1. Write a program in Java to implement data encapsulation. Create class EncapTest that has private data members- name, age, idno of an employee. Get and set the values of the private data members using public methods- getName(), getAge(), getIdno(), setName(), setAge() and setIdno().

Code:

```
class EncapTest {
  private int age;
  private String name;
  private int idno;

  public void setName(String n) { name = n; }

  public void setAge(int a) { age = a; }

  public void setIdno(int i) { idno = i; }

  public String getName() { return name; }

  public int getIdno() { return idno; }

  public int getAge() { return age; }
}

public class Main {
  public static void main(String[] args) {
    EncapTest test = new EncapTest();
    test.setName("Ajaykumar");
    test.setIdno(9);
    test.setAge(19);

    System.out.println("Id: "+ test.getIdno()+"\nName: "+
test.getName()+"\nAge: "+ test.getAge()+"\n");
  }
}
```

Output:

```
Ajay kumar@Ajaykumar-PC MINGW64 ~/Desktop/SEIT/PCPF/Lab/Exp 2/E
$ javac Main.java

Ajay kumar@Ajaykumar-PC MINGW64 ~/Desktop/SEIT/PCPF/Lab/Exp 2/E
$ java Main
Id: 9
Name: Ajaykumar
Age: 19
```

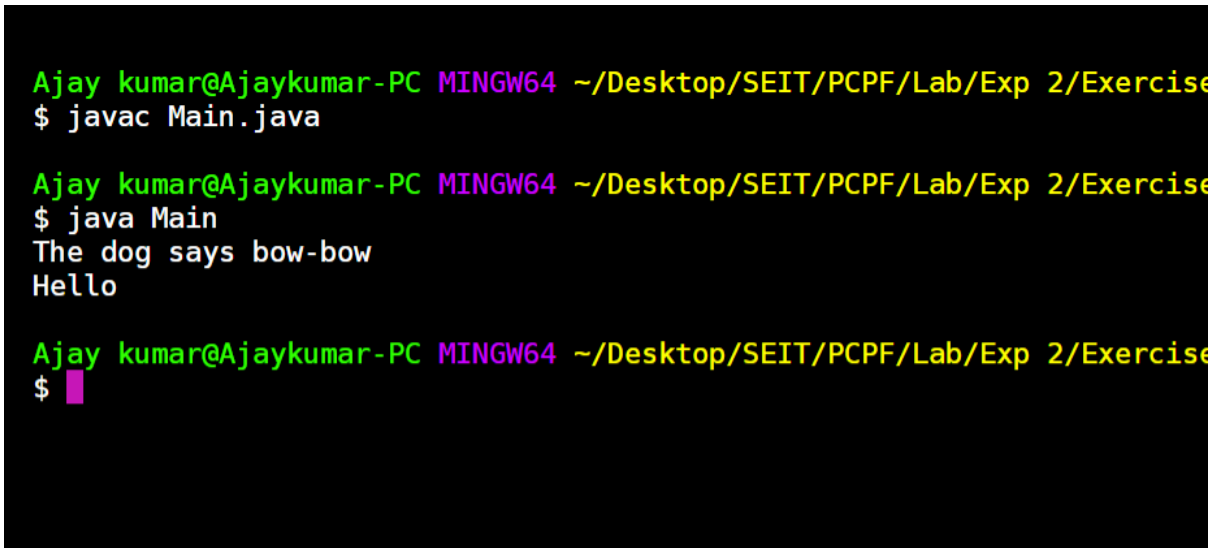
2. Write a program in Java to implement abstract classes. Create an abstract class animal having an abstract method animalSound(). Create subclass dog from superclass animal. Access the abstract class method by creating the object of subclass to implement data abstraction.

Code:

```
abstract class Animal {

  int age;
  public abstract void animalSound();
  public void sleep() {
    System.out.println("Hello");
  }
}
class Dog extends Animal {
  public void animalSound() {
    System.out.println("The dog says bow-bow");
  }
}
public class Main {
  public static void main(String[] args){
    Dog dog = new Dog();
    dog.animalSound();
    dog.sleep();
  }
}
```

Output:



1. Implement a program in Java to calculate the area of a rectangle, a square and a circle. Create an abstract superclass 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters and 'SquareArea' and 'CircleArea' taking one parameter each. The parameters of 'RectangleArea' are its length and breadth. The parameters of 'SquareArea' is its side and that of 'CircleArea' is its radius. Also create subclass ‘area’. Apply the concept of data abstraction to access the methods of the superclass by creating the object of subclass.

Code:

```
import java.lang.Math;

abstract class Shape {
  abstract int RectangleArea(int x, int y);
  abstract int SquareArea(int s);
  abstract double CircleArea(int r);
}
class Area extends Shape {
  public int RectangleArea(int x, int y) {
    return x * y;
  }
  public int SquareArea(int s) {
    return s * s;
  }
  public double CircleArea(int r) {
    return (2 * Math.PI * r);
  }
}
public class Main {
  public static void main(String[] args) {
    Area area = new Area();
    System.out.println("Area of 2x4 Rectangle: " +
area.RectangleArea(2, 4));
    System.out.printf("Area of r(2) Circle: %.02f",
area.CircleArea(2));
  }
}
```

Output:

```
Ajay kumar@Ajaykumar-PC MINGW64 ~/Desktop/SEIT/PCPF/Lab/Exp 2/Exercisee/
$ javac Main.java

Ajay kumar@Ajaykumar-PC MINGW64 ~/Desktop/SEIT/PCPF/Lab/Exp 2/Exercisee/
$ java Main
Area of 2x4 Rectangle: 8
Area of r(2) Circle: 12.57
Ajay kumar@Ajaykumar-PC MINGW64 ~/Desktop/SEIT/PCPF/Lab/Exp 2/Exercisee/
$
```