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Assignment 4 – Word Blast

Description:
This assignment is to write a C program that will let me experience using Linux file functions such as open, close, read, lseek, and pread. In this project, I created a program that will read words that are 6 or more characters long from a file. It also takes a parameter from the command line that will dictate how many threads will be created and used to read chunks from the file. Then it will report the total time it took to process the file.

Approach / What I Did:

The assignment was really challenging because it involved files. I never had any prior experience with c, let along using files in my program. The project was mostly exploring Lix file functions and how they work. I also had to explore and read a lot about Mutex and how it works in my program.
The approach I did was I first visualized how I would potentially tackle the assignment. I started by creating my functions first and I created them as I would need them in my code. My process was a bit confusing and involved a lot of scrolling from my main function to my other functions. After a few hours of going back and forth, and reading things as I go, I was able to complete the project with all its requirements.

Issues and Resolutions:

One of the biggest issue that I had working on the project is the implementation of my mutex. At first it didnt work, and it stayed like that for a couple hours. I had to find a way to properly implement my mutex. My first solution to my initial problem was to expand the scope of my mutexes hoping it would eventually fix my problem. So instead of keeping it small, I increased the scope by bringing it out of my ifs and else statement. Although that allowed my program to run, it took a toll by slowing down my processes.
After finding other way to potentially solve my processing problem, I revisited how I defined my mutex and figured out that I was defining it wrong. I tried a new way that I read from a book, which unfortunately I don't remember what book, but after trying that way, it finally worked.

I had to re assemble my code how I initially had it before trying to increase the scope of my mutex. And as soon as I got it to what I had before, the processing time got way better than what I was getting before.

Analysis: (If required for the assignment)

Screen shot of compilation:

```
ejay@The-Kraken:/mnt/c/Users/EJ Cenario/Desktop/assignment-4-wordblast-kurtina09$ make
gcc -c -o cenario_edeljhon_HW4_main.o cenario_edeljhon_HW4_main.c -g -I.
gcc -o cenario_edeljhon_HW4_main cenario_edeljhon_HW4_main.o -g -I. -l pthread
```

Screen shot(s) of the execution of the program:

```
ejay@The-Kraken:/mnt/c/Users/EJ Cenario/Desktop/assignment-4-wordblast-kurtina09$ make run
./cenario_edeljhon_HW4_main WarAndPeace.txt 2


Word Frequency Count on WarAndPeace.txt with 2 threads
Printing top 10 words 6 characters or more.
Number 1 is Prince with a count of 1867
Number 2 is Pierre with a count of 1779
Number 3 is Natásha with a count of 1061
Number 4 is Andrew with a count of 1026
Number 5 is himself with a count of 1011
Number 6 is French with a count of 873
Number 7 is Princess with a count of 869
Number 8 is before with a count of 821
Number 9 is thought with a count of 763
Number 10 is CHAPTER with a count of 732
Total Time Was 1.577521600 seconds
```

```
ejay@The-Kraken:/mnt/c/Users/EJ Cenario/Desktop/assignment-4-wordblast-kurtina09$ make run RUNOPTIONS="WarAndPeace.txt 4"
./cenario_edeljhon_HW4_main WarAndPeace.txt 4


Word Frequency Count on WarAndPeace.txt with 4 threads
Printing top 10 words 6 characters or more.
Number 1 is Prince with a count of 1867
Number 2 is Pierre with a count of 1779
Number 3 is Natásha with a count of 1061
Number 4 is Andrew with a count of 1026
Number 5 is himself with a count of 1011
Number 6 is French with a count of 873
Number 7 is princess with a count of 869
Number 8 is before with a count of 821
Number 9 is thought with a count of 763
Number 10 is CHAPTER with a count of 732
Total Time Was 0.911215000 seconds
```

```
ejay@The-Kraken:/mnt/c/Users/EJ Cenario/Desktop/assignment-4-wordblast-kurtina09$ make run RUNOPTIONS="WarAndPeace.txt 8"
./cenario_edeljhon_HW4_main WarAndPeace.txt 8


Word Frequency Count on WarAndPeace.txt with 8 threads
Printing top 10 words 6 characters or more.
Number 1 is Prince with a count of 1867
Number 2 is Pierre with a count of 1779
Number 3 is Natásha with a count of 1061
Number 4 is Andrew with a count of 1026
Number 5 is himself with a count of 1011
Number 6 is French with a count of 873
Number 7 is princess with a count of 869
Number 8 is before with a count of 821
Number 9 is thought with a count of 763
Number 10 is CHAPTER with a count of 732
Total Time Was 0.588293400 seconds
```

```
ejay@The-Kraken:/mnt/c/Users/EJ Cenario/Desktop/assignment-4-wordblast-kurtina09$ make run RUNOPTIONS="WarAndPeace.txt 16"
./cenario_edeljhon_HW4_main WarAndPeace.txt 16


Word Frequency Count on WarAndPeace.txt with 16 threads
Printing top 10 words 6 characters or more.
Number 1 is Prince with a count of 1867
Number 2 is Pierre with a count of 1779
Number 3 is Natásha with a count of 1061
Number 4 is Andrew with a count of 1026
Number 5 is himself with a count of 1011
Number 6 is French with a count of 873
Number 7 is princess with a count of 869
Number 8 is Before with a count of 821
Number 9 is thought with a count of 763
Number 10 is CHAPTER with a count of 732
Total Time Was 0.486506300 seconds
```