

Symbolic Derivatives

CSCI 112, Lab 9

File names: Names of files, functions, and variables, when specified, must be EXACTLY as specified. This includes simple mistakes such as capitalization.

Individual work: All work must be your own. Do not share code with anyone other than the instructor and teaching assistants. This includes looking over shoulders at screens with the code open. You may discuss ideas, algorithms, approaches, *etc.* with other students but NEVER actual code. Do not use code written by anyone else, in the class or from the internet.

Documentation: Each file should begin with a docstring that includes your name, the class number and name, the lab number, and a short description of the lab, as well as documentation pertinent to that particular file.

The project: Write a function that takes a parse tree for a mathematical expression and calculates the derivative of the expression with respect to some variable.

Symbolic derivatives: In calculus class we learned several rules for derivatives. For example, where A and B are arbitrary expressions involving x , and c is an arbitrary constant:

$$\frac{d}{dx}c = 0$$

$$\frac{d}{dx}cx = c$$

$$\frac{d}{dx}(a^n) = \left(\frac{d}{dx}a\right)na^{n-1}$$

$$\frac{d}{dx}(a+b) = \frac{d}{dx}a + \frac{d}{dx}b$$

$$\frac{d}{dx}(ab) = (b)\frac{d}{dx}(a) + (a)\frac{d}{dx}(b)$$

File names: Call your module `derivative.py`, your unit test module `derivative_test.py`, put them in a folder called `csci112lab09yourname`, zip and turn into canvas.