Object Oriented Programming

Home Work 12   Marks 10

Instructions

Work on this home work individually. Absolutely NO collaboration is allowed. Any traces of plagiarism would result in a ZERO marks in this homework and possible disciplinary action. Tasks should be coded in **C++**.

Due Date

Paste the solution of the problem (source code .cpp file only) labeled with your complete roll number in SEM – HW 12 and SEA – HW 12 folders for SE Morning and SE Afternoon sections respectively on Tuesday, June 07, 2016 before 05:00 PM. These folders are available at \\printsrv\Teacher Data\Umair Babar\Students.

Feel free to include any additional member functions in any of the classes that can help you to fulfill your required working.

Shape Inheritance Hierarchy

1. ADT: BasicShape

Design a **BasicShape** class that has the following members:

Private Member Variable:

➢ **area**, a double used to hold the shape's area.

Public Member Functions:

- **getArea** – return the value in the member variable **area**.
- **calcArea** – a **virtual function** that display a message "Basic Shape Calculate Area Function…".

2. ADT: Circle

Design a **Circle** class that is derived from the **BasicShape** class. The **Circle** class should have the following members:

Private Member Variable:

➢ **centerX**, a **long integer** used to hold the **x coordinate** of the circle's center.
➢ **centerY**, a **long integer** used to hold the **y coordinate** of the circle's center.
➢ **radius**, a **double** used to hold the circle's **radius**.

Public Member Functions:

- **constructor** – accepts values for **centerX**, **centerY**, and **radius**. Should call the overridden **calcArea** function described below.
- **getCenterX** – returns the value in **centerX**.
- **getCenterY** – returns the value in **centerY**.
- **calcArea** – calculates the **area** of the circle (area = 3.14159 * radius * radius) and stores the result in the inherited member area.

3. ADT: Rectangle

Design a **Rectangle** class that is derived from the **BasicShape** class. The **Rectangle** class should have the following members.

Private Member Variable:

➢ **width**, a **long integer** used to hold the **width** of the rectangle.
➢ **length**, a **long integer** used to hold the **length** of the rectangle.

Public Member Functions:

- **constructor** – accepts values for width and length. Should call the overridden **calcArea** function described below.
- **getWidth** – returns the value in **width**.
- **getLength** – returns the value in **length**.
- **calcArea** – calculates the **area** of the rectangle (area = length * width) and stores the result in the inherited member area.

4. Main Function

Demonstrate the classes in a program that has a **BasicShape** pointer. Initialize it with the **dynamically created object** of **Circle** and **make call to calcArea** function, then assign the **BasicShape's** pointer with **dynamically created Rectangle** objects and make call to **calcArea** function.

NOTE: - No submission will be accepted after the due date and time.

BEST OF LUCK