

23CSE111

OBJECT ORIENTED PROGRAMMING

LAB MANUAL



**Department of Computer and Science Engineering Amrita
School of Engineering
Amrita Vishwa Vidyapeetham, Amaravati Campus**

NAME:- C.Umesh Chandra Reddy.

ROLL.NO:-av.sc.u4cse24037

VERIFIED BY:-

S.NO	Programs	DATE	PG.NO	SIGNATURE
WEEK-1		27-01-2025		
1.	Write the steps to download and install Java.		3	
2.	Write a java program to print the message "Welcome to java programming".		6	
3.	Write a java program that prints name, roll number and section of a student.		7	
WEEK-2		03-02-2025		
1.	Write a java program to calculate the area of a rectangle.			
2.a)	Write a program to convert temperature from Celsius to Fahrenheit .			
2.b)	Write a java program to convert temperature from Fahrenheit to Celsius.			
3.	Write a java program to calculate the simple interest.			
4.	Write a java program to find the largest of three numbers using ternary operator.			
5.	Write a java program to find the factorial of a number.			
WEEK-3		11-02-2025		
1.	Create a java program with following instructions a)create a class with name car b) Create 4 attributes name car color, car brand, fuel type, milage. c) Create 3 methods named start, stop, services d) Create 3 objects named car1, car2, car3.			

	e) Create a constructor which should print “welcome to car garage”			
2.	<p>Write a java program to create a class BackAccount with two methods deposit() and withdraw()</p> <p>b) In deposit() whenever an amount is deposited it has to be updated with current amount</p> <p>b) In withdraw() whenever an amount is withdrawn it has to be less than current amount else print “Insufficient funds”</p>			
WEEK-4		02-03-2025		
1.	Write a java program with class named “Book”. The class should contain various attributes such as “Title of the book , author , year of publication ”. It should also contain a constructor with parameters details of the book. i.e. “ Title of the book, author and year of publication”. Display the details of two books by creating two objects.			
2.	To create a java program with class named Myclass with a staticvariable “Count” of “int type”, Initialized to 0 and a constant variable “pi” of type double initialized to 3.1415 as attributes of that class Now, define a constructor for “Myclass” that increments the “Count” variable each that an object of Myclass is created. Finally , print the final values of “Count” and “pi”variables.			
WEEK-5		09-03-25		
1.	Create a calc using the operations including add, sub, mul, div using multilevel inheritance and display the desired output			

WEEK:-1

1. Write the steps to download and install Java.

Aim: To download and install java.

Procedure:

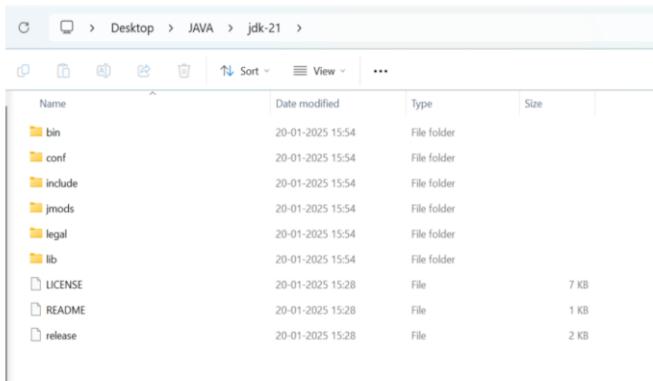
- i. Visit oracle.com website to download Java

Product/file description	File size	Download
x64 Compressed Archive	228.77 MB	https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.zip (sha256)
x64 Installer	205.27 MB	https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.exe (sha256)
x64 MSI Installer	204.02 MB	https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.msi (sha256)

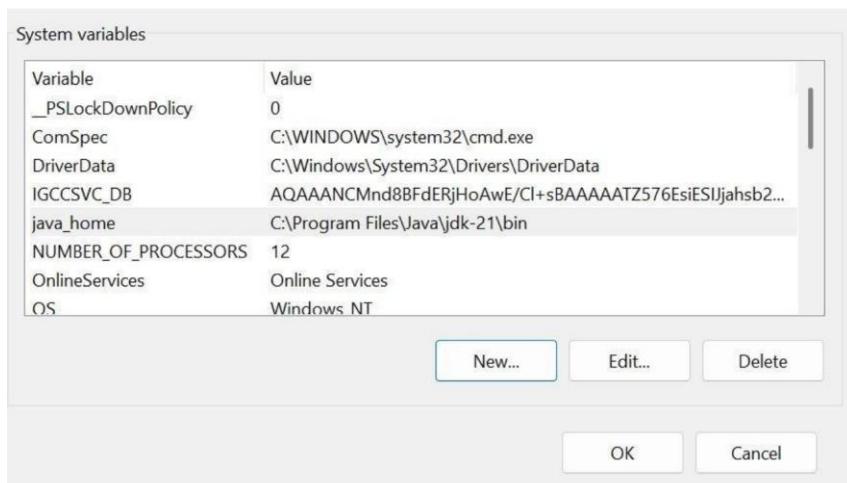
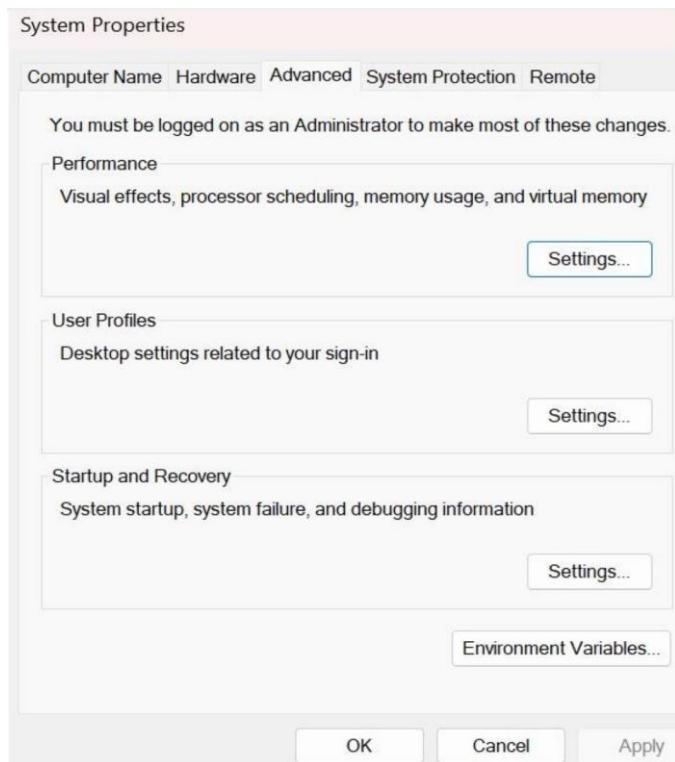
- ii. Download the version which supports LTS (JDK 21) x64 installer for windows.



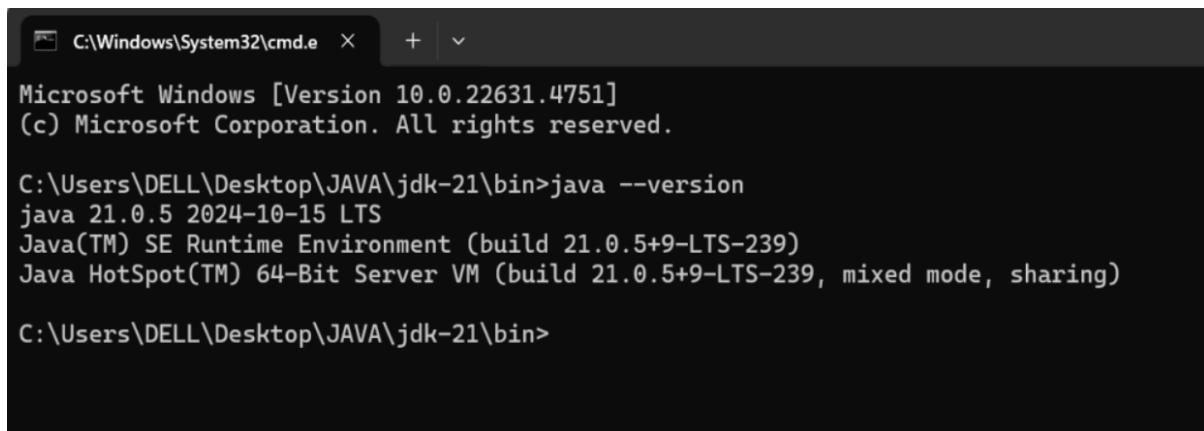
- iii. Install and copy the path.



iv. Open environmental variables and add a new file with path.



v. Verify java version in command window.



```
C:\Windows\System32\cmd.e × + | 
Microsoft Windows [Version 10.0.22631.4751]
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C:\Users\DELL\Desktop\JAVA\jdk-21\bin>java --version
java 21.0.5 2024-10-15 LTS
Java(TM) SE Runtime Environment (build 21.0.5+9-LTS-239)
Java HotSpot(TM) 64-Bit Server VM (build 21.0.5+9-LTS-239, mixed mode, sharing)

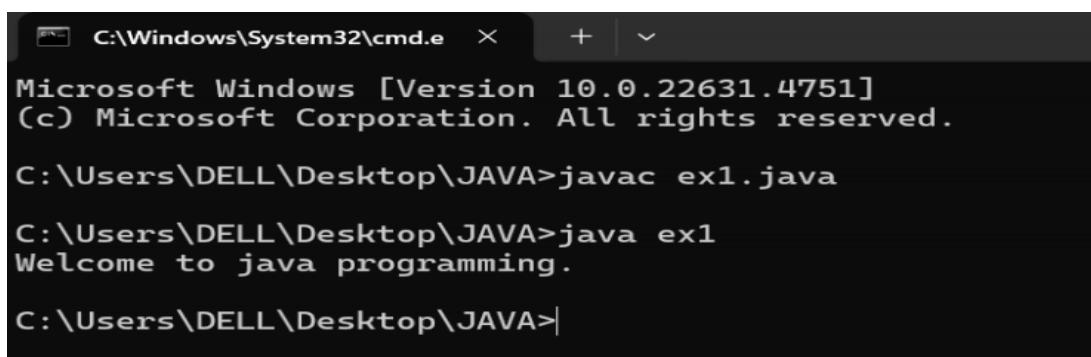
C:\Users\DELL\Desktop\JAVA\jdk-21\bin>
```

2. Write a java program to print the message “Welcome to java programming”.

CODE:

```
class ex1
{
    public static void main(String[] args)
    {
        System.out.println("Welcome to java programming.");
    }
}
```

OUTPUT:-



```
C:\Windows\System32\cmd.e × + | 
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac ex1.java
C:\Users\DELL\Desktop\JAVA>java ex1
Welcome to java programming.

C:\Users\DELL\Desktop\JAVA>
```

ERROR:-

S.NO	EXPECTED ERROR	REASON
1.	;	; is expected at end
2.	S	Capital S is expected for String and System.

3. Write a java program to print the name, roll number and section of a student.

Code:

```
class ex2{
    public static void main(String[] args){
        String name = "Umesh";
        int rollNo = 24037;
        String section = "A";
        System.out.println("Student Information:");
        System.out.println("Name:" + name);
        System.out.println("Roll No:" + rollNo);
        System.out.println("Section:" + section);
    }
}
```

Output:

```
C:\Windows\System32\cmd.e × + | ▾
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac ex2.java
C:\Users\DELL\Desktop\JAVA>java ex2
Student Information:
Name:Umesh
Roll No:24037
Section:A
```

ERROR:-

S.No	EXPECTED ERROR	REASON
1.	S	Capital S is expected for String and System.

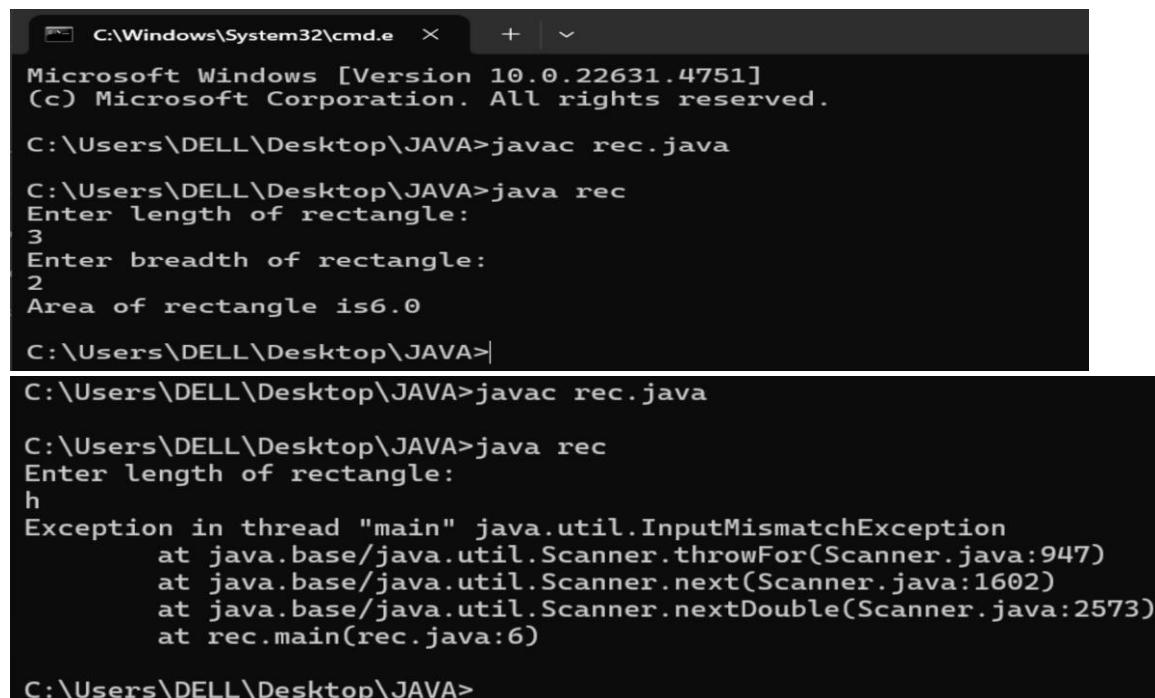
WEEK:-2

1. Write a java program to calculate the area of a rectangle.

Code:

```
import java.util.Scanner;
class rec{
    public static void main(String[] args){
        Scanner scan=new Scanner(System.in);
        System.out.println("Enter length of rectangle:");
        double l=scan.nextDouble();
        System.out.println("Enter breadth of rectangle:");
        double b=scan.nextDouble();
        double a=l*b;
        System.out.println("Area of rectangle is"+a);
    }
}
```

OUTPUT:-



```
C:\Windows\System32\cmd.e × + ▾
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac rec.java
C:\Users\DELL\Desktop\JAVA>java rec
Enter length of rectangle:
3
Enter breadth of rectangle:
2
Area of rectangle is6.0
C:\Users\DELL\Desktop\JAVA>

C:\Users\DELL\Desktop\JAVA>javac rec.java
C:\Users\DELL\Desktop\JAVA>java rec
Enter length of rectangle:
h
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)
    at java.base/java.util.Scanner.next(Scanner.java:1602)
    at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)
    at rec.main(rec.java:6)

C:\Users\DELL\Desktop\JAVA>
```

ERROR:-

S.No	Expected Error	Reason
1	S	Capital S is expected for String and System.

2a). Write a program to convert temperature from Fahrenheit to Celsius.

Code:

```
import java.util.Scanner;
class temp{
public static void main(String[] args){
Scanner scan=new Scanner(System.in);
System.out.println("Enter temperature in Fahrenheit:");
double f=scan.nextDouble();
double c=((f-32)/(1.8));
System.out.println("Temperature in celsius is"+c);
}
}
```

OUTPUT:-

```
C:\Windows\System32\cmd.exe  ×  +  ▾  
Microsoft Windows [Version 10.0.22631.4751]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\DELL\Desktop\JAVA>javac temp.java  
  
C:\Users\DELL\Desktop\JAVA>java temp  
Enter temperature in Fahrenheit:  
97  
Temperature in celsius is36.11111111111111  
  
C:\Users\DELL\Desktop\JAVA>  
  
C:\Users\DELL\Desktop\JAVA>javac temp.java  
  
C:\Users\DELL\Desktop\JAVA>java temp  
Enter temperature in Fahrenheit:  
hi  
Exception in thread "main" java.util.InputMismatchException  
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)  
    at java.base/java.util.Scanner.next(Scanner.java:1602)  
    at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)  
    at temp.main(temp.java:6)  
  
C:\Users\DELL\Desktop\JAVA>
```

ERROR:-

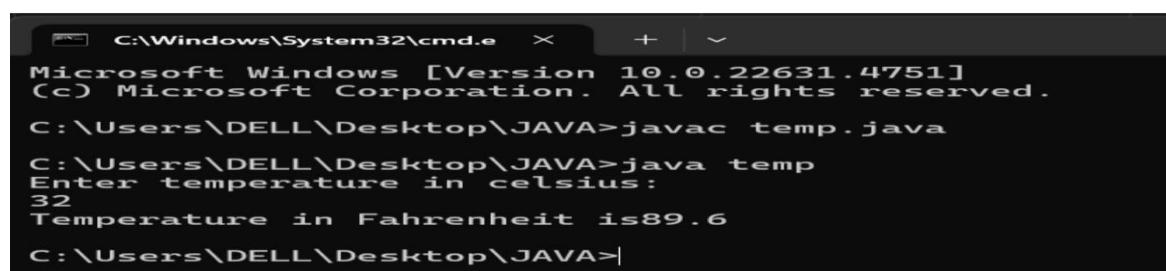
S.No	Expected Error	Reason
1	S	Capital S is expected for String and System.

2b). Write a program to convert temperature from Celsius to Fahrenheit.

Code:

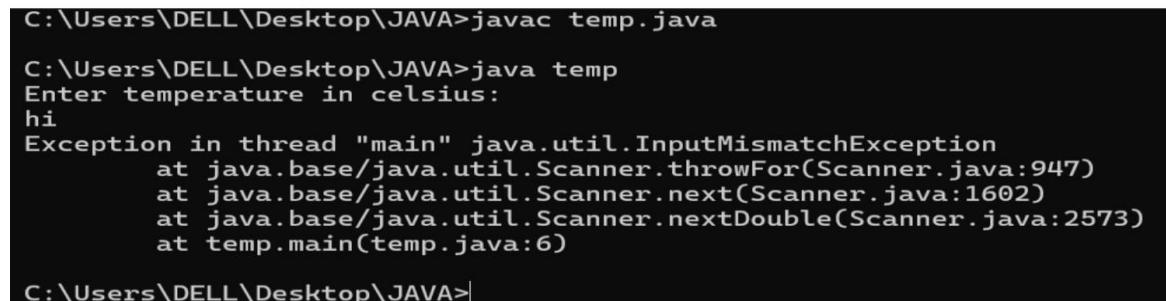
```
import java.util.Scanner;
class temp{
    public static void main(String[] args){
        Scanner scan=new Scanner(System.in);
        System.out.println("Enter temperature in celsius:");
        double c=scan.nextDouble();
        double f=(c*1.8)+32;
        System.out.println("Temperature in Fahrenheit is"+f);
    }
}
```

OUTPUT:-



```
C:\Windows\System32\cmd.exe + ~
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac temp.java
C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in celsius:
32
Temperature in Fahrenheit is89.6
C:\Users\DELL\Desktop\JAVA>
```

```
C:\Users\DELL\Desktop\JAVA>javac temp.java
C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in celsius:
hi
Exception in thread "main" java.util.InputMismatchException
        at java.base/java.util.Scanner.throwFor(Scanner.java:947)
        at java.base/java.util.Scanner.next(Scanner.java:1602)
        at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)
        at temp.main(temp.java:6)

C:\Users\DELL\Desktop\JAVA>
```

ERRORS:-

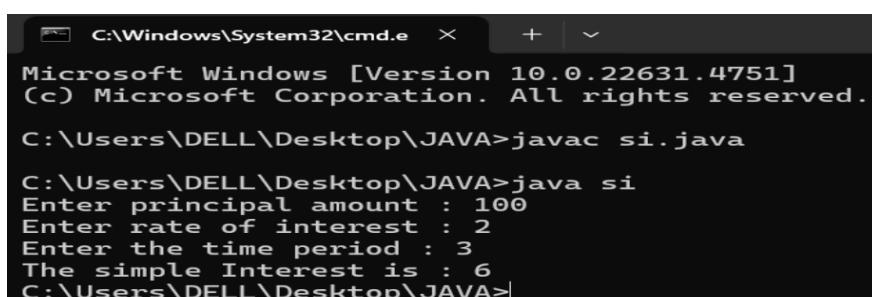
S.No	Expected Error	Reason
1	;	; is expected at end
2	Input.close();	The input is expected to be closed.

3) Write a java program to calculate the simple interest.

Code:

```
import java.util.Scanner;
public class si{
    public static void main(String[] args){
        Scanner input = new Scanner(System.in);
        System.out.print("Enter principal amount : ");
        int p = input.nextInt();
        System.out.print("Enter rate of interest : ");
        int r = input.nextInt();
        System.out.print("Enter the time period : ");
        int t = input.nextInt();
        int SI = p*r*t/100;
        System.out.print("The simple Interest is : " + SI);
        input.close();
    }
}
```

CODE:-



```
C:\Windows\System32\cmd.e > + | 
Microsoft Windows [Version 10.0.22631.4751]
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C:\Users\DELL\Desktop\JAVA>javac si.java
C:\Users\DELL\Desktop\JAVA>java si
Enter principal amount : 100
Enter rate of interest : 2
Enter the time period : 3
The simple Interest is : 6
C:\Users\DELL\Desktop\JAVA>
```

```
C:\Users\DELL\Desktop\JAVA>javac si.java
C:\Users\DELL\Desktop\JAVA>java si
Enter principal amount : h
Exception in thread "main" java.util.InputMismatchException
        at java.base/java.util.Scanner.throwFor(Scanner.java:947)
        at java.base/java.util.Scanner.next(Scanner.java:1602)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2267)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2221)
        at si.main(si.java:6)

C:\Users\DELL\Desktop\JAVA>
```

ERROR:-

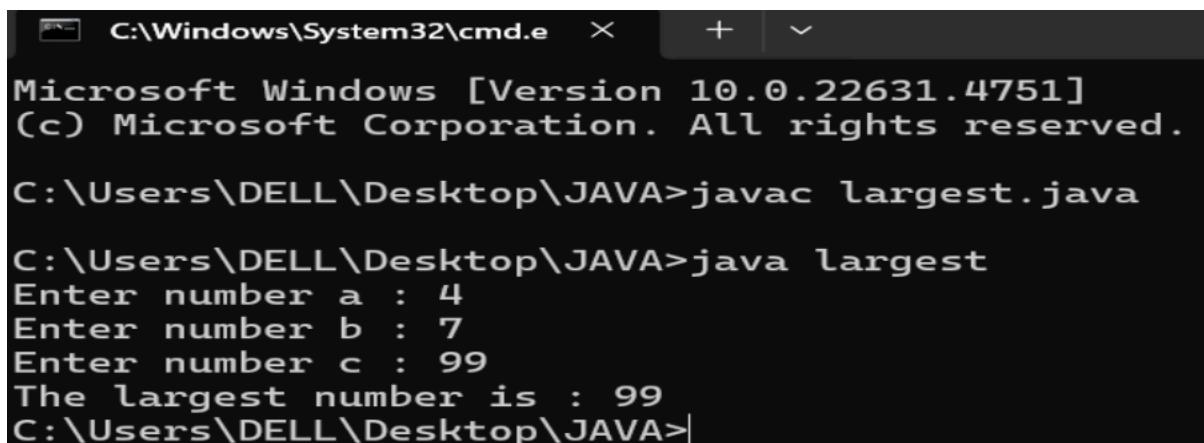
S.No	Expected Error	Reason
1	;	; is expected at end
2	Int t	Without declaring t the compiler cannot execute the program.

4) Write a java program to find the largest of three numbers using ternary operation.

Code:

```
import java.util.Scanner;
public class largest{
    public static void main(String[] args){
        Scanner input = new Scanner(System.in);
        System.out.print("Enter number a : ");
        int a = input.nextInt();
        System.out.print("Enter number b : ");
        int b = input.nextInt();
        System.out.print("Enter number c : ");
        int c = input.nextInt();
        int largest = (a>=b) ? ((a>=c) ? a : c) : ((b >=c) ? b : c);
        System.out.print("The largest number is : " + largest);
        input.close();
    }
}
```

CODE:-



```
C:\Windows\System32\cmd.e × + ▾
Microsoft Windows [Version 10.0.22631.4751]
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C:\Users\DELL\Desktop\JAVA>javac largest.java

C:\Users\DELL\Desktop\JAVA>java largest
Enter number a : 4
Enter number b : 7
Enter number c : 99
The largest number is : 99
C:\Users\DELL\Desktop\JAVA>
```

ERRORS:-

S.No	Expected Error	Reason
1	?	Checks the condition
2	:	Comparing between two variables

5) Write a java program to find the factorial of a number

Code:

```
import java.util.Scanner;
public class fac{
    public static void main(String[] args){15
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the number n : ");
        int n = input.nextInt();
        int fac = 1;
        for(int i = 2; i<=n;i++){
            fac *= i;
        }
        System.out.println( "The factorial of the given number is :" + fac);
        input.close();
    }
}
```

OUTPUT:-

```
C:\Windows\System32\cmd.e X + | 
Microsoft Windows [Version 10.0.22631.4751]
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C:\Users\DELL\Desktop\JAVA>javac fac.java

C:\Users\DELL\Desktop\JAVA>java fac
Enter the number n : 5
The factorial of the given number is :120

C:\Users\DELL\Desktop\JAVA>
```

ERRORS:-

S.no	EXPECTED ERROR	REASON
1.	}	To close for loop
2.	System.out.println	If we place the print statement inside the for loop it will print the each i value every time but to print only the final value we must place it outside the for loop.

WEEK:-3

1.Create the java program with the following instructions

- i) Create a class with name Car
- ii) Create 4 attributes named Car_Color , Car_brand, fuel_type, mileage
- iii) Create 3 method named Start() , Stop(), Service()
- iv) Create 3 objects Car1 , Car2 , Car3
- v) Create a constructor which should print “Welcome to Car Garage”

Code:

```
public class car {
    public String carColor;
    private String carBrand;
    private String fuelType;
    public int mileage;

    car(String carColor, String carBrand, String fuelType, int mileage) {
        this.carColor = carColor;
        this.carBrand = carBrand;
        this.fuelType = fuelType;
        this.mileage = mileage;
        System.out.println(carColor + " " + carBrand + " " + fuelType + " " +
                           mileage);
    }

    public void Start() {
        System.out.println("The car has just started");
    }

    public void Stop() {
        System.out.println("The car has just stopped");
    }

    public void Service() {
        System.out.println("The car is in good condition");
    }

    public static void main(String[] args) {
        car car1 = new car(" orange", "Audi", "Petrol", 60);
        car car2 = new car(" yellow", "BMW", "Diesel", 97);
        car car3 = new car(" violet", " tata", "Petrol", 66);
    }
}
```

```

        car1.Start();
    }
}

```

OUTPUT:-

- PS D:\java\programmes.java> **d:**; **cd** 'd:\java\programmes.java';
`umesh\AppData\Roaming\Code\User\workspaceStorage\aa70e02bfaa3
' 'car'
orange Audi Petrol 60
yellow BMW Diesel 97
violet tata Petrol 66
The car has just started
- PS D:\java\programmes.java>

ERRORS:-

S.No	Expected Error	Reason
1	}	} is expected at end of the class
2	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first

CLASS:-

Car
+ carColor : String
- carBrand : String
- fuelType : String
+ mileage : int
+ Car() : void
+ Start() : void
+ Stop() : void
+ Service() : void

2. Write a java program to create a class BackAccount with two methods deposit()

and withdraw()

- i) In deposit() whenever an amount is deposited it has to be updated with current amount
- ii) In withdraw() whenever an amount is withdrawn it has to be less than current amount else print “Insufficient funds”

```
public class BankAccount {
    private String Name;
    private int AccNo, CurrBal;

    public BankAccount(String Name, int AccNo, int CurrBal) {
        this.Name = Name;
        this.AccNo = AccNo;
        this.CurrBal = CurrBal;
        System.out.println("The customer is: " + this.Name);
    }

    public int deposit(int dAmt) {
        CurrBal += dAmt;
        return CurrBal;
    }

    public void withdraw(int wAmount) {
        if (wAmount <= CurrBal) { // Allowing withdrawal if balance is equal
            CurrBal -= wAmount;
            System.out.println("Remaining Balance: " + CurrBal);
        } else {
            System.out.println("Insufficient funds");
        }
    }

    public static void main(String[] args) {
        BankAccount Umesh = new BankAccount("UMESH CHANDRA REDDY", 1500,
10000);
        Umesh.withdraw(9000); // Should print "Insufficient funds"
        Umesh.withdraw(5900); // Should print remaining balance
        int FinalAmount = Umesh.deposit(5000);
        System.out.println("Final Balance: " + FinalAmount);
    }
}
```

OUTPUT:-

```

● PS D:\java\programmes.java> d;; cd 'd:\java\programmes.java'; & 'umesh\AppData\Roaming\Code\User\workspaceStorage\aa70e02bfaa37ab7' 'BankAccount'
The customer is: UMESH CHANDRA REDDY
Remaining Balance: 1000
Insufficient funds
Final Balance: 6000
○ PS D:\java\programmes.java>

```

ERRORS:-

S.No	Expected Error	Reason
1	}	{ is expected at end of the class
2	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first

CLASS:-

BankAccount
- Name : String
- AccNo : String
- CurrBal : String
+ BankAccount() : void
+ deposit() : int
+ withdraw() : void

WEEK-4

1) Write a java program with class named “Book”. The class should contain various attributes such as “Title of the book , author , year of publication ”. It should also contain a constructor with parameters details of the book. i.e. “ Title of the book, author and year of publication”. Display the details of two books by creating two objects.

Code:

```

import java.util.Scanner;

class book {

    public String title;

    public String author;

    public int year;

    book(String title, String author, int year) {

        this.title = title;

        this.author = author;

        this.year = year;
    }

    public void display() {

        System.out.println("Title of the book is: " + title);

        System.out.println("Author of the book is: " + author);

        System.out.println("Year of publication of the book is: " + year);
    }

    public static void main(String[] args) {

        Scanner scan = new Scanner(System.in);

        System.out.println("Enter name of the book:");

        String title = scan.nextLine();

        System.out.println("Enter author of the book:");
    }
}

```

```
String author = scan.nextLine();

System.out.println("Enter year of publication of the book:");

int year = scan.nextInt();

book third = new book(title, author, year);

third.display();

book first = new book("The kill a mocking bird", "Harper Lee", 2005);

book second = new book("The alchemist", "Paulo Coelho", 1995);

first.display();

second.display();

}

}
```

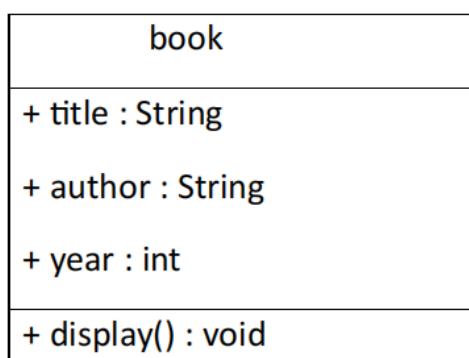
OUTPUT:-

```
| PS D:\java\programmes.java> & 'C:\Program Files\Java\jdk-11.0.11\bin\javaw.exe' -jar C:\Users\DELL\OneDrive\Desktop\Book\Book.jar
| Enter name of the book:
| the kill a mocking bird
| Enter author of the book:
| harper lee
| Enter year of publication of the book:
| 2005
| Title of the book is: the kill a mocking bird
| Author of the book is: harper lee
| Year of publication of the book is: 2005
| Title of the book is: The kill a mocking bird
| Author of the book is: Harper Lee
| Year of publication of the book is: 2005
| Title of the book is: The alchemist
| Author of the book is: Paulo Coelho
| Year of publication of the book is: 1995
PS D:\java\programmes.java> []
```

ERRORS:-

S.No.	Expected Error	Reason
1	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first
2	}	Ending the class and main method is required

Class diagram:-



2) To create a java program with class named Myclass with a static variable “Count” of “int type”, Initialized to 0 and a constant variable “pi” of type double initialized to 3.1415 as attributes of that class
 Now, define a constructor for “Myclass” that increments the “Count”variable each that an object of Myclass is created.
 Finally ,print the final values of “Count” and “pi” variables.

Code:

```

class myclass {
    static int count = 0;
    final double pi = 3.1415;

    myclass() {
        count++;
    }
}
  
```

```

void display() {
    System.out.println("The value of pi is: " + pi);
}

public static void main(String[] args) {
    myclass obj1 = new myclass();
    myclass obj2 = new myclass();
    myclass obj3 = new myclass();
    int fc = count;
    System.out.println("Total number of objects created is: " + fc);
    obj1.display();
    obj2.display();
    obj3.display();
}
}

```

OUTPUT:-

```

PS D:\java\programmes.java> & 'C:\Program
orkspaceStorage\aa70e02bfaa37ab73229e2e8da
orkspaceStorage\aa70e02bfaa37ab73229e2e8da
Total number of objects created is: 3
Total number of objects created is: 3
The value of pi is: 3.1415
The value of pi is: 3.1415
The value of pi is: 3.1415
PS D:\java\programmes.java>

```

ERRORS:-

S.No.	Expected Error	Reason
1	.variable	We must mention variable name to call the variable
2	static	Static variables contain only one value

Class Diagram:

myclass
+ static count : int=0
+ final pi : double=3.14
+ display() : void

WEEK-5

1) Create a calc using the operations including add, sub, mul, div using multilevel inheritance and display the desired output.

CODE:-

```

class bcalc {
    int a, b;
    int sum, diff;

    bcalc(int a, int b) {
        this.a = a;
        this.b = b;
    }

    public void add() {
        diff = a - b;
        sum = a + b;
        System.out.println("Difference: " + diff);
        System.out.println("Sum: " + sum);
    }
}

class acalc extends bcalc {
    int mul;

    acalc(int a, int b) {
        super(a, b);
    }

    public void mult() {
        mul = a * b;
        System.out.println("Multiplication: " + mul);

    }
}

class aacalc extends acalc {
    float div;

    aacalc(int a, int b) {
        super(a, b);
    }

    public void divi() {
        if (b != 0) { // Check to avoid division by zero
    
```

```

        div = (float) a / b;
        System.out.println("Division: " + div);
    } else {
        System.out.println("Division by zero error!");
    }
}

class ocalc {
    public static void main(String[] args) {
        aacalc c = new aacalc(10, 2);
        c.divi();
        c.mult();
        c.add();
    }
}

```

OUTPUT:-

```

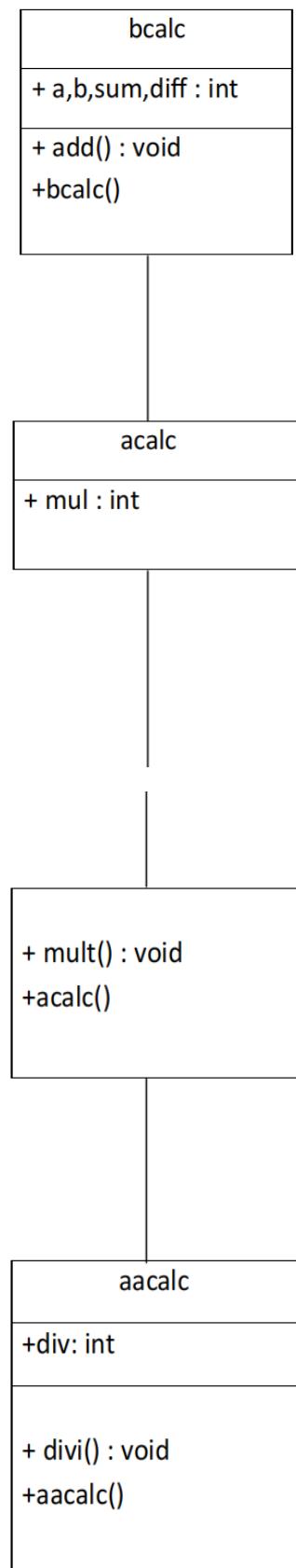
● PS D:\java\programmes.java> & 'C:\Program
orkspaceStorage\aa70e02bfaa37ab73229e2e8da
Division: 5.0
Multiplication: 20
Difference: 8
Sum: 12

```

ERRORS:-

S.No.	Expected Error	Reason
1	.variable	We must mention variable name to call the variable
2	static	Static variables contain only one value

CLASS DIAGRAM:-



2) A vehicle rental company wants to develop a system that maintains information about different types of vehicles available for rent. The company rents out cars and bikes and they need a program to store details about each vehicle such as brand and speed cars should have an additional properties(attributes)- no.of doors , seating capacity bikes should have a property indicating whether they have gears or not the system should also include a function to display details about each vehicle and indicate when a vehicle is starting each class should have a constructor .

a) which oops concept is used in the above program ? Explain why it is useful in this scenario b)If the company decides to add a new type of vehicle truck how would u modify the above program

- 1) truck should include an additional property called capacity(in tons)
- 2)create a show truck details method() to display the trucks capacity
- 3)write a constructor for truck that initializes all the properties
- c)Implement the truck class and update the main method to create the truck object and also create an object for car and bike subclass. Finally display its details

CODE:-

```
// OOP Concept: Inheritance and Polymorphism are used in this program.
// Inheritance allows different vehicle types to share common properties from a base class.
// Polymorphism enables a generic function to display vehicle details dynamically.

// Base class
class Vehicle {
    String brand;
    int speed;
    Vehicle(String brand, int speed) {
        this.brand = brand;
        this.speed = speed;
    }
    void displayDetails() {
        System.out.println("Brand: " + brand);
        System.out.println("Speed: " + speed + " km/h");
    }
    void startVehicle() {
        System.out.println(brand + " is starting...");
    }
}
// Car subclass
class Car extends Vehicle {
```

```
int noOfDoors;
int seatingCapacity;
Car(String brand, int speed, int noOfDoors, int seatingCapacity) {
super(brand, speed);
this.noOfDoors = noOfDoors;
this.seatingCapacity = seatingCapacity;
}
@Override
void displayDetails() {
super.displayDetails();
System.out.println("Number of Doors: " + noOfDoors);
System.out.println("Seating Capacity: " + seatingCapacity);
}
}
// Bike subclass
class Bike extends Vehicle {
boolean hasGears;
Bike(String brand, int speed, boolean hasGears) {
super(brand, speed);
this.hasGears = hasGears;
}
@Override
void displayDetails() {
super.displayDetails();
System.out.println("Has Gears: " + (hasGears ? "Yes" : "No"));
}
}
// Truck subclass
class Truck extends Vehicle {
double capacity;
Truck(String brand, int speed, double capacity) {
super(brand, speed);
this.capacity = capacity;
}
void showTruckDetails() {
System.out.println("Truck Capacity: " + capacity + " tons");
}
@Override
void displayDetails() {
super.displayDetails();
showTruckDetails();
}
}
}
// Main class
```

```
public class VehicleRentalSystem {  
    public static void main(String[] args) {  
        Car car = new Car("Toyota", 150, 4, 5);  
        Bike bike = new Bike("Yamaha", 120, true);  
        Truck truck = new Truck("Volvo", 100, 15.5);  
        System.out.println("Car Details:");  
        car.displayDetails();  
        car.startVehicle();  
        System.out.println();  
        System.out.println("Bike Details:");  
        bike.displayDetails();  
        bike.startVehicle();  
        System.out.println();  
        System.out.println("Truck Details:");  
        truck.displayDetails();  
        truck.startVehicle();  
    }  
}
```

OUTPUT:-

```
C:\Users\DELL\Desktop\JAVA>java VehicleRentalSystem  
Car Details:  
Brand: Toyota  
Speed: 150 km/h  
Number of Doors: 4  
Seating Capacity: 5  
Toyota is starting...  
  
Bike Details:  
Brand: Yamaha  
Speed: 120 km/h  
Has Gears: Yes  
Yamaha is starting...  
  
Truck Details:  
Brand: Volvo  
Speed: 100 km/h  
Truck Capacity: 15.5 tons  
Volvo is starting...
```

ERRORS:-

S.No.	Expected Error	Reason
1	.variable	We must mention variable name to call the variable
2	static	Static variables contain only one value

CLASS DIAGRAM:—

