Revising Code: the QuadTree Example

Due to Github and mycourses: 10/7/2019

Goals: To practice some of the concepts from the course when revising a program to run better.

Steps:

1. Make sure you have a GitHub account that is set up for the submission of code. Follow these steps:
    a. Create or use an existing github.com account
    b. Make a repo called dataOrientedSeminar
    c. Make the repo private and add profjdbayliss as a collaborator
    d. Submit the name of your github account to mycourses so that I can tell who you are.
2. Download the C/C++ project for this assignment from mycourses. NOTE: the dll's for openGL are already included in the Debug directory for the project for you along with shader files. These files need to be copied to the Release directory when you compile in Release mode as they are necessary for the program to run.
3. Change the program to run better given what you've learned in the course so far. Make sure to profile your code to tell where the problematic parts are. You may completely change the code, but you may not remove the quad tree from the code. Please:
    a. Fix any errors or stupid pieces of code in the program (there is at least one thing in this code that doesn't need to be there and is costly).
    b. Potentially use memoization. This means that if a value has been calculated before, then cache the results if it's being calculated multiple times.
    c. Make sure that the program is making a good use of the cache.
    d. Look at the structure of the program and re-structure basic parts of it for better performance. Remember how the array of structures tends not to be as good for performance as a structure of arrays.
    e. You may use things that you have learned outside of this course to make the program run better.

4. Do a performance analysis each time you change the code for the steps above. Whenever you have a before and then after, make sure to submit it as a version onto GitHub. This makes before/after profiling a lot easier.

5. Write and submit a document about how the performance changes to mycourses with the following features:

    a. Your Name

    b. How you fixed the code. Specifically, for each element that was wrong:

        i. What was wrong with the performance in terms of the code?

        ii. What did you do to fix the problem?

        iii. What is the new performance? Note: pictures are helpful

    c. This is a very bad example of a quad tree because the tree isn't necessary in the code. What would you do to change the program so that the quad tree is necessary?

    d. Any questions or problems you had for this assignment that could potentially be addressed in class.