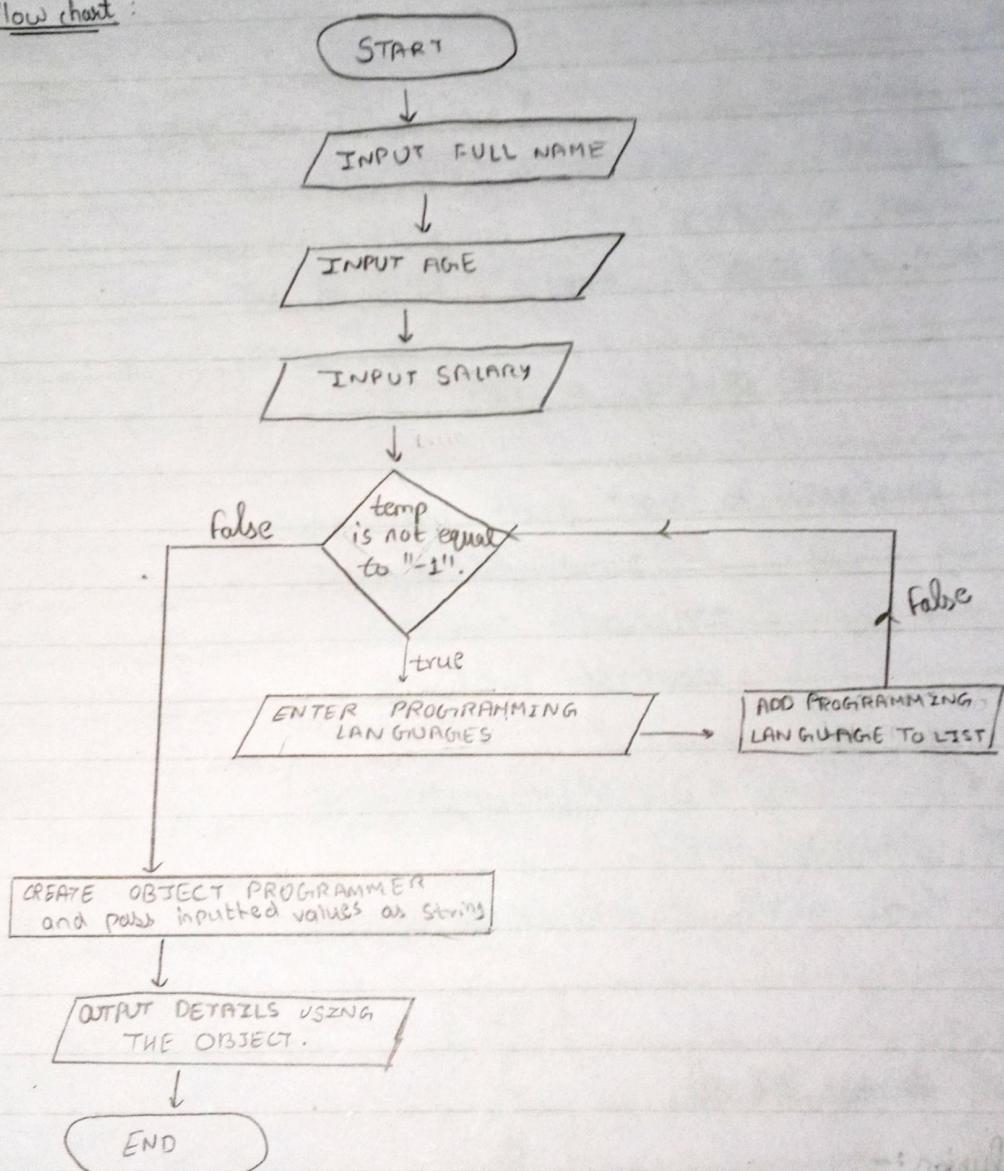


Practical No. 08

Aim: Create, debug and run java programs based on inheritance.

Flow chart:



Code 1: SINGLE INHERITANCE

single inheritance has one base class, it can inherit from one class.

multiple inheritance has both its base classes in one class.

Practical No. 08

Aim: Create debug and run Java programs based on Inheritance.

Theory:

What is Inheritance?

- The capability of a class to derive properties and characteristics from another class is called Inheritance.
- The keyword 'extends' is used for inheritance java.

For example:

class A extends B;

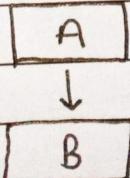
There are three types of inheritance in java.

- Single inheritance
- Multi-level inheritance
- Hierarchical inheritance

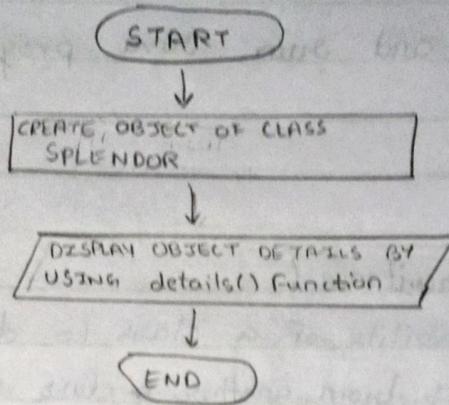
i) Single Inheritance:

When a class extends inherits another class, it is known as a single inheritance.

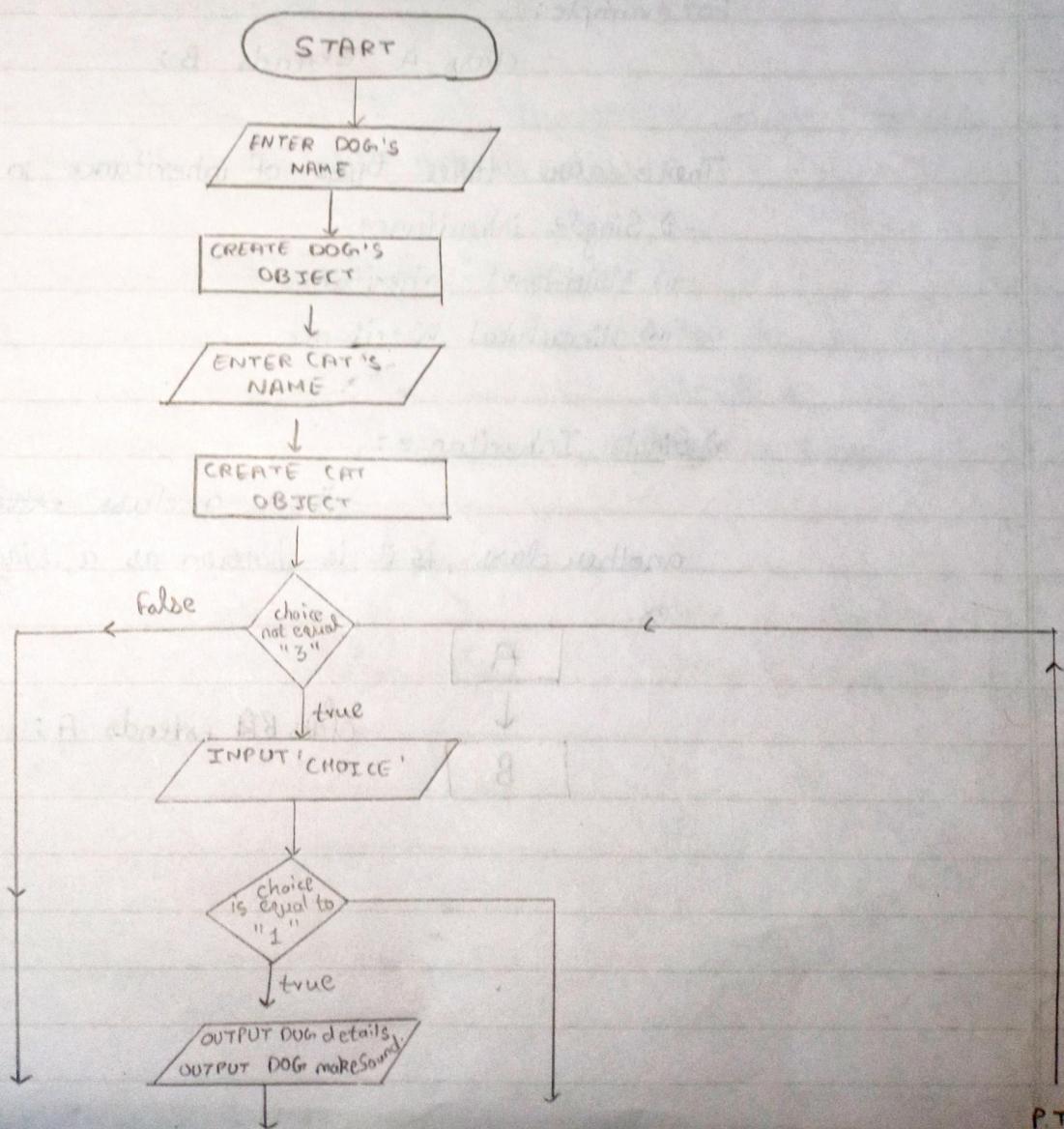
ex.



class B extends A;



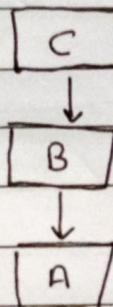
CODE 2 : MULTI-LEVEL INHERITANCE



ii) Multi level Inheritance:

When there is a chain of inheritance. It is known as Multi-level Inheritance.

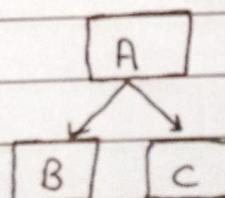
Example:



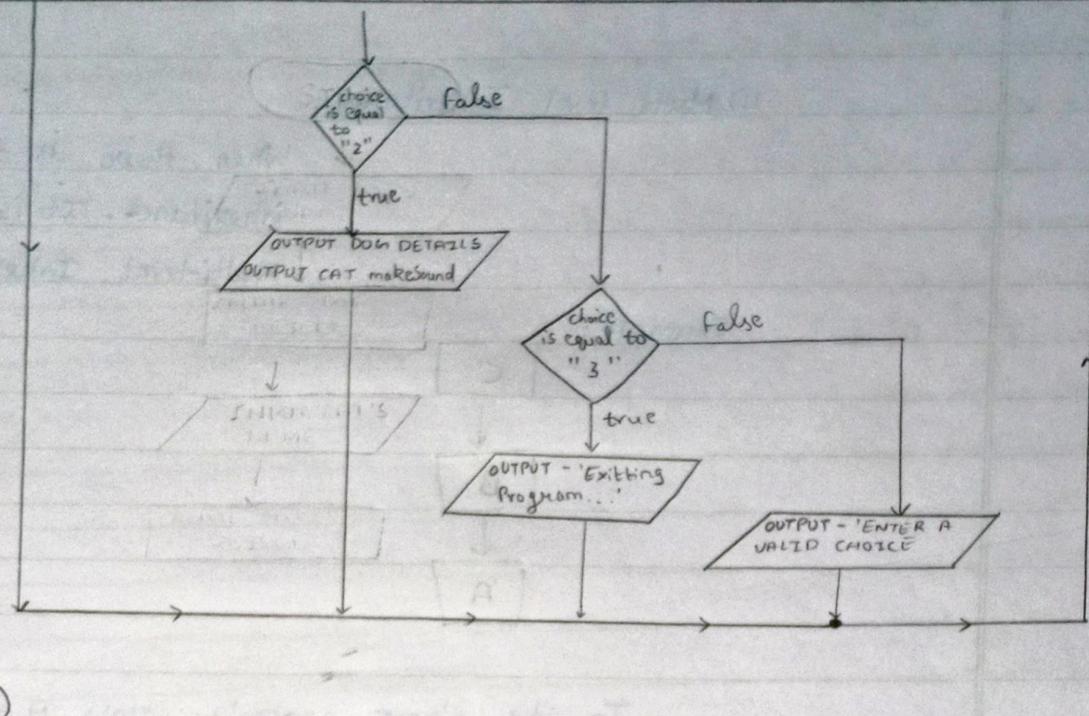
In the above example , class A extends class B which extends class C .

iii) Hierarchical Inheritance:

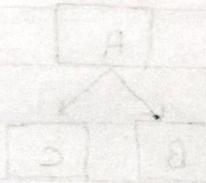
When two or more classes inherit a single class, it is known as hierarchical inheritance.



class B extends A;
class C extends A;



Code 3 : Hierarchical Inheritance .



Conclusion: I learnt

Hence, by performing this practical I learnt about the concepts of inheritance. I also created, debugged and executed Java programs on these concepts.

Code:

```
// single inheritance

import java.util.Scanner;
import java.util.Vector;

class Employee{
    String name;
    int age;
    float salary;

    void display(){
        System.out.println("Name : " + name);
        System.out.println("Age : " + age);
        System.out.println("Salary : " + salary);
    }

    Employee(String name,int age,float salary){
        this.name = name;
        this.age = age;
        this.salary = salary;
    }
}

class Programmer extends Employee{

    String[] languages;

    Programmer(String name, int age, float salary, String[] languages){
        super(name,age,salary);
        this.languages = languages;
    }

    void display(){
        System.out.println("\n");
        super.display();
        System.out.println("Programming Languages : ");
        for(String a : languages){
            System.out.println(" " + a);
        }
    }
}

class Practical8A{
```

```
public static void main(String[] args){
    Scanner sc = new Scanner(System.in);
    String name;
    int age;
    float salary;
    Vector<String> list = new Vector<>();

    System.out.print("Enter your full name : ");
    name = sc.nextLine();

    System.out.print("Enter your age : ");
    age = sc.nextInt();

    System.out.print("Enter your Salary : ");
    salary = sc.nextFloat();
    sc.nextLine();
    System.out.println("Enter the name of programming languages you know.
Enter -1 to end input");

    String temp;
    do{
        System.out.print("Enter language : ");
        temp = sc.nextLine();
        if(!temp.equals("-1"))
            list.add(temp);
    }while(!temp.equals("-1"));

    String[] languages = new String[list.size()];
    for(int i = 0; i < list.size(); i++)
        languages[i] = list.elementAt(i);

    Programmer p1 = new Programmer(name,age,salary,languages);
    p1.display();
}

}
```

Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> javac Practical8A.java
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> java Practical8A
Enter your full name : Pratyay Dhond
Enter your age : 18
Enter your Salary : 75000
Enter the name of programming languages you know. Enter -1 to end input
Enter language : Java
Enter language : C
Enter language : C++
Enter language : Dart
Enter language : JavaScript
Enter language : -1

Name    : Pratyay Dhond
Age     : 18
Salary  : 75000.0
Programming Languages :
    Java
    C
    C++
    Dart
    JavaScript
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> |
```

Code:

```
// multi level inheritance

import java.util.Scanner;
import java.util.Vector;

class Vehicle{
    String fuelType;

    Vehicle(String fuelType){
        this.fuelType = fuelType;
    }

    String getFuelType(){
        return fuelType;
    }
}

class Bike extends Vehicle{
    int noOfWheels;

    Bike(String fuelType,int noOfWheels){
        super(fuelType);
        this.noOfWheels = noOfWheels;
    }

    void displayFuelType(){
        System.out.println("Fuel Type : " + super.getFuelType());
    }

    void displayNoOfWheels(){
        System.out.println("No Of Wheels : " + noOfWheels);
    }
}

class Splendor extends Bike{
    String modelName = "Splendor";

    Splendor(String fuelType,int noOfWheels){
        super(fuelType,noOfWheels);
    }

    void display(){
        System.out.println("\nBike name : " + modelName);
        super.displayFuelType();
        super.displayNoOfWheels();
    }
}
```

```
class Practical8B{

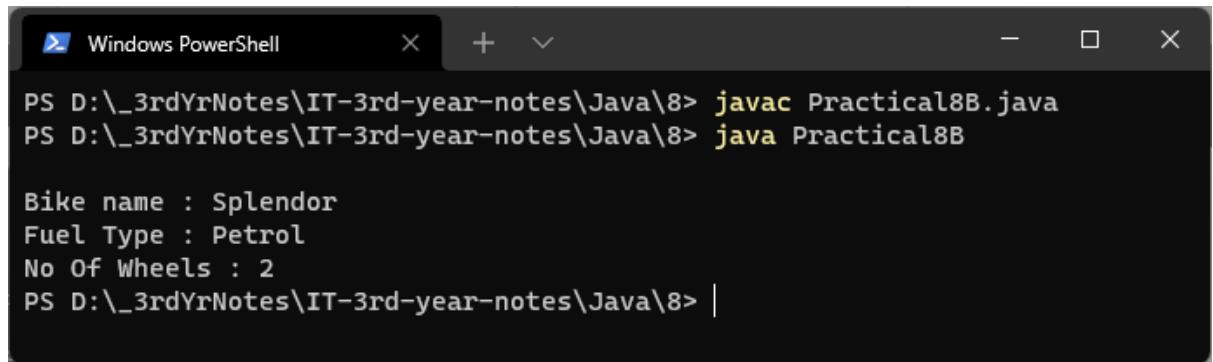
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        String fuelType = "Petrol";
        int noOfWheels = 2;

        Splendor b1 = new Splendor(fuelType,noOfWheels);
        b1.display();

    }

}
```

Output:



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window shows the command "javac Practical8B.java" being run, followed by the output of the program which displays "Bike name : Splendor", "Fuel Type : Petrol", and "No Of Wheels : 2".

```
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> javac Practical8B.java
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> java Practical8B

Bike name : Splendor
Fuel Type : Petrol
No Of Wheels : 2
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> |
```

Code:

```
// hierachical inheritance

import java.util.Scanner;

abstract class Animal{
    String name;

    Animal(String name){
        this.name = name;
    }

    String getName(){
        return name;
    }

    abstract void makeSound();
}

class dog extends Animal{

    dog(String name){
        super(name);
    }

    void details(){
        System.out.println("\nName : " + super.getName());
    }

    void makeSound(){
        System.out.println("woof..woof!");
    }
}

class cat extends Animal{

    cat(String name){
        super(name);
    }

    void details(){
        System.out.println("\nName : " + super.getName());
    }

    void makeSound(){
        System.out.println("meow..meow!");
    }
}
```

```
}

}

class Practical8C{

    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);

        String name;

        System.out.print("Enter dog's name : ");
        name = sc.next();
        dog d1 = new dog(name);

        System.out.print("Enter cat's name : ");
        name = sc.next();
        cat c1 = new cat(name);

        System.out.println("Press 1 to check the sound dog makes\nPress 2 to
check the sound cat makes\nPress 3 to Exit");
        String choice;

        do{
            System.out.print("Enter choice : ");
            choice = sc.next();

            if(choice.equals("1")){
                d1.details();
                d1.makeSound();
            }else if(choice.equals("2")){
                c1.details();
                c1.makeSound();
            }else if(choice.equals("3")){
                System.out.println("Exiting Program...");
            }else{
                System.out.println("Enter a valid choice! \n");
            }
        }while(!choice.equals("3"));

    }
}
```

Output:

```
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> javac Practical8C.java
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> java Practical8C
Enter dog's name : Google
Enter cat's name : Mika
Press 1 to check the sound dog makes
Press 2 to check the sound cat makes
Press 3 to Exit
Enter choice : 2

Name : Mika
meow..meow!
Enter choice : 1

Name : Google
woof..woof!
Enter choice : 0
Enter a valid choice!

Enter choice : 3
Exiting Program...
PS D:\_3rdYrNotes\IT-3rd-year-notes\Java\8> |
```

Conclusion:

Hence, by performing this practical I learnt about the concepts of inheritance. I also created, debugged and executed Java programs based on these concepts.