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JAVA PROGRAMMIMG LAB MANUAL

II Year - Semester II

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-23

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
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Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

LAB MANUAL

Branch: CSE **Class: B.Tech- II Year-II sem**
Subject: JAVA PROGRAMMING Lab **Code: R20CSE22L3 Academic**
Year: 2022-23 **Regulation: R20**
Core/Elective/H&S: Core **Credits:1**

Prepared By
Name: G.MANASA

Verified By
Head of the Department:

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LAB MANUAL- INDEX

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – CYBER SECURITY

INSTITUTION VISION

To be a premier Institution in Engineering & Technologyand Management with competency,values and social consciousness.

INSTITUTION MISSION

IM1 Provide high quality academic programs, training activities and research facilities.

IM2 Promote Continuous Industry-Institute Interaction for Employability, Entrepreneurship,Leadership and Research aptitude among stakeholders.

IM3 Contribute to the Economical and technological development of the region, state and nation**.**

DEPARTMENT VISION

To be a recognized knowledge center in the field of Information Technology with self -motivated, employable engineers to society.

DEPARTMENT MISSION

The Department has following Missions:

DM1 To offer high quality student centric education in Information Technology.

DM2 To provide a conducive environment towards innovation and skills.

DM3 To involve in activities that provide social and professional solutions.

DM4 To impart training on emerging technologies namely cloud computing and IOT with involvementof stake holders.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Higher Studies: Graduates with an ability to apply knowledge of Basic sciences andprogramming skills in their career and higher education.

PEO 2: Lifelong Learning: Graduates with an ability to adopt new technologies for ever changingIT industry needs through Self-Study, Critical thinking and Problem solving skills.

PEO 3: Professional skills: Graduates will be ready to work in projects related to complexproblems involving multi-disciplinary projects with effective analytical skills.

PEO 4: Engineering Citizenship: Graduates with an ability to communicate well and exhibitsocial, technical and ethical responsibility in process or product**.**

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning:** Recognize the need for, andhave the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change.
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
PSO 3	**Project implementation:** Analyze and recommend the appropriate IT Infrastructure required for the implementation of a project.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - II Year – II Semester	**L**	**T**	**P**	**C**
	0	0	2	1

(R20CSE22L3) Java Programming Lab

Course Objectives:

- To write programs using abstractclasses.
- To write programs for solving real world problems using java collection framework.
- To write multithreadedprograms.
- To write GUI programs using swing controls inJava.
- To introduce java compiler and eclipseplatform.
- To impart hands on experience with javaprogramming.

Course Outcomes:

- Able to write programs for solving real world problems using java collection framework.
- Able to write programs using abstractclasses.
- Able to write multithreadedprograms.
- Able to write GUI programs using swing controls inJava.

Note:

1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipseplatform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list asneeded.

List of Experiments:

1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a forloop.
2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided byzero.
3. a) Develop an applet in Java that displays a simplemessage.
   a) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" isclicked.
4. Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialogbox.
5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of thenumber.
6. Write a Java program for the following:
   Create a doubly linked list of elements.
   Delete a given element from the above list.
   Display the contents of the list afterdeletion.
7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no messageshown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the givenshape.
9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in GridLayout.
10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapterclasses).
11. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hashtables).
12. Write a Java program that correctly implements the producer – consumer problem using the concept of interthreadcommunication.
13. Write a Java program to list all the files in a directory including the files present in all its subdirectories.
14. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascendingorder
15. Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.

REFERENCE BOOKS

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition *Pearson*education.
2. Thinking in Java, Bruce Eckel, *Pearson*Education.
3. Java Programming, D. S. Malik and P. S. Nair, *Cengage*Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell,*Pearson*.

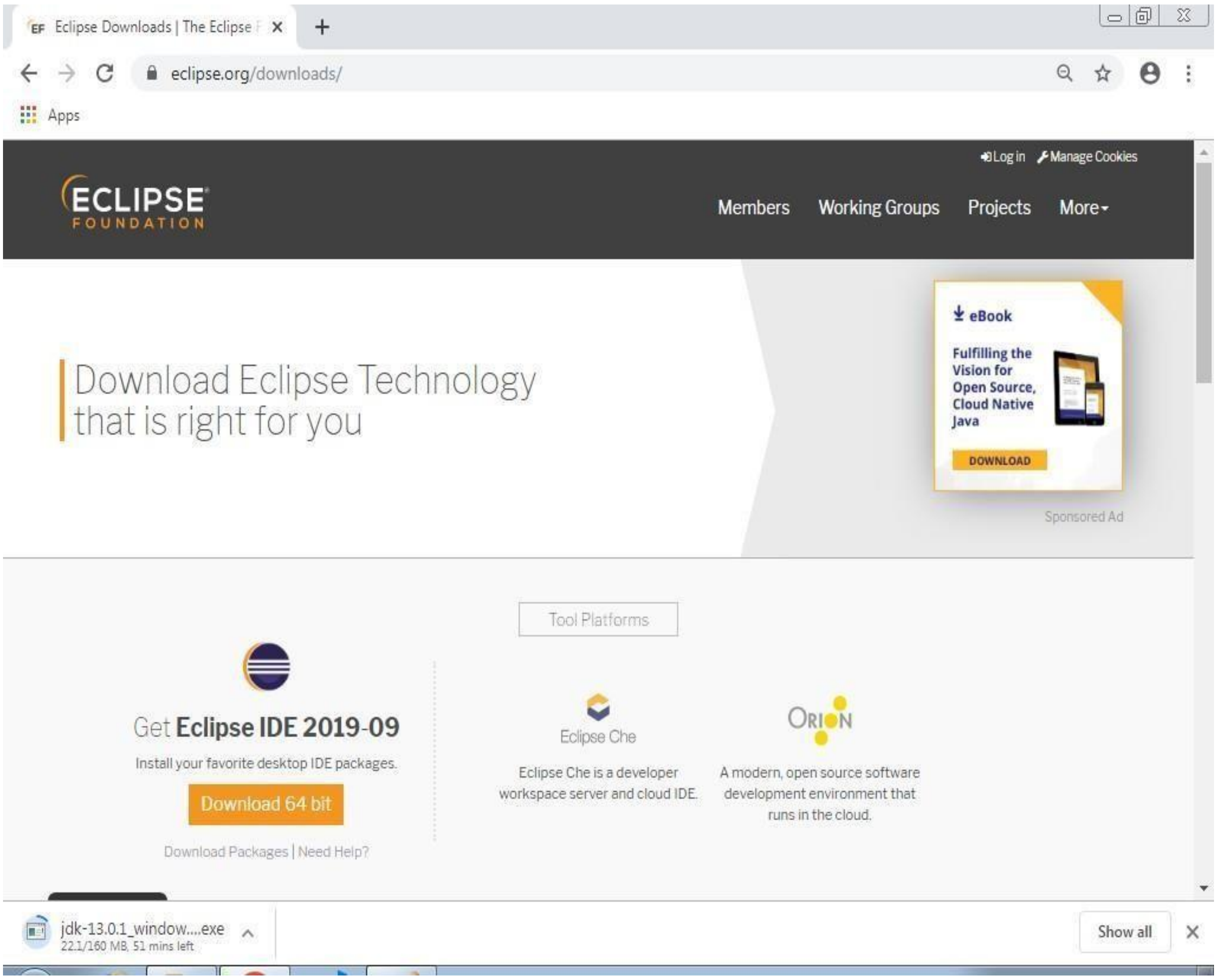
PROGRAMS

Week 1.

Aim: Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

Solution:

- **Step 1 -** Install JDK in the computer.
- **Step 2 -** Set the path in the Environment Variables from Advanced Setting of computer
- **Step 3 -** Download Eclipse from Eclipse website
- **Step 4 -** Install the Eclipse (follow the screen to install eclipse)



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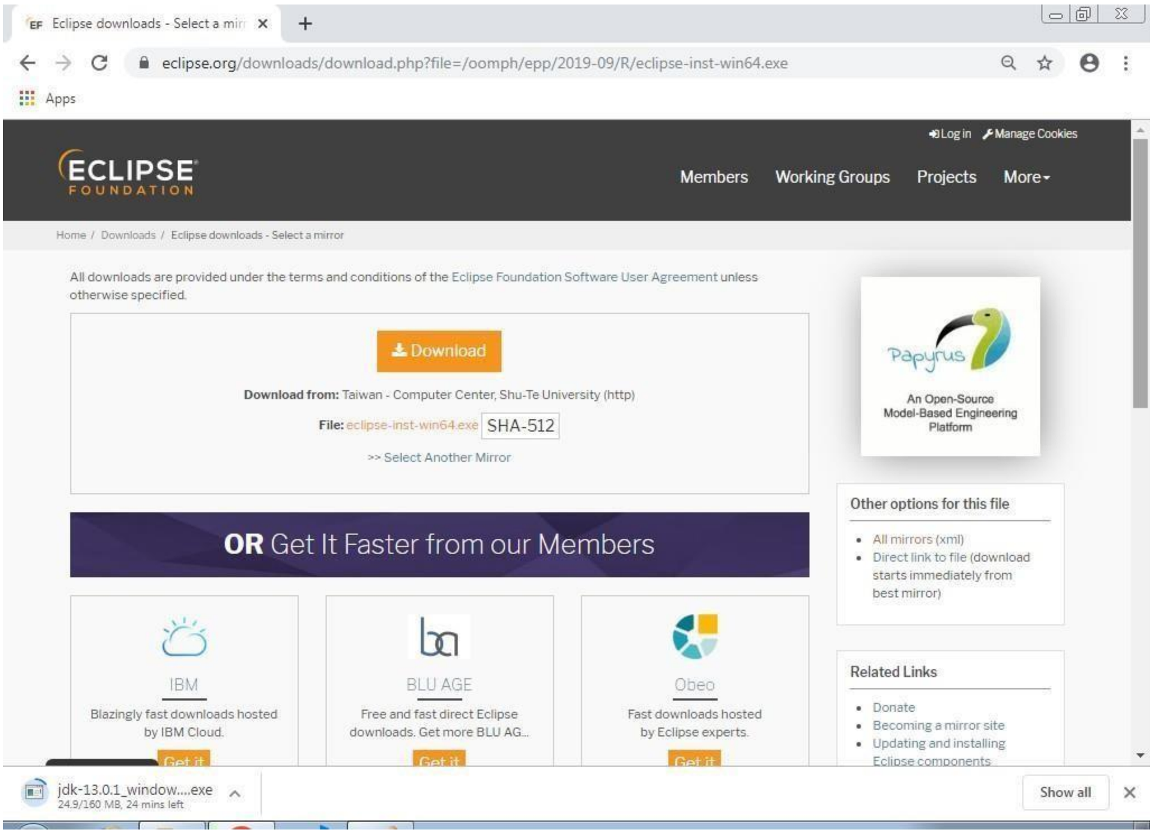
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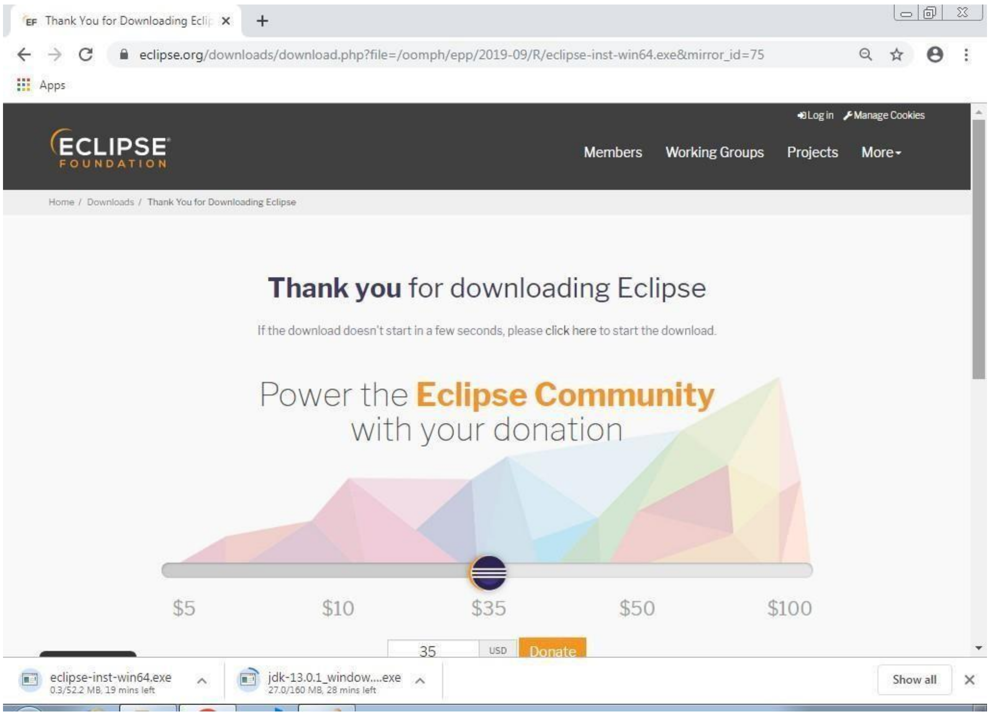
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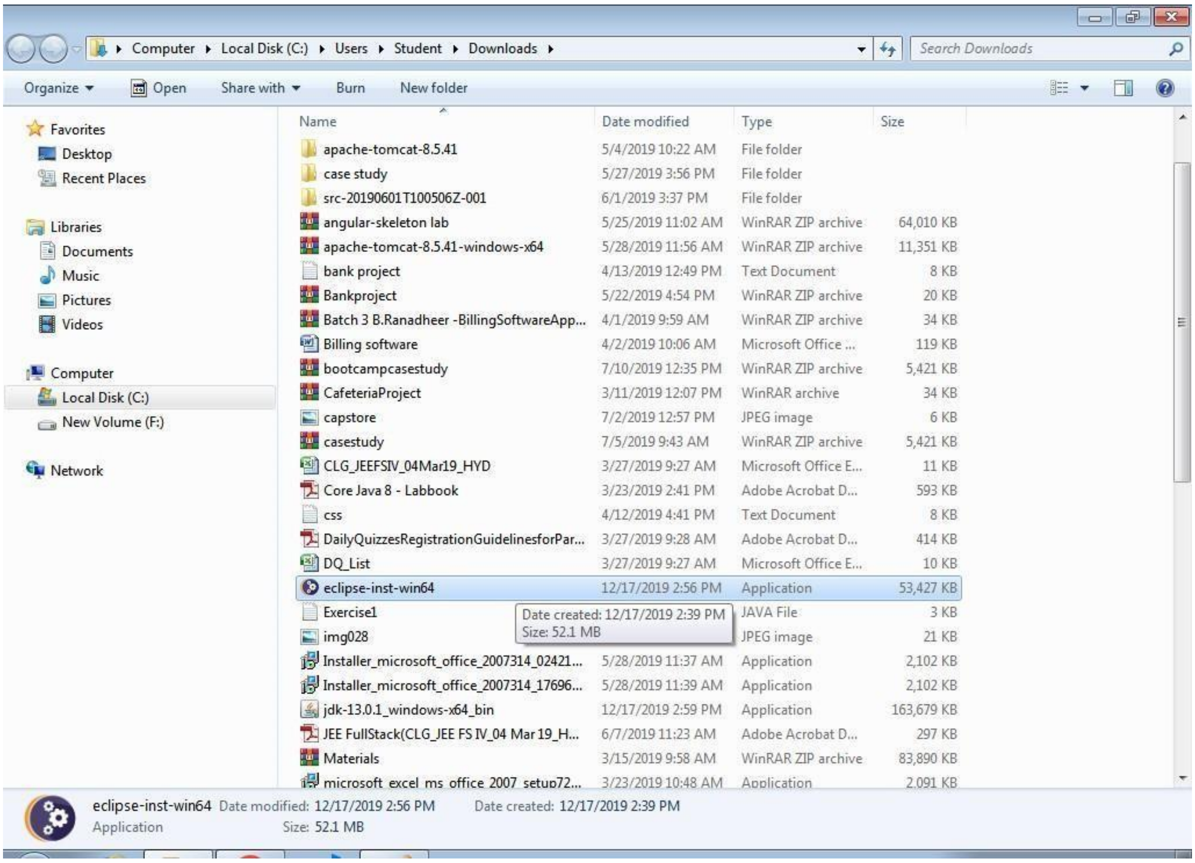
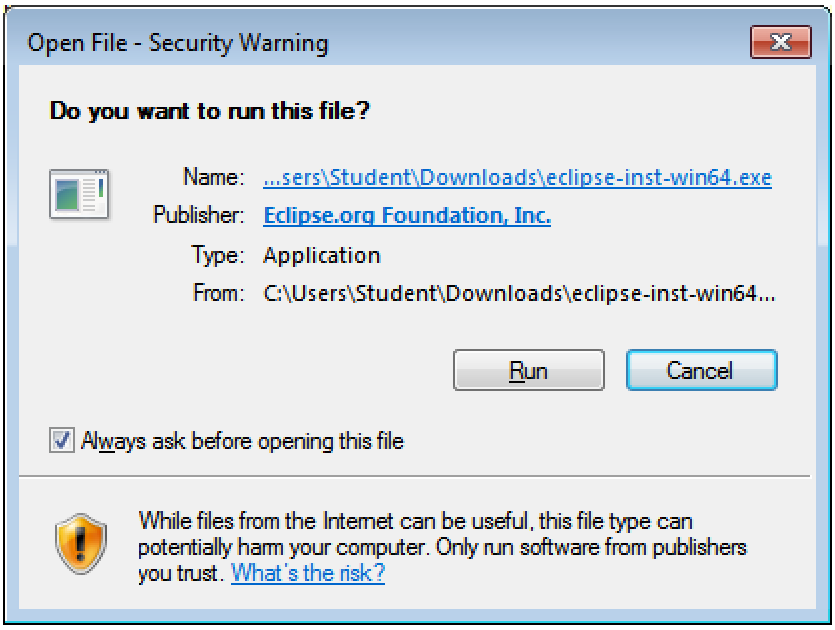


Name	Date modified	Type	Size
apache-tomcat-8.5.41	5/4/2019 10:22 AM	File folder	
case study	5/27/2019 3:56 PM	File folder	
src-20190601T100506Z-001	6/1/2019 3:37 PM	File folder	
angular-skeleton lab	5/25/2019 11:02 AM	WinRAR ZIP archive	64,010 KB
apache-tomcat-8.5.41-windows-x64	5/28/2019 11:56 AM	WinRAR ZIP archive	11,351 KB
bank project	4/13/2019 12:49 PM	Text Document	8 KB
Bankproject	5/22/2019 4:54 PM	WinRAR ZIP archive	20 KB
Batch 3 B.Ranadheer -BillingSoftwareApp...	4/1/2019 9:59 AM	WinRAR ZIP archive	34 KB
Billing software	4/2/2019 10:06 AM	Microsoft Office ...	119 KB
bootcampcasestudy	7/10/2019 12:35 PM	WinRAR ZIP archive	5,421 KB
CafeteriaProject	3/11/2019 12:07 PM	WinRAR archive	34 KB
capstore	7/2/2019 12:57 PM	JPEG image	6 KB
casestudy	7/5/2019 9:43 AM	WinRAR ZIP archive	5,421 KB
CLG_JEEFSIV_04Mar19_HYD	3/27/2019 9:27 AM	Microsoft Office E...	11 KB
Core Java 8 - Labbook	3/23/2019 2:41 PM	Adobe Acrobat D...	593 KB
css	4/12/2019 4:41 PM	Text Document	8 KB
DailyQuizzesRegistrationGuidelinesforPar...	3/27/2019 9:28 AM	Adobe Acrobat D...	414 KB
DQ_List	3/27/2019 9:27 AM	Microsoft Office E...	10 KB
eclipse-inst-win64	12/17/2019 2:56 PM	Application	53,427 KB
Exercise1		JAVA File	3 KB
img028		JPEG image	21 KB
Installer_microsoft_office_2007314_02421...	5/28/2019 11:37 AM	Application	2,102 KB
Installer_microsoft_office_2007314_17696...	5/28/2019 11:39 AM	Application	2,102 KB
jdk-13.0.1_windows-x64_bin	12/17/2019 2:59 PM	Application	163,679 KB
JEE FullStack(CLG_JEE FS IV_04 Mar 19_H...	6/7/2019 11:23 AM	Adobe Acrobat D...	297 KB
Materials	3/15/2019 9:58 AM	WinRAR ZIP archive	83,890 KB
microsoft_excel_ms_office_2007_setup72...	3/23/2019 10:48 AM	Application	2,091 KB

Date created: 12/17/2019 2:39 PM
Size: 52.1 MB

eclipse-inst-win64 Date modified: 12/17/2019 2:56 PM Date created: 12/17/2019 2:39 PM
Application Size: 52.1 MB

Click on Run in the Security Warning box.



Open File - Security Warning

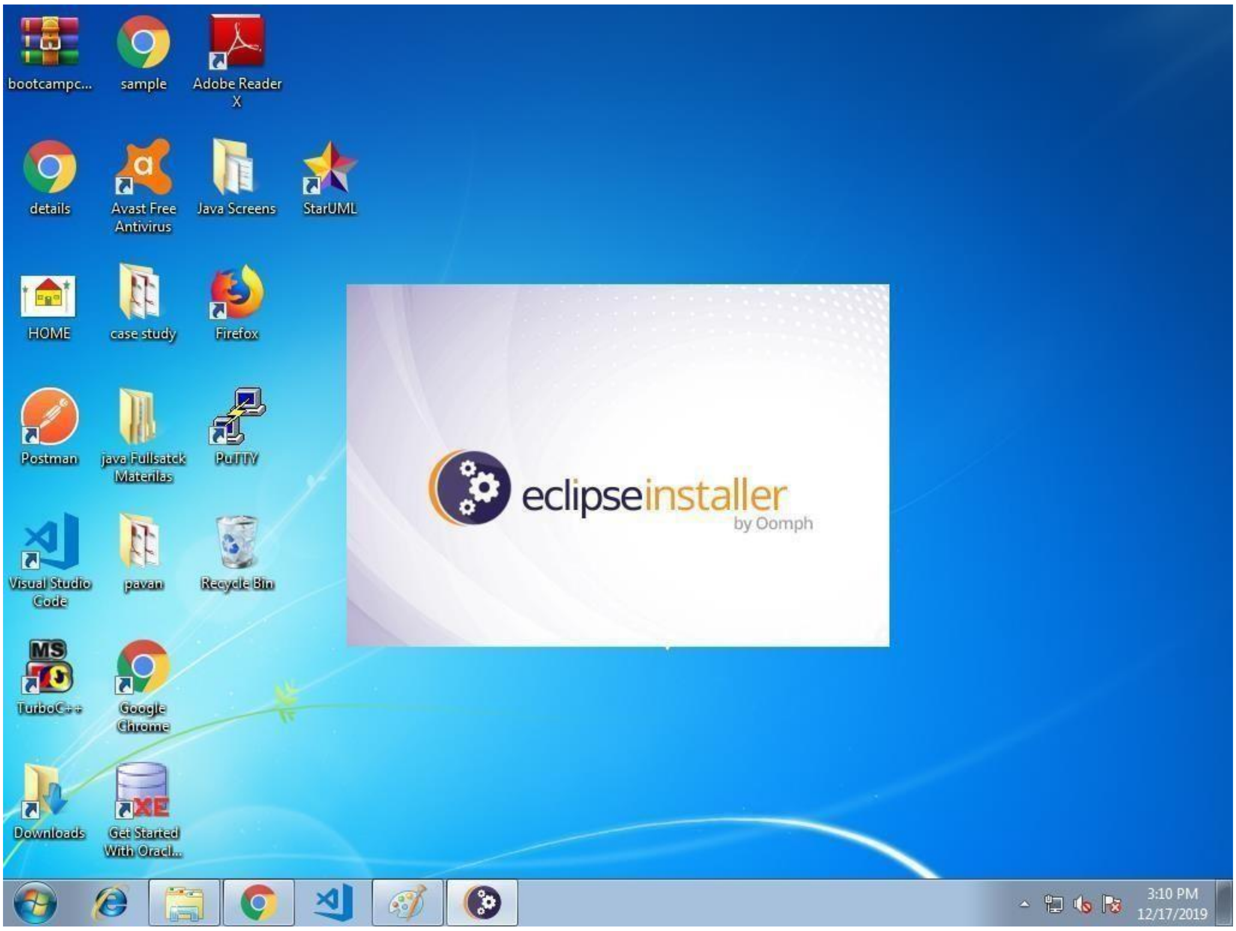
Do you want to run this file?

Name: ...sers\Student\Downloads\eclipse-inst-win64.exe
Publisher: Eclipse.org Foundation, Inc.
Type: Application
From: C:\Users\Student\Downloads\eclipse-inst-win64...

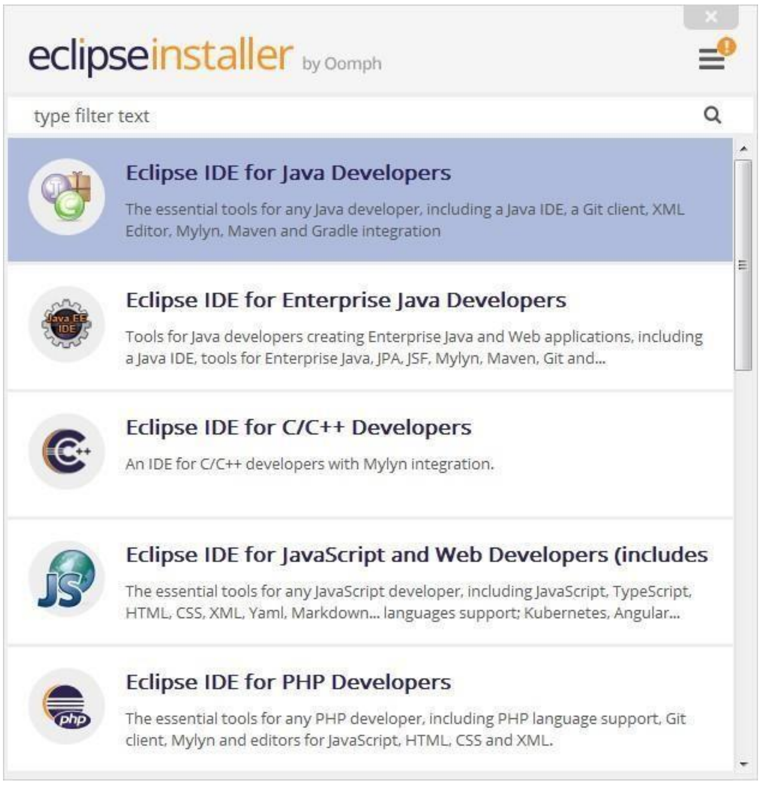
☑ Always ask before opening this file

While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?

Then, the installation process begins.



Click on Eclipse IDE for Java Developers.



Eclipse IDE for Java Developers

The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Mylyn, Maven and Gradle integration

Eclipse IDE for Enterprise Java Developers

Tools for Java developers creating Enterprise Java and Web applications, including a Java IDE, tools for Enterprise Java, JPA, JSF, Mylyn, Maven, Git and...

Eclipse IDE for C/C++ Developers

An IDE for C/C++ developers with Mylyn integration.

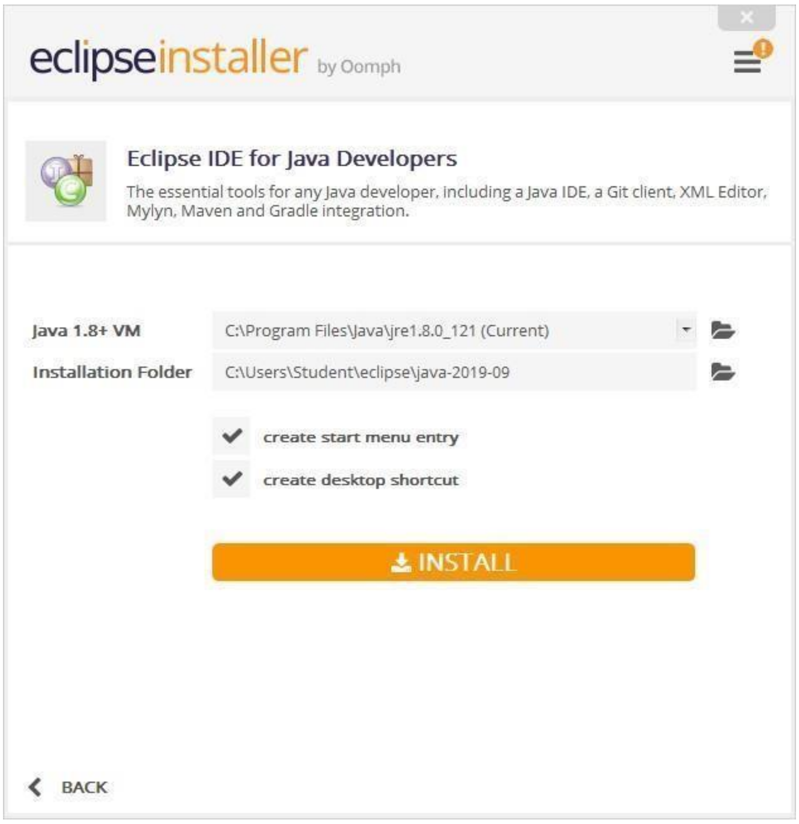
Eclipse IDE for JavaScript and Web Developers (includes

The essential tools for any JavaScript developer, including JavaScript, TypeScript, HTML, CSS, XML, Yaml, Markdown... languages support; Kubernetes, Angular...

Eclipse IDE for PHP Developers

The essential tools for any PHP developer, including PHP language support, Git client, Mylyn and editors for JavaScript, HTML, CSS and XML.

Click on Install button.



Eclipse IDE for Java Developers

The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Mylyn, Maven and Gradle integration.

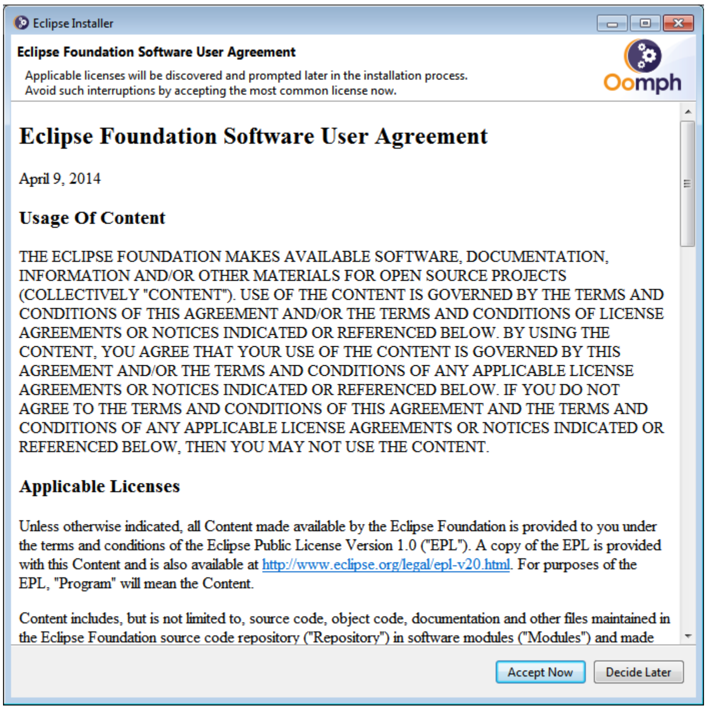
Java 1.8+ VM: C:\Program Files\Java\jre1.8.0_121 (Current)

Installation Folder: C:\Users\Student\eclipse\java-2019-09

☑ create start menu entry

☑ create desktop shortcut

Click on Accept Now.



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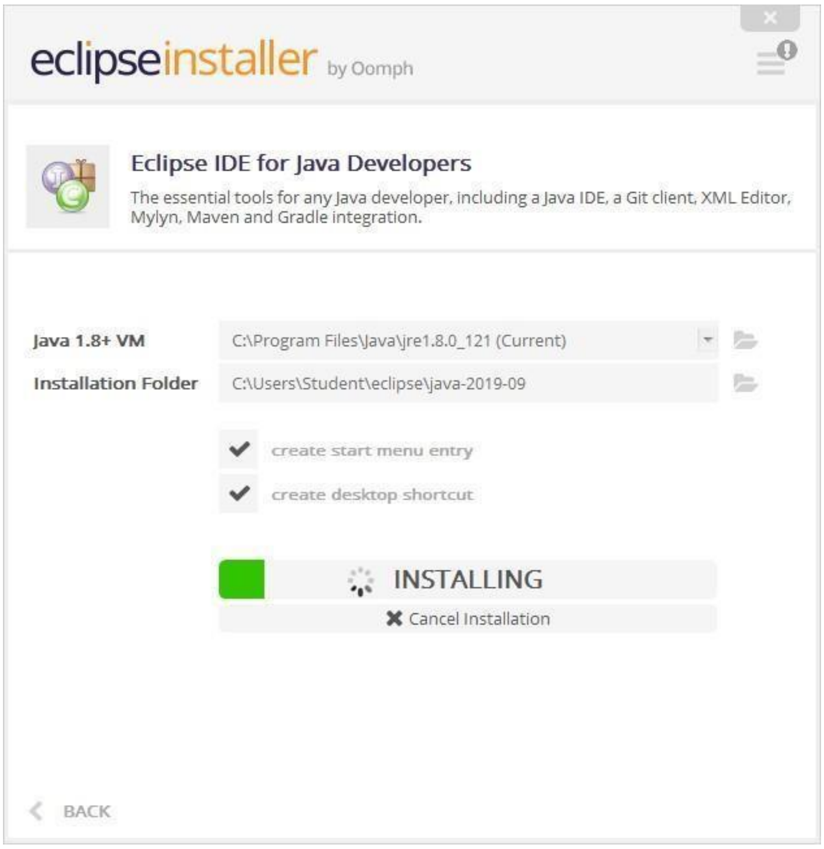

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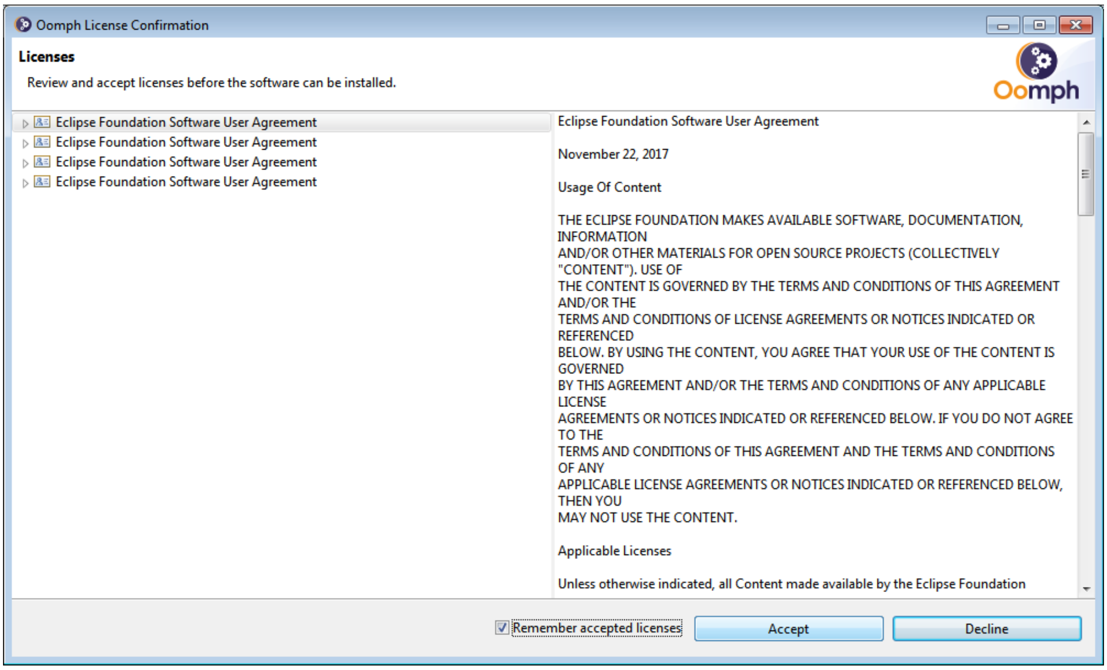
Installation Folder: C:\Users\Student\eclipse\java-2019-09

✓ create start menu entry

✓ create desktop shortcut

Click on Accept



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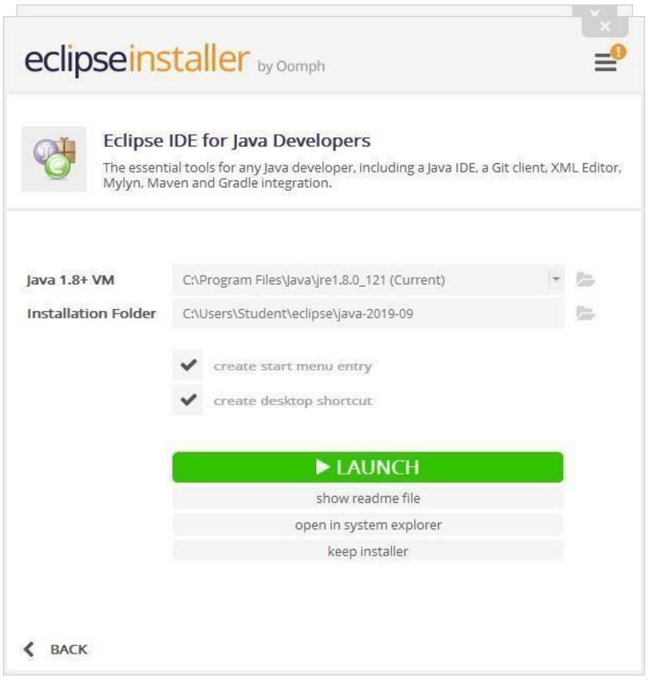


eclipseinstaller by Oomph

Eclipse IDE for Java Developers

The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Mylyn, Maven and Gradle integration.

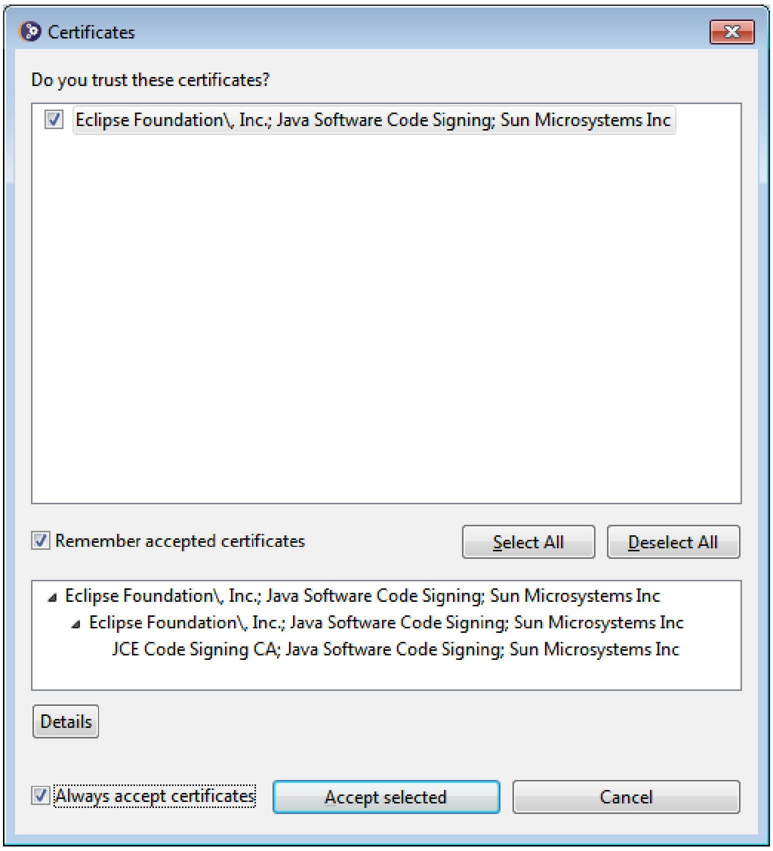
Java 1.8+ VM: C:\Program Files\Java\jre1.8.0_121 (Current)

Installation Folder: C:\Users\Student\eclipse\java-2019-09

✓ create start menu entry

✓ create desktop shortcut

Click on Select All and Accept Selected.



Certificates

Do you trust these certificates?

☑ Eclipse Foundation\, Inc.; Java Software Code Signing; Sun Microsystems Inc

☑ Remember accepted certificates

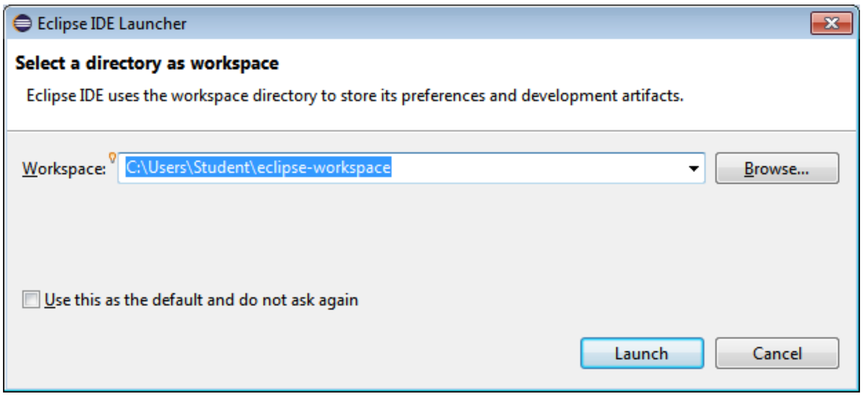
Eclipse Foundation\, Inc.; Java Software Code Signing; Sun Microsystems Inc
Eclipse Foundation\, Inc.; Java Software Code Signing; Sun Microsystems Inc
JCE Code Signing CA; Java Software Code Signing; Sun Microsystems Inc

☑ Always accept certificates

After completing, click on Launch to start the Eclipse IDE.

CREATING PROJECT AND CLASSES IN ECLIPSE IDE

Browse the Workspace for storing the java project and click on Launch.



Eclipse IDE Launcher

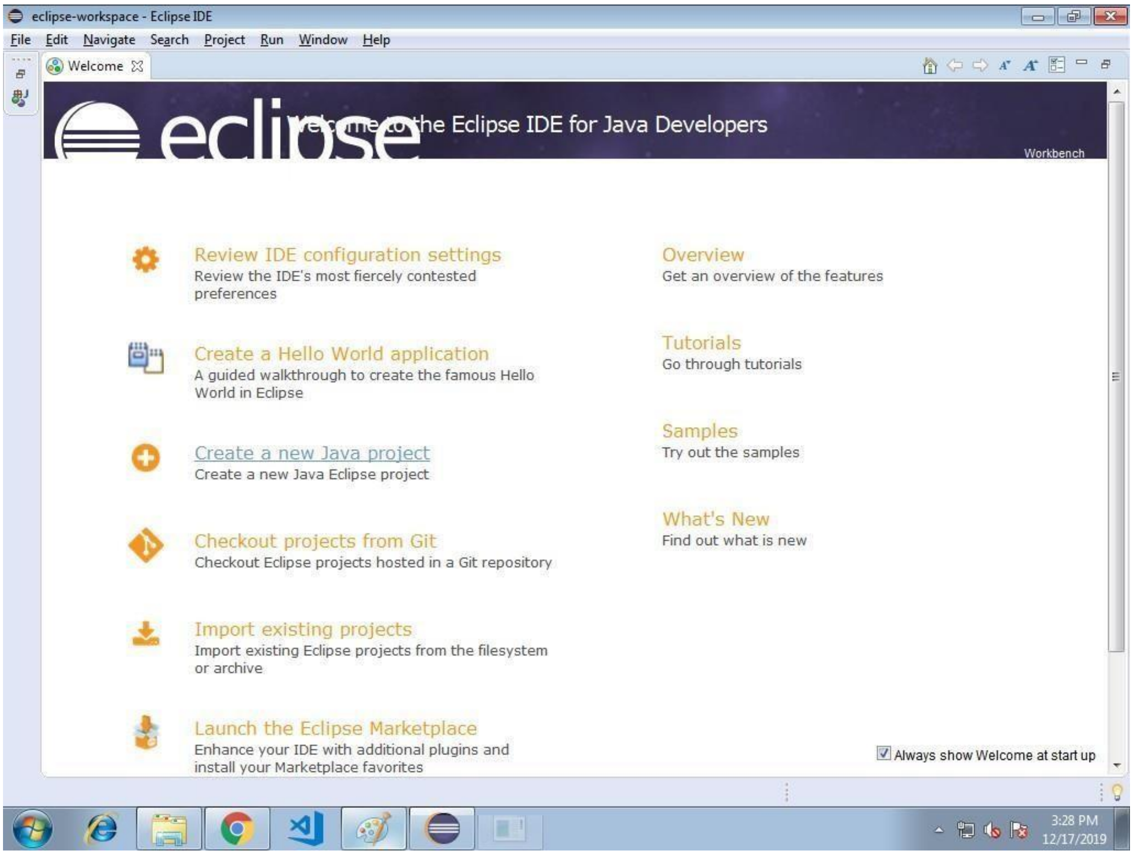
Select a directory as workspace

Eclipse IDE uses the workspace directory to store its preferences and development artifacts.

Workspace: C:\Users\Student\eclipse-workspace

□ Use this as the default and do not ask again

Select "Create a new Java project".



eclipse-workspace - Eclipse IDE

File Edit Navigate Search Project Run Window Help
Welcome
Welcome to the Eclipse IDE for Java Developers
Workbench

Review IDE configuration settings
Review the IDE's most fiercely contested preferences

Create a Hello World application
A guided walkthrough to create the famous Hello World in Eclipse

Create a new Java project
Create a new Java Eclipse project

Checkout projects from Git
Checkout Eclipse projects hosted in a Git repository

Import existing projects
Import existing Eclipse projects from the filesystem or archive

Launch the Eclipse Marketplace
Enhance your IDE with additional plugins and install your Marketplace favorites

Overview
Get an overview of the features

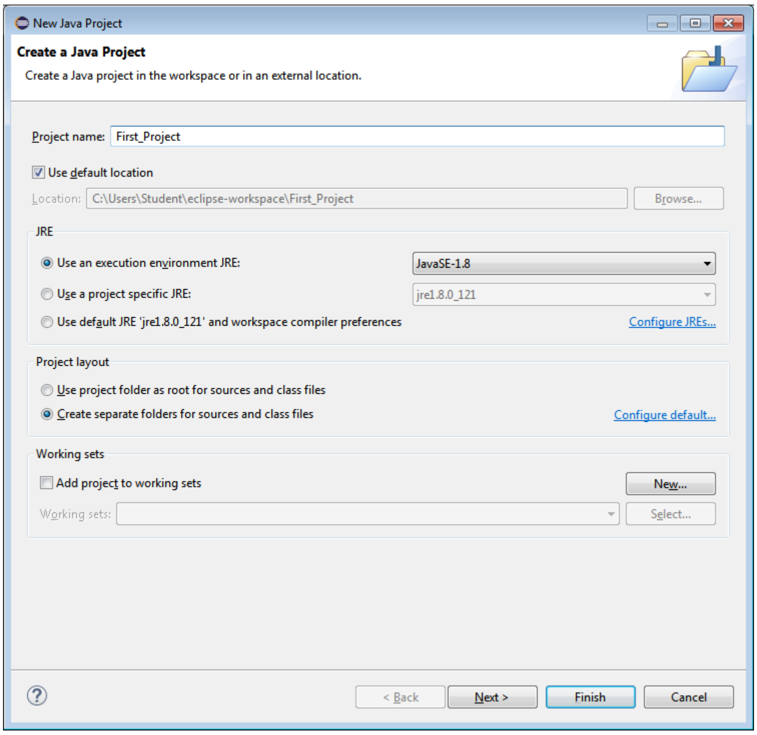
Tutorials
Go through tutorials

Samples
Try out the samples

What's New
Find out what is new

☑ Always show Welcome at start up

Type the project name and click on Finish.



New Java Project

Create a Java Project

Create a Java project in the workspace or in an external location.

Project name: First_Project

☑ Use default location

Location: C:\Users\Student\eclipse-workspace\First_Project Browse...

JRE

● Use an execution environment JRE: JavaSE-1.8

○ Use a project specific JRE: jre1.8.0_121

○ Use default JRE 'jre1.8.0_121' and workspace compiler preferences Configure JREs...

Project layout

○ Use project folder as root for sources and class files

● Create separate folders for sources and class files Configure default...

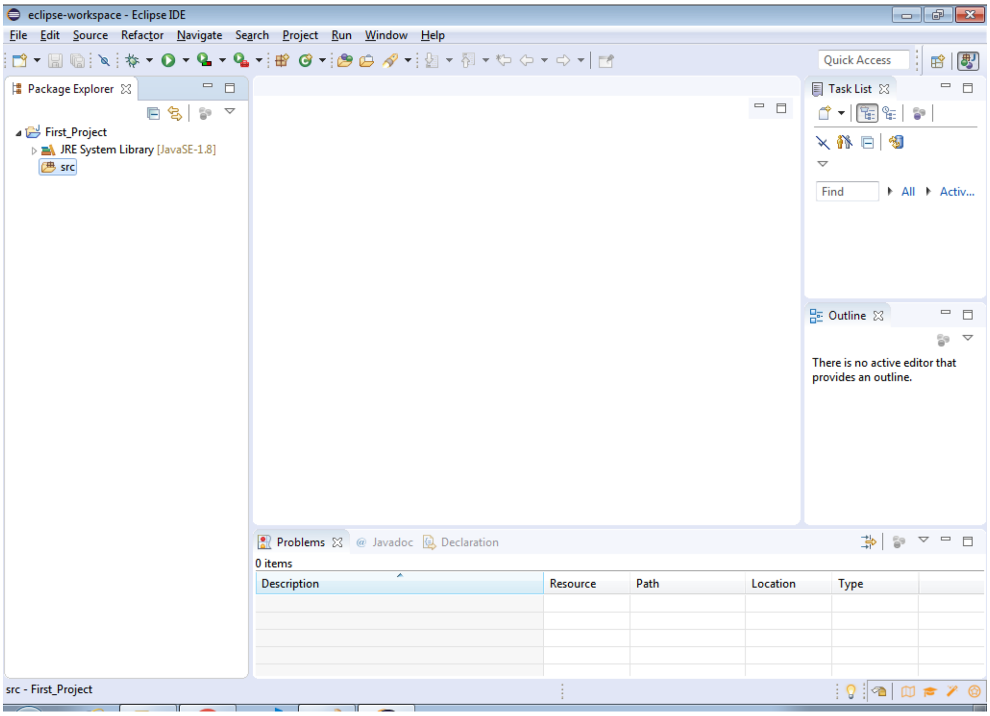
Working sets

☐ Add project to working sets New...

Working sets: Select...

< Back Next > Finish Cancel

Now, create the class in src directory from Package Explorer window.



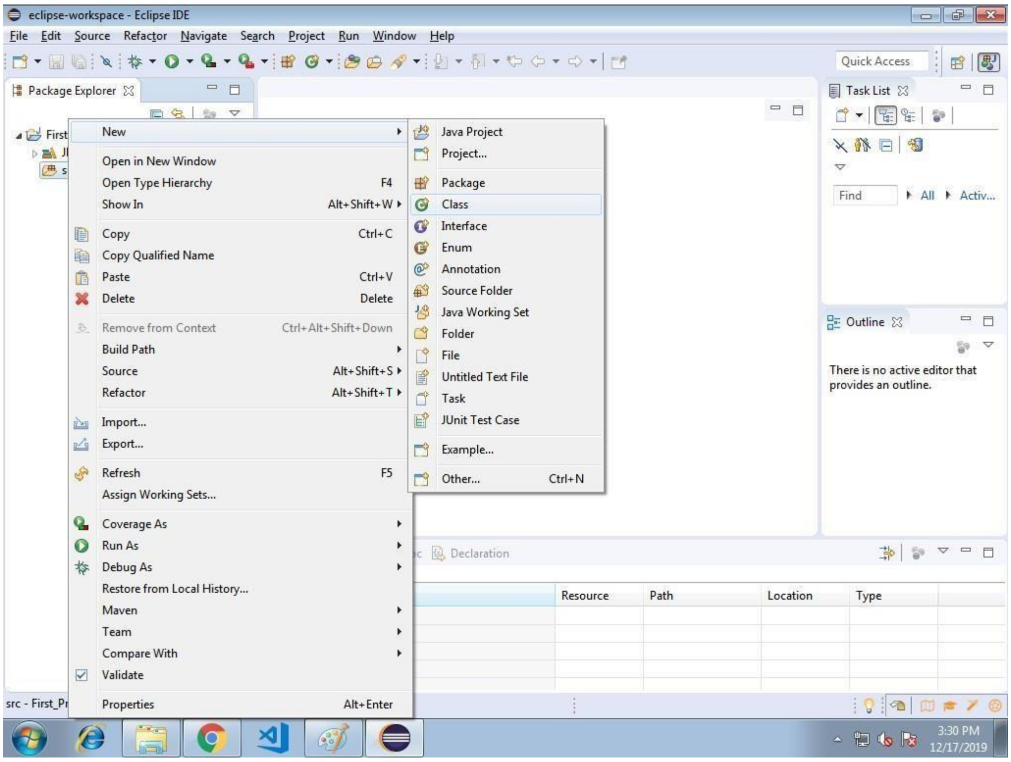
eclipse-workspace - Eclipse IDE

There is no active editor that provides an outline.

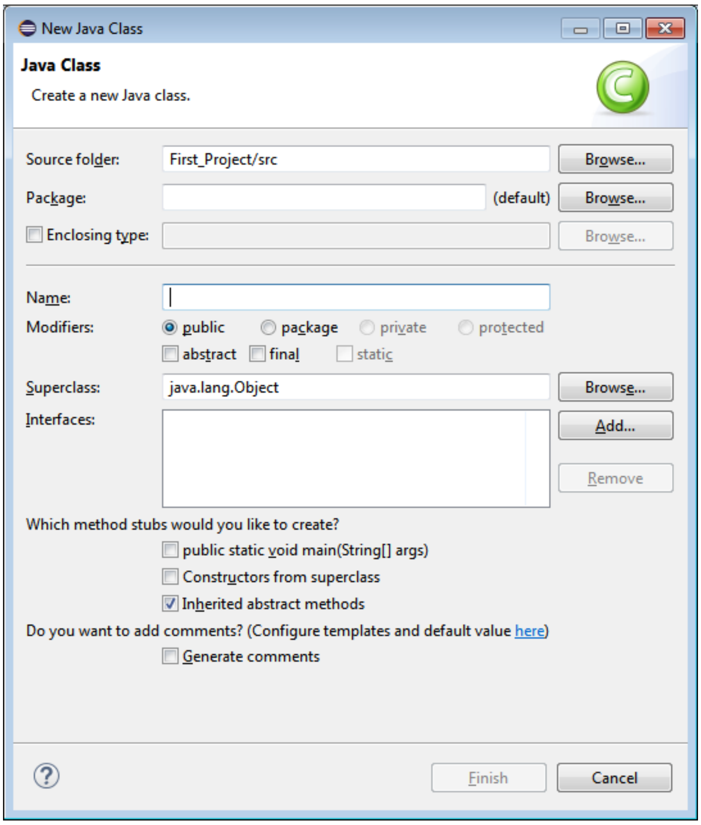
0 items

Description	Resource	Path	Location	Type

src - First_Project



Type the class name and click on Finish.



New Java Class

Java Class

Create a new Java class.

Source folder: First_Project/src Browse...

Package: (default) Browse...

□ Enclosing type: Browse...

Name:

Modifiers: ● public ○ package ○ private ○ protected

□ abstract □ final □ static

Superclass: java.lang.Object Browse...

Interfaces: Add... Remove

Which method stubs would you like to create?

□ public static void main(String[] args)

□ Constructors from superclass

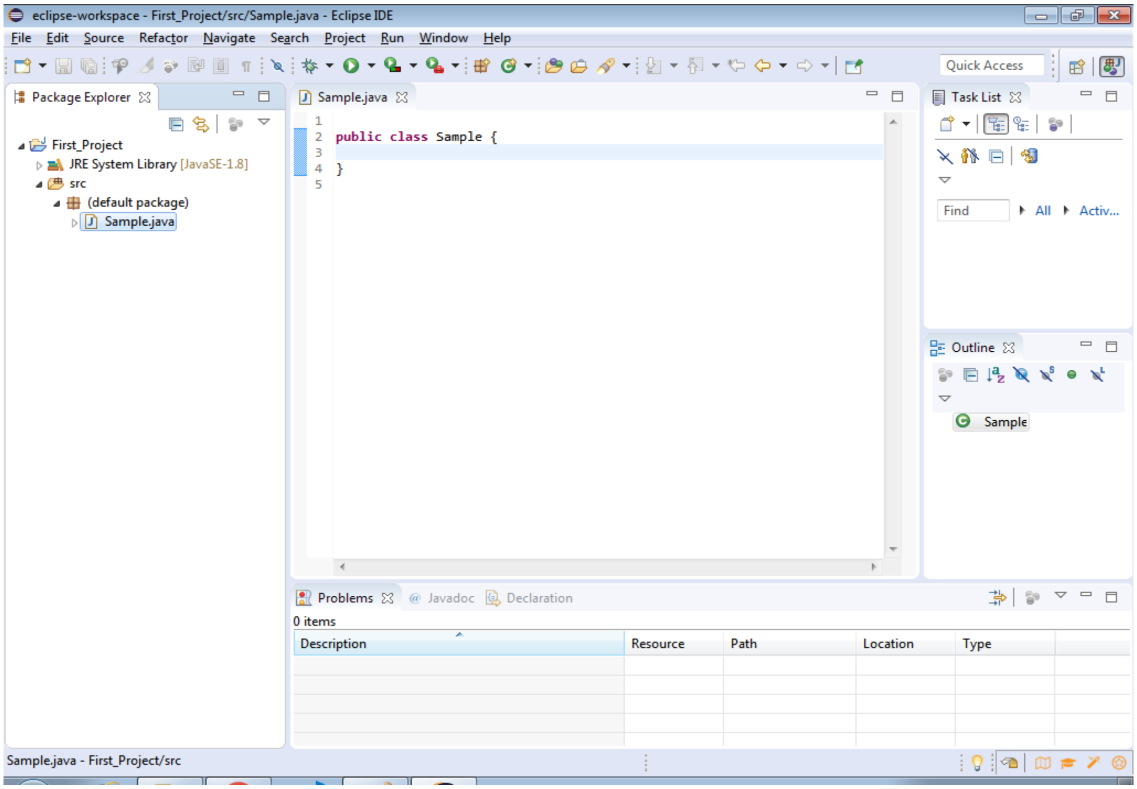
☑ Inherited abstract methods

Do you want to add comments? (Configure templates and default value here)

□ Generate comments

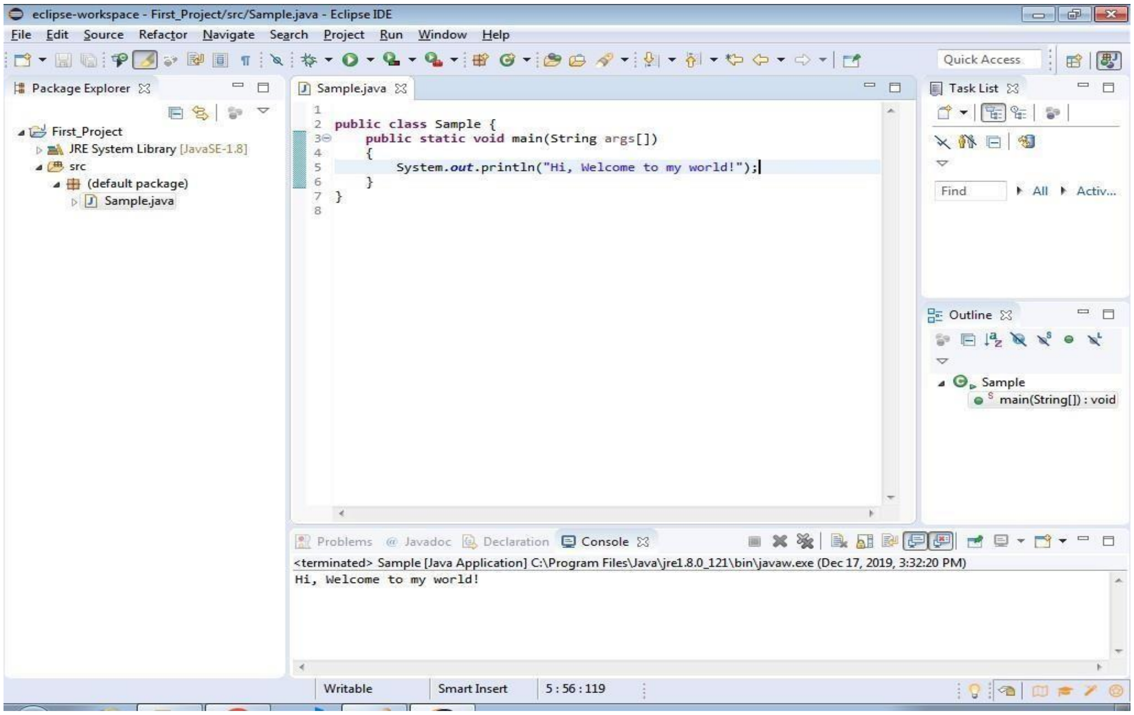
Finish Cancel

Type the java code.


eclipse-workspace - First_Project/src/Sample.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Package Explorer
First_Project
JRE System Library [JavaSE-1.8]
src
(default package)
Sample.java
Sample.java
Task List
Find
All
Activ...
Outline
Sample
Problems
Javadoc
Declaration
0 items
Description
Resource
Path
Location
Type
Sample.java - First_Project/src

```java

public class Sample {

}

```

Click on Play button to run or execute the java code.



```java

public class Sample {
    public static void main(String args[])
    {
        System.out.println("Hi, Welcome to my world!");
    }
}

```

```
<terminated> Sample [Java Application] C:\Program Files\Java\jre1.8.0_121\bin\javaw.exe (Dec 17, 2019, 3:32:20 PM)
Hi, Welcome to my world!
```

Program Using If and For Loop:-

```
public class Prog1
 {

      public static void main(String[] args)
      {
            System.out.println("\n Prog. is showing
            even no"); for(int i=2;i<=20;i++)
            {
                  if(i%2==0)
                  {
                        System.out.print("\n "+i);
                  }

            }
      }
}
```

Compile:-

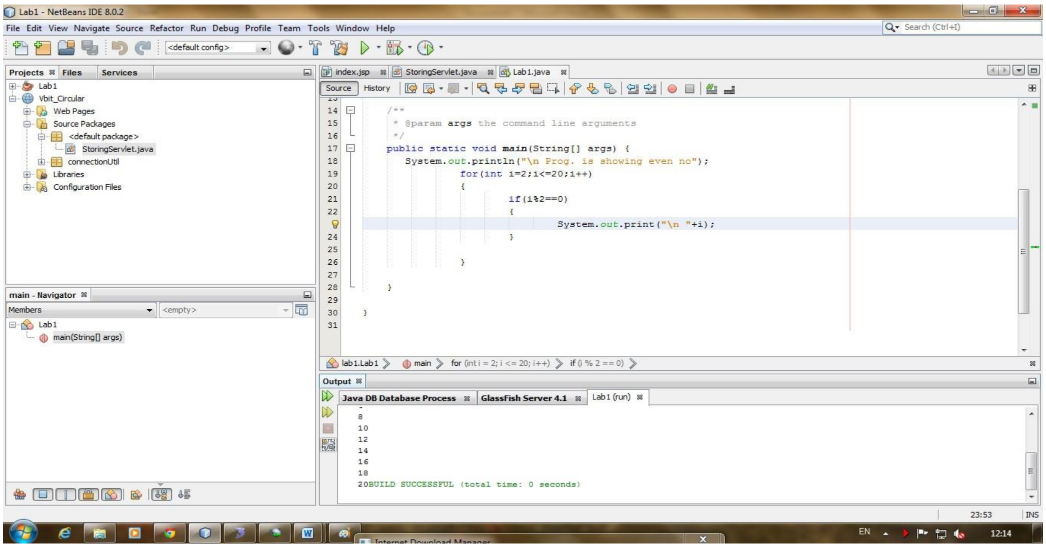
```
D:>javac Prog1.java
```

Run:-

```
D:>java Prog1
```

Output:-

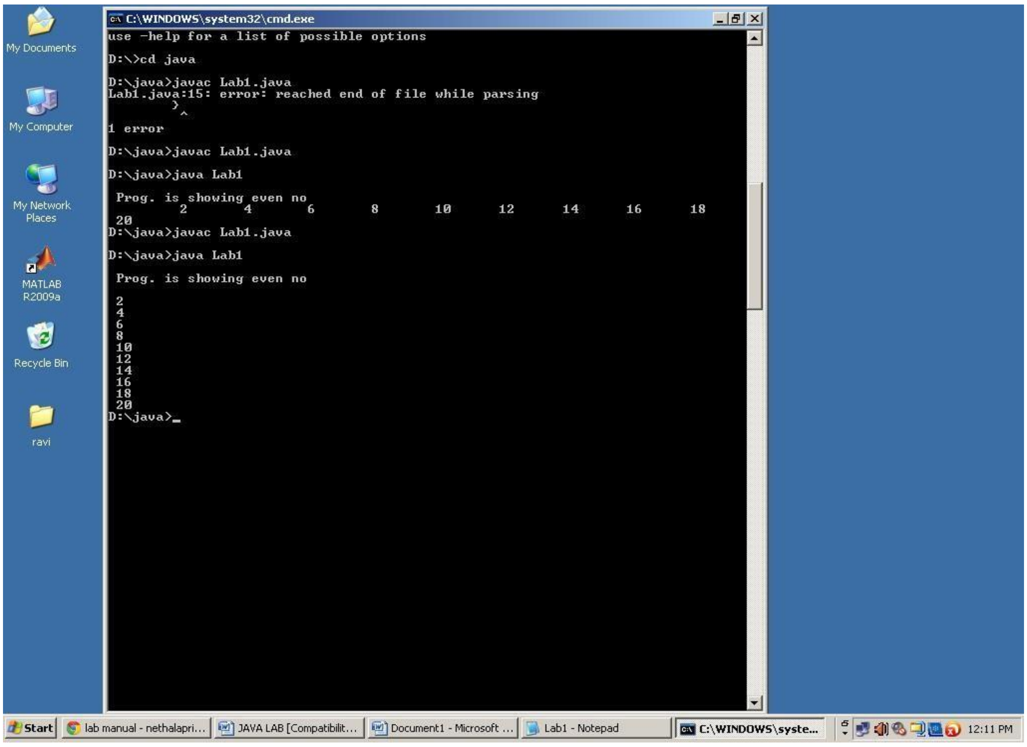
In Netbeans IDE:-



```
    /**
     * @param args the command line arguments
     */
    public static void main(String[] args) {
       System.out.println("\n Prog. is showing even no");
              for(int i=2;i<=20;i++)
              {
                    if(i%2==0)
                    {
                          System.out.print("\n "+i);
                    }

              }

    }

}
```

```
8
10
12
14
16
18
20BUILD SUCCESSFUL (total time: 0 seconds)
```

In Command Prompt:-



```
use -help for a list of possible options

D:\>cd java

D:\java>javac Lab1.java
Lab1.java:15: error: reached end of file while parsing
         }
          ^
1 error

D:\java>javac Lab1.java

D:\java>java Lab1

 Prog. is showing even no
         2       4       6       8       10      12      14      16      18
 20
D:\java>javac Lab1.java

D:\java>java Lab1

 Prog. is showing even no

 2
 4
 6
 8
 10
 12
 14
 16
 18
 20
D:\java>_
```

Viva Questions:

- Explain JDK, JRE and JVM?
- Explain public static void main(String args[]) in Java
- Why Java is platform independent?
- What is an Eclipse IDE?
- What are the system requirements for Eclipse IDE to run successfully on our computersystem?

Week 2:

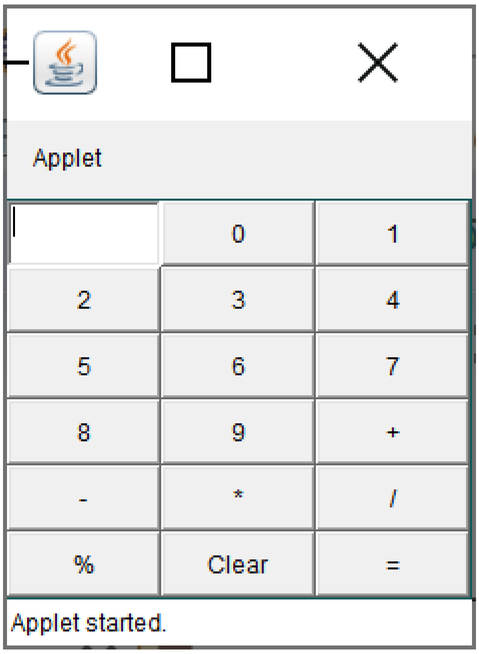
Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

Source Code:

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

/*
 * <applet code="Calculator" width=500 height=500></applet>
 * */

public class Calculator extends Applet implements ActionListener
{
	String msg=" ";
	int v1,v2,result;
	TextField t1;
	Button b[]=new Button[10];
	Button add,sub,mul,div,clear,mod,EQ;
	char OP;
	public void init()
	{
		Color k=new Color(10,89,90);
		setBackground(k);
		t1=new TextField(50);
		GridLayout gl=new GridLayout(6,3);
		setLayout(gl);
		for(int i=0;i<10;i++)
		{
			b[i]=new Button(""+i);
		}
		add=new Button("+");
		sub=new Button("-");
		mul=new Button("*");
		div=new Button("/");
		mod=new Button("%");
		clear=new Button("Clear");
		EQ=new Button("=");
		t1.addActionListener(this)
		;add(t1);
		for(int i=0;i<10;i++)
		{
			add(b[i]);
		}
		add(add);
		add(sub);
		add(mul);
		add(div);
		add(mod);

		add(clear);
		add(EQ);
		for(int i=0;i<10;i++)
		{
			b[i].addActionListener(this);
		}



		add.addActionListener(this);
```

```
                sub.addActionListener(this);
                mul.addActionListener(this);
                div.addActionListener(this);
                mod.addActionListener(this);
                clear.addActionListener(this);
                EQ.addActionListener(this);
        }
        public void actionPerformed(ActionEvent ae)
        {
                String str=ae.getActionCommand();
                char ch=str.charAt(0);

                if ( Character.isDigit(ch))
                        t1.setText(t1.getText()+str);
                else
                        if(str.equals("+"))
                        {
                                v1=Integer.parseInt(t1.getText());
                                OP='+';
                                t1.setText("");
                        }
                        else if(str.equals("-"))
                        {
                                v1=Integer.parseInt(t1.getText()); OP='-';
                                t1.setText("");
                        }
                        else if(str.equals("*"))
                        {
                                v1=Integer.parseInt(t1.getText());
                                OP='*';
                                t1.setText("");
                        }
                        else if(str.equals("/"))
                        {
                                v1=Integer.parseInt(t1.getText());
                                OP='/';
                                t1.setText("");
                        }
                        else if(str.equals("%")){
                                v1=Integer.parseInt(t1.getText());
                                OP='%';
                                t1.setText("");
                        }
                if(str.equals("=")){
                        v2=Integer.parseInt(t1.getText());
                        if(OP=='+')
                                result=v1+v2;
                        else if(OP=='-')
                                result=v1-v2;
                        else if(OP=='*')
                                result=v1*v2;
                        else if(OP=='/')
                                result=v1/v2;
                        else if(OP=='%')
                                result=v1%v2;
                        t1.setText(""+result);
                }
                if(str.equals("Clear"))
                {
                        t1.setText("");
                }
        }
    }
```

Output:



Viva Questions:

- What is an Applet ?
- What is the difference between an Applet and a Java Application ?
- Name three Component subclasses that support painting.
- What is the relationship between an event-listener interface and an event-adapter class ?
- How can a GUI component handle its own events ?

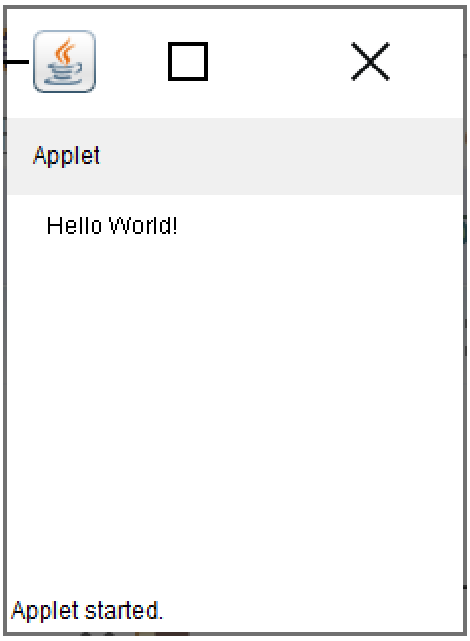
Week 3:

a) Develop an applet in Java that displays a simple message.
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named “Compute” is clicked.

Source code for question a:

```
// Import the packages to access the classes and methods in awt and applet classes.
import java.awt.*;
import java.applet.*;

/* <applet code="Applet1" width=200 height=300></applet>*/

public class Applet1 extends Applet
{
	// Paint method to display the message.
	public void paint(Graphics g)
	{
		g.drawString("Hello World!",20,20);
	}
}
```

Output:



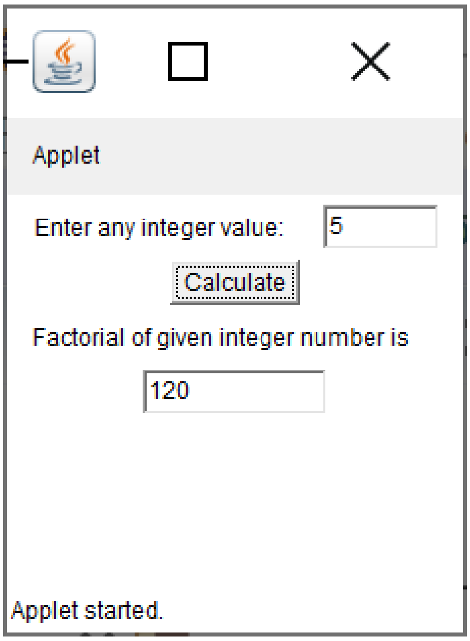
Hello World!

Applet started.

Source code for question b:

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

/*<applet code="Fact.class" height=300 width=300></applet>*/

public class Factorial extends Applet implements ActionListener{
        Label l1,l2;
        TextField t1,t2;
        Button b1;
        public void init(){
                l1=new Label("Enter any integer value: ");
                add(l1);
                t1=new TextField(5);
                add(t1);
                b1=new Button("Calculate");
                add(b1);
                b1.addActionListener(this);
                l2=new Label("Factorial of given integer number is ");
                add(l2);
                t2=new TextField(10);
                add(t2);
        }
        public void actionPerformed(ActionEvent e){
                if(e.getSource()==b1){
                        int fact=fact(Integer.parseInt(t1.getText()));
                        t2.setText(String.valueOf(fact));
                }
        }
        int fact(int f)     {
                int s=0; if(f==0)
                        return 1;
                else
                        return f*fact(f-1);
        }
}
```

Output:



Enter any integer value: 5

Factorial of given integer number is

120

Applet started.

Viva Questions:

1. What is Applet?
2. What is the order of method invocation in an Applet
3. How will you initialize an applet?
4. How do I load a serialized applet?
5. Define AWT.

Week 4:

Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

ALGORITHMS:

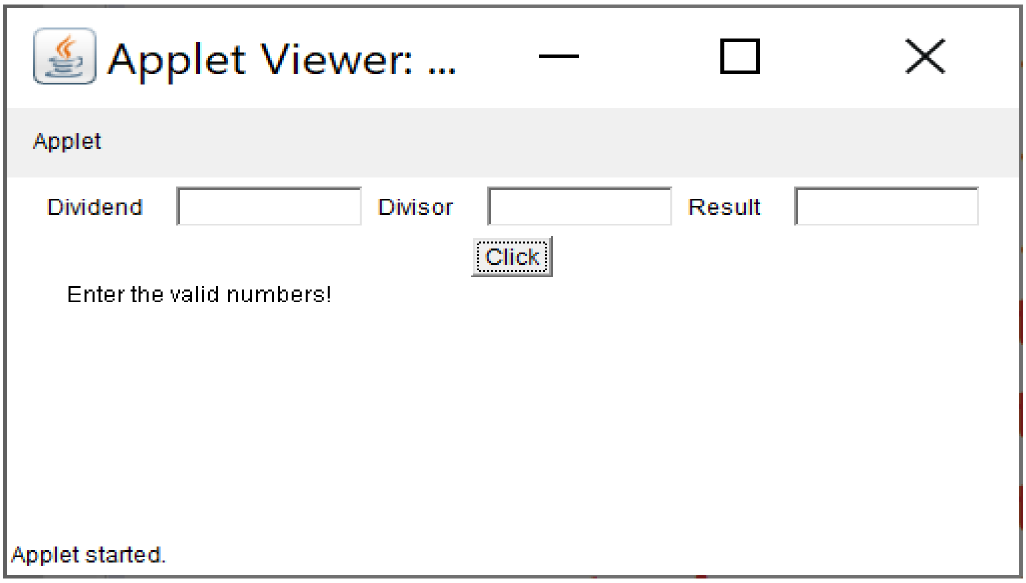
1. create an applet from extending Applet class.
2. Draw a line using drawLine()method.
3.Draw rectangle using drawRec() method.
4.Draw an ovel using drawOvel()method.
5.Include all these methods in the paint()method.

Source code:

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

/*<applet code="DivisionExample"width=230 height=250></applet>*/

public class DivisionExample extends Applet implements ActionListener {
	String msg;
	TextField num1, num2, res;
	Label l1, l2, l3;
	Button div;

	public void init() {
		l1 = new Label("Dividend");
		l2 = new Label("Divisor");
		l3 = new Label("Result");
		num1 = new TextField(10);
		num2 = new TextField(10);
		res = new TextField(10);
		div = new Button("Click");
		div.addActionListener(this);
		add(l1);
		add(num1);
		add(l2);
		add(num2);
		add(l3);
		add(res);
		add(div);
	}

	public void actionPerformed(ActionEvent ae) {
		String arg = ae.getActionCommand();
		int num1 = 0, num2 = 0;
		if (arg.equals("Click")) {
			if (this.num1.getText().isEmpty() | this.num2.getText().isEmpty())
			{
				msg = "Enter the valid numbers!";
				repaint();
			} else {
				try {
					num1 = Integer.parseInt(this.num1.getText());
					num2 = Integer.parseInt(this.num2.getText());

					int num3 = num1 / num2;
```

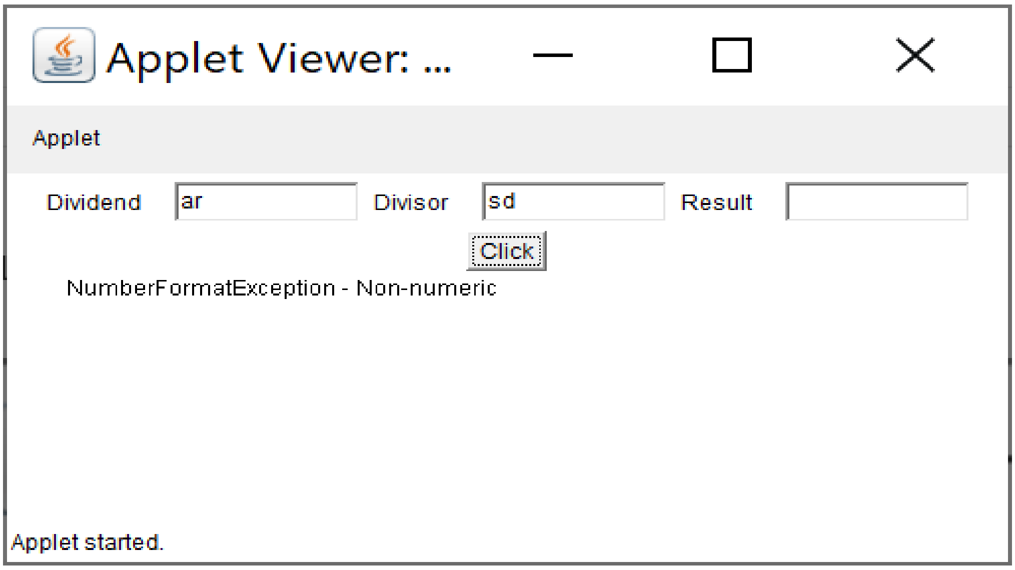
```
                    res.setText(String.valueOf(num3));
                    msg = "Operation Succesfull!!!";
                    repaint();
                } catch (NumberFormatException ex) {
                    System.out.println(ex);
                    res.setText("");
                    msg = "NumberFormatException - Non-numeric";
                    repaint();
                } catch (ArithmeticException e) {
                    System.out.println("Can't be divided by Zero" + e);
                    res.setText("");
                    msg = "Can't be divided by Zero";
                    repaint();
                }
            }
        }
    }

    public void paint(Graphics g) {
        g.drawString(msg, 30, 70);
    }
}
```

Output:



Enter the valid numbers!

Applet started.



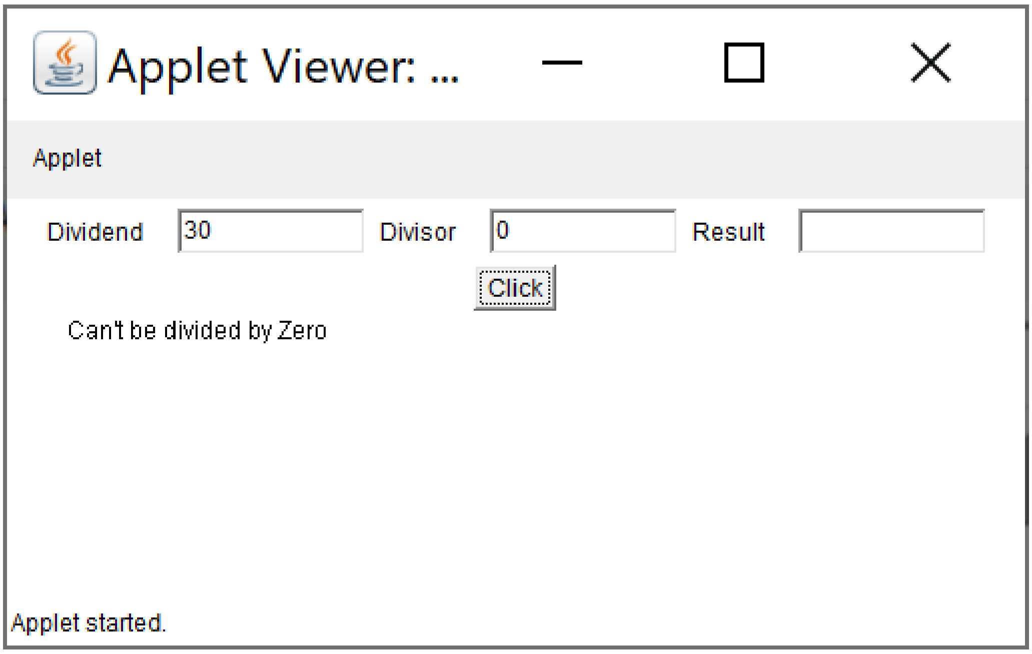
Dividend: ar

Divisor: sd

Result:

NumberFormatException - Non-numeric

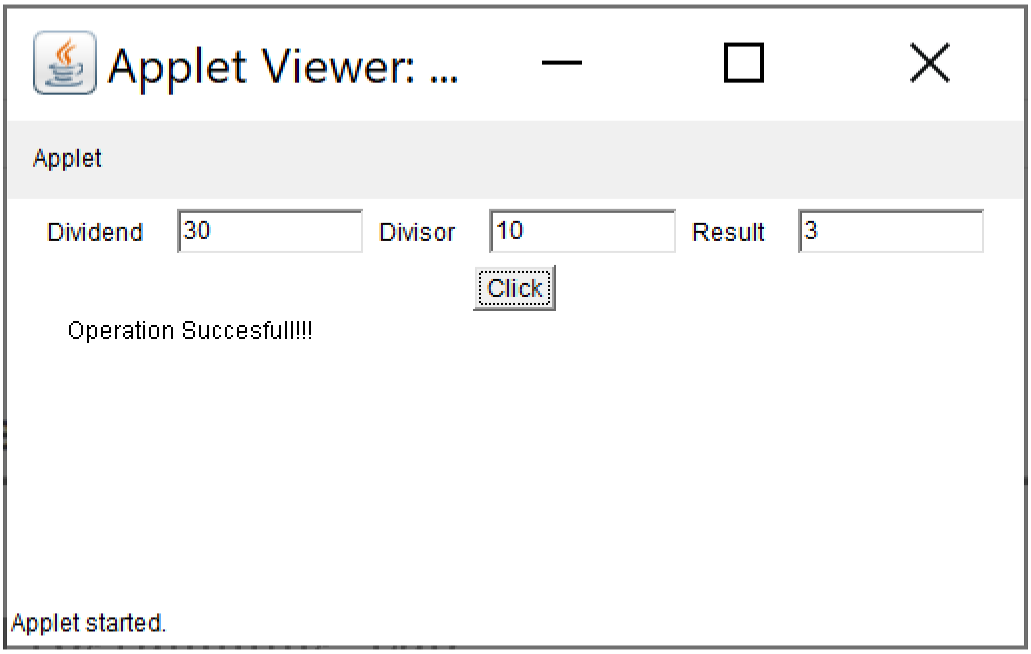
Applet started.



Dividend 30 Divisor 0 Result

Can't be divided by Zero

Applet started.



Dividend 30 Divisor 10 Result 3

Operation Succesfull!!!

Applet started.

Viva Questions:

1. What is Exceptionhandling?
2. What is the difference between Exception and Error?
3. what is interface?
4. types of exceptions in Java?
5. Write the Syntax for Try … Catch

Week 5:

Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

ALGORITHMS:

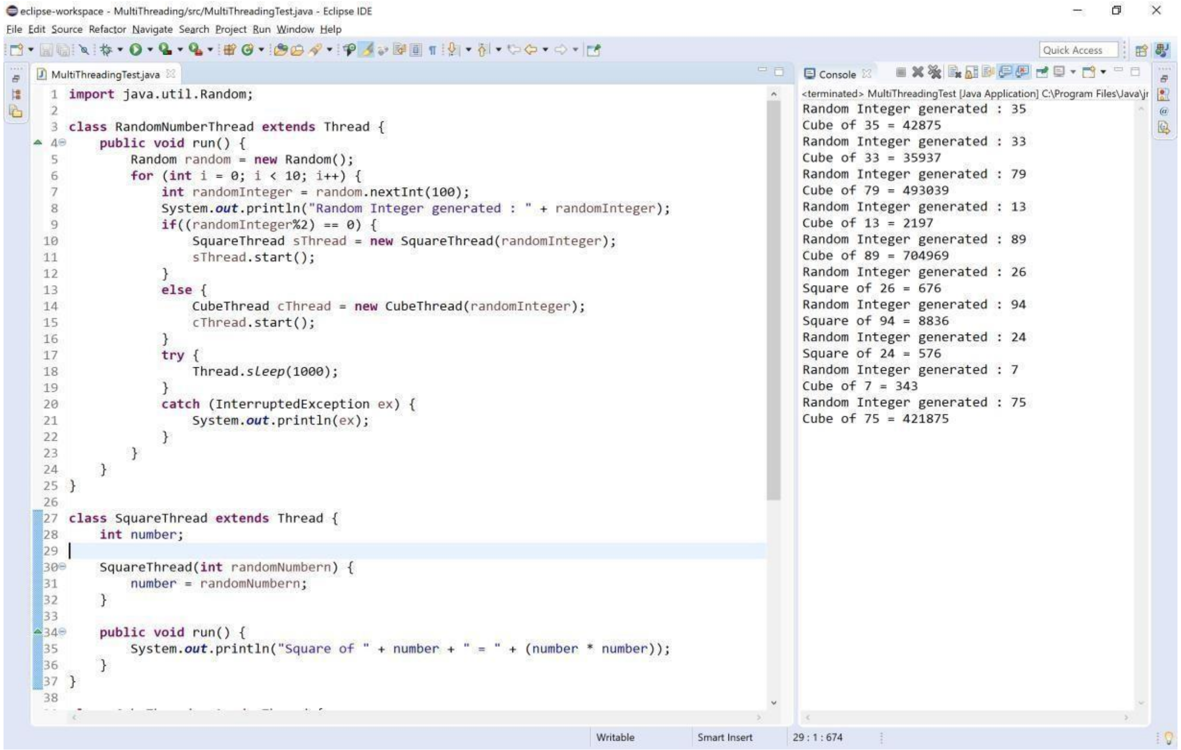
1Create a thread class by implementing the Runnable
interface.
2.Start the thread in the constructor.
3.implement the run() method.
4.create multiple threads in the main()
5.Display the threads

Source code:

```
import java.util.Random;

class RandomNumberThread extends Thread {
    public void run() {
        Random random = new Random();
        for (int i = 0; i < 10; i++) {
            int randomInteger = random.nextInt(100);
            System.out.println("Random Integer generated : " +
            randomInteger);if((randomInteger%2) == 0) {
                SquareThread sThread = new
                SquareThread(randomInteger);sThread.start();
            }
            else
            {   CubeThread cThread = new
                CubeThread(randomInteger);cThread.start();

            }
            try
            {   Thread.sleep(1000);

            }
```

```
                    catch (InterruptedException
                        ex) {
                        System.out.println(ex)
                        ;
                    }
                }
            }
        }
        class SquareThread extends Thread {
            int number;
            SquareThread(int
                randomNumbern)  {number
                = randomNumbern;
            }

            public void run() {
                System.out.println("Square of " + number + " = " + (number *
                number));
            }
        }
        class CubeThread extends Thread {
            int number;

            CubeThread(int
                randomNumber) {
                number =
                randomNumber;
            }

            public void run() {
                System.out.println("Cube of " + number + " = " + number * number
                *
       number);
            }

            }
        public class MultiThreadingTest {
            public static void main(String args[]) {
                RandomNumberThread rnThread = new RandomNumberThread();
                rnThread.start();
            }
        }
```

Output:



eclipse-workspace - MultiThreading/src/MultiThreadingTest.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
MultiThreadingTest.java
Console

```java
import java.util.Random;

class RandomNumberThread extends Thread {
    public void run() {
        Random random = new Random();
        for (int i = 0; i < 10; i++) {
            int randomInteger = random.nextInt(100);
            System.out.println("Random Integer generated : " + randomInteger);
            if((randomInteger%2) == 0) {
                SquareThread sThread = new SquareThread(randomInteger);
                sThread.start();
            }
            else {
                CubeThread cThread = new CubeThread(randomInteger);
                cThread.start();
            }
            try {
                Thread.sleep(1000);
            }
            catch (InterruptedException ex) {
                System.out.println(ex);
            }
        }
    }
}

class SquareThread extends Thread {
    int number;

    SquareThread(int randomNumbern) {
        number = randomNumbern;
    }

    public void run() {
        System.out.println("Square of " + number + " = " + (number * number));
    }
}

```

```
<terminated> MultiThreadingTest [Java Application] C:\Program Files\Java\jr
Random Integer generated : 35
Cube of 35 = 42875
Random Integer generated : 33
Cube of 33 = 35937
Random Integer generated : 79
Cube of 79 = 493039
Random Integer generated : 13
Cube of 13 = 2197
Random Integer generated : 89
Cube of 89 = 704969
Random Integer generated : 26
Square of 26 = 676
Random Integer generated : 94
Square of 94 = 8836
Random Integer generated : 24
Square of 24 = 576
Random Integer generated : 7
Cube of 7 = 343
Random Integer generated : 75
Cube of 75 = 421875
```

Viva Questions:

1. What is thread?
2. Define Random value with ex
3. Is it possible to start a thread twice?
4. When should we interrupt a thread?
5. What is Daemon Thread?

Week 6:

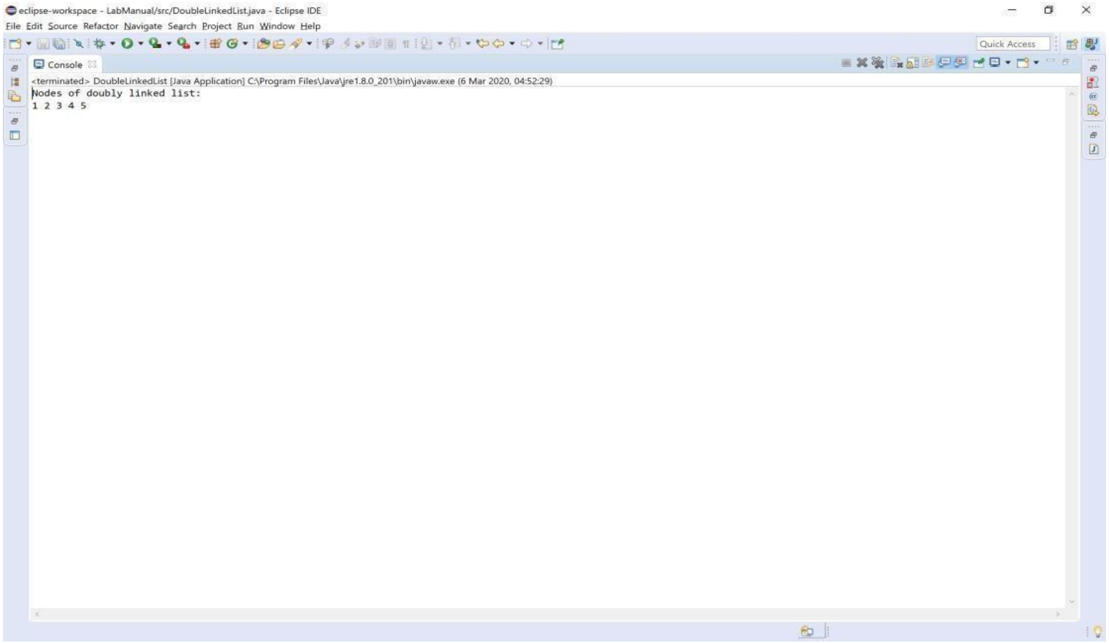
Write a Java program for the following: Create a doubly linked list of elements. Delete a given element from the above list.Display the contents of the list after deletion.

Source code:

```
public class DoubleLinkedList {
	class Node {
		int  data;
		Node previous;
		Node next;
		 public Node(int data) {
			this.data = data;
		}
	}

	Node head, tail = null;

	public void addNode(int data) {
		Node newNode = new Node(data);

		if (head == null) {
			head = tail = newNode;
			head.previous = null;
			tail.next = null;
		} else {
			tail.next = newNode;
			newNode.previous = tail;
			tail = newNode;
			tail.next = null;
		}
	}

	public void display() {
		Node current = head;
		if (head == null) {
			System.out.println("List is empty");

			return;
		}
		System.out.println("Nodes of doubly linked list: ");
		while (current != null) {

			System.out.print(current.data + "  ");
			current = current.next;
		}
	}

	public static void main(String[] args) {

		DoubleLinkedList dList = new DoubleLinkedList();
		dList.addNode(1);
		dList.addNode(2);
		dList.addNode(3);
		dList.addNode(4);
		dList.addNode(5);
```

```
        dList.display();
        }
}
```

Output:



eclipse-workspace - LabManual/src/DoubleLinkedList.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Console

```
<terminated> DoubleLinkedList [Java Application] C:\Program Files\Java\jre1.8.0_201\bin\javaw.exe (6 Mar 2020, 04:52:29)
Nodes of doubly linked list:
1 2 3 4 5
```

Week 7:

Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.

ALGORITHMS:

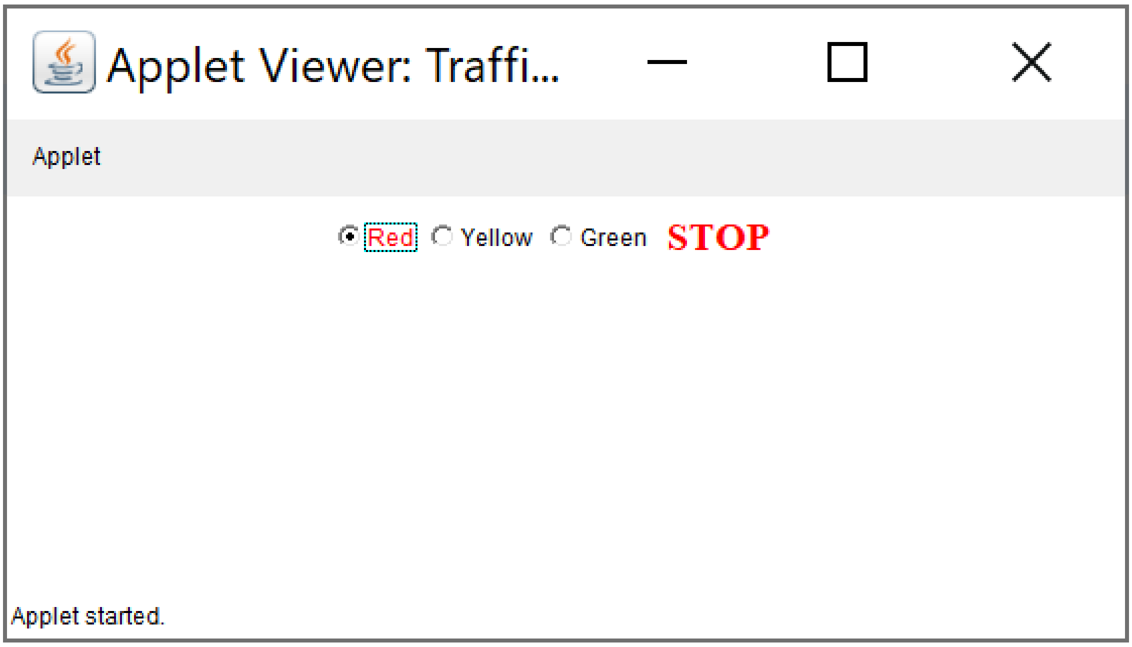
1. create an applet from extending Applet class.
2. Draw a line using drawLine()method.
3.Draw rectangle using drawRec() method.
4.Draw an ovel using drawOvel()method.
5.Include all these methods in the paint()method.
6.Display the line.rectangle and ovel.

Source code:

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

   //<applet code = "TrafficLights" width = 1000 height = 500></applet>

public class TrafficLights extends Applet implements ItemListener{

        CheckboxGroup grp = new CheckboxGroup();
        Checkbox redLight, yellowLight, greenLight;
        Label msg;

        public void init()
        {
                redLight = new Checkbox("Red", grp, false);
                yellowLight = new Checkbox("Yellow", grp, false);
                greenLight = new Checkbox("Green", grp, false);
                msg = new Label("                              ");

                redLight.addItemListener(this);
                yellowLight.addItemListener(this);
                greenLight.addItemListener(this);

                add(redLight);
                add(yellowLight);
                add(greenLight);
                add(msg);
                msg.setFont(new Font("Serif", Font.BOLD, 20));
        }
        public void itemStateChanged(ItemEvent ie)
        {
                redLight.setForeground(Color.BLACK);
                yellowLight.setForeground(Color.BLACK);
                greenLight.setForeground(Color.BLACK);

                if(redLight.getState() == true) {
                        redLight.setForeground(Color.RED);
                        msg.setForeground(Color.RED);
                        msg.setText("STOP");
                }
```

```
            else if(yellowLight.getState() == true)
            {
                yellowLight.setForeground(Color.YELLOW);
                msg.setForeground(Color.YELLOW);
                msg.setText("READY");
            }
            else
            {

               greenLight.setForeground(Color.GREEN);
                msg.setForeground(Color.GREEN);
                msg.setText("GO");

             }

         }

    }
```

Output:



Applet started.

Viva Questions

1. what is Awt?
2. what is java eventhandling?
3. how to do awt Button Class declaration?
4. what is java Awt Textfield?
5. write the syntax for serFont()

WEEK 8:

Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

Source code:

```
import java.util.*;

abstract class Shape
{
        int length, breadth, radius;

        Scanner input = new Scanner(System.in);

        abstract void printArea();

}

class Rectangle extends Shape {
         void printArea()
          {
                System.out.println("*** Finding the Area of Rectangle ***");
                System.out.print("Enter length and breadth: ");
                length = input.nextInt();
                breadth = input.nextInt();
                System.out.println("The area of Rectangle is: " + length * breadth);
        }
}

class Triangle extends Shape {
        void printArea() {
                System.out.println("\n*** Finding the Area of Triangle ***");
                System.out.print("Enter Base And Height: ");
                length = input.nextInt();
                breadth = input.nextInt();
                System.out.println("The area of Triangle is: " + (length * breadth)/2);
        }
}
class Cricle extends Shape {
        void printArea() {
                System.out.println("\n*** Finding the Area of Cricle ***");
                System.out.print("Enter Radius: ");
                radius = input.nextInt();
                System.out.println("The area of Cricle is: " + 3.14f * radius * radius);
        }
}
public class AbstractClass {
        public static void main(String[] args) {
                Rectangle rec = new Rectangle();
                rec.printArea();

                Triangle tri = new Triangle();
                tri.printArea();

                Cricle cri = new Cricle();
                cri.printArea();
        }
}
```

Output:

```
C:\Users\sriindu\Desktop\sasi>javac AbstractClass.java

C:\Users\sriindu\Desktop\sasi>java AbstractClass

        *** Finding the Area of Rectangle ***
        Enter length and breadth: 2 3
        The area of Rectangle is: 6

        *** Finding the Area of Triangle ***
        Enter Base And Height: 3 3
        The area of Triangle is: 4

        *** Finding the Area of Cricle ***
        Enter Radius: 3
        The area of Cricle is: 28.26

C:\Users\sriindu\Desktop\sasi>
```

Viva Questions:

1. What is Abstract Class?
2. Write the syntax for Print Area().
3. What is the use of Scanner option
4. Write the syntax for Scanner

WEEK 9:

9). Suppose that a table named Table.txt is stored in a text file. The first line in the file header and the remaining lines correspond to row in the table. The elements are separatedby commas. Write a Java program to display the table using labels in grid layout.

Program:-

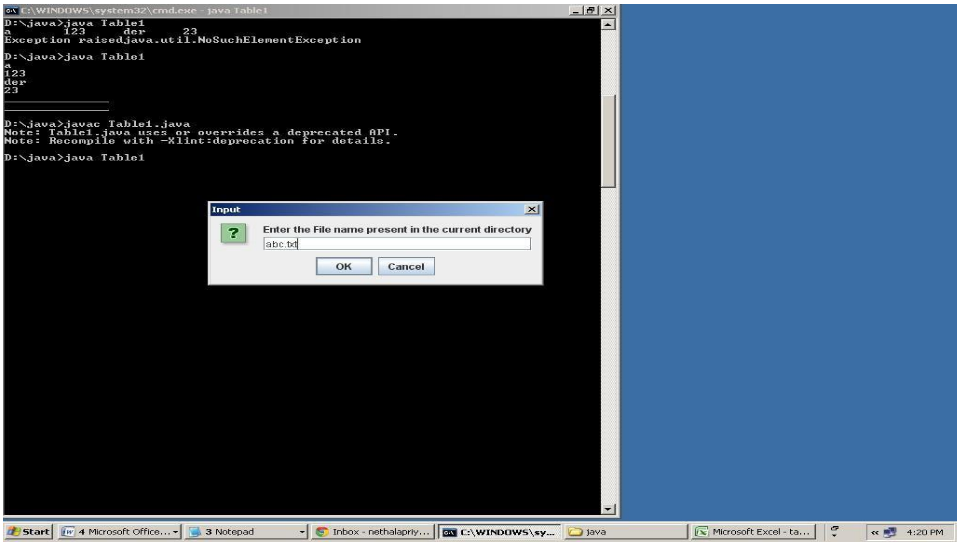
```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import java.util.*;
import java.io.*;
public class Table1 extends JFrame

{

        int i=0;

        int j=0,k=0;

        Object data[][]=new Object[5][4];

        Object list[][]=new Object[5][4];

        JButton save;

        JTable table1;

        FileInputStream fis;

        DataInputStream dis;

        public Table1()

        {

                String d= " ";

                Container con=getContentPane();

                con.setLayout(new  BorderLayout());

                final String[] colHeads={"Name","Roll Number","Department","Percentage"};

                try

                {

                  String s=JOptionPane.showInputDialog("Enter the File name present in the current
                  directory");FileInputStream fis=new FileInputStream(s);
                  DataInputStream dis = new DataInputStream(fis);
                  while ((d=dis.readLine())!=null)
                  {
                        StringTokenizer st1=new StringTokenizer(d,",");
                        while (st1.hasMoreTokens())
                           {
                           for (j=0;j<4;j++)
                           {
```

```
                                        data[i][j]=st1.nextToken();
                                        System.out.println(data[i][j]);
                                   }
                                   i++;
                                 }
                                 System.out.println ("__");
                           }
                  } catch (Exception e)
                    {
                         System.out.println ("Exception raised" +e.toString());
                    }
                    table1=new JTable(data,colHeads);
                    int   v=ScrollPaneConstants.VERTICAL_SCROLLBAR_AS_NEEDED;
                    int h=ScrollPaneConstants.HORIZONTAL_SCROLLBAR_AS_NEEDED;
                    JScrollPane scroll=new JScrollPane(table1,v,h);
                    con.add(scroll,BorderLayout.CENTER);
              }
        public static void main(String args[])
          {

                  Table1 t=new Table1();

                  t.setBackground(Color.green);

                  t.setTitle("Display Data");

                  t.setSize(500,300);

                  t.setVisible(true);

                  t.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        }
}
```

Abc.txt:-

```
a,123,der,23b,456,frg,45
```

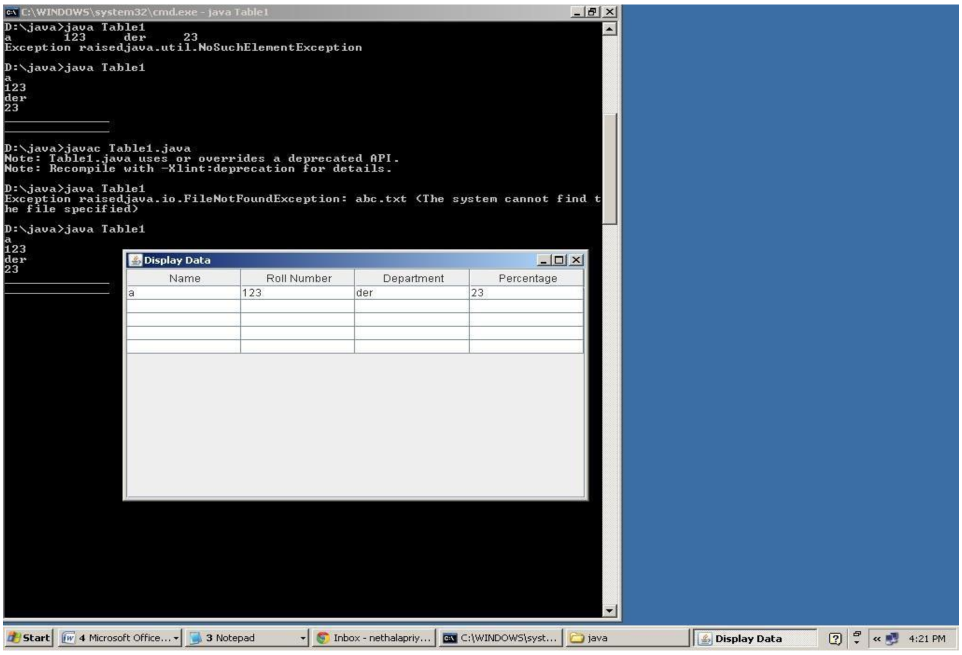
Output:-



```
D:\java>java Table1
a        123      der      23
Exception raisedjava.util.NoSuchElementException

D:\java>java Table1
a
123
der
23
______________
______________

D:\java>javac Table1.java
Note: Table1.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

D:\java>java Table1
```

Enter the File name present in the current directory

abc.txt



```
D:\java>java Table1
a        123      der      23
Exception raisedjava.util.NoSuchElementException

D:\java>java Table1
a
123
der
23
______________
______________

D:\java>javac Table1.java
Note: Table1.java uses or overrides a deprecated API.
Note: Recompile with -Xlint:deprecation for details.

D:\java>java Table1
Exception raisedjava.io.FileNotFoundException: abc.txt (The system cannot find t
he file specified)

D:\java>java Table1
a
123
der
23
______________
______________
```

Name	Roll Number	Department	Percentage
a	123	der	23

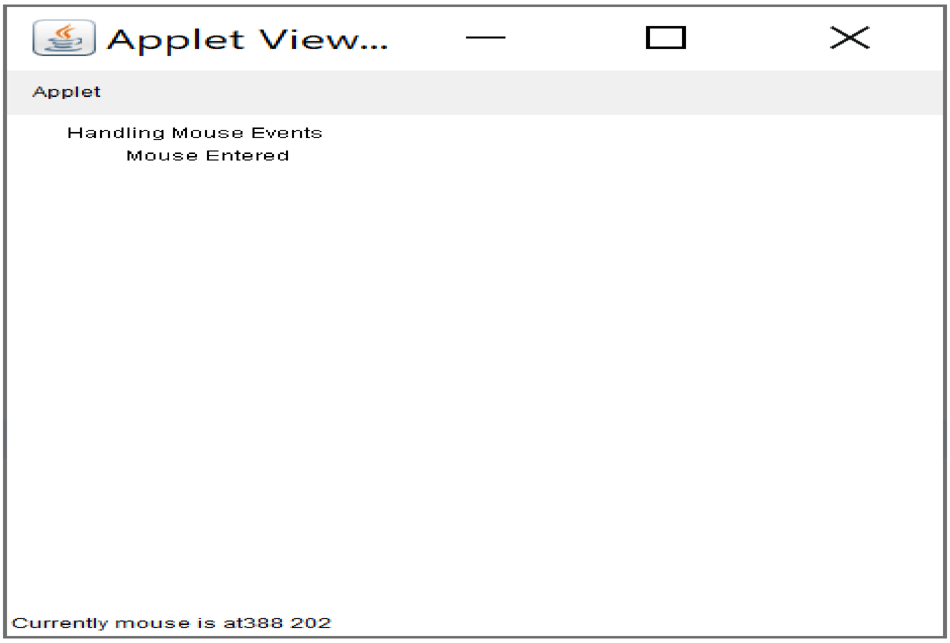
Week 10:

Write a Java program that handles all mouse events and shows the event name at the center of the windowwhen a mouse event is fired (Use Adapter classes).

Source code:

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

/*<applet code="MouseDemo" width=300 height=300> </applet>*/

public class MouseDemo extends Applet implements MouseListener, MouseMotionListener
{
        int mx = 0;
        int my = 0;
        String msg = "";

        public void init()
         {
                addMouseListener(this);
                addMouseMotionListener(this);
        }

        public void mouseClicked(MouseEvent me)
         {
                mx = 20;
                my = 40;
                msg = "Mouse Clicked";
                repaint();
        }

        public void mousePressed(MouseEvent me) {
                mx = 30;
                my = 60;
                msg = "Mouse Pressed";
                repaint();
        }

        public void mouseReleased(MouseEvent me) {
                mx = 30;
                my = 60;
                msg = "Mouse Released";
                repaint();
        }

        public void mouseEntered(MouseEvent me) {
                mx = 40;
                my = 80;
                msg = "Mouse Entered";
                repaint();
        }
        public void mouseExited(MouseEvent me) {
                mx = 40;
                my = 80;
                msg = "Mouse Exited";
                repaint();
        }

        public void mouseDragged(MouseEvent me)
                {mx = me.getX();
                my = me.getY();
                showStatus("Currently mouse dragged" + mx + " " + my);
                repaint();
        }

        public void mouseMoved(MouseEvent me)
                {mx = me.getX();
                my = me.getY();
                showStatus("Currently mouse is at" + mx + " " + my);
                repaint();
        }

        public void paint(Graphics g) { g.drawString("Handling
                Mouse Events", 30, 20);
                g.drawString(msg, 60, 40);
        }
}
```

Output:



```
Handling Mouse Events
        Mouse Entered
```

```
Currently mouse is at388 202
```

Week 11:

Write a java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t).it takes a name or phone number as input and prints the corresponding other value from the hash table(hint: use hash tables)

Source code:

```java
import java.io.BufferedReader;
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileReader;
import java.io.IOException;
import java.util.Hashtable;
import java.util.Iterator;
import java.util.Set;

public class HashTab {
	public static void main(String[] args) {
		HashTab prog11 = new HashTab();
		Hashtable<String, String> hashData = prog11.readFromFile("HashTab.txt");
		System.out.println("File data into Hashtable:\n" + hashData);
		prog11.printTheData(hashData, "raja");
		prog11.printTheData(hashData, "123");
		prog11.printTheData(hashData, "----");
	}

	private void printTheData(Hashtable<String, String> hashData, String input) {
		String output = null;
		if (hashData != null)
		{
			Set<String> keys = hashData.keySet();
			if (keys.contains(input))
			{
				output = hashData.get(input);
			}
			else
			{
				Iterator<String> iterator = keys.iterator();
				while (iterator.hasNext())
				{
					String key = iterator.next();
					String value = hashData.get(key);
					if (value.equals(input))
					{
						output = key;
						break;
					}
				}
			}
		}

		System.out.println("Input given:" + input);
		if (output != null)
		{
			System.out.println("Data found in HashTable:" + output);
		} else {
			System.out.println("Data not found in HashTable");
		}
	}
```

```
       private Hashtable<String, String> readFromFile(String fileName)
       {
             Hashtable<String, String> hashData = new Hashtable<String, String>();
             try
             {
                  File f = new File("C:\\Users\\sriindu\\Desktop\\sasi\\" + fileName);
                    BufferedReader br = new BufferedReader(new FileReader(f));
                    String line = null;
                    while ((line = br.readLine()) != null)
                    {
                           String[] details = line.split("\t");
                           hashData.put(details[0], details[1]);
                    }
             }

             catch (FileNotFoundException e)
             {
                    e.printStackTrace();
             }
             catch (IOException e)
             {
                    e.printStackTrace();
             }
             return hashData;
       }
}
```

HashTab.txt

```
  raja     123
  rani     456
  anu      789
```

Output:

```
C:\Users\sriindu\Desktop\sasi>javac HashTab.java

C:\Users\sriindu\Desktop\sasi>java HashTab

File data into Hashtable:
{anu=789, rani=456, raja=123}
Input given : raja
Data found in HashTable : 123
Input given : 123
Data found in HashTable : raja
Input given:
Data not found in HashTable
```

Week – 12

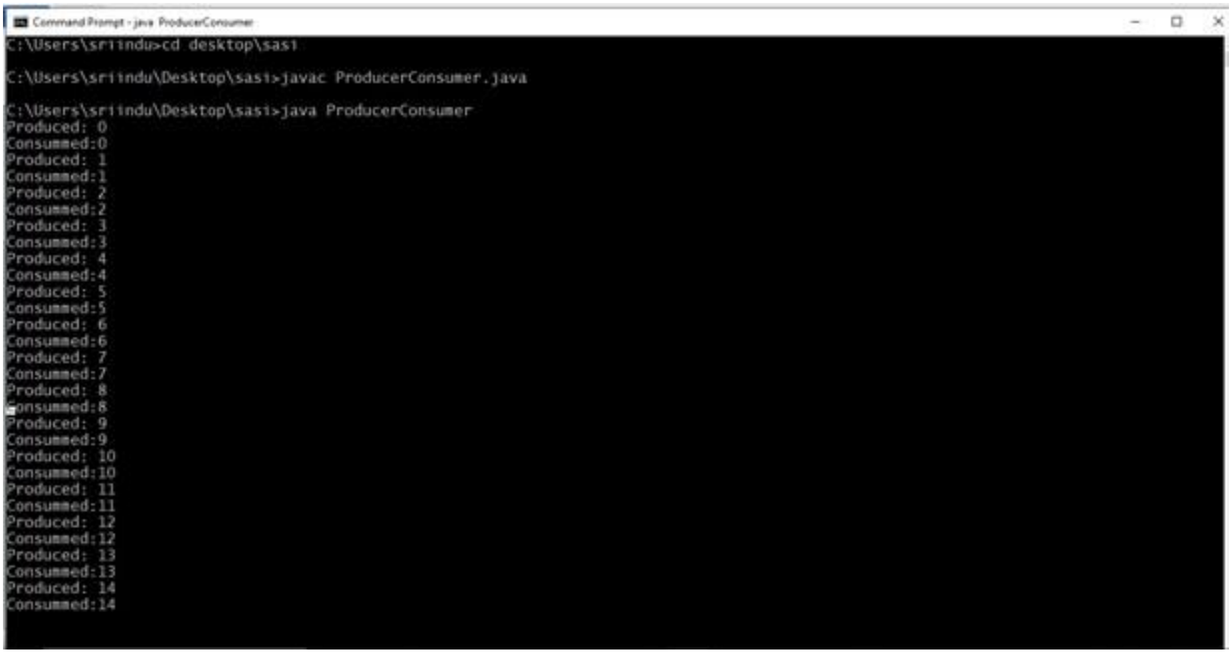
Write a Java program that correctly implements the producer – consumer problem using the concept of interthread communication.

Source Code:

```
class ItemQueue {
    int item;
    boolean valueSet = false;

    synchronized int getItem()

    {
        while (!valueSet)
            try
            {
                wait();
            }
            catch (InterruptedException e)
            {
                System.out.println("InterruptedException caught");
            }
          System.out.println("Consummed:" + item);
          valueSet = false;
          try
          {
            Thread.sleep(1000);
          }
          catch (InterruptedException e)
          {
               System.out.println("InterruptedException caught");
          }
          notify();
          return item;
    }
    synchronized void putItem(int item)
    {
        while (valueSet)
            try
            {
                wait();
            }
            catch (InterruptedException e)
            {
                System.out.println("InterruptedException caught");
            }
            this.item = item;
            valueSet = true;
            System.out.println("Produced: " + item);
            try
            {
                 Thread.sleep(1000);
            }
            catch (InterruptedException e)
            {
                  System.out.println("InterruptedException caught");
            }
        notify();
    }
}
```

```java
class Producer implements Runnable
{
    ItemQueue itemQueue;
    Producer(ItemQueue itemQueue)
    {
        this.itemQueue = itemQueue;
        new Thread(this, "Producer").start();
    }
    public void run()
    {
        int i = 0;
        while(true)
        {
            itemQueue.putItem(i++);
        }
    }
}

class Consumer implements Runnable
{
    ItemQueue itemQueue;
    Consumer(ItemQueue itemQueue)
    {
        this.itemQueue = itemQueue;
        new Thread(this, "Consumer").start();
    }
    public void run()
    {
        while(true)
        {
            itemQueue.getItem();
        }
    }
}

class ProducerConsumer
{
    public static void main(String args[])
    {
        ItemQueue itemQueue = new ItemQueue();
        new Producer(itemQueue);
        new Consumer(itemQueue);

    }
}
```

Output:



```
C:\Users\sriindu>cd desktop\sasi

C:\Users\sriindu\Desktop\sasi>javac ProducerConsumer.java

C:\Users\sriindu\Desktop\sasi>java ProducerConsumer
Produced: 0
Consummed:0
Produced: 1
Consummed:1
Produced: 2
Consummed:2
Produced: 3
Consummed:3
Produced: 4
Consummed:4
Produced: 5
Consummed:5
Produced: 6
Consummed:6
Produced: 7
Consummed:7
Produced: 8
Consummed:8
Produced: 9
Consummed:9
Produced: 10
Consummed:10
Produced: 11
Consummed:11
Produced: 12
Consummed:12
Produced: 13
Consummed:13
Produced: 14
Consummed:14
```

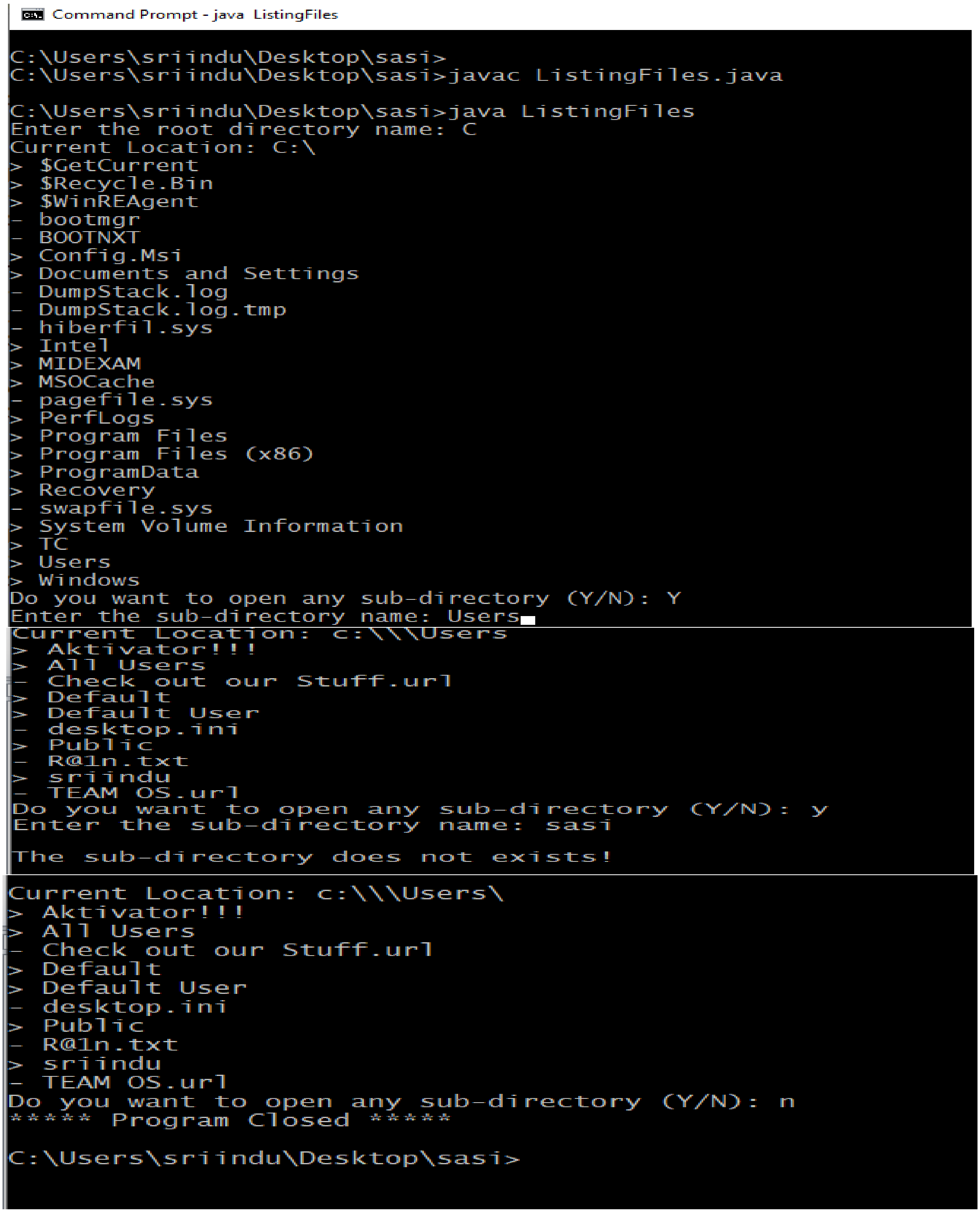
Week – 13

Write a Java program to list all the files in a directory including the files present in all its subdirectories.

Source Code:

```
import java.util.Scanner;
import java.io.*;

public class ListingFiles
{
       public static void main(String[] args)
       {

             String path = null;
             Scanner read = new Scanner(System.in);
             System.out.print("Enter the root directory name: ");
             path = read.next() + ":\\";
             File f_ref = new File(path);
             if (!f_ref.exists())
             {
                    printLine();
                    System.out.println("Root directory does not exists!");
                    printLine();
             }
             else
             {
                  String ch = "y";
                    while (ch.equalsIgnoreCase("y"))
                    {
                  printFiles(path);
                  System.out.print("Do you want to open any sub-directory (Y/N):  ");

                  ch = read.next().toLowerCase();
                  if (ch.equalsIgnoreCase("y"))
                  {
                  System.out.print("Enter the sub-directory name: ");
                  path = path + "\\\\" + read.next();
                  File f_ref_2 = new File(path);
                  if (!f_ref_2.exists())
                  {
                         printLine();
                         System.out.println("The sub-directory does not exists!");
                         printLine();
                         int lastIndex = path.lastIndexOf("\\");
                         path = path.substring(0, lastIndex);
                  }
                 }
                }
              }
             System.out.println("***** Program Closed *****");
       }

       public static void printFiles(String path)
       {
             System.out.println("Current Location: " + path);
             File f_ref = new File(path);
             File[] filesList = f_ref.listFiles();
             for (File file : filesList)
             {
                    if (file.isFile())
                           System.out.println("- " + file.getName());
                    else
                        System.out.println("> " + file.getName());
                }
            }


    public static void printLine()
    {
        System.out.println("            “);
    }
}
```

Output:



Command Prompt - java ListingFiles

```
C:\Users\sriindu\Desktop\sasi>
C:\Users\sriindu\Desktop\sasi>javac ListingFiles.java

C:\Users\sriindu\Desktop\sasi>java ListingFiles
Enter the root directory name: C
Current Location: C:\
> $GetCurrent
> $Recycle.Bin
> $WinREAgent
- bootmgr
- BOOTNXT
> Config.Msi
> Documents and Settings
- DumpStack.log
- DumpStack.log.tmp
- hiberfil.sys
> Intel
> MIDEXAM
> MSOCache
- pagefile.sys
> PerfLogs
> Program Files
> Program Files (x86)
> ProgramData
> Recovery
- swapfile.sys
> System Volume Information
> TC
> Users
> Windows
Do you want to open any sub-directory (Y/N): Y
Enter the sub-directory name: Users
Current Location: c:\\\Users
> Aktivator!!!
> All Users
- Check out our Stuff.url
> Default
> Default User
- desktop.ini
> Public
- R@1n.txt
> sriindu
- TEAM OS.url
Do you want to open any sub-directory (Y/N): y
Enter the sub-directory name: sasi

The sub-directory does not exists!

Current Location: c:\\\Users\
> Aktivator!!!
> All Users
- Check out our Stuff.url
> Default
> Default User
- desktop.ini
> Public
- R@1n.txt
> sriindu
- TEAM OS.url
Do you want to open any sub-directory (Y/N): n
***** Program Closed *****

C:\Users\sriindu\Desktop\sasi>
```

Week 14

Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending Order.

Source Code:

```
public class QuickSortOnStrings
{
String names[];
int length;

public static void main(String[] args)
{
  QuickSortOnStrings obj = new QuickSortOnStrings();
  String stringsList[] = {"Sasi", "Priya", "Abi", "Savitha", "Hema", "Iniya", "Viji"};
  obj.sort(stringsList);

        for (String i : stringsList)
        {
        System.out.print(i);
        System.out.print(" ");
        }
    }

    void sort(String array[])
    {
        if (array == null || array.length == 0)
        {
            return;
        }
        this.names = array;
        this.length = array.length;
        quickSort(0, length - 1);
    }

    void quickSort(int lowerIndex, int higherIndex)
    {
        int i = lowerIndex;
        int j = higherIndex;
        String pivot = this.names[lowerIndex + (higherIndex - lowerIndex) / 2];

        while (i <= j)
        {
            while (this.names[i].compareToIgnoreCase(pivot) < 0)
            {
               i++;
            }

            while (this.names[j].compareToIgnoreCase(pivot) > 0)
            {
               j--;
            }

            if (i <= j)
            {
                exchangeNames(i, j);
                i++;
                j--;
            }
        }
        if (lowerIndex < j)
        {
                quickSort(lowerIndex, j);
        }

        if (i < higherIndex)
        {
                quickSort(i, higherIndex);
        }
    }

    void exchangeNames(int i, int j)
    {
        String temp = this.names[i];
        this.names[i] = this.names[j];
        this.names[j] = temp;
    }
}
```

Output:

```
C:\Users\sriindu\Desktop\sasi>javac QuickSortOnStrings.java

C:\Users\sriindu\Desktop\sasi>java QuickSortOnStrings

        Abi Hema Iniya Priya Sasi Savitha Viji
```

Week 15:

Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

Source Code:

```java
import java.util.Scanner;
public class BubbleSort
{

    public static void main(String[] args)
    {
        Scanner read = new Scanner(System.in);
        int size, count = 0;
        System.out.print("Enter the list size: ");
        size = read.nextInt();

        int list[] = new int[size];
        System.out.println("Enter any " + size + " integer numbers: ");
        for(int i = 0; i < size; i++)
            list[i] = read.nextInt();

        // Bubble sort logic
        int temp=0;
        for(int i=0;i<size-1;i++)
        {
            for(int j=0;j<size-i-1;j++)
            {
                if(list[j]<list[j+1])
                { temp=list[j];
                    list[j]=list[j+1];
                    list[j+1]=temp;
                    count++;
                }
            }
        }

        // Displaying sorted list
        System.out.println("List of sorted elements: ");
        for(int x:list)
        {
            System.out.print(x + "    ");
        }
        System.out.println("\nTotal number of Interchanges is " + count);
    }
}
```

Output:

```
C:\Users\sriindu\Desktop\sasi>javac BubbleSort.java

C:\Users\sriindu\Desktop\sasi>java BubbleSort
        Enter the list size: 5
        Enter any 5 integer numbers:
        3
        5
        1
        4
        2

        5      4      3      2      1

        Total number of Interchanges is 4
```