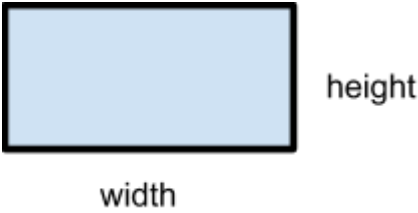
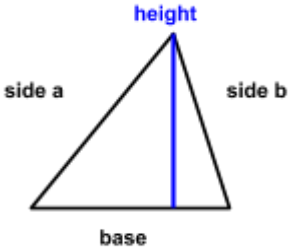
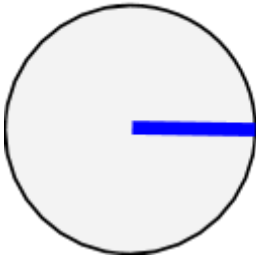
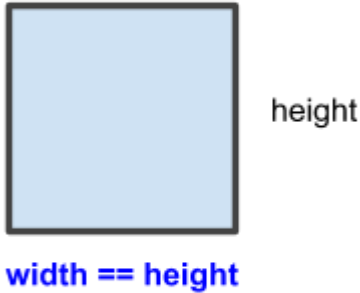


Lecture 12 - Abstract Classes - Exercise

<https://tinyurl.com/yxmu6htx>

You were hired to implement a program for NASA to study **images from other planets**. Your software **receives measurements** of a specific **shape**. All shapes must return its perimeter and its area. There are 4 different shapes:

| | |
|--|--|
|  <p>A light blue rectangle with a black border. The bottom side is labeled 'width' and the right side is labeled 'height'.</p> | <p>Rectangle:</p> <ul style="list-style-type: none">• Rectangles have a width and height.• Area: $\text{width} * \text{height}$• Perimeter: $(2 * \text{width}) + (2 * \text{height})$ |
|  <p>A triangle with a black border. The left side is labeled 'side a', the right side is labeled 'side b', and the bottom side is labeled 'base'. A vertical blue line from the top vertex to the base is labeled 'height'.</p> | <p>Triangle:</p> <ul style="list-style-type: none">• Triangles have a base, two sides and a height.• Area: $(\text{base} * \text{height}) / 2$• Perimeter: $\text{base} + \text{side A} + \text{side B}$ |
|  <p>A light gray circle with a black border. A horizontal blue line from the center to the right edge is labeled 'radius'.</p> | <p>Circle:</p> <ul style="list-style-type: none">• Circles have a radius.• Area: $\pi * (\text{radius})^2$• Perimeter (Circumference): $2 * \pi * \text{radius}$• Pi is a constant of value: 3.14• Diameter: $2 * \text{radius}$ |

| | |
|---|---|
|  <p>width</p> <p>height</p> <p>width == height</p> | <p>Square:</p> <ul style="list-style-type: none">• Squares are similar to rectangles, but require only one measure to create.<ul style="list-style-type: none">◦ Their width is equal to the height.• Diameter: same as rectangle• Area: same as rectangle |
|---|---|

1. Create the business logic for your system with all shapes above.
2. Notice that your software needs an Image Catalogue that can:
 - a. Register shapes
 - b. Calculate the area of all shapes
 - c. Calculate the perimeter of all shapes.
 - d. Find the shape with the highest area.
 - e. Find the shape with the highest perimeter.
3. Create a menu that asks the user to:
 - a. Specify a shape
 - b. Read measurements
 - c. Register the shape in the catalogue.