INSTITUTE OF ENGINEERING & MANAGEMENT

Department of Computer Science & Engineering

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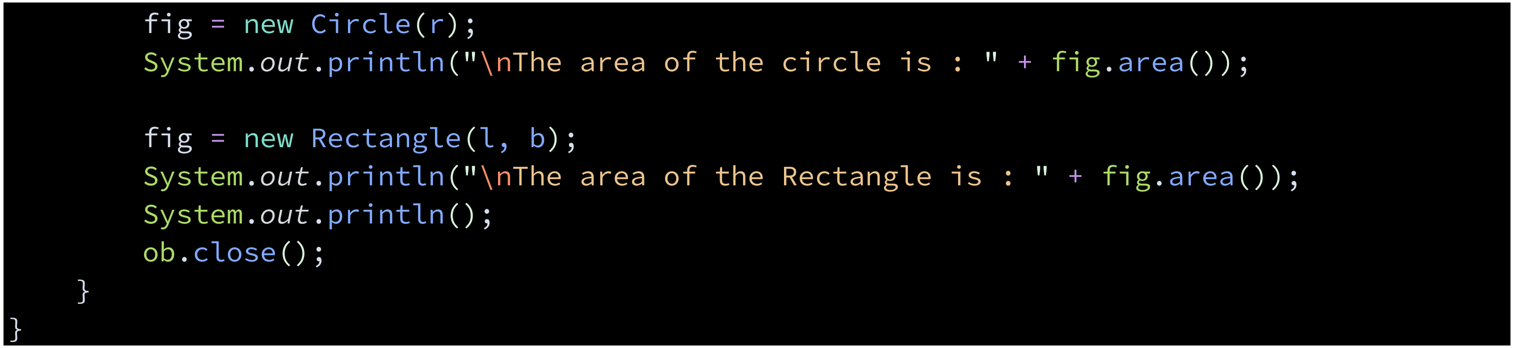
Class Roll	**: 27**
Enrollment No.	**: 12019002002039**
Subject Name	**: OOP Lab**
Assignment No.	**: Day 7**
Date	**: 11/08/2021**

1. **Design an interface named Figure with a field PI (=3.14). Create two concrete subclasses of it named Circle and Rectangle respectively. Create objects of the two subclasses and calculate their areas.**

Ans:

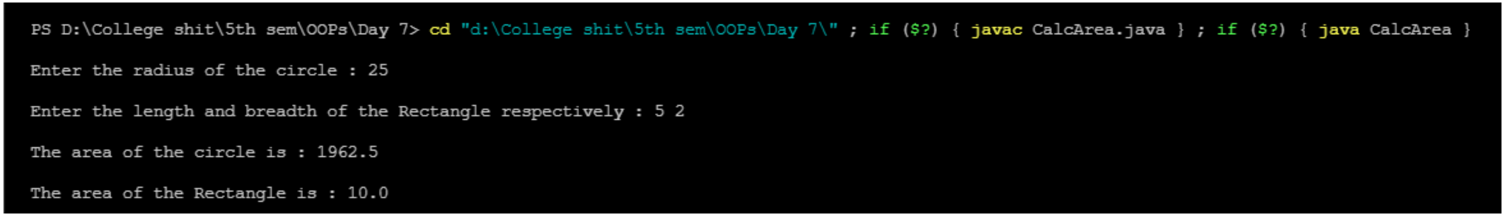
```java
import java.util.*;

interface Figure {
    double PI = 3.14;

    double area();
}

class Circle implements Figure {
    double rad;

    Circle(double rad) {
        this.rad = rad;
    }

    public double area() {
        return Figure.PI * rad * rad;
    }
}
```

```java
class Rectangle implements Figure {
    double length, breadth;

    Rectangle(double length, double breadth) {
        this.length = length;
        this.breadth = breadth;
    }

    public double area() {
        return length * breadth;
    }
}

public class CalcArea {
    public static void main(String[] args) {
        Scanner ob = new Scanner(System.in);
        System.out.print("\nEnter the radius of the circle : ");
        double r = ob.nextDouble();
        System.out.print("\nEnter the length and breadth of the Rectangle respectively :
");
        double l = ob.nextDouble();
        double b = ob.nextDouble();

        Figure fig;
```



```java
        fig = new Circle(r);
        System.out.println("\nThe area of the circle is : " + fig.area());

        fig = new Rectangle(l, b);
        System.out.println("\nThe area of the Rectangle is : " + fig.area());
        System.out.println();
        ob.close();
    }
}
```

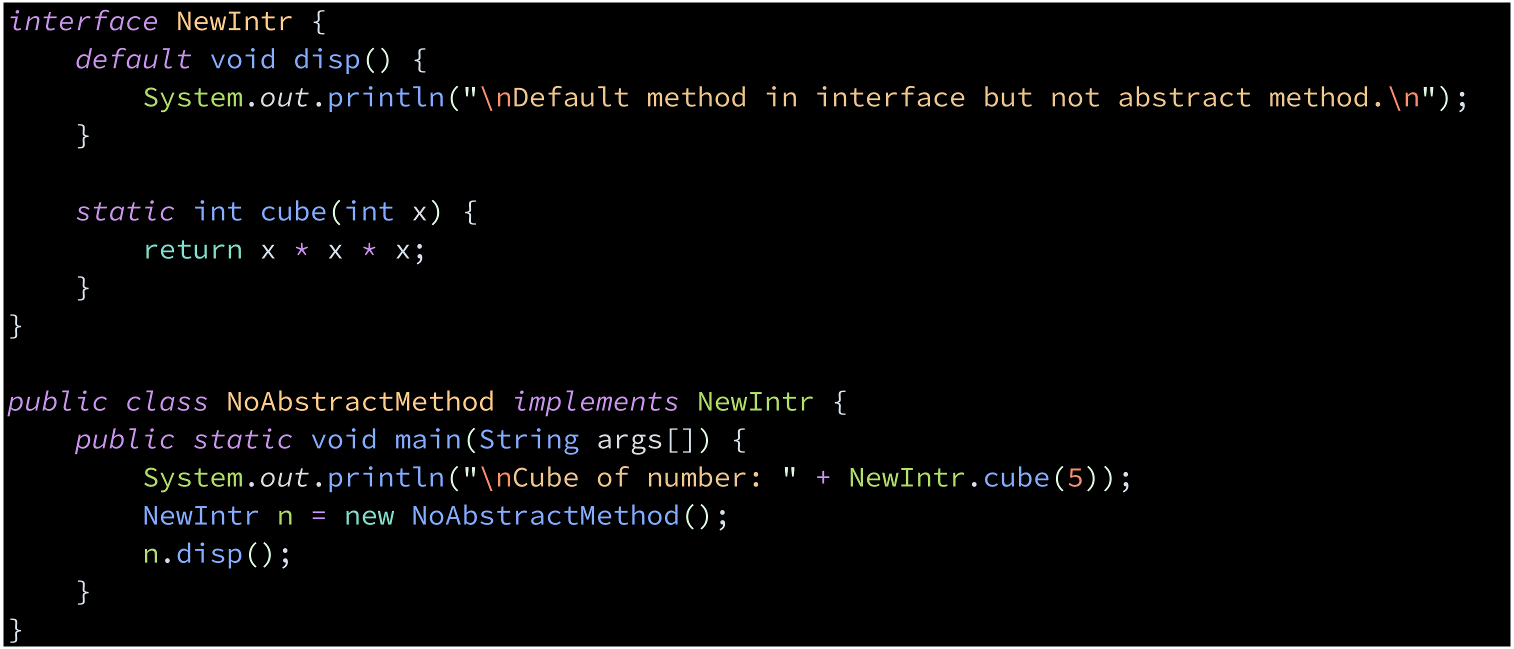
Output:



```
PS D:\College shit\5th sem\OOPs\Day 7> cd "d:\College shit\5th sem\OOPs\Day 7\" ; if ($?) { javac CalcArea.java } ; if ($?) { java CalcArea }

Enter the radius of the circle : 25

Enter the length and breadth of the Rectangle respectively : 5 2

The area of the circle is : 1962.5

The area of the Rectangle is : 10.0
```

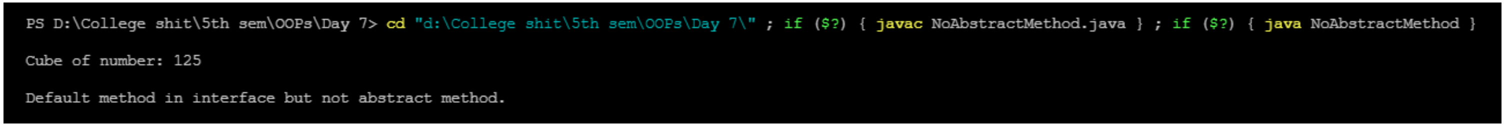
2. Check without having any abstract method whether an interface is possible. If so, then give coding example.

Ans:



```java
interface NewIntr {
    default void disp() {
        System.out.println("\nDefault method in interface but not abstract method.\n");
    }

    static int cube(int x) {
        return x * x * x;
    }
}

public class NoAbstractMethod implements NewIntr {
    public static void main(String args[]) {
        System.out.println("\nCube of number: " + NewIntr.cube(5));
        NewIntr n = new NoAbstractMethod();
        n.disp();
    }
}
```

Output:



```
PS D:\College shit\5th sem\OOPs\Day 7> cd "d:\College shit\5th sem\OOPs\Day 7\" ; if ($?) { javac NoAbstractMethod.java } ; if ($?) { java NoAbstractMethod }

Cube of number: 125

Default method in interface but not abstract method.
```

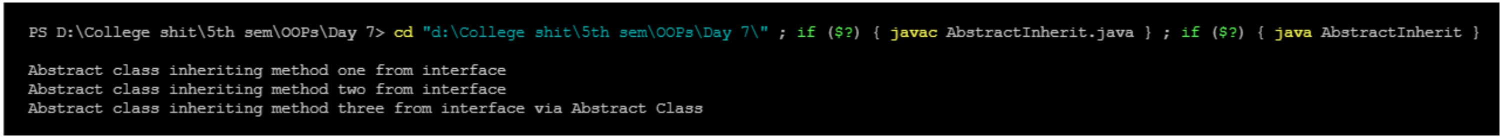
3. Create an interface with three abstract methods check whether you can override only few methods (not all methods) in its concrete subclass or not.

Ans:

```java
interface Intr {
    void methodOne();

    void methodTwo();

    void methodThree();
}

abstract class Abstract implements Intr {
    @Override
    public void methodOne() {
        System.out.println("Abstract class inheriting method one from interface");
    }

    @Override
    public void methodTwo() {
        System.out.println("Abstract class inheriting method two from interface");
    }
}
```

```java
class ExtendAbstract extends Abstract {

    @Override
    public void methodThree() {
        System.out.println("Abstract class inheriting method three from interface via Abs
tract Class");
    }
}

public class AbstractInherit {
    public static void main(String[] args) {
        ExtendAbstract obj = new ExtendAbstract();
        System.out.println();
        obj.methodOne();
        obj.methodTwo();
        obj.methodThree();
        System.out.println();
    }
}
```

Output:

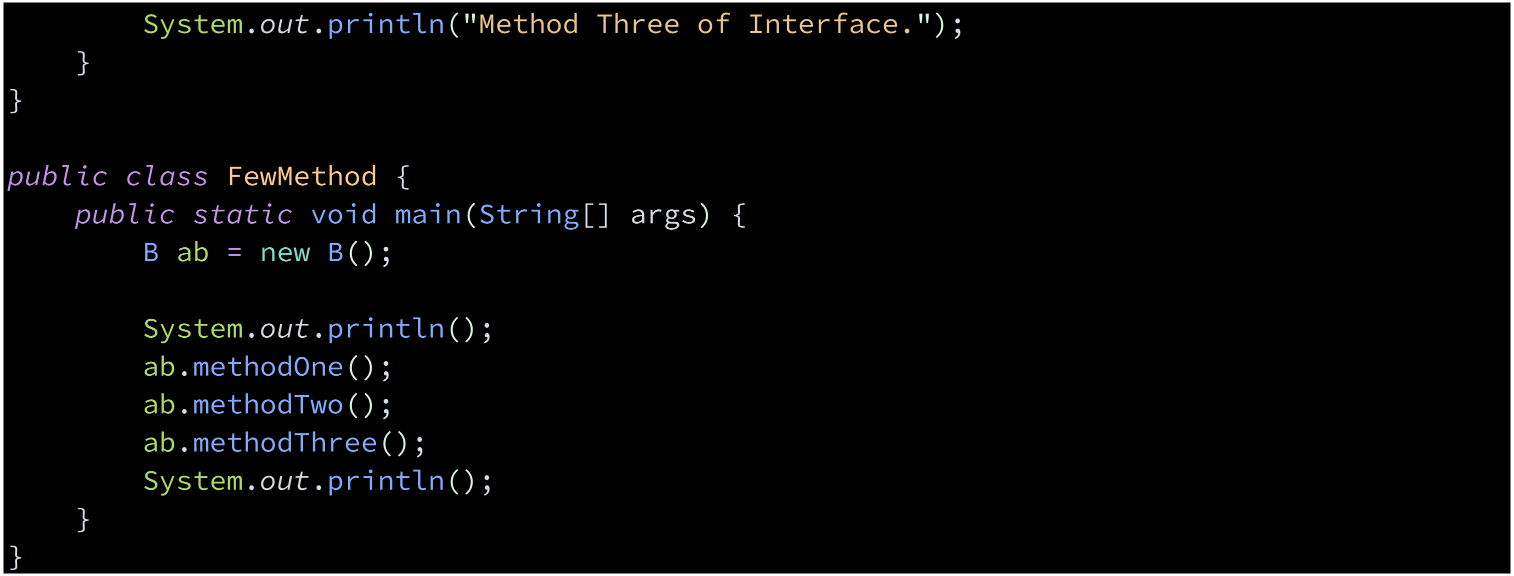


```
PS D:\College shit\5th sem\OOPs\Day 7> cd "d:\College shit\5th sem\OOPs\Day 7\" ; if ($?) { javac AbstractInherit.java } ; if ($?) { java AbstractInherit }

Abstract class inheriting method one from interface
Abstract class inheriting method two from interface
Abstract class inheriting method three from interface via Abstract Class
```

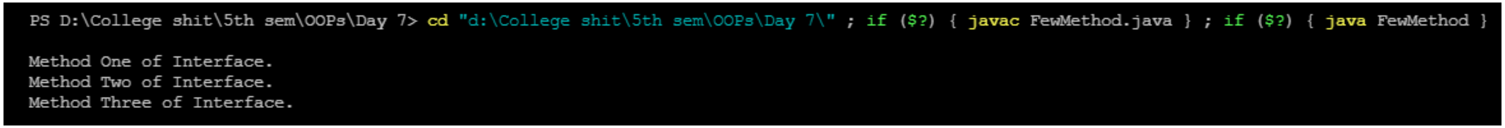
4. Does an interface can inherit an abstract class? If so, then give coding example.

Ans:

```java
interface A {
    void methodOne();

    void methodTwo();

    void methodThree();
}

class B implements A {
    public void methodOne() {
        System.out.println("Method One of Interface.");
    }

    public void methodTwo() {
        System.out.println("Method Two of Interface.");
    }

    public void methodThree() {
```



```
        System.out.println("Method Three of Interface.");
    }
}

public class FewMethod {
    public static void main(String[] args) {
        B ab = new B();

        System.out.println();
        ab.methodOne();
        ab.methodTwo();
        ab.methodThree();
        System.out.println();
    }
}
```

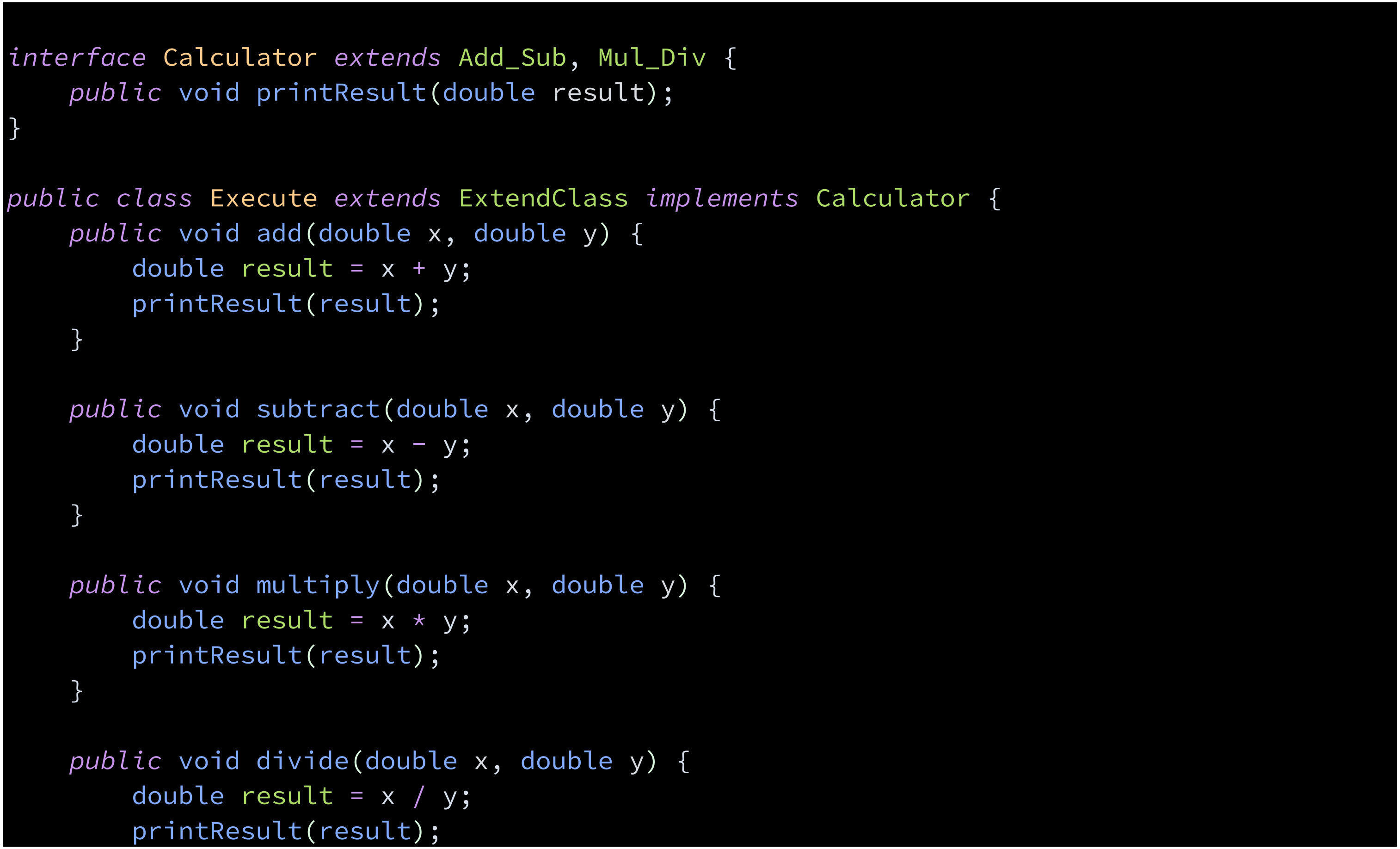


```
PS D:\College shit\5th sem\OOPs\Day 7> cd "d:\College shit\5th sem\OOPs\Day 7\" ; if ($?) { javac FewMethod.java } ; if ($?) { java FewMethod }

Method One of Interface.
Method Two of Interface.
Method Three of Interface.
```

5. Create two interfaces, each with two methods. Inherit a new interface from the two, adding a new method. Create a class by implementing the new interface and inheriting from a concrete class. In main() method, create an object of the derived class and call all the methods.

Ans:

```
interface Add_Sub {
    public void add(double x, double y);

    public void subtract(double x, double y);
}

interface Mul_Div {
    public void multiply(double x, double y);

    public void divide(double x, double y);
}

class ExtendClass {
    void show() {
        System.out.println("Extended class via Execute.");
    }
}
```



```java
interface Calculator extends Add_Sub, Mul_Div {
    public void printResult(double result);
}

public class Execute extends ExtendClass implements Calculator {
    public void add(double x, double y) {
        double result = x + y;
        printResult(result);
    }

    public void subtract(double x, double y) {
        double result = x - y;
        printResult(result);
    }

    public void multiply(double x, double y) {
        double result = x * y;
        printResult(result);
    }

    public void divide(double x, double y) {
        double result = x / y;
        printResult(result);
    }

    public void printResult(double result) {
        System.out.println("The result is : " + result);
    }

    public static void main(String[] args) {
        Execute c = new Execute();
        System.out.println();
        c.add(5, 10);
        c.subtract(35, 15);
        c.multiply(6, 9);
        c.divide(45, 6);
        c.show();
        System.out.println();
    }
}
```

Output: