```
/*************************************************************
* Class:  CSC-415-0# Spring 2020
* Name: Wameedh Mohammed Ali
* Student ID: 920678405
* Project: Assignment 4 - Word Blast
*
* File: MohammedAli_Wameedh_HW4_main
*
* Description: Counting all the words that are 6 or more characters long. We will only use Linux
file functions, i.e. open, close, read, lseek.
*
*************************************************************/
```


On Mac:
> Cloned the repo from github.
> Created MohammedAli_Wameedh_HW4_main.c
> Added the makefile.

For this assignment I tried to first write down an outline of the program and what function it would need to be created. Below is what I did:

> Functions we need to write:
> > Function that creates a function that opens the file and reads it by chunks.
> > > Function that scan through each chunk and update our data structure
> > > - Use strtok_r
> > > - Take care of the critical section.
> > > - When reading the file, it needs to count a word that is 6 characters or longer.
> > > - Keep a counter for that word to get its frequency

> Create a struct array containing variables needed to store each thread:
> > thread ID

> Create an init function that initializes each thread:
> > pthread_create()

> Create a function that waits for all threads to terminate when their finished:
> > pthread_join()

> The main should print the top ten words and the # of times that word appears in the text.

I worked in implementing Mutex to protect the critical section. I created multi threads processes. Each thread would a chunk of the text file then parse it and save or update words in an array of "word" structs that was implemented in the program.

Using one thread would take a longer process time than 2 threads, 4 threads and 8 threads. The more the threads the faster the process.

Issues I have faced:

- On my mac when I test for 4 threads I get a run time about 1.4 seconds. If I use less threads the process gets slower however if I go higher than 4 the run time never gets faster than 1.4 seconds.
- On Linux the same issue but the max I can use is 2 threads if I use more than that, no change in run time speed. It will always be the same.

- Lastly, my results are close to the results that were presented in class however some words have the wrong count of frequency. Even if I rerun the program the same exact words would have the wrong number of frequencies.

Committed and pushed to github.

Testing on Linux:
    Cloned the repo from github.

    Run:
        `make run`
    Output: Next page!

One thread:

Two threads:

Four threads:


```
student@student-VirtualBox: ~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh

File  Edit  View  Search  Terminal  Help
student@student-VirtualBox:~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh$ make run
./MohammedAli_Wameedh_HW4_main WarAndPeace.txt 4

Number 1 is Pierre with a count of 1963.

Number 2 is Prince with a count of 1577.

Number 3 is Natásha with a count of 1212.

Number 4 is Andrew with a count of 1143.

Number 5 is himself with a count of 1017.

Number 6 is French with a count of 881.

Number 7 is before with a count of 779.

Number 8 is Rostóv with a count of 776.

Number 9 is thought with a count of 766.

Number 10 is CHAPTER with a count of 730.
Total Time was 1.877508530 seconds
student@student-VirtualBox:~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh$
```

8 threads:


```
student@student-VirtualBox: ~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh

File  Edit  View  Search  Terminal  Help
student@student-VirtualBox:~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh$ make run
./MohammedAli_Wameedh_HW4_main WarAndPeace.txt 8

Number 1 is Pierre with a count of 1963.

Number 2 is Prince with a count of 1577.

Number 3 is Natásha with a count of 1213.

Number 4 is Andrew with a count of 1143.

Number 5 is himself with a count of 1017.

Number 6 is French with a count of 881.

Number 7 is before with a count of 779.

Number 8 is Rostóv with a count of 776.

Number 9 is thought with a count of 766.

Number 10 is CHAPTER with a count of 730.
Total Time was 1.646498581 seconds
student@student-VirtualBox:~/Desktop/CSC415/HW/assignment-4-word-blast-Wameedh$
```