**LAB MANUAL**



NAME: S.RaghuRam

Roll No:AV.SC.U4CSE24315

SECTION:CSE-A

|  |  |  |  |
| --- | --- | --- | --- |
| **S.no** | **WEEK** | **TITLE** | **PAGE NO.** |
| 1. | **1** | Installation of JAVA | 4 |
|  |  | Basic Details Of a Student | 7 |
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| 3. | **3** |  |  |
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|  |  |  |  |

**WEEK-1:**How to install jdk and first program on

printing student details.

**Step-1:** Download JDK-21 from oracle website

**

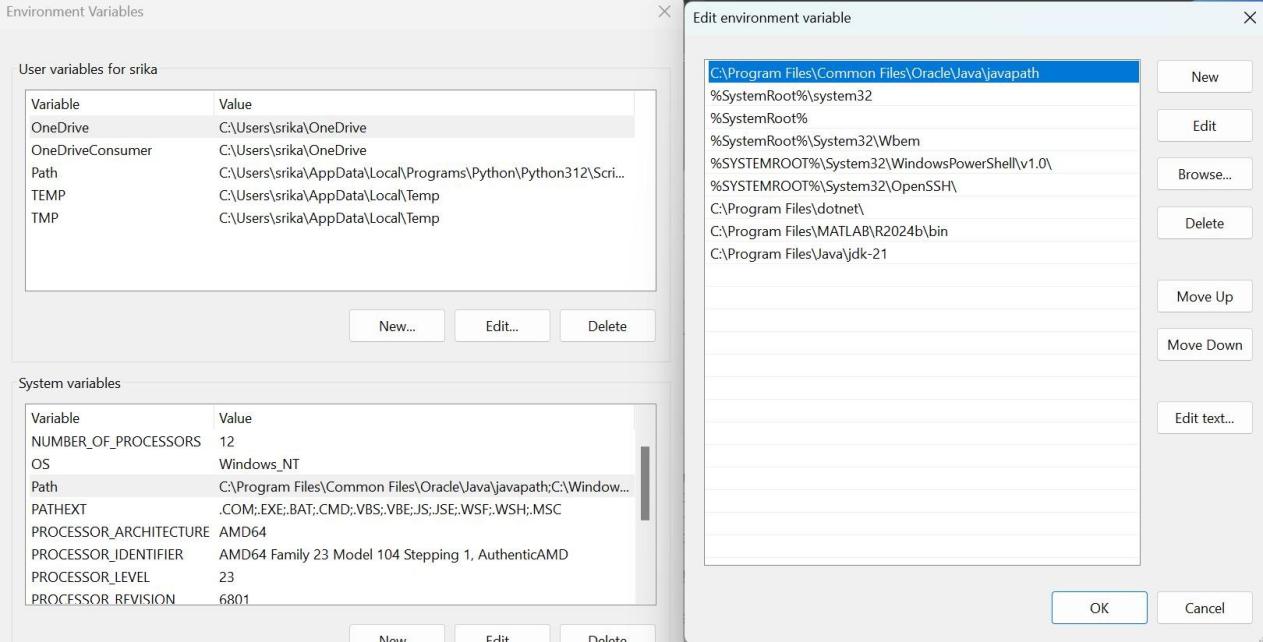
**Step-2:**Install the JDK-21 with accepting terms and

conditions according to the respective windows.

*.*

**

**Step-3:**Setting up environmental variables.

**

\*Windows c -> C-drive -> program files ->Java -

>JDK-21->select bin

\*Select and open environmental variable in search

bar-> either select system variables or user

variables-> select path-> click edit->New-> paste

the bin-> finish the setup(apply the changes).

~for verifying the installed version

Open cmd-> type java --version

~command propt

Javac filename.java ->compiling.

Java filename.java ->displaying

**PROGRAM-1:**Wirte a program in java for displaying

student details.

class  ME

{

    public static void main(String[] args)

    {

        System.out.println("NAME= S.RaghuRam")

        System.out.println("ROLL NO= AV.SC.U4CSE24315");

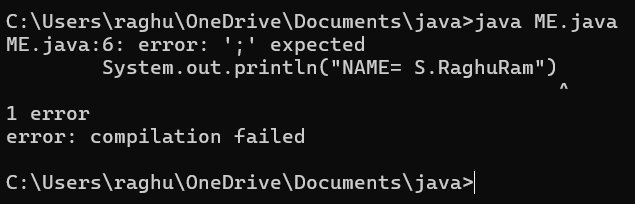
        System.out.println("SEC= A”);

        System.out.println("BRANCH= CSE");

    }

}

**Output:**



|  |  |  |
| --- | --- | --- |
| Code | Error | Rectification |
| System.out.println  ("NAME:  S.RaghuRam") | Semi colon(;) is  missing at the  end. | Add a semi colon(;) at the  end.  System.out.println("NAME:  S.RaghuRam"); |

**PROGRAM-1(Rectified):**

class ME

{

public static void main(String[] args)

{

System.out.println("NAME= S.RaghuRam");

System.out.println("ROLL NO= AV.SC.U4CSE24315");

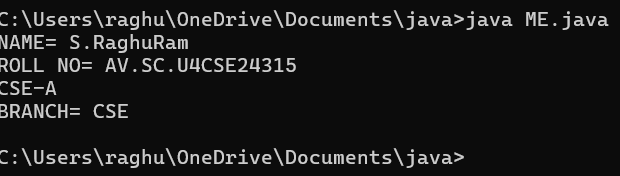
System.out.println("CSE-A");

System.out.println("BRANCH= CSE");

}

}

**OUTPUT:**

****

**WEEK-2:**

**PROGRAM-1:** Write a java program for SI?

import java.util.Scanner;

class SI{

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("Enter Principal Amount :");

double p = input.nextDouble();

System.out.println("Enter Time:");

double t=input.nextDouble();

System.out.println("Enter rate of Interest:");

double r=input.nextDouble();

double I=(p\*t\*r)/100;

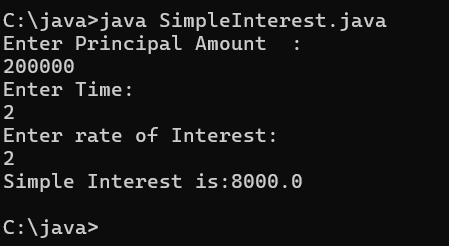
System.out.println("Simple Interest is:"+ I);

input.close();

}

}

**OUTPUT:**

****

**PROGRAM-2:** Write a program in java for area of

rectangle.

import java.util.Scanner;

class Main{

public static void main(String[] args){

Scanner input = new Scanner (System.in);

System.out.println("Enter value of length:");

double L=input.nextDouble();

System.out.println("Enter value of Width:");

double W=input.nextDouble();

double A=L\*W;

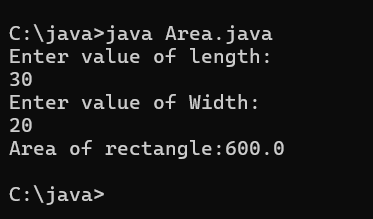
System.out.println("Area of rectangle:"+A);

input.close();

}

}

**OUTPUT:**



**PROGRAM-3:**Write a program in java for area of

triangle using heron’s formula.

import java.util.Scanner;

class Main{

public static void main(String[] args){

Scanner input = new Scanner (System.in);

System.out.println("Enter value of a:");

double a=input.nextDouble();

System.out.println("Enter value of b:");

double b=input.nextDouble();

System.out.println("Enter value of c:");

double c=input.nextDouble();

double s=(a+b+c)/2;

double A=sqrt(s\*(s-a)\*(s-b)\*(s-c));

System.out.println("Area of triangle:"+A);

input.close();

}

}

**OUTPUT:**

|  |  |  |
| --- | --- | --- |
| Code | Error | Rectification |
| double A=sqrt(s\*(s-a)\*(s-b)\*(s-c)); | double A=sqrt(s\*(s-a)\*(s-b)\*(s-c));  ^  symbol: method sqrt(double)  location: class Main  1 error  ERROR!  error: compilation failed | Use Math.sqrt statement.  double  A=Math.sqrt(x); |

**PROGRAM-3(Rectified):**

import java.util.Scanner;

class Main{

public static void main(String[] args){

Scanner input = new Scanner (System.in);

System.out.println("Enter value of a:");

double a=input.nextDouble();

System.out.println("Enter value of b:");

double b=input.nextDouble();

System.out.println("Enter value of c:");

double c=input.nextDouble();

double s=(a+b+c)/2;

double A=Math.sqrt(s\*(s-a)\*(s-b)\*(s-c));

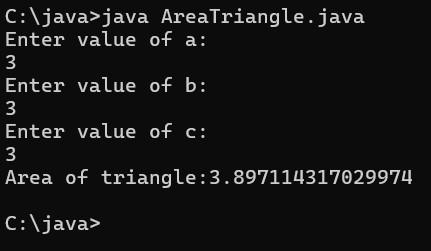
System.out.println("Area of triangle:"+A);

input.close();

}

}

**OUTPUT:**

****

**PROGRAM-4(a):**Write a program in java for converting temperature from celsius to fahrenite.

import java.util.Scanner;

class Main{

public static void main(String[] args){

Scanner input = new Scanner(System.in);

System.out.println("Enter temperature in Celsius:");

double C=input.nextDouble();

double F=(9\*C/5)+32;

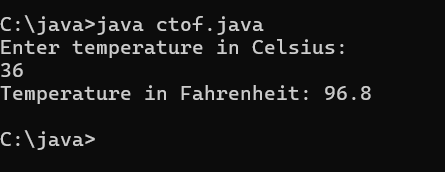
System.out.println("Temperature in Fahrenheit: "+F);

input.close();

}

}

**OUTPUT:**



**PROGRAM-4(b):**Write a program in java for converting temperature from fahrenite to celsius.

import java.util.Scanner;

class Main{

public static void main(String[] args){

Scanner input = new Scanner(System.in);

System.out.println("Enter temperature in Fahrenheit:");

double f=input.nextDouble();

double C=(f-32)\*5/9;

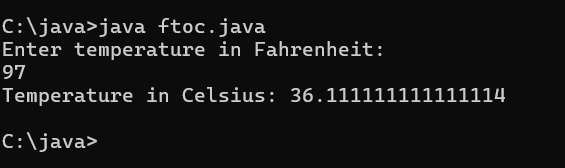
System.out.println("Temperature in Celsius: "+C);

input.close();

}

}

**OUTPUT:**



**PROGRAM-5:**Write a program in java for factorial of a number.

import java.util.Scanner;

class Factorial {

public static void main(String[] args)

{

int num;

int factorial = 1;

int i;

Scanner input = new Scanner(System.in);

System.out.println("Enter a number: ");

num = input.nextInt();

for(i = 1; i > num; i++)

{

factorial \*= i;

}

System.out.println(num+"!"+"="+factorial);

input.close();

}

}

**OUTPUT:**

|  |  |  |
| --- | --- | --- |
| Code | Error | Rectification |
| for(i = 1; i > num; i++) | Output is wrong | for(i = 1; i <= num; i++) |

**PROGRAM-5(Rectified):**

import java.util.Scanner;

class Factorial {

public static void main(String[] args)

{

int num;

int factorial = 1;

int i;

Scanner input = new Scanner(System.in);

System.out.println("Enter a number: ");

num = input.nextInt();

for(i = 1; i <= num; i++)

{

factorial \*= i;

}

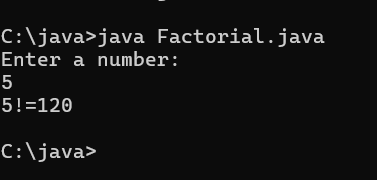
System.out.println(num+"!"+"="+factorial);

input.close();

}

}

**OUTPUT:**

****

**PROGRAM-5:**Write a program in java for fibonacci series.

import java.util.Scanner;

class fibonacci{

public static void main(String[] args){

Scanner input=new Scanner(System.in);

System.out.print("enter number of digits to be displayed :");

int num=input.nextInt();

int first=0;

int second=1;

int third;

System.out.println("fibonaaci series for "+ num +" number of terms :");

System.out.println(first);

System.out.println(second);

for(int i=3;i<=num;++i){

third=first+second;

first=second;

second=third;

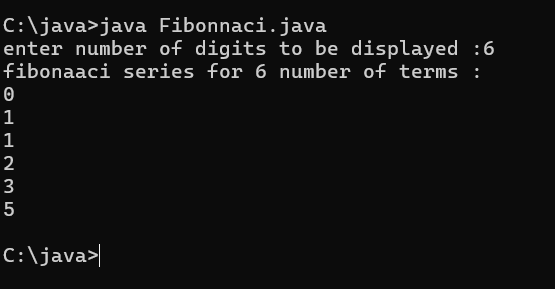
System.out.println(second);

}

}

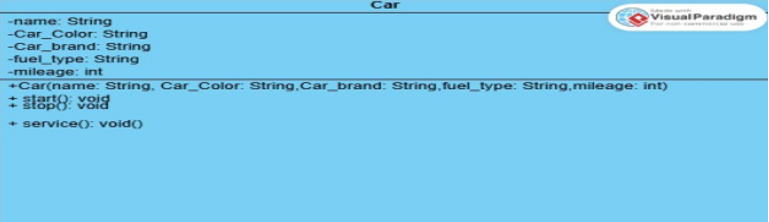
}

**OUTPUT:**



**WEEK-3:**

**CLASS DIAGRAM:**

****

**PROGRAM-1:**Write a program in java with following instructions

1. Create a class with name car.
2. Create 4 attributes named car\_color,car\_brand,fuel\_type,mileage.
3. Create three methods named start(),stop() and service().
4. Create three objects named car1,car2,car3.

class Car{

public String car\_color;

public String car\_brand;

public String fuel\_type;

public String mileage;

public void start(){

System.out.println("Car Started");

}

public void stop(){

System.out.println("Car Stopped");

}

public void service(){

System.out.println("Car has given to service");

}

public static void main(String[] args){

System.out.println("S.RaghuRam");

System.out.println("Class:CSE-A");

System.out.println("Roll No:24315");

System.out.println("");

car car1=new car();

car1.car\_color="Red";

car1.car\_brand="Tata";

car1.fuel\_type="Petrol";

car1.mileage="70kmpl";

System.out.println("Car1 :");

car1.start();

car1.stop();

car1.service();

System.out.println("Car Color is "+car1.car\_color);

System.out.println("Car Brand is "+car1.car\_brand);

System.out.println("Car fuel type is "+ car1.fuel\_type);

System.out.println("Car mileage is "+ car1.mileage);

System.out.println("");

Car car2=new Car();

car2.car\_color="Black";

car2.car\_brand="BMW";

car2.fuel\_type="Diesel";

car2.mileage="80kmpl";

System.out.println("Car2 :");

car2.start();

car2.stop();

car2.service();

System.out.println("Car Color is "+car2.car\_color);

System.out.println("Car Brand is "+car2.car\_brand);

System.out.println("Car fuel type is "+ car2.fuel\_type);

System.out.println("Car mileage is "+ car2.mileage);

System.out.println("");

Car car3=new Car();

car3.car\_color="White";

car3.car\_brand="Audi";

car3.fuel\_type="Diesel";

car3.mileage="75kmpl";

System.out.println("Car3 :");

car3.start();

car3.stop();

car3.service();

System.out.println("Car Color is "+car3.car\_color);

System.out.println("Car Brand is "+car3.car\_brand);

System.out.println("Car fuel type is "+ car3.fuel\_type);

System.out.println("Car mileage is "+ car3.mileage);

System.out.println("");

Car car4=new Car();

car4.car\_color="Green";

car4.car\_brand="Ferrari";

car4.fuel\_type="Petrol";

car4.mileage="90kmpl";

System.out.println("Car4 :");

car4.start();

car4.stop();

car4.service();

System.out.println("Car Color is "+car4.car\_color);

System.out.println("Car Brand is "+car4.car\_brand);

System.out.println("Car fuel type is "+ car4.fuel\_type);

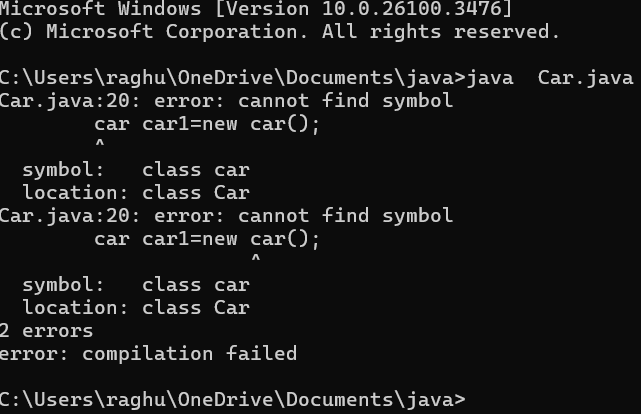
System.out.println("Car mileage is "+ car4.mileage);

System.out.println("");

}

}

**OUTPUT:**

****

|  |  |  |
| --- | --- | --- |
| Code | Error | Rectification |
| car car1=new car(); | Capital C used for class name | Car car1=new Car(); |

**PROGRAM-1(RECTIFIED):**

class Car{

public String car\_color;

public String car\_brand;

public String fuel\_type;

public String mileage;

public void start(){

System.out.println("Car Started");

}

public void stop(){

System.out.println("Car Stopped");

}

public void service(){

System.out.println("Car has given to service");

}

public static void main(String[] args){

System.out.println("S.RaghuRam");

System.out.println("Class:CSE-A");

System.out.println("Roll No:24315");

System.out.println("");

Car car1=new Car();

car1.car\_color="Red";

car1.car\_brand="Tata";

car1.fuel\_type="Petrol";

car1.mileage="70kmpl";

System.out.println("Car1 :");

car1.start();

car1.stop();

car1.service();

System.out.println("Car Color is "+car1.car\_color);

System.out.println("Car Brand is "+car1.car\_brand);

System.out.println("Car fuel type is "+ car1.fuel\_type);

System.out.println("Car mileage is "+ car1.mileage);

System.out.println("");

Car car2=new Car();

car2.car\_color="Black";

car2.car\_brand="BMW";

car2.fuel\_type="Diesel";

car2.mileage="80kmpl";

System.out.println("Car2 :");

car2.start();

car2.stop();

car2.service();

System.out.println("Car Color is "+car2.car\_color);

System.out.println("Car Brand is "+car2.car\_brand);

System.out.println("Car fuel type is "+ car2.fuel\_type);

System.out.println("Car mileage is "+ car2.mileage);

System.out.println("");

Car car3=new Car();

car3.car\_color="White";

car3.car\_brand="Audi";

car3.fuel\_type="Diesel";

car3.mileage="75kmpl";

System.out.println("Car3 :");

car3.start();

car3.stop();

car3.service();

System.out.println("Car Color is "+car3.car\_color);

System.out.println("Car Brand is "+car3.car\_brand);

System.out.println("Car fuel type is "+ car3.fuel\_type);

System.out.println("Car mileage is "+ car3.mileage);

System.out.println("");

Car car4=new Car();

car4.car\_color="Green";

car4.car\_brand="Ferrari";

car4.fuel\_type="Petrol";

car4.mileage="90kmpl";

System.out.println("Car4 :");

car4.start();

car4.stop();

car4.service();

System.out.println("Car Color is "+car4.car\_color);

System.out.println("Car Brand is "+car4.car\_brand);

System.out.println("Car fuel type is "+ car4.fuel\_type);

System.out.println("Car mileage is "+ car4.mileage);

System.out.println("");

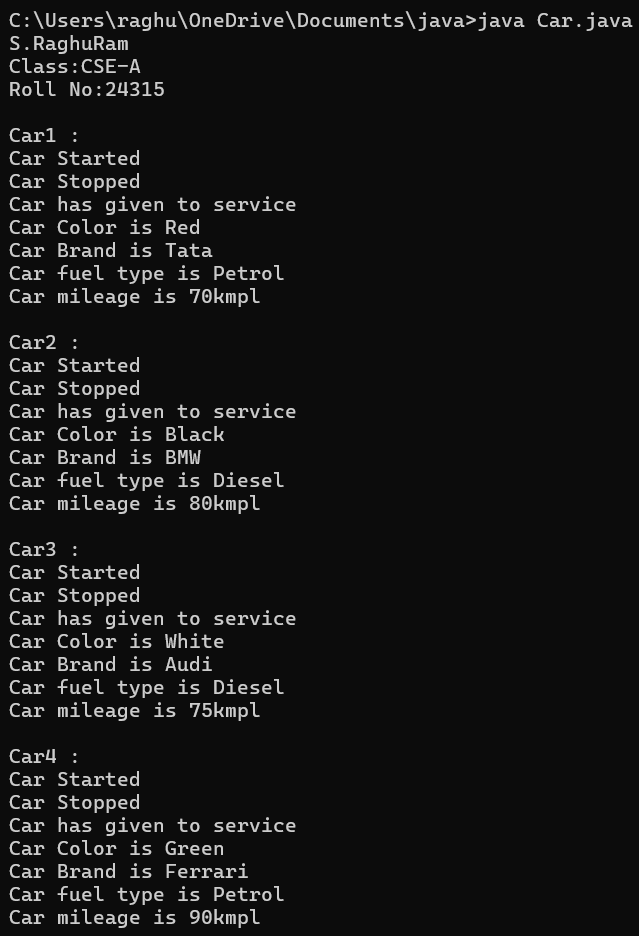
}

}

**Important points:**

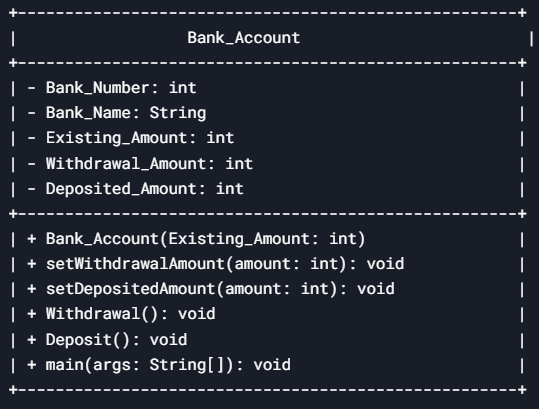
Encapsulation is achieved as methods and variables are existing in the same class.

**OUTPUT:**



**PROGRAM-2:** Write a program in java to create class Bank\_Account with methods deposit and withdrawal.

**CLASS DIAGRAM:**

****

import java.util.Scanner;

class Bank\_Account {

private int Bank\_Number;

public String Bank\_Name;

private int Existing\_Amount;

private int Withdrawal\_Amount;

private int Deposited\_Amount;

public Bank\_Account(int Existing\_Amount) {

this.Existing\_Amount = Existing\_Amount;

}

public void Withdrawal() {

if (Withdrawal\_Amount > this.Existing\_Amount) {

System.out.println("Withdrawal is not possible, ERROR!");

} else {

System.out.println("Withdrawal is possible");

int Total = Existing\_Amount - Withdrawal\_Amount;

System.out.println("Remaining amount is " + Total);

}

}

public void Deposit() {

System.out.println(Deposited\_Amount + " amount is successfully deposited");

int Total\_Amount = Existing\_Amount + Deposited\_Amount;

System.out.println("Total amount is " + Total\_Amount);

}

public static void main(String[] args) {

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println(“Roll:24315”);

System.out.println("");

Scanner input = new Scanner(System.in);

Bank\_Account bank = new Bank\_Account(100000);

bank.Bank\_Number = 1234567;

bank.Bank\_Name = "SBI";

System.out.println("Account Number: "+ bank.Bank\_Number);

System.out.println("Bank Name: "+bank.Bank\_Name);

System.out.println("");

System.out.println("Enter Withdrawal Amount:");

int withdrawal = input.nextInt();

bank.setWithdrawalAmount(withdrawal);

System.out.println("Enter Deposit Amount:");

int deposit = input.nextInt();

bank.setDepositedAmount(deposit);

bank.Withdrawal();

bank.Deposit();

}

}

**Output:**

|  |  |  |
| --- | --- | --- |
| code | Error | rectification |
| Not used set method to withdrawal and deposited amount | Wrong Output | Use set method to withdrawal and deposited amount |

**PROGRAM-2(Rectified):**

import java.util.Scanner;

class Bank\_Account {

private int Bank\_Number;

public String Bank\_Name;

private int Existing\_Amount;

private int Withdrawal\_Amount;

private int Deposited\_Amount;

public Bank\_Account(int Existing\_Amount) {

this.Existing\_Amount = Existing\_Amount;

}

public void setWithdrawalAmount(int amount) {

this.Withdrawal\_Amount = amount;

}

public void setDepositedAmount(int amount) {

this.Deposited\_Amount = amount;

}

public void Withdrawal() {

if (Withdrawal\_Amount > this.Existing\_Amount) {

System.out.println("Withdrawal is not possible, ERROR!");

} else {

System.out.println("Withdrawal is possible");

int Total = Existing\_Amount - Withdrawal\_Amount;

System.out.println("Remaining amount is " + Total);

}

}

public void Deposit() {

System.out.println(Deposited\_Amount + " amount is successfully deposited");

int Total\_Amount = Existing\_Amount + Deposited\_Amount;

System.out.println("Total amount is " + Total\_Amount);

}

public static void main(String[] args) {

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println("Roll.NO:24315");

System.out.println("");

Scanner input = new Scanner(System.in);

Bank\_Account bank = new Bank\_Account(100000);

bank.Bank\_Number = 1234567;

bank.Bank\_Name = "SBI";

System.out.println("Account Number: "+ bank.Bank\_Number);

System.out.println("Bank Name: "+bank.Bank\_Name);

System.out.println("");

System.out.println("Enter Withdrawal Amount:");

int withdrawal = input.nextInt();

bank.setWithdrawalAmount(withdrawal);

System.out.println("Enter Deposit Amount:");

int deposit = input.nextInt();

bank.setDepositedAmount(deposit);

bank.Withdrawal();

bank.Deposit();

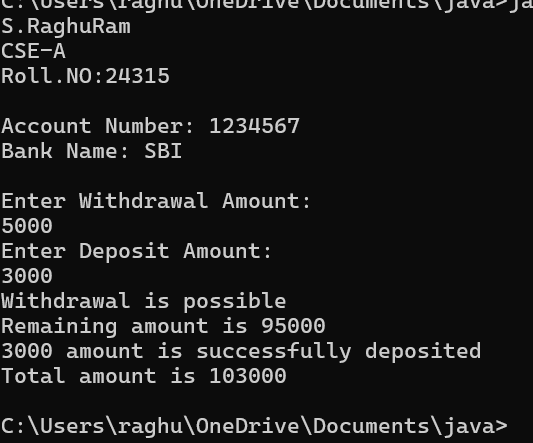
}

}

**Important points:**

1. Encapsulation is achieved as methods and variables are existing in the same class.
2. Constructer is used ***.***
3. Set Method is Used

**OUTPUT:**

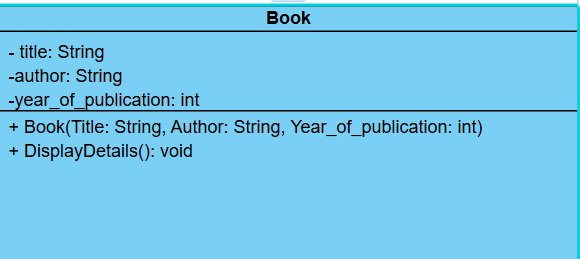


***WEEK-4:***

***PROGRAM-1:*** Write a java program with class named “book”, the class should contain various attributes such as title, author, year of publication it should also contain a constructor with parameters which initializes, title, author, and year of publication.

Create a method which displays the details of the book and display the details of two books

***class diagram:***



class Book{

public String Title;

public String Author;

public int Publish\_date;

Book(String Title,String Author,int Publish\_date){

this.Title=Title;

this.Author=Author;

this.Publish\_date= Publish\_date;

}

public void display(){

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

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

System.out.println("The publish date of the book is "+Publish\_date);

}

public static void main(String[] args){

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println("Roll.NO:24315");

System.out.println("");

Book book1=new Book("Harry Potter","J.K. Rowling",1997);

book1.display();

System.out.println("");

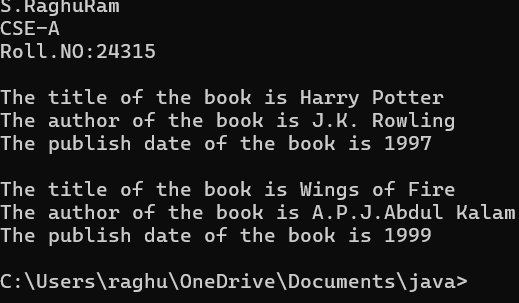
Book book2=new Book("Wings of Fire","A.P.J.Abdul Kalam",1999);

book2.display();

}

}

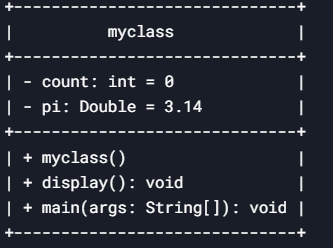
**OUTPUT:**

****

**PROGRAM-2:**

Create a java Program with class named myclass with static variable count of int type, initialized to zero and a constant variable “pi” of type double initialized to 3.14 as attributes of the class, ow define a constructor for “myclass” that increments the count variable each time an object of my class is created (count++), finally print the final values of count and pi variables create three objects.

**class diagram:**



class myclass{

static int count=0;

static Double pi=3.14;

myclass(){

count++;

}

public void display(){

System.out.println("Count value: "+count);

System.out.println("pi value: "+pi);

}

public static void main(String[] args){

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println("Roll.NO:24315");

System.out.println("");

myclass hello=new myclass();

hello.display();

System.out.println("");

myclass hi=new myclass();

hi.display();

System.out.println("");

myclass my=new myclass();

my.display();

}

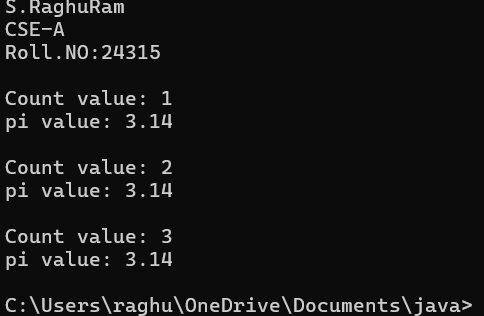
}

**Important points:**

**Static Variable (**count**)**

The variable count is declared as static, meaning it is shared among all instances of the MyCount class.It starts at 0 and increments each time a new object is created.

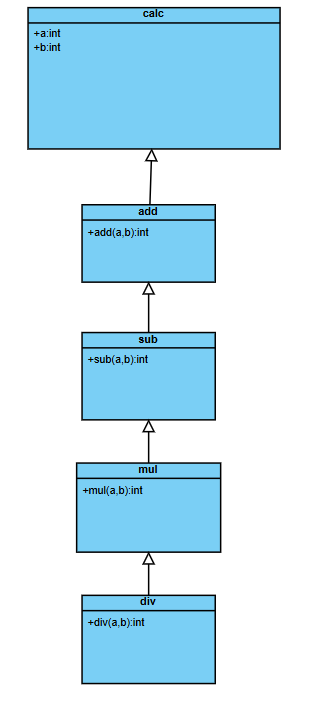
**OUTPUT:**



**WEEK-5:**

**AIM:** Create a calculator using the operations including addition, subtraction, multiplication and division using multi level inheritance and display the desired output.

**class diagram:**



**CODE:**

class calc{

    public int a;

    public int b;

        public static void main(String[] args){

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println("Roll.NO:24315");

System.out.println("");

        add obj1 = new add();

        sub obj2 = new sub();

        mul obj3 = new mul();

        div obj4 = new div();

        System.out.println("addition of the following numbers is :"+obj1.add(10,20));

        System.out.println("subtraction of the follwing numbers is :" +obj2.sub(20, 10));

        System.out.println("multiplication of the follwing number is :" +obj3.mul(10, 20));

        System.out.println("division of the follwing number is :" +obj4.div(20, 10));

        }

    }

class add extends calc{

    public int add(int a, int b){

        int addition = a+b;

        return addition;

    }

}

class sub extends add{

    public int sub(int a, int b){

        int subtraction = a-b;

        return subtraction;

    }

}

class mul extends sub{

    public int mul(int a, int b){

        int multiplication = a\*b;

        return multiplication;

    }

}

class div extends mul{

    public float div(int a, int b){

        if(b==0){

            System.out.println("the value of b is incorrect");

        }

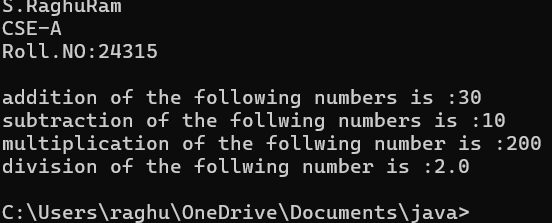
        int division = a/b;

        return division;

    }

}

**OUTPUT:**

****

**Important points:**

1. There are constructors for each and every subclass initializing values for each and every operation.
2. The concept of multilevel inheritance is used here.

**PROGRAM:2**

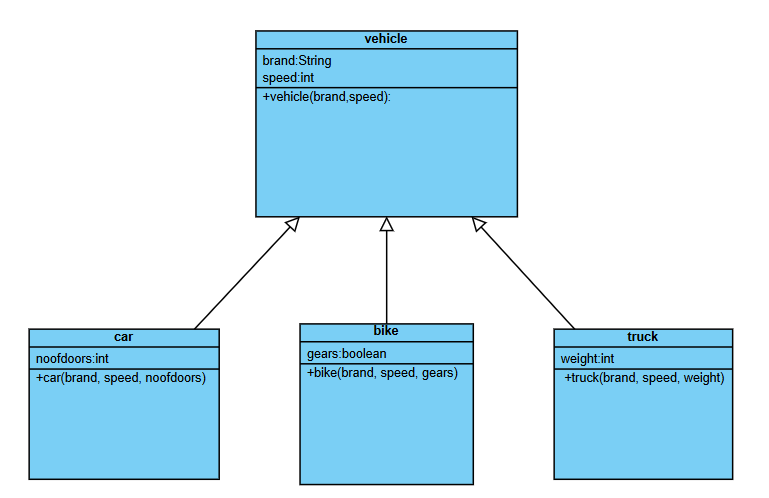
**AIM:**

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 , bikes and trucks and they need a program to store details about each vehicle, such as brand and speed.

**CONDITIONS:**

1. Cars should have an additional property such as number\_of\_doors .
2. Bikes should have a property indicating whether they have gears or not.
3. Truck should have a property of their capacity(in tons).
4. Every class should have a constructor.

**class diagram:**



**CODE:**

class vehicle{

String brand;

int speed;

public vehicle(String brand,int speed){

this.brand=brand;

this.speed=speed;

}

public static void main(String[] args) {

System.out.println("S.RaghuRam");

System.out.println("CSE-A");

System.out.println("Roll.NO:24315");

System.out.println("");

car obj1=new car("BMW",120,4);

bike obj2=new bike("Honda",100,true);

truck obj3=new truck("Mahindra",80,40);

}

}

class car extends vehicle{

int noofdoors;

public car(String brand, int speed,int noofdoors) {

super(brand, speed);

this.noofdoors=noofdoors;

System.out.println("brand of the car is :"+brand);

System.out.println("speed of the car is :"+speed);

System.out.println("number of doors :"+noofdoors);

}

}

class bike extends vehicle{

boolean gears;

public bike(String brand,int speed,boolean gears){

super(brand, speed);

this.gears=gears;

System.out.println("brand of the bike is :"+brand);

System.out.println("speed of the bike is :"+speed);

System.out.println("gears are present :"+gears);

}

}

class truck extends vehicle{

int weight;

public truck(String brand,int speed,int weight){

super(brand,speed);

this.weight=weight;

System.out.println("brand of the truck is :"+brand);

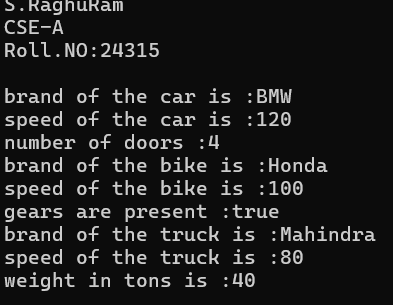
System.out.println("speed of the truck is :"+speed);

System.out.println("weight in tons is :"+weight);

}

}

**OUTPUT:**

****

**Important points:**

1. The car, bike, and truck classes inherit from the vehicle. Hierarchical Inheritance is being used here.
2. Each subclass calls the parent constructor using super(brand, speed);, ensuring proper initialization.