

23CSE111

**OBJECT ORIENTED PROGRAMMING
LAB MANUAL**



**Department of Computer and Science Engineering Amrita
School of Engineering
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Verified By:

S. No	Programs	Date	Page No	Signature
WEEK 1		27-01-2025		
1	Write the steps to download and install Java.			
2	Write a java program to print the message "Welcome to java programming".			
3	Write a java program that prints name, roll number and section of a student.			
WEEK 2		3-02-2025		
1	Write a java program to calculate the area of a rectangle.			
2a)	Write a program to convert temperature from Celsius to Fahrenheit			
b)	Write a program to convert temperature from Fahrenheit to Celsius.			
3	Write a program to calculate the simple interest			
4	Write a program to find the largest of three numbers using ternary operator.			
5	Write a program to find the factorial of a number			
WEEK 3		11-02-2025		
1	Creating a car class with the given instructions			

	Creating a BankAccount class with the given instructions			
WEEK 4		02-03-2025		
1	Write a java program with class named "Book" with given instructions			
2	To create a java program with class named Myclass with given instructions			

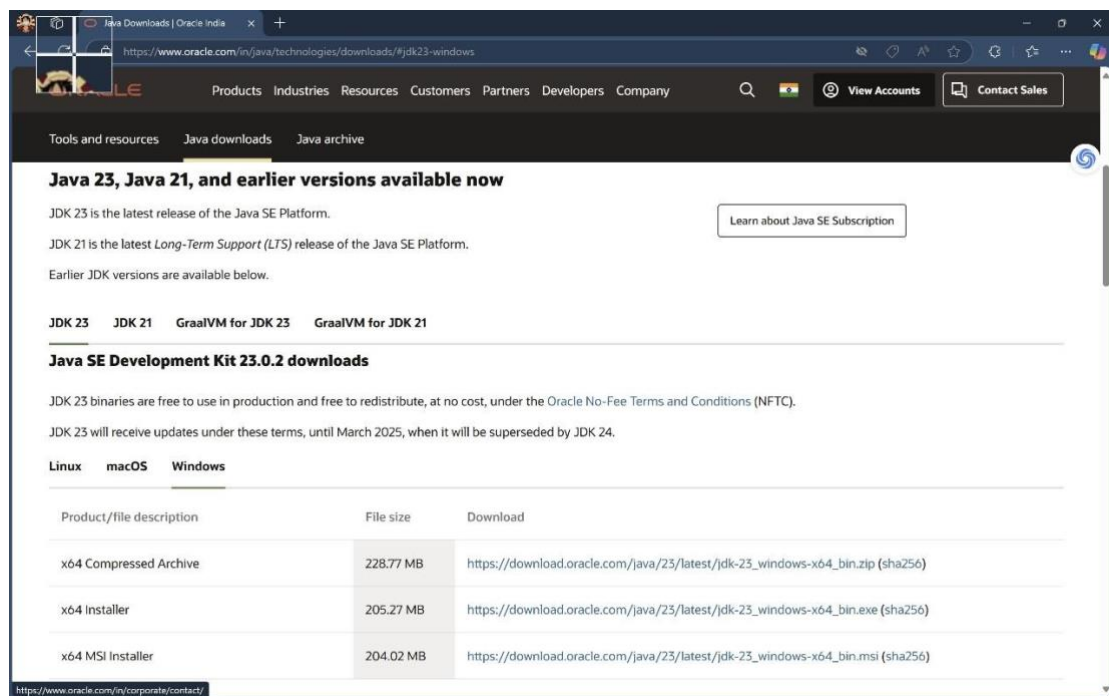
WEEK –1

1. Write the steps to download and install Java.

Aim: To download and install java.

Procedure:

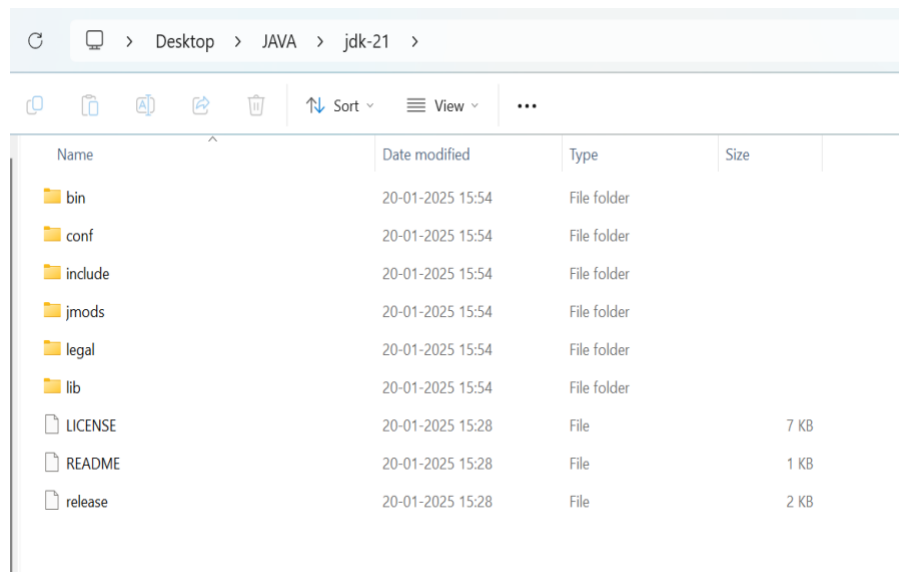
- i. Visit oracle.com website to download Java.



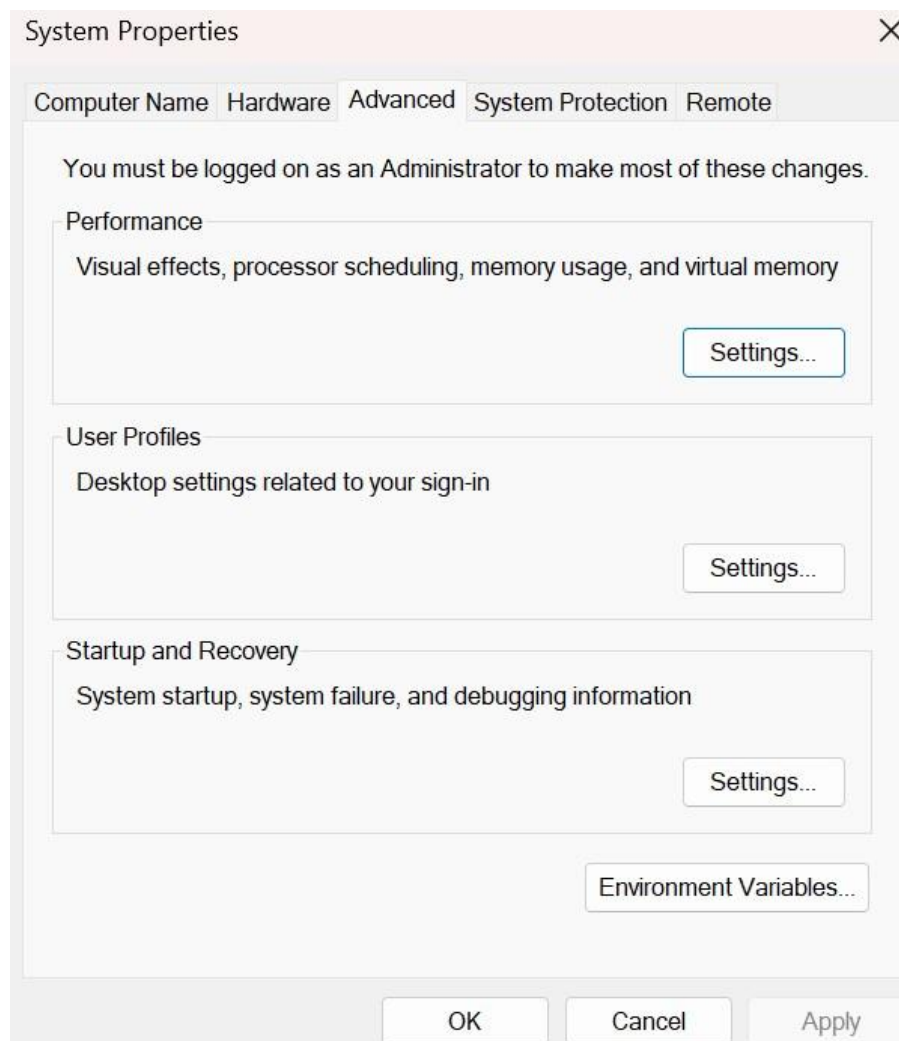
- ii. Download the version which supports LTS (JDK 21) x64 installer for windows.

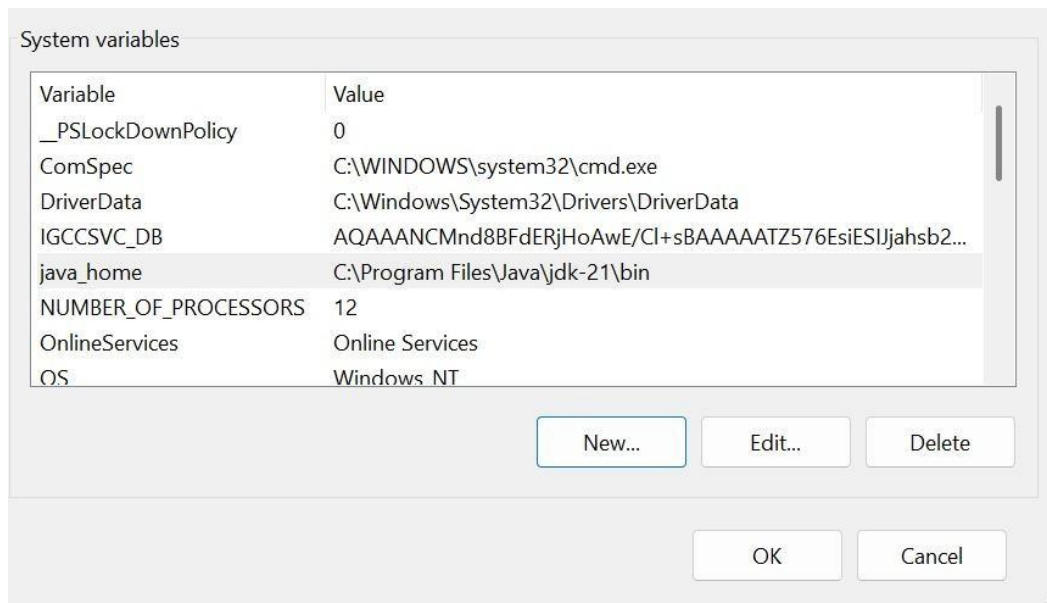
jdk-21_windows-x64_bin 20-01-2025 15:27 Windows Installer Pa... 1,66,940 KB

- iii. Install and copy the path.



- iv. Open environmental variables and add a new file with path.





- v. Verify java version in command window.

```

C:\Windows\System32\cmd.e x + v
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA\jdk-21\bin>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\DELL\Desktop\JAVA\jdk-21\bin>

```

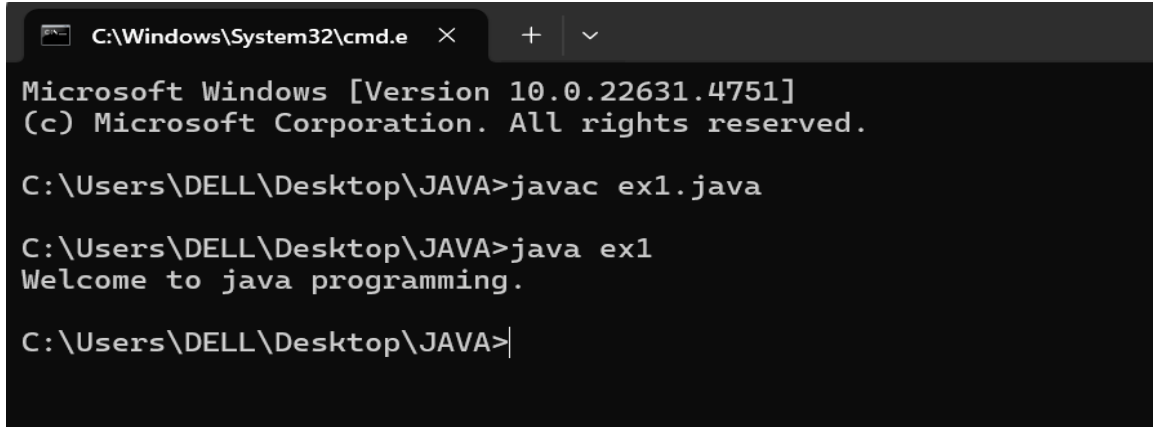
2. Write a java program to print the message “Welcome to java programming”.

Code:

```

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

```

Output:


```

C:\Windows\System32\cmd.e  ×  +  ▾
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac ex1.java

C:\Users\DELL\Desktop\JAVA>java ex1
Welcome to java programming.

C:\Users\DELL\Desktop\JAVA>|

```

Error:

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

- Write a java program to print the name, roll number and section of a student.

Code:

```

class ex2{

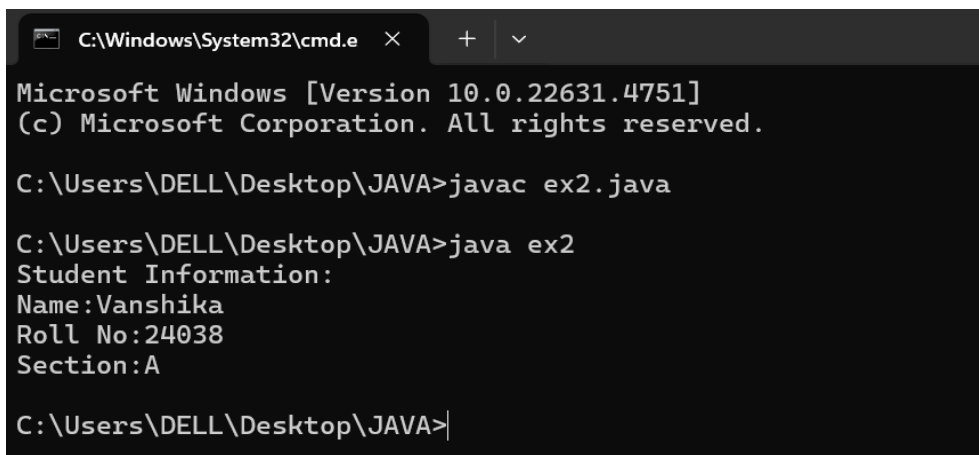
    public static void main(String[]
args){        String name =
"Vanshika";

int rollNo = 24038;

    String section = "A";

```

```
System.out.println("Student Information:");  
  
System.out.println("Name:" + name);  
  
System.out.println("Roll No:" + rollNo);  
  
System.out.println("Section:" + section);  
  
}  
  
}
```

Output:

```
C:\Windows\System32\cmd.e  X  +  v  
Microsoft Windows [Version 10.0.22631.4751]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\DELL\Desktop\JAVA>javac ex2.java  
  
C:\Users\DELL\Desktop\JAVA>java ex2  
Student Information:  
Name:Vanshika  
Roll No:24038  
Section:A  
  
C:\Users\DELL\Desktop\JAVA>|
```

Error:

S.No	Expected Error	Reason
1	S	Capital S is expected for String and System.

WEEK -2

1. Write a java program to calculate the area of a rectangle.

Code:

```
import java.util.Scanner;

class rec{

    public static void main(String[] args){

        Scanner scan=new Scanner(System.in);

        System.out.println("Enter length of rectangle:");

        double l=scan.nextDouble();

        System.out.println("Enter breadth of rectangle:");

        double b=scan.nextDouble();

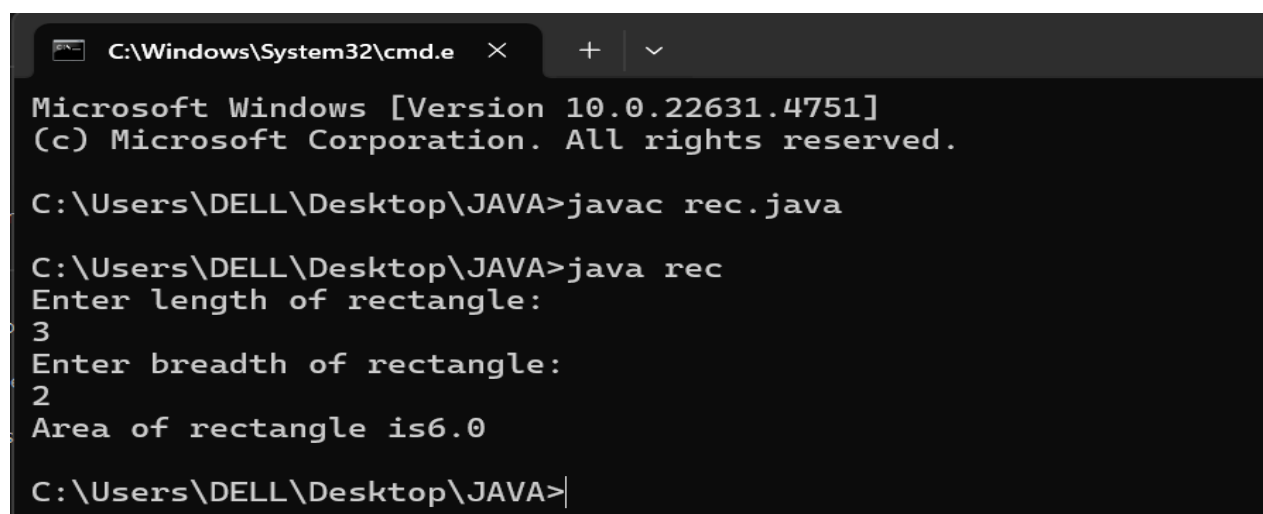
        double a=l*b;

        System.out.println("Area of rectangle is"+a);

    }

}
```

Output:



```
C:\Windows\System32\cmd.e  x  +  v

Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac rec.java

C:\Users\DELL\Desktop\JAVA>java rec
Enter length of rectangle:
3
Enter breadth of rectangle:
2
Area of rectangle is6.0

C:\Users\DELL\Desktop\JAVA>
```

```

C:\Users\DELL\Desktop\JAVA>javac rec.java

C:\Users\DELL\Desktop\JAVA>java rec
Enter length of rectangle:
h
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)
    at java.base/java.util.Scanner.next(Scanner.java:1602)
    at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)
    at rec.main(rec.java:6)

C:\Users\DELL\Desktop\JAVA>

```

Error:

S.No	Expected Error	Reason
1	S	Capital S is expected for String and System.

2a). Write a program to convert temperature from Fahrenheit to Celsius.

Code:

```

import java.util.Scanner;

class temp{

    public static void main(String[] args){

        Scanner scan=new Scanner(System.in);

        System.out.println("Enter temperature in Fahrenheit:");

        double f=scan.nextDouble();

        double c=((f-32)/(1.8));

        System.out.println("Temperature in celsius is"+c);

    }

}

```

Output:

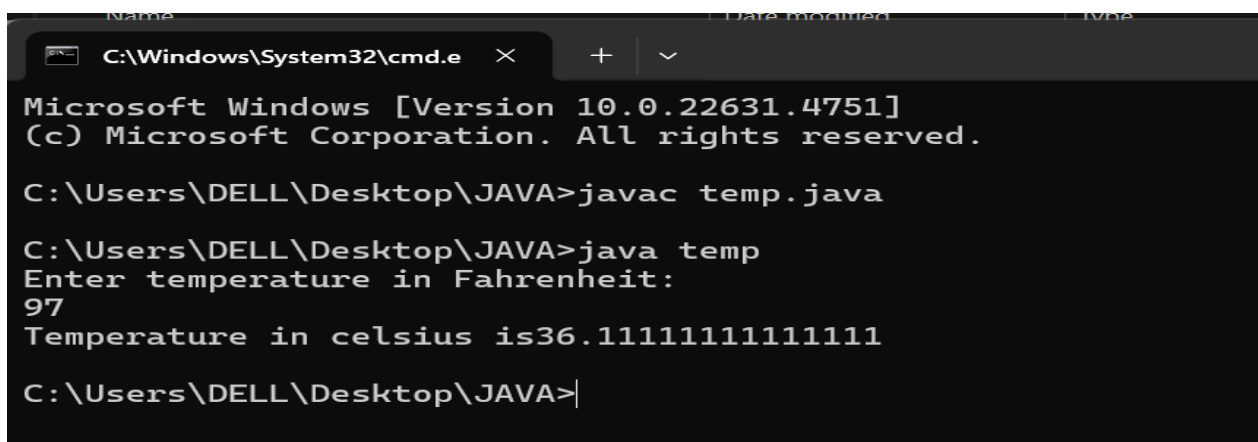
```

C:\Users\DELL\Desktop\JAVA>javac temp.java

C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in Fahrenheit:
hi
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)
    at java.base/java.util.Scanner.next(Scanner.java:1602)
    at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)
    at temp.main(temp.java:6)

C:\Users\DELL\Desktop\JAVA>

```



```

Microsoft Windows [Version 10.0.22631.4751]
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C:\Users\DELL\Desktop\JAVA>javac temp.java

C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in Fahrenheit:
97
Temperature in celsius is36.11111111111111

C:\Users\DELL\Desktop\JAVA>

```

Error:

S.No	Expected Error	Reason
1	S	Capital S is expected for String and System.

2b). Write a program to convert temperature from Celsius to Fahrenheit.

Code:

```

import java.util.Scanner;

class temp{

    public static void main(String[] args){

        Scanner scan=new Scanner(System.in);

```

```

        System.out.println("Enter temperature in celsius:");

        double c=scan.nextDouble();

        double f=(c*1.8)+32;

        System.out.println("Temperature in Fahrenheit is"+f);

    }

}

```

Output:

```

C:\Windows\System32\cmd.e
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac temp.java

C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in celsius:
32
Temperature in Fahrenheit is89.6

C:\Users\DELL\Desktop\JAVA>|

```

```

C:\Users\DELL\Desktop\JAVA>javac temp.java

C:\Users\DELL\Desktop\JAVA>java temp
Enter temperature in celsius:
hi
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)
    at java.base/java.util.Scanner.next(Scanner.java:1602)
    at java.base/java.util.Scanner.nextDouble(Scanner.java:2573)
    at temp.main(temp.java:6)

C:\Users\DELL\Desktop\JAVA>|

```

ERRORS :

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

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

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\DELL\Desktop\JAVA>javac si.java

C:\Users\DELL\Desktop\JAVA>java si
Enter principal amount : h
Exception in thread "main" java.util.InputMismatchException
    at java.base/java.util.Scanner.throwFor(Scanner.java:947)
    at java.base/java.util.Scanner.next(Scanner.java:1602)
    at java.base/java.util.Scanner.nextInt(Scanner.java:2267)
    at java.base/java.util.Scanner.nextInt(Scanner.java:2221)
    at si.main(si.java:6)

C:\Users\DELL\Desktop\JAVA>|
```

```

C:\Windows\System32\cmd.e
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac si.java

C:\Users\DELL\Desktop\JAVA>java si
Enter principal amount : 100
Enter rate of interest : 2
Enter the time period : 3
The simple Interest is : 6
C:\Users\DELL\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.

4) 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:\Windows\System32\cmd.e
Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac largest.java

C:\Users\DELL\Desktop\JAVA>java largest
Enter number a : 4
Enter number b : 7
Enter number c : 99
The largest number is : 99
C:\Users\DELL\Desktop\JAVA>

```

ERRORS :

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

5) 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);

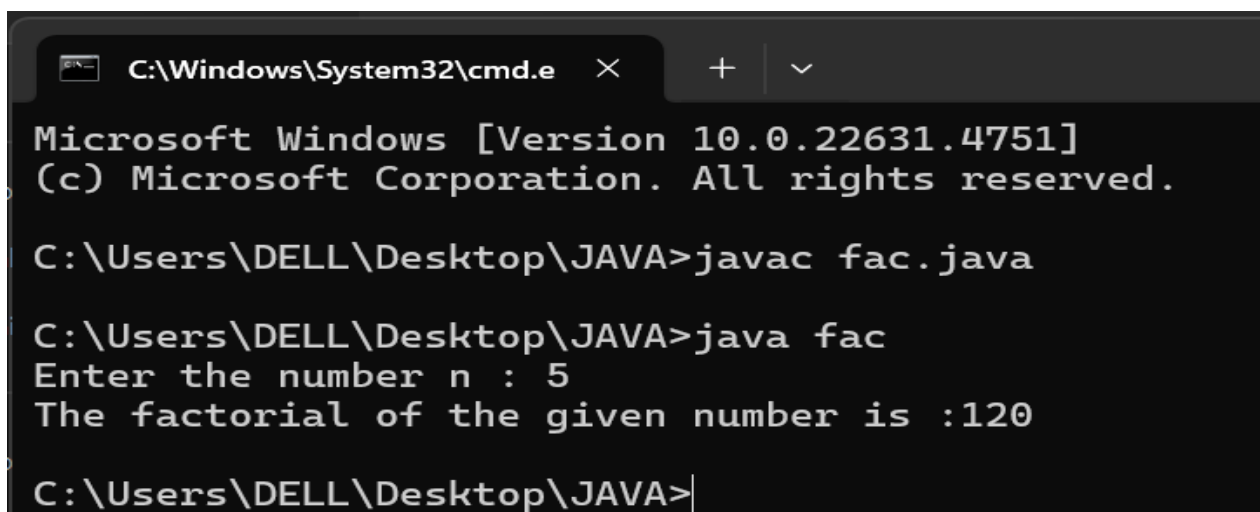
input.close();

}

}

```

Output:



```

C:\Windows\System32\cmd.e  ×  +  ∨

Microsoft Windows [Version 10.0.22631.4751]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL\Desktop\JAVA>javac fac.java

C:\Users\DELL\Desktop\JAVA>java fac
Enter the number n : 5
The factorial of the given number is :120

C:\Users\DELL\Desktop\JAVA>

```

ERRORS :

S.No	Expected Error	Reason
1	}	To close for loop

2	<code>System.out.print();</code>	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

1) 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”

Code:

```
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","Audi","Petrol",20);
    Car Car2 = new Car("White","BMW","Diesel",17);
    Car Car3 = new Car("Red","Mercedes","Petrol",16);
    Car1.Start();
    }
    }

```

Output:

```

C:\Users\DELL\Desktop\JAVA>javac Car.java

C:\Users\DELL\Desktop\JAVA>java Car
Black Audi Petrol 20
White BMW Diesel 17
Red Mercedes Petrol 16
The car has just started

```

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

2) 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".

Code:

```
public class BankAccount {
    private String Name;
    private int AccNo, CurrBal;

    public BankAccount(String Name, int AccNo, int CurrBal) {
        this.Name = Name;
        this.AccNo = AccNo;
        this.CurrBal = CurrBal;
        System.out.println("The customer is: " + this.Name);
    }
}
```

```
public int deposit(int dAmt) {  
    CurrBal += dAmt;  
    return CurrBal;  
}  
  
public void withdraw(int wAmount) {  
    if (wAmount <= CurrBal) { // Allowing withdrawal if balance is equal  
        CurrBal -= wAmount;  
        System.out.println("Remaining Balance: " + CurrBal);  
    } else {  
        System.out.println("Insufficient funds");  
    }  
}  
  
public static void main(String[] args) {  
    BankAccount Vanshika = new BankAccount("Vanshika", 1500, 10000);  
  
    Vanshika.withdraw(13000); // Should print "Insufficient funds"  
    Vanshika.withdraw(1900); // Should print remaining balance  
    int FinalAmount = Vanshika.deposit(10000);  
    System.out.println("Final Balance: " + FinalAmount);  
}  
}
```

Output:

```

C:\Users\DELL\Desktop\JAVA>javac BankAccount.java

C:\Users\DELL\Desktop\JAVA>java BankAccount
The customer is: Vanshika
Insufficient funds
Remaining Balance: 8100
Final Balance: 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

- 1) 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 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.

Code:

```
import java.util.Scanner;

class book{

    public String title;

    public String author;

    public int year;

    book(String title,String author, int year){

        this.title=title;

        this.author=author;

        this.year=year;

    }

    public void display(){

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

        System.out.println("Author of the book is: "+author);

        System.out.println("Year of publication of the book is: "+year);

    }

    public static void main(String[] args){

        Scanner scan=new Scanner(System.in);
```

```

System.out.println("Enter name of the book:");

String title=scan.nextLine();

System.out.println("Enter author of the book:");

String author=scan.nextLine();

System.out.println("Enter year of publication of the book:");

int year=scan.nextInt();

book third=new book(title,author,year);

third.display();

book first=new book("The kill a mocking bird","Harper Lee",2005);

book second=new book("The alchemist","Paulo Coelho",1995);

first.display();

second.display();

}

}

```

Output:

```

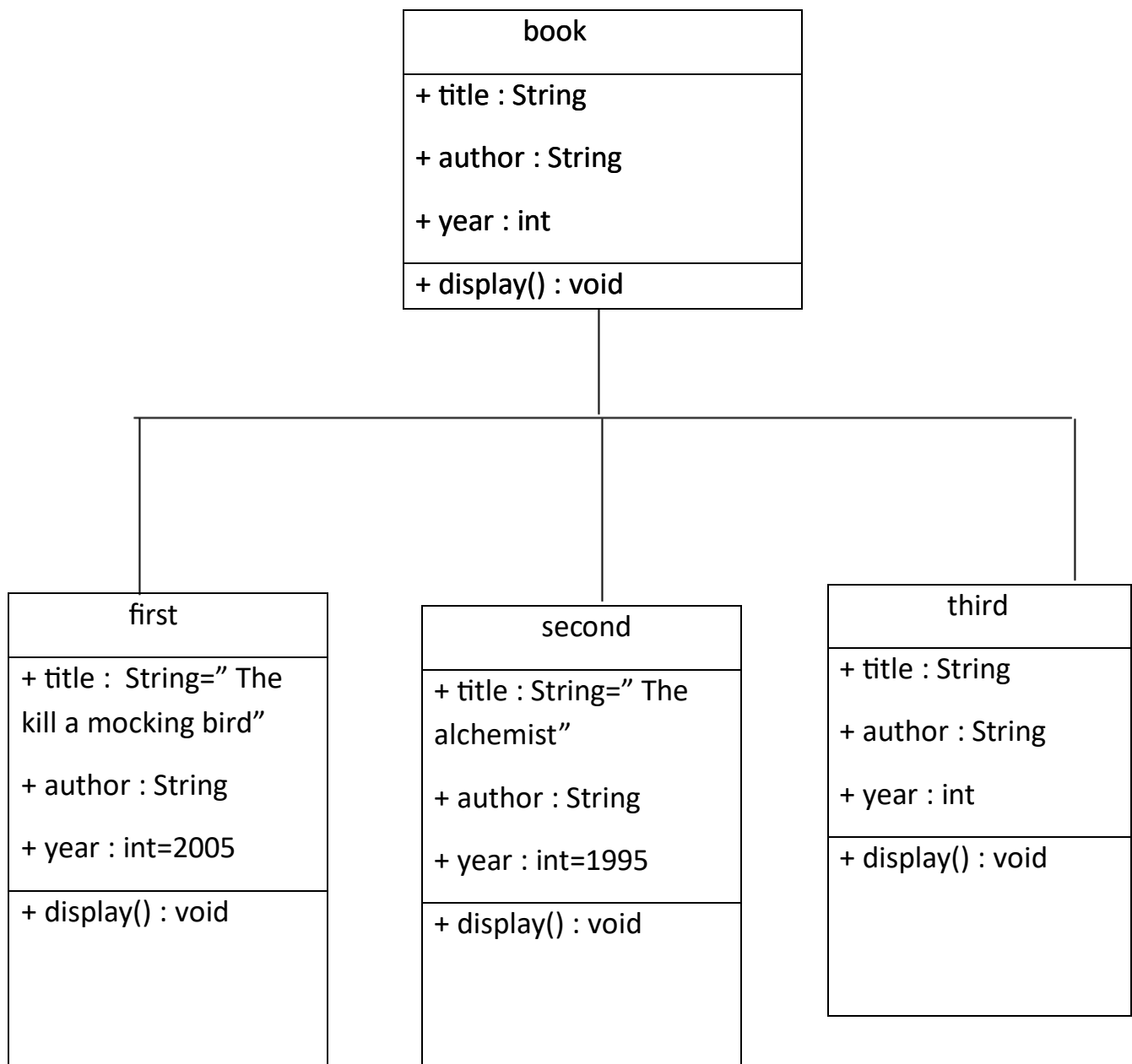
C:\Users\DELL\Desktop\JAVA>javac book.java

C:\Users\DELL\Desktop\JAVA>java book
Enter name of the book:
The monk who sold his ferrari
Enter author of the book:
Robin Sharma
Enter year of publication of the book:
1996
Title of the book is: The monk who sold his ferrari
Author of the book is: Robin Sharma
Year of publication of the book is: 1996
Title of the book is: The kil a mocking bird
Author of the book is: Harper Lee
Year of publication of the book is: 2005
Title of the book is: The alchemist
Author of the book is: Paulo Coelho
Year of publication of the book is: 1995

```


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



- 2) 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.

Code:

```
class myclass{
    static int count=0;
    final double pi=3.1415;
    myclass(){
        count++;
    }
    void display(){
        System.out.println("The value of pi is: "+ pi);
    }
    public static void main(String[] args){
        myclass obj1=new myclass();
        myclass obj2=new myclass();
        myclass obj3=new myclass();
        int fc=count;
        System.out.println("Total number of objects created is: "+fc);
        obj1.display();
        obj2.display();
        obj3.display();
    }
}
```

Output:

```
C:\Users\DELL\Desktop\JAVA>javac myclass.java

C:\Users\DELL\Desktop\JAVA>java myclass
Total number of objects created is: 3
The value of pi is: 3.1415
The value of pi is: 3.1415
The value of pi is: 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

