**23CSE111**

**OBJECT ORIENTED PROGRAMMING**

**LAB REPORT**

****

**Department of Computer Science Engineering**

**Amrita School of Computing**

**Amrita Vishwa Vidyapeetham, Amaravati Campus**

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Branch: CSE

Section: C [D]

**Verified By**

**WEEK-1**

**Program-1**

**AIM:** To download and install Java (JDK 21)

**PROCEDURE:**

This is the process for installation of JDK on windows.

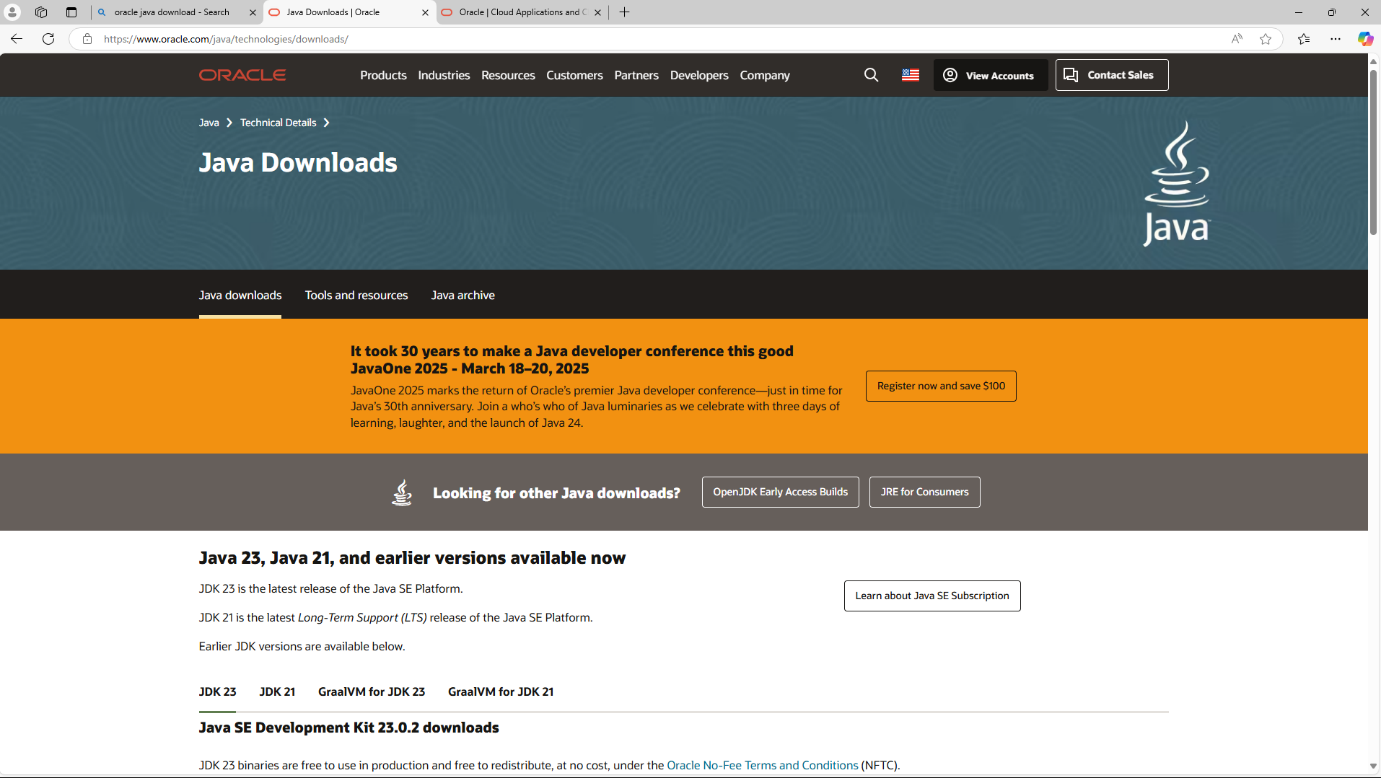
Follow the steps below to install Java on Windows:

* Download JDK (Java Development Kit)
* Run the Installer
* Configure Environment Variables
* Update the path variable
* Verify Installation in Command Prompt

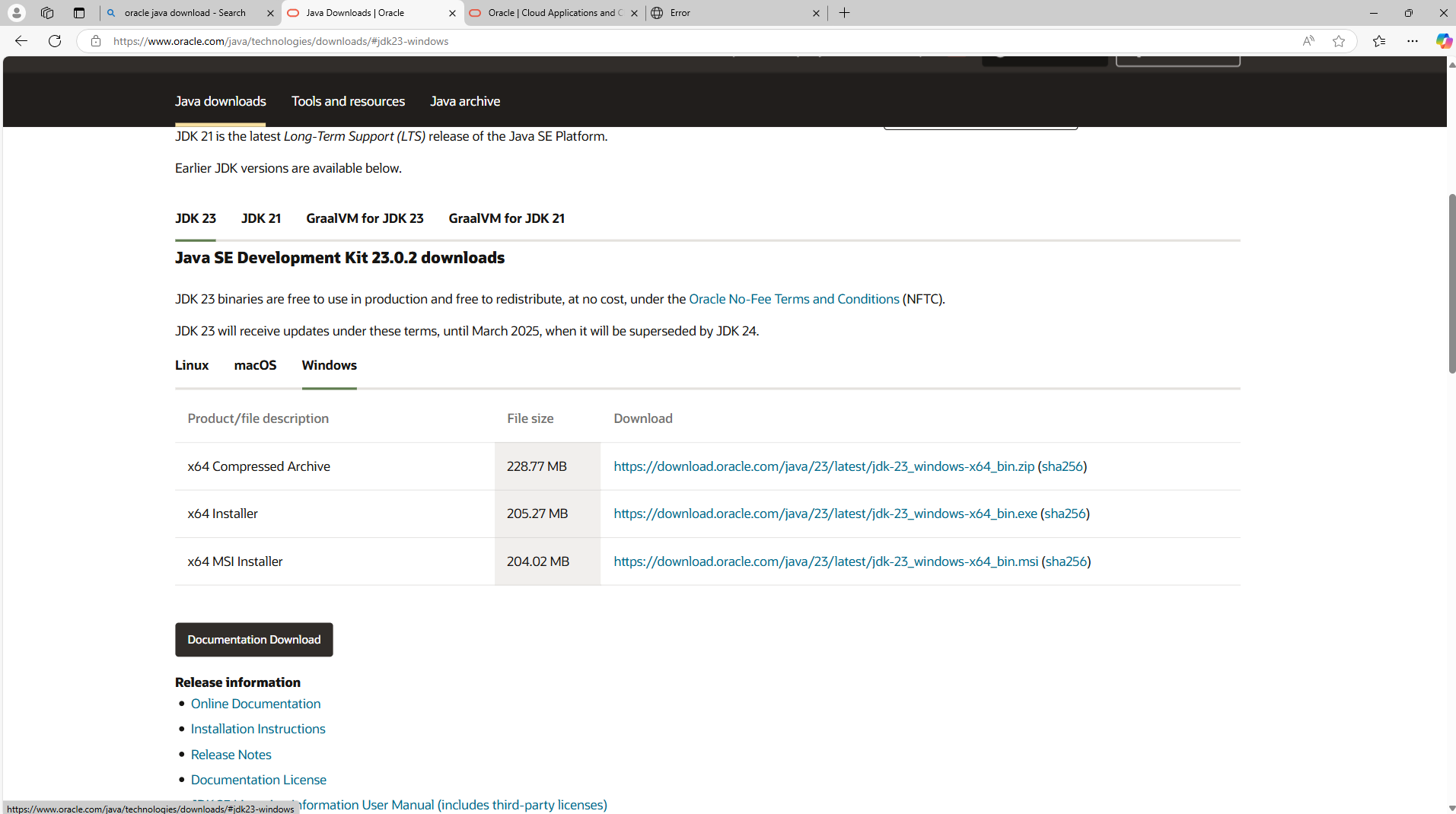
Here's a detailed explanation of each of the steps.

**Step 1**: Download JDK

1. Go to the official oracle website in the google search to download the JDK.
2. Locate the downloaded jdk-21\_windows-x64\_bin.exe file.
3. Double-click to launch the installer.
4. Click Next on the setup wizard.



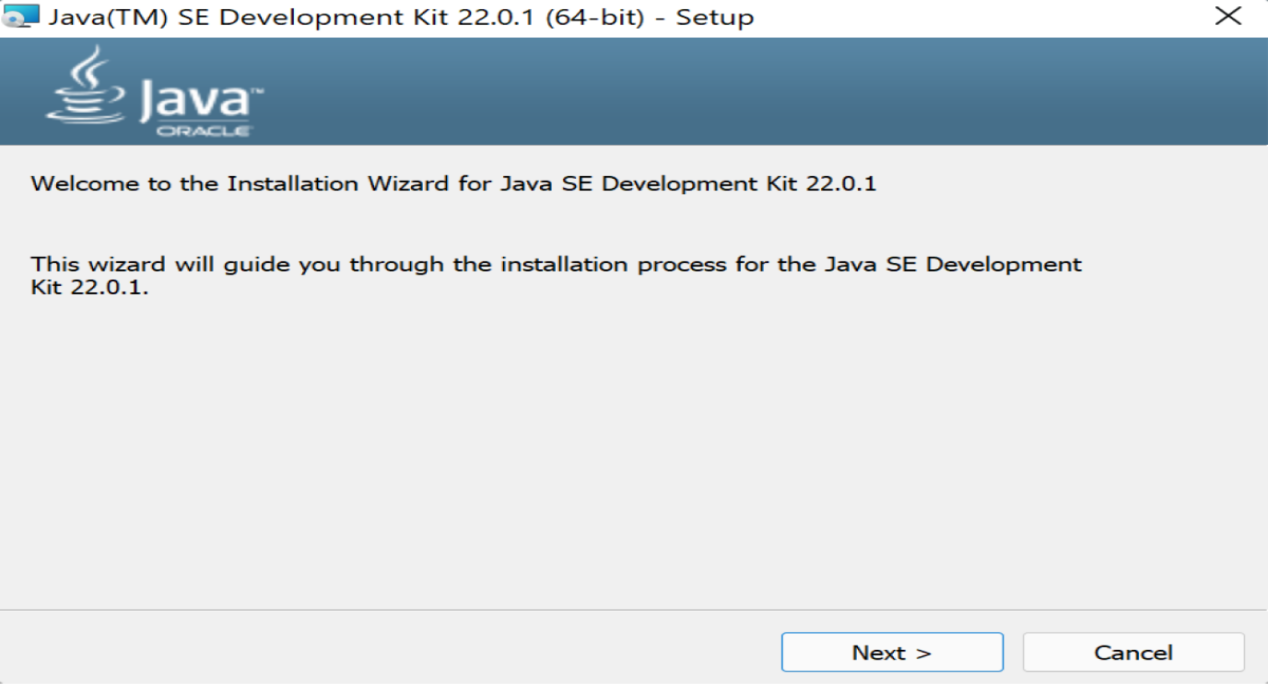
1. Choose the installation path (default is C:\Program Files\Java\jdk-21).
2. Click Next, then click Install.
3. Wait for the installation to complete.
4. Click Close once the installation is finished
5. Choose **x64 MSI Installer** on the windows tab and click on download link.



Step 2: Run the Installer

Now, go to your **downloads** folder and run the installer you just downloaded.

The screen below will be seen.



Simply click **Next** to proceed. Next you will be prompted another screen simply click next on that also.

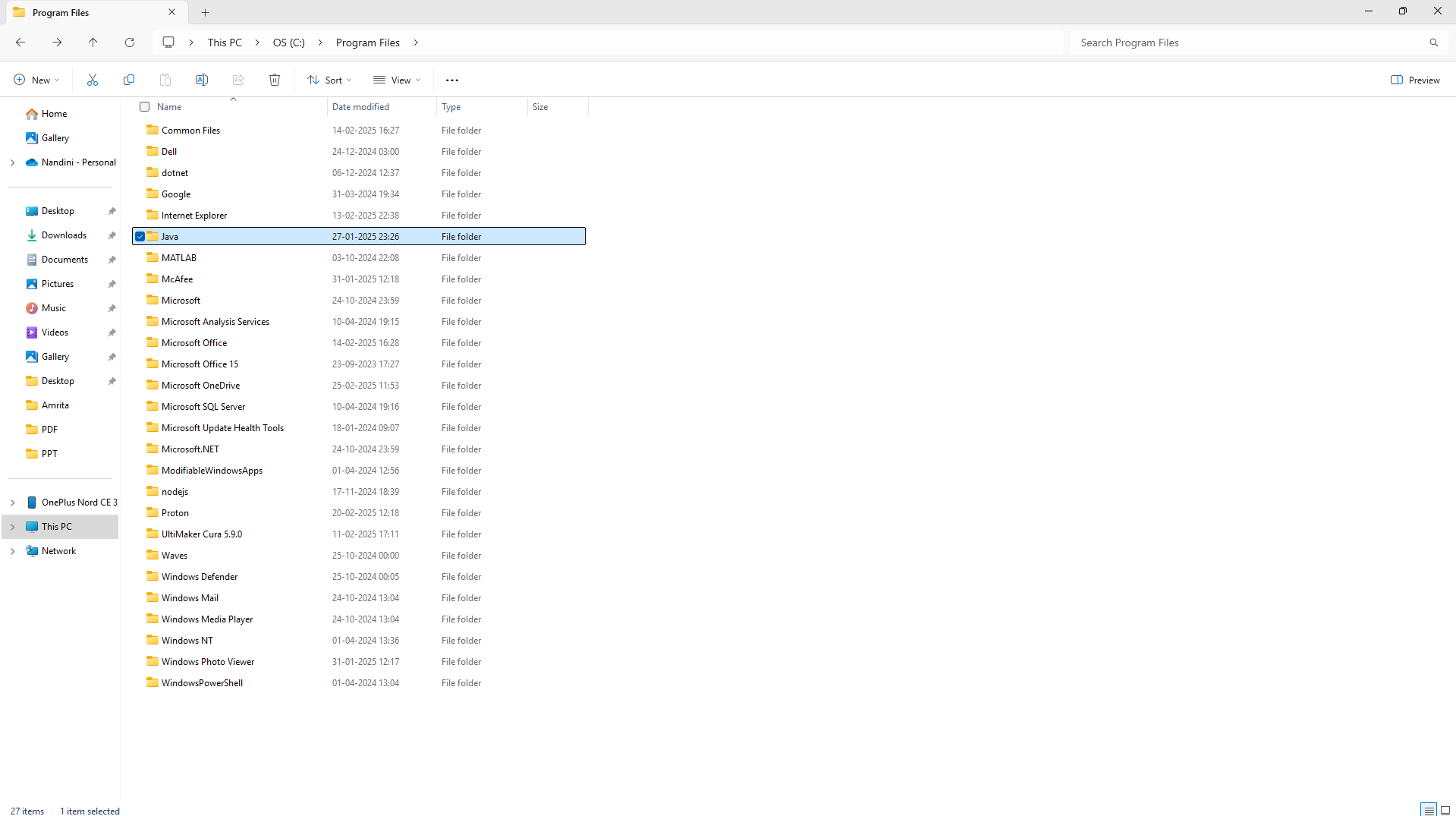
Step 3: Configure Environment Variables

After installation, you will need to tell your system where to find Java. This is done by setting environment variables.

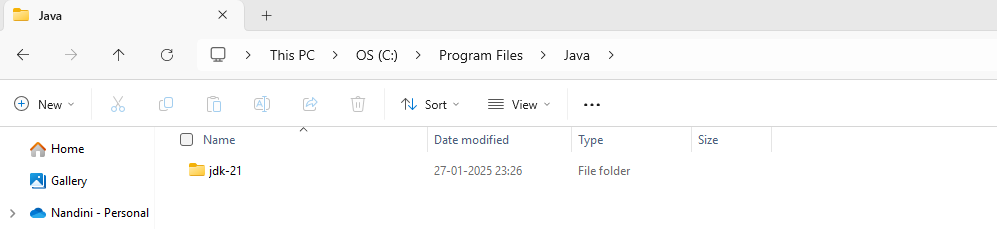
These are the ways to follow:

1)Go to file manager on your laptop or pc

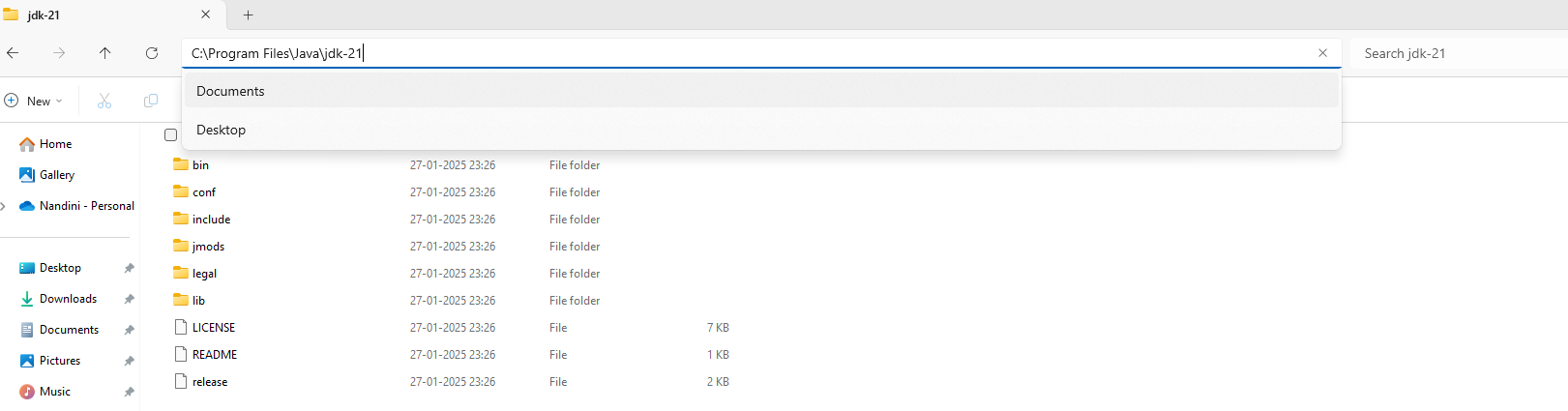
2) Go to “Windows C” Drive in File manager



3) Choose Program Files, select Java, then JDK 22, then select Bin.

4) Select and copy the path at the address bar 

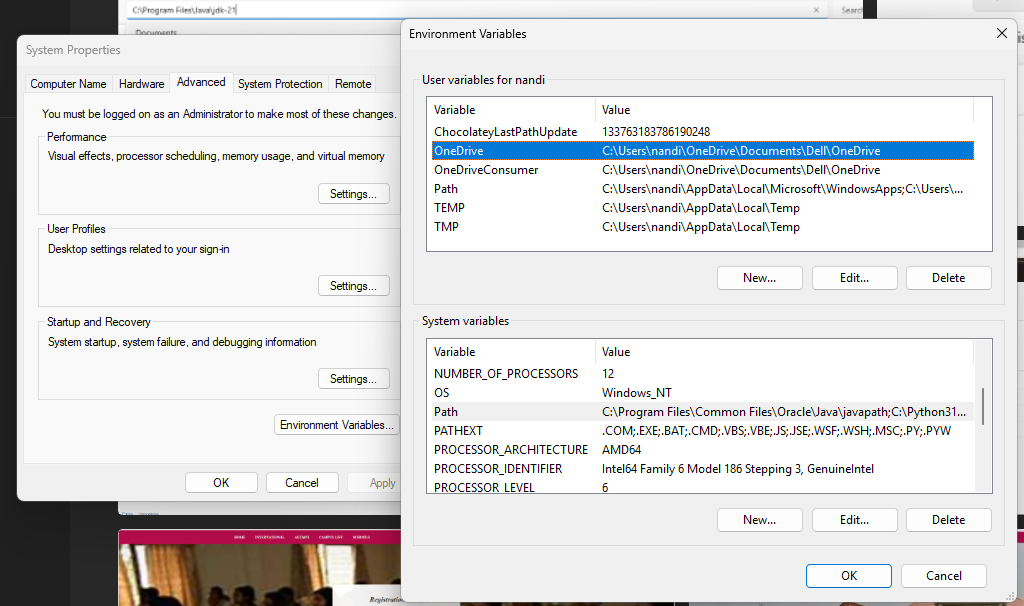
**Locate JDK Path**: Navigate through your file explorer to reach the JDK installation directory. Normally, it is located at

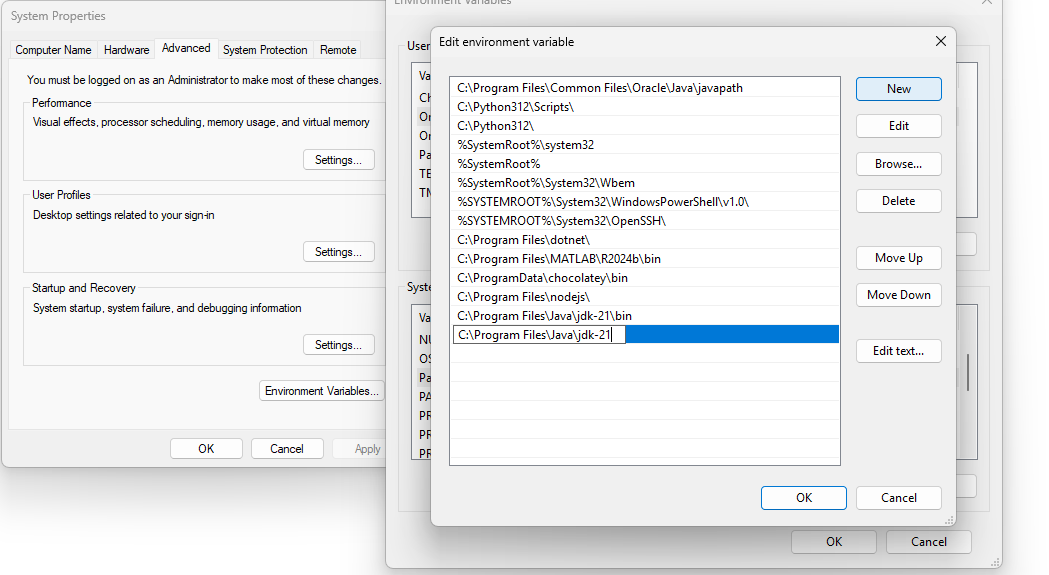


C:\Program Files\Java\jdk-22\bin

Copy this path

**Access Environment Variables**: Search **environment variable** on the terminal. In system properties, click on environment variables. You will be prompted to the screen below.





**Step 4: Update the Path Variable:**

Find the **Path** variable in the System variables section and click on **Edit**.

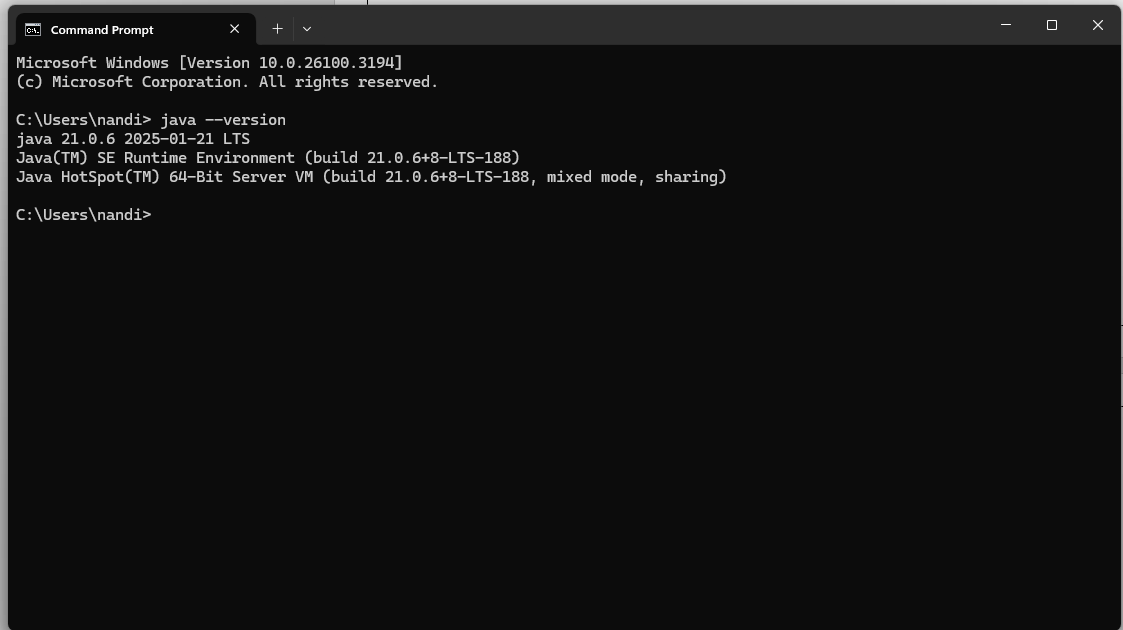
Then, click **New** and paste your JDK bin path (i.e. C:\Program Files\Java\jdk-22\bin).

Finally, click **Ok** to close each window.

**Step 5**: Verify your Installation

After the installation, you can verify whether Java is installed by using the following command in the command prompt.

java --version

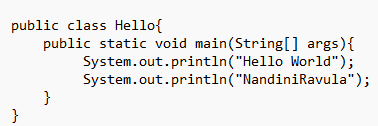


If Java is installed successfully, it will print the version information; otherwise, it will produce an error message indicating that the command is not recognized.

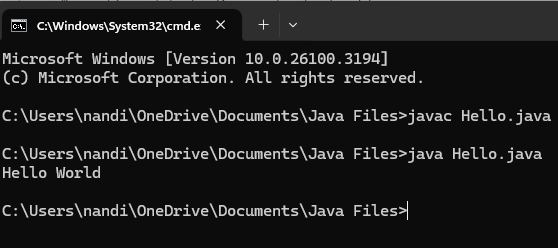
**PROGRAM-2:**

**AIM:** Write a Java program to print the message “Hello World”.

**Code**:



**OUTPUT**:



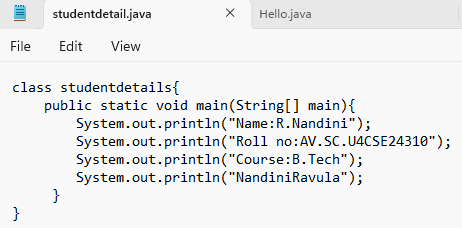
**ERROR TABLE:**

|  |  |
| --- | --- |
| ERRORS | RECTIFICATION |
| S in string is written in lowercase letter | The error is rectified by writing s in uppercase letter |

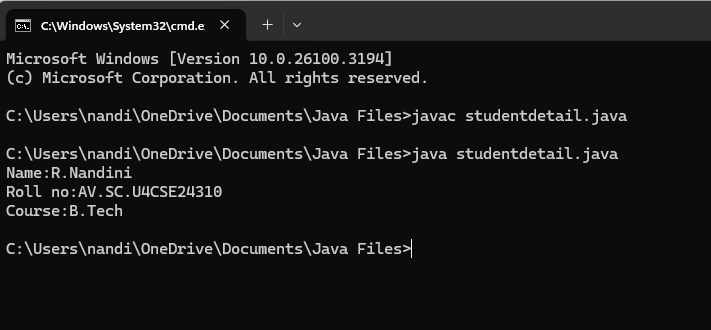
**PROGRAM-3:**

**AIM:** Write a Java Program that prints Name, Roll No,Course

**CODE:**

****

**OUTPUT:**



**ERROR TABLE:**

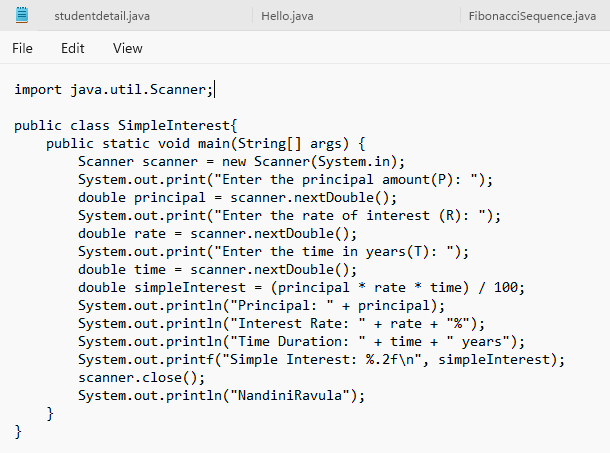
|  |  |
| --- | --- |
| ERROR | RECTIFICATION |
| In the statement at the end ; is not mentioned | Rectified by keeping ; at the end of the ststement |

**WEEK-2**

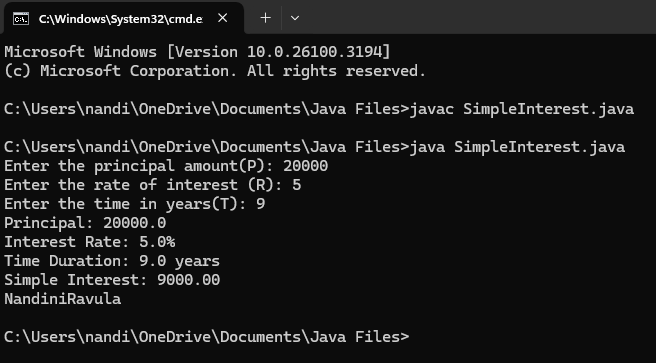
**Program-1**

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

**CODE:**



**OUTPUT:**

****

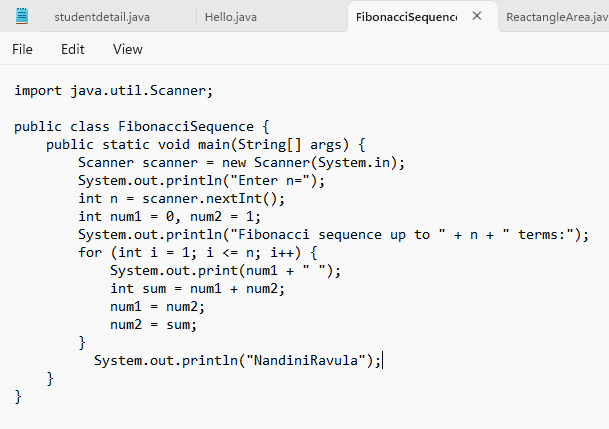
**ERROR TABLE:**

|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | error: ';' expected          System.out.print("Enter the rate of interest (R) in percentage: ") | Insert: ‘;’          System.out.print("Enter the rate of interest (R) in percentage: "); |

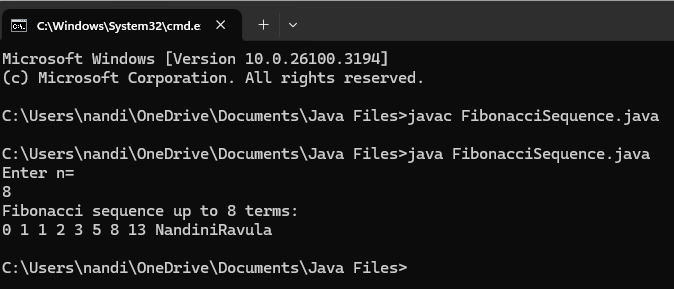
**PROGRAM-2:**

**AIM:** Write a java program to find the Fibonacci sequence of a given number

**CODE:**

****

**OUTPUT:**

****

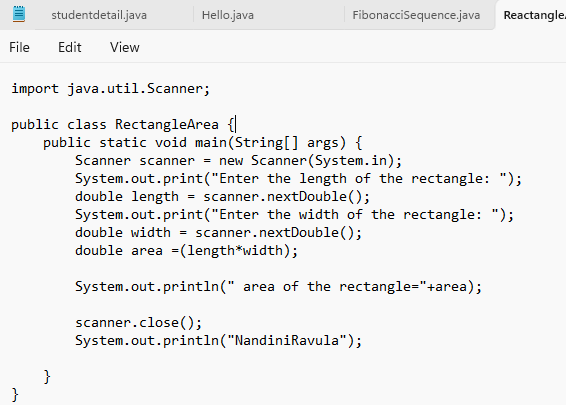
**ERROR TABLE:**

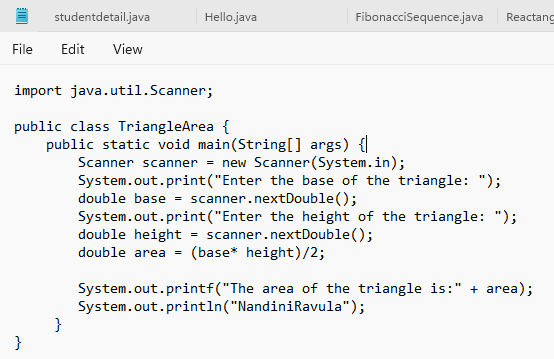
|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAAGE | ERROR RECTIFICATION |
| 1. | Enter the number: 5  The factorial of 5 is 1  Error: factorial \*=1; | Replace i in 1 place   Replace:factorial \*=i; |

**Program-3:**

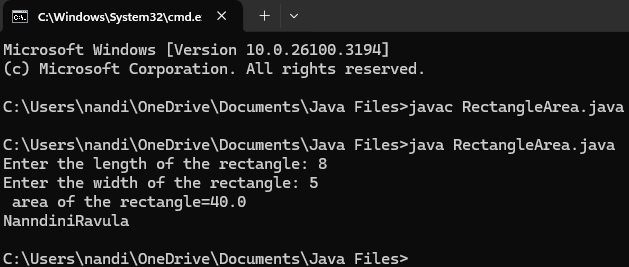
**AIM:** Write a java program to find the area of rectangle and triangle.

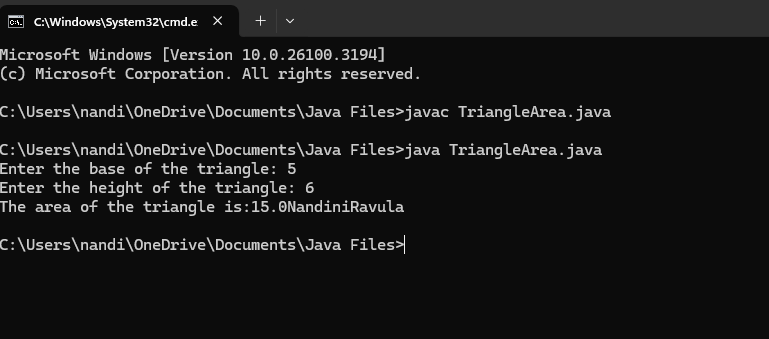
**CODE:**

****

****

**OUTPUT:**

****

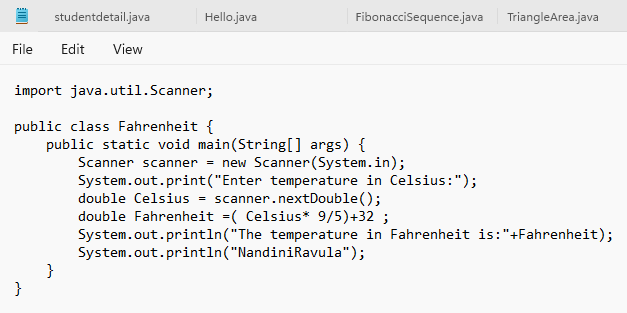
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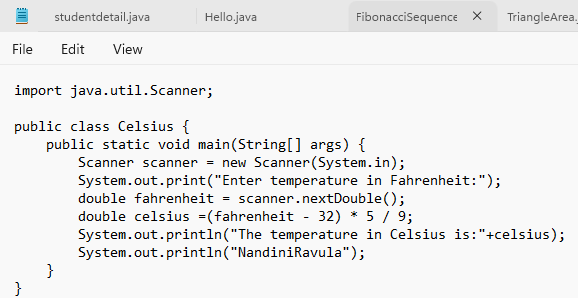
**ERROR TABLE:**

|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | Error: float fahrenheit = celsius \* 9 / 5 + 32;  Reason:Formula mistake. | It should be ((celsius \* 9) / 5) + 32 |

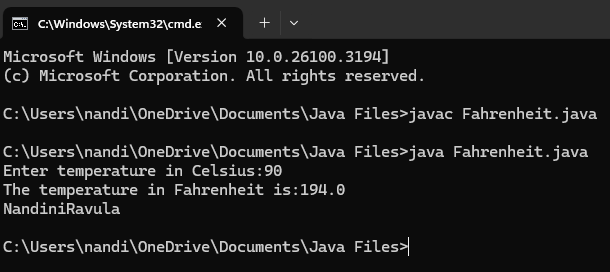
**PROGRAM-4:  
AIM:** Write a java code to convert the temperature from Celsius to Fahrenheit and from Fahrenheit to Celsius.

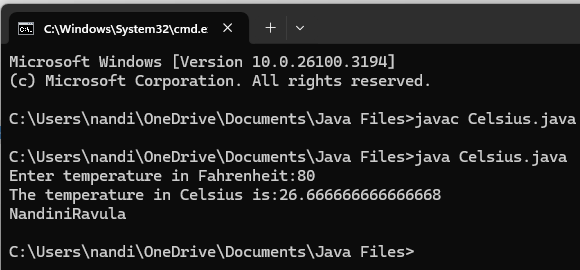
**CODE:**

****

****

**OUTPUT:**

****

****

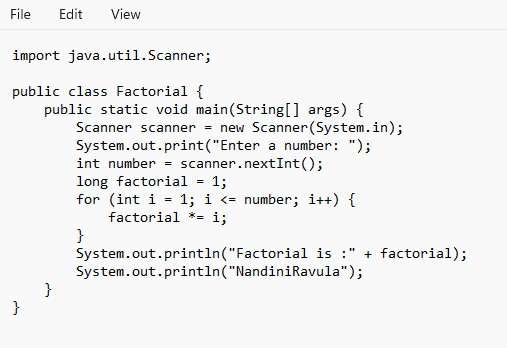
**ERROR TABLE:**

|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | Error: Print statement with incorrect variable name System.out.println(fahrenheit + "°F is equal to " + Celsius + "°C") | 'Celsius' should be lowercase  It should be ‘celsius’. |

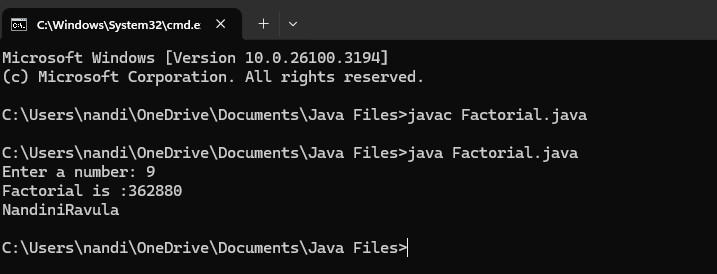
**PROGRAM-5**

**AIM:** Write a java code to find factorial of a number by taking input.

**CODE:**

****

**OUTPUT:**

****

**ERROR TABLE:**

|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | int firstTerm;  Error: variables not initialized properly | should be initialized          int n = 10; |

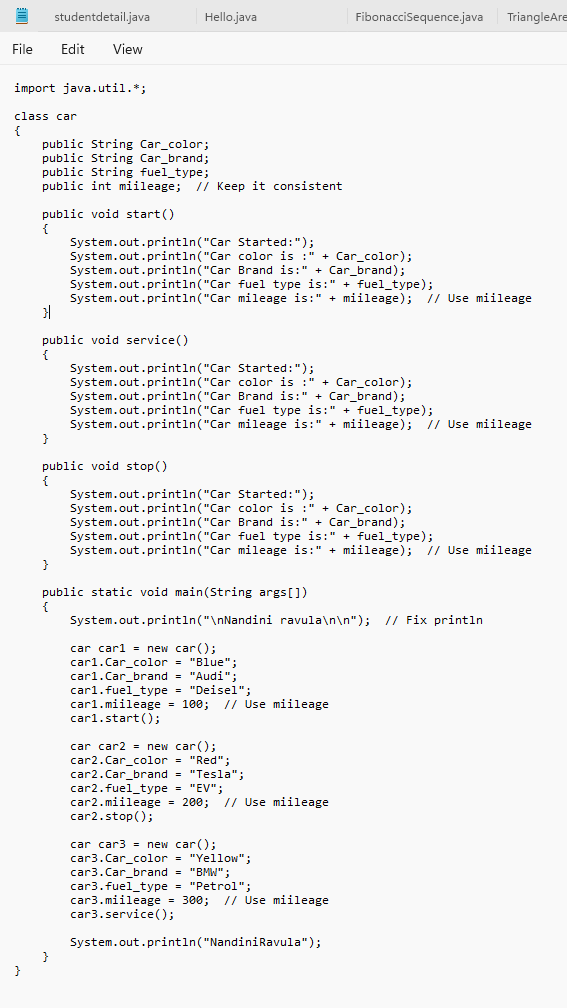
**WEEK-3**

**Program-1**

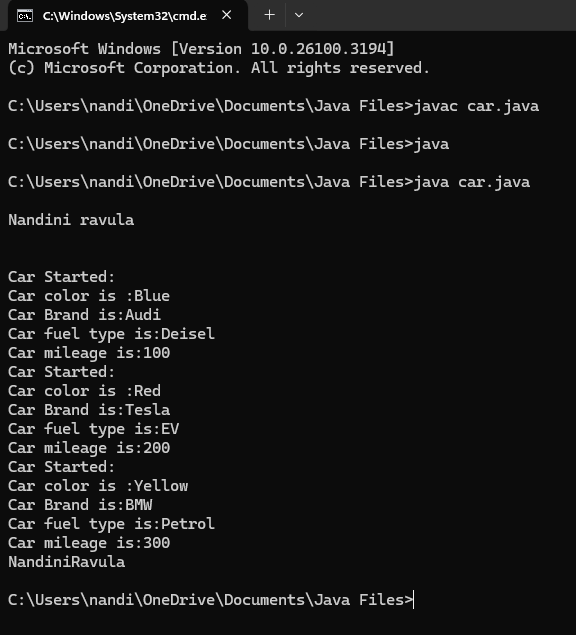
**AIM:** To create java program with following instructions

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 methods named Car1, Car2, Car3.

**CODE:**

****

**OUTPUT:**

****

**CLASS DIAGRAM:**

|  |
| --- |
| CLASS CAR |
| +Car\_color: string  +Car\_brand: string  + fuel\_type:string  +mileage:int |
| +void start()  +void stop()  +void service() |

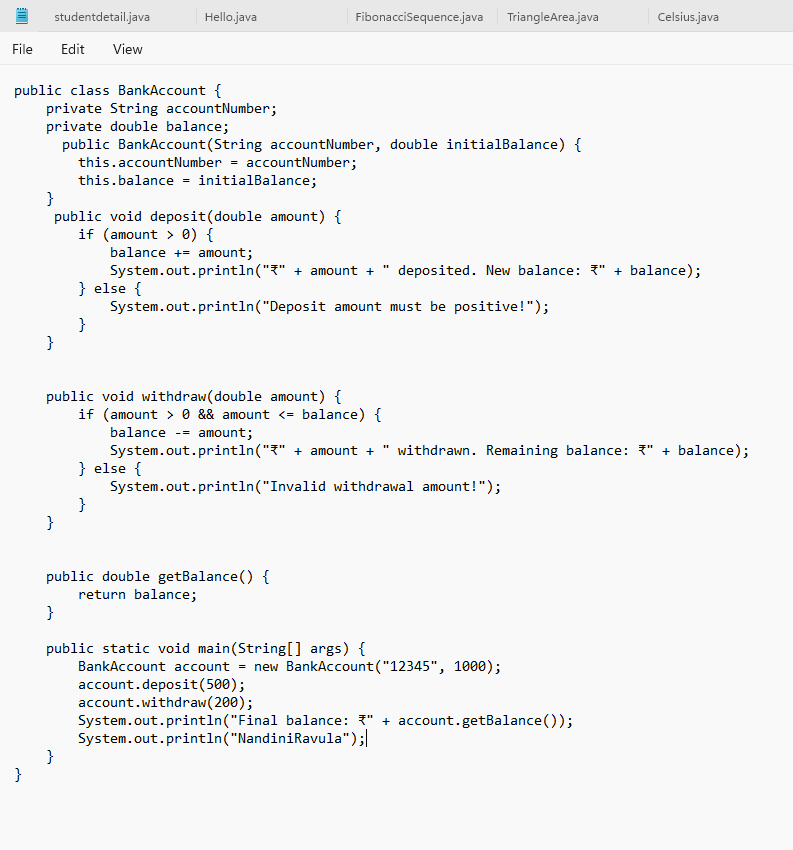
**ERROR TABLE:**

|  |  |  |
| --- | --- | --- |
| **SI.NO** | **ERROR MESSAGE** | **ERROR RECTIFICATION** |
| **1.** | **Error: car\_Color is undefined, should be car\_color** | **Replace: car\_Color with car\_color** |

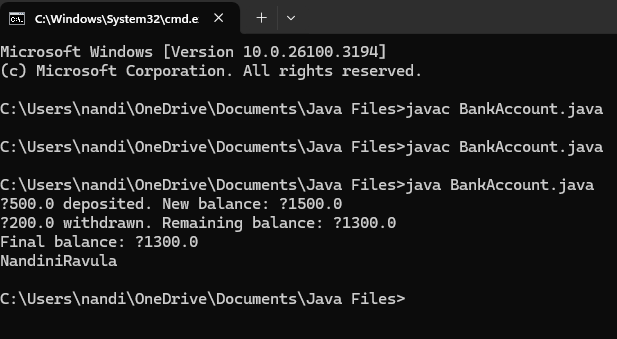
**Program-2**

**Aim:** To create a class bank account with method deposit () and withdrawal ().

**CODE:**

****

**OUTPUT:**

****

**CLASS DIAGRAM:**

|  |
| --- |
| CLASS BANKACCOUNT |
| -balance:double |
| +void deposit()  +void withdrawal() |

**ERROR TABLE:**

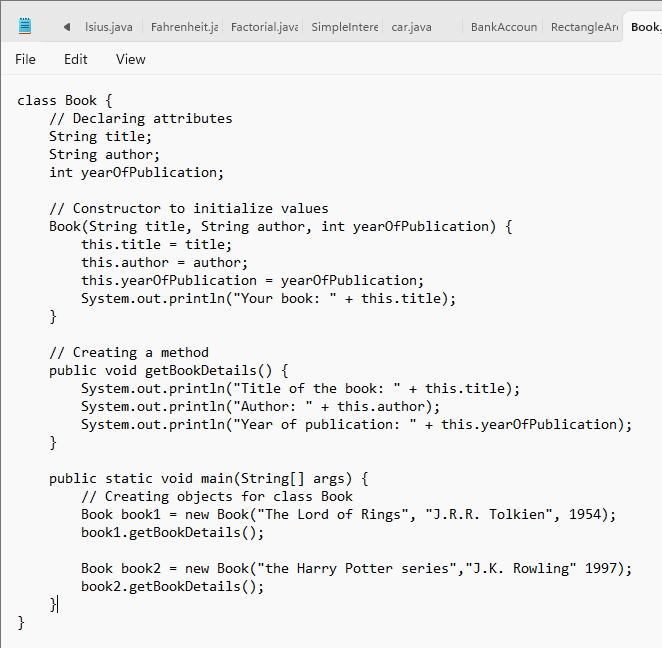
|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | this.existing = int.nextFloat(); | this.existing = input.nextFloat(); |

**WEEK-4**

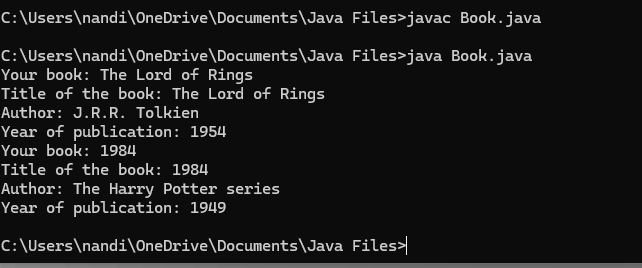
**Program-1**

**AIM:** Write a java program with class named “book”. The class should contain various attributes such as “Title of the book”, “Author”, Year of publications”, it should also contain a constructor with parameter which initializes “Title of the book”, “Author”, “Year of publication”. Create a method which displays the details of the book. Title of the book (), Author (), Year of publication ().Display the details of two book, by creating 2 objects.

**CODE:**



**OUTPUT:**



**Error:**

|  |  |  |
| --- | --- | --- |
| SI.NO | ERROR MESSAGE | ERROR RECTIFICATION |
| 1. | Not defining the function in a file. | To call the method we must define a function in a file. |

**IMPORTANT POINTS:**

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

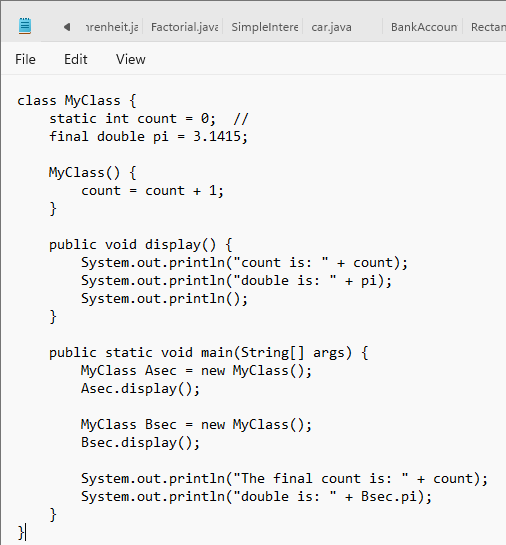
**CLASS DIAGRAM:**

|  |
| --- |
| **Book** |
| * Title: String * Author: String * Year of publication: int |
| + Book(title: String,                    Author: String;                    Year of publication: int     + displayDetails( ): void |

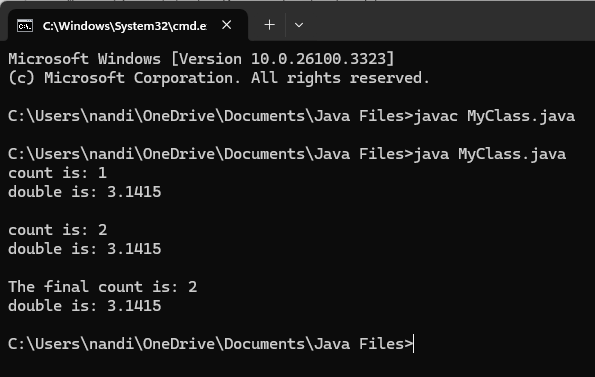
**Program-2**

**AIM:** To create a java program with class named “Myclass” with a static variable count of “int” type, in sized to “zero” and a constant variable “pi” of type “double” initialized to 3.1415 as attributes of that class. define a contractor for “Myclass” is created finally print the final values “count” and “pi” variables.

**CODE:**

****

**OUTPUT:**



**Error:**

|  |  |  |
| --- | --- | --- |
| **SI.NO** | **ERROR MESSAGE** | **ERROR RECTIFICATION** |
| **1.** | Not Putting the semi-colon after calling a function, | Put the semi-colon after calling a function. |

**IMPORTANT POINTS:**

1. We must declare the initial value of the variable before declaring the final one.
2. 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:**

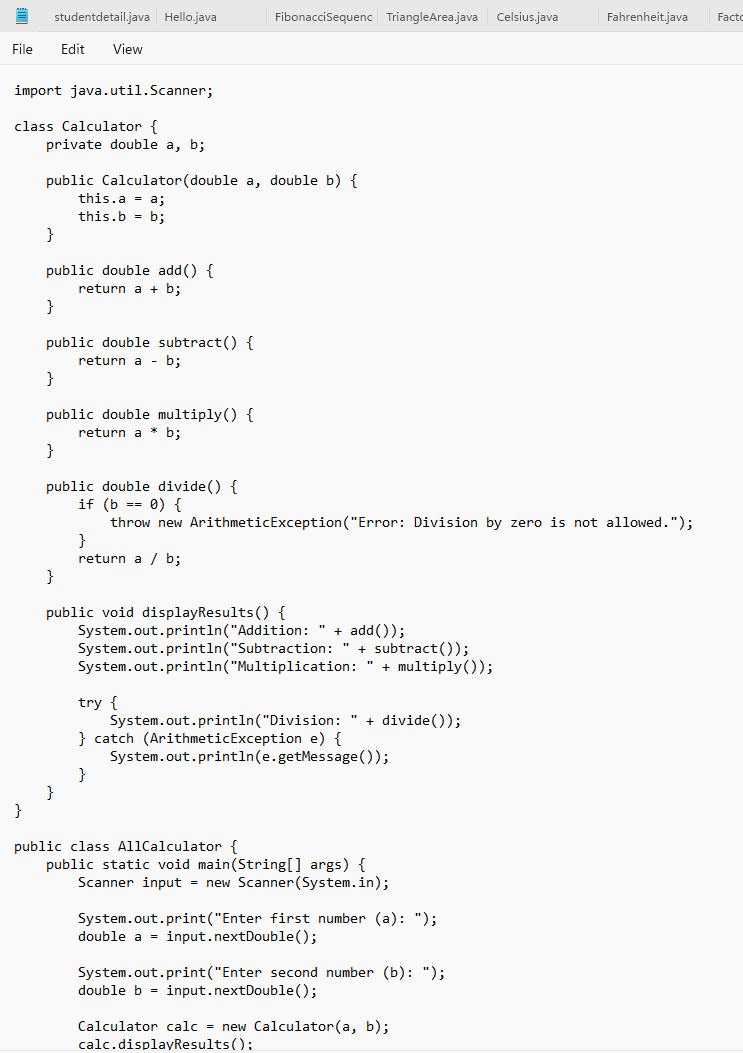
|  |
| --- |
| Myclass |
| * Count: int * Pi: double |
| + myclass( )          + main(args  String[]):             void |

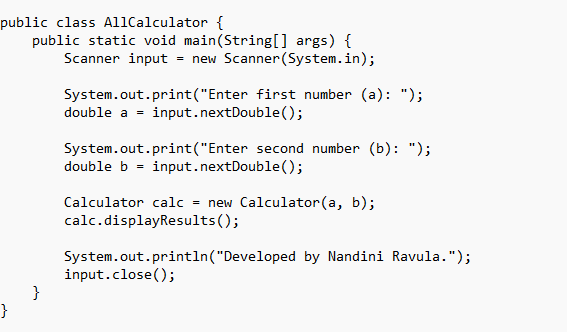
**WEEK-5**

**Program-1**

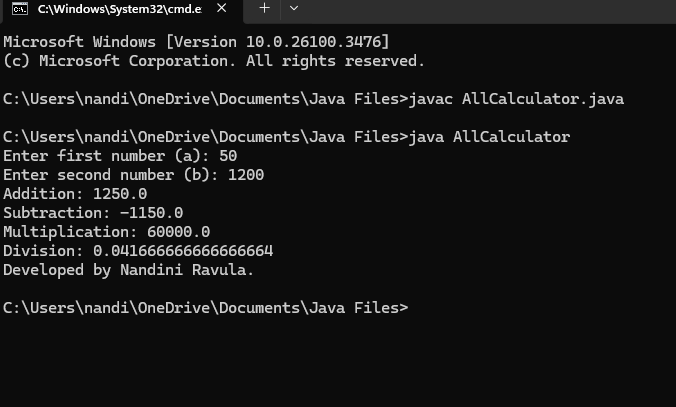
**AIM:: Create a calculator using the operations including addition, subtraction, multiplication and division using Multilevel Inheritance and display the desired output.**

**CODE:**





**OUTPUT:**



Important Points:

Demonstrates **inheritance** with a single Calculator class

### **Error Table:**

| **Error** | **Possible Cause** | **Solution** |
| --- | --- | --- |
| **Main method not found** | Class name does not match file name (Rent instead of rent) | Ensure class name and file name match (Rent.java) |
| **Method not found error** | showTruck() used in Truck, but other classes use showDetails() | Rename showTruck() to showDetails() in Truck |

**CLASS DIAGRAMS:**

|  |
| --- |
| **Calculator** |
| **- a: double**  **- b: double** |
| **+ add(): double**  **+ subtract(): double**  **+ multiply(): double**  **+ divide(): double**  **+ displayResults(): void** |

**Program-2**

**AIM:**

**A vehicle rental company wants to develop a system that maintains information about different types of vehicles available for rent. The company rents out cars and bikes and they need a program to store details about each vehicle such as brand and speed**

**• Cars should have an additional property: number of doors**

**• Bike should have a property indicating whether they have gears or not**

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

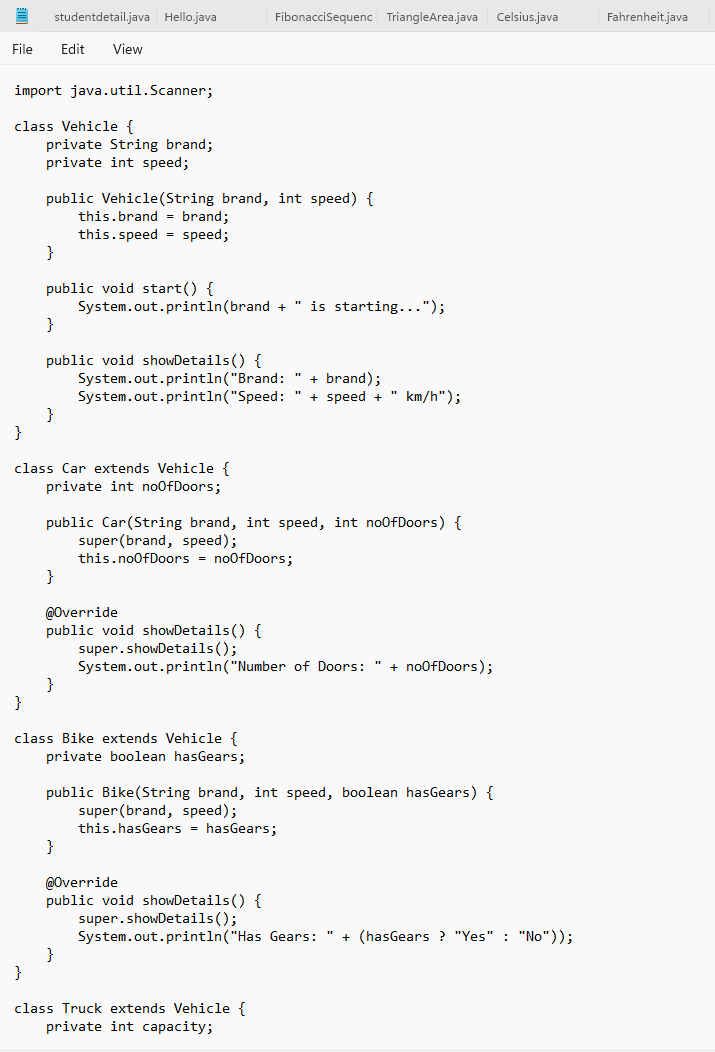
**• Every class should have a constructor**

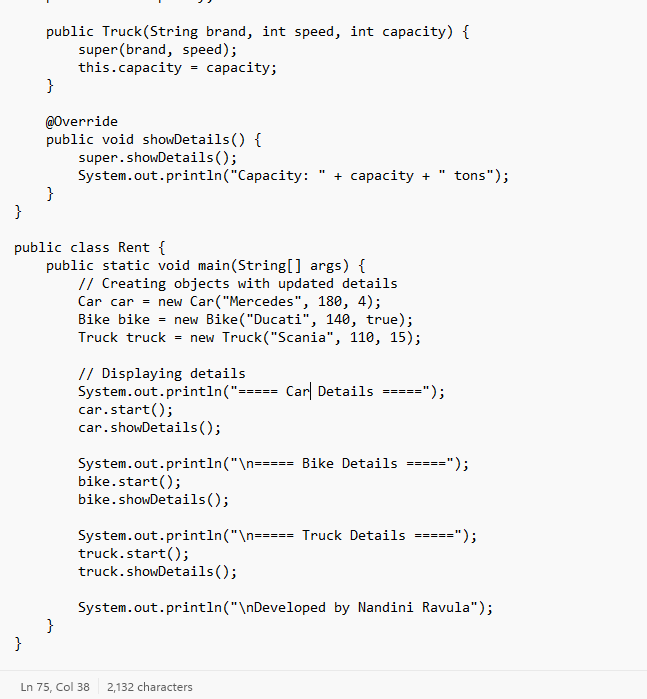
**1. Which OOP concept is used in the above program? Explain why it is useful in this scenario.**

**2. If the company decides to add a new type of vehicle truck, how would you modify the program? Truck should include an additional property capacity(in tons). Create a showTruckDetails() method to display the truck’s capacity. Write a constructor for truck that initializes all properties.**

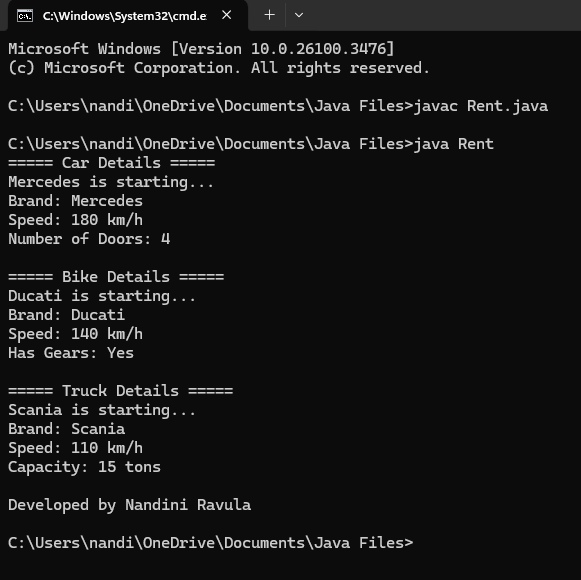
**3. Implement the truck class and update the main method to create a truck object, also create an object for car and bike subclassed. Finally display its details.**

**CODE:**





**OUTPUT:**



Important Points:

Demonstrates **inheritance** (Car, Bike, Truck inherit from Vehicle).

Uses **method overriding** (showDetails() method in each subclass).

### **Error Table:**

| **Error** | **Possible Cause** | **Solution** |
| --- | --- | --- |
| **Method not found error** | showTruck() used in Truck, but other classes use showDetails() | Rename showTruck() to showDetails() in Truck |

**CLASS DIAGRAMS:**

|  |  |  |
| --- | --- | --- |
| **Vehicle** | | |
| **- brand: String**  **- speed: int** | | |
| **+ start(): void**  **+ showDetails(): void** | | |
| **Car** | **Bike** | **Truck** |
| **- noOfDoors: int** | **- hasGears: boolean** | **- capacity: int** |
| **+ showDetails(): void** | **+ showDetails(): void** | **+ showDetails(): void** |