Lab Summary

Create a Universal Windows application that will allow the user to calculate the surface area and volume of various 3-dimensional shapes. The user should be able to choose what type of shape, and then have a way to enter the appropriate dimensions necessary to calculate the surface area and volume. See the table below for some examples of 3-D shapes, their required dimensions, and formulas to calculate the surface area and volume.

Shape	Dimensions	Formula for Surface Area (SA)	Formula for Volume (V)
Cuboid	Length (l), Width (w), Height (h)	SA = 2*l*w + 2*l*h + 2*h*w	V = l*w*h
Sphere	Radius (r)	SA = 4*π*r²	V = 4/3*π*r³
Cylinder	Radius (r), Height (h)	SA = 2*π*r*h + 2*π*r²	V = π*r²*h

Think about…

- How can the user choose a shape? Use images to help.
- How will the user know which dimensions they must provide for their chosen shape?
  - You could experiment with disabling inputs that are not required.
- In code, how will you decide which formula to use?
- How will you represent the mathematical constant Pi (π) and perform the exponential calculations required by some of the formulas?
- How will you display the results to the user?

Lab Requirements

You will submit your Universal Windows application.

Your app must include:

- At least 2 different shape options with accompanying correct surface area and volume formulas (you can choose from the list above, or use different shapes)
- Minimal input controls for entering shape dimensions, and a way for the user to select a shape
- A clear and helpful user interface that helps the user understand how to interact with the app
- Logically and syntactically correct code to respond to the user's actions and display the desired results
- **Methods** – one for each different volume/surface area calculation
  - Code must select and call the appropriate method to calculate the surface area and volume of the chosen shape.
  - Methods should return the resulting surface area and volume for given dimensions.
- Code should be commented, tabbed/formatted correctly, and well organized.
- Objects and variables should be named appropriately
  - Follow the naming conventions outlined in the document "Naming Conventions in C#" (found in Blackboard Course Documents)
  - XAML control names must include appropriate prefixes

Lab Submission

The due date for this lab is 11:59 pm on the day of **your first class after reading/break week**. Submit to the Lab 4 Blackboard link a ZIP (compressed file) consisting of the **entire folder** containing your Universal Windows Project and Solution File. The file name should be YourName_Lab4.zip

Grading Scheme

Task	Marks
User interface design	4
Variables and operators	4
Code logic and efficiency	4
Methods for Surface Area and Volume calculations	4
Code comments and organization	4
Total	**20 Marks**