OOP Practice Problems

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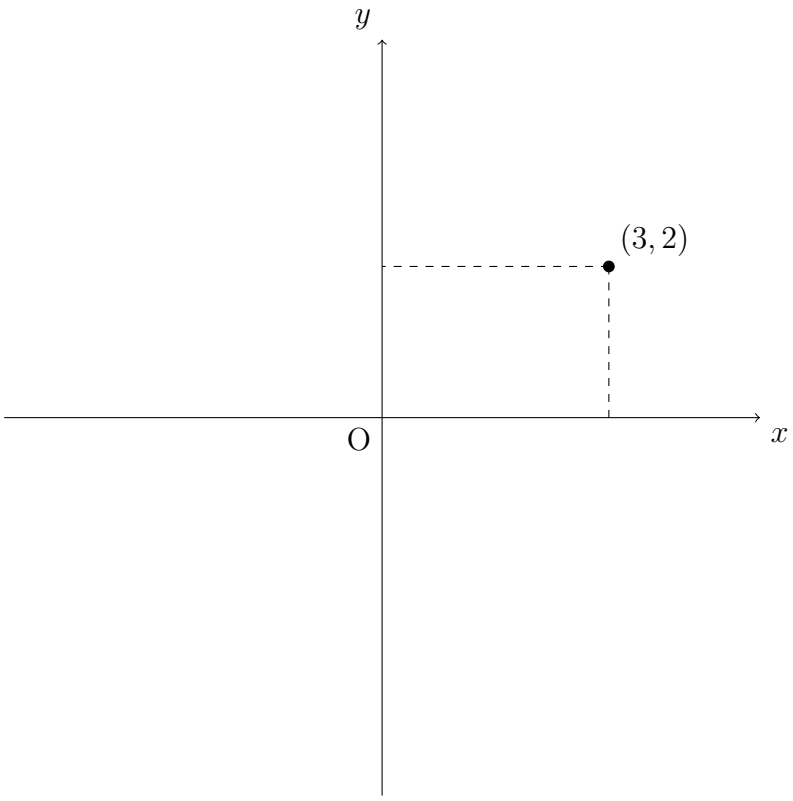
Inheritance, Polymorphism

Shape2D

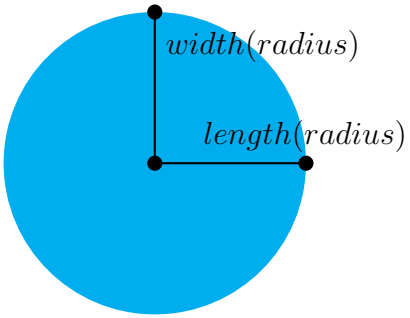


- Write a class named ***Shape2D*** having two member variables ***length(int)*** and ***width(int)***.
- Write a constructor with two parameters(length and width) that initializes all the variables.
- Write a method ***area()*** to calculate the area. [Hint: $length * width$]
- Write a method ***perimeter()*** to calculate the perimeter. [Hint: $2 * (length + width)$]

Rectangle

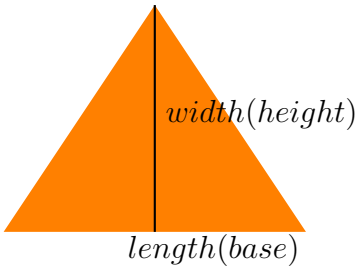
- Write a class ***Rectangle*** that inherits ***Shape2D***.
- Write a constructor that uses parent's constructor.
- Write a method ***area()***, if necessary.
- Write a method ***perimeter()***, if necessary.
- Write a method ***diagonal()*** to calculate the length of a diagonal.

Circle



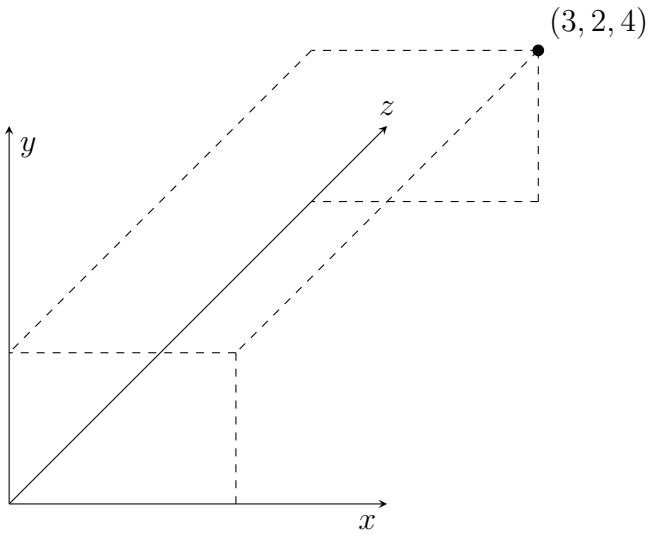
- Write a class ***Circle*** that inherits ***Shape2D***. Add member variables if needed. [Hint: $length = width = radius$]
- Write a constructor with one parameter(radius) that uses parent's constructor.
- Write a method ***area()*** that uses parent's ***area()*** method.
- Write a method ***perimeter()*** that uses parent's ***perimeter()*** method.

Triangle



- Write a class ***Triangle*** that inherits ***Shape2D***. Add member variables if needed. [Hint: $length = base, width = height$]
- Write a constructor with two parameters(base and height) that uses parent's constructor.
- Write a method ***area()*** that uses parent's ***area()*** method.
- Write a method ***perimeter()*** that uses parent's ***perimeter()*** method.

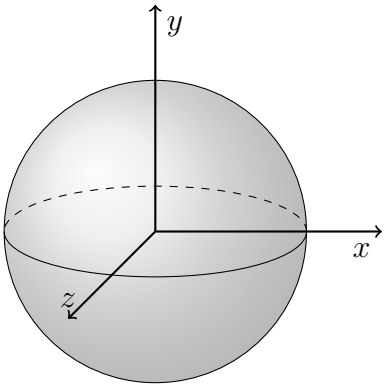
Shape3D



- Write a class ***Shape3D*** that inherits ***Shape2D***. Add member variables if needed(***height(int)***).

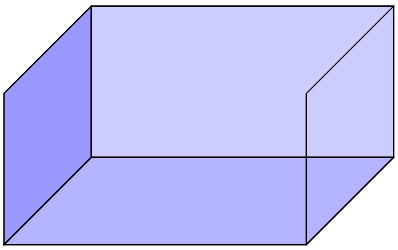
- Write a constructor with three parameters that uses parent's constructor.
- Write a method ***volume()*** that uses parent's ***area()*** method.
- Write a method ***surfaceArea()*** that calculates the total surface area of a 3d shape. [Hint: $2(l * w + w * h * h * l)$]

Sphere



- Write a class ***Shape3D*** that inherits ***Shape3D***. Add member variables if needed(***height(int)***).
- Write a constructor with one parameter that uses parent's constructor.
- Write a method ***volume()*** that uses parent's ***volume()*** method.
- Write a method ***surfaceArea()*** that uses parent's ***surfaceArea()*** method.

Cuboid



- Write a class ***Cuboid*** that inherits ***Shape3D***. Add member variables if needed(***height(int)***).
- Write a constructor with three parameters that uses parent's constructor.
- Write a method ***volume()*** that uses parent's ***volume()*** method.
- Write a method ***surfaceArea()*** that uses parent's ***surfaceArea()*** method.