HW6 CS103 Fall 2019 Johnstone due: 11.20.19

HW6 is about exploring object-oriented programming, before you examine it in more depth in the next course CS203 (in Java), through building a circle class that inherits from a polygon class.
HW6 is also about using computational tools (e.g., scalar product, vector product) to help implement natural algorithms such as angle and area.

HW6 syntax tested

Only syntax developed already in lecture is necessary.

Deliverables

hw6_19fa103.py
hw6_tests_19fa103.py (with tests of your implemented methods)

Honor code

Violations of the UAB Academic Honor Code will be dealt with seriously and aggressively, becoming part of your permanent UAB record. No collaboration is allowed on this homework. No use of internet resources for coding are allowed on this homework, except the official Python documentation and your Canvas materials.

Although no coding help is allowed, you are allowed to explore mathematical texts in the library for solutions of the computational tasks (e.g., convexity of a polygon), although the more subtle material will be discussed in lecture. If you need to use mathematical texts, you should reference any useful information in the relevant docstring. (This type of research is viewed as a positive, not a negative.)

You should digitally sign the honor code statement at the top of hw6_19fa103.py.
If you cannot in good conscience sign it, you should not hand in this homework.

HW6 problems

You are to implement the methods in the attached script hw6_19fa103.py.
You should test these methods in hw6_test_19fa103.py.

In particular,

1. Build a class for polygons in 2-space, with the name Pol and the following methods:

    - __init__
    - __str__
    - perimeter
    - avgEdgeLength
    - angle (at a vertex; use the interior angle)
    - (bonus) isSimple
    - (bonus) isConvex

Note: a polygon consists of a list of vertices, ordered around the polygon.

2. Build a class for triangles in 2-space that inherits from the polygon class, with the name Tri and the following methods:

    - __init__
    - __str__
    - getColour
    - isEquilateral
    - signedArea
    - isCCW
    - (bonus) centroid
    - (bonus) circumCenter ()

Note: each vertex has a position and a colour.