23CSE111

OBJECT ORIENTED PROGRAMMING

LAB REPORT

Department of Computer Science Engineering

Amrita School of Computing

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Verified By

Roll No: 24207

WEEK 01

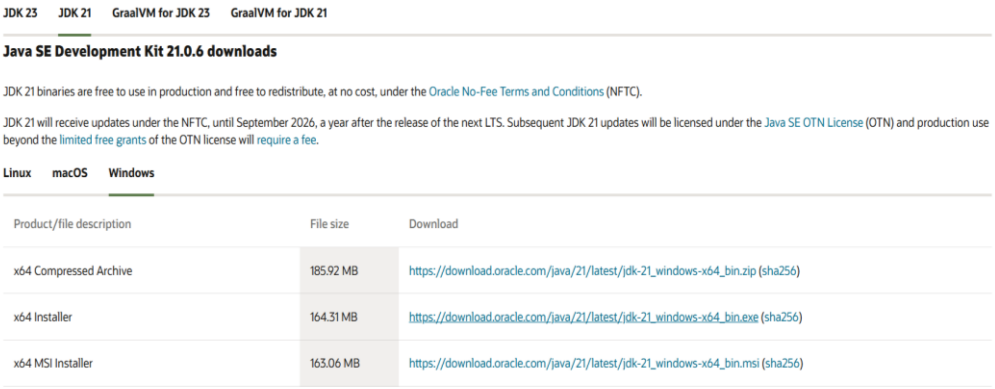
PROGRAM-1:

AIM: Download and Install Java Software

PROCEDURE:

Step 1: Download JDK 21

1) Open your web browser and go to the Oracle JDK Downloads page
2) Scroll down to the Java SE Development Kit 21 section.
3) Choose the Windows x64 Installer version.
4) Click on Download, then Wait for the download to complete



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 2: Install JDK 21

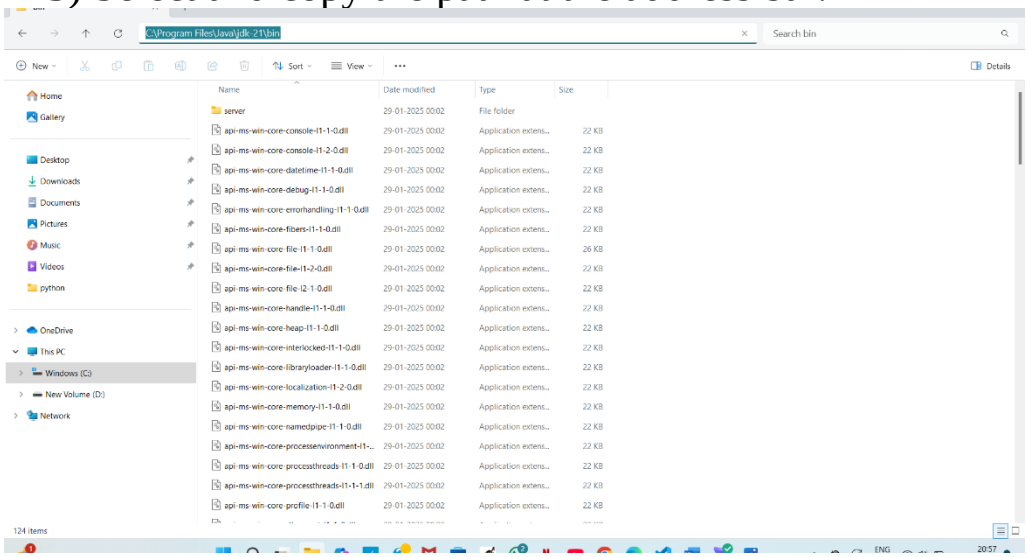
1) Locate the downloaded jdk-21_windows-x64_bin.exe file.
2) Double-click to launch the installer.
3) Click Next on the setup wizard.
4) Choose the installation path (default is C:\Program Files\Java\jdk-21).
5) Click Next, then click Install.
6) Wait for the installation to complete.
7) Click Close once the installation is finished.

Step 3: Setting up the path

1) Go to “Windows C” Drive on Desktop

2) Choose Program Files, select Java, then JDK 21, then select Bin.

3) Select and copy the path at the address bar.



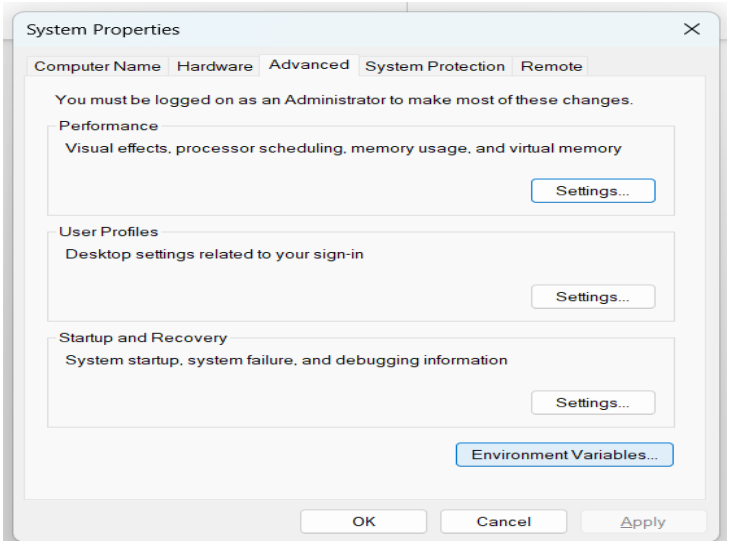
Step 4: Open System Properties

1) Press Windows + R, type sysdm.cpl , and click Ok-

2) The System Properties window will open.

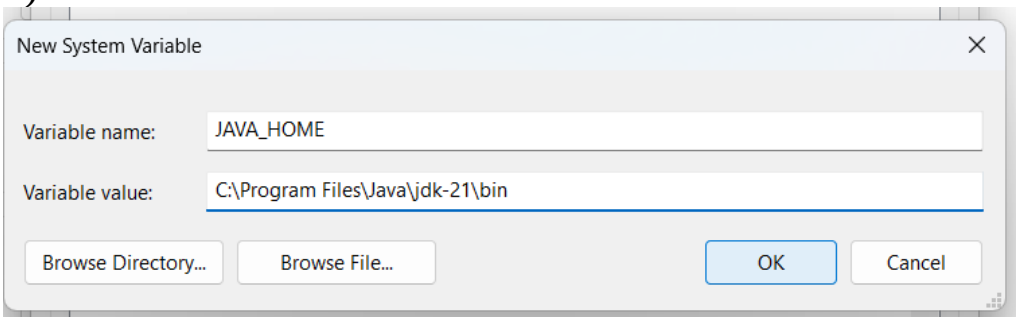
3) Navigate to the Advanced tab.

4) Click on Environment Variables at the bottom.



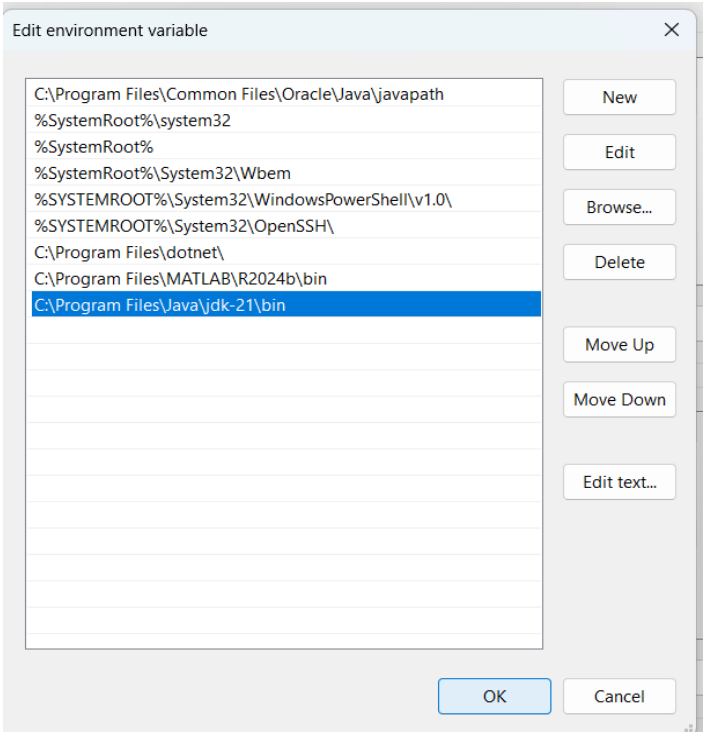
Step 5: Set JAVA_HOME

1)Under System Variables, click New.
2)Set the Variable name as JAVA_HOME.
3)Set Variable value as C:\Program Files\Java\jdk-21 (or your installation path).
4)Click OK.



Step 6: Update PATH Variable

1)In System Variables, find Path and click Edit.
2)Click New and add: C:\Program Files\Java\jdk-21\bin
3)Click OK to save.



Step 7: Verify Installation

1) Open Command Prompt.
2) Type the following command: **java --version** and press Enter.

```
Microsoft Windows [Version 10.0.22631.4890]
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C:\Users\ukoma>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)
```

3) To check the java compiler type: **javac –version.**

```
C:\Users\ukoma>
C:\Users\ukoma>javac --version
javac 21.0.6
```

PROGRAM-2:

AIM: Write a Java program to print the message “Welcome to Java Programming.”

CODE:

rson.java | Readme.txt | Studentdeta | LAB MANUA | areaofrectan | Simpleinters | Factorial.java | fibona | celsi

File Edit View

```
public class Welcometojavaprogramming {

  public static void main(String[] args) {

   System.out.println("Welcome to java programming");

  }
}
```

Output:

```
Microsoft Windows [Version 10.0.22631.4890]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ukoma\OneDrive\Documents\java>javac Welcometojavaprogramming.java

C:\Users\ukoma\OneDrive\Documents\java>java Welcometojavaprogramming
Welcome to java programming

C:\Users\ukoma\OneDrive\Documents\java>
```

ERRORS: None found

PROGRAM-3:

AIM: Write a Java Program that prints Name, Roll No, Section of a student.

CODE:

STUDENT DETAILS:

```
public class Studentdetails {

  public static void main(String[] args){

    System.out.println("Name:Uday kiran");

    System.out.println("rollno:24207");

    System.out.println("course:btech");

  }

}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.22631.4890]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ukoma\OneDrive\Documents\java>javac Studentdetails.java

C:\Users\ukoma\OneDrive\Documents\java>java Studentdetails
Name:Uday kiran
rollno:24207
course:btech
```

ERROR TABLE:

Code Error	Code rectification

1) writing small “S”in place of”S” In system.out.println() 2)not giving strings to the name and scetion	1) code is rectified by keeping capital “S” 2) Giving strings to name and section

IMPORTANT POINTS:

- Use `System.out.println()` correctly (capital "S" in `System`).
- Ensure Name, Roll No, and Section are enclosed in double quotes.

WEEK-2:

AIM: Write a java program to find the Area of a rectangle, where all the inputs are taken from the user.

CODE:

```
File  Edit  View

import java.util.Scanner;

public class areaofrectangle {
    public static void main(String[] args) {
        int l, b, Areaofrectangle;
        Scanner measurement = new Scanner(System.in);

        System.out.println("enter the value of length");
        l = measurement.nextInt();

        System.out.println("Enter the value of breadth");
        b = measurement.nextInt();

        Areaofrectangle = l * b;

        System.out.println("Areaofrectangle: " + Areaofrectangle);
    }
}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.22631.4890]
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C:\Users\ukoma\OneDrive\Documents\java>javac areaofrectangle.java

C:\Users\ukoma\OneDrive\Documents\java>java areaofrectangle
enter the value of length
4
Enter the value of breadth
3
Areaofrectangle: 12
```

ERROR TABLE:

Code Error	Code rectification
1. While using for iteration, not giving the conditions correctly. 2. Declaring the data type as double instead of int.	1. We should give iterative statements correctly. 2. We should give the data type as int for integers.

IMPORTANT POINTS:

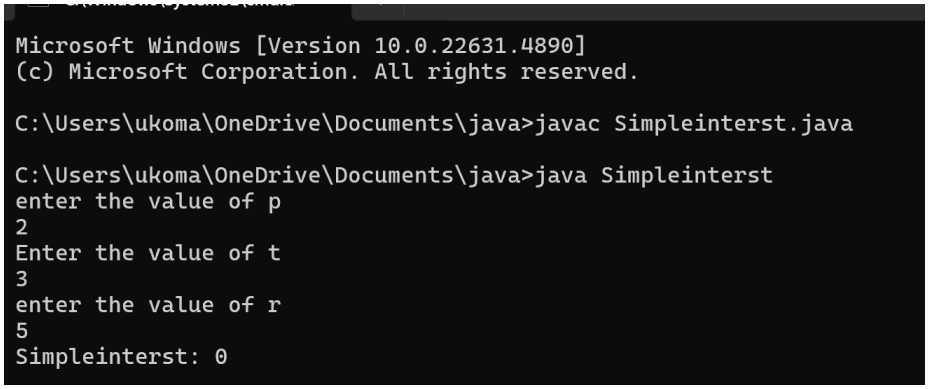
- Use the formula: **Area = length × breadth**.
- We must be sure that all conditions inside for loop must be given correctly

2.AIM: Write a java programme to calculate Calculate the simple interest

CODE:

```
import java.util.Scanner;

public class Simpleinterst{
    public static void main(String[] args) {
        int p,t,r,Simpleinterst;
        Scanner num = new Scanner(System.in);

        System.out.println("enter the value of p");
        p = num.nextInt();

        System.out.println("Enter the value of t");
        t = num.nextInt();

        System.out.println("enter the value of r");
        r = num.nextInt();
        Simpleinterst = (p * t *r)/100;

        System.out.println("Simpleinterst: " + Simpleinterst);
    }
}
```

OUTPUT:



ERROR TABLE:

Code Error	Code rectification
1. Giving space between next and Double. 2. Not giving parenthesis after closing the input.	1. Should not give space between next and Double. 2. We must put parenthesis after closing the input.

IMPORTANT POINTS:

- Use the formula: **SI = (P × R × T) / 100** (P = Principal, R = Rate, T = Time).
- The statement **"import java.util.Scanner"** serves the following purpose:
- **import**: Informs the Java compiler that a specific class or package is required in the code.
- **java.util**: Refers to the package that contains various utility classes, including those for handling input and output.
- **Scanner**: A class that enables reading input from the user via the keyboard.

3.AIM: Write a java programme to calculate Factorial of N

CODE:

File Edit View

```
import java.util.Scanner;
public class Factorial {
   public static void main(String[] args) {
       int n, factorial = 1;
       Scanner num = new Scanner(System.in);
       System.out.println("Enter a number:");
       n = num.nextInt();
                for (int i = 1; i <= n; i++) {
          factorial *= i;

        }
        System.out.println("Factorial of " + n + " is: " + factorial);

    }

}
```

OUTPUT:

```
C:\Users\ukoma\OneDrive\Documents\java>java Factorial
Enter a number:
4
Factorial of 4 is: 24

C:\Users\ukoma\OneDrive\Documents\java>
```

ERROR TABLE:

Code Error	Code rectification

1. While using for iteration, not giving the conditions correctly. 2.Declaring the data type as double instead of int.	1.We should give iterative statements correctly. 2.We should give the data type as int for integers.

IMPORTANT POINTS :

- **Here are we are using datat type “int” to calculate the integer values**
- **It dosent support floating points**

4.AIM: Write a java programme to calculate fibonacci sequence

CODE:

```
import java.util.Scanner;
   public class fibonaccisequence {
       public static void main(String[]args){
       Scanner scanner = new Scanner(System.in);
       System.out.println("Enter the no of terms:");
       int n=scanner.nextInt();
       int a=0,b=1;
       System.out.println("Fibonacci sequence");
       for (int i=1;i<=n;i++){
           System.out.println(a+" ");
           int nextTerm =a+b;
           a=b;
           b=nextTerm;
       }
       scanner.close();
   }
}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.22631.4890]
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C:\Users\ukoma\OneDrive\Documents\java>javac fibonaccisequence.java

C:\Users\ukoma\OneDrive\Documents\java>java fibonaccisequence
Enter the no of terms:
6
Fibonacci sequence
0
1
1
2
3
5
```

ERROR TABLE:

Code Error	Code rectification
1. Giving space between next and Double. 2. Not giving parenthesis after closing the input.	1. Should not give space between next and Double. 2. We must put parenthesis after closing the input.

IMPORTANT POINTS:

- Use `import java.util.Scanner;` to take user input.
- Here sum value is given to second variable, second is given to first variable

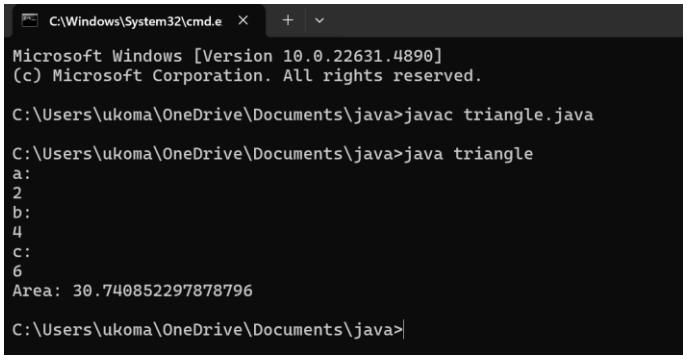
5.AIM: Write a java programme to calculate Area of triangle using herons formula

CODE:

File Edit View

```
import java.util.Scanner;
public class triangle {
    public static void main(String[]args){
        Scanner input = new Scanner(System.in);
        System.out.println("a: ");
        double a = input.nextDouble();
        System.out.println("b: ");
        double b = input.nextDouble();
        System.out.println("c: ");
        double c = input.nextDouble();
        double s = a+b+c/2;
        double area = Math.sqrt(s * (s - a) * (s - b) * (s - c));
        System.out.println("Area: " + area);
        input.close();
    }
}
```

OUTPUT:



ERROR TABLE:

Code Error	Code rectification
1. While printing the variable not giving + sign. 2. Not closing the scanner.	1. We should give correct indentation. 2. Closing the scanner is must.

IMPORTANT POINTS:

* Use Scanner to take input for base and height.

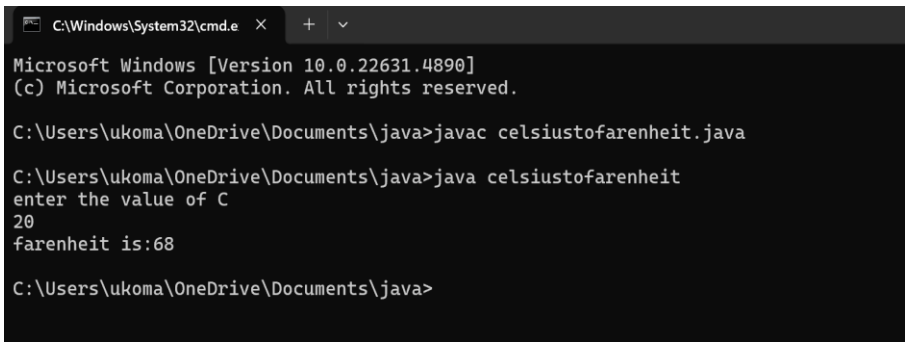
*We use herons formula to find area of triangle (S=(a+b+c/2))

6)AIM: Write a java program to convert the temperature from Celsius to Fahrenheit and Celsius to Fahrenheit.

CODE:

```
import java.util.Scanner;
 public class celsiustofarenheit {
   public static void main(String[] args) {
   int C,F;
   Scanner num = new Scanner(System.in);
   System.out.println("enter the value of C");
   C = num.nextInt();
   F=(C*9/5)+32;
   System.out.println("farenheit is:"+F);
  }
 }
```

OUTPUT:



II.) <u>AIM:</u> Write a java programme to calculate Convert temperature Fahrenheit to celsius

<u>CODE:</u>

File Edit View

```
import java.util.Scanner;
 public class farenheittocelsius {
   public static void main(String[] args) {
   int C,F;
   Scanner num = new Scanner(System.in);
   System.out.println("enter the value of F");
   F = num.nextInt();
   C = (F - 32)* 5/9;
   System.out.println("Celsius is:"+C);
  }
 }
```

OUTPUT:

```
C:\Users\ukoma\OneDrive\Documents\java>javac farenheittocelsius.java

C:\Users\ukoma\OneDrive\Documents\java>java farenheittocelsius
enter the value of F
10
Celsius is:-12
```

ERROR TABLE:

Code Error	Code rectification
1. While printing the variable not giving + sign. 2. Not closing the scanner.	1. We should give correct indentation. 2. Closing the scanner is must.

WEEK -3:

AIM:

CODE:

```
public class Car {
   private String car_color;
   private String car_brand;
   private String fuel_type;
   private String mileage;

   public void start() {
      System.out.println("car is started");
   }
```

```
    public void stop() {
        System.out.println("car is stopped");
    }

    public void service() {
        System.out.println("car is for service");
    }

    public static void main(String args[]) {
        Car car = new Car();
        car.car_color = "white";
        car.car_brand = "audi";
        car.fuel_type = "petrol";
        car.mileage = "20";
        car.start();
        System.out.println("car_color: " + car.car_color + " car_brand: " +
car.car_brand + " fuel_type: " + car.fuel_type + " mileage: " +
car.mileage);
        Car car1 = new Car();
        car1.car_color = "white";
        car1.car_brand = "audi";
        car1.fuel_type = "petrol";
        car1.mileage = "20";
        car1.stop();
        System.out.println("car_color: " + car1.car_color + " car_brand: " +
car1.car_brand + " fuel_type: " + car1.fuel_type + " mileage: " +
car1.mileage);
        Car car2 = new Car();
        car2.car_color = "white";
        car2.car_brand = "audi";
        car2.fuel_type = "petrol";
        car2.mileage = "20";
        car2.service();
        System.out.println("car_color: " + car2.car_color + " car_brand: " +
car2.car_brand + " fuel_type: " + car2.fuel_type + " mileage: " +
car2.mileage);
    }
}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.22631.4890]
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C:\Users\ukoma\OneDrive\Documents\java>javac Car.java

C:\Users\ukoma\OneDrive\Documents\java>java Car
car is started
car_color: white car_brand: audi fuel_type: petrol mileage: 20
car is stopped
car_color: white car_brand: audi fuel_type: petrol mileage: 20
car is for service
car_color: white car_brand: audi fuel_type: petrol mileage: 20
```
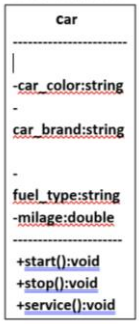

Error table:

Code error	Rectification
Syntax Error	'{' added
Compile time Error	Rectified with Correct variable name
Case sensitive error	Rectified

Class diagram:



PROGRAM- 2:

AIM: To create a class BankAccount with methods deposit() and withdraw() . create two subclasses savingsaccount and checkingaccount override the withdraw () method in each subclass to impose different withdrawal limits and fees.

CODE:

```
public class BankAccount {

public double balance;



public BankAccount(double initialBalance) {
```

```
        balance = initialBalance;
    }

    public void deposit(double amount) {
        if (amount > 0) {
            balance += amount;
            System.out.println("Deposited " + amount + ". New balance is " + balance);
        } else {
            System.out.println("Deposit amount must be positive.");
        }
    }

    public void withdraw(double amount) {
        if (amount > 0 && amount <= balance) {
            balance -= amount;
            System.out.println("Withdrew " + amount + ". New balance is " + balance);
        } else {
            System.out.println("Invalid withdrawal amount. Check your balance.");
        }
    }

    public static void main(String[] args) {
        BankAccount account = new BankAccount(100); // Initial balance of 100

        account.deposit(100000);
        account.withdraw(30000);
```

```
    account.withdraw(1500); // Invalid withdrawal
}
```

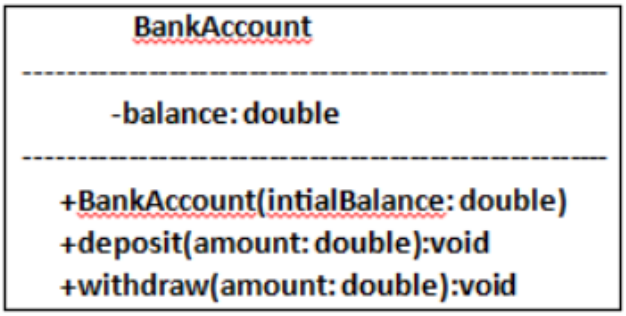
Output:

```
Deposited 100000.0. New balance is 100100.0
Withdrew 30000.0. New balance is 70100.0
Withdrew 1500.0. New balance is 68600.0

C:\Users\Anil\OneDrive\Desktop\Java>
```

Error table:

Code error	Rectification
Name Error	Correct variable Name replaced
Syntax Error	Parenthesis Added
Logical Error	Condition Recti fied

CLASS DIAGRAM:



WEEK -4

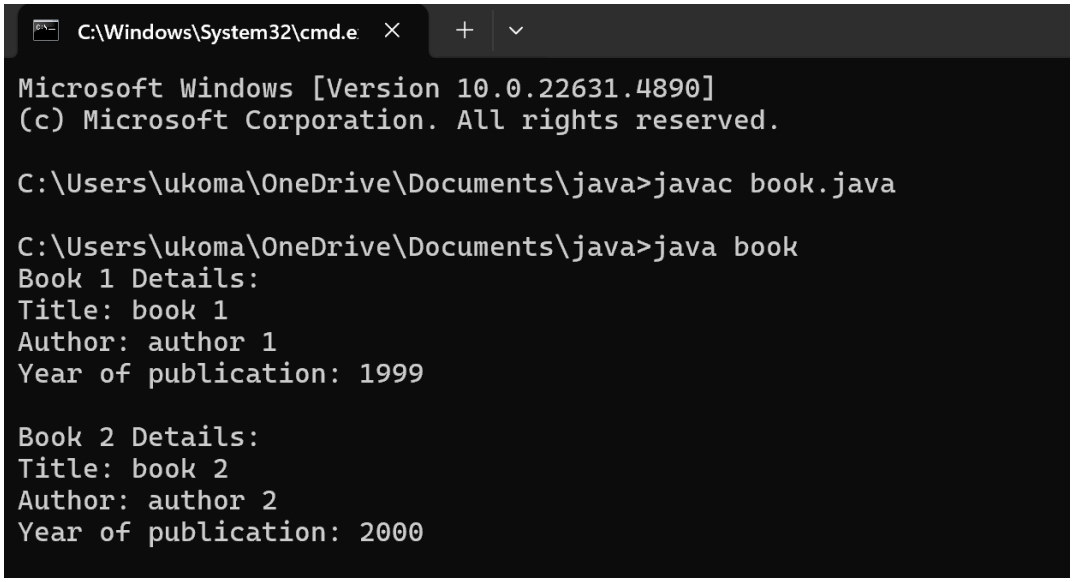
PROGRAM – 1:

AIM: Write a java program with class named “book”, the class should contain various attributes such as title, author, year of publication it should also contain a constructor with parameters which initializes, title, author, and year of publication.
Create a method which displays the details of the book and display the details of two books.

CODE:

```
public class book
{
   String title;
   String author;
   int year;

   // Constructor
   public book(String title, String author, int year) {
      this.title = title;
      this.author = author;
      this.year = year;
   }

   // Method
   public void displayDetails() {
      System.out.println("Title: " + title);
      System.out.println("Author: " + author);
      System.out.println("Year of publication: " + year);
      System.out.println();
   }

   public static void main(String[] args) {
      //objects
      book book1 = new book("book 1", "author 1", 1999);
      book book2 = new book("book 2", "author 2", 2000);

      //book details
      System.out.println("Book 1 Details:");
      book1.displayDetails();

      System.out.println("Book 2 Details:");
      book2.displayDetails();
   }
}
```

OUTPUT:



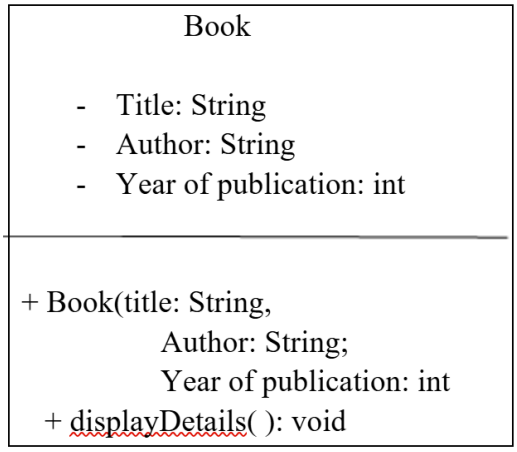
ERROR TABLE:

Code Error	Code rectification
1. Not defining the function in a file. 2. Two public class files should not be saved in the same file.	1. To call the method we must define a function in a file. 2. Two public class files should be saved in different files.

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:



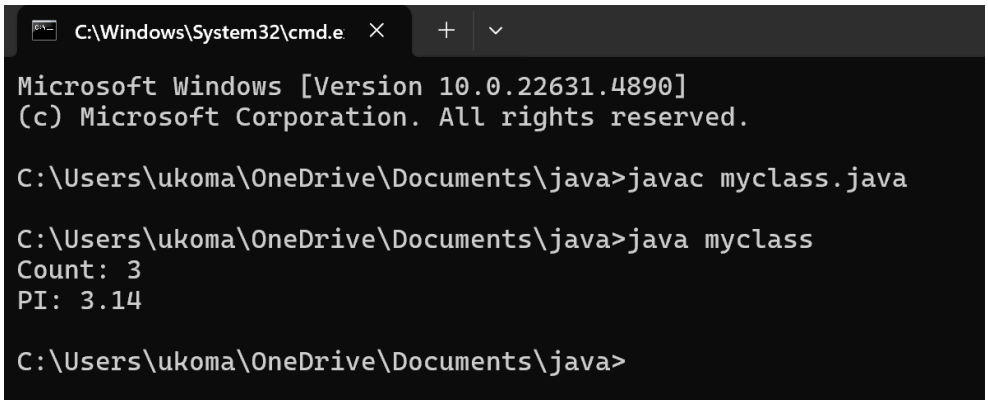
PROGRAM – 2:

AIM: Create a java Program with class named myclass with static variable count of int type, initialized to zero and a constant variable “pi” of type double initialized to 3.14 as attributes of the class, ow define a constructor for “myclass” that increments the count variable each time an object of my class is created (count++), finally print the final values of count and pi variables create three objects.

CODE:

```
public class myclass
{
   static int count = 0;
   final double PI = 3.14;

   myclass() {
      count++;
   }

   void display() {
      System.out.println("Count: " + count);
      System.out.println("PI: " + PI);
   }

   public static void main(String[] args) {
      myclass obj1 = new myclass();
      myclass obj2 = new myclass();
      myclass obj3 = new myclass();

      obj3.display();
   }
}
```

OUTPUT:



ERROR TABLE:

Code Error	Code rectification
1. Not Putting the semi-colon after calling a function, 2. Not giving the indentation properly.	1. Put the semi-colon after calling a function. 2. All the indentation must be correct to run the code correct.