Overview

Exercise\_12\_10 implements an inheritance hierarchy for the abstract class Shape and tests the implementation using abstract classes and inheritance.

### PROCESSING LOGIC

Testing Logic:

1. Create various instances of derived Shape classes and place in an Array reference of Shape objects.
2. Loop through all objects in array.
   1. Print ToString()
   2. Try casting object to ThreeDimensionalObject and printing Area and Volume
   3. Try casting object to TwoDimensionalObject and printing Area (The object cannot cast to both so only one try/catch will succeed and the other will catch.
3. End program

### DATA (INPUT/OUTPUT)

Input: Shape objects

Output: string Shape.ToString(), string Area or strings Area and Volume

### COMPONENTS (SOURCE CODE NAMES, CLASSES, METHODS)

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| **Program** |
|  |
| +static Main(args[]) |

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| **Shape** |
|  |
| +abstract ToString(): string |

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| **ThreeDimensionalShape: Shape** |
|  |
| +abstract Area(): double  +abstract Volume(): double |

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| **TwoDimensionalShape: Shape** |
|  |
| +abstract Area(): double |

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| --- |
| **Cube: TwoDimensionalShape: Shape** |
| - double m\_Edge |
| +Cube(double): constructor  +Area(): double  +ToString(): string |

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| **Circle: TwoDimensionalShape; Shape** |
| -double m\_Radius |
| +Cube(double): constructor  +Area(): double  +ToString(): string |

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| **Sphere: ThreeDimensionalShape: Shape** |
| -double m\_Radius |
| +Sphere(double): constructor  +Area(): double  +Volume(): double  +ToString(): string |

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| **Cube: ThreeDimensionalShape: Shape** |
| - double m\_Edge |
| +Cube(double): constructor  +Area(): double  +Volume(): double  +ToString(): string |

### TESTING

Scenario 1 – Basic test

Steps to test:

1. Start program
2. Read printed information from array. Note that inheritance is properly used, the write ToStrings are being printed and the Area and Volumes are being printed correctly.
3. Exit program

Expected reaction:

For the program to work as the steps say.

Actual result:

Expected reaction was actual result. Program works.

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