**23CSE111**

**OBJECT ORIENTED PROGRAMMING**

**LAB MANUAL**

****

**Department of Computer Science and Engineering Amrita School of computing**

**Amrita Vishwa Vidyapeetham, Amaravati Campus**

**Verified by:** NAME: M. BINDHU SREE

ROLLNO: AV.SC.U4CSE24226

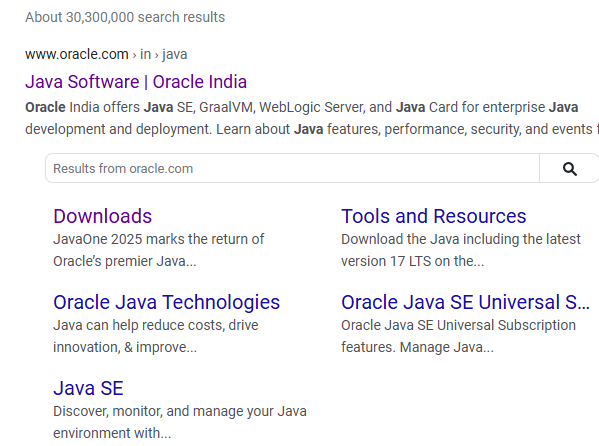
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| --- | --- | --- | --- | --- |
| **S.No.** | **Experiment Name** | **Page No.** | **Remarks** | **Signature** |
| **1** | **Installation Process of JDK** | **3-7** |  |  |
| **2** | **Simple Java Program for printing basic details of student** | **8-19** |  |  |
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**WEEK-1**

1. How to download and install java software in your computer.

**1.Steps for downloading.**

Step 1: Java is developed by oracle. so, open your web browser and search for java oracle.



Step 2: Then go to the website <https://www.oracle.com/in/java/> .

Step 3: And navigate to the java downloads. Then some earlier versions are available like

* [**JDK 23**](https://www.oracle.com/in/java/technologies/downloads/#java23)
* [**JDK 21**](https://www.oracle.com/in/java/technologies/downloads/#java21)
* [**GraalVM for JDK 23**](https://www.oracle.com/in/java/technologies/downloads/#graalvmjava23)
* [**GraalVM for JDK 21**](https://www.oracle.com/in/java/technologies/downloads/#graalvmjava21)

Step 3: JDK 21 is the latest *Long-Term Support (LTS)* release of the Java SE Platform. So, we use this version.

Step 4: According to your device operating system choose the product/file description.

Step 5: Then the version will be automatically downloaded.

**2.Steps for installation.**

Step 1: Go to the folder where it was downloaded.

Step 2: Then open and accept all terms and conditions.

Step 3: And install it.

**3.Setting environmental variables.**

Step 1: 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**.

Step 2: 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)

Step 3: Find Path under **System Variables**, click **Edit**, and add the path of the jdk-21(D:\UNI+\EDU\JAVA) **A screenshot of a computer

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**4.Checking for jdk(java development kit) version.**

Step 1: Open command prompt.

Step 2: Enter javac --version for version of jdk installed.

Step 3: Enter java –version for all details like when downloaded and path of environment variables

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a ) write a simple java program to print your name, roll no,sec etc.

**Program :**

class Demo

{

public static void main(String[] args)

{

System.out.println("NAME= M. BINDHU");

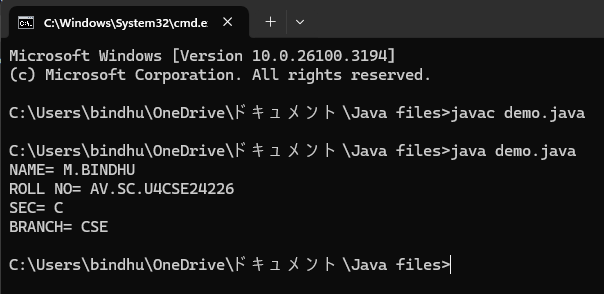
System.out.println("ROLL NO= AV.SC.U4CSE24226");

System.out.println("SEC= C");

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

}

}



**Errors:**

|  |  |  |
| --- | --- | --- |
| S.NO | Error Name | Error Rectification |
| 1 | Syntax/ Compilation Error | Trial.java:6: error: ';' expected  System.out.println("NAME= M.BINDHU")  ^  1 error |
|  |  |  |
|  |  |  |

**WEEK -2 (LAB)**

**SIMPLE JAVA programs**

1. **WRITE A JAVA PROGRAM TO FIND AREA OF RECTANGLE**

**Program:**

**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:**

**A screenshot of a computer screen

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Error:

|  |  |  |
| --- | --- | --- |
| 1 | Syntax error | area.java:7: error: ';' expected  Scanner sc = new Scanner(System.in)  ^  1 error |

1. **WRITE A JAVA PROGRAM TO CALCULATE SIMPLE INTREST:**

import java.util.\*;

class Simpleinterest{

public static void main(String[] args)

{

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

Scanner sc = new Scanner(System.in);

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

float p = sc.nextFloat();

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

float t = sc.nextFloat();

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

float r = sc.nextFloat();

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

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

}

}

Output:

A screenshot of a computer program

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Error:

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1** | **Runtime error** | **error: file not found: Simpleinterest.java**  **Usage: javac <options> <source files>**  **use --help for a list of possible options** |

1. **WRITE A JAVA PROGRAM TO FIND FIBNOACCI SERIES:**

**Program:**

**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:**

**A screenshot of a computer program

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**Error:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1** | **Runtime error** | **error: file not found: Fibonacci.java**  **Usage: javac <options> <source files>**  **use --help for a list of possible options** |

1. **WRITE A JAVA PROGRAM TO CALCULATING TEMPERATURE IN CELSIUS**

**Program:**

**import java.util.\*;**

**class temp**

**{**

**public static void main(String args[])**

**{**

**Scanner sc = new Scanner(System.in);**

**float c;**

**System.out.println("Enter Fahrenheit Temperature:");**

**float f = sc.nextFloat();**

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

**System.out.println("celcius Temperature is :"+c);**

**}**

**}**

**Output:**

**A screenshot of a computer program

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**Error:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1.** | **Syntax** | temp.java:7: error: ';' expected  Scanner sc = new Scanner(System.in) |

1. **WRITE A JAVA PROGRAM TO FIND FACTORIAL OF A GIVEN NUMBER**

**Program:**

**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();**

**System.out.println("Enter time:");**

**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:**

**A screenshot of a computer program

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**Error:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** | **rectification** |
|  | **Logical error** | **Incorrect input** | **Correcting input** |
|  | **Runtime error** | **Incorrect path** | **Using correct path** |

1. **WRITE A JAVA PROGRAM TO CONVERTE CELSIUS TO FAHRENHEIT:**

**Program:**

**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:**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Error:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** | **rectification** |
| **1.** | **Logical error** | **Incorrect input** | **Correcting input** |

1. **WRITE A JAVA PROGRAM TO CALCULATING AREA OF TRIANGLE USING HERONS’ FORMULA:**

**Program:**

**import java.util.\*;**

**import java.lang.Math;**

**class Triangle{**

**public static void main(String[] args) {**

**double s, c, a, b, p;**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter the value 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:**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Error:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** | **rectification** |
| **1.** | **Logical error** | **Incorrect input** | **Correcting input** |

**WEEK-3**

**1)WRITE A JAVA PROGRAM TO CREATE A CLASS WITH CAR NAME:**

**PROGRAM:**

**class Main {**

**String car\_color;**

**String car\_brand;**

**String fuel\_type;**

**int mileage;**

**// Constructor**

**public Main(String car\_color, String car\_brand, String fuel\_type, int mileage) {**

**this.car\_color = car\_color;**

**this.car\_brand = car\_brand;**

**this.fuel\_type = fuel\_type;**

**this.mileage = mileage; // Fixed the spelling mistake here**

**}**

**// Getter methods**

**public String color() {**

**return car\_color;**

**}**

**public String brand() {**

**return car\_brand;**

**}**

**public String fuel() {**

**return fuel\_type;**

**}**

**public int mile() {**

**return mileage;**

**}**

**// Main method**

**public static void main(String[] args) {**

**Main car1 = new Main("red", "Hyundai", "diesel", 19);**

**System.out.println("Car 1 - Color: " + car1.color() + ", Brand: " + car1.brand() +**

**", Fuel Type: " + car1.fuel() + ", Mileage: " + car1.mile());**

**Main car2 = new Main("blue", "Toyota", "petrol", 17);**

**System.out.println("Car 2 - Color: " + car2.color() + ", Brand: " + car2.brand() +**

**", Fuel Type: " + car2.fuel() + ", Mileage: " + car2.mile());**

**Main car3 = new Main("black", "Tata", "diesel", 19);**

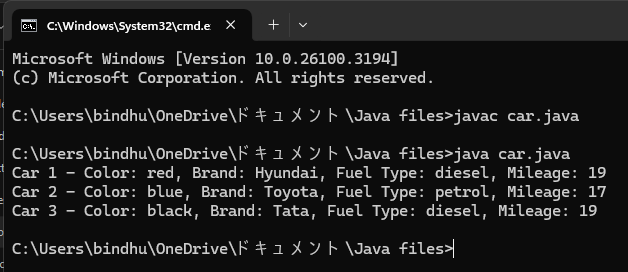
**System.out.println("Car 3 - Color: " + car3.color() + ", Brand: " + car3.brand() +**

**", Fuel Type: " + car3.fuel() + ", Mileage: " + car3.mile());**

**}**

**}**

**Output:**

****

**Error:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1.** | **Identifier error** | **Main.java:3: error: <identifier> expected**  **car\_brand;**  **^**  **1 error** |

**2)WRITE A JAVA PROGRAM TO CREATE A CLASS BANK ACCOUNT WITH METHODS DEPOSIT AND WITHDRAWAL:**

**PROGRAM:**

**class Bank\_Account {**

**private String accname;**

**private int acno;**

**private float balance;**

**// Constructor**

**public Bank\_Account(String accname, int acno, float balance) {**

**this.accname = accname;**

**this.acno = acno;**

**this.balance = balance;**

**}**

**// Withdraw method**

**public void withdraw(int amount) {**

**if (amount <= balance) {**

**balance -= amount;**

**System.out.println("Withdrawal of " + amount + " successful. Remaining balance: " + balance);**

**} else {**

**System.out.println("Insufficient balance for " + accname);**

**}**

**}**

**// Deposit method**

**public void deposit(int amount) {**

**balance += amount;**

**System.out.println("Deposit of " + amount + " successful. Updated balance: " + balance);**

**}**

**// Method to display account details**

**public void displayDetails() {**

**System.out.println("Account Name: " + accname);**

**System.out.println("Account Number: " + acno);**

**System.out.println("Balance: " + balance);**

**}**

**public static void main(String[] args) {**

**Bank\_Account s = new Bank\_Account("janu", 34571, 25000);**

**s.withdraw(20000);**

**s.deposit(2000);**

**s.displayDetails();**

**System.out.println(); // Just for better readability**

**Bank\_Account s1 = new Bank\_Account("bindhu", 333226, 25000);**

**s1.withdraw(2500);**

**s1.deposit(250000);**

**s1.displayDetails();**

**}**

**}**

**OUTPUT:**

**A computer screen shot of a computer program

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**ERROR:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1.** | **Syntax** | Bank\_Account.java:7: error: ';' expected  Scanner sc = new Scanner(System.in) |

**WEEK-4 (LAB)**

**1)**  **Create a java program with class named “Myclass” with a static variable count of “int” type ,insized to “zero” and a constant variable “pi” of type “double” initialized to 3.1415 as attributes of that class . define a contructor for “Myclass” is created finally print the final values “count” and “pi” variables.**

**PROGRAM:**

**class MyClass {**

**static int count = 0; //**

**final double pi = 3.1415;**

**MyClass() {**

**count = count + 1;**

**}**

**public void display() {**

**System.out.println("count is: " + count);**

**System.out.println("double is: " + pi);**

**System.out.println();**

**}**

**public static void main(String[] args) {**

**MyClass Asec = new MyClass();**

**Asec.display();**

**MyClass Bsec = new MyClass();**

**Bsec.display();**

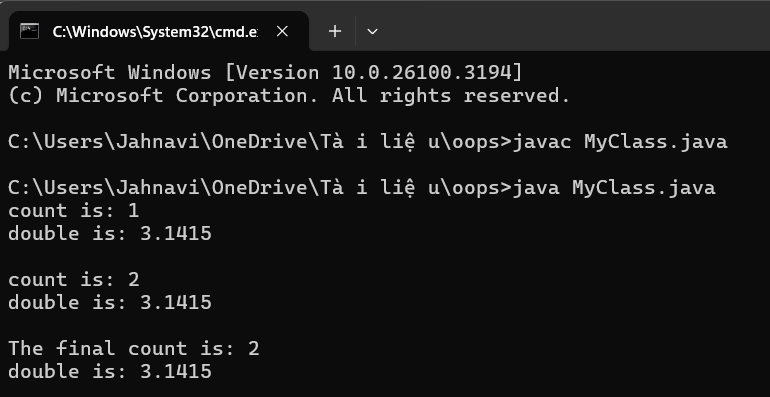
**System.out.println("The final count is: " + count);**

**System.out.println("double is: " + Bsec.pi);**

**}**

**}**

**OUTPUT:**



**ERROR:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1.** | **Syntax** | Bsec.java:23:error:illegal character:’\u00a0 |
|  |  |  |

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

**2)** **Create 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.**

**PROGRAM:**

**class Book {**

**// Declaring attributes**

**String title;**

**String author;**

**int yearOfPublication;**

**// Constructor to initialize values**

**Book(String title, String author, int yearOfPublication) {**

**this.title = title;**

**this.author = author;**

**this.yearOfPublication = yearOfPublication;**

**System.out.println("Your book: " + this.title);**

**}**

**// Creating a method**

**public void getBookDetails() {**

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

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

**System.out.println("Year of publication: " + this.yearOfPublication);**

**}**

**public static void main(String[] args) {**

**// Creating objects for class Book**

**Book book1 = new Book("The Great Gatsby", "F. Scott Fitzgerald", 1925);**

**book1.getBookDetails();**

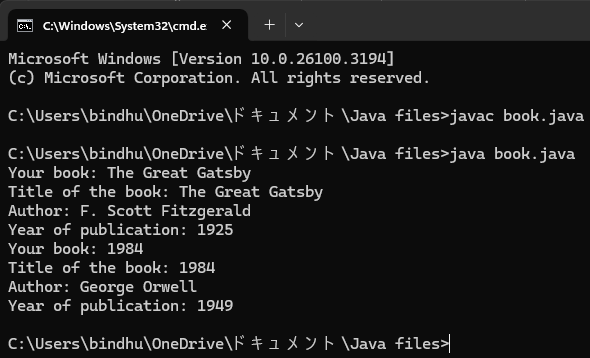
**Book book2 = new Book("1984", "George Orwell", 1949);**

**book2.getBookDetails();**

**}**

**}**

**OUTPUT:**

****

**ERROR:**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Error type** | **Reason for error** |
| **1.** | In the statement at the end ; is not mentioned | Rectified by keeping ; at the end of the ststement |

|  |
| --- |
| **CLASS DIAGRAM** |
| **book**  **- title: String**  **- author: String**  **- year: int** |
| **book(String, String, int)**  **+ displayDetails(): void** |