Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

Lab Number:	**10**
Student Name:	**Bhagyesh Subhash Manjrekar**
Roll No :	**07**

Title:

1. Write a java program to implement Multiple Inheritance using Interfaces. Create an interface called Management with selectCandidate() method. Another interface called Department with allotSubject() method. Class called HOD will implements these two interfaces and define the methods and access them with valid objects.

Learning Objective:

- Students will be able to implement multiple inheritance using Interface concepts

Learning Outcome:

- Understanding the abstraction concept and hiding of the unnecessary code using interfaces.

Course Outcome:

- Implement different programming applications using packaging.

Faculty: Ms. Deepali Kayande

Theory:

(1) What is complete abstraction and how is it achieved in JAVA?

Ans:

Data abstraction is a method where essential elements are displayed to the user and trivial elements are kept hidden.

In Java, abstraction is achieved by using the abstract keyword for classes and interfaces. In abstract classes, we can have abstract methods as well as concrete methods.

Data Abstraction may also be defined as the process of identifying only the required characteristics of an object ignoring the irrelevant details. The properties and behaviours of an object differentiate it from other objects of similar type and also help in classifying/grouping the objects.

In java, abstraction is achieved by interfaces and abstract classes. We can achieve 100% abstraction using interfaces.

Advantages of Abstraction:

1. **It reduces the complexity of viewing the things.**
2. **Avoids code duplication and increases reusability.**
3. **Helps to increase the security of an application or program as only important details are provided to the user.**

(2) Explain multiple inheritance and how is it performed in Java?
Ans:

The programming language of java is unable to utilise this feature directly. It can be achieved indirectly through the usage of interfaces.

Multiple Inheritance is a feature of an object-oriented concept, where a class can inherit properties of more than one parent class. The problem occurs when there exist methods with the same signature in both the super classes and subclass. On calling the method, the compiler cannot determine which class method to be called and even on calling which class method gets the priority.

Multiple inheritance is not supported by Java using classes, handling the complexity that causes due to multiple inheritances is very complex. It creates problems during various operations like casting, constructor chaining, etc, and the above all reason is that there are very few scenarios on which we actually need multiple inheritances, so better to omit it for keeping things simple and straightforward.

Multiple inheritance in java means one class implementing two or more than two interfaces simultaneously. In simple words multiple inheritance in java means one class accessing the states and behaviour of two or more than two interfaces simultaneously.

Although, multiple inheritance is no more a part of Java but still, there is a way we can implement the same along with resolving the ambiguity of the problem. The solution to the problem is interfaces. The only way to implement multiple inheritance is to implement multiple interfaces in a class.

In java, one class can implements two or more interfaces. This also does not cause any ambiguity because all methods declared in interfaces are implemented in class.

Statement: Write a java program to implement Multiple Inheritance using Interfaces. Create an interface called Management with selectCandidate() method. Another interface called Department with allotSubject() method. Class called HOD will implements these two interfaces and define the methods and access them with valid objects.

Algorithm :

Step1 : Start

Step2 : Create an interface called Management with selectCandidate() method

Step3 : Another interface called Department with allotSubject() method

Step4 : Class called HOD will implements these two interfaces

Step5 : Get the details from the usr about name, allted aubject etc. and print the result or data of particular employee

Step6 : Stop

Program:

```
package inheritence_java;


import java.util.Scanner;


interface Management
{
	public void selectcandidate();
}
```

```
interface Department
{
        public void allotsubject();
}

public class HOD implements Management,Department
{
        static String name;
        static String dept;
        static String sub;
        Scanner in = new Scanner(System.in);

        public void selectcandidate()
        {
                System.out.println("Enter the candidate name:");
                name= in.next();
        }

        public void allotsubject()
        {
                System.out.println("Enter alloted department:");
                dept= in.next();
                System.out.println("Enter subject:");
                sub= in.next();
        }
        public static void main(String[] args) {
                // TODO Auto-generated method stub
        HOD i = new interface_multiple();
        i.selectcandidate();
        i.allotsubject();
        System.out.println("Candidate name is:"+name);
        System.out.println("Alloted Department:"+dept);
        System.out.println("Alloted Subject:"+sub);
          }
  }
```

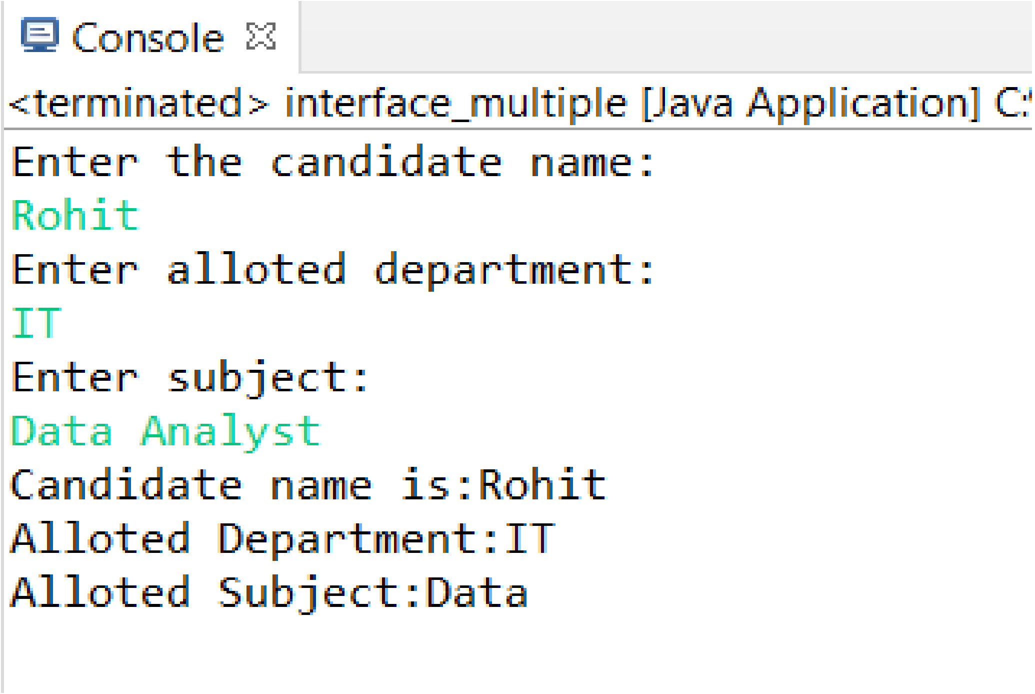
Input given:

Enter the Candidate name: Rohit

Enter alloted department: IT

Enter subject: Data Analyst

Output Screenshot:



```
<terminated> interface_multiple [Java Application] C:
Enter the candidate name:
Rohit
Enter alloted department:
IT
Enter subject:
Data Analyst
Candidate name is:Rohit
Alloted Department:IT
Alloted Subject:Data
```