**23CSE111**

**OBJECT ORIENTED PROGRAMMING**

**LAB REPORT**



**Department of Computer Science Engineering**   **Amrita School of Computing**

**Amrita Vishwa Vidyapeetham, Amaravati Campus**

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**Roll No: 24220**

**Verified By :**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO** | **Experiment** | **Page No** | **Remarks** | **Signature** |
| **1** | **Installation Process of JDK** | **3-4** |  |  |
| **2** | **Simple java program for printing basic details of student** | **5-6** |  |  |
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# WEEK-1

1. **Process of Installing JDK (Java Development Kit)**

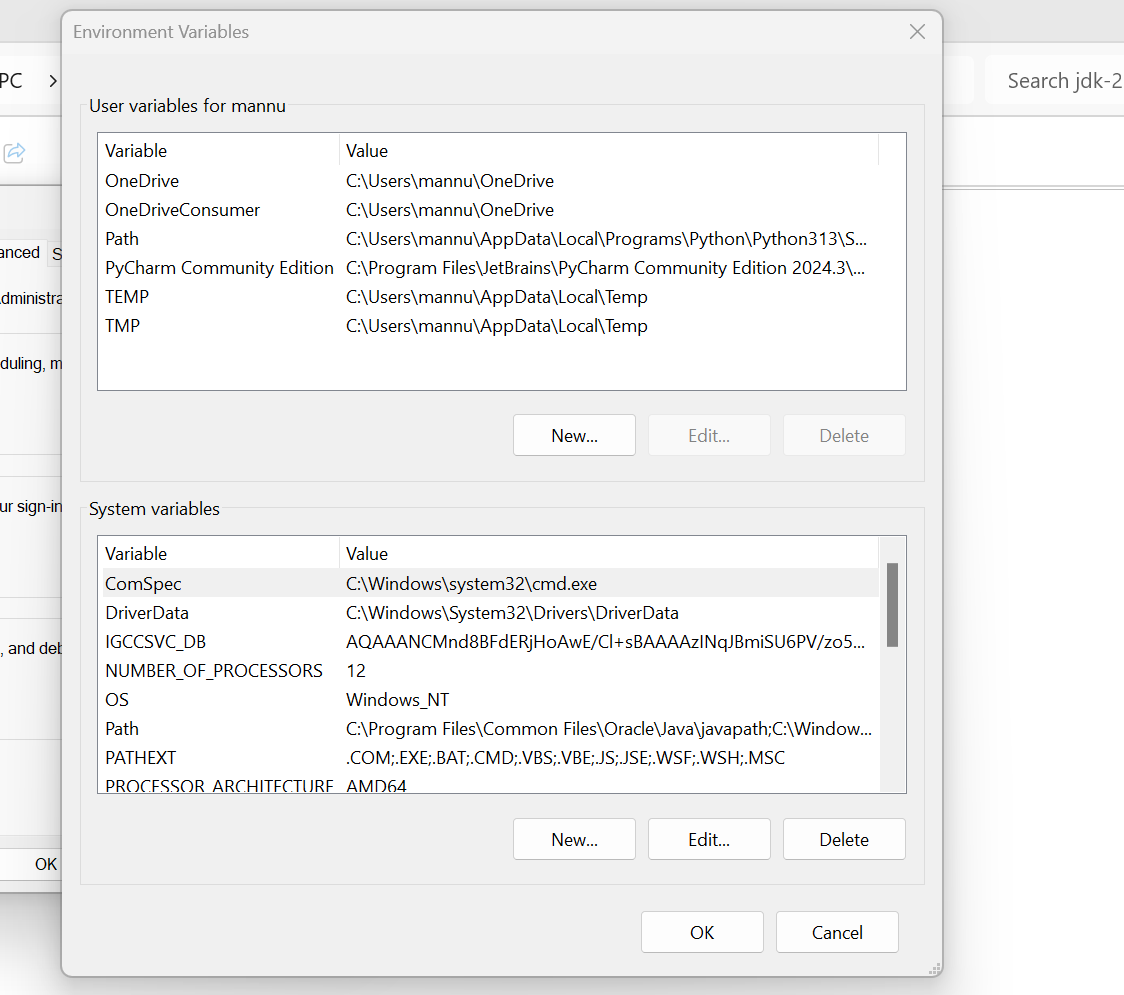
**Installing JDK (Java Development Kit):**

* 1. **Download JDK:**
* Go to the Oracle JDK download page in google and click on JDK-21 version which is Long term support (LTS) version.
* Click the download link as your operating system (Windows, macOS, or Linux).
  1. **Install JDK:**
* Once downloaded, run the installer.
* Follow the given instructions and keep clicking "Next" until it is done.
  1. **Set Environment Variables (Windows):**
* Open file explorer, then right click on This PC next select on properties then it will take you to the settings app then click on advanced system settings and then click on **Environment Variables**.
* Click on path and new under **System Variables**:

**Variable value:** The folder address where JDK is installed (like

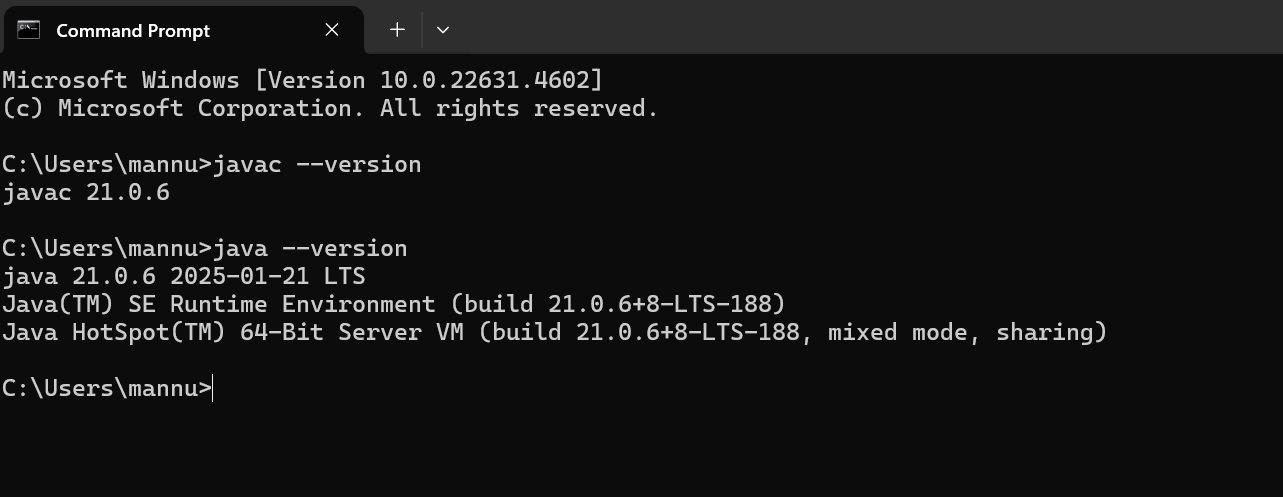
C:\Program Files\Java\jdk-21\bin)

* Find Path under **System Variables**, click **New**, and add the path of the jdk-21(C:\Program Files\Java\jdk-21\bin)



**Checking JDK Version: -**

* 1. **Open Command Prompt:**
* Presswin+R, typecmd, and press Enter.
  1. **Check Version:**
* Type java -version and press Enter.
* Type javac --version and press Enter.



1. **Simple Java Program for printing Name, Class, Roll No, of a Student**

Write your code in Notepad and execute it in cmd prompt

**CODE: -**

class Main

{

public static void main(String[] args)

{

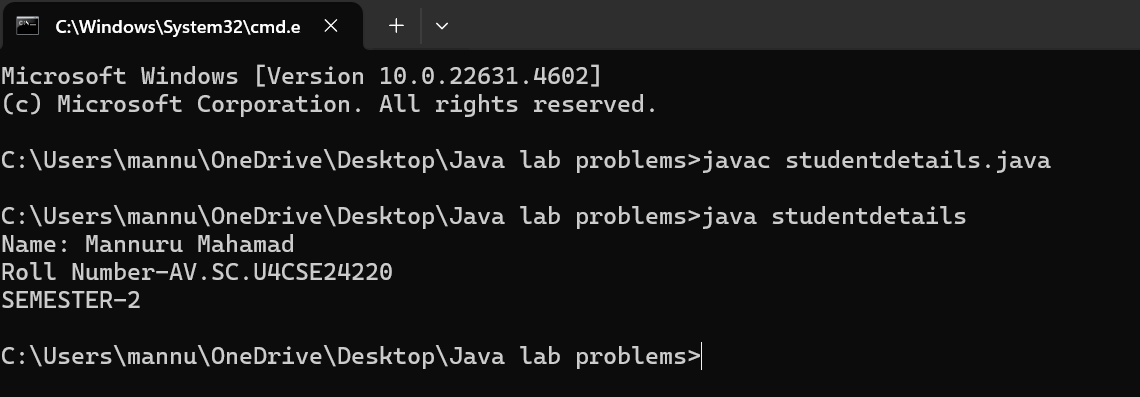
System.out.println("Name: Mannuru Mahamad");

System.out.println("Roll Number-AV.SC.U4CSE24220");

System.out.println("SEMESTER-2");

}

}

**Output: -**

Errors

|  |  |  |
| --- | --- | --- |
| 1 | Syntax error | Semicolon added |
| 2 | Runtime error | Copied correct path |
| 3 | Name error | rectified |

**WEEK -2 (LAB)**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Title** | **Pg no** |
| **1** | **Write a java program to calculate the area of rectangle:** | **8-9** |
| **2** | **Write a java program to find simple interest where all inputs are taken from user:** | **8-11** |
| **3** | **Write a java program to calculate the FibonacciSequence of a input taken from user:** | **11-14** |
| **4** | **Write a java program to convert temperature from Celsius to Fahrenheit:** | **14-15** |
| **5** | **Write a java program to convert temperature from Fahrenheit to Celsius:** | **16-18** |
| **6** | **Write a java program to calculate factorial of a number , read the input from user:** | **18-20** |
| **7** | **Write a java program to calculate the area of triangle by using heron’s formula** | **20-22** |

**SIMPLE JAVA programs**

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

SYNTAX:

import java.util.\*;

classdemo

{

public static void main(String[] args)

{

Scanner sc = new Scanner(System.in);

System.out.println(“enter a number:”);

int l = sc.nextInt();

System.out.println(“enter a number;”);

int b = sc.nextInt();

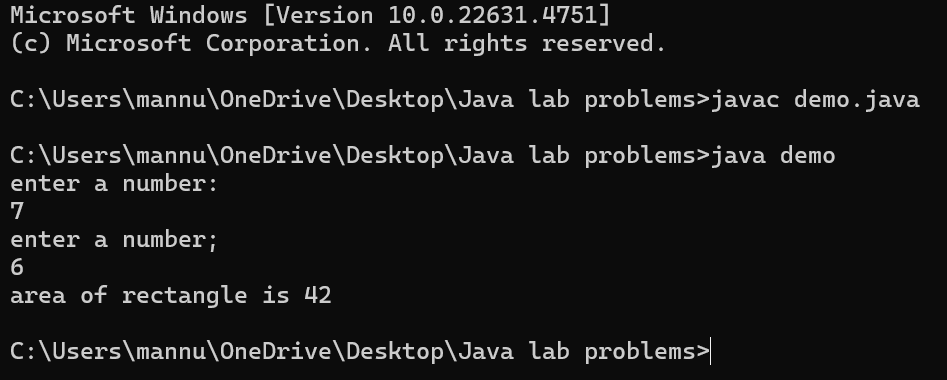
int a = l\*b;

System.out.println(“area of rectangle is “+a);

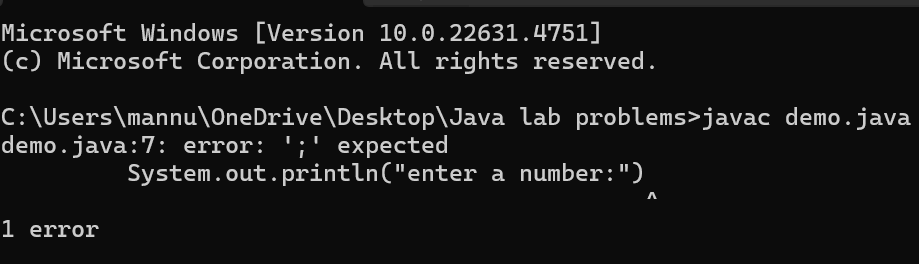
}

}

**OUTPUT:**



Negative Case:



**Errors:**

|  |  |  |
| --- | --- | --- |
| 1 | Syntax error | Semicolon added |
| 2. | Name error | rectified |

**2. Write a java program to find simple interest where all inputs are taken from user:**

Syntax:

import java.util.\*;

class test

{

public static void main(String[] args)

{

System.out.println(" taking input");

Scanner sc = new Scanner(System.in);

System.out.println("enter INTa number:");

float p = sc.nextFloat();

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

float t = sc.nextFloat();

System.out.println("enter a num:");

float r = sc.nextFloat();

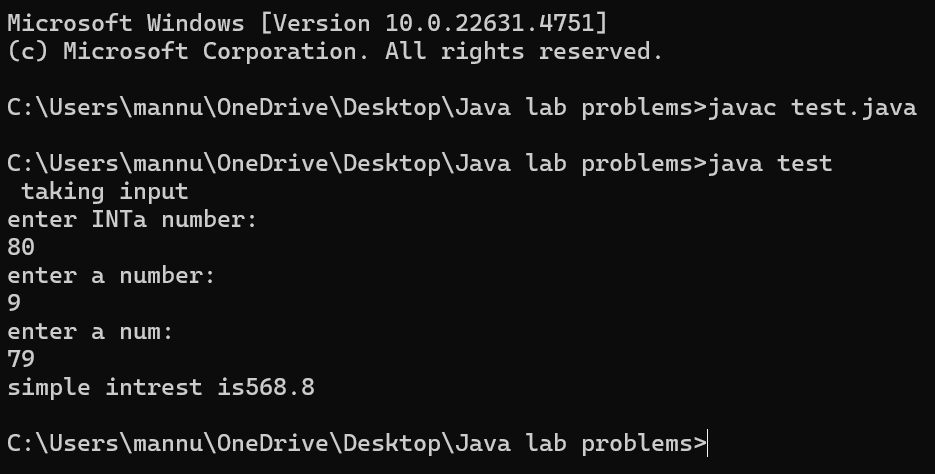
float s = (p\*t\*r)/100;

System.out.println("simple intrest is"+s);

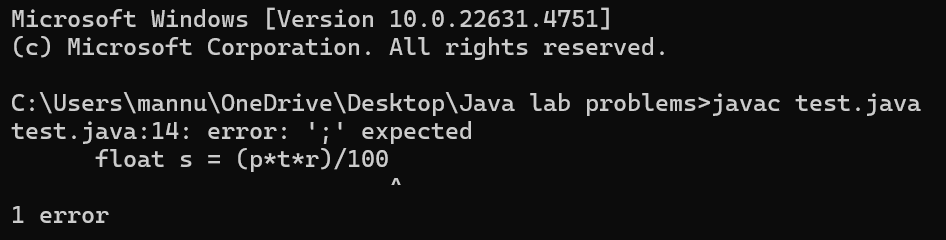
}

}

**OUTPUT:**



Negative Case:



**Errors:**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Error type | Reason for error | rectification |
|  |  |  |  |
| 1 | Runtime error | Incorrect path | Copied correct path |
| 2 | Syntax error | { missing | { added |
| 3 | Logical error | Wrong formula | Formula rectified |

**3.Write a java program to calculate the FibonacciSequence of a input taken from user:**

Syntax: import java.util.\*;

class fibo

{

public static void main(String args[])

{

Scanner sc = new Scanner(System.in);

int num;

int f3;

int f1 = 0;

int f2 = 1;

int i = 2;

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

num = sc.nextInt();

System.out.println(f1);

System.out.println(f2);

while(i<num)

{

f3 = f1+f2;

f1 = f2;

f2 = f3;

System.out.println(f3);

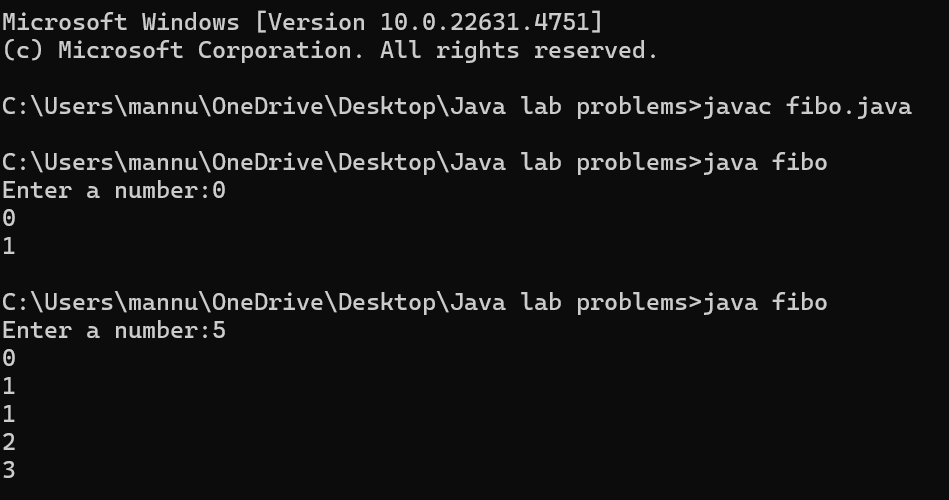
i = i+1;

}

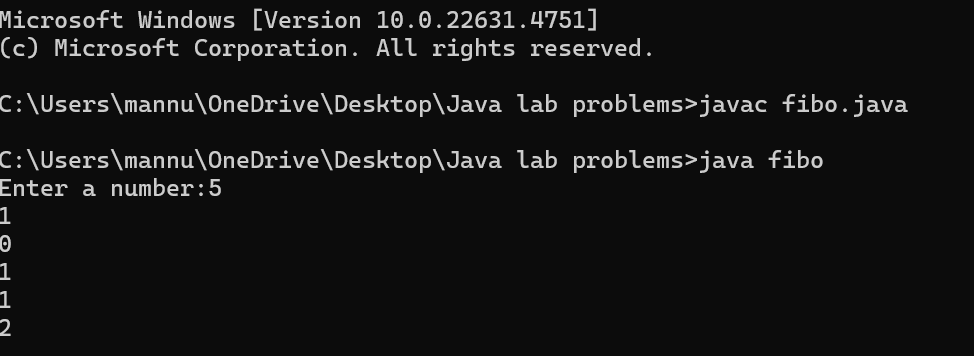
}

}

**OUTPUT:**



**Negative Case:**

****

**Errors:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** | **Rectification** |
| **1** | **Name error** | **Incorrect usage of function** | **Correcting by using correct formula** |
| **2** | **Syntax error** | **No semicolon** | **Acolnidded sem** |
| **3** | **Runtime error** | **Incorrect path** | **Copied correct path** |

**4.Write a java program to convert temperature from Celsius to Fahrenheit:**

**CODE:**

import java.util.\*;

class heat

{

public static void main(String args[])

{

Scanner sc = new Scanner(System.in);

float f;

System.out.println("Enter celsius temperature:");

float c = sc.nextFloat();

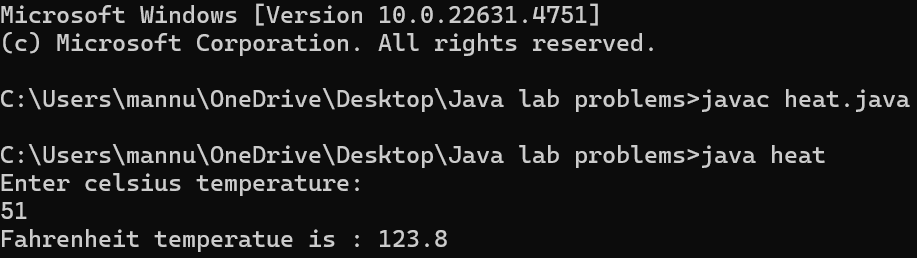
f = (c\*9/5)+32;

System.out.println("Fahrenheit temperatue is : "+f);

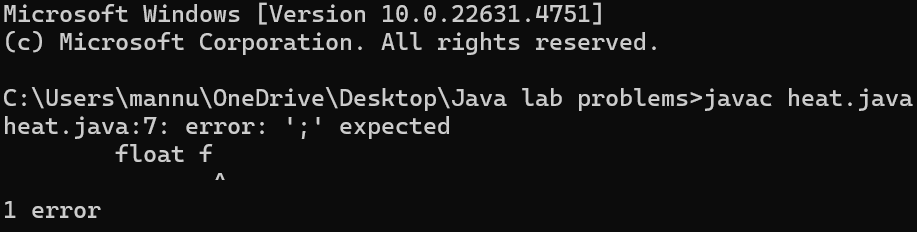
}

}

**OUTPUT:**



**Negative case:**

****

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Error type | Reason for error | Rectification |
| 1 | Runtime error | Incorrect path selection | Correct path added |
| 2 | Logical error | Incorrect formula | Correct formula  rectified |
| 3 | Import package error | Incorrect importing of  Packages | Imported util.\*;  Package |

**5.Write a java program to convert temperature from Fahrenheit to Celsius:**

import java.util.\*;

class far

{

public static void main(String[] args)

{

Scanner sc = new Scanner(System.in);

float c;

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

float f = sc.nextFloat();

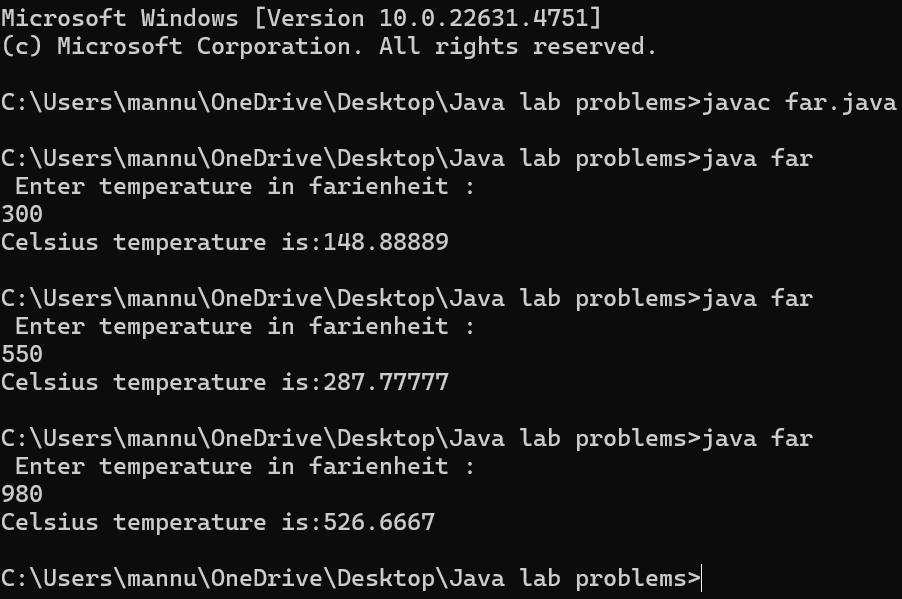
c = (f-32)\*5/9;

System.out.println("Celsius temperature is:"+c);

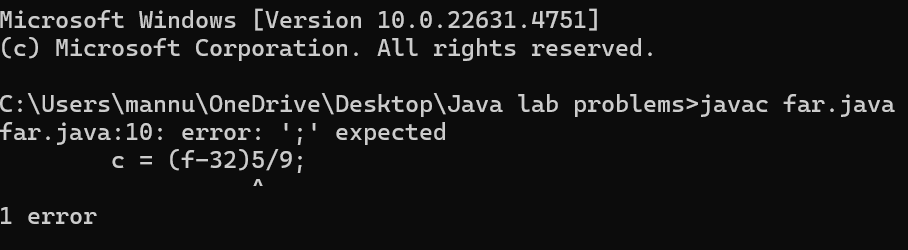
}

}

**OUTPUT:**

****

**Negative Case:**

****

**Error:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** | **rectification** |
| **1.** | **Syntax** | **No semicoln** | **Added semicoln** |
| **2.** | **Logical error** | **Due to incorrect input** | **Corrected by giving correct input** |
| **3.** | **Runtime error** | **Incorrect path** | **Using correct path** |

**6. Write a java program to calculate factorial of a number , read the input from user:**

Syntax:

import java.util.\*;

class factorial

{

public static void main(String[] args)

{

int number;

Scanner sc = new Scanner(System.in);

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

number= sc.nextInt();

int answer= factorial(number);

System.out.println("factorial of"+ number+ "is"+answer);

}static int factorial(int n){

{

if (n == 1)

return 1;

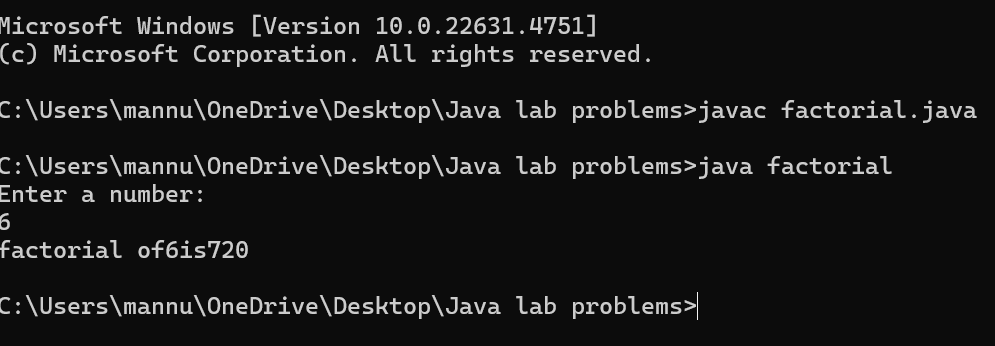
}

return n \* factorial(n - 1);

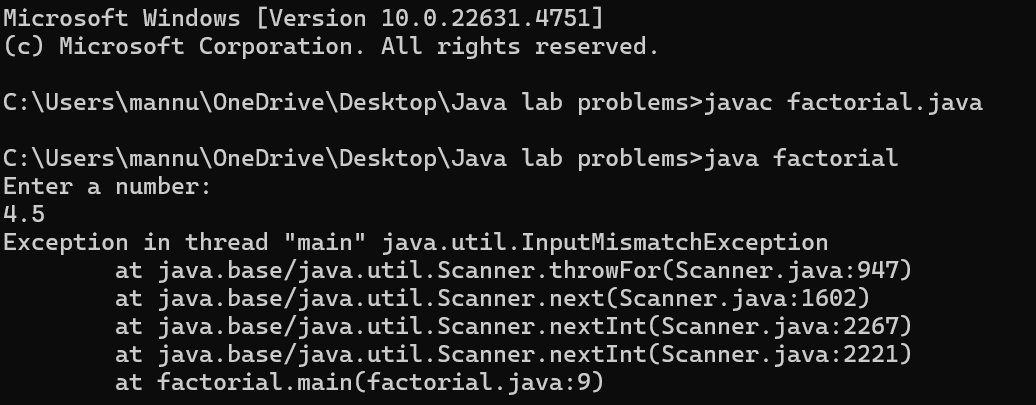
}

}

**OUTPUT:**

****

**Negative Case:**

****

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Error type | Reason for error | Rectification |
| 1 | Undeclared variable error | Missing variable | Variable declared |
| 2 | Missing import statement | Not importing packages | Packages imported |
| 3 | Logical error | Wrong formula | Formula rectified |

**7.Write a java program to calculate the area of triangle by using heron’s formula:**

import java.util.\*;

import java.lang.Math;

class heron

{

public static void main(String args[])

{

double s, c,a,b,p;

Scanner sc = new Scanner(System.in);

System.out.println("Enter the values of a , b and c:");

a = sc.nextDouble();

b = sc.nextDouble();

c = sc.nextDouble();

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

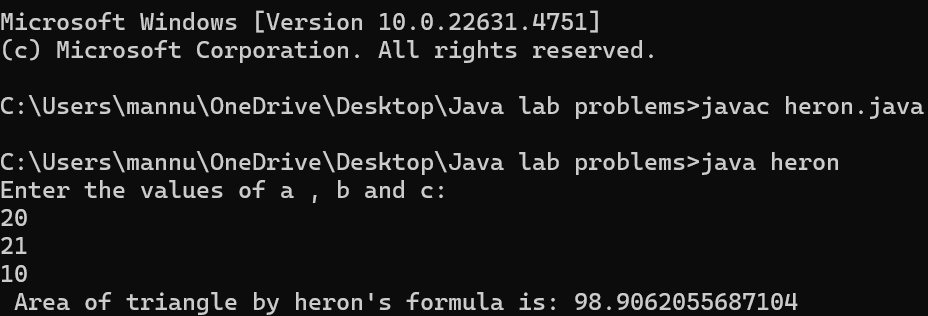
p = Math.sqrt(s\*(s-a)\*(s-b)\*(s-c));

System.out.println(" Area of triangle by heron's formula is: "+p);

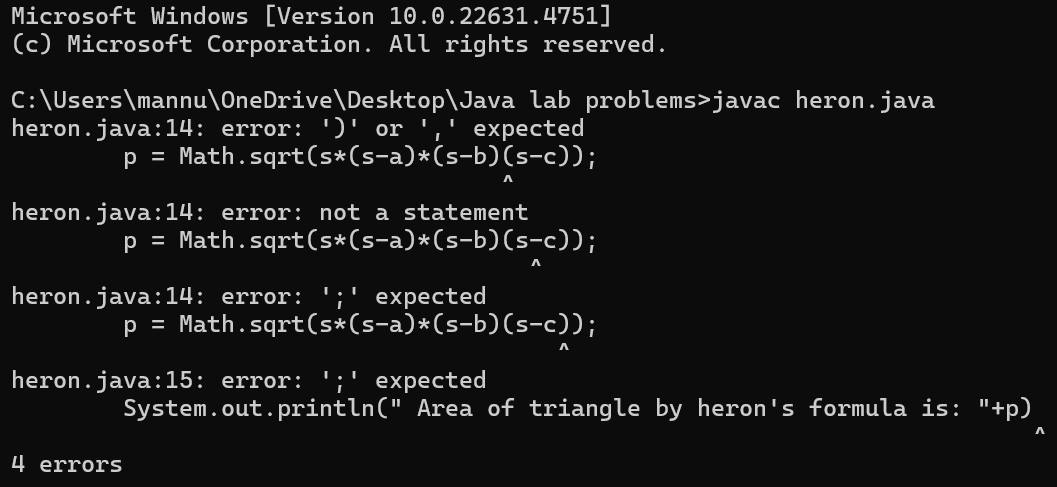
}

}

**OUTPUT:**

****

**Negative Case:**

****

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Error type | Reason for error | Rectification |
| 1 | Logical error | Incorrect formula | Formula rectified |
| 2 | Name error | Undeclared variable | Variable declared |

**WEEK -3(LAB)**

|  |  |  |
| --- | --- | --- |
| S.No | Title | Pg no |
| 1 | Create a java program with following instructions   1. Create a class with name car 2. Create four attributes named Car\_color , Car\_brand, fuel\_type,mileage 3. Create three methods named start(),stop(),service() 4. Create three objects named Car1, Car2 and Car3 |  |
| 2 | Create a class bankAccount with elements deposit() and Withdrawl |  |

**Aim:**

**To create java program with following instructions**

**1.Create a class with name car**

**2. Create four attributes named car\_color ,Car\_brand,fuel\_type,mileage**

**3. Create three methods named start(), stop(). Service()**

**4. Create three objects named car1,car2 and car3**

**CODE:**

import java.util.\*;

class car

{

public String Car\_color;

public String Car\_brand;

public String fuel\_type;

public int mileage;

public void start()

{

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

System.out.println("Car color is :"+Car\_color);

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

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

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

}

public void service()

{

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

System.out.println("Car color is :"+Car\_color);

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

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

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

}

public void stop()

{

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

System.out.println("Car color is :"+Car\_color);

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

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

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

}

public static void main(String args[])

{ System.out.println("\nMahamad Mannuru\n\n");

car car1 = new car();

car1.Car\_color = "Blue";

car1.Car\_brand = "Audi";

car1.fuel\_type = "Deisel";

car1.mileage = 100;

car1.start();

car car2 = new car();

car2.Car\_color = "Red";

car2.Car\_brand = "Tesla";

car2.fuel\_type = "EV";

car2.mileage = 200;

car2.stop();

car car3 = new car();

car3.Car\_color = "Yellow";

car3.Car\_brand = "BMW";

car3.fuel\_type = "Petrol";

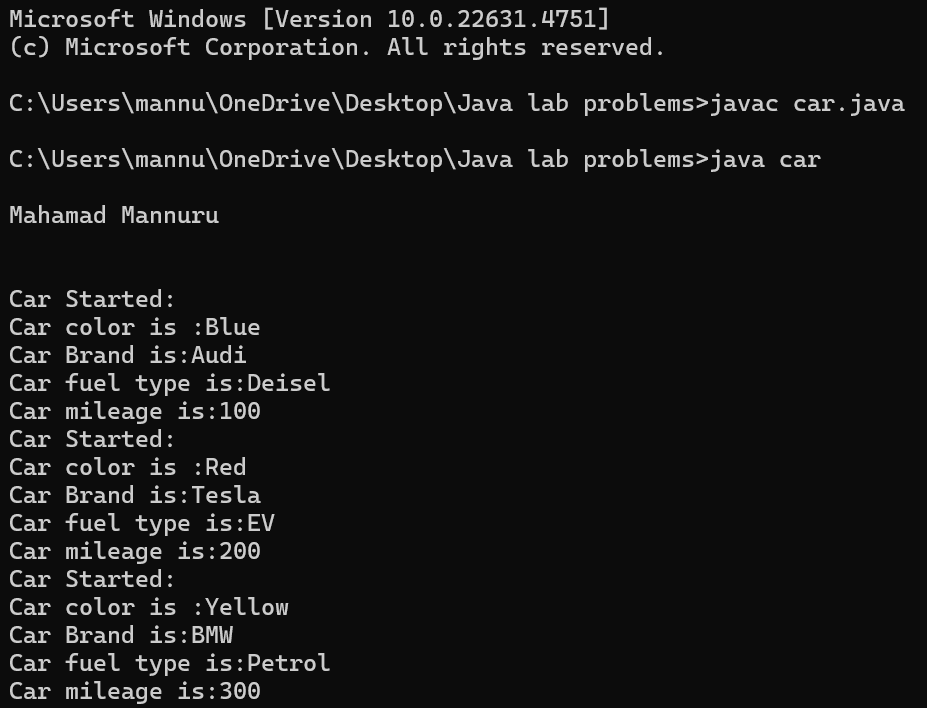
car3.mileage = 300;

car3.service();

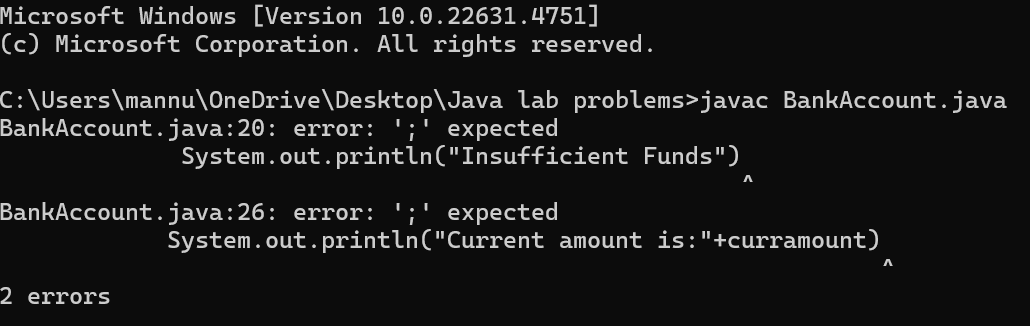
}

}

**OUTPUT:**

****

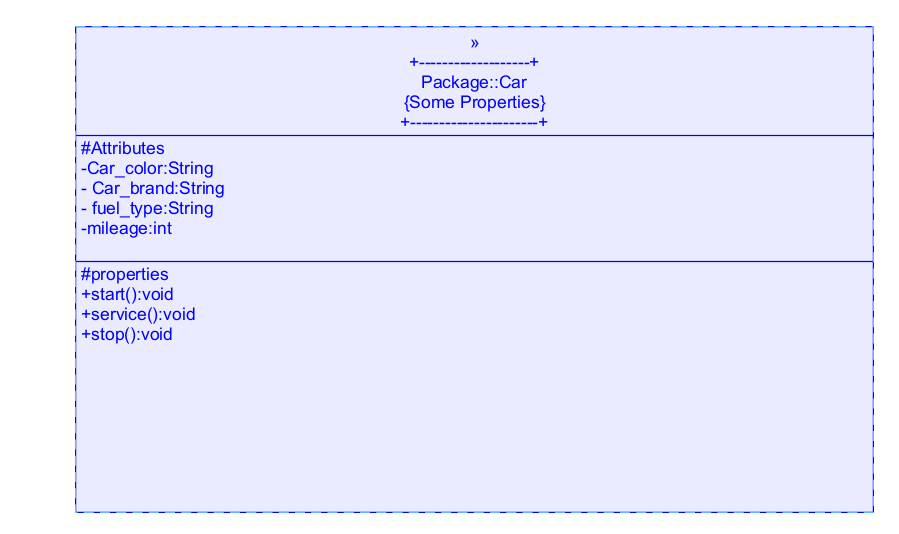
**Negative Case:**

****

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| S No | Error Type | Cause of error | Rectification |
| 1 | Syntax Error | Missing ‘{‘ | ‘{‘ added |
| 2 | Compile time Error | Mispelled Variable call | Rectified with  Correct variable name |

**Class Diagram:**



**2.**

**Aim: To create a class bankAccount with methods deposit() and withdrawl**

**Code:**

class BankAccount

{

public String Acchname;

public int Accnumber;

public float curramount;

BankAccount(String Acchname, int Accnum,float curramount)

{

this.Acchname = Acchname;

this.Accnumber = Accnumber;

this.curramount = curramount;

System.out.println("Enter Account holder name:"+Acchname);

System.out.println("Enter Account number:"+Accnum);

System.out.println("Enter current amount:"+curramount);

}

public void withdraw(int withdraw)

{

if(withdraw>curramount)

{

System.out.println("Insufficient Funds");

}

else

{

curramount = curramount-withdraw;

System.out.println("withdraw amount is:"+withdraw);

System.out.println("Current amount is:"+curramount);

}

}

public void deposit(int deposit)

{

System.out.println("Deposited amount is :");

curramount = curramount+deposit;

System.out.println("Deposited amount is:"+deposit);

System.out.println("Total current amount is:"+curramount);

}

public static void main(String args[])

{

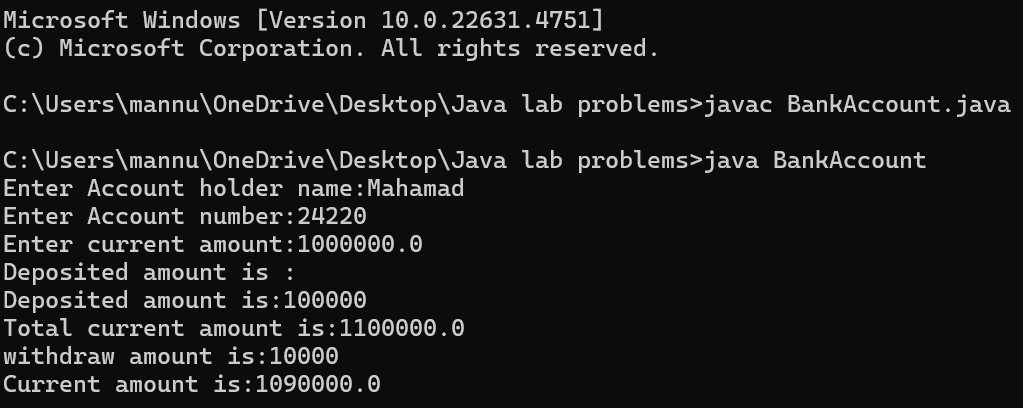
BankAccount b = new BankAccount("Hari",24210,100000);

b.deposit(10000);

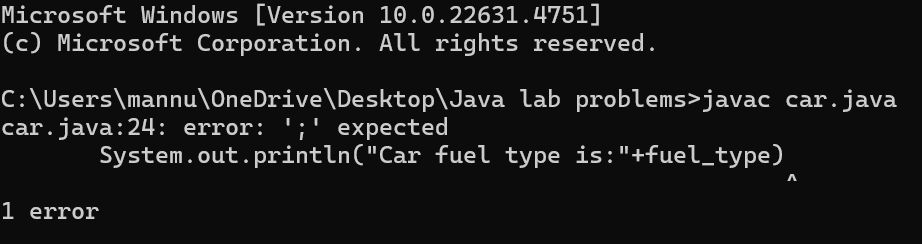
b.withdraw(500);

}}

**OUTPUT:**

****

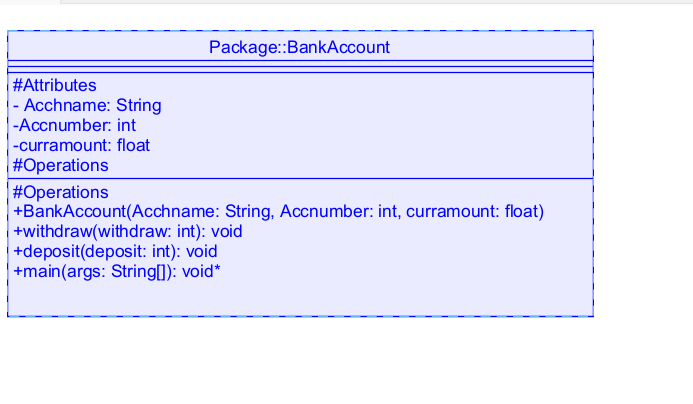
**Negative Case:**

****

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| s.no | Error name | Cause of error | Rectification |
| 1 | Name Error | Undefined name | Correct variable  Name replaced |
| 2 | Syntax Error | Missing Parenthesis | Parenthesis Added |
| 3 | Logical Error | Incorrect Condition | Condition Rectified |

**Class Diagram:**



**WEEK -4 (LAB)**

**1.AIM: WRITE A JAVA PROGRAM WITH CLASS NAMED “Book”. THE CLASS SHOUKD CONTAIN VARIOUS ATTRIBUTES SUCH AS TITLE, AUTHOR, YEAR OF PUBLICATION. IT SHOULD ALSO CONTAIN A CONSTRUCTOR WITH PARAMETERS WHICH INITIALIZES TITLE, AUTHOR, YEAR OF PUBLICATION AND CREATE A METHOD WHICH DISPLAYS THE DETAILS OF 2 BOOKS.**

**PROGRAM:**

public 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 displayDetails() {

System.out.println("Title: " +title);

System.out.println("Author: " +author);

System.out.println("Year of Publication" +year);

}

public static void main(String[] args) {

Book b1 = new Book("To Kill a Monkingbird", "Harper Lee", 1960);

Book b2 = new Book("The Great Gatsby", "F. Scott Fitzgerald", 1925);

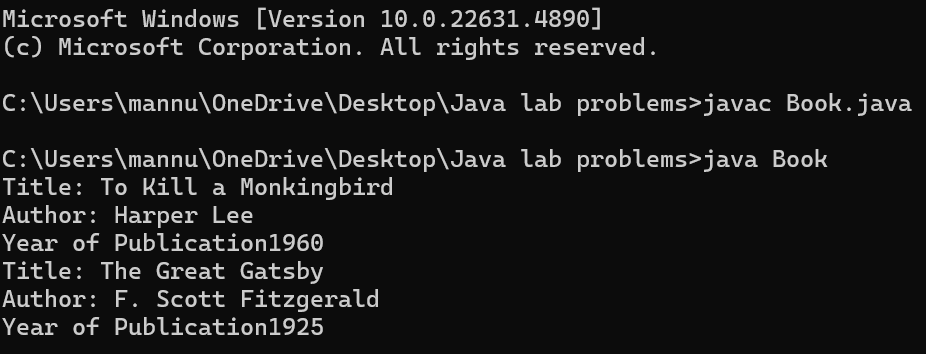
b1.displayDetails();

b2.displayDetails();

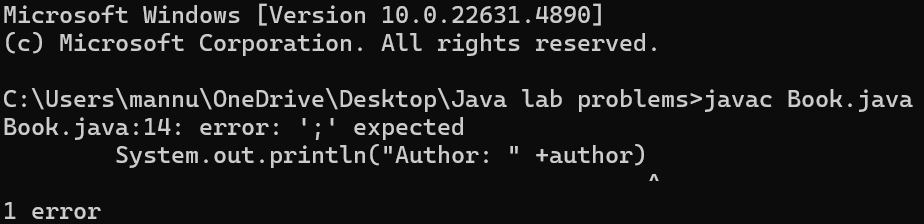
}

}

**OUTPUT:**



**NEGATIVE CASE:**



**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **ERROR TYPE** | **Reason for error** | **Rectification** |
| **1.** | Syntax error | No semicolon | Semicolon added |
| **2.** | Runtime error | Incorrect path | Copied correct path |

**CLASS DIAGRAM:**

|  |
| --- |
| Book |
| -title: String  -author: String  -year: int |
| + Book(title: String, author:String, year: int) + displayDetails(): void |

**IMPORTANT POINTS:**

1. **Constructor**:

* The constructor Book(String, String, int) is used to initialize the object when it is created.
* The keyword **this** is used to differentiate between class attributes and constructor parameters.

2.**Method**:

* The method displayDetails() is used to display the book details.
* The **System.out.println()** method prints the details to the console.

3. **Object Creation**:

* Two objects b1 and b2 are created using the constructor.

**2.AIM: WRITE A JAVA PROGRAM WITH CLASS NAMED “MyClass” WITH A STATIC VARIABLE COUNT OF INT TYPE. INTIALIZE IT TO ZERO AND A CONSTANT VARIABLE “Pi” OF TYPE DOUBLE INITIALIZED TO “3.14” AS ATTRIBUTES OF THAT CLASS. NOW DEFINE A CONSTRUCTOR FOR “MyClass”, THAT INCREMENTS THE COUNT VARIABLE EACH TIME AN OBJECT OF “MyClass” IS CREATED. FINALLY, PRINT THE FINAL VALUES**

**OF ‘COUNT’ AND ‘PI’ VARIABLES AND CREATE 3 OBJECTS.**

**PROGRAM:**

public class MyClass {

static int count = 0;

static final double pi = 3.14;

MyClass() {

count++;

}

public static void main(String[] args) {

MyClass obj1 = new MyClass();

MyClass obj2 = new MyClass();

MyClass obj3 = new MyClass();

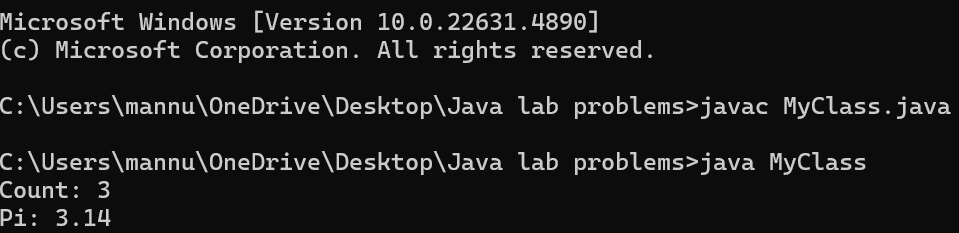
System.out.println("Count: " +count);

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

}

}

**OUTPUT:**

****

**NEGATIVE CASE:**

**ERROR:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error Type** | **Reason for error** | **Rectification** |
| **1.** | No class | No class name declared | Created class named ‘MyClass’ |
| **2.** | Syntax error | Not added keyword | Added keyword named ‘new’ |

**CLASS DIAGRAM:**

|  |
| --- |
| MyClass |
| -count: int (static)  -pi: double (static, final) |
| +MyClass()  +main(args: String[]):void |

**IMPORTANT POINTS:**

**1.Static Keyword**

* Static members belong to the **class, not to individual objects**.
* Only one copy of the static variable is maintained for all objects.

**2.Static Variable**

* **static int count**:
  + Shared among all objects of the class.
  + It is initialized only once and not for every object.
  + It increments every time the constructor is called.

**3.Final Variable**

* **static final double pi**:
  + The **final** keyword makes the variable constant.
  + Its value **cannot be changed** once assigned.
  + It must be initialized at the time of declaration.