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:	**8**
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Title:

1. To perform Multilevel Inheritance in JAVA. Create a Person class representing name, age and address. Inherit person class to employee class with emp ID and salary factor. Inherit the Employee class to programmer class with technical skills and hike attributes. Implement valid methods to input the details from the user in the main method and display for 3 programmers.
2. To perform Hierarchical Inheritance in JAVA. Create an Employee class with attributes EmpID and EmpSalary. Also create necessary methods/constructors to accept these values from the user. Create classes permenantEmployee and TemporaryEmployee which will be derived classes of Employee. Mention hike attribute in these derived classes and calculate the total salary using generate_salary() method for respective types of employees. Objects of the derived classes should be created and salaries for the permanent and temporary employees should be calculated and displayed on the screen.

Learning Objective:

- Students will be able to perform multilevel inheritance using JAVA.
- Students will be able to perform hierarchical inheritance using JAVA

Learning Outcome:

- To understand how to use the private members using friend function and friend class.

Course Outcome:

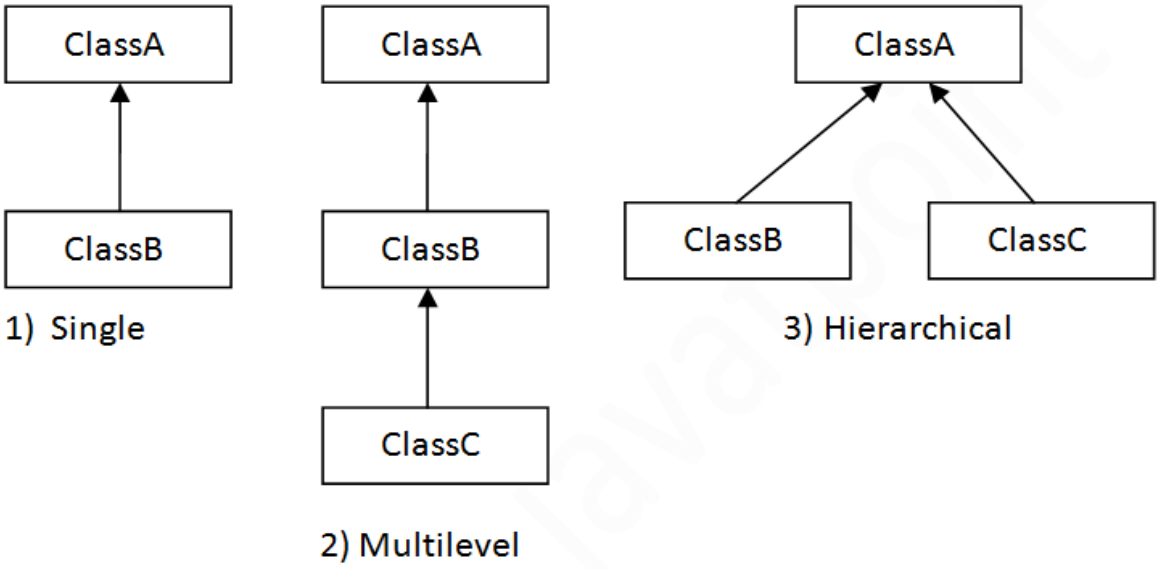
ECL304.2	Comprehend building blocks of OOPs language, inheritance, package and interfaces.

Theory:

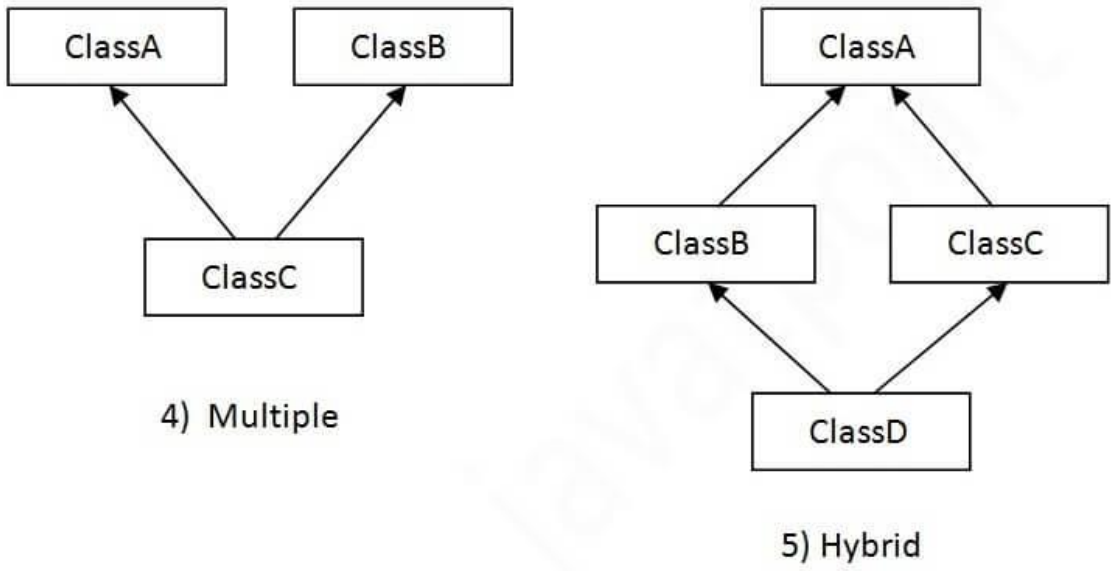
- Explain in details about various inheritance types supported in JAVA

Solution:-

On the basis of class, there can be three types of inheritance in java: single, multilevel and hierarchical. In java programming, multiple and hybrid inheritance is supported through interface only.



When one class inherits multiple classes, it is known as multiple inheritance. For Example:



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Single Inheritance Example

When a class inherits another class, it is known as a *single inheritance*. In the example given below, Dog class inherits the Animal class, so there is the single inheritance.

```
1.  class Animal{
2.  void eat(){System.out.println("eating...");}
3.  }
4.  class Dog extends Animal{
5.  void bark(){System.out.println("barking...");}
6.  }
7.  class TestInheritance{
8.  public static void main(String args[]){
9.  Dog d=new Dog();
10. d.bark();
11. d.eat();
12. }}
```

Output:

```
barking...
eating...
```

Multilevel Inheritance Example

When there is a chain of inheritance, it is known as *multilevel inheritance*. As you can see in the example given below, BabyDog class inherits the Dog class which again inherits the Animal class, so there is a multilevel inheritance.

```
1.  class Animal{
2.  void eat(){System.out.println("eating...");}
3.  }
4.  class Dog extends Animal{
5.  void bark(){System.out.println("barking...");}
6.  }
7.  class BabyDog extends Dog{
8.  void weep(){System.out.println("weeping...");}
9.  }
10. class TestInheritance2{
11. public static void main(String args[]){
12. BabyDog d=new BabyDog();
13. d.weep();
14. d.bark();
15. d.eat();
16. }}
```

Output:

```
weeping...
barking...
eating...
```

Hierarchical Inheritance Example

When two or more classes inherits a single class, it is known as *hierarchical inheritance*. In the example given below, Dog and Cat classes inherits the Animal class, so there is hierarchical inheritance.

```
1.  class Animal{
2.  void eat(){System.out.println("eating...");}
3.  }
4.  class Dog extends Animal{
5.  void bark(){System.out.println("barking...");}
6.  }
7.  class Cat extends Animal{
8.  void meow(){System.out.println("meowing...");}
9.  }
10. class TestInheritance3{
11. public static void main(String args[]){
12. Cat c=new Cat();
13. c.meow();
14. c.eat();
15. //c.bark();//C.T.Error
16. }}
```

Output:

```
meowing...
eating...
```

8:

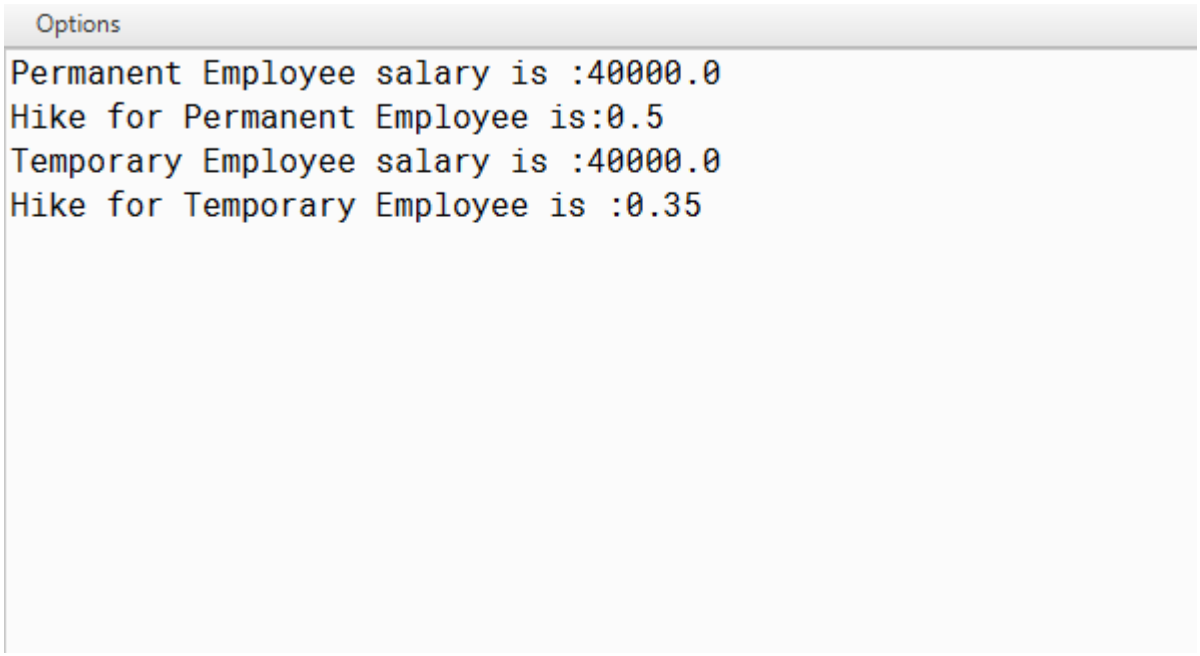
Q1)OUTPUT:

Options

```
Class Car
Class Maruti
Maruti Model: 800
Vehicle Type: Car
Brand: Maruti
Max: 80Kmph
```

8.1:

Q2) OUTPUT:


Options
Permanent Employee salary is :40000.0
Hike for Permanent Employee is:0.5
Temporary Employee salary is :40000.0
Hike for Temporary Employee is :0.35