23CSE111

OBJECT ORIENTED PROGRAMMING

LAB REPORT

Department of Computer Science Engineering

Amrita School of Computing

Amrita Vishwa Vidyapeetham, Amaravati Campus

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Department	CSE
Designation	Asst. Professor

INDEX

	e. Create a constructor with parameters with car color, car brand, fuel type, mileage.			
2	Create a class named bank account with methods deposit and withdraw. Where the deposit method should accepts a parameter and when this method is called the deposited amount should be added to current balance. In addition to that when a withdraw method is called it has to verify whether the withdraw amount is less than the current balance. If not display message saying that there are insufficient funds. Use the constructor to display the details of the customer (Name, Account number, IFSC code, Branch). Also create two customer objects C1, C2.	23		
	WEEK-4		05/3/2025	
1	Write a Java program with a class named book. The class should contain various attributes such as title, author, year of publication, and price. It should also contain a constructor with parameters that include title, author, year of publication, and price. Create a method that displays details of the book(Display the details of 3 books that is create 3 objects and display their details)	26		
2	Create a java program with a Class named "my class" with a static variable 'count' of int type static and initialized to zero and a constant variable 'pi' of type double initialized to 3.1415 as attributes of that class now define a constructor of my class that increments the count variable each time an object of my class is created and finally prints the final values of count and pi variables.	28		

	WEEK-5		12/3/2025	
1	Create a calculator using the operations including addition, subtraction, multiplication and division using multilevel in heritance and display the desired output.	30		
2	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. i. Cars should have an additional property: number of doors, Seating capacity. ii. Bikes should have a property indicating whether they have gears or not. iii. The system should also include a function to display details about each vehicle and indicate when a vehicle is starting. iv. Each class should have a constructor. Questions: 1. Which OOP concept is used in the above program? Explain why it is useful in this scenario. 2. If the company decides to add a new type of vehicle ‘Truck’, how would you modify the program? a. Truck should include and additional property capacity (in tons). b. Create a showTruck() method to display the truck’s capacity. c. Write a constructor for truck that initializes all properties.	32		

	3. Implement the truck class and update the main method to create a Truck object and also create an object for car and bike subclasses. Finally display the details.			
	WEEK-6		26/3/2025	
1	Write a Java program to create a vehicle class with a method displayInfo(). Override this method in the car subclass to provide specific information about a car, model, fuel type, and colour using the constructor	37		
2	Create a Java program for the scenario. A college is developing an automated admission system that verifies student eligibility for undergraduate (UG) and postgraduate(PG) programs. Each program has different eligibility criteria based on the student's percentage in their previous qualification. i) UG admissions require a minimum of 60% ii) PG admissions require a minimum of 70%	39		
3	Write a Java Program to create a Calculator class with overloaded methods to perform addition: Take the integer values a and b from the user. i) Add two integers ii) Add two doubles iii) Add three integer	40		
4	Write a Java Program to create a shape class with a method calculateArea() that is overloaded for different shapes(e.g., Square, Rectangle). Then create a subclass Circle that overrides the calculateArea() method for a circle.	42		

	WEEK-7		02/4/2025	
1	Write a Java program to create an abstract class Animal with an abstract method called sound(). Create subclasses Lion and Tiger that extend the Animal class and implement the sound() method to make a specific sound for each animal.	44		
2	Write a Java program to create an abstract class Shape3D with abstract methods calculateVolume() and calculateSurfaceArea(). Create subclasses Sphere and Cube that extend the Shape3D class and implement the respective methods to calculate the volume and surface area of each shape.	45		
3	write a java program using an abstract class to define a method for pattern printing Create an abstract class named pattern printer with an abstract method print pattern (int n) and a concrete method to display the pattern tittle. Implement two sub class : 1.star pattern -prints a right-angled triangle of stars(*) 2.number pattern-prints a right angled triangle of increasing numbers. In the main () method,create objects of both subclasses and print the pattern for a given number of rows.	46		
	WEEK-8		09/4/2025	
1	Write a java program to create an interface shape with getPerimeter() method. Create three classes Rectangle, Circle, and Triangle that implement the shape interface implement the getPerimeter() method for each of the three classes.	50		
2	Write a java program to create an interface playable with a method play that takes no arguments and returns play that takes no	52		

	arguments and returns void. Create 3 classes Football, Volleyball, Basketball that implements the playable interface and override the play method to play the respective sports.			
3	Write a java program to implement a login system using interfaces	54		
	WEEK-9		16/4/2025	
1	write a java program to create a method that takes a integer as a parameter and throws an exception if the public class even number	56		
2	2)write a java program to create a method that reads a file and throws an exception if the file is not found imp points buffered reader	57		
3	write a java program to handle arthematic expression try catch and finally	59		
4	write a java program to simulate a university system using inner classes create an outer class named "university" with a variable universityName inside it two non static inner classes: 1.department with variable like deptName and deptCode and a method to display department details 2.student with variables like student name and roll number and a method to display 3.create an object for each class and call their methods to display their details along with universityname ex: public class university{ string universityname="amrita Vishwa Vidyapeetham"	61		
	WEEK-10		30/4/2025	
1	write a java program to generate a password for a student using his/her initials and age the password displayed should be string consists of first character of first name middle name last name with age	65		

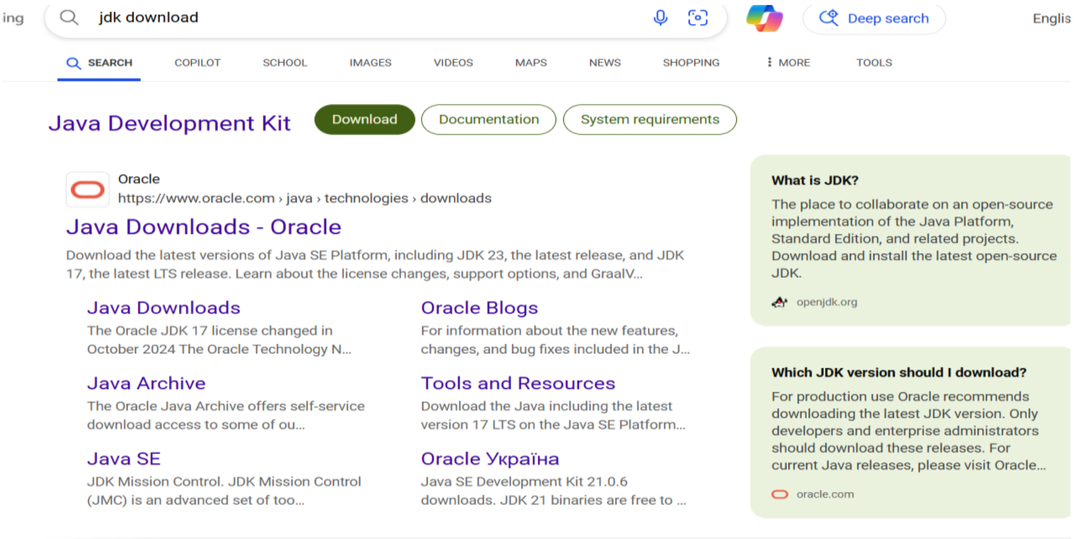
2	design and implement a java program that will do the following operations to this string "welcome! you are practicing strings concepts" *convert all alphabets to capital letters and print out the result *convert all aphabets into lower case letters and print out the resukt *print out the length of string *print out the index of course	67		
3	Implement a java program using the below array methods *sorting the elements(numbers &strings) of an array *convert the array elements into string *fill the part of an array *copy the elememts of one array into another	70		
4	Implement a java program using the below arraylist methods *insert an element at particular index in the array list *modify an element in the array list *access an element from the array list *remove an element from the array list *clear the elements from the array list	72		

WEEK-1

1) Explain the process of Installing JDK (Java Development Kit)

Installing of JDK (Java Development Kit):

1. **Download JDK:**
    - Go to the Oracle JDK download page in your web browser and click on JDK-21 version which is Long term support (LTS) version.
    - Click on the download link for your operating system (Windows, macOS, or Linux).
2. **Install JDK:**
    - Once downloaded, run the installer.
    - Follow the instructions and keep clicking "Next" until it's done.
    -
    -



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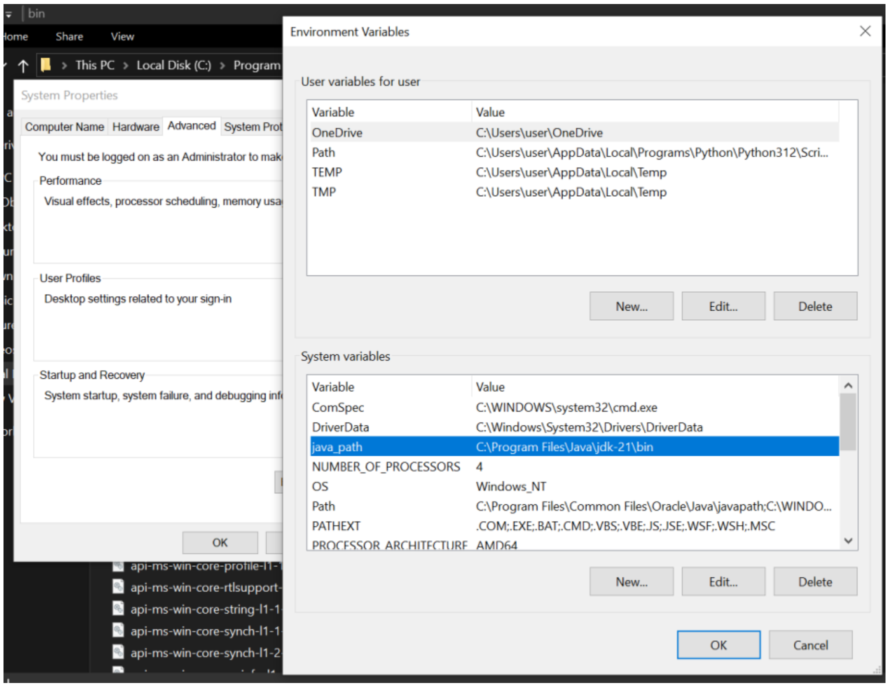
Oracle Україна
Java SE Development Kit 21.0.6 downloads. JDK 21 binaries are free to ...

What is JDK?
The place to collaborate on an open-source implementation of the Java Platform, Standard Edition, and related projects. Download and install the latest open-source JDK.
openjdk.org

Which JDK version should I download?
For production use Oracle recommends downloading the latest JDK version. Only developers and enterprise administrators should download these releases. For current Java releases, please visit Oracle...
oracle.com

3. **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 **New** under **System Variables**:
        - **Set Variable name as:** java_home
        - **Variable value:** The folder address where JDK is installed (like C:\Program Files\Java\jdk-21\bin)
    - Find Path under **System Variables**, click **Edit**, and add the path of the jdk-21(C:\Program Files\Java\jdk-21\bin)


bin
Home
Share
View
This PC > Local Disk (C:) > Program
System Properties
Computer Name
Hardware
Advanced
System Prot
You must be logged on as an Administrator to mak
Performance
Visual effects, processor scheduling, memory usa
User Profiles
Desktop settings related to your sign-in
Startup and Recovery
System startup, system failure, and debugging inf
OK
Environment Variables
New...
Edit...
Delete
OK
Cancel

User variables for user

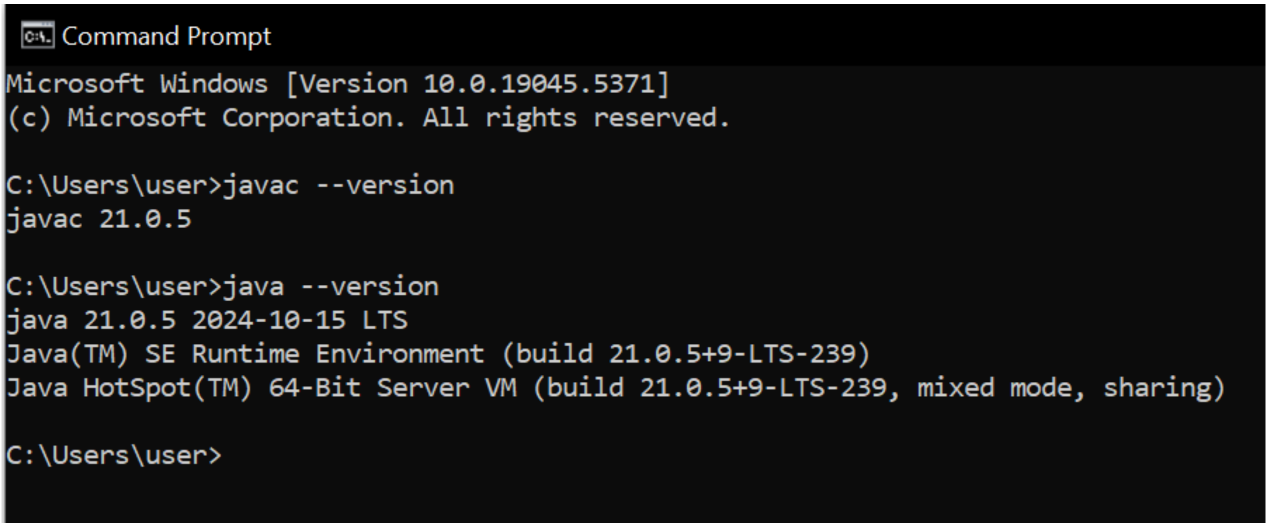
Variable	Value
OneDrive	C:\Users\user\OneDrive
Path	C:\Users\user\AppData\Local\Programs\Python\Python312\Scri...
TEMP	C:\Users\user\AppData\Local\Temp
TMP	C:\Users\user\AppData\Local\Temp

System variables

Variable	Value
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
java_path	C:\Program Files\Java\jdk-21\bin
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files\Common Files\Oracle\Java\javapath;C:\WINDO...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE	AMD64

Checking of JDK Version:

1. **Open Command Prompt:**
   - Press win+R, type cmd, and press Enter.
2. **Check Version:**
   - Type java --version and press Enter.
   - Type javac --version and press Enter.



```
Microsoft Windows [Version 10.0.19045.5371]
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C:\Users\user>javac --version
javac 21.0.5

C:\Users\user>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\user>
```

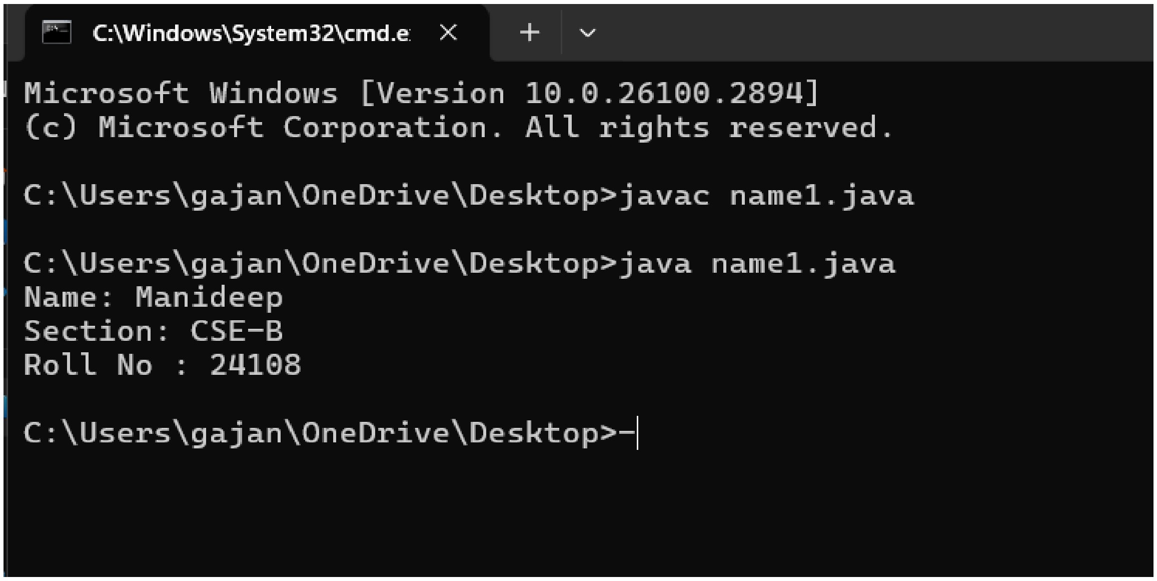
2) Simple Java Program for printing Name, Class, Roll No, of a Student

Write your code in Notepad and execute in cmd prompt

CODE:

```
class Main {
   public static void main(String[] args) {
      System.out.println("Name: Manideep");
      System.out.println("Section: CSE-B");
      System.out.println("Roll No : 24108");}}
```

Output:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Desktop>javac name1.java

C:\Users\gajan\OneDrive\Desktop>java name1.java
Name: Manideep
Section: CSE-B
Roll No : 24108

C:\Users\gajan\OneDrive\Desktop>-
```
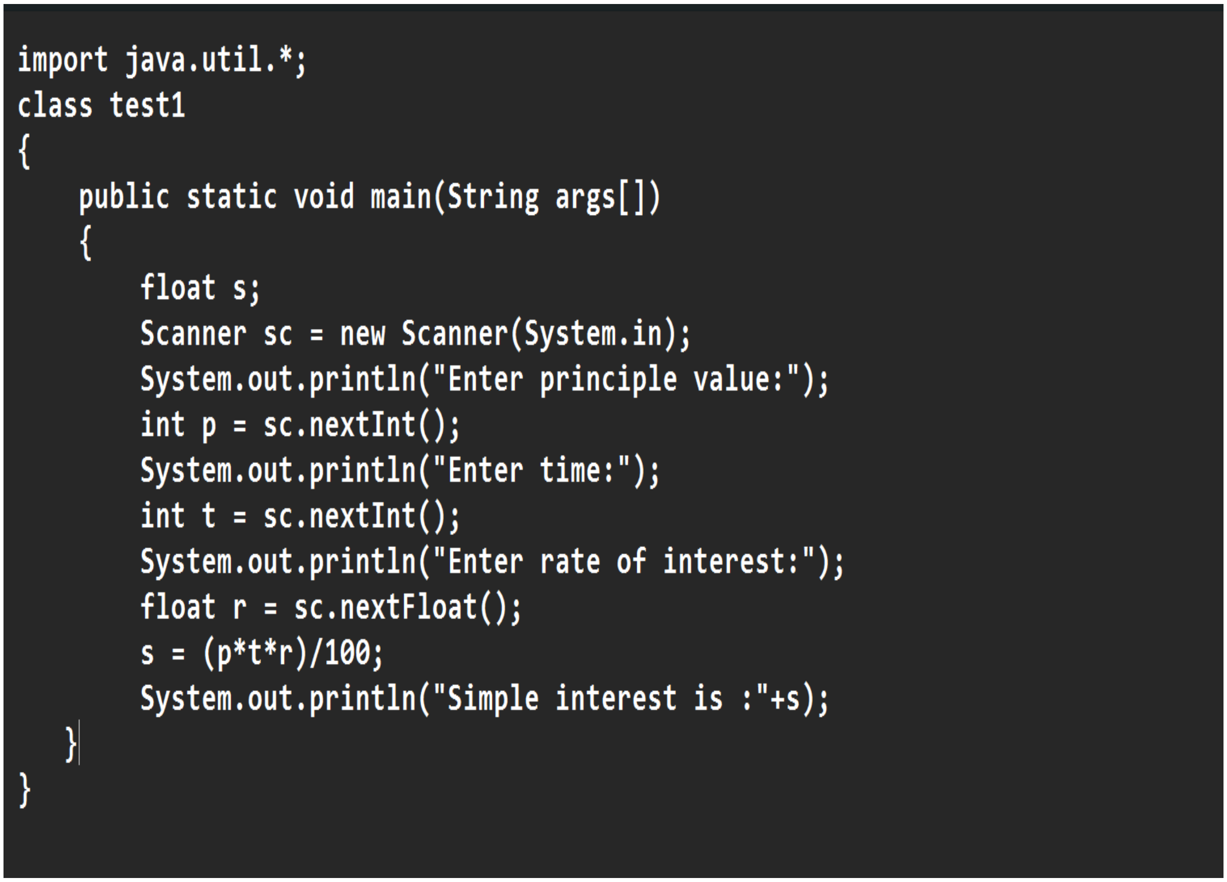

WEEK-2

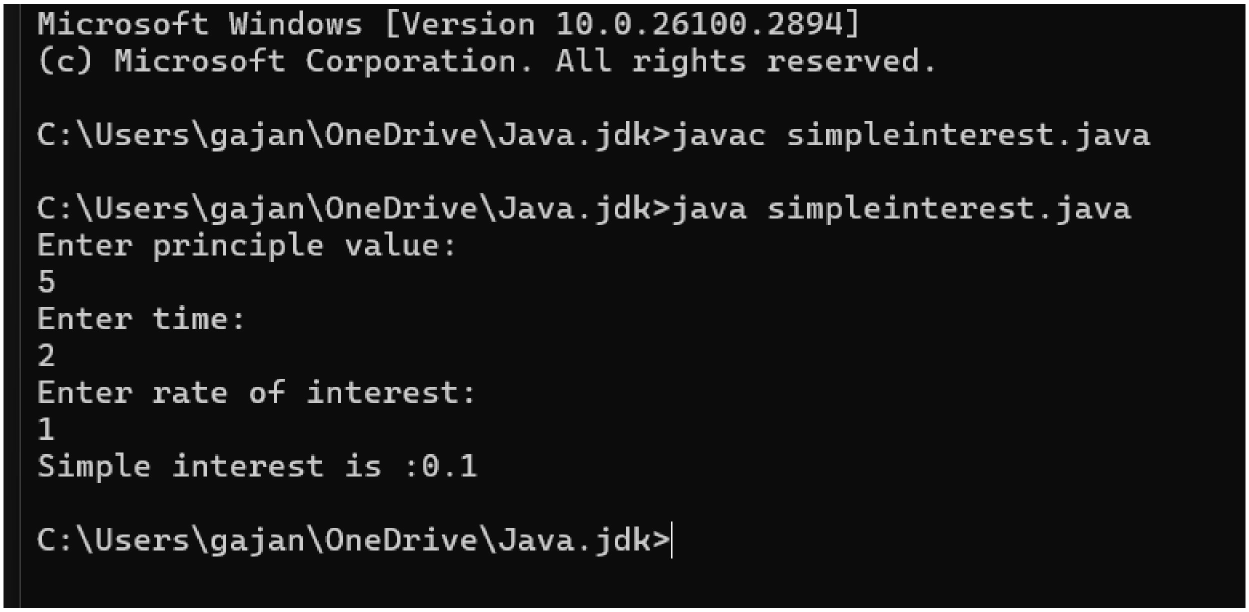
1) Simple Java Program for finding simple interest by taking input from User ?

Code:



```
import java.util.*;
class test1
{
    public static void main(String args[])
    {
        float s;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter principle value:");
        int p = sc.nextInt();
        System.out.println("Enter time:");
        int t = sc.nextInt();
        System.out.println("Enter rate of interest:");
        float r = sc.nextFloat();
        s = (p*t*r)/100;
        System.out.println("Simple interest is :"+s);
   }
}
```

Output:



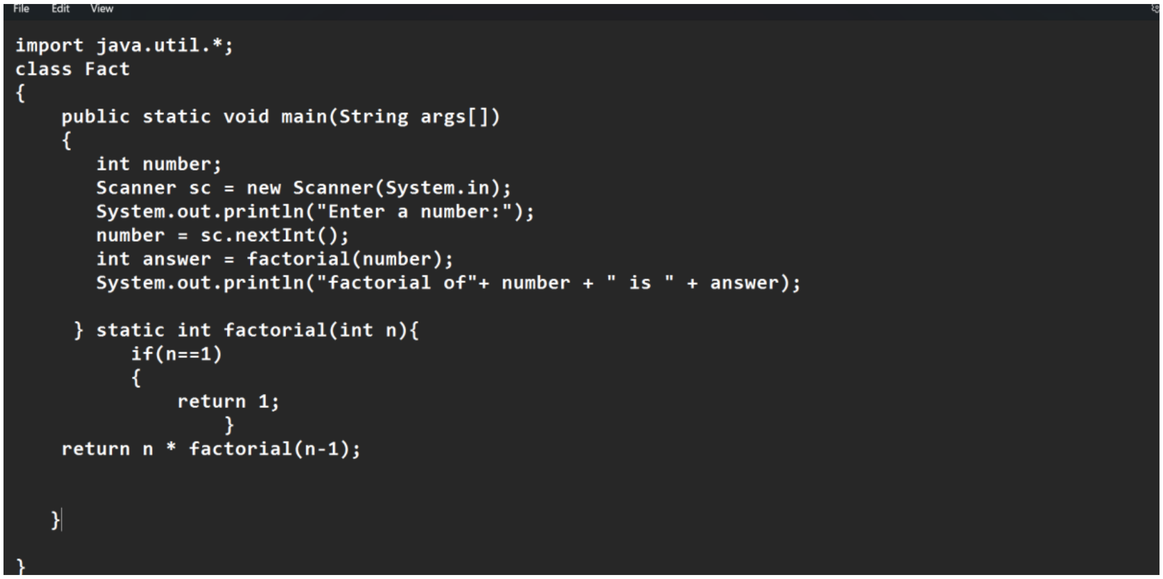
```
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Users\gajan\OneDrive\Java.jdk>javac simpleinterest.java

C:\Users\gajan\OneDrive\Java.jdk>java simpleinterest.java
Enter principle value:
5
Enter time:
2
Enter rate of interest:
1
Simple interest is :0.1

C:\Users\gajan\OneDrive\Java.jdk>
```

Error table:

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

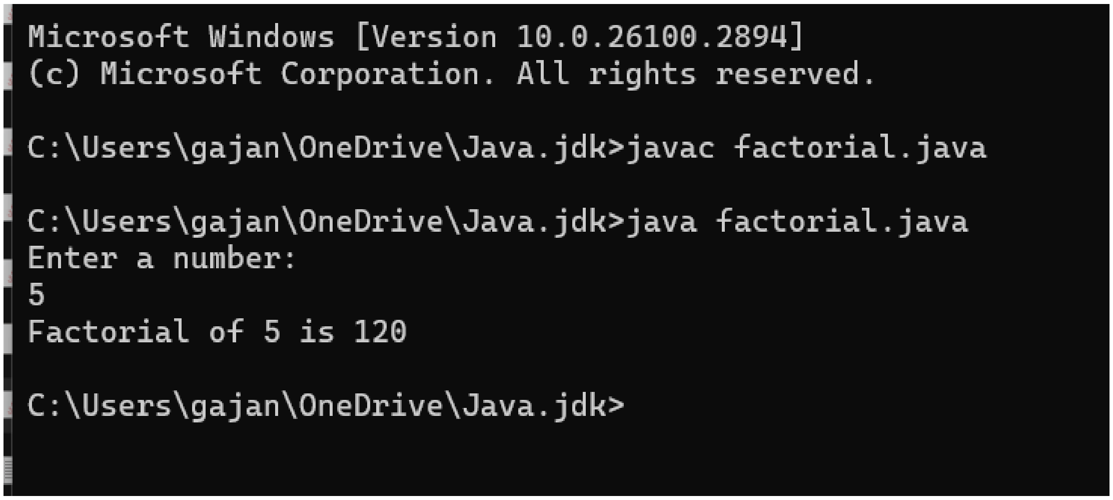
2.Write a simple program to calculate factorial of a number and read the input from user ?

code:



```
import java.util.*;
class Fact
{
    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:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Java.jdk>javac factorial.java

C:\Users\gajan\OneDrive\Java.jdk>java factorial.java
Enter a number:
5
Factorial of 5 is 120

C:\Users\gajan\OneDrive\Java.jdk>
```
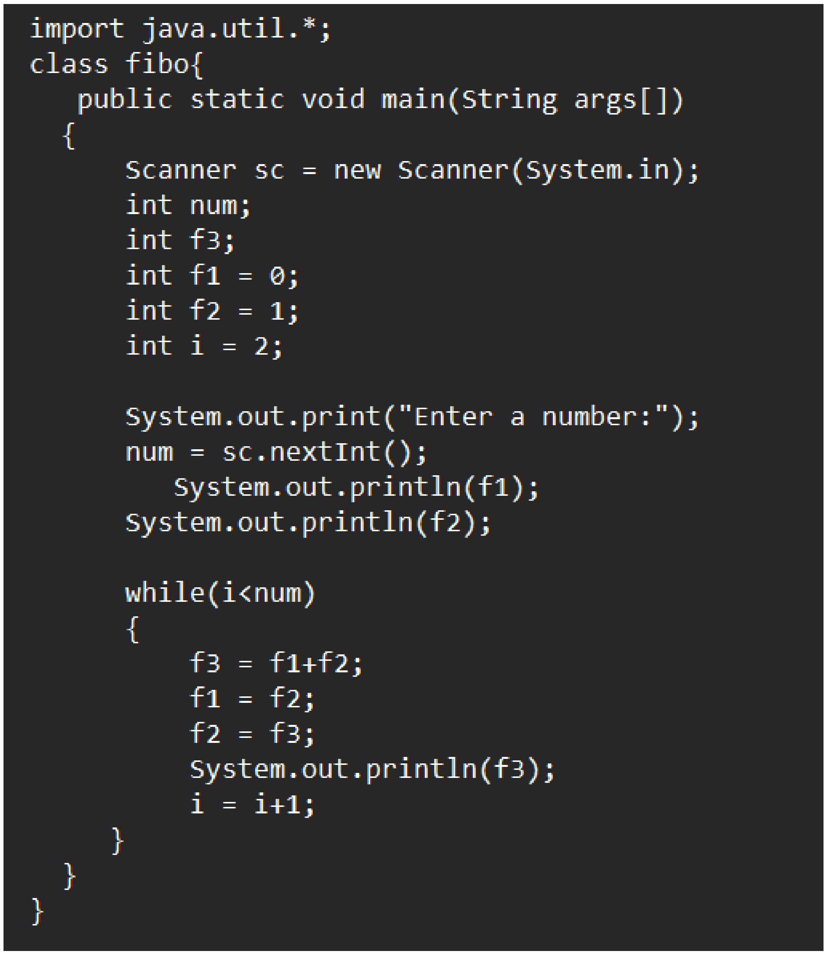

Error table:

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

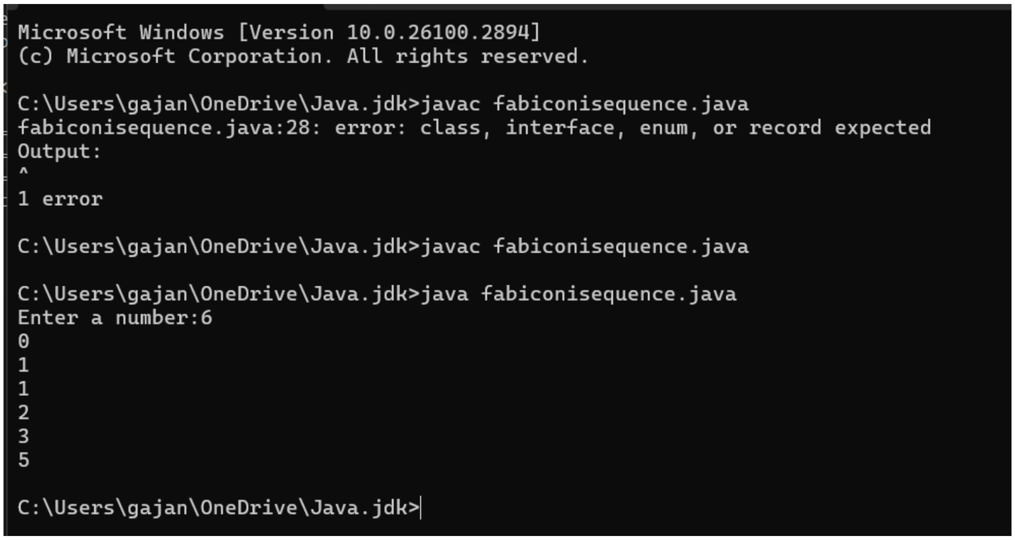
3.Write a program to to calculate the fibonacii sequence and take the input from user ?

Code:



```
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:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Java.jdk>javac fabiconisequence.java
fabiconisequence.java:28: error: class, interface, enum, or record expected
Output:
^
1 error

C:\Users\gajan\OneDrive\Java.jdk>javac fabiconisequence.java

C:\Users\gajan\OneDrive\Java.jdk>java fabiconisequence.java
Enter a number:6
0
1
1
2
3
5

C:\Users\gajan\OneDrive\Java.jdk>
```

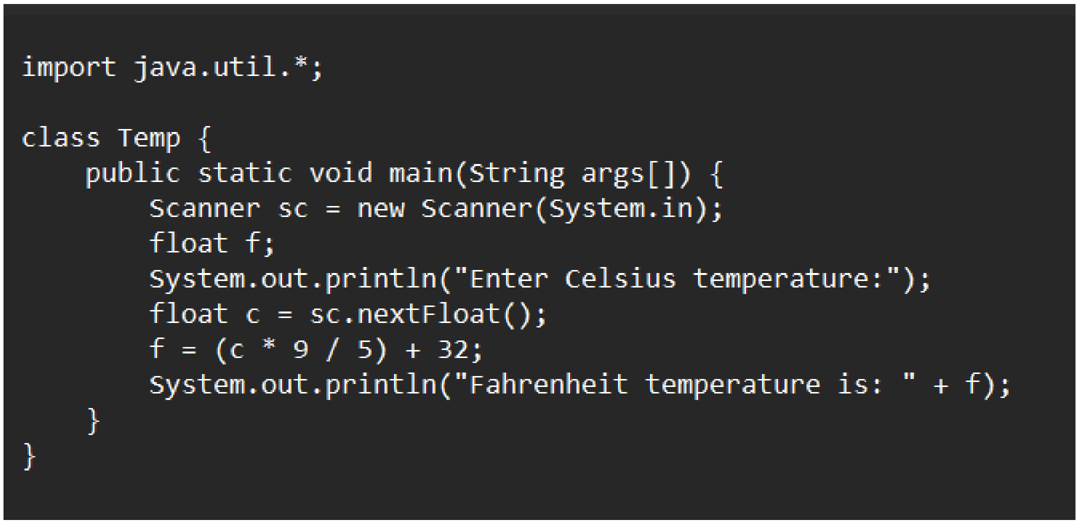
Error table:

S.No	Error type	Reason for error	Rectification

1	**Logical error**	**Incorrect formula**	**Formula rectified**
2	**Run-time error**	**Incorrect path**	**Added correct path**

4).Write a java program to convert temperature from Fahrenheit to celsius and take the input from user ?

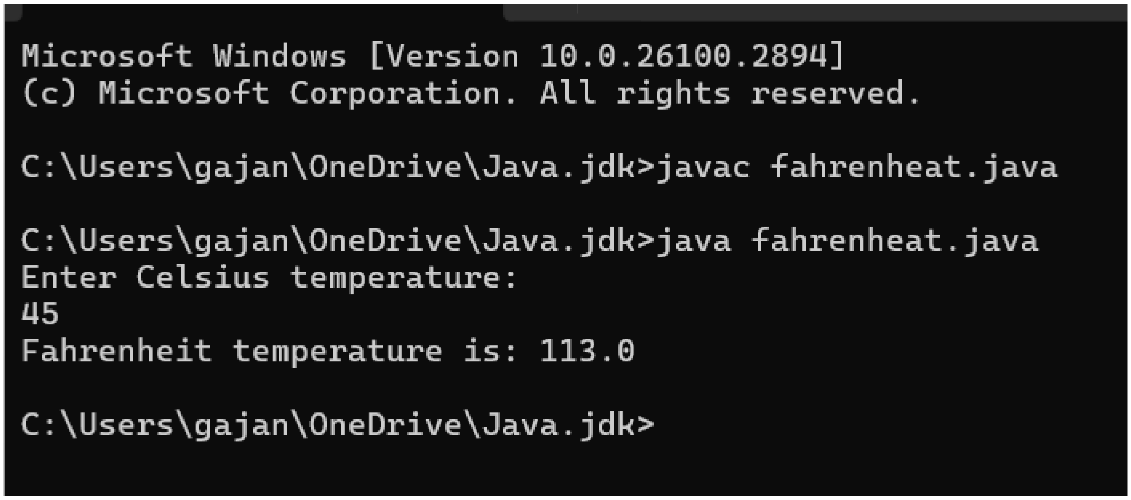
Code:



```java
import java.util.*;

class Temp {
    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 temperature is: " + f);
    }
}
```

Output:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Java.jdk>javac fahrenheat.java

C:\Users\gajan\OneDrive\Java.jdk>java fahrenheat.java
Enter Celsius temperature:
45
Fahrenheit temperature is: 113.0

C:\Users\gajan\OneDrive\Java.jdk>
```
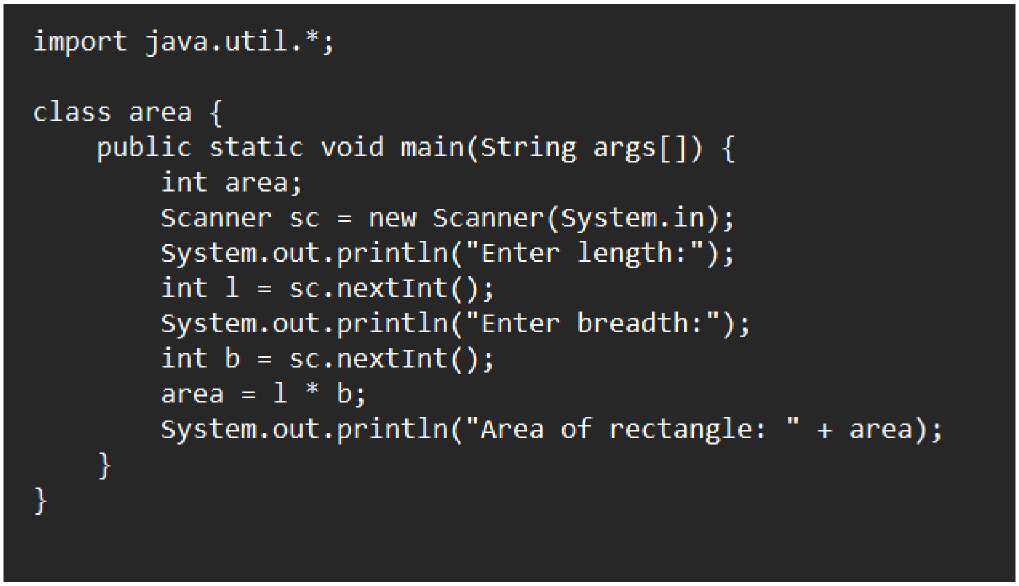

Error table:

S.No	Error type	Reason for error	rectification
1	Syntax error	Missing ”	“ is added
2	Missing import error	Util package missing	Util package added

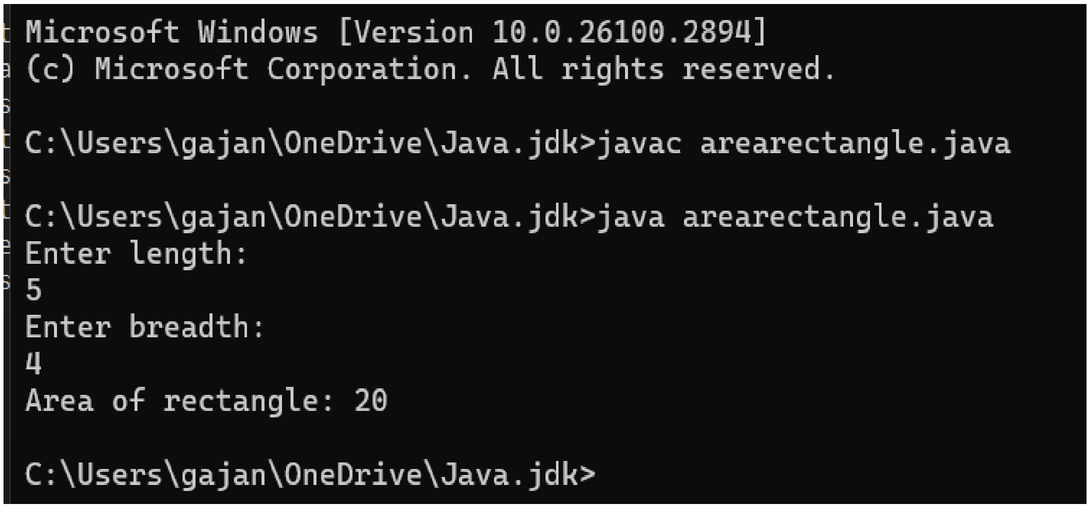
5).Write a simple program to find the area of rectangle and take the input from user ?

Code:



```
import java.util.*;

class area {
    public static void main(String args[]) {
        int area;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter length:");
        int l = sc.nextInt();
        System.out.println("Enter breadth:");
        int b = sc.nextInt();
        area = l * b;
        System.out.println("Area of rectangle: " + area);
    }
}
```

Output:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Java.jdk>javac arearectangle.java

C:\Users\gajan\OneDrive\Java.jdk>java arearectangle.java
Enter length:
5
Enter breadth:
4
Area of rectangle: 20

C:\Users\gajan\OneDrive\Java.jdk>
```
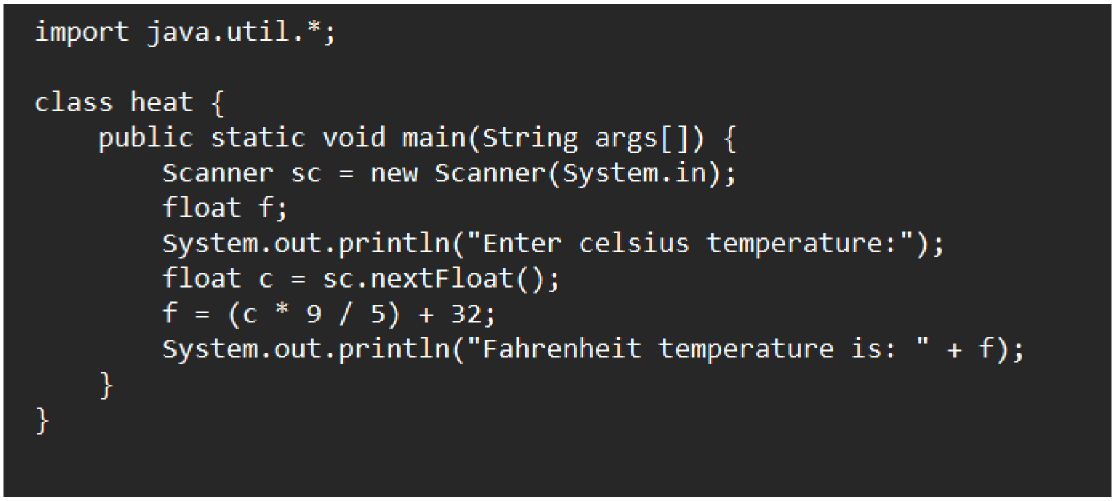

Error table:

S.No	Error type	Reason for error	Rectification
1	Syntax error	Semi colon missing	Semi colon added

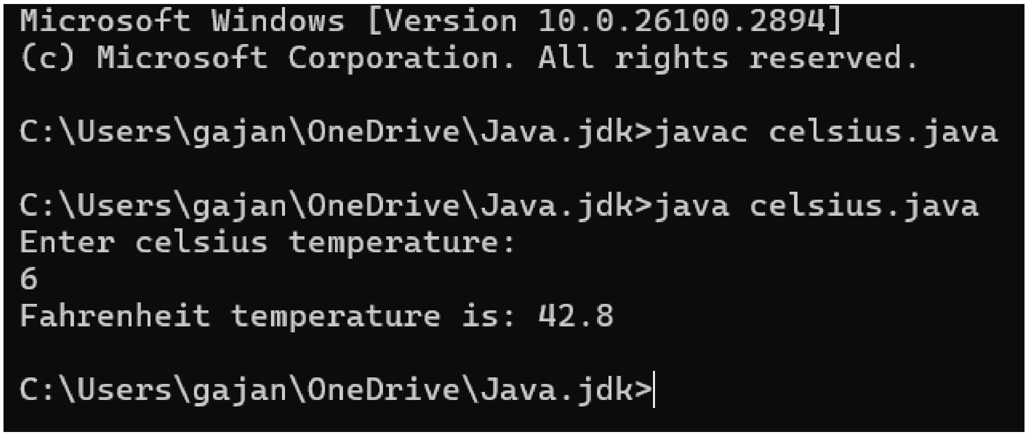
6).Write a java program to convert temperature from Celsius to Fahrenheit

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 temperature is: " + f);
    }
}
```

Output:



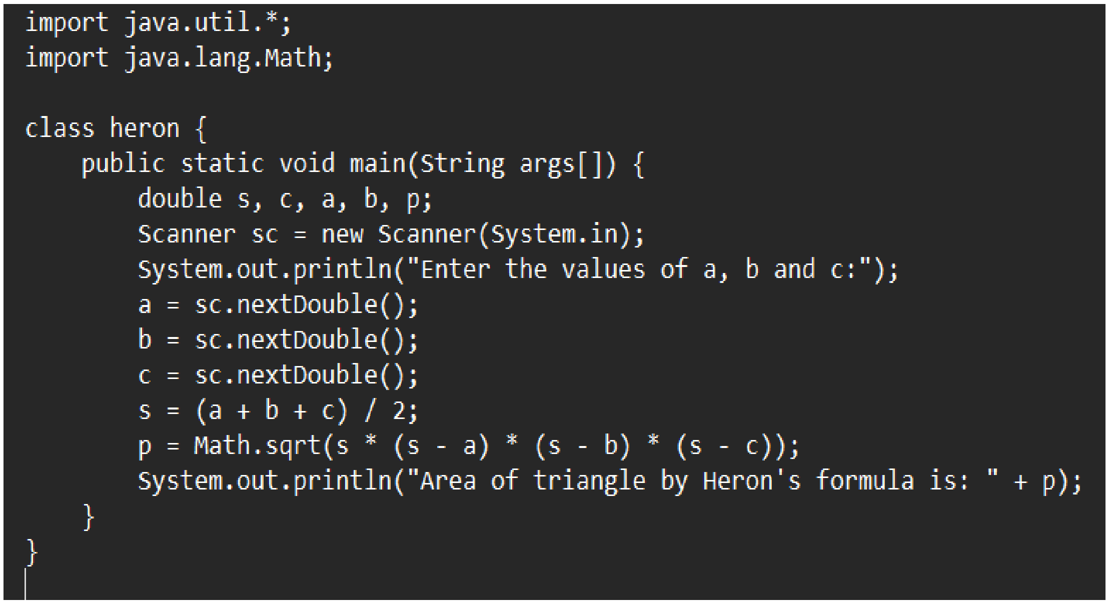
```
Microsoft Windows [Version 10.0.26100.2894]
(c) Microsoft Corporation. All rights reserved.

C:\Users\gajan\OneDrive\Java.jdk>javac celsius.java

C:\Users\gajan\OneDrive\Java.jdk>java celsius.java
Enter celsius temperature:
6
Fahrenheit temperature is: 42.8

C:\Users\gajan\OneDrive\Java.jdk>
```

<u>Error table:</u>

S.No	Error type	Reason for error	Rectification
1	Runtime error	Incorrect path selection	Correct path added
2	Logical error	Incorrect logic	Correct logic

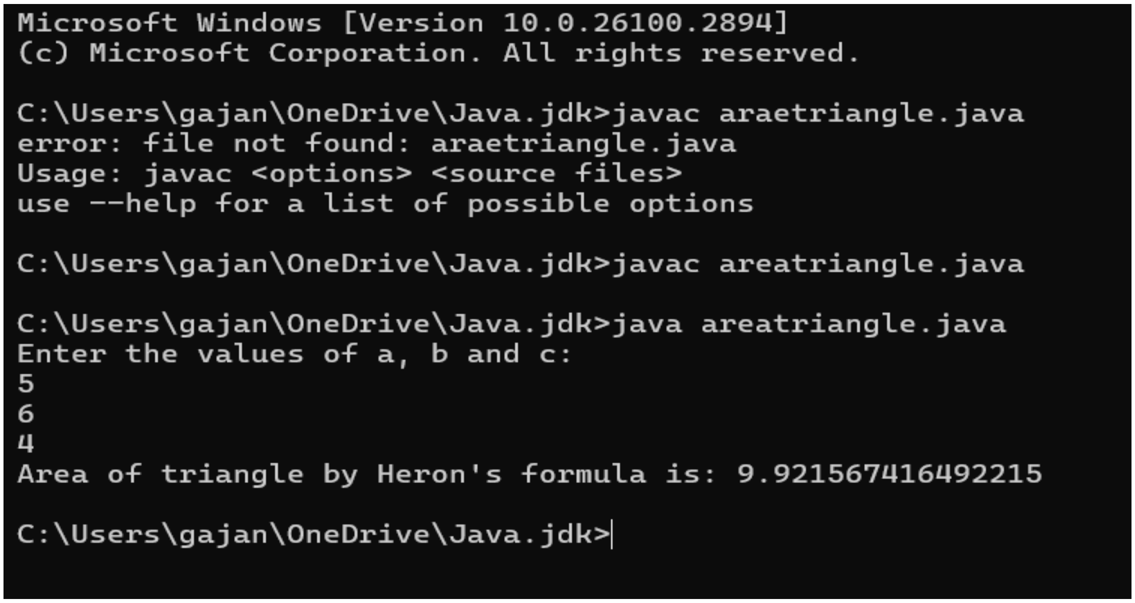
7).Write a program to find the area of triangle by using heron's formula take the input from the user

Code:



```
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:



```
Microsoft Windows [Version 10.0.26100.2894]
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C:\Users\gajan\OneDrive\Java.jdk>javac araetriangle.java
error: file not found: araetriangle.java
Usage: javac <options> <source files>
use --help for a list of possible options

C:\Users\gajan\OneDrive\Java.jdk>javac areatriangle.java

C:\Users\gajan\OneDrive\Java.jdk>java areatriangle.java
Enter the values of a, b and c:
5
6
4
Area of triangle by Heron's formula is: 9.921567416492215

C:\Users\gajan\OneDrive\Java.jdk>
```

Error table:

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

WEEK-3

Aim:

1) create a java program with following instructions

a.Create a class with name car

b. Create four attributes named car_color ,Car_brand,fuel_type,mileage

c. Create three methods named start(), stop(). Service()

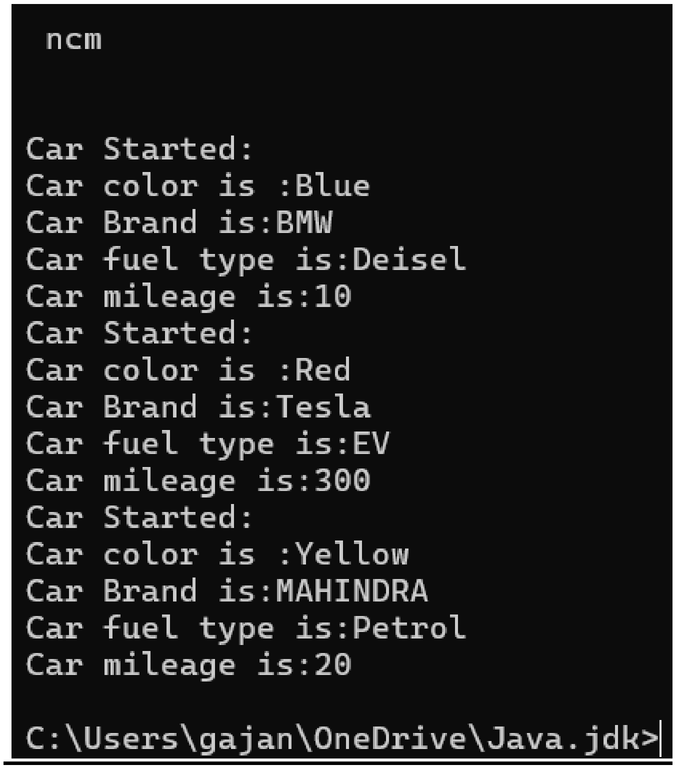
d. Create three objects named car1,car2 and car3

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("\n ncm\n\n");
      car car1 = new car();
      car1.Car_color = "Blue";
      car1.Car_brand = "BMW";
      car1.fuel_type = "Deisel";
      car1.mileage = 10;
     car1.start();
      car car2 = new car();
      car2.Car_color = "Red";
      car2.Car_brand = "Tesla";
      car2.fuel_type = "EV";
      car2.mileage = 300;
      car2.stop();
      car car3 = new car();
      car3.Car_color = "Yellow";
 car3.Car_brand = "MAHINDRA";
    car3.fuel_type = "Petrol";
     car3.mileage = 20;}}
```

Output:



```
 ncm


Car Started:
Car color is :Blue
Car Brand is:BMW
Car fuel type is:Deisel
Car mileage is:10
Car Started:
Car color is :Red
Car Brand is:Tesla
Car fuel type is:EV
Car mileage is:300
Car Started:
Car color is :Yellow
Car Brand is:MAHINDRA
Car fuel type is:Petrol
Car mileage is:20

C:\Users\gajan\OneDrive\Java.jdk>
```

Errors:

S.No	Error type	Reason for error	Rectification
1	Name error	Undeclared variable	Variable declared
2	Run time error	Incorrect path decloration	Correct path declared
3	Syntax error	Semi colon missed	Semi colon added
4	Syntax error	Missing “	Added “
5	Syntax error	Int missing	Int added

Important points:

- Variable name mismatch: The variable car_Color in the code should be car_color
- Incorrect variable name: car1.car_color is used when the actual variable is car1.car_Color, which will cause an error due to case sensitivity.
- Missing Semicolon: Forgetting to add a semicolon at the end of a statement will cause a compilation error.

CLASS DIAGRAM-

car

-car_color:string

-car_brand:string

-fuel_type:string

-milage:double

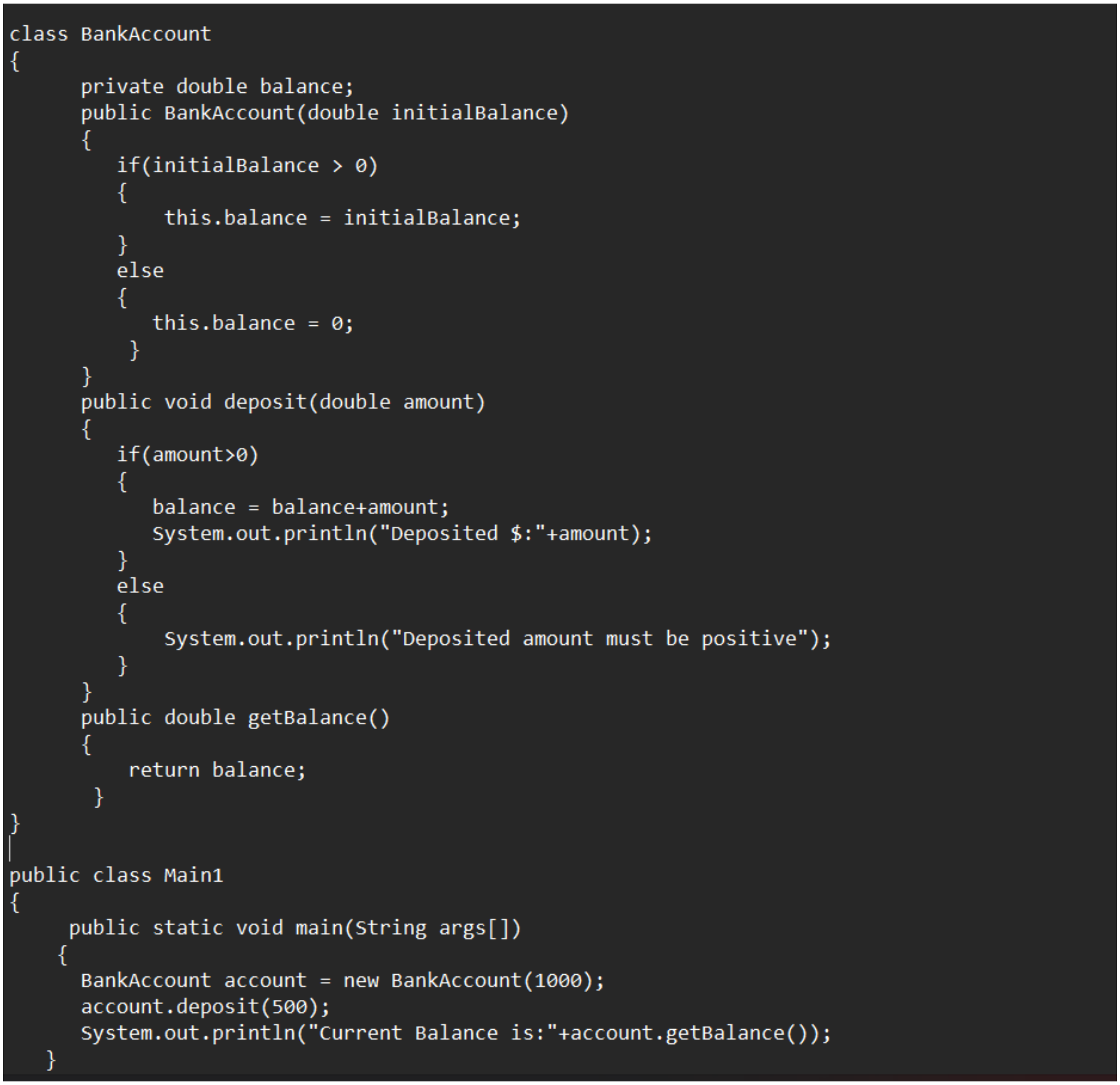
+start():void

+stop():void

+service():void

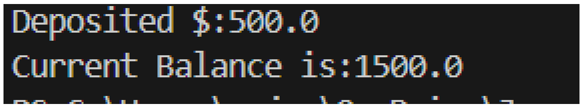
2).To create a class bankAccount with methods deposit() and withdrawl ?

code:



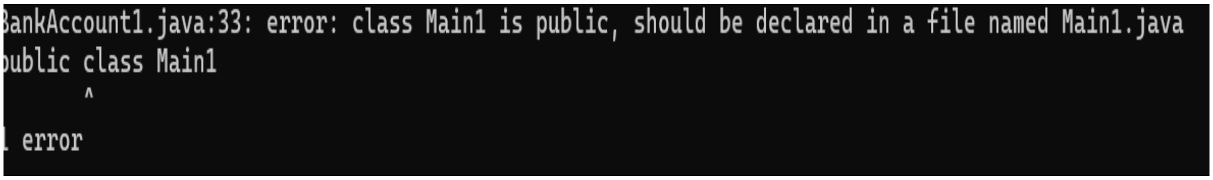
```
class BankAccount
{
      private double balance;
      public BankAccount(double initialBalance)
      {
         if(initialBalance > 0)
         {
             this.balance = initialBalance;
         }
         else
         {
            this.balance = 0;
          }
      }
      public void deposit(double amount)
      {
         if(amount>0)
         {
            balance = balance+amount;
            System.out.println("Deposited $:"+amount);
         }
         else
         {
             System.out.println("Deposited amount must be positive");
         }
      }
      public double getBalance()
      {
          return balance;
       }
}

public class Main1
{
     public static void main(String args[])
    {
      BankAccount account = new BankAccount(1000);
      account.deposit(500);
      System.out.println("Current Balance is:"+account.getBalance());
   }
```

Output:



```
Deposited $:500.0
Current Balance is:1500.0
```

Errors:

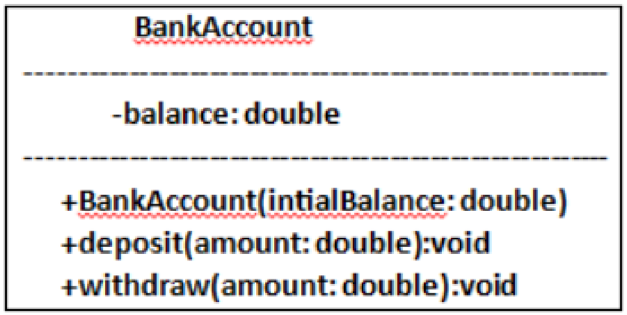


```
BankAccount1.java:33: error: class Main1 is public, should be declared in a file named Main1.java
public class Main1
       ^
1 error
```

Important points:

- The balance should be a float or double to handle decimal values correctly, but it's declared as an int.
- Incorrect deposit method signature: The method DEPOSIT () has an incorrect return type int(), while it should be void since it doesn't need to return any value.
- Fixed the return type of deposit: Changed from int to void, as the method does not need to return anything

CLASS DIAGRAM-



BankAccount

-balance: double

+BankAccount(intialBalance: double)
+deposit(amount: double):void
+withdraw(amount: double):void

WEEK-4

1. Write a Java program with a class named Book

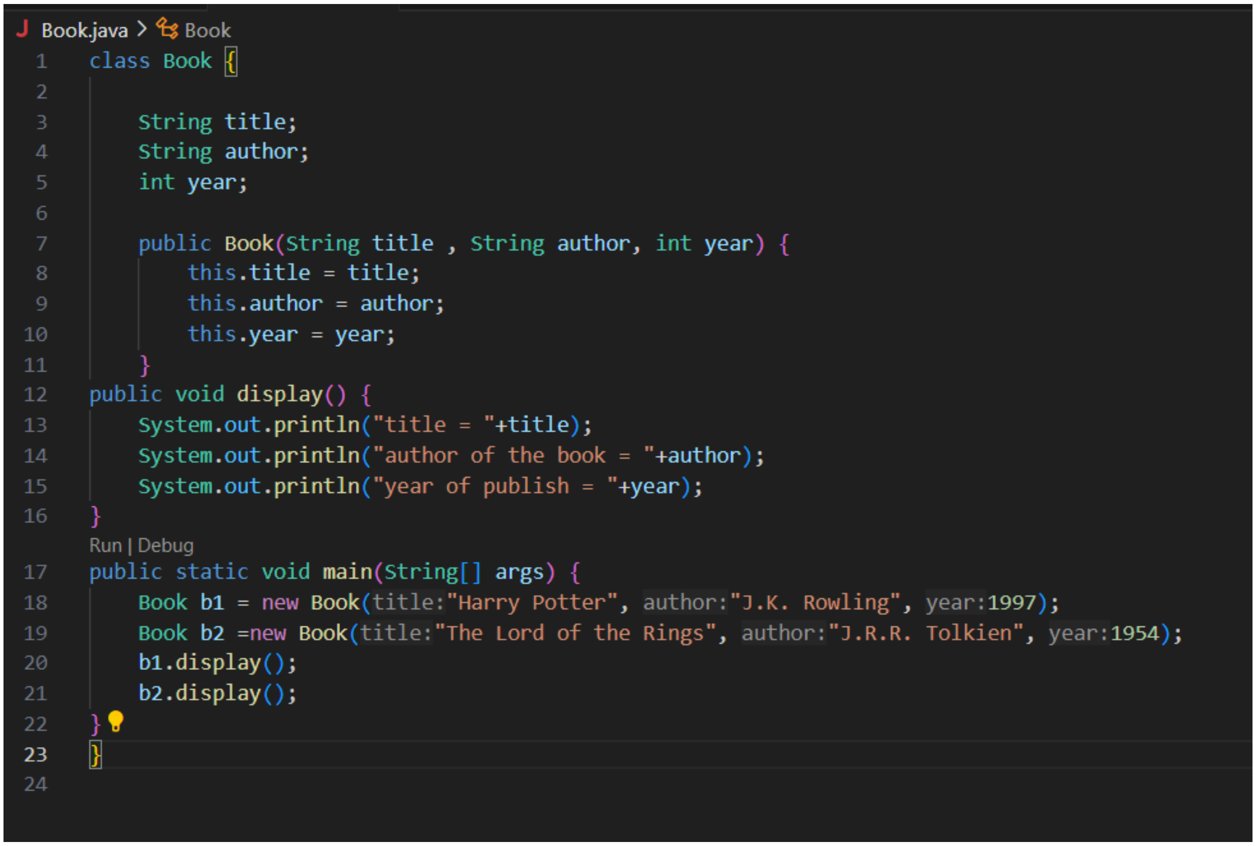
a) a class should contain various attributes such as title, author, and year of publication.

b) it should also contain a constructor with parameters which initialize the title, author, and year of publication.

c)create a method which displays the details of the book title, author, year of publication

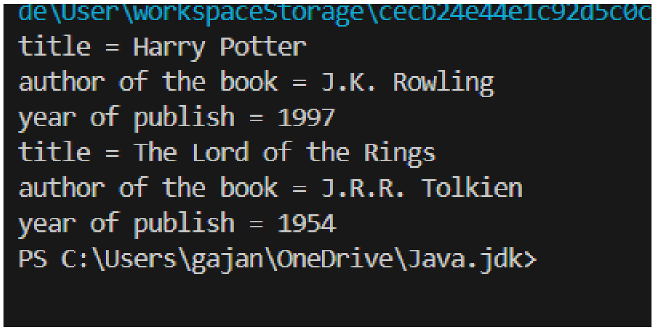
Display the details of two books.

CODE:



```java
class Book {

    String title;
    String author;
    int year;

    public Book(String title , String author, int year) {
        this.title = title;
        this.author = author;
        this.year = year;
    }
public void display() {
    System.out.println("title = "+title);
    System.out.println("author of the book = "+author);
    System.out.println("year of publish = "+year);
}
Run | Debug
public static void main(String[] args) {
    Book b1 = new Book(title:"Harry Potter", author:"J.K. Rowling", year:1997);
    Book b2 =new Book(title:"The Lord of the Rings", author:"J.R.R. Tolkien", year:1954);
    b1.display();
    b2.display();
}
}
```

Output:



```
de\User\workspaceStorage\cecb24e44e1c92d5c0c
title = Harry Potter
author of the book = J.K. Rowling
year of publish = 1997
title = The Lord of the Rings
author of the book = J.R.R. Tolkien
year of publish = 1954
PS C:\Users\gajan\OneDrive\Java.jdk>
```

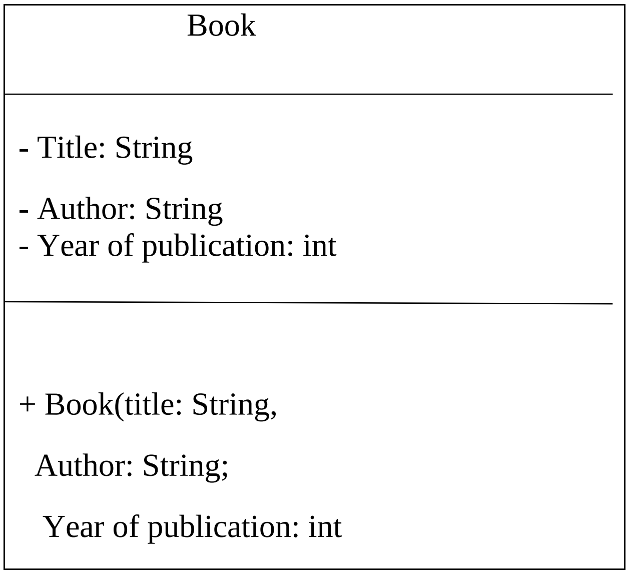
Error table:

SI.NO	ERROR MESSAGE	ERROR RECTIFICATION
1.		
2.		

Important points:

- While defining two classes for a code, we must be sure that we save both the classes in separate files.
- While defining a method we should also define a function to call that method.

CLASS DIAGRAM-



Book

- Title: String

- Author: String
- Year of publication: int

+ Book(title: String,

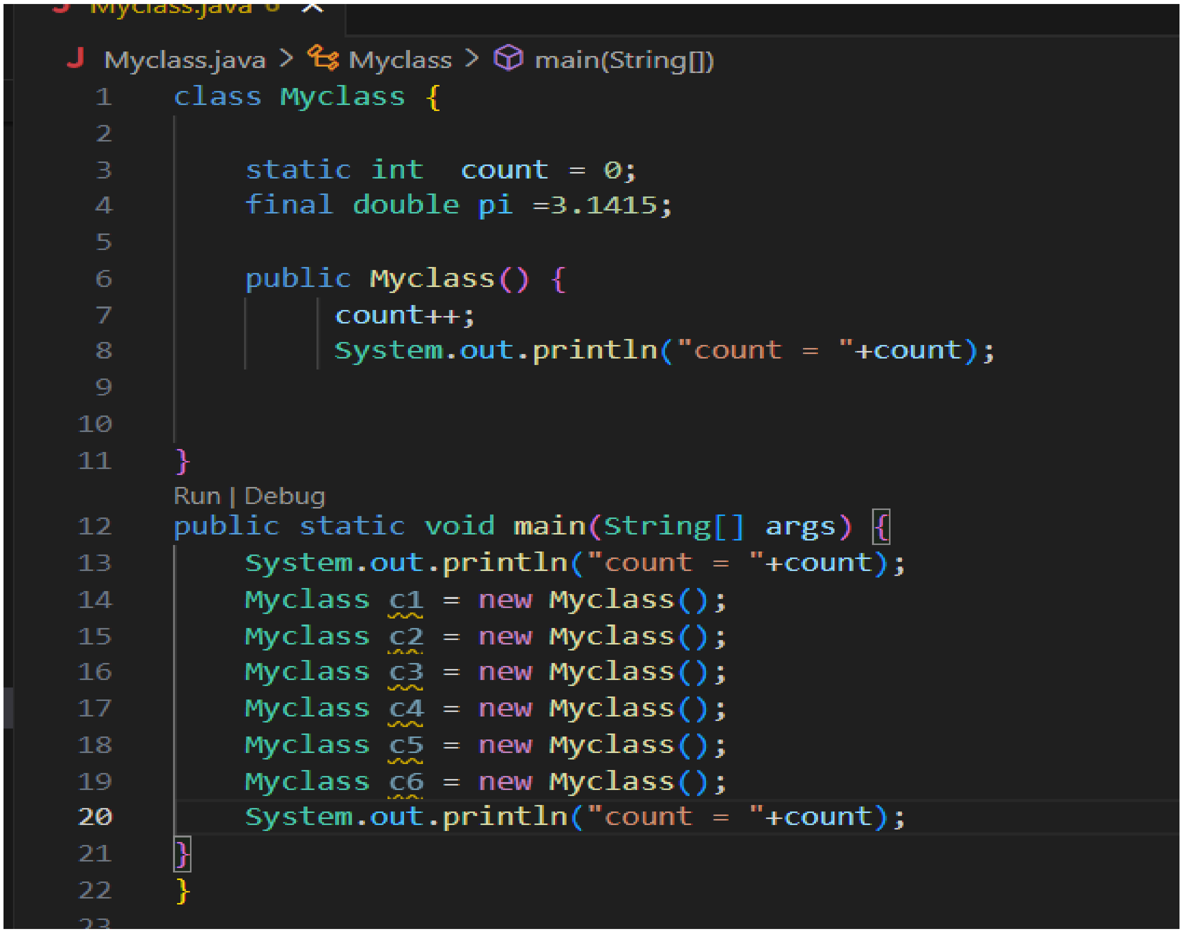
Author: String;

Year of publication: int

+ displayDetails( ): void

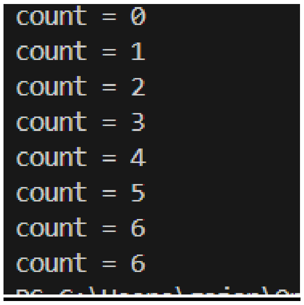
2). Create a Java program with a class named ‘MyClass’ with a static variable count of int type, initialized to zero and a constant variable ‘pi’ or type double initialized to 3.14 as attributes of the class. Now define a constructor for “MyClass” that increments the count variable each time an object of MyClass is created. Finally, print the final values of the count and pi variables. Create three objects and a constructor.

CODE:



```java
class Myclass {

    static int  count = 0;
    final double pi =3.1415;

    public Myclass() {
        count++;
        System.out.println("count = "+count);


}
public static void main(String[] args) {
    System.out.println("count = "+count);
    Myclass c1 = new Myclass();
    Myclass c2 = new Myclass();
    Myclass c3 = new Myclass();
    Myclass c4 = new Myclass();
    Myclass c5 = new Myclass();
    Myclass c6 = new Myclass();
    System.out.println("count = "+count);
}
}
```

Output:



```
count = 0
count = 1
count = 2
count = 3
count = 4
count = 5
count = 6
count = 6
```

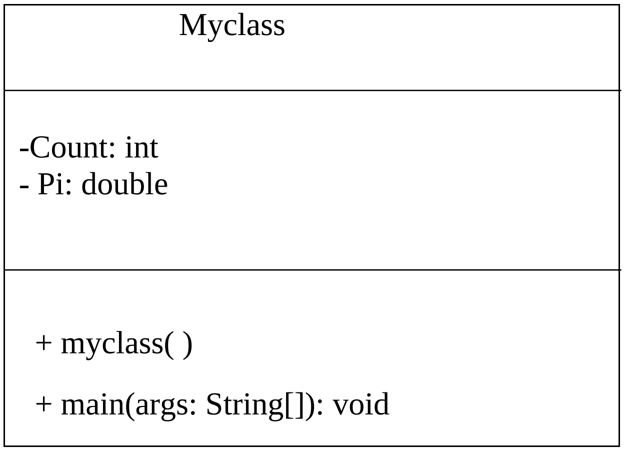
Error table:

SI.NO	ERROR MESSAGE	ERROR RECTIFICATION
1	error: can't find primary (String []) method in class: SimpleInterestCalculator	Should close the string brackets []

Important points:

- We must declare the initial value of the variable before declaring the final one.
- Here the main objective is to increase the count according to the number of objects we make, i.e the count increases when the no.of objects are increasing**.**

CLASS DIAGRAM-



Myclass

-Count: int
- Pi: double

+ myclass( )

+ main(args: String[]): void

Week-5

Task-1

Aim: **Create a calculator using the operations including addition, subtraction, multiplication and division using multilevel in heritance and display the desired output.**

Important points:

In order to do this, we have to use inheritance concept. Here we used the multi-inheritance concept.

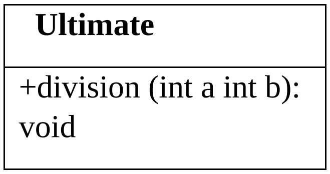
Syntax:

Super class extends subclass

Here extends is the main key word which represents the extending relation from parent class to child class.

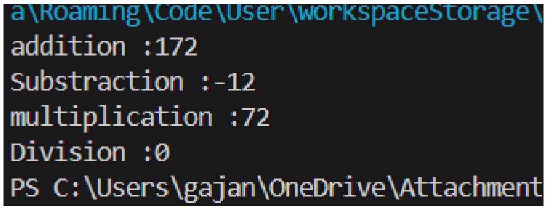
Program :

```
import java.util.Scanner;
import jdk.jshell.execution.Util;
public class Calci {
   public void addition(int a , int b){
      System.out.println("addition :"+(a+b));}
   public  void diff(int a , int b){
      System.out.println("Substraction :"+(a - b));}
} //end
class  Calci2 extends Calci{
   public void multi(int a , int b){
      System.out.println("multiplication :"+(a*b));}} // end
class Calci3 extends Calci2{
   public void divid(int a , int b){
if(b == 0){
      System.out.println("b should not be zero");     }
   else{
```



```
System.out.println("Division :"
+(a/b));}}
          }//end
          class Multilevel {
             public static void main(String[] args) {
                Scanner input = new Scanner(System.in);
                Calci c1 = new Calci()
            c1.diff(80, 92);
                Calci2 c2 = new Calci2();
                c2.multi(8, 9);
                Calci3 c3 = new Calci3();
                c3.divid(80, 92);}}
```

Output :

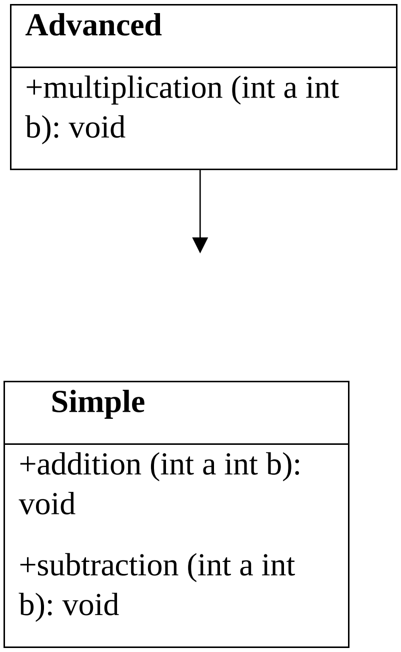


```
a\Roaming\Code\User\workspaceStorage\
addition :172
Substraction :-12
multiplication :72
Division :0
PS C:\Users\gajan\OneDrive\Attachment
```

Errors table:

Sl.No	Error name	Error Rectification
1.	Semi colon (;)	Give the semi colon (;) in each line where it is required
2.	Syntax Error	Giving Capital ‘S’ in printing statements (System.out.println)

Class Diagram :


Advanced
+multiplication (int a int b): void
Simple
+addition (int a int b): void
+subtraction (int a int b): void

<u>**Task-2**</u>

Aim:

Task-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.

i. Cars should have an additional property: number of doors, Seating capacity.

ii. Bikes should have a property indicating whether they have gears or not.

iii. The system should also include a function to display details about each vehicle and indicate when a vehicle is starting.

iv. Each class should have a constructor.

<u>Questions:</u>

1. Which OOP concept is used in the above program? Explain why it is useful in this scenario.

2. If the company decides to add a new type of vehicle ‘Truck’, how would you modify the program?

a. Truck should include and additional property capacity (in tons).

b. Create a showTruck() method to display the truck’s capacity.

c. Write a constructor for truck that initializes all properties.

3. Implement the truck class and update the main method to create a Truck object and also create an object for car and bike subclasses. Finally display the details.

Important points:

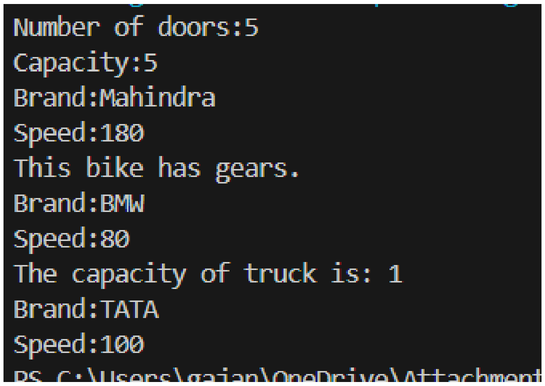
Multi-inheritance: It is one of the types of the inheritance where subclass 2 inherits subclass1 and subclass1 inherits superclass. Here Vehicle is the super class or parent class and remaining cars, bikes, trucks are the subclasses or child classes.

Program :

```
class Vehicle{
    String brand;
    int speed;
    Vehicle(String brand,int speed){
        this.brand=brand;
        this.speed=speed; }
    void Details(){
        System.out.println("Brand:"+brand);
        System.out.println("Speed:"+speed);}
  }//End of super class
  class CARS extends Vehicle{
    int doors;
    int capacity;
    public CARS(String brand,int speed,int doors,int capacity){
        super(brand, speed);
        this.doors=doors;
        this.capacity=capacity;}
    void cardetails(){
        System.out.println("Number of doors:"+doors);
        System.out.println("Capacity:"+capacity);}
  }//End of car sub-class
```

```
class Bikes extends Vehicle{
   Boolean gears;
   Bikes(String brand,int speed,Boolean gears){
      super(brand, speed);
      this.gears=gears;}
   void bikedetails(){
      if (gears==true)
      System.out.println("This bike has gears.");
      else
      System.out.println("This bike does not have gear system.");}
}//End of bike sub-class
class Trucks extends Vehicle{
   int tons;
   Trucks(String brand,int speed,int tons){
      super(brand, speed);
      this.tons=tons;}
   void truckdetails(){
      System.out.println("The capacity of truck is: "+tons);    }
}//End of truck sub-class
class Rent{
   public static void main(String[] args){
      CARS c=new CARS("Mahindra",180,5,5);
      c.cardetails();
      c.Details();
      Bikes b=new Bikes("BMW",80,true);
      b.bikedetails();
      b.Details();
      Trucks t=new Trucks("TATA",100,1);
t.truckdetails();
t.Details();}}
```

Output :

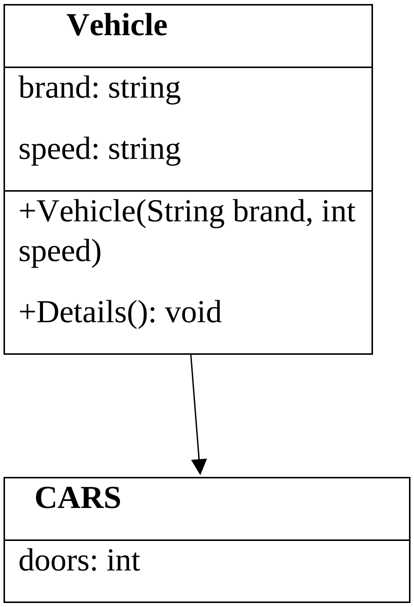


```
Number of doors:5
Capacity:5
Brand:Mahindra
Speed:180
This bike has gears.
Brand:BMW
Speed:80
The capacity of truck is: 1
Brand:TATA
Speed:100
PS C:\Users\gajan\OneDrive\Attachment
```

Errors table:

Sl.No	Error name	Error Rectification
1.	Semi colon (;)	Give the semi colon (;) in each line where it is required
2.	Syntax Error	Giving Capital 'S' in printing statements (System.out.println)

Class Diagram:



Vehicle

brand: string

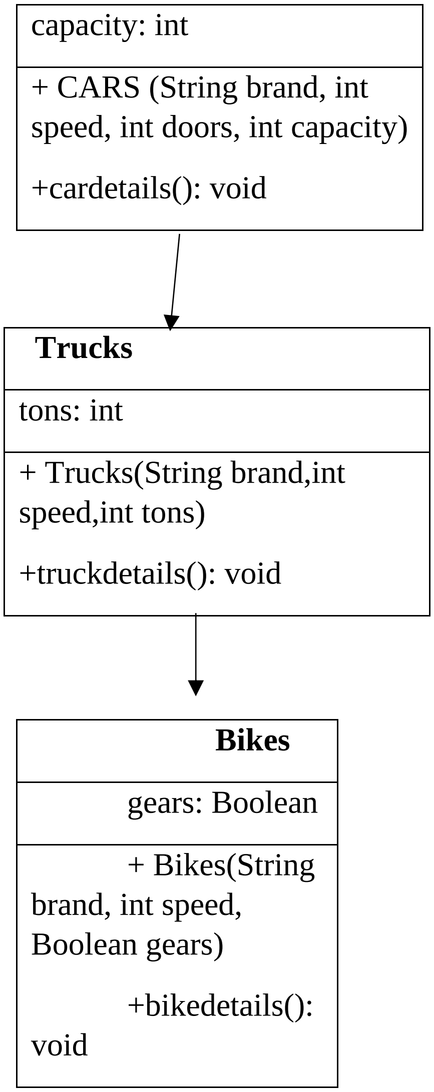
speed: string

+Vehicle(String brand, int speed)

+Details(): void

CARS

doors: int



capacity: int

+ CARS (String brand, int speed, int doors, int capacity)

+cardetails(): void

Trucks

tons: int

+ Trucks(String brand,int speed,int tons)

+truckdetails(): void

Bikes

gears: Boolean

+ Bikes(String brand, int speed, Boolean gears)

+bikedetails(): void

WEEK-6

1) **Write a Java program to create a vehicle class with a method displayInfo(). Override this method in the car subclass to provide specific information about a car, model, fuel type, and color using the constructor**

- Write your code in VS CODE and execute

- Important Points:

Understand the calling of a Constructor

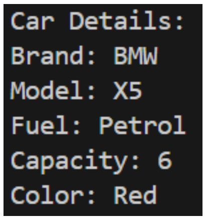
Giving class name correctly

Give the parameters Correctly

CODE:

```
class Vehicle {
        String Brand;
        String model;
        String fuel;
        String color;
        int capacity;
        Vehicle(String Brand, String model, String fuel, int capacity, String color) {
          this.Brand = Brand;
          this.model = model;
          this.fuel = fuel;
          this.capacity = capacity;
          this.color = color;}
        void displayInfo(String Brand, String model, String fuel, int capacity, String color) {
          System.out.println("Vehicle Details: ");
          System.out.println("Brand: " + Brand);
          System.out.println("Model: " + model);
          System.out.println("Fuel: " + fuel);
          System.out.println("Capacity: " + capacity);
          System.out.println("Color: " + color);}}
      class Car extends Vehicle {
        Car(String Brand, String model, String fuel, int capacity, String color) {
          super(Brand, model, fuel, capacity, color);}
        void displayInfo() {
          System.out.println("Car Details: ");
          System.out.println("Brand: " + Brand);
          System.out.println("Model: " + model);
          System.out.println("Fuel: " + fuel);
          System.out.println("Capacity: " + capacity);
          System.out.println("Color: " + color);}}
      class Week6_1 {
        public static void main(String[] args) {
          // Creating an instance of Car
          Car car1 = new Car("BMW", "X5", "Petrol", 6, "Red");
          car1.displayInfo();  // Display car details}}
```

OUTPUT:



```
Car Details:
Brand: BMW
Model: X5
Fuel: Petrol
Capacity: 6
Color: Red
```

Errors table:

S.NO	Error Name	Error Rectification
1	Syntax/ Compilation Error	Absence of Semicolon
2	Closing Brackets	Need to Close the brackets
3	Class Name Error	Give the class name correctly
4	Constructor Calling	Call the constructor correctly

2) Create a Java program for the scenario.

A college is developing an automated admission system that verifies student eligibility for undergraduate (UG) and postgraduate(PG) programs. Each program has different eligibility criteria based on the student's percentage in their previous qualification.

i) UG admissions require a minimum of 60%

ii) PG admissions require a minimum of 70%

- Write your code in VS CODE and execute

- Important Points:

Understand the calling of a Constructor

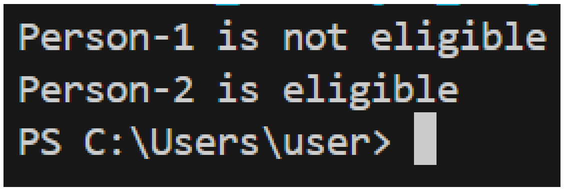
Giving class name correctly

Give the parameters Correctly

CODE:

```
class College{
    String name;
    int percentage;
    void geteligibility(String name,int percentage){
        this.name=name;
        this.percentage=percentage;}}
class UG extends College{
    void geteligibility(String name,int percentage){
        if (percentage>=60){
            System.out.println(name+" is eligible");}
        else{
            System.out.println(name+" is not eligible");}}}
class PG extends College{
    void geteligibility(String name,int percentage){
        if (percentage>=70){
            System.out.println(name+" is eligible");}
          else{
            System.out.println(name+" is not eligible");}}}
class week6_2{
    public static void main(String[] args){
        UG ug=new UG();
        ug.geteligibility("Person-1",40);
        PG pg=new PG();
        pg.geteligibility("Person-2",80);}}
```

OUTPUT:



```
Person-1 is not eligible
Person-2 is eligible
PS C:\Users\user>
```

Errors table:

S.NO	Error Name	Error Rectification
1	Syntax/ Compilation Error	Absence of Semicolon
2	Closing Brackets	Need to Close the brackets
3	Class Name Error	Give the class name correctly
4	Constructor Calling	Call the constructor correctly

3) Write a Java Program to create a Calculator class with overloaded methods to perform addition: Take the integer values a and b from the user.

i) Add two integers

ii) Add two doubles

iii) Add three integers

- Write your code in VS CODE and execute

- **Important Points:**

Understand the calling of a Constructor

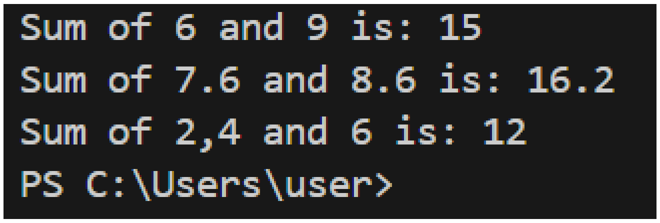
Giving class name correctly

Give the parameters Correctly

CODE:

```
class Calc{
  public int add(int a,int b){
    return a+b;}
  public double add(double a,double b){
    return a+b;}
  public int add(int a,int b,int c){
          return a+b+c;}}
      class week6_3{
        public static void main(String[] args){
          Calc C1=new Calc();
          System.out.println("Sum of 6 and 9 is: "+C1.add(6,9));
          System.out.println("Sum of 7.6 and 8.6 is: "+C1.add(7.6,8.6));
          System.out.println("Sum of 2,4 and 6 is: "+C1.add(2,4,6));}}
```

OUTPUT:



```
Sum of 6 and 9 is: 15
Sum of 7.6 and 8.6 is: 16.2
Sum of 2,4 and 6 is: 12
PS C:\Users\user>
```

Errors:

S.NO	Error Name	Error Rectification
1	Syntax/ Compilation Error	Absence of Semicolon
2	Closing Brackets	Need to Close the brackets
3	Class Name Error	Give the class name correctly
4	Constructor Calling	Call the constructor correctly

4) Write a Java Program to create a shape class with a method calculateArea() that is overloaded for different shapes(e.g., Square, Rectangle). Then create a subclass Circle that overrides the calculateArea() method for a circle.

- Write your code in VS CODE and execute

<u>- Important Points:</u>

Understand the calling of a Constructor

Giving class name correctly

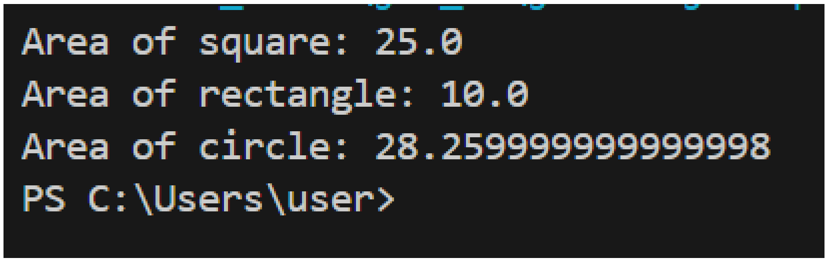
Give the parameters Correctly

<u>CODE:</u>

```
class Shape {
        double calculateArea(double side) {
          return side * side;}
        double calculateArea(double width, double height) {
          return width * height;}}
      class Circle extends Shape {
        double calculateArea(double radius) {
          return 3.14 * radius * radius;}}
      class Week6_4 {
        public static void main(String[] args) {
          Shape S1 = new Shape();
```

```
            System.out.println("Area of square: " + S1.calculateArea(5));
System.out.println("Area of rectangle: " + S1.calculateArea(2, 5));
            Circle C1 = new Circle();
            System.out.println("Area of circle: " + C1.calculateArea(3));}}
```

OUTPUT:



```
Area of square: 25.0
Area of rectangle: 10.0
Area of circle: 28.259999999999998
PS C:\Users\user>
```

Errors:

S.NO	Error Name	Error Rectification
1	Syntax/ Compilation Error	Absence of Semicolon
2	Closing Brackets	Need to Close the brackets
3	Class Name Error	Give the class name correctly
4	Constructor Calling	Call the constructor correctly

WEEK-7

1)Aim : Write a Java program to create an abstract class Animal with an abstract method called sound(). Create subclasses Lion and Tiger that extend the Animal class and implement the sound() method to make a specific sound for each animal.

Important points :

1. Here we used abstract class concept it is a restricted class that cannot be instantiated (cannot have objects created directly) and is typically designed to be extended by subclasses.

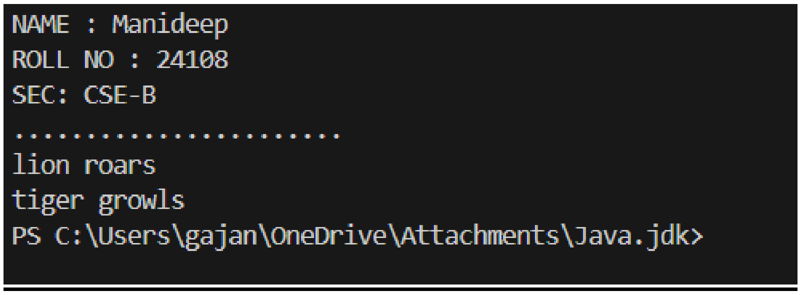
2. An abstract method is a method declared in an abstract class that does not have an implementation, meaning it doesn't have a body within the abstract class.

3. Here we used hierarchy inheritance concept means every sub class extends super class.

Program:

```
abstract class animal{
    abstract void sound();}
class lion extends animal{
    void sound(){
        System.out.println("lion roars");}}
class tiger extends animal{
    void sound(){
        System.out.println("tiger growls");}}
class ABanimal{
    public static void main(String[] args) {
        System.out.println("NAME : Manideep");
        System.out.println("ROLL NO : 24108");
        System.out.println("SEC: CSE-B");
        System.out.println(".......................");
        lion l = new lion();
        l.sound();
        tiger t = new tiger();
        t.sound();}}
```

Output:



```
NAME : Manideep
ROLL NO : 24108
SEC: CSE-B
.......................
lion roars
tiger growls
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

Error table :

S.NO		
1	Main Class	Better to create main class name same as the file you saved and first letter is capital.
2	Method	We need to provide return type to the method.
3	Data type	As per need provide data type 4 Abstract method
4	Abstract method	Implementation in subclass only

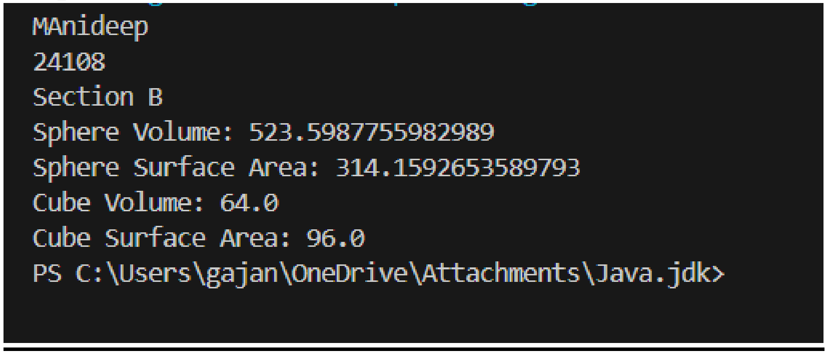
2)Aim : Write a Java program to create an abstract class Shape3D with abstract methods calculateVolume() and calculateSurfaceArea(). Create subclasses Sphere and Cube that extend the Shape3D class and implement the respective methods to calculate the volume and surface area of each shape.

Program:

```
abstract class Shape3D {
        public abstract double calculateVolume();
        public abstract double calculateSurfaceArea();}
    class Sphere extends Shape3D {
        private double radius;
        public Sphere(double radius) {
            this.radius = radius;}
        public double calculateVolume() {
```

```
        return (4.0/3) * Math.PI * Math.pow(radius, 3);}
    public double calculateSurfaceArea() {
        return 4 * Math.PI * Math.pow(radius, 2);}}
class Cube extends Shape3D {
    private double side;
    public Cube(double side) {
        this.side = side;}
    public double calculateVolume() {
        return Math.pow(side, 3); }
    public double calculateSurfaceArea() {
        return 6 * Math.pow(side, 2);}}
public class  Shapees{
    public static void main(String[] args) {
        System.out.println("MAnideep");
        System.out.println( "24108");
        System.out.println( "Section B");
        Shape3D sphere = new Sphere(5);
        Shape3D cube = new Cube(4);
        System.out.println("Sphere Volume: " + sphere.calculateVolume());
        System.out.println("Sphere Surface Area: " + sphere.calculateSurfaceArea());
        System.out.println("Cube Volume: " + cube.calculateVolume());
        System.out.println("Cube Surface Area: " + cube.calculateSurfaceArea());     }}
```

Output:



```
MAnideep
24108
Section B
Sphere Volume: 523.5987755982989
Sphere Surface Area: 314.1592653589793
Cube Volume: 64.0
Cube Surface Area: 96.0
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

Error table :

S.NO	Error Name	Error Rectification
1	Main Class	Better to create main class name same as the file you saved and first letter is capital.
2	Data type	As per need provide data type 3 Abstract method Implementation in subclass only
3	Abstract method	Implementation in subclass only

Important points :

1. Here we used abstract class concept it is a restricted class that cannot be instantiated (cannot have objects created directly) and is typically designed to be extended by subclasses.

2. An abstract method is a method declared in an abstract class that does not have an implementation, meaning it doesn't have a body within the abstract class.

3. Understanding the calling of constructor.

3)

Aim : write a java program using an abstract class to define a method for pattern printing Create an abstract class named pattern printer with an abstract method print pattern (int n) and a concrete method to display the pattern tittle. Implement two sub

class :

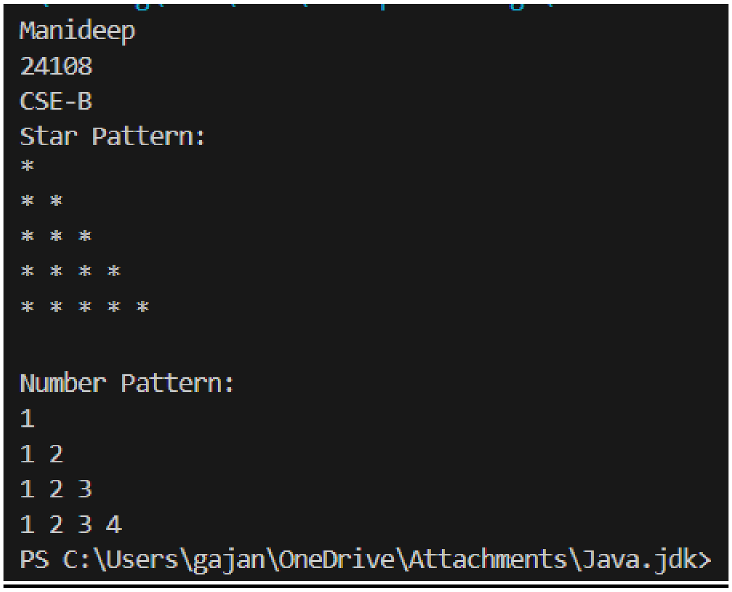
1.star pattern -prints a right-angled triangle of stars(*)

2.number pattern-prints a right angled triangle of increasing numbers. In the main () method,create objects of both subclasses and print the pattern for a given number of rows.

Program:

```
abstract class PatternPrinter{
    public abstract void printPattern(int n);
    public void printTitle(String title) {
        System.out.println(title);     } }
class StarPattern extends PatternPrinter {
    public void printPattern(int n){
        for (int i=1;i<=n;i++) {
            for (int j=1;j<=i;j++) {
                System.out.print("* ");      }
            System.out.println();    }  } }
class NumberPattern extends PatternPrinter {
    public void printPattern(int n) {
        for (int i=1;i<n;i++) {
          for (int j=1;j<=i;j++) {
             System.out.print(j+" "); }
          System.out.println(); }  } }
public class pattern {
   public static void main(String[] args) {
System.out.println("Manideep");
System.out.println("24108");
System.out.println("CSE-B");
      int rows=5;
      PatternPrinter starPattern = new StarPattern();
      PatternPrinter numberPattern = new NumberPattern();
      starPattern.printTitle("Star Pattern:");
      starPattern.printPattern(rows);
      System.out.println();
      numberPattern.printTitle("Number Pattern:"); } }
```

Output:



```
Manideep
24108
CSE-B
Star Pattern:
*
* *
* * *
* * * *
* * * * *

Number Pattern:
1
1 2
1 2 3
1 2 3 4
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

Error table :

S.NO	Error Name	Error Rectification
1	Main Class	Better to create main class name same as the file you saved and first letter is capital.
2	Data type	As per need provide data type
3	Syntax	in for Initializing value and condition should be correct
4	Overriding	Same method name

Important points :

1. Here we used nested for loop concept the block of code is executed until the condition is false.

2. Here the logic very important .

3. Here we used abstract class concept it is a restricted class that cannot be instantiated (cannot have objects created directly) and is typically designed to be extended by subclasses.

WEEK-8

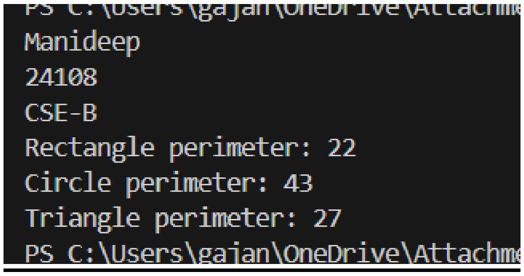
1.Write a java program to create an interface shape with getPerimeter() method. Create three classes Rectangle, Circle, and Triangle that implement the shape interface implement the getPerimeter() method for each of the three classes.

Program:

```
interface Shapee {
    float pi = 3.14f;
    int getperimeter();}
class Rectangle implements Shapee {
    int length;
    int breadth;
    public Rectangle(int length, int breadth) {
        this.length = length;
        this.breadth = breadth;}
    public int getperimeter() {
        return 2 * (length + breadth);}}
class Circle implements Shapee {
    private int radius;
    public Circle(int radius) {
    this.radius = radius;   }
    public int getperimeter() {
        return (int) (2 * pi * radius);}}
class Triangle implements Shapee {
    private int side1;
    private int side2;
    private int side3;
    public Triangle(int side1, int side2, int side3) {
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;}
```

```
  public int getperimeter() {
    return (side1 + side2 + side3);}}
class InShape {
  public static void main(String[] args) {
  System.out.println("Manideep");
  System.out.println("24108");
  System.out.println("CSE-B");
    Rectangle r = new Rectangle(5, 6);
    System.out.println("Rectangle perimeter: " + r.getperimeter());
    Circle c = new Circle(7);
    System.out.println("Circle perimeter: " + c.getperimeter());
    Triangle t = new Triangle(8, 9, 10);
    System.out.println("Triangle perimeter: " + t.getperimeter());}}
```

Output:



```
PS C:\Users\gajan\OneDrive\Attachme
Manideep
24108
CSE-B
Rectangle perimeter: 22
Circle perimeter: 43
Triangle perimeter: 27
PS C:\Users\gajan\OneDrive\Attachme
```

Errors table:

S.NO	Error Name	Error Rectification
1	Method not implemented	Ensure all classes implement the getperimeter() method from the interface.
2	Incorrect method name	Use the exact method name getperimeter() as declared in the interface.
3	Missing cast in Circle calculation	Cast the result to int: (int)(2 * pi * radius).
4	Access modifier confusion	Clearly define public, private, or default where appropriate.

Important Points:

1. Interfaces can have constants: pi in Shapee is implicitly public static final.
2. All classes implement the same interface, so they must define the getperimeter() method.
3. Casting is done in Circle: (int)(2 * pi * radius) — this truncates the result to an integer.
4. Access Modifiers: Notice mixed use of public/default (e.g., length is package-private in Rectangle)

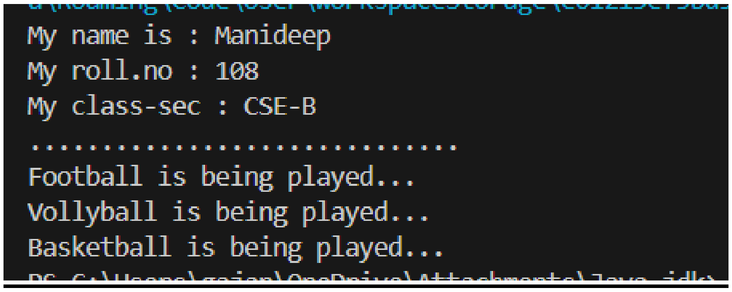
2.Write a java program to create an interface playable with a method play that takes no arguments and returns play that takes no arguments and returns void. Create 3 classes Football, Volleyball, Basketball that implements the playable interface and override the play method to play the respective sports.

Program:

```
public interface playable {
   void play();}
class Football implements playable {
   public void play() {
       System.out.println("Football is being played...");}}
class Vollyball implements playable {
   public void play() {
       System.out.println("Vollyball is being played...");}}
class Basketball implements playable {
   public void play() {
       System.out.println("Basketball is being played...");}}
class played {
   public static void main(String[] args) {
  System.out.println("My name is : Manideep");
  System.out.println("My roll.no : 108");
```

```
 System.out.println("My class-sec : CSE-B");
System.out.println("..............................");
       Football fot = new Football();
       fot.play();
       Vollyball voly = new Vollyball();
       voly.play();
       Basketball bask = new Basketball();
       bask.play();}}
```

Output:



```
My name is : Manideep
My roll.no : 108
My class-sec : CSE-B
..............................
Football is being played...
Vollyball is being played...
Basketball is being played...
```

Errors table:

S.NO	Error Name	Error Rectification
1	Interface not fully implemented	Implement the play() method in all classes. .
2	Class/interface name mismatch	Make sure class and interface names match exactly (e.g., intplayable).
3	Method name spelling error	Use correct syntax: System.out.println("...");.
4	Object reference typo .	Maintain consistent spelling in class names and object references

Important Points:

1. Polymorphism is possible with intplayable but not used here (all objects are called separately).
2. Each class provides its own implementation of play().

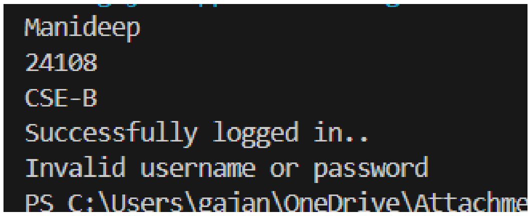
3. Could be enhanced by using an array or list of intplayable objects and a loop.

3.Write a java program to implement a login system using interfaces

Program:

```
interface loginSystem{
   public boolean  login(String username,String password);}
class Universitylogin implements loginSystem {
   public boolean login(String username, String password) {
      if(username == "ashish1" && password == "cse1111") {
         System.out.println("Successfully logged in..");
         return true;}
   else {
      System.out.println("Invalid username or password");
      return false;}}}
class login{
   public static void main(String[] args) {
System.out.println("Manideep");
System.out.println("24108");
System.out.println("CSE-B");
      Universitylogin ul = new Universitylogin();
      ul.login("ashish1", "cse1111");
      ul.login("ashih","ashish01"); }}
```

Output:



```
Manideep
24108
CSE-B
Successfully logged in..
Invalid username or password
PS C:\Users\gajan\OneDrive\Attachme
```

Errors table:

S.NO	Error Name	Error Rectification
1	String comparison using == Use	username.equals("ashish1") instead of username == "ashish1".
2	Missing return statement	Ensure login() returns true or false as required.
3	Poor class naming convention	Rename class login to Login (PascalCase) to follow Java conventions.
4	Incorrect method call in main	Call ul.login("username", "password") correctly with matching arguments.

Important Points:

1. Use .equals() for string comparison in Java to compare values.
2. Interface method is correctly implemented by Universitylogin.
3. The method prints a success or failure message based on input.
4. Proper boolean return allows flexible control in further development.

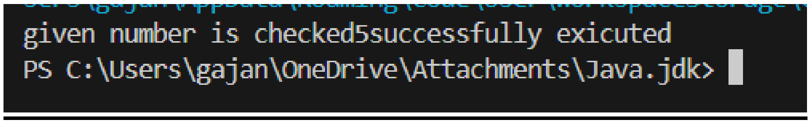
WEEK-9

1)write a java program to create a method that takes a integer as a parameter and throws an exception if the public class even number

Program:

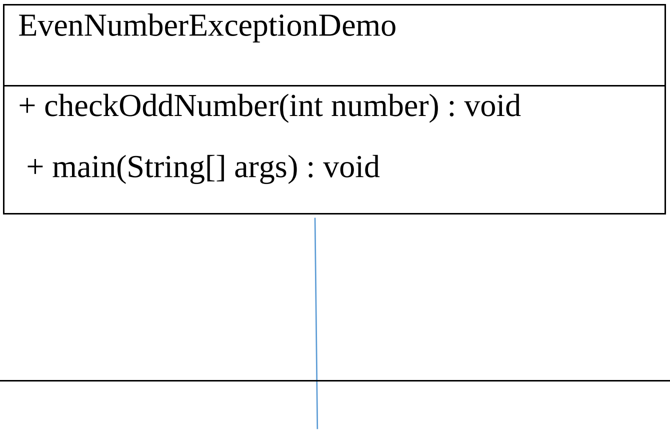
```
public class Exceptionnumber {
    public static void checknum(int num) throws Exception {
        if (num%2 == 0){
            System.out.println("number cannont be even" +"--"+  num+"--"  + "so try using another
number"); }
        else{
            System.out.println("given number is checked"+num+"successfully exicuted");}}
    public static void main(String[] args) {
        Exceptionnumber en = new Exceptionnumber();
        int num = 5;
        try {
            checknum(5);}
        catch (Exception e) {
            System.out.println("number cannot be cheked becuse it is an even"+ num
+"number"+e.getMessage());
        }}}
```

Output:



```
given number is checked5successfully exicuted
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

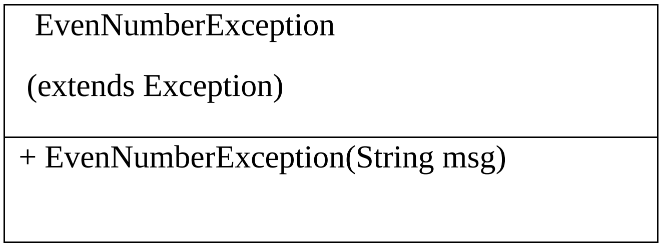
Class Diagram:



EvenNumberExceptionDemo

+ checkOddNumber(int number) : void

+ main(String[] args) : void



EvenNumberException

(extends Exception)

+ EvenNumberException(String msg)

Error table:

CODE ERROR	ERROR RECTIFICATION
1)Unhandled exception type EvenNumberException	If you call checkOddNumber() without using try-catch or without declaring throws.
2) Syntax Error	If missing curly braces {} or wrong method syntax
3) Compilation Error	If constructor of EvenNumberException is missing or incorrectly defined.

Important points:

1) Created a custom exception by extending the Exception class.

2) Used throw keyword to manually throw the custom exception if the number is even.

3)Handled the exception using a try-catch block inside main() method.

4) Demonstrates user-defined exception handling.

5) Shows clear separation of concerns: checking number and exception message.

2)write a java program to create a method that reads a file and throws an exception if the file is not found

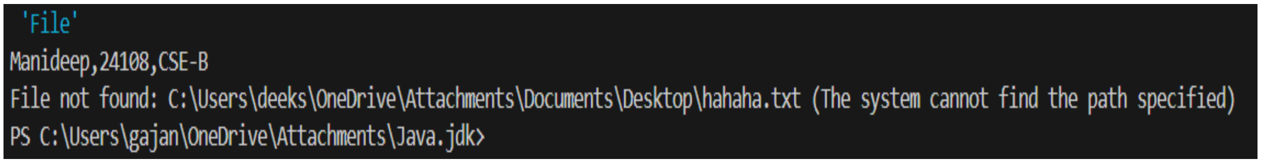
imp points buffered reader

program:

```
import java.io.*;
```

```
public class File {
    public static void main(String[] args) {
        System.out.println("Manideep,24108,CSE-B");
        try {
            BufferedReader reader = new BufferedReader
new FileReader("C:/Users/deeks/OneDrive/Attachments/Documents/Desktop/hahaha.txt"));
            String line;
            while ((line = reader.readLine()) != null) {
                System.out.println(line);  }
            reader.close();
        } catch (FileNotFoundException e) {
            System.out.println("File not found: " + e.getMessage());
        } catch (IOException e) {
            System.out.println("Error reading file: " + e.getMessage());  }}}
```

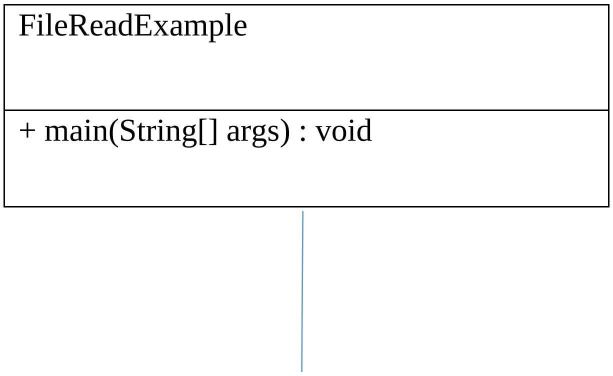
Output:



```
 'File'
Manideep,24108,CSE-B
File not found: C:\Users\deeks\OneDrive\Attachments\Documents\Desktop\hahaha.txt (The system cannot find the path specified)
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

Errors:

CLASS DIAGRAM:



Uses:
- BufferedReader - FileReader - FileNotFoundException - IOException

Error table:

Error	Error Rectification
1) FileNotFoundException	Occurs if the specified file path is wrong or file does not exist.
2) IOException	Occurs while reading file if an input/output error happens.
3) Syntax Error	If missing semicolon ;, wrong try-catch block syntax. `

Important Points:

1) Used BufferedReader and FileReader to read text files.

2) FileNotFoundException occurs if the file is missing.

3) IOException occurs for input/output errors during file reading.

4) try-catch block is used for proper exception handling.

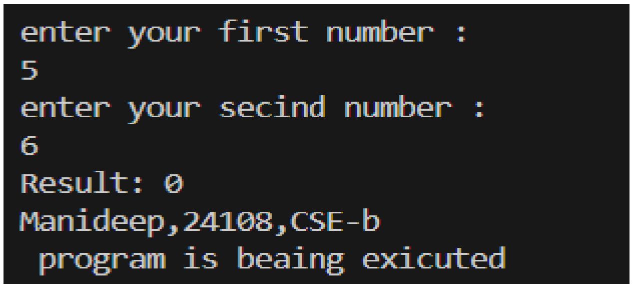
5) Always close the reader after reading the file (reader.close()).

3)write a java program to handle arthematic expression try catch and finally

Program:

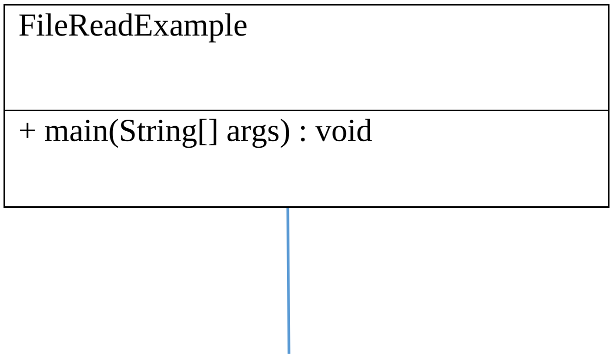
```
import java.util.Scanner;
class Arthematic {
    public static void main(String[] args) {
        try {
            Scanner sc = new Scanner(System.in);
            System.err.println("enter your first number :");
            int a = sc.nextInt();
            System. out. println("enter your secind number :");
            int b = sc.nextInt();
            int result = a/b;
            System.out.println("Result: " + result);;
            System.out.println("Manideep,24108,CSE-b");
        } catch (Exception e) {
            System.out.println(" Error: Division by zero or invalid input."+e.getMessage());}
        finally{
            System.out.println(" program is beaing exicuted"); }}}
```

Output:



```
enter your first number :
5
enter your secind number :
6
Result: 0
Manideep,24108,CSE-b
 program is beaing exicuted
```

Errors:



Uses:
- BufferedReader - FileReader - FileNotFoundException - IOException

Error table:

Error	Error Rectification
1)FileNotFoundException	1)Occurs if the specified file path is wrong or file does not exist.
2)IOException	2)Occurs while reading file if an input/output error happens.
3)Syntax Error	3)If missing semicolon ;, wrong try-catch block syntax.

Important points:

1) Used BufferedReader and FileReader to read text files.

2) FileNotFoundException occurs if the file is missing.

3) IOException occurs for input/output errors during file reading.

4) try-catch block is used for proper exception handling.

5) Always close the reader after reading the file (reader.close()).

4).

.write a java program to simulate a university system using inner classes

create an outer class named "university" with a variable universityName

inside it two non static inner classes:

1.department with variable like deptName and deptCode and a method to display department details

2.student with variables like student name and roll number and a method to display

3.create an object for each class and call their methods to display their details along with universityname

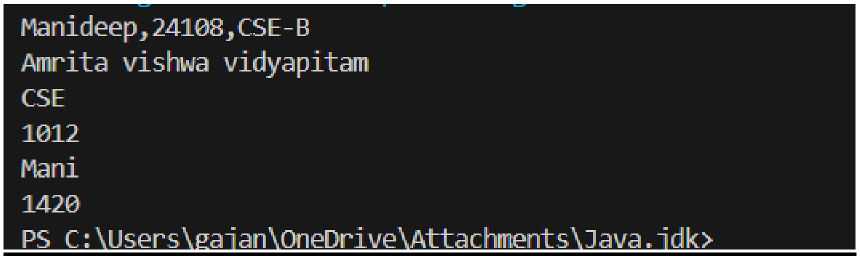
ex: public class university{

string universityname="amrita Vishwa Vidyapeetham"

<u>program:</u>

```
class University {
    String universityName = "Amrita vishwa vidyapitam";
    class Department{
        String deptName = "CSE";
        int deptcode = 1012;}
        class Student{
            String studentName = "Mani";
            int rollNum = 1420;}
        public static void main(String[] args) {
            University un = new University();
            System.err.println(un.universityName);
            Department dp = un.new Department();
            System.err.println(dp.deptName);
            System.err.println(dp.deptcode);
            Student st = un.new Student();
            System.err.println(st.studentName);
            System.err.println(st.rollNum);   }}
```

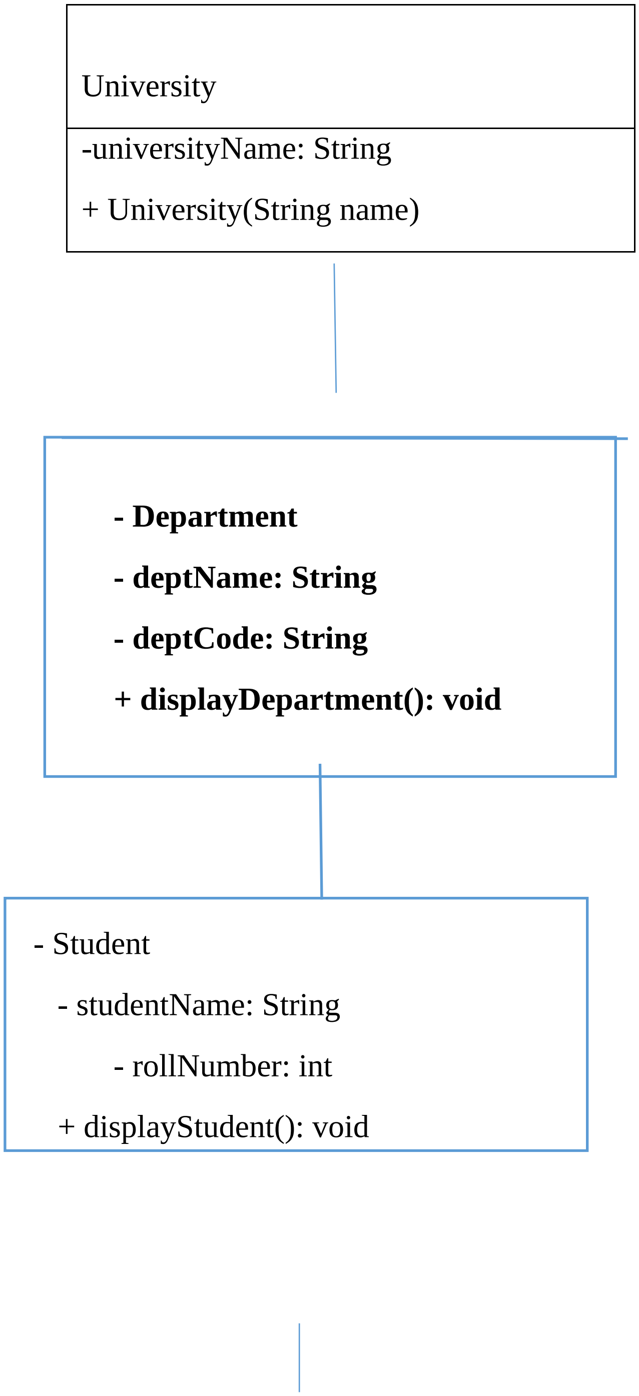
<u>Output:</u>



```
Manideep,24108,CSE-B
Amrita vishwa vidyapitam
CSE
1012
Mani
1420
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

CLASS DIAGRAM:

Inner Classes:



+ main(String[] args): void

Error table:

Error	Error Rectification
Syntax Error	Wrong object creation for inner class
Compilation Error	Accessing outer class members wrongly
Runtime Error	NullPointerException if outer object missing

IMPORTANT POINTS:

1) Demonstrates inner class usage.
2) Inner classes access outer class members easily.
3) Separate objects for Department and Student.

Good example of encapsulation.

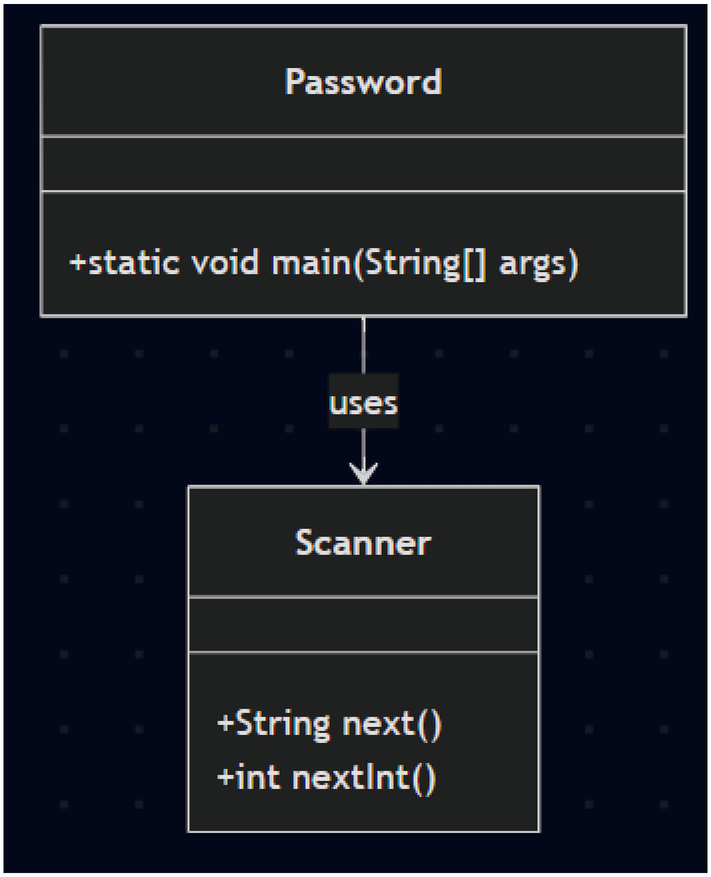
WEEK-10

1)write a java program to generate a password for a student using his/her initials and age the password displayed should be string consists of first character of first name middle name last name with age

Code:

```
import java.util.Scanner;
public class Passwordforstu {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        // Prompt the user for their first, middle, and last names
        System.out.print("Enter your first name: ");
        String firstName = scanner.nextLine();
        System.out.print("Enter your middle name: ");
        String middleName = scanner.nextLine();
        System.out.print("Enter your last name: ");
        String lastName = scanner.nextLine();
        // Prompt the user for their age
        System.out.print("Enter your age: ");
        int age = scanner.nextInt();
        // Generate the password
        String password = generatePassword(firstName, middleName, lastName, age);
        // Display the generated password
        System.out.println("Generated Password: " + password);   }
    public static String generatePassword(String firstName, String middleName, String lastName, int age) {
        // Extract the first character of each name and convert to uppercase
        char firstInitial = Character.toUpperCase(firstName.charAt(0));
        char middleInitial = Character.toUpperCase(middleName.charAt(0));
        char lastInitial = Character.toUpperCase(lastName.charAt(0));
System.out.println("Manideep , 24108 , CSE-B");
        // Concatenate initials and age to form the password
        return "" + firstInitial + middleInitial + lastInitial + age;  }}
```

CLASS DIAGRAM:

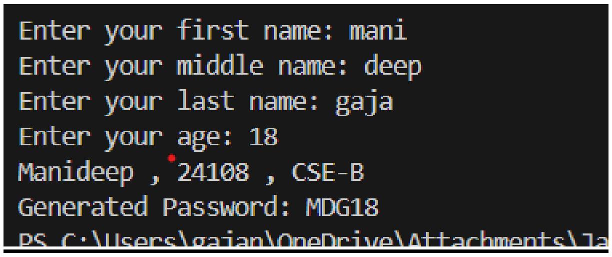


ERROR TABLE:

S.No	ERRORS	Error rectification

1.	Forget to create a scanner object.	Created a scanner object named “scanner”.

output:



```
Enter your first name: mani
Enter your middle name: deep
Enter your last name: gaja
Enter your age: 18
Manideep , 24108 , CSE-B
Generated Password: MDG18
PS C:\Users\gajan\OneDrive\Attachments\Ja
```

IMPORTANT POINTS:

- The program is encapsulated in a class called Password (following Java naming conventions with a capitalized class name).
- The program uses Scanner to accept user input for the first name, middle name, last name, and age
- charAt(0) is used to get the first letter (initial) of each name.
- The password is generated by concatenating the initials (first character) of the first, middle, and last names along with the user's age.

2)design and implement a java program that will do the following operations to this string "welcome! you are practicing strings concepts"

***convert all alphabets to capital letters and print out the result**

***convert all aphabets into lower case letters and print out the resukt**

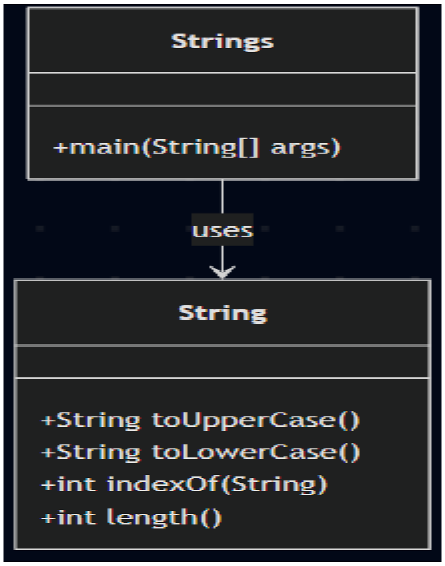
***print out the length of string**

***print out the index of course**

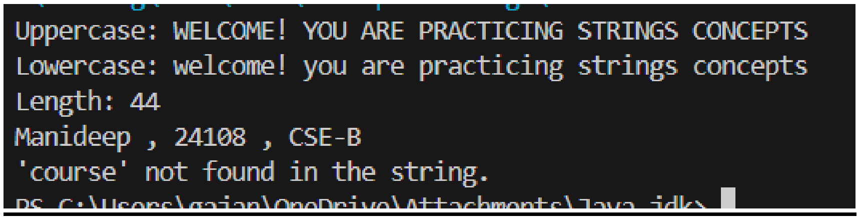
Code:

```
public class Stringoperations {
    public static void main(String[] args) {
        // Original string
      String str = "welcome! you are practicing strings concepts";
        // Convert all alphabets to uppercase and print
        String upperCaseStr = str.toUpperCase();
        System.out.println("Uppercase: " + upperCaseStr);
        // Convert all alphabets to lowercase and print
       String lowerCaseStr = str.toLowerCase();
        System.out.println("Lowercase: " + lowerCaseStr);
        // Print the length of the string
        int length = str.length();
        System.out.println("Length: " + length);
System.out.println("Manideep , 24108 , CSE-B");
        // Find the index of the word "course"
        int indexOfCourse = str.indexOf("course");
        if (indexOfCourse != -1) {
            System.out.println("Index of 'course': " + indexOfCourse);
        } else {
            System.out.println("'course' not found in the string.");  }}}
```

CLASS DIAGRAM:



Output:



```
Uppercase: WELCOME! YOU ARE PRACTICING STRINGS CONCEPTS
Lowercase: welcome! you are practicing strings concepts
Length: 44
Manideep , 24108 , CSE-B
'course' not found in the string.
PS C:\Users\gajan\OneDrive\Attachments\Java idk>
```

Error table:

S.No	ERRORS	Error rectification
1.	Used “uppercase” instead of “UpperCase”	Replaced it.
2.	Used “lowercase” instead of “LowerCase”	Replaced it.

IMPORTANT POINTS:

- Strings in Java are immutable.
- Use toUpperCase() to convert all letters to uppercase.
- Use toLowerCase() to convert all letters to lowercase.
- Use length() to find the total number of characters in a string.
- Use indexOf("substring") to find the starting index of a substring.

3)Implement a java program using the below array methods

***sorting the elements(numbers &strings) of an array**

***convert the array elements into string**

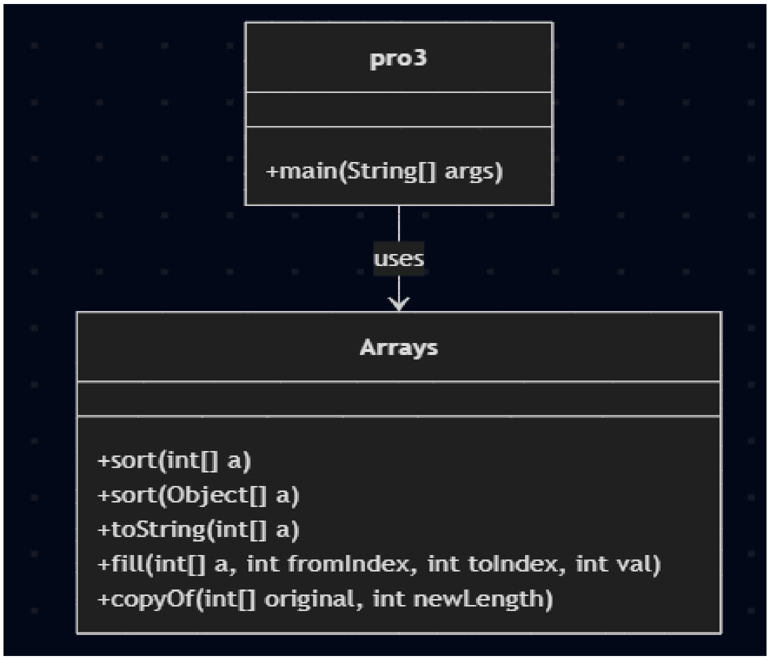
***fill the part of an array**

***copy the elememts of one array into another**

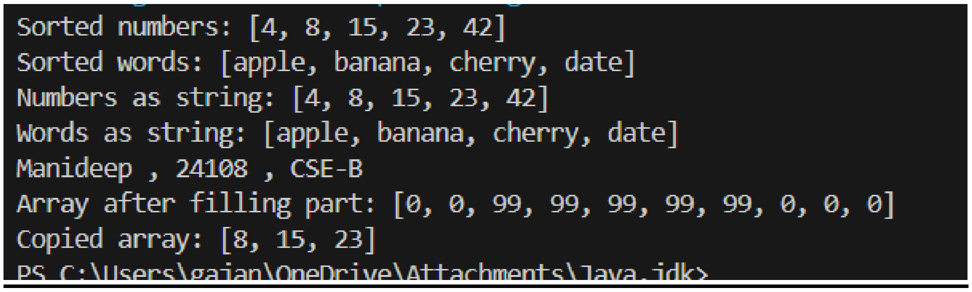
Code:

```
import java.util.Arrays;
public class ArrayOperations {
    public static void main(String[] args) {
        int[] numbers = { 42, 15, 8, 23, 4 };
        String[] words = { "banana", "apple", "cherry", "date" };
        Arrays.sort(numbers);
        Arrays.sort(words);
        System.out.println("Sorted numbers: " + Arrays.toString(numbers));
        System.out.println("Sorted words: " + Arrays.toString(words));
        String numbersStr = Arrays.toString(numbers);
        String wordsStr = Arrays.toString(words);
        System.out.println("Numbers as string: " + numbersStr);
        System.out.println("Words as string: " + wordsStr);
        System.out.println("Manideep , 24108 , CSE-B");
        int[] filledArray = new int[10];
        Arrays.fill(filledArray, 2, 7, 99);
        System.out.println("Array after filling part: " + Arrays.toString(filledArray));
        int[] copiedArray = Arrays.copyOfRange(numbers, 1, 4);
        System.out.println("Copied array: " + Arrays.toString(copiedArray)); }}
```

CLASS DIAGRAM:


pro3
+main(String[] args)
uses
Arrays
+sort(int[] a)
+sort(Object[] a)
+toString(int[] a)
+fill(int[] a, int fromIndex, int toIndex, int val)
+copyOf(int[] original, int newLength)

Output:



```
Sorted numbers: [4, 8, 15, 23, 42]
Sorted words: [apple, banana, cherry, date]
Numbers as string: [4, 8, 15, 23, 42]
Words as string: [apple, banana, cherry, date]
Manideep , 24108 , CSE-B
Array after filling part: [0, 0, 99, 99, 99, 99, 99, 0, 0, 0]
Copied array: [8, 15, 23]
PS C:\Users\gajan\OneDrive\Attachments\Java.jdk>
```

Error table:

S.No	ERRORS	Error rectification
1.	Did not place ";" after importing array package.	Added ";"

IMPORTANT POINTS:

- Use Arrays.sort() to sort numeric and string arrays in ascending order.
- Use Arrays.toString() to convert an array into a printable string format.
- Use Arrays.fill(array, fromIndex, toIndex, value) to fill part of an array with a specific value.
- Use Arrays.copyOf(originalArray, length) to copy one array into another.

- The fromIndex in fill() is inclusive; toIndex is exclusive.

All arrays of primitive types are initialized with default values (0 for int

4)Implement a java program using the below arraylist methods

***insert an element at particular index in the array list**

***modify an element in the array list**

***access an element from the array list**

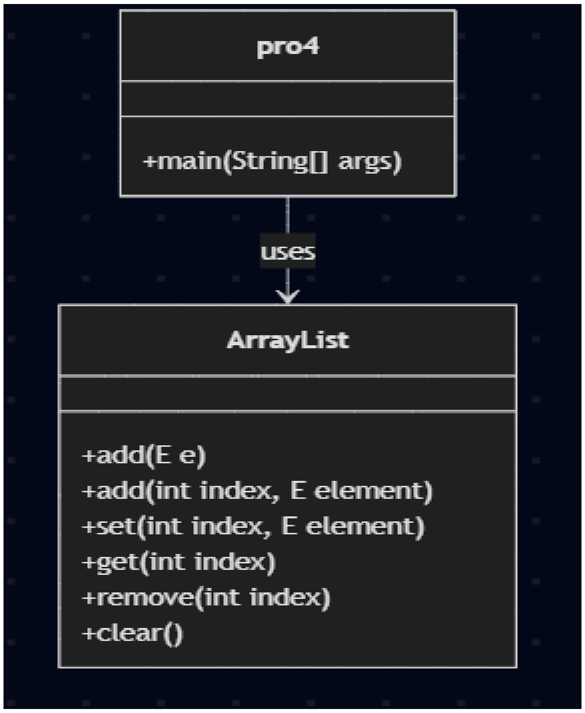
***remove an element from the array list**

***clear the elements from the array list**

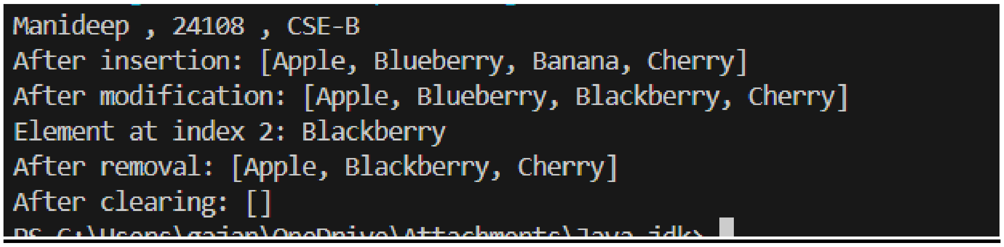
Code:

```
    import java.util.ArrayList;
public class Arraylistoperations {
        public static void main(String[] args) {
            ArrayList<String> list = new ArrayList<>();
            list.add("Apple");
            list.add("Banana");
            list.add("Cherry");
            System.out.println("Manideep , 24108 , CSE-B");
            list.add(1, "Blueberry");
            System.out.println("After insertion: " + list);
            list.set(2, "Blackberry");
            System.out.println("After modification: " + list);
           String fruit = list.get(2);
            System.out.println("Element at index 2: " + fruit);
            list.remove(1);
            System.out.println("After removal: " + list);
            list.clear();

            System.out.println("After clearing: " + list);}}
```

CLASS DIAGRAM:



Output:



```
Manideep , 24108 , CSE-B
After insertion: [Apple, Blueberry, Banana, Cherry]
After modification: [Apple, Blueberry, Blackberry, Cherry]
Element at index 2: Blackberry
After removal: [Apple, Blackberry, Cherry]
After clearing: []
PS C:\Users\gajan\OneDrive\Attachments\Java jdk>
```

ERROR TABLE:

S. No	ERRORS	Error rectification
1.	Did not place “;” after importing array package.	Added “;”

IMPORTANT POINTS:

- ArrayList Creation ArrayList<String> cricketers = new ArrayList<>();
- Inserting an Element cricketers.add(1, "Jasprit Bumrah");
- Modifying an Element cricketers.set(2, "Ravindra Jadeja");
- Accessing an Element String cricketerAtIndex1 = cricketers.get(1);
- Removing an Element cricketers.remove(3);
- Clearing the List cricketers.clear();