

Advanced Programming (CSE 399)

Homework Assignment 1

Due Sunday, January 16, at 10PM

1. Create a file `hw1.hs` containing the definitions of the `Shape` datatype and the functions over shapes from Chapter 2 of SOE. Test these definitions with the Hugs interpreter.
2. Define functions `rectangle` and `rtTriangle`, as suggested at the end of Section 2.1 of SOE. Each should return a `Shape` built with the `Polygon` constructor.
3. Write a function `sides :: Shape -> Integer` that returns the number of sides in a given shape. For purposes of this problem, you should assume that an ellipse has 42 sides.
4. Write a function `bigger :: Shape -> Float -> Shape` that takes a shape `s` and an expansion factor `e` and yields a new shape that is the same as `s` except bigger by a factor of `e`.
5. Implement the alternate algorithm for calculating areas of polygons described in Exercise 2.5 in SOE. Call your new function `area`.

You may assume that only polygons with positive coordinates will be presented to your algorithm.

Submission instructions:

- Collect your solutions into a *single file* of Haskell source code, making sure that this file contains definitions for functions named `rectangle`, `rtTriangle`, `simple`, `bigger`, and `area`.
- Make sure this file is accepted by Hugs without errors and follows the other rules in the Style Guide on the course web page.
- Email this file to `bcpierce@cis.upenn.edu` before the deadline.