Assignment #1

CS 4600.01

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****Note**: For this assignment, I initially decided to do this project using C++. I spent about a week trying to learn how to accomplish this. I ended up deciding not to use C++ and instead use Python. The reasoning for this is because we will be using Python in my Machine Learning class and figured this would be a good project to get me started in using that language. This is why I had given two rough estimates instead of one.

Rough Estimate:

- For C++, I figured around 4 hours to really dive into the different ways to set up a GUI. There were around "35" different libraries that people have suggested to use.
- For Python, I figured around 2 hours since I didn't spend much time researching and instead just chose one that many recommended, which was the tkinter library.

Time Spent:

- September 18, 2022 - Requirements, Analysis, Design
  - ~1 hour researching different ways to build a GUI application in Python. Chose tkinter as it seemed easy and was recommended by many.
- September 19, 2022 - Development
  - ~30 minutes coding the GUI window and buttons (Front-end only)
- September 20, 2022 - Development, Testing
  - ~30 minutes coding the function of the buttons (Back-end)
  - ~10 minutes checking the functionality of the program (checking each button works correctly and that the program correctly evaluates the expression)
- September 22, 2022 - Development, Design, Testing
  - ~30 minutes to rearrange the Decimal, Clear, and Equals button to a new bottom row. I did this to add Parenthesis to my calculator.
  - ~10 minutes to test the functionality after adding the parenthesis. Noticed my first 'bug' in my program. Not a true 'bug' but an unintended consequence of using Pythons built-in library to evaluate string expressions.

Record of Bugs:

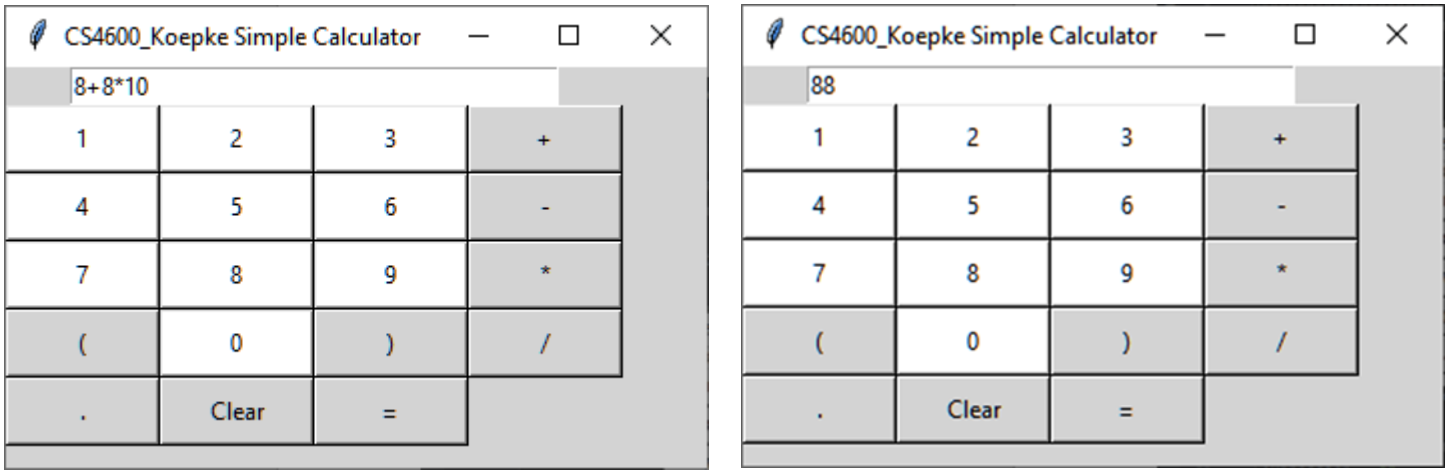
- The only bug I found was after inserting the buttons and functionality for parenthesis. Its not a bug in the sense that it does not work as intended but in that I assumed that the evaluate function in Python would evaluate an express like 8(8+2) to equal 80. The function would fail and produce an error. From my understanding, the evaluate function would use the parenthesis to evaluate what is inside of them but that the parenthesis themselves do not act as a multiplication operation as it would if we were to evaluate that expression ourselves.

Comparison of rough estimate to actual time spent:

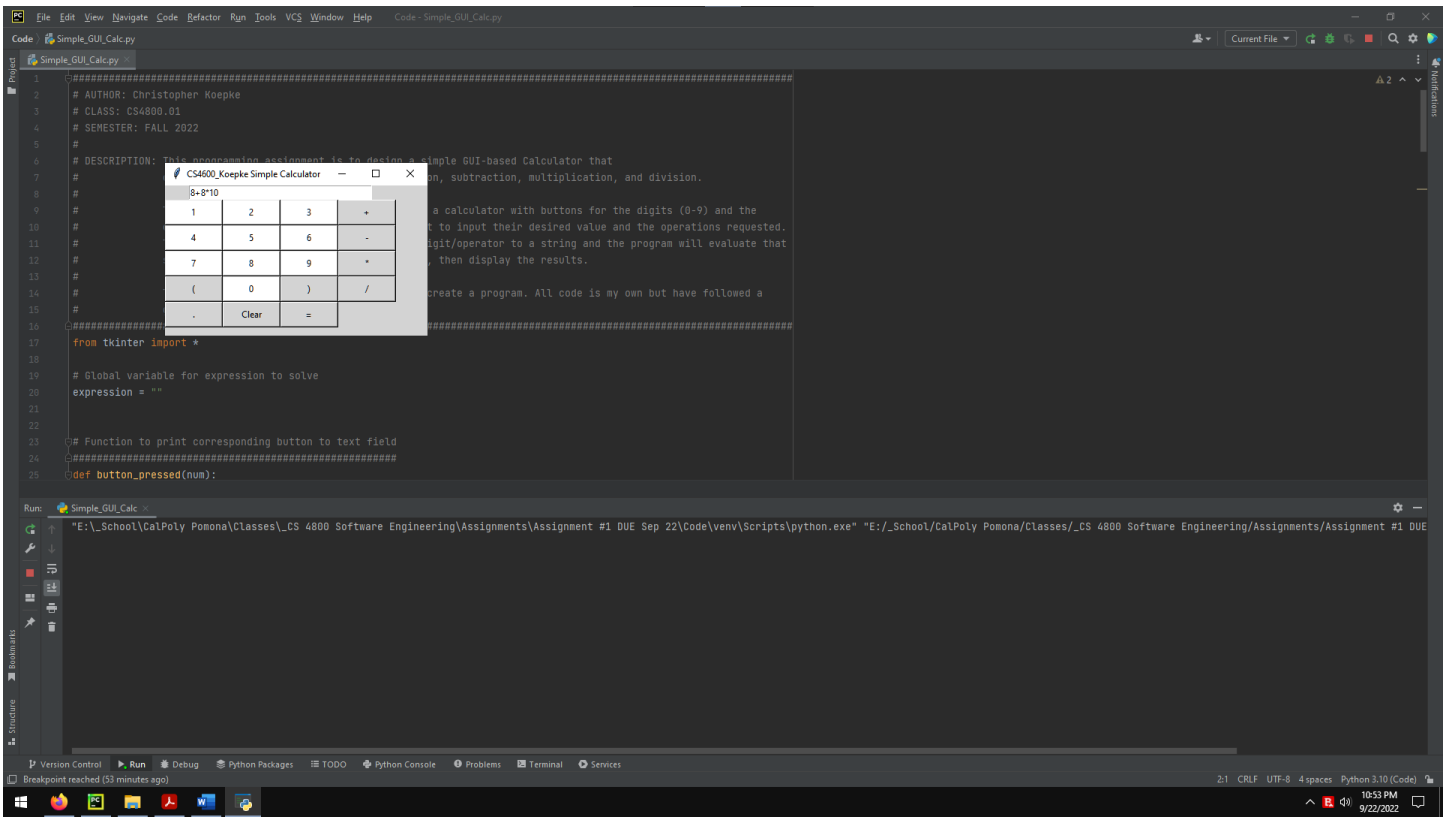
- My rough estimate is actually close to my actual time spend on this assignment. I realize that my actual time spent is greater than my estimate but that is because I spent more time reworking my GUI to try and get everything aligned and later adding the buttons and functionality of the parenthesis. If I developed my program without the parenthesis than my rough estimate and actual time spent would be about the same. I could have spent more time researching the different ways to build a GUI application in Python but my decision to switch from C++ to Python the week before this assignment was due put pressure on myself to complete it quickly.

Screenshots of the working program and 'bug':

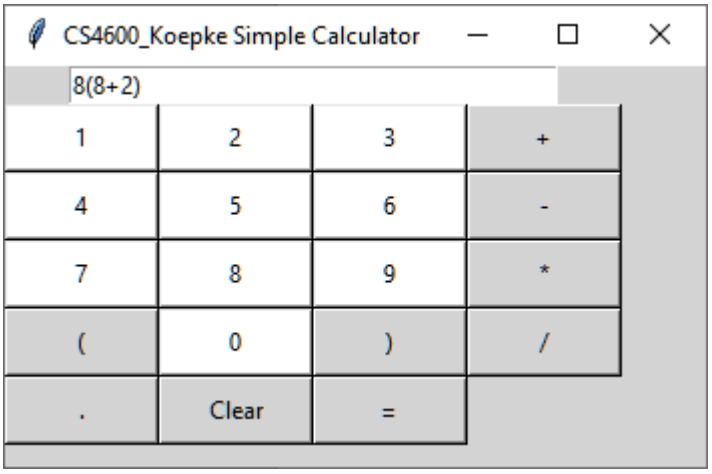
Screenshot of an expression and its evaluation after clicking the 'equals' button.

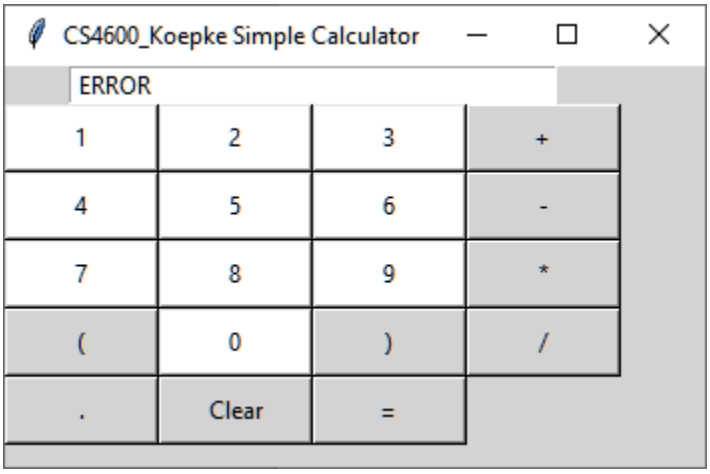


Screenshot of the above Calculator and the Pycharm IDE.



Screenshot of the ‘bug’ when using parenthesis in an expression.





Screenshot of the correct use of parenthesis in my program.