sessions.

Hidden Form Fields

A web server can send a hidden HTML form field along with a unique session ID as follows –

```
<input type = "hidden" name = "sessionid" value = "12345">
```

URL Rewriting

You can append some extra data on the end of each URL that identifies the session, and the server can associate that session identifier with data it has stored about that session.

The HttpSession Object

Apart from the above mentioned three ways, servlet provides HttpSession Interface which provides a way to identify a user across more than one page request or visit to a Web site and to store information about that user.

Types of Cookie

There are 2 types of cookies in servlets.

1. Non-persistent cookie
2. Persistent cookie

Non-persistent cookie

It is **valid for single session** only. It is removed each time when user closes the browser.

Persistent cookie

It is **valid for multiple session**. It is not removed each time when user closes the browser. It is removed only if user logout or sign-out.

javax.servlet.http.Cookie class provides the functionality of using cookies. It provides a lot of useful methods for cookies.

Other methods required for using Cookies

For adding cookie or getting the value from the cookie, we need some methods provided by other interfaces. They are:

1. **public void addCookie(Cookie ck):**method of HttpServletResponse interface is used to add cookie in response object.
2. **public Cookie[] getCookies():**method of HttpServletRequest interface is used to return all the cookies from the browser.

VIII. Resources required (Additional)–

Nil

IX. Resources used (Additional)

Sr. No.	Name of Resource	Broad Specification	Quantity	Remarks (If any)
1	Web Server Software	Apache Tomcat 8.0 with JRE.		

2				
3				

X. Program Code: Teacher must assign a separate program statement to group of 3-4 students.

1. Write a Program to Create Cookie.
2. Write the output of following servlet code

index.html

```
<form action=" http://localhost:8080/examples/servlet /servlet1" method="post">
    Name:<input type="text" name="userName"/><br/>
    <input type="submit" value="go"/>
</form>
```

```
//FirstServlet.java
```

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
```

```
public class FirstServlet extends HttpServlet
{
    public void doPost(HttpServletRequest request, HttpServletResponse response)
    {
        try
        {
            response.setContentType("text/html");
            PrintWriter out = response.getWriter();
            String n=request.getParameter("userName");
            out.print("Welcome "+n);
            Cookie ck=new Cookie("uname",n);//creating cookie object
            response.addCookie(ck);//adding cookie in the response
            //creating submit button
            out.print("<form action='servlet2'>");
            out.print("<input type='submit' value='go'>");
            out.print("</form>");
            out.close();
        }
        catch(Exception e){System.out.println(e);}
    }
}
```

```
// SecondServlet.java
```

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
```

```
public class SecondServlet extends HttpServlet
```


XIV. References/ Suggestions for Further Reading

1. <https://www.javatpoint.com>
2. <https://www.tutorialspoint.com/java>
3. The complete reference Java 2 by Herbert schildt
4. <https://tomcat.apache.org/download-80.cgi>

XV. Assessment Scheme

Performance Indicators		Weightage
Process related (35 Marks)		70%
1.	Logic formation	30%
2.	Debugging ability	30%
3.	Follow ethical practices	10%
Product related (15 Marks)		30%
4.	Expected output	10%
5.	Timely Submission	10%
6.	Answer to sample questions	10%
Total (50 Marks)		100%

List of Students /Team Members

1.
2.
3.

Marks Obtained			Dated signature of Teacher
Process Related(35)	Product Related(15)	Total(50)	

List Of Laboratory Manuals Developed by MSBTE

First Semester:

1	Fundamentals of ICT	22001
2	English	22101
3	English Work Book	22101
4	Basic Science (Chemistry)	22102
5	Basic Science (Physics)	22102

Second Semester:

1	Business Communication Using Computers	22009
2	Computer Peripherals & Hardware Maintenance	22013
3	Web Page Design with HTML	22014
4	Applied Science (Chemistry)	22202
5	Applied Science (Physics)	22202
6	Applied Machines	22203
7	Basic Surveying	22205
8	Applied Science (Chemistry)	22211
9	Applied Science (Physics)	22211
10	Fundamental of Electrical Engineering	22212
11	Elements of Electronics	22213
12	Elements of Electrical Engineering	22215
13	Basic Electronics	22216
14	'C' programming Language	22218
15	Basic Electronics	22225
16	Programming in "C"	22226
17	Fundamentals of Chemical Engineering	22231

Third Semester:

1	Applied Multimedia Techniques	22024
2	Advanced Surveying	22301
3	Highway Engineering	22302
4	Mechanics of Structures	22303
5	Building Construction	22304
6	Concrete Technology	22305
7	Strength Of Materials	22306
8	Automobile Engines	22308
9	Automobile Transmission System	22309
10	Mechanical Operations	22313
11	Technology Of Inorganic Chemicals	22314
12	Object Oriented Programming Using C++	22316
13	Data Structure Using 'C'	22317
14	Computer Graphics	22318
15	Database Management System	22319
16	Digital Techniques	22320
17	Principles Of Database	22321
18	Digital Techniques & Microprocessor	22323
19	Electrical Circuits	22324
20	Electrical & Electronic Measurement	22325
21	Fundamental Of Power Electronics	22326
22	Electrical Materials & Wiring Practice	22328
23	Applied Electronics	22329
24	Electrical Circuits & Networks	22330
25	Electronic Measurements & Instrumentation	22333
26	Principles Of Electronics Communication	22334
27	Thermal Engineering	22337
28	Engineering Metrology	22342
29	Mechanical Engineering Materials	22343
30	Theory Of Machines	22344

Fourth Semester:

1	Hydraulics	22401
2	Geo Technical Engineering	22404
3	Chemical Process Instrumentation & Control	22407
4	Fluid Flow Operation	22409
5	Technology Of Organic Chemicals	22410
6	Java Programming	22412
7	GUI Application Development Using VB.net	22034
8	Microprocessor	22415
9	Database Management	22416
10	Electric Motors And Transformers	22418
11	Industrial Measurements	22420
12	Digital Electronics And Microcontroller Applications	22421
13	Linear Integrated Circuits	22423
14	Microcontroller & Applications	22426
15	Basic Power Electronics	22427

16	Digital Communication Systems	22428
17	Mechanical Engineering Measurements	22443
18	Fluid Mechanics and Machinery	22445
19	Fundamentals Of Mechatronics	22048

Fifth Semester:

1	Design of Steel and RCC Structures	22502
2	Public Health Engineering	22504
3	Heat Transfer Operation	22510
4	Environmental Technology	22511
5	Operating Systems	22516
6	Advanced Java Programming	22517
7	Software Testing	22518
8	Control Systems and PLC's	22531
9	Embedded Systems	22532
10	Mobile and Wireless Communication	22533
11	Industrial Machines	22523
12	Switchgear and Protection	22524
13	Energy Conservation and Audit	22525
14	Power Engineering and Refrigeration	22562
15	Solid Modeling and Additive Manufacturing	22053
16	Guidelines & Assessment Manual for Micro Projects & Industrial Training	22057

Sixth Semester:

1	Solid Modeling	17063
2	Highway Engineering	17602
3	Contracts & Accounts	17603
4	Design of R.C.C. Structures	17604
5	Industrial Fluid Power	17608
6	Design of Machine Elements	17610
7	Automotive Electrical and Electronic Systems	17617
8	Vehicle Systems Maintenance	17618
9	Software Testing	17624
10	Advanced Java Programming	17625
11	Mobile Computing	17632
12	System Programming	17634
13	Testing & Maintenance of Electrical Equipments	17637
14	Power Electronics	17638
15	Illumination Engineering	17639
16	Power System Operation & Control	17643
17	Environmental Technology	17646
18	Mass Transfer Operation	17648
19	Advanced Communication System	17656
20	Mobile Communication	17657
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22	Process Control System	17663
23	Industrial Automation	17664
24	Industrial Drives	17667
25	Video Engineering	17668
26	Optical Fiber & Mobile Communication	17669
27	Therapeutic Equipment	17671
28	Intensive Care Equipment	17672
29	Medical Imaging Equipment	17673

Pharmacy Lab Manual

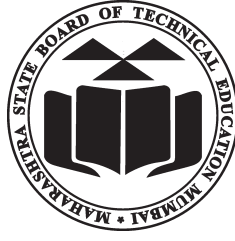
First Year:

1	Pharmaceutics - I	0805
2	Pharmaceutical Chemistry - I	0806
3	Pharmacognosy	0807
4	Biochemistry and Clinical Pathology	0808
5	Human Anatomy and Physiology	0809

Second Year:

1	Pharmaceutics - II	0811
2	Pharmaceutical Chemistry - II	0812
3	Pharmacology & Toxicology	0813
4	Hospital and Clinical Pharmacy	0816

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