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| **Programming 2**  Diploma in IT / DS / CSF  Year 1 (2021/22) Semester 2 | Week **4** |
| **2 hours** |
| **Practical 4 : Inheritance (Advanced)** | |

**Objectives**

At the end of this practical, the students should be able to:

* write their own classes and subclasses
* use their own classes

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| **IMPORTANT**   * Create a folder, **week04.** * Create a new Console App (.NET Core) project, **Snnnnnnnn\_MyShapeApp**, in the **Week04** folder created above *(note:* ***Snnnnnnnn*** *is your Student Number)*. * At the end of the session, copy the folder **Week04** folder (which contains all your work) to PRG2 network folder: **\\ictspace.ict.np.edu.sg\PRG2**. |

**Advanced**

The class diagram for an application is given below.

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| **Circle** |
| -radius:double |
| +Circle()  +Circle(double)  +CalculateArea():double  +ToString():string |

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| **Cylinder** |
| -length:double |
| +Cylinder()  +Cylinder(double,double)  +CalculateArea():double  +CalculateVolume():double  +ToString():string |

1. Create a Console project **MyShapeApp** in Visual Studio 2019.
2. Implement the **Circle** class and add to the project.
3. Implement the **Cylinder** class and add to the project.
4. Write an Application program to do the following:

(a) create a circle (object), circle1, with radius = 5.0

(b) create a cylinder (object), cylinder1, with the following attributes:  
 radius:5.0, length:10.0

(c) display a simple menu as shown below:

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| ---------------- M E N U ----------------- [1] Change the radius of circle [2] Change the radius of cylinder [3] Change the length of cylinder [4] Display the area of circle [5] Display the surface area of cylinder  [6] Display the volume of cylinder [0] Exit ------------------------------------------ Enter your option : |

Process the option selected by the user as follows:

Option 1: Change the radius of circle

* *display current radius of the circle*
* *prompt user to enter the new radius*
* *set the radius of the circle to the new radius*

Option 2: Change the radius of cylinder

* *display current radius of the cylinder*
* *prompt user to enter the new radius*
* *set the radius of the cylinder to the new radius*

Option 3: Change the length of cylinder

* *display current length of the cylinder*
* *prompt user to enter the new length*
* *set the length of the cylinder to the new length*

Option 4: Display the area of circle

* *display the area of the circle*

Option 5: Display the surface area of cylinder

* *display the surface area of the cylinder*

Option 6: Display the volume of cylinder

* *display the volume of the cylinder*

Option 0: Exit

**Note**

* *You should implement methods where appropriate.*
* *You should implement and test ONE option at a time.*

**Plagiarism Warning:**

**If a student is found to have submitted work not done by him/her, he/she will not be awarded any marks for this practical. Disciplinary action may also be taken.**

**Similar action will be taken for student who allows other student(s) to copy his/her work.**