

During the in lab, we were asked to check our output with the standard outputfile. After a few reformatting (lineament and spacing) on the cout statement, the implementation I wrote matches the result. For the -O2 optimization, I realized that the runtime becomes much faster as the file size increases. Sometimes the differences can be almost 10 seconds with and without the -O2 flag.(which is almost half of the original run-time). For the 250x250 grid file with words.txt, the average runtime is 4959 milliseconds while for the words2.txt and the 300x300 grid is 1629 milliseconds (The result is from my own laptop which is a 64 bit computer). Because the program is influenced by both the row, columns, and words sizes, the big-Theta notation for the program should be  $(r*c*w)$  while other factors are constant. When implementing the lab, the hardest part is to understand how to open up and read the file in the wordPuzzle.cpp file. I did learn a lot about shell scripting, it is much efficient to save me a lot of work and its flexibility can be implemented into various other codes.