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Branch : Information Technology
Batch : S1
Subject : Java Programming

Assignment : 03

1. Write a program to calculate area and volume of sphere using static variable and method create two static methods for area and volume calculation. (insert data from user).

Program :

```
import java.util.Scanner;

public class Sphere {
    public static void calculateArea(double radius) {
        System.out.println("Area of the sphere: " + 4 * 3.14 * radius * radius);
    }

    public static void calculateVolume(double radius) {
        System.out.println("Volume of the sphere: " + 4 / 3 * 3.14 * radius *
radius * radius);
     }

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the radius of the sphere: ");
        double radius = scanner.nextDouble();
        calculateArea(radius);
        calculateVolume(radius);

        }
}
```

Output :

```
Select Command Prompt
D:\22620004>javac Sphere.java

D:\22620004>java Sphere
Enter the radius of the sphere: 7
Area of the sphere: 615.44
Volume of the sphere: 1077.02

D:\22620004>
```

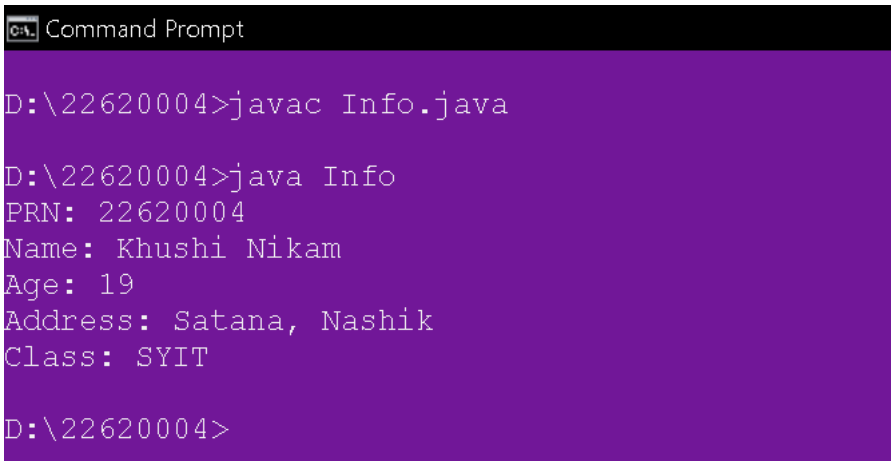
2. Display all your information (prn, name, age, address, class) on console without creating any object and writing any code in main method.

Program:

```
public class Info {
    static {
        System.out.println("PRN: 22620004");
        System.out.println("Name: Khushi Nikam");
        System.out.println("Age: 19");
        System.out.println("Address: Satana, Nashik");
        System.out.println("Class: SYIT");
    }
    public static void main(String args[]){

    }
}
```

Output :

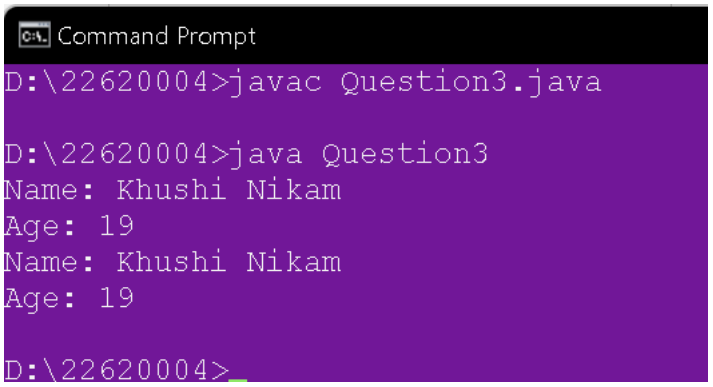


3. Demonstrate how to use static inner class and non-static inner class to access static and non-static members of outer class.

```
public class Question3 {
 public static void main(String[] args) {
 InnerNonStatic obj1 = new Question3().new InnerNonStatic();
 InnerStatic obj2 = new InnerStatic();
 obj2.access();
 }
 class InnerNonStatic {
 InnerNonStatic() {
```

```
 System.out.println("Name: " + new OuterClass().name);
 System.out.println("Age: " + OuterClass.age);
 }
 }
 static class InnerStatic {
 void access() {
 System.out.println("Name: " + new OuterClass().name);
 System.out.println("Age: " + OuterClass.age);
 }
 }
}
class OuterClass {
 static int age = 19;
 String name = "Khushi Nikam";
}
```

Output :



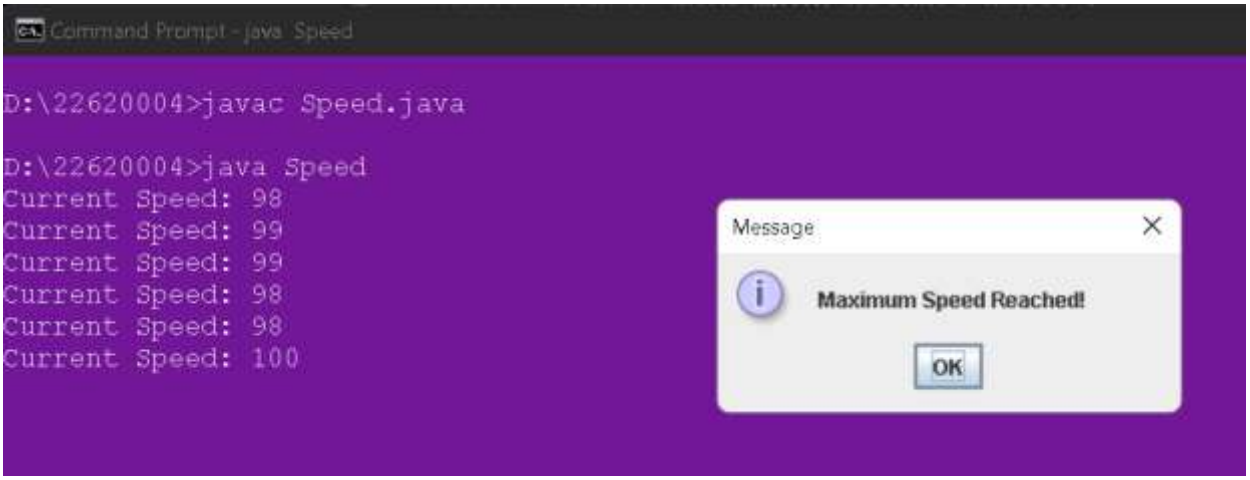
4. Write a program using final variable to check speed limit exceeds or not on highway. If speed is greater than 100. Then generate alert message.

Program :

```
import java.util.Random;
import static javax.swing.JOptionPane.showMessageDialog;
public class Speed {
 public static void main(String[] args) {
 final int max_speed = 100;
 while (true) {
 int current_speed = new Random().nextInt(101 - 97) + 97;
 System.out.println("Current Speed: " + current_speed);
 if (current_speed == max_speed ) {
 showMessageDialog(null, "Maximum Speed Reached!");
```

```
 break;
 }
 }
 }
}
```

Output :



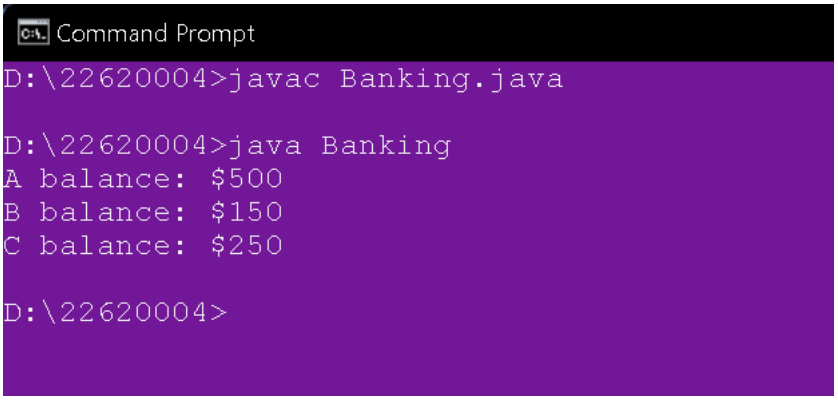
5. Create an abstract class 'Bank' with an abstract method 'getBalance'. $100, $150 and $200 are deposited in banks A, B and C respectively. 'BankA', 'BankB' and 'BankC' are subclasses of class 'Bank', each having a method named 'getBalance'. Call this method by creating an object of each of the three classes:

Program :

```
abstract class Bank {
 abstract int getBalance();
}
class A extends Bank {
 private int balance = 500;
 public int getBalance() {
 return balance;
 }
}
class B extends Bank {
 private int balance = 150;
 public int getBalance() {
 return balance;
```

```
 }
}
class C extends Bank {
 private int balance = 250;
 public int getBalance() {
 return balance;
 }
}
public class Banking {
 public static void main(String[] args) {
 A a = new A();
 B b = new B();
 C c = new C();
 System.out.println("A balance: $" + a.getBalance());
 System.out.println("B balance: $" + b.getBalance());
 System.out.println("C balance: $" + c.getBalance());
 }
}
```

Output :



6. An abstract class has a construtor which prints "This is constructor of abstract class", an abstract method named 'a_method' and a non-abstract method which prints "This is a normal method of abstract class". A class 'SubClass' inherits the abstract class and has a method named 'a_method' which prints "This is abstract method". Now create an object of 'SubClass' and call the abstract method and the non-abstract method.

Program :

```
abstract class AbstractClass {
    AbstractClass() {
        System.out.println("This is the constructor of abstract class");
    }

    abstract void a_method();

    void normal_method() {
        System.out.println("This is a normal method");
    }
}

class SubClass extends AbstractClass {
    void a_method() {
        System.out.println("This is the abstract method");
    }
}

public class Question6 {
    public static void main(String[] args) {
        SubClass subClass = new SubClass();
        subClass.a_method();
        subClass.normal_method();
    }
}
```

Output :

```
Select Command Prompt
D:\22620004>javac Question6.java

D:\22620004>java Question6
This is the constructor of abstract class
This is the abstract method
This is a normal method

D:\22620004>
```

7. We have to calculate the area of a rectangle, a square and a circle. Create an abstract class 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters, 'SquareArea' and 'CircleArea' taking one

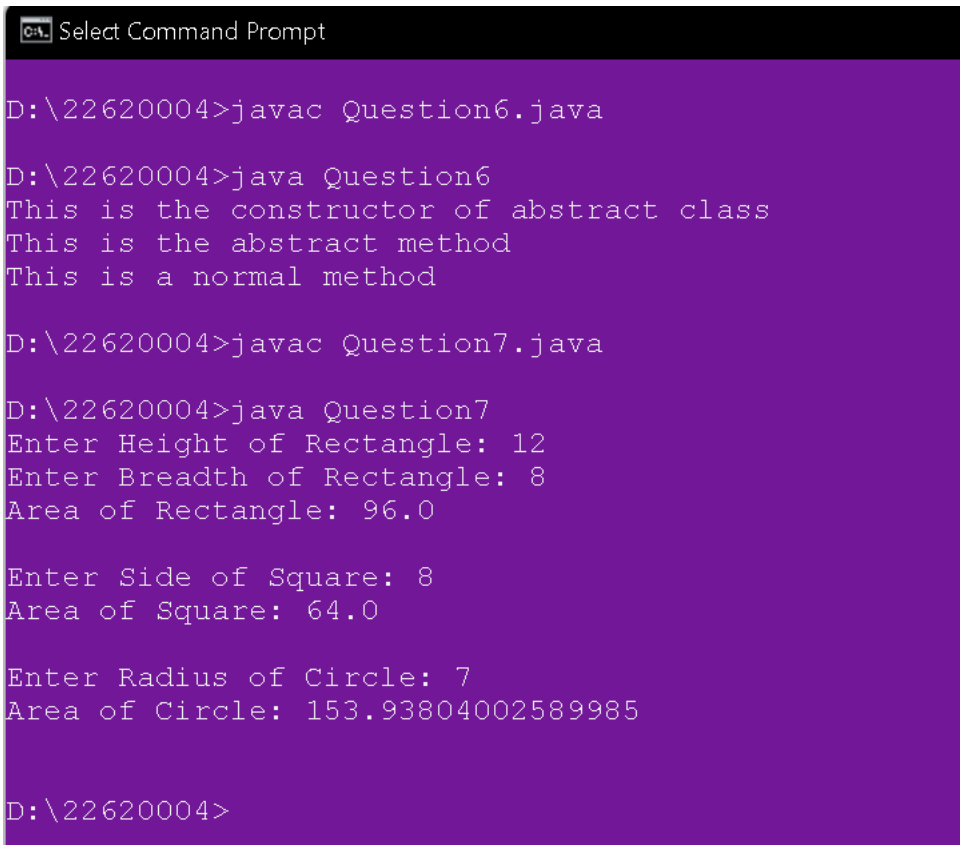
parameter each. The parameters of 'RectangleArea' are its length and breadth, that of 'SquareArea' is its side and that of 'CircleArea' is its radius. Now create another class 'Area' containing all the three methods 'RectangleArea', 'SquareArea' and 'CircleArea' for printing the area of rectangle, square and circle respectively. Create an object of class 'Area' and call all the three methods.

Program :

```
import java.util.Scanner;
abstract class Shape {
 abstract double RectangleArea(double l, double b);
 abstract double SquareArea(double s);
 abstract double CircleArea(double r);
}
class Area extends Shape {
 double RectangleArea(double l, double b) {
 return l * b;
 }
 double SquareArea(double s) {
 return s * s;
 }
 double CircleArea(double r) {
 return Math.PI * r * r;
 }
}
public class Question7 {
 public static void main(String[] args) {
 Area obj = new Area();
 Scanner sc = new Scanner(System.in);
 System.out.print("Enter Height of Rectangle: ");
 double h = sc.nextDouble();
 System.out.print("Enter Breadth of Rectangle: ");
 double b = sc.nextDouble();
 System.out.println("Area of Rectangle: " + obj.RectangleArea(h,b) +
"\n");
 System.out.print("Enter Side of Square: ");
 double s = sc.nextDouble();
 System.out.println("Area of Square: " + obj.SquareArea(s) +"\n");
 System.out.print("Enter Radius of Circle: ");
 double r = sc.nextDouble();
```

```
 System.out.println("Area of Circle: " + obj.CircleArea(r) +"\n");
 sc.close();
 }
}
```

Output :



8. Define a package named ‘useful’ with a class name ‘Useme’ having following methods: area() To calculate area of given shape. percentage() to calculate percentage given total marks and marks obtained. Develop a program to import above package and use both methods:

Program :

```
package useful;
public class Useme {
 public double areaOfRectangle(double l, double w) {
 return l * w;
 }
 public double percentage(double percent, double of) {
```

```
 return (percent / 100) * of;
 }
}
```

```
import java.util.Scanner;
import useful.*;
public class Question8{
 public static void main(String[] args) {
 Useme obj = new Useme();
 Scanner sc = new Scanner(System.in);
 System.out.print("Enter Length of Rectangle: ");
 double l = sc.nextDouble();
 System.out.print("Enter Width of Rectangle: ");
 double w = sc.nextDouble();
 System.out.println("Area of Rectangle: " +
obj.areaOfRectangle(l, w) + "\n");
 System.out.print("Enter Percentage: ");
 double percent = sc.nextDouble();
 System.out.print("Enter Of: ");
 double of = sc.nextDouble();
 System.out.println("Result: " + obj.percentage(percent, of) +
"\n");
 }
}
```

Output :

```
Command Prompt - java Question8

D:\22620004>javac useful/Useme.java Question8.java

D:\22620004>java Question8
Enter Length of Rectangle: 5
Enter Width of Rectangle: 6
Area of Rectangle: 30.0

Enter Percentage:
```