

Lab 1

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(1) How the code is organized:

The Main File is (matmult.c) in which the program :

- ➔ open the file given from the user or open the default one.
- ➔ extract the dimension from the file which is should be in this format
(row=xx col=yy)
- ➔ read the matrix from the files.
- ➔ start the first method following by the second one.

(2)The Main Functions:

● **method1:**

- ✓ This function generates array of threads (size of array equals to number of rows of the first matrix).
- ✓ Each thread will call a function to calculate the elements of the row.
- ✓ The index of the thread in the array is the number of the row it executed .
- ✓ The answer is filled in an matrix after joining each thread and then the matrix will copied to a file.

● **Method2:**

- ✓ This function generates array of threads (size of array equals to number of rows of the first

matrix * number of columns of the second matrix).

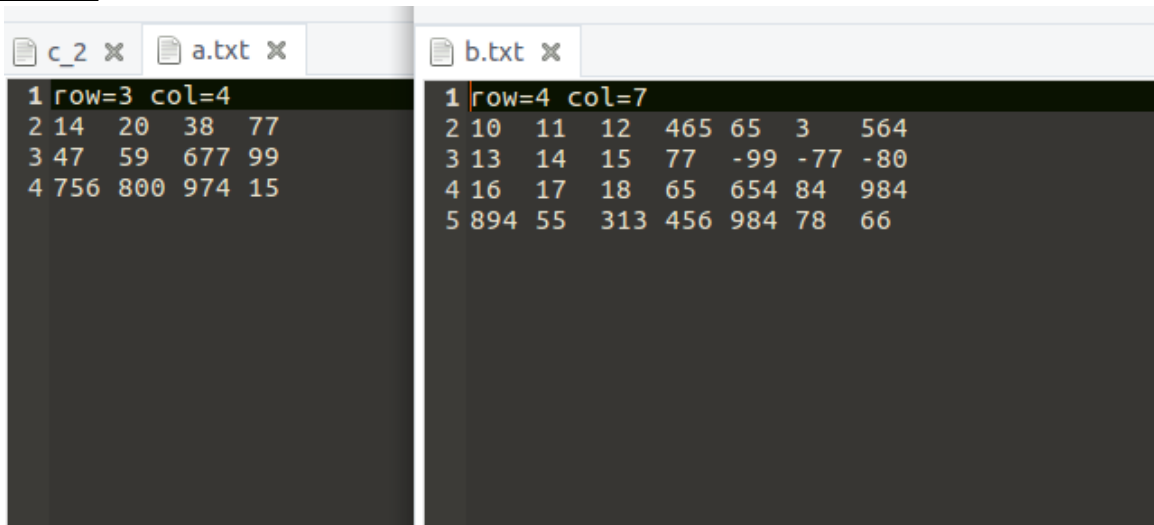
- ✓ Each thread will call a function to calculate an element in a given row and column.
- ✓ Information about the element is passed in a struct.
- ✓ The answer is filled in an matrix after joining each thread and then the matrix will copied to a file.

(3)How to compile:

Simply after changing the directory to project directory , you will type in terminal (make) then after compiling type (./matmult) and if the matrices are in different directory then write their path and write a name to the output file (which will generated in the same folder of the project) else if the matrices in the same file they should be named a.txt and b.txt for input matrices A and B, respectively

(4)sample run:

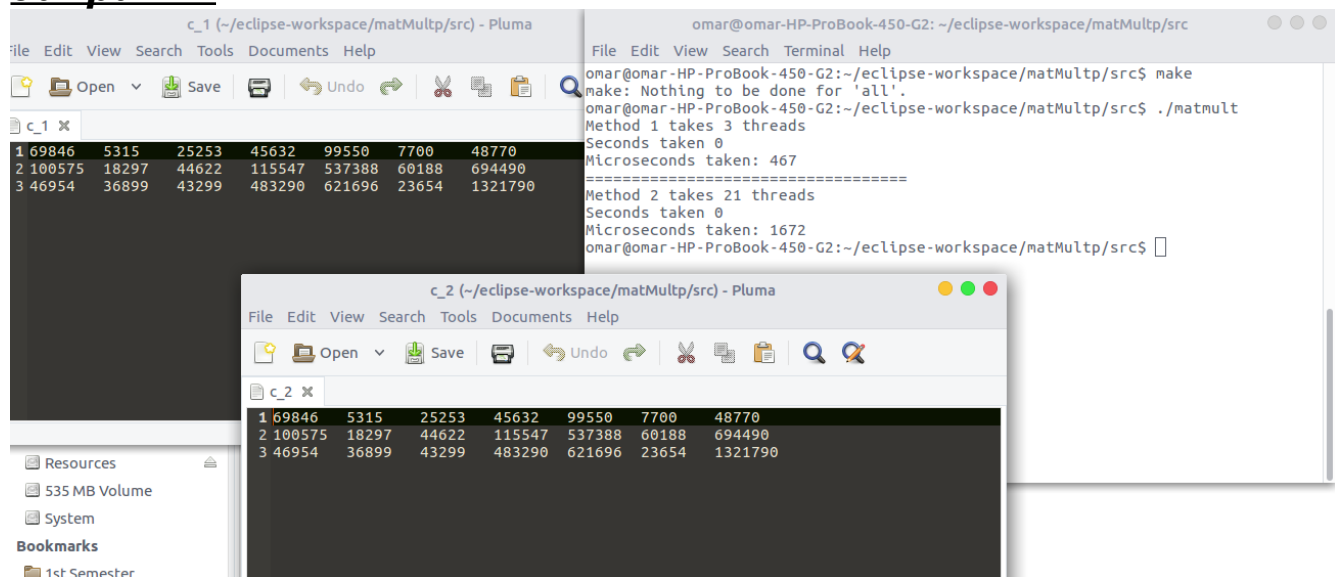
Input: -



```
c_2 x a.txt x b.txt x
1 row=3 col=4
2 14 20 38 77
3 47 59 677 99
4 756 800 974 15

1 row=4 col=7
2 10 11 12 465 65 3 564
3 13 14 15 77 -99 -77 -80
4 16 17 18 65 654 84 984
5 894 55 313 456 984 78 66
```

Output: -



```
c_1 (~/.eclipse-workspace/matMult/src) - Pluma
File Edit View Search Tools Documents Help
c_1 x
1 69846 5315 25253 45632 99550 7700 48770
2 100575 18297 44622 115547 537388 60188 694490
3 46954 36899 43299 483290 621696 23654 1321790

omar@omar-HP-ProBook-450-G2: ~/.eclipse-workspace/matMult/src
File Edit View Search Terminal Help
omar@omar-HP-ProBook-450-G2:~/.eclipse-workspace/matMult/src$ make
make: Nothing to be done for 'all'.
omar@omar-HP-ProBook-450-G2:~/.eclipse-workspace/matMult/src$ ./matmult
Method 1 takes 3 threads
Seconds taken 0
Microseconds taken: 467
=====
Method 2 takes 21 threads
Seconds taken 0
Microseconds taken: 1672
omar@omar-HP-ProBook-450-G2:~/.eclipse-workspace/matMult/src$

c_2 (~/.eclipse-workspace/matMult/src) - Pluma
File Edit View Search Tools Documents Help
c_2 x
1 69846 5315 25253 45632 99550 7700 48770
2 100575 18297 44622 115547 537388 60188 694490
3 46954 36899 43299 483290 621696 23654 1321790
```

(5)Comparison between the two methods of matrix multiplication

For most cases the first method is faster than the second one.

Thats because the system calls for thread creation and joining in the second method take time greater than the computational function do while in the first method the number of system calls are fewer.