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COSC 3346 Assignment 3

Time: I lost track of the exact number but around 18 hours

Part 1:

I solved the problem by creating processes. I then created the threads. I then executed these by creating a function for each vowel, digit, other and calling them based on the input. Then executed the program entirely for different file inputs. I also set values so global values and used mutex where needed, such as the filetypes. The assumptions that I made were to count the number of vowels, digits, others in the filename. Then use this count and multiply by the byte size for each one, so for digits it would be an int which is four and the others I assumed char which is one. I then used this value of the number of bytes.

Part 2:

```
[dsubnaik@bane assignment3]$ ./lineagedp -v ~sking/tmp/COSC4348/A3/e6/fred18/20 ~sking/tmp/COSC4348/A3/e6/fred18/20/zzz.dat
/home/faculty/sking/tmp/COSC4348/A3/e6/fred18/20
vowel thread PID:675266 tid:139671745066560 (0x7f07dcbff640) bytesthisfile:0 bytesso far:0
digit thread PID:675266 tid:139671736673856 (0x7f07dc3fe640) bytesthisfile:8 bytesso far:8
other thread PID:675266 tid:139671728281152 (0x7f07dbbfd640) bytesthisfile:0 bytesso far:8
vowels:
  bytes used:0
  typecount:
    directory 1
digits:
  bytes used:8
  typecount:
    directory 1
others:
  bytes used:0
  typecount:
    directory 1
total:
  bytes used:8
  typecount:
    directory 3
/home/faculty/sking/tmp/COSC4348/A3/e6/fred18/20/zzz.dat
vowel thread PID:675267 tid:139671745066560 (0x7f07dcbff640) bytesthisfile:1 bytesso far:1
digit thread PID:675267 tid:139671736673856 (0x7f07dc3fe640) bytesthisfile:0 bytesso far:1
other thread PID:675267 tid:139671598265920 (0x7f07d3fff640) bytesthisfile:6 bytesso far:7
vowels:
  bytes used:1
  typecount:
    regular 1
digits:
  bytes used:0
  typecount:
    regular 1
others:
  bytes used:6
  typecount:
    regular 1
total:
```

```

        directory 3
/home/faculty/sking/tmp/COSC4348/A3/e6/fred18/20/zzz.dat
vowel thread PID:675267 tid:139671745066560 (0x7f07dcbff640) bytesthisfile:1 bytesso far:1
digit thread PID:675267 tid:139671736673856 (0x7f07dc3fe640) bytesthisfile:0 bytesso far:1
other thread PID:675267 tid:139671598265920 (0x7f07d3fff640) bytesthisfile:6 bytesso far:7
    vowels:
        bytes used:1
        typecount:
            regular 1
    digits:
        bytes used:0
        typecount:
            regular 1
    others:
        bytes used:6
        typecount:
            regular 1
    total:
        bytes used:7
        typecount:
            regular 3
[dsbnaik@bane assignment3]$

```

I had to use 2 screenshots to display the total for the second file.

I did testing when developing this code. When testing I generally try to test throughout and not all at once. The first part that I did to test was make sure I can enter multiple file arguments. I did this by entering the ./lineagedp command and tested multiple input and displayed this back to myself by using a loop. I also always test that makefile is set up correctly with a simple “Hello World” statement. The next part that I tested was being able to display the content in the proper format. This was relatively easy as the function was provided for us. I would pass test values and made sure it was displayed correctly. The next part that I tested was the I was counting the digits, vowels, others correctly. This was done by a simple printf line. I also did test making sure the total was calculated correctly. I tested the filetypes by using the file command followed by the file and when I ran my program I made sure that it matched and was correct. I ran this below

```

[dsbnaik@bane ~]$ file ~/sking/tmp/COSC4348/A3/e6/fred18/20
/home/faculty/sking/tmp/COSC4348/A3/e6/fred18/20: directory

```

The next part that I had to test was making sure that everything was displayed correctly in the write order. This took a little because it was a challenging to code but I had to make sure that it was in order as in the assignment so it went in vowel, digit, other then total. I had to make sure that part was done correctly by passing and calling the command at the right time. The last part that I had to test was the -v option being passed. I got this to display when it was in execution. I also unintentionally tested invalid input for a file that did not exist and that worked too. I did this by typing the wrong file name into input.

Problems/solutions:

The first issue that I ran into was the total not being correct. This was caused by using proper logic when updating as that variable was updated my multiple parts of the program.

I fixed by redoing my logic on mutex. The next issue that I ran into was getting it to display in the vowel-digit-other-total format. Every time I was running the code I was getting it in a different order. I had to fix this by doing printf statements to trace where I was going wrong and then I figured when to call the function to display it. The last part that I had to fix was when I had to display the path. This part is funny because I tried to get ChatGPT to do it but it couldn't, so I traced the code and implemented the printf statements in the proper spot to display the path.

Sources:

I used the sources below and chatgpt to get a basis for what implementation and used chatgpt to debug where I needed to at times.

<https://www.geeksforgeeks.org/command-line-arguments-in-c-cpp/> (command line input)

<https://www.geeksforgeeks.org/thread-functions-in-c-c/> (implementing threads)

<https://stackoverflow.com/questions/6990888/c-how-to-create-thread-using-pthread-create-function> (creating threads)

<https://www.geeksforgeeks.org/mutex-lock-for-linux-thread-synchronization/> (using mutex)

<https://chatgpt.com/share/67da2ebe-df1c-8010-b800-c58d71ba0dac>

<https://chatgpt.com/share/67da2f0c-d014-8010-8e09-ee1855ca7582>

<https://chatgpt.com/share/67da2f8a-a414-8010-9413-7d492894f6ae>

<https://chatgpt.com/share/67da2fd8-a0c8-8010-9bb4-d3cfbec81f6a>

<https://chatgpt.com/share/67da302d-86e0-8010-a1af-a84be43c58c7>

<https://chatgpt.com/share/67da3131-d26c-8010-852f-076420e02571>

<https://chatgpt.com/share/67da3157-2e94-8010-9da4-edc2d6c3f2a2>

<https://chatgpt.com/share/67da321f-aafc-8010-9bf8-a4fffd006345>

<https://chatgpt.com/share/67da3294-6d54-8010-9cbf-448741c83e4c>