Subject: PRO192
LAB 04

- **Inheritance (kế thừa)**
- **Abstract Class**

Tạo 1 project riêng có tên theo quy định sau:

Tên Project: **<MASV>_LAB4**
Bước 1: Ví dụ: Sinh viên có masv: CE123456. Tên Project được đặt tên như sau:

CE123456_LAB4

Bước 2: Tạo 1 file MS Word và chụp kết quả (*Tất cả màn hình của IDE Netbean 8.2*) của 4 chương trình, dán vào file.

Bước 3: Nén tất cả bài làm lại với tên: Lab4.zip

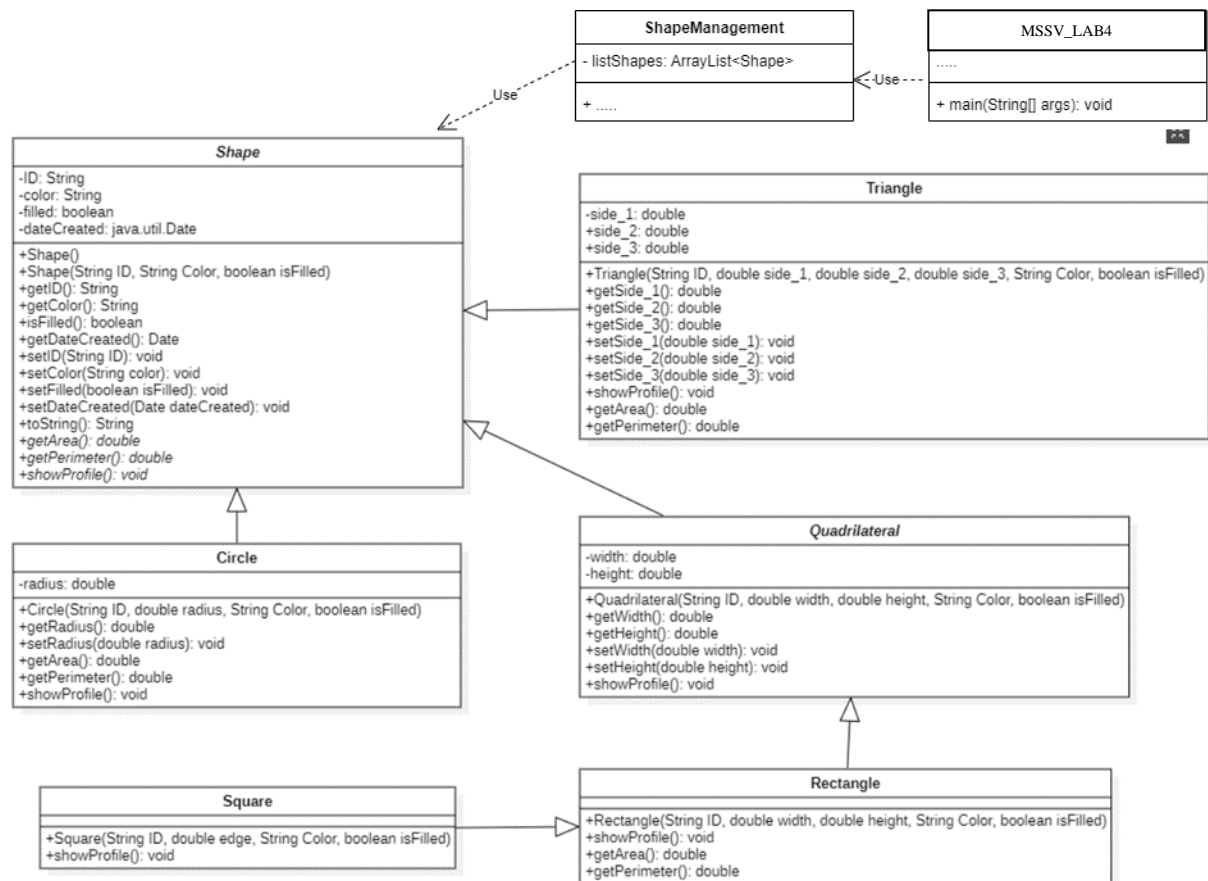Bước 4: Sau đó submit bài làm (Lab4.zip) vào mục **Lab04** *đúng Slots* trên trang *https://edunext.fpt.edu.vn/*

Yêu cầu:
- Comment giải thuật đầy đủ,
- Ghi thông tin tác giả (author): MSSV, Họ tên, lớp
- Format code
- Tạo file .jar cho từng project
- Nhập trước dữ liệu mẫu

Technical Requirements:

1. Using Object-Oriented programming style.
2. Using ArrayList to store data
3. Check data input is valid with following information:
   ID: must be exactly 2 characters and no duplicated with existed ID in Database (your list).
   color: not empty
   dateCreated: get current date (https://viettuts.vn/java-date/java-util-date-trong-java)
   filled: defaults to true
   radius, width, height, side_1, side_2, side_3: must be greater than 0 and not empty.

Design and code a abstract class named **Shape** that holds information about a **shape (**there are three abstract methods named: *getArea(), getPerimeter() and showProfile())***,* class named **Triangle** which is **derived** from **Shape**, class named **Circle** which is derived from **Shape**, abstract class named **Quadriateral** which is derived form **Shape**, a class named **Rectangle** which is derived from a abstract class name **Quadrilateral** and a class name **Square** which is derived from a class **Rectangle**.

Write a shape management program with the following functions:

Create menu for this program as below:

```
----- SHAPE MANAGEMENT -----
1. Adds new Circle.
2. Adds new Triangle.
3. Adds new Rectangle.
4. Adds new Square.
5. Shows all Shapes.
6. The biggest area shape.
7. Sort ascending by shape area.
8. Search a shape.
9. Quit.
Please select a function:
```

case 1. When user select the first function, the application will receive a Circle information and append this circle into a list.

```
----- Add new Circle -----
Input ID: C3
This C3 is already exists!
Input ID: C4
Input color: Pink
Input radius: 3
Circle created and added to list of shapes successful!
```

Same for select the 2nd, 3rd and 4th function

case 2. When user select the 5th function, the list of shapes will be shown

```
----- List of Shapes -----
|Circle:     |  C1|02/20/24|       Red| true|  8.0|    -|    -|201.1| 50.3|
|Circle:     |  C3|02/20/24|      Blue| true|  3.0|    -|    -| 28.3| 18.8|
|Circle:     |  C2|02/20/24|     Green| true|  2.0|    -|    -| 12.6| 12.6|
|Rectangle:  |  R1|02/20/24|     Green| true|  2.0| 3.0|    -|  6.0| 10.0|
|Rectangle:  |  R2|02/20/24|      Blue| true|  3.0| 4.0|    -| 12.0| 14.0|
|Triangle:   |  T1|02/20/24|       Red| true|  2.0| 3.0| 4.0|  2.9|  9.0|
|Triangle:   |  T2|02/20/24|     Green| true|  3.0| 4.0| 5.0|  6.0| 12.0|
|Square:     |  S1|02/20/24|      Blue| true|  5.0|    -|    -| 25.0| 20.0|
|Square:     |  S2|02/20/24|     Green| true|  3.0|    -|    -|  9.0| 12.0|
|Circle:     |  C4|02/20/24|       Red| true|  3.0|    -|    -| 28.3| 18.8|
```

case 3. When user select the 6th function, the list shapes have biggest area

```
----- List of the biggest Area Shapes -----
|Circle:     |  C1|02/20/24|       Red| true|  8.0|    -|    -|201.1| 50.3|
```

case 4. When user select the 7th function, sort ascending by shape area.

```
----- List of Shapes -----
|Triangle:   |  T1|02/20/24|       Red| true|  2.0| 3.0| 4.0|  2.9|  9.0|
|Rectangle:  |  R1|02/20/24|     Green| true|  2.0| 3.0|    -|  6.0| 10.0|
|Triangle:   |  T2|02/20/24|     Green| true|  3.0| 4.0| 5.0|  6.0| 12.0|
|Square:     |  S2|02/20/24|     Green| true|  3.0|    -|    -|  9.0| 12.0|
|Rectangle:  |  R2|02/20/24|      Blue| true|  3.0| 4.0|    -| 12.0| 14.0|
|Circle:     |  C2|02/20/24|     Green| true|  2.0|    -|    -| 12.6| 12.6|
|Square:     |  S1|02/20/24|      Blue| true|  5.0|    -|    -| 25.0| 20.0|
|Circle:     |  C3|02/20/24|      Blue| true|  3.0|    -|    -| 28.3| 18.8|
|Circle:     |  C4|02/20/24|       Red| true|  3.0|    -|    -| 28.3| 18.8|
|Circle:     |  C1|02/20/24|       Red| true|  8.0|    -|    -|201.1| 50.3|
```

case 5. When user select the 8th function, Search a shape.

```
Find Shape:
Input ID to find: T1
|Triangle:   |  T1|02/20/24|       Red| true|  2.0| 3.0| 4.0|  2.9|  9.0|
```

If not found

```
Find Shape:
Input ID to find: T5
Not found!
```

case 6. When the user selects 9th function, end the program and display the information below

THANK FOR USING OUR APPLICATION!

case 7. When user selected invalid function, the application will be shown the warning message "The function of application must be from 1 to 9!"