CS 366
Assignment #8
Profile

**Goal**
Due 5/1/17, in class

The goal of this assignment is to study the execution time of a multi-threaded Mergesort with the help of the profiler `gprof`.

**Problem Statement**
To experiment with the execution time requires collecting data using a range of values for the parameters that effect the timing, and then presenting the data “nicely.” The parameters to consider include the number of threads, the size of the array being sorted, and the hardware (e.g., the number of CPU cores available). You will need to consider sufficient parameter combinations to enable you to uncover interesting trends. While not required, visually an example graph might have time on the y-axis, the number of threads on the x-axis, and array size on the z-axis. You should include whatever visualizations you think best shows off patterns in the data.

In addition to the external time taken, with the help of a profiler such as `gprof` you can also examine the time taken by the individual functions that make up your code. To differentiate the merging done as part of the initial sorting of each chunk and that done to combine sorted chunks, create a clone of your `merge()` function, named `merge_combine()`, and then use this clone to combine the sorted chunks. Over a range of configurations compare and contrast the function(s) that dominate the run time.

To summarize, for each set of parameters run your code three times: first with memwatch and the `qsort` comparison to help ensure correct operation, then turn off memwatch and the `qsort` comparison to produce the external timing data, and finally turn on profiling to collect internal (function-level) timing information.

**What to hand in** (Please no .docx files.)

1. A well-formatted printout of your data analysis.
2. An updated Assignment 7 GitHub repo that includes your updated source code and a copy of your data analysis (include the raw data and the final report).

**Assignment Notes**
- A primer on `gprof` can be found at http://web.eecs.umich.edu/~sugih/pointers/gprof_quick.html
- The git classroom invitation is the same as Assignment 7.