Polymorphism Assignments

<table>
<tr><th>Assmt ID</th><th>Assignment</th></tr>
<tr><td>a.</td><td>Design a class Rectangle consists of two attributes x-coordinate and y-coordinate. Design two constructors and methods for setting and getting the attributes of class Rectangle. Incorporate a method getArea() to compute the area of the Rectangle.</td></tr>
<tr><td>b.</td><td>Design a class Math consists of the methods add (), subtract (), multiply () and divide () operations which will return the respective values. Design an interface which will call the methods.</td></tr>
<tr><td>c.</td><td>Find the answers to these questions
1. Is the base class constructor being called when a derived class object is being created? If yes in what order?
2. Can I assign a derived class object to a base reference? If yes then which Read_Data method will be invoked?
3. Can a base class object be assigned to e derived class reference?</td></tr>
<tr><td>d.</td><td>Create a class shape, Which is capable of representing different geometric figures like cube, sphere, cylinder, cone etc. Write a method to find out the volume of each shape, it should take the argument of same type (radius both radius and height). Reads the shape and its radius and/or height as it is and displays the result. If the volume method is invoked without any arguments then the default size should be taken as 10 assuming the shape to be a cube.</td></tr>
<tr><td>e.</td><td>Design a class hierarchy with GeometricFigure as a base class of a rectangle class. GeometricFigure has attribute of no. of sides and member function to accept values in attribute. RectangleFigure class has attributes for length and breadth as well as member functions to calculate area, accept and display values of attributes. Access the members through base class reference and derived class reference. Design derived classes RectangleFigure, SquareFigure and CircleFigure of base class GeometricFigure. All derived classes should accept and display their respective attributes. All classes need to have the capability to compute area of respective geometric figure. Member function names in all classes need to be the same. (Hint: Use the concept of virtual function)</td></tr>
<tr><td>f.</td><td>Create a class Height with the following DataMembers
<table>
<tr><th>Identifier</th><th>Type</th></tr>
<tr><td>Feet</td><td>Int</td></tr>
<tr><td>Inches</td><td>Int</td></tr>
</table>
Overload the + operator such that it should increase the value contained in the Inches field by one and when the Inches value crosses 12 it should revert to zero after increasing the Feet value by one. Display the output to the users</td></tr>
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