Nepathya College
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Object Oriented Programming in Java
Lab 5

Objective: To learn concepts of Inheritance, techniques to use it, concept of overriding, use of keyword super, abstract class and method.

Descriptions:

- **Refer theory from the slides.**

Program

Note: The program should be well formatted i.e. proper use of indentation, comment, description of program and functions etc.

1. Create an abstract class animal for the following program and complete it.

```
class dog extends animal{
        void makesound(){
        }
}
class cat extends animal{

}
public class abstraction {
        public static void main(String[] args) {

        }
}
```

Output

```
bark
mew
```

2. Create an abstract class shape with variables dim1 and dim2 and abstract method area() along with the constructor. Derive a class rectangle and triangle from class shape and calculate the area of rectangle and triangle.

Output

```
Area of rectangle: area is: 100.0
Area of Triangle: area is: 400.0
```

3. Create an abstract class Fmachine, having methods getdata() and putdata(). Derive a class Airplane, having instance variables code, name, capacity and methods getdata() and putdata() (that overrides Fmachine's getdata() and putdata()) to ready and display the result. Create some instances of Airplane and call the required methods.

4. Create an interface called calculate which has methods int add(int x, int y) and int diff(int x, int y) to perform addition and subtraction of numbers passed as an arguments. Then define a

class that implements interface calculate.

5. Complete the following program using the concept of interface.

```
class Rectangle implements Polygon {
   public void getArea(int length, int breadth) {
          …..........................
   }
}
public class interfaceclass {
   public static void main(String[] args) {

   }
}
```

Output

```
The area of the rectangle is 30
```

6. Complete the following program using the concept of interface

```
class Bicycle {
        int speed;
        int gear;
        public void changeGear(int newGear){
                gear = newGear;
        }
        public void speedUp(int increment){
                speed = speed + increment;
        }
        public void applyBrakes(int decrement){
                speed = speed - decrement;
        }
        public void printStates() {
                System.out.println("speed: " + speed + " gear: " + gear);
        }
}
class Bike  {

}
public class interfaceclass {
        public static void main (String[] args) {
                Bicycle bicycle = new Bicycle();

        }
}
```

Output

```
Bicycle present state :
speed: 2 gear: 2
Bike present state :
speed: 1 gear: 1
```

7. Run the following program and identify the concept used in the following program.

```
interface Writeable{
   void writes();
}
interface Readable {
   void reads();
}
class student implements Readable,Writeable{
   public void reads(){
         System.out.println("Student reads.. ");
   }
   public void writes(){
         System.out.println("Student writes..");
   }
   public static void main(String args[]){
         student s = new student();
         s.reads();
         s.writes();
   }
}
```

8. Create an interface shape which has methods get_data() an display_area(). Create two classes Rectangle and square which implements this interface. Define the instance variable of these classes as per requirement in class itself. Create some instances of rectangle and square classes and demonstrate interface implementation by classes.