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| **PIRENS Institute of Business Management and Administration, Loni BK.** |
| **Roll Number: MC022063 Date: / / Sign:** |
| **Student Name: Nirhali Shubham Rajesh** |
| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title: Q1. Installation of jdk environment & following utilities. What is javac , javap andJavadoc.** |

# Q1. Installation of jdk environment & following utilities. What is javac , javap and javadoc.

The Java Development Kit (JDK) is helpful to write programs in Java. It is also known as the [Java Platform Standard Edition (Java SE).](https://www.educba.com/what-is-java-se/) JDK is an open-source software provided by Sun Microsystems, [now taken over by Oracle,](https://www.educba.com/career-in-oracle/) for anyone to use freely for programming

Do many people have the question, JDK or JRE? So let us look at what each is used for. Java Runtime Environment (JRE) is required for running programs of Java, whereas JDK is required for writing and running the programs. JDK is a development kit containing JRE and the development tools (debugger and compiler) needed for getting a program output in Java. Simply put, JRE happens to be a subset of JDK; that is, it is included in JDK. Therefore, we will need to install JDK to write and run programs.

# Installation Prerequisites of JDK

JDK has bare minimum requirements for disk space and RAM for the 64-bit Windows platform. It requires around 800 MB disk space to install JDK, as JRE also gets installed along with it. JDK requires 128 MB of memory space to run JDK successfully. This is the minimum RAM required for running basic and small programs, but as the size of an application increases, the memory requirement also increases for the application to run smoothly.

# Step by Step Installation Of JDK

Before installing the latest JDK version, it is recommended to check our systems for any old JDK versions and uninstall them. Though we can have more than one JDK, it is easier to set paths and to work with just the latest one.

## Step 1: Download JDK from the Site

* Go to the Oracle site and open the Java SE download page. Under the latest version of Java Platform, Standard Edition, click on the JDK download button.

Next, click on the Accept License Agreement button and choose your version of Java for Windows (32-bit or 64-bit) to proceed with downloading the JDK executable file.

## Step 2: Install the JDK exe File

* In this step, we will be running the executable JDK file (It will be a file with .exe as an extension) once the download is done. This installs JDK as well as JRE. For running this file on Windows, we will need Administrator rights.
* To begin the installation, we need to double-click on the downloaded file, and we will be presented with the below window.
* Click on Next to proceed with the installation.
* Click on the Close button once the installation has finished.
* To recover some of our system’s disk space, it is good practice to delete the downloaded exefile once the download has been done.

## Step 3: Check the Directory

* JDK gets installed in the C directory of our system by default having the path “C:\Program Files\Java\jdk-11.0”. If we make any change to this path at all, we need to make a note of itas it will be required in the upcoming steps.
* This is the directory structure for our example.

## Step 4: Update the Environment Variables

* We will need to update our system’s Environment variables with our installed JDK bin path to run the Java programs because while executing the programs, the command promptwill look for the complete JDK bin path.
* The PATH variable in our system provides the exact location of executables that will beused for running Java programs, such as javac and java. The CLASSPATH variable provides us with the library files location.
* If we do not set the PATH variable, we will specify the full path to the JDK bin every timewe run a program.

**For example:** C:\> “C:\Program Files\Java\jdk-11.0\bin\javac” TestClass.java

* So to set these variables, first right-click on My PC and select Properties.
* Inside Properties, in the left-side panel, select Advanced System Settings, and here choosethe option Environment Variables.
* Click on New, and type PATH in the Variable Name, and enter the path of the bin of installed JDK in the Variable Value field.
* If we already have the PATH variable, we can edit it by adding it to the existing values.
* Click on the OK button to apply the changes.

## Step 5: Verify the Java Installation

* Open the command prompt and enter the command “java –version”, and if it runs successfully, Java has been successfully installed.
* Now that we have seen the steps to install JDK, let the programming fun begin!

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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title: Q.2 Design an application by using array.** |

# Program:

public class ReverseArray

{

public static void main(String[] args) //Initialize array

{

int [] arr = new int [] {1, 2, 3, 4, 5}; System.out.println("Original array: "); for (int i = 0; i < arr.length; i++)

{

System.out.print(arr[i] + " ");

}

System.out.println(); System.out.println("Array in reverse order: ");

//Loop through the array in reverse order for (int i = arr.length-1; i >= 0; i--)

{

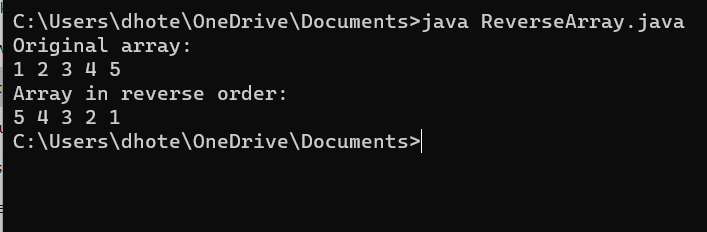
System.out.print(arr[i] + " ");

}

}

}

# Output:



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title: Q.3 Implementation of package, Interface and abstract class** |

**Implementation of Package Program:**

package pack1; public class Base

{

int i=1; // package scope private int j=2; protected int k=3; public int l=4;

void display()

{

System.out.println("Package scope i="+i); System.out.println("private j="+j); System.out.println("protected k="+k); System.out.println("public l="+l);

}

}

class BaseDemo

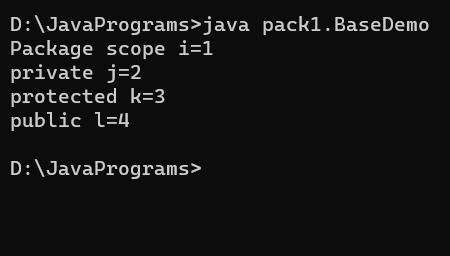
{ public static void main(String s[])

{

Base b=new Base(); b.display();

}

}

Output:

package pack1;

class Derived extends Base

{

public static void main(String s[])

{

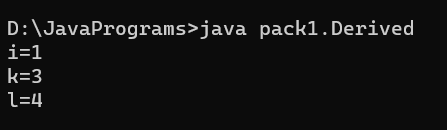
Base b=new Base(); System.out.println("i="+b.i);

//System.out.println("j="+b.j);// System.out.println("k="+b.k); System.out.println("l="+b.l);

}

}

Output:



package pack1; class Nonderived

{

public static void main(String s[])

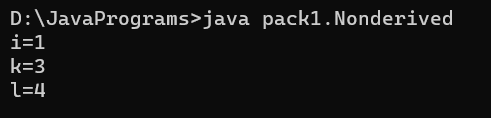
{

Base b=new Base(); System.out.println("i="+b.i);

//System.out.println("j="+b.j);// System.out.println("k="+b.k); System.out.println("l="+b.l);

}

}

Output:

# B.Implementing Interface Program:

interface Results

{

final static float pi = 3.14f; float areaOf(float l, float b);

}

class Rectangle implements Results

{

public float areaOf(float l, float b)

{

return (l \* b);

}

}

class Square implements Results

{

public float areaOf(float l, float b)

{

return (l \* l);

}

}

class Circle implements Results

{

public float areaOf(float r, float b)

{

return (pi \* r \* r);

}}

public class InterfaceDemo

{

public static void main(String args[])

{

Rectangle rect = new Rectangle(); Square square = new Square(); Circle circle = new Circle();

System.out.println("Area of Rectangle: "+rect.areaOf(20.3f, 28.7f)); System.out.println("Are of square: "+square.areaOf(10.0f, 10.0f)); System.out.println("Area of Circle: "+circle.areaOf(5.2f, 0));

}

}

# Output:

**C. Implements Abstract Program:**

interface A{ void a();

void b();

void c();

void d();

}

abstract class B implements A{

public void c(){System.out.println("I am c");}

}

class M extends B{

public void a(){System.out.println("I am a");} public void b(){System.out.println("I am b");} public void d(){System.out.println("I am d");}

}

class Test5{

public static void main(String args[]){ A a=new M();

a.a();

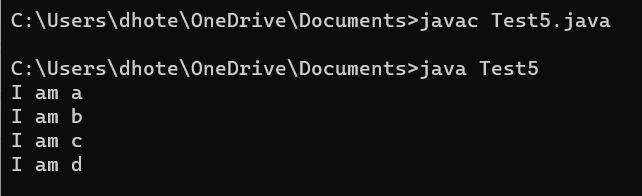
a.b();

a.c();

a.d();

}}

# Output:



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title: Q.4 Design application using String, StringBuilder, StringTokenizer** |

**Program :**

# Using String, String Builder:

import java.util.\*;

public class stringlength{

public static void main(String args[])

{

StringBuilder sb=new StringBuilder("jony");

//Insert a character at some Index sb.insert(2, 'o'); System.out.println(sb);

//Append means to add something the end sb.append("lever"); System.out.println(sb);

/\*Get Char sb.setCharAt(2, 'm'); \*/

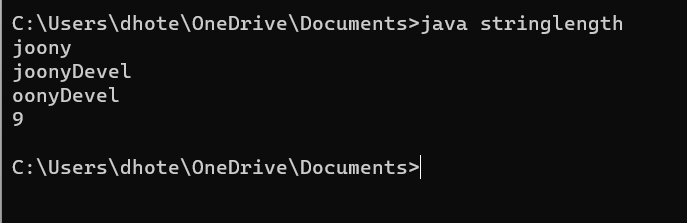
// delete char sb.delete(0,1); System.out.println(sb);

System.out.println(sb.length());

}

}

# Output:



1. **StringTokenizer**

import java.util.StringTokenizer; public class StringTokenizer1

{

/\* Driver Code \*/

public static void main(String args[])

{

/\* StringTokenizer object \*/

StringTokenizer st = new StringTokenizer("Demonstrating methods from StringTokenizer class"," ");

/\* Checks if the String has any more tokens \*/ while (st.hasMoreTokens())

{

System.out.println(st.nextToken());

}

}

}

**Output**

Demonstrating methods

from StringTokenizer class

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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.5 **Test any five of standard exception and user Defined Custom Exceptions injava.** |

**Program :**

# Java Standard exception program:

public Class {

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

{

int data=100/0;

}

catch(ArithmeticException e)

{

System.out.println("Arithmetic Exception "+e);

}

try

{

String s="abc";

int i=Integer.parseInt(s);

}

catch(NumberFormatException e1)

{

System.out.println("Number format exception.."+e1);

}

try

{

int a[]=new int[5]; a[10]=50;

}

catch(ArrayIndexOutOfBoundsException e2)

{

System.out.println("ArrayIndexOutOfBoundsException "+e2);

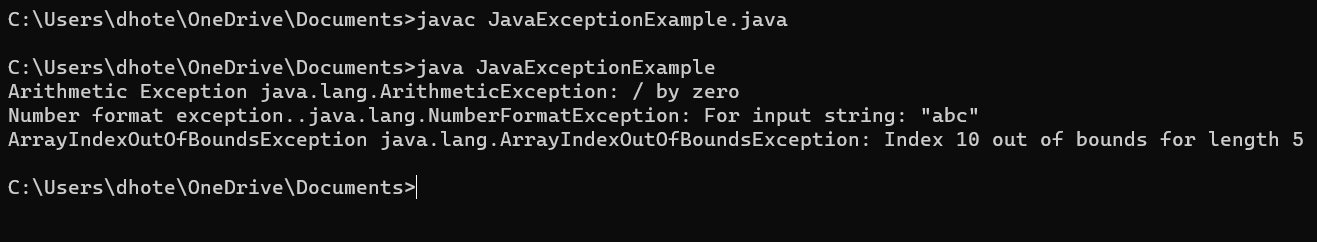
}

}

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

}

# Output:



**B )Custom Excetpion:**

class InvalidAgeException extends Exception

{

public InvalidAgeException (String str)

{

super(str);

}

}

public class TestCustomException1

{

static void validate (int age) throws InvalidAgeException{if(age < 18){

throw new InvalidAgeException("age is not valid to vote");

}

else {

System.out.println("welcome to vote");

}

}

public static void main(String args[])

{

try

{

validate(13);

}

catch (InvalidAgeException ex)

{

System.out.println("Caught the exception"); System.out.println("Exception occured: " + ex);

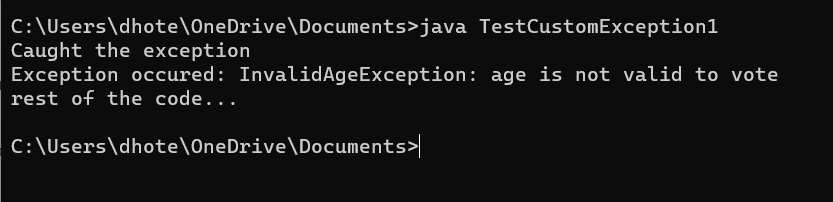
}

System.out.println("rest of the code...");

}

}

# Output :



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.**6 Thread creation and design application by using extending the thread class implementing the runnable interface. Application of multithreading in java.** |

**Program :**

# By Extending Thread Class:

class ExtendingThread extends Thread

{

String s[]={"Welcome","to","Java","Programming","Language"}; public static void main(String args[])

{

ExtendingThread t=new ExtendingThread("Extending Thread Class");

}

public ExtendingThread (String n)

{

super(n);

start();

}

public void run() {

String name=getName(); for(int i=0;i<s.length;i++)

{ try

{

sleep(500);

}

catch(Exception e)

{

}

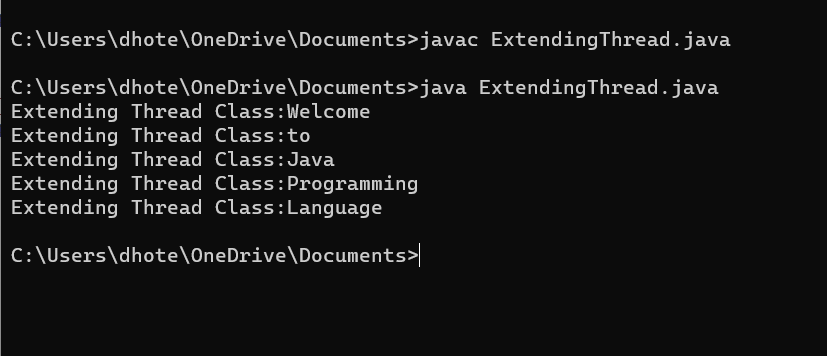
System.out.println(name+":"+s[i]);

# }

**}**

# }

**Output :**



# Implementing Thread class

public class MyThread2 implements Runnable

{

public void run()

{

System.out.println("Now the thread is running ...");

}

// main method

public static void main(String argvs[])

{

// creating an object of the class MyThread2 Runnable r1 = new MyThread2();

// creating an object of the class Thread using Thread(Runnable r, String name) Thread th1 = new Thread(r1, "My new thread");

// the start() method moves the thread to the active state th1.start();

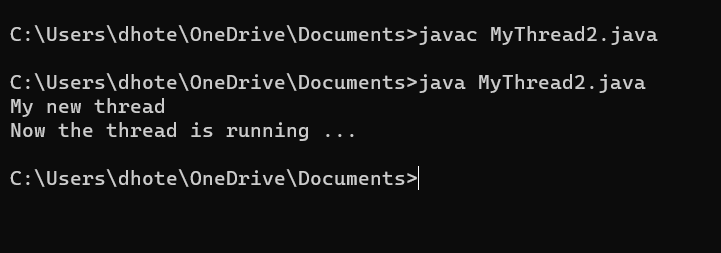
// getting the thread name by invoking the getName() method String str = th1.getName();

System.out.println(str);

}

}

Output :



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.**7 Design java application using Collection in java such as Array List, LinkList** |

# Program :

**Array List :**

import java.util.\*;

public class ArrayListExample{ public static void main(String args[]){ ArrayList<String> list=new ArrayList<String>();

list.add("Mango");

list.add("Apple");

list.add("Banana");

list.add("Grapes");

Iterator itr=list.iterator(); while(itr.hasNext())

{

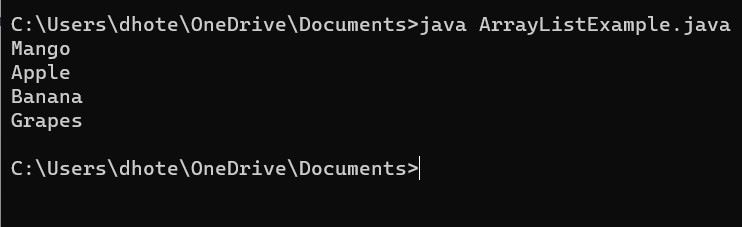
System.out.println(itr.next());

}

}

}

# Output :



**Linked List :**

import java.util.\*;

public class LinkedList1{

public static void main(String args[]){

LinkedList<String> al=new LinkedList<String>(); al.add("Ravi");

al.add("Vijay");

al.add("Ravi");

al.add("Ajay");

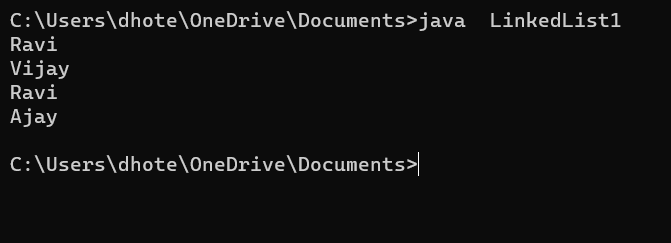
Iterator<String> itr=al.iterator(); while(itr.hasNext()){ System.out.println(itr.next());

}

}

}

Output:



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.**8 Design GUI based java application using AWT, Swing with Event Handling.** |

# Program :

import java.awt.\*;

public class AwtProgram1 { public AwtProgram1( )

{

Frame f = new Frame();

Button btn=new Button("Hello World"); btn.setBounds(80, 80, 100, 50); f.add(btn); //adding a new Button. f.setSize(300, 250); //setting size. f.setTitle("JavaTPoint"); //setting title.

f.setLayout(null); //set default layout for frame. f.setVisible(true); //set frame visibility true.

}

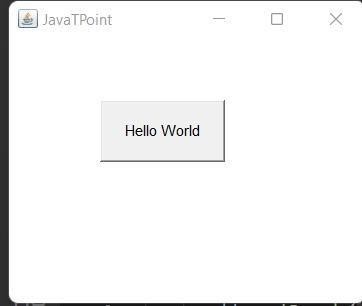
public static void main(String[] args) {

AwtProgram1 awt = new AwtProgram1(); //creating a frame.

}

}

# Output :



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.**9 Design a and implement JDBC applications.** |

**Program :**

import java.sql.\*;

public class FirstExample {

static final String DB\_URL = "jdbc:mysql://localhost/TUTORIALSPOINT"; static final String USER = "guest";

static final String PASS = "guest123";

static final String QUERY = "SELECT id, first, last, age FROM Employees";

public static void main(String[] args) {

// Open a connection

try{

System.out.println(“Connecting to database… \n”);

Connection conn = DriverManager.getConnection(DB\_URL, USER, PASS); System.out.println(“Creating Statement… \n”);

Statement stmt = conn.createStatement(); ResultSet rs = stmt.executeQuery(QUERY);) {

// Extract data from result set while (rs.next()) {

// Retrieve by column name System.out.print("ID: " + rs.getInt("id"));

System.out.print(", Age: " + rs.getInt("age")); System.out.print(", First: " + rs.getString("first")); System.out.println(", Last: " + rs.getString("last"));

}

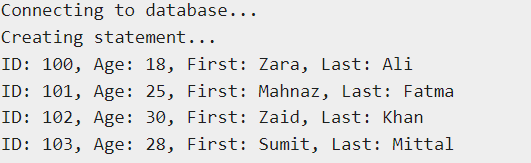
} catch (SQLException e) { e.printStackTrace();

}

}

}

# Output :



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.**10 Design and implement servlet applications.** |

**Program :**

// importing the javax.servlet package

// importing java.io package for PrintWriter import javax.servlet.\*;

import java.io.\*;

// now creating a servlet by implementing Servlet interface public class LifeCycleServlet implements Servlet {

ServletConfig config = null;

// init method

public void init(ServletConfig sc)

{

config = sc; System.out.println("in init");

}

// service method

public void service(ServletRequest req, ServletResponse res) throws ServletException, IOException

{

res.setContenttype("text/html"); PrintWriter pw = res.getWriter();

pw.println("<h2>hello from life cycle servlet</h2>"); System.out.println("in service");

}

// destroy method public void destroy()

{

System.out.println("in destroy");

}

public String getServletInfo()

{

return "LifeCycleServlet";

}

public ServletConfig getServletConfig()

{

return config; // getServletConfig

}

}

# HTML code :

<html>

<body>

<form action="LifeCycleServlet">

<input type="submit" value="invoke life cycle servlet">

</form>

</body>

</html>

# web.xml file code :

<?xml version="1.0" encoding="UTF=8"?>

<web-app>

<servlet>

<servlet-name>LifeCycleServlet</servlet-name>

<servlet-class>LifeCycleServlet</servlet-class>

</servlet>

<servlet-mapping>

<servlet-name>LifeCycleServlet</servlet-name>

<url-pattern>/LifeCycleServlet</url-pattern>

</servlet-mapping>

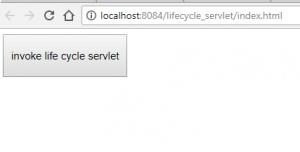
<session-config>

<session-timeout> 30

</session-config>

</web-app>

# Output :



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| **Subject Name: IT11 JAVA PROGRAMMING** |
| **Program Title**: Q.11 **Design and implement JSP applications** |

**Program :**

# date.jsp

<HTML>

<HEAD>

<TITLE>JSP Example</TITLE>

</HEAD>

<BODY BGCOLOR="ffffcc">

<CENTER>

<H2>Date and Time</H2>

<%

java.util.Date today = new java.util.Date(); out.println("Today's date is: "+today);

%>

</CENTER>

</BODY>

</HTML>

**Output :**

