23CSE111

OBJECT ORIENTED PROGRAMMING

DOCUMENT

Department of computer science Engineering

Amrita School of Engineering

Amrita Vishwa Vidyapeetham, Amaravati Campus

Name: Davis J. Johney

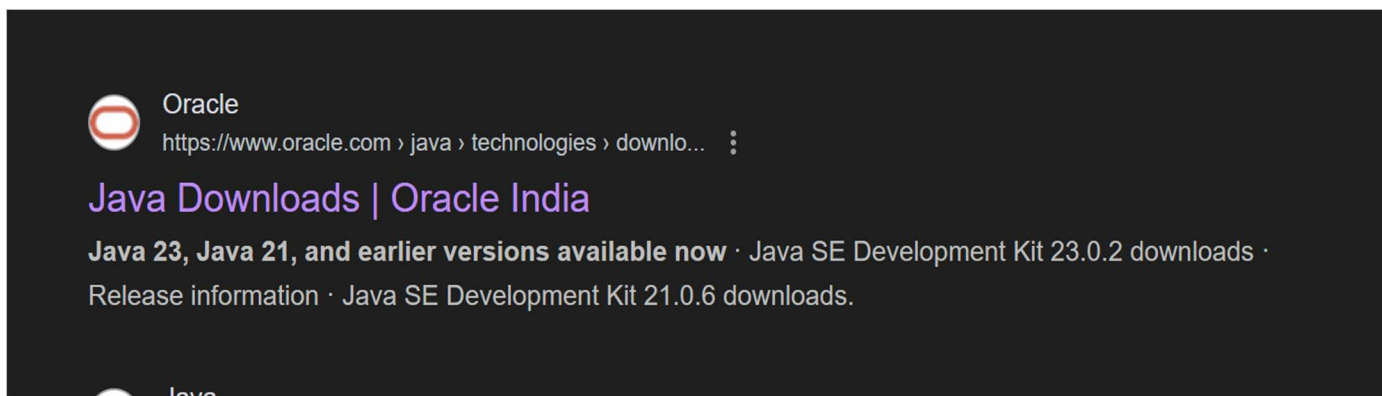**Verified By :**   **Roll No: CSEA-24041**

WEEK - 1

a) **Write the steps to download and install Java.**

Aim : **Download and Install Java Software**

Step – 1 : Visit any web browser and search for java download. Select the official Oracle website.

Step – 2 : Open Oracle website and select the LTS "JDK 21 " for Windows and select "X64 Installer" and download it.

JDK 23   JDK 21   GraalVM for JDK 23   GraalVM for JDK 21

Java SE Development Kit 21.0.6 downloads

JDK 21 binaries are free to use in production and free to redistribute, at no cost, under the Oracle No-Fee Terms and Conditions (NFTC).

JDK 21 will receive updates under the NFTC, until September 2026, a year after the release of the next LTS. Subsequent JDK 21 updates will be licensed under the Java SE OTN License (OTN) and production use beyond the limited free grants of the OTN license will require a fee.

Linux   macOS   **Windows**

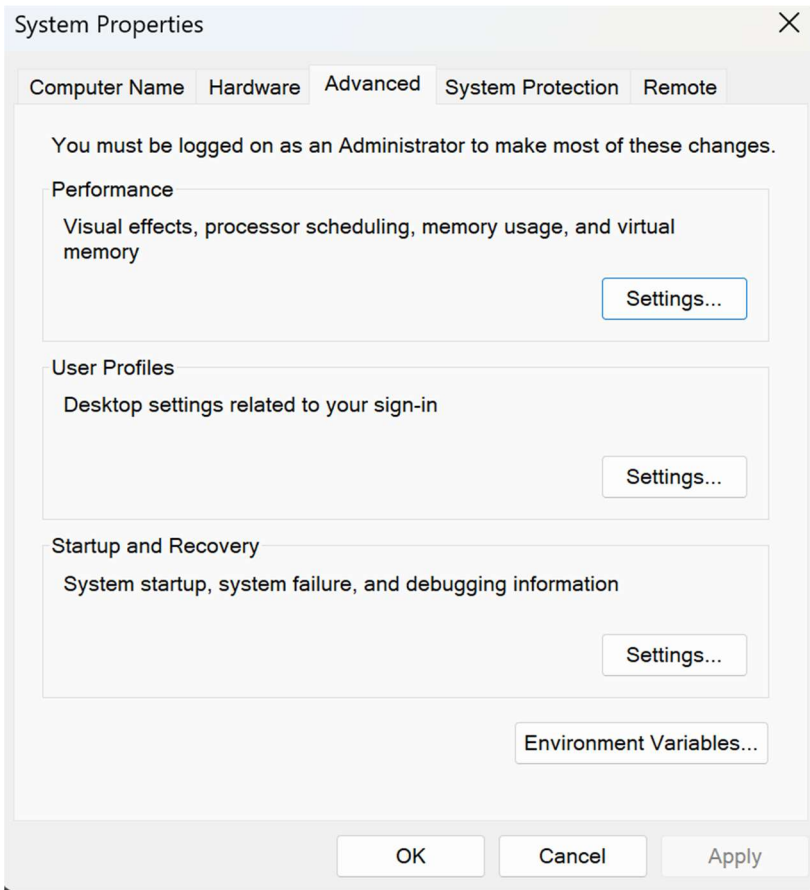| Product/file description	File size	Download
x64 Compressed Archive	185.92 MB	https://download.oracle.com/java/21/latest/jdk-21_windows-x64_bin.zip (sha256)
x64 Installer	164.31 MB	https://download.oracle.com/java/21/latest/jdk-21_windows-x64_bin.exe (sha256)
x64 MSI Installer	163.06 MB	https://download.oracle.com/java/21/latest/jdk-21_windows-x64_bin.msi (sha256)

Step – 3 : After downloading open "C-drive" on your pc and select "Program Files", open "JDK 21"

Name	Date modified	Type	Size
📁 eSupport	19-09-2024 06:46	File folder	
📁 Program Files	30-01-2025 13:53	File folder	
📁 Program Files (x86)	27-01-2025 06:17	File folder	
📁 Users	29-01-2025 21:58	File folder	
📁 Windows	02-02-2025 15:10	File folder	

Name	Date modified	Type	Size
📁 ASUS	19-09-2024 05:25	File folder	
📁 Common Files	30-01-2025 15:59	File folder	
📁 Google	27-01-2025 06:18	File folder	
📁 Internet Explorer	02-02-2025 15:08	File folder	
📁 Java	27-01-2025 06:52	File folder	
📁 MATLAB	28-01-2025 12:22	File folder	
📁 McAfee	29-01-2025 10:32	File folder	
📁 Microsoft Office	31-01-2025 13:35	File folder	
📁 Microsoft Office 15	30-05-2023 18:30	File folder	
📁 Microsoft Update Health Tools	30-01-2025 13:53	File folder	
📁 ModifiableWindowsApps	07-05-2022 10:54	File folder	
📁 Windows Defender	28-01-2025 21:26	File folder	

Name	Date modified	Type	Size
📁 jdk-21	27-01-2025 06:52	File folder	

Step – 4 : Open environmental variables and add a new file with path.

Step – 5 : Verify java version in command window

```
C:\Users\johne>java --version
java 21.0.6 2025-01-21 LTS
Java(TM) SE Runtime Environment (build 21.0.6+8-LTS-188)
Java HotSpot(TM) 64-Bit Server VM (build 21.0.6+8-LTS-188, mixed mode, sharing)
```

b) Write a java program to print the message "Welcome to java programming".

Code:
```
class ex1 {
    public static void main(String[] args) {
        System.out.println("Welcome to java programming.");

    }
}
```

```
C:\Users\johne\OneDrive\Desktop\java>java Welcome
Welcome to Java Programming

C:\Users\johne\OneDrive\Desktop\java>
```

Error :

S.No	Expected Error	Reason
1	;	; is expected at end
2	S	Capital S is expected for String and System.

c) Write a java program to print the student information

Code : public class ex2 {

  public static void main(String[] args) {
    // Predefined student details
    String name = "Davis J.Johney";
    int age = 20;
    String rollNumber = "24041";

    // Display student details
    System.out.println("Student Details:");
    System.out.println("Name: " + name);
    System.out.println("Age: " + age);
    System.out.println("Roll Number: " + rollNumber);
  }
}

```
C:\Users\johne\OneDrive\Desktop\java>java ex2
Student Details:
Name: Davis J.Johney
Age: 20
Roll Number: 24041

C:\Users\johne\OneDrive\Desktop\java>
```

ERRORS :

S.No	Expected Error	Reason
1	;	; is expected at end
2	S	Capital S is expected for String

WEEK – 2

a) **Write a java program to clalculate area of rectangle.**

Code :
```
import java.util.Scanner;
    public class arear{
      public static void main(String[] args){
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a value : ");
        int b = input.nextInt();
        System.out.print("Enter a value : ");
        int l = input.nextInt();
         int area = b*l;
         System.out.print("The area of the rectangle is : "+ area);
    input.close();
  }
 }
```

Output :

```
C:\Users\johne\OneDrive\Desktop\java>java Rectangle
Enter the length of the rectangle: 23
Enter the width of the rectangle: 23
The area of the rectangle is: 529.00 square units.

C:\Users\johne\OneDrive\Desktop\java>|
```

ERRORS :

S.No	Expected Error	Reason
1	;	; is expected at end
2	area	Declaration of int type variable

b) Write a java program to convert temperature from Celsius to Fahrenheit and vice versa.

Code :

```java
import java.util.Scanner;

public class TemperatureConverter {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Temperature Converter");
        System.out.println("1. Celsius to Fahrenheit");
        System.out.println("2. Fahrenheit to Celsius");
        System.out.print("Choose an option (1 or 2): ");
        int choice = scanner.nextInt();
        if (choice == 1) {
            // Celsius to Fahrenheit
            System.out.print("Enter temperature in Celsius: ");
            double celsius = scanner.nextDouble();
            double fahrenheit = (celsius * 9/5) + 32;
            System.out.printf("%.2f Celsius is %.2f Fahrenheit.%n", celsius, fahrenheit);
        } else if (choice == 2) {
            // Fahrenheit to Celsius
            System.out.print("Enter temperature in Fahrenheit: ");
            double fahrenheit = scanner.nextDouble();
            double celsius = (fahrenheit - 32) * 5/9;
            System.out.printf("%.2f Fahrenheit is %.2f Celsius.%n", fahrenheit, celsius);
        } else {
            System.out.println("Invalid choice. Please select 1 or 2.");
        }

        scanner.close();
    }
}
```

Output :

```
C:\Users\johne\OneDrive\Desktop\java>javac Temperature.java

C:\Users\johne\OneDrive\Desktop\java>java Temperature
Temperature Converter
1. Celsius to Fahrenheit
2. Fahrenheit to Celsius
Choose an option (1 or 2): 1
Enter temperature in Celsius: 34
34.00 Celsius is 93.20 Fahrenheit.

C:\Users\johne\OneDrive\Desktop\java>|
```

ERRORS :

S.No	Expected Error	Reason
1	;	; is expected at end
2	Input.close();	The input is expected to be closed.

c)Write a java program to calculate the simple interest.

```java
Code :  import java.util.Scanner;
        public class si{
         public static void main(String[] args){
        Scanner input = new Scanner(System.in);
        System.out.print("Enter principal amount : ");
         int p = input.nextInt();
        System.out.print("Enter rate of interest : ");
         int r = input.nextInt();
         System.out.print("Enter the time period : ");
       int t = input.nextInt();
       int SI = p*r*t/100;
     System.out.print("The simple Interest is : " + SI);
     input.close();
  }
 }
```

Output :

```
C:\Users\johne\OneDrive\Desktop\java>javac Interest.java

C:\Users\johne\OneDrive\Desktop\java>java Interest
Enter the principal amount (P): 1000
Enter the rate of interest (R) in percentage: 23
Enter the time period (T) in years: 4
The simple interest is: 920.0

C:\Users\johne\OneDrive\Desktop\java>
```

ERRORS :

S.No	Expected Error	Reason
1	;	; is expected at end
2	Int t	Without declaring t the compiler cannot execute the program.

d)Write a java program to find the largest of three numbers using ternary operation.

```
Code :  import java.util.Scanner;
         public class largest{
          public static void main(String[] args){
          Scanner input = new Scanner(System.in);
          System.out.print("Enter number a : ");
          int a = input.nextInt();
          System.out.print("Enter number b : ");
          int b = input.nextInt();
          System.out.print("Enter number c : ");
          int c = input.nextInt();
          int largest = (a>=b) ? ((a>=c ) ? a : c) : ((b >=c) ? b : c);
          System.out.print("The largest number is : " + largest);
          input.close();
     }

   }
```

Output :

```
C:\Users\johne\OneDrive\Desktop\java>java Largest
Enter the first number: 12
Enter the second number: 23
Enter the third number: 45
The largest number is: 45

C:\Users\johne\OneDrive\Desktop\java>
```

ERRORS :

S.No	Expected Error	Reason
1	?	Checks the condition
2	:	Comparing between two variables

e) Write a java program to find the factorial of a number

Code : import java.util.Scanner;
        public class fac{
          public static void main(String[] args){
         Scanner input = new Scanner(System.in);
         System.out.print("Enter the number n : ");
          int n = input.nextInt();
          int fac = 1;
         for(int i = 2; i<=n;i++){
         fac *= i;
    }
        System.out.println("The factorial of the given number is :" + fac);
        input.close();

     }
     }

Output :

```
C:\Users\johne\OneDrive\Desktop\java>javac Calculator.java

C:\Users\johne\OneDrive\Desktop\java>java Calculator
Enter a non-negative integer: 10
Factorial of 10 is: 3628800

C:\Users\johne\OneDrive\Desktop\java>
```

ERRORS :

S.No	Expected Error	Reason
1	}	To close for loop
2	System.out.print();	If we place the print statement inside the for loop it will print the each i value everytime but to print only the final value we must place it outside the for loop.

WEEK – 3

Create the java program with the following instructions

    i)   Create a class with name Car
    ii)   Create 4 attributes named Car_Color , Car_brand, fuel_type, mileage
    iii)   Create 3 method named Start( ) , Stop( ), Service( )
    iv)   Create 3 objects Car1 , Car2 , Car3
    v)   Create a constructor which should print "Welcome to Car Garage"

```java
public class Car{
    public String carColor;
    private String carBrand;
    private String fuelType;
    public int mileage;
    Car(String carColor , String carBrand , String fuelType , int mileage){
    this.carColor =  carColor;
    this.carBrand = carBrand;
    this.fuelType = fuelType;
    this.mileage = mileage;
    System.out.println(carColor + " " + carBrand + " " + fuelType + " " + mileage);
    }
    public void Start(){
    System.out.println("The car has just started");
    }
    public void Stop(){
    System.out.println("The car has just stopped");
    }
    public void Service(){
    System.out.println("The car is in good condition");
     }
    public static void main(String[] args){
    Car Car1 = new Car("Black","Hyundai","Petrol",100);
    Car Car2 = new Car("White","Suzuki","Diesel",150);
    Car Car3 = new Car("Red","Benz","Petrol",200);
    Car1.Start();
    }
    }
```

```
C:\Users\johne\OneDrive\ドキュメント >java Car
Black Hyundai Petrol 100
White Suzuki Diesel 150
Red Benz Petrol 200
The car has just started

C:\Users\johne\OneDrive\ドキュメント >
```

Errors :

S.No	Expected Error	Reason
1	}	} is expected at end of the class
2	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first

Class Diagram :

Car
+ carColor : String
- carBrand : String
- fuelType : String
+ mileage : int
+ Car( ) : void
+ Start( ) : void
+ Stop( ) : void
+ Service( ) : void

Write a java program to create a class BackAccount with two methods deposit( ) and withdraw( )

i)   In deposit( ) whenever an amount is deposited it has to be updated with current amount
ii)   In withdraw( ) whenever an amount is withdrawn it has to be less than current amount else print
          "Insufficient funds".

```java
public class BankAccount{
            private String Name;
            private int AccNo, CurrBal ;
            BankAccount(String Name, int AccNo, int CurrBal){
        this.Name = Name;
        this.AccNo = AccNo;
        this.CurrBal = CurrBal;
        System.out.println("The customers are : " + this.Name + " ");
        }
        public int deposit(int dAmt){
        CurrBal = CurrBal + dAmt ;
        return CurrBal;
        }
        public void withdraw(int wAmount){
     if(wAmount < CurrBal){
      CurrBal = CurrBal - wAmount ;
     System.out.println(CurrBal);
     }
      else{
    System.out.println("Insufficient funds");
    }
    }
    public static void main(String[] args){
    BankAccount davis = new BankAccount("Davis",1500,10000);
    davis.withdraw(13000);
    davis.withdraw(1900);
    int FinalAmount = davis.deposit(10000);
    System.out.println(FinalAmount);
    }
  }
```

```
C:\Users\johne\OneDrive\ドキュメント >java BankAccount
The customers are : Davis
Insufficient funds
8100
18100
```

Errors :

S.No	Expected Error	Reason
1	}	} is expected at end of the class
2	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first

Class Diagram :

BankAccount
- **Name : String**
- **AccNo : String**
- **CurrBal : String**
+ **BankAccount( ) : void**
+ **deposit( ) : int**
+ **withdraw( ) : void**

WEEK – 4

Write a java program with class named "Book". The class should contain various attributes such as "Title of the book , author , year of publication ". It should also contain a constructor with parameters which initializes " Title of the book, author, year of publication". Create a method which displays the details of the book. i.e. " Title of the book, author and year of publication". Display the details of two books by creating two objects.

```java
class Book {
    // beginning of the class Book
public String title; // Changed Title to title for consistency
private String author;
public int yearOfPublication;

    // beginning of constructor
    Book(String title, String author, int yearOfPublication) {
     this.title = title; // Changed Title to title for consistency
    this.author = author;
      this.yearOfPublication = yearOfPublication;
     }
     // constructor ends here

     // method display starts here
      public void display() {
    System.out.println("Title of the book is: " + title +
        ", The name of the author is: " + author +
        ", The year of publication is: " + yearOfPublication);
     }
     // method display ends here

    // creating objects
     public static void main(String[] args) {
    Book book1 = new Book("Harry Potter", "J.K. Rowling", 1993);
   Book book2 = new Book("Someone Like You", "Nikitha Singh", 2010);
    book1.display();
    book2.display();
  }
 }
  // class ends here
```

```
C:\Users\johne\OneDrive\ドキュメント >java Book
Title of the book is: Harry Potter, The name of the author is: J.K. Rowling, The year of publication is: 1993
Title of the book is: Someone Like You, The name of the author is: Nikitha Singh, The year of publication is: 2010
```

Errors :

S.No.	Expected Error	Reason
1	Setting the parameters inside the constructor	We cannot pass the values inside constructor without setting them first
2	}	Ending the class and main method is required

To create a java program with class named Myclass with a static variable "Count" of "int type", Initialized to 0 and a constant variable "pi" of type double , initialized to 3.1415 as attributes of that class Now, define a constructor for "Myclass" that increments the "Count" variable each that an object of Myclass is created. Finally , print the final values of "Count" and "pi" variables .

```java
class Myclass{
// class starts here
static int Count = 0;
final double pi = 3.1415;
// the constructor starts here
Myclass(){
Count++;
}
// the constructor ends here
public static void main(String[] args){
Myclass c1 = new Myclass();
Myclass c2 = new Myclass();
System.out.println("Count : " + c1.Count);
System.out.println("Pi : " + c1.pi);
}
}
// class ends here
```

```
C:\Users\johne\OneDrive\ドキュメント >java Myclass
Count : 2
Pi : 3.1415
```

Errors :

S.No.	Expected Error	Reason
1	.variable	We must mention variable name to call the variable
2	static	Static variables contain only one value