**OBJECTIVE:**

LAB # 10

Mutability and Immutability

Understanding and implementing the concept of mutability and immutability.

**LAB TASKS:**

1. Apply concept of mutability and immutability for the task promoted and failed students. The roll number, subject code, and subject name would have to be entered at time of object creation and with getter method these variables should be printed. (Hint: Those students who are failed in previous semester will be registered in immutable class, and promoted students are registered in mutable class).

**SOURCE CODE:**

**PASS CLASS:**

**public class** pass {

**private** String coursename; **private int** coursecode; **private int** rollno;

pass(String coursename , **int** coursecode , **int** rollno)

**this**.coursename = coursename; **this**.coursecode = coursecode; **this**.rollno = rollno;

}

**public** String getName() {

**return** coursename;

}

**public void** setName(String coursename) {

**this**.coursename = coursename;

}

{

**public int** getcode() {

**return** coursecode;

}

**public void** setcode(**int** coursecode) {

**this**.coursecode = coursecode;

}

**public int** getroll() {

**return** rollno;

}

**public void** setroll(**int** rollno) {

**this**.rollno = rollno;

}

**public static void** main(String[] args) { System.***out***.println("Pevious class preview.");

pass obj = **new** pass ("Software Design Architecture" , 204 , 219);

System.***out***.println("Previous course:" +obj.getName()+"\n"); System.***out***.println("Coursecode:" +obj.getcode()+"\n"); System.***out***.println("Roll number:" +obj.getroll()+"\n");

// update the name, this object is mutable System.***out***.println("Congratulation! You're Promoted to new

class"+"\n");

obj.setName("Software Construction and Development"); System.***out***.println("" +obj.getName()+"\n"); obj.setcode(456);

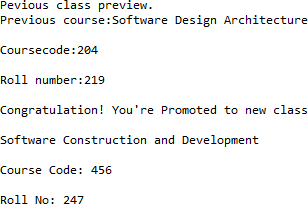
System.***out***.println("Course Code: " +obj.getcode()+"\n"); obj.setroll(247);

System.***out***.println("Roll No: " +obj.getroll()+"\n");

}

}

**OUTPUT:**



**FAIL CLASS:**

**public final class** Fail { **final** String courseName; **final int** rollNumber; **final** String courseCode;

**public** Fail(String courseName, **int** rollNumber, String courseCode) {

**this**.courseName = courseName; **this**.rollNumber = rollNumber; **this**.courseCode = courseCode;

}

**public** String getCourseName() {

**return** courseName;

}

**public int** getRollNumber() {

**return** rollNumber;

}

**public** String getCourseCode() {

**return** courseCode;

}

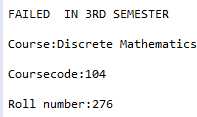
**public static void** main(String[] args) {

Fail obj = **new** Fail("Discrete Mathematics", 276, "104"); System.***out***.println("\nFAILED IN 3RD SEMESTER\n"); System.***out***.println("Course:" +obj.getCourseName()+"\n"); System.***out***.println("Coursecode:" +obj.getCourseCode()+"\n"); System.***out***.println("Roll number:" +obj.getRollNumber()+"\n");

}

}

# OUTPUT:



1. Write a program that will calculate the below 4 formulas. Decide what to make mutable and what to make immutable and perform task operations. Formulas are:

Circumference of circle: **C = 2 π r**

Area of circle: **A = π r²**

Volume of sphere: **V = 4/3 π r3**

Surface area of sphere: **A = 4 π r²**

(Hint: Value of pie would be constant, and value of radius should be variant)

# SOURCE CODE:

**public class** Lab8 {

**private int** radius;

**final double** pie = 3.142;

**public void** circle() {

System.***out***.println("Area of circle: " + (pie\*radius\*radius));

}

**public void** circle\_circum() {

System.***out***.println("Circumference of circle: " + (2\*pie\*radius));

}

**public void** sphere\_volume() { System.***out***.println("Volume of Sphere: " +

(4/3\*pie\*radius\*radius\*radius));

}

**public void** sphere\_surfacearea() {

System.***out***.println("Surface Area of Sphere: " + (4\*pie\*radius\*radius));

}

Lab8(**int** radius) {

**this**.radius = radius;

}

**public int** getradius() {

**return** radius;

}

**public void** setradius(**int** radius) {

**this**.radius = radius;

}

**public double** getpie() {

**return** pie;

}

**public static void** main(String[] args) {

// **TODO** Auto-generated method stub Lab8 obj = **new** Lab8(5); obj.circle();

obj.setradius(2); obj.circle\_circum(); obj.setradius(1); obj.sphere\_volume(); obj.setradius(9); obj.sphere\_surfacearea();

}

}

**OUTPUT:**



**Github:**