**CS 4322 – Coding Assignment 5**

You can work individually or in a group of two for this assignment.

**Problem**

(75 points) Design a system to model one-dimensional, real-valued functions using the decorator pattern as discussed in class. Your design should handle functions of any complexity that utilize: arithmetic operations, exp, square, square root, power, sin. All classes must be immutable.

For additional points add some of these capabilities:

1. (5 points) Round decorator that rounds a value to a specified (in constructor) number of decimal places.
2. (5 points) Combination decorator, $f\left(x\right)=\left(\begin{matrix}n\\x\end{matrix}\right)$. An exception should be thrown if *x* is invalid. See:
3. (5 points) A piecewise decorator composed of two pieces. Note: you will also need a way to specify the domain for each piece. You should probably use a Boolean to indicate if a domain boundary is exclusive or inclusive, *i.e.* $x<c or x\leq c$*.*
4. (5 points) Max decorator that operates on two functions
5. (5 points) Max decorator that operates on any number of functions. If doing this requirement, you should have one decorator that works for both this requirement and requirement 4, using different constructors to handle the two cases.

**Requirements:**

1. Provide a write-up explaining:
2. Your design which includes a class diagram(s).
3. What works and what doesn’t and which additional requirements you implemented.
4. Time Log(s)
5. Write the code including a tester

**Final Deliverables**

Zip (or Rar) the items described above into a file named: *ca5\_lastName1\_lastName2.zip* and submit on Blazeview. Please only submit once, under one person’s account if working in a group.

**Time Log**

If working in a group, submit a single timelog ONLY if you worked face-to-face for the entire assignment; Otherwise submit one for each member (copy table below).

* **Delete empty rows, add if needed.**
* **Put the total time at bottom.**

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