

#HW10
AHMED SEMİH ÖZMEKİK
171044039

Since the program prints so much data at any time on terminal, I won't be going to give explanations through my terminal screenshots. Instead, I will try to explain through my code and ".txt" files.

Those shown below, are my function prototypes. Even though I have left comment for them in my code, I will give an explanation here, for the sake of homework reader.

```
int readLine(FILE **fp,int *n);
int isPrime(int n);
int findPrimeLinkedList(int max_num);
void writePrimeLinkedList(prime *head);
int findPrimeArray(int max_num);
void writePrimeArray(int primes[],size_t pnumber);
void insert(int number,prime*head);
```

- ReadLine(), covers the whole “**PART1**” which was “Write a C programming function which read each line from “data.txt” file.”
- IsPrime(), as the name implies, helps us to find prime numbers.
- FindPrimeLinkedList() does all the job for given maximum number. This job is “**PART2**”, which is finding and showing all prime numbers. In the meantime, it calculates the time that took for the calculations. As desired in “**PART2**”, writes those calculated times to the file.
- This function has writePrimeLinkedList() inside, for the sake of “**PART4**”. It only works when the data is between 1 and 1.000.000.
- The concepts of other 2 functions are same with the other 2 functions. Only difference is data structures used.
- Insert() is for to push an element to the end of the linked-list.

```
#define LIST_T "output_prime_LinkedList.txt" /*
#define LIST_F "primes_LinkedList.txt" /* linked
#define ARRAY_T "output_prime_dynamic_array.txt"
#define ARRAY_F "primes_dynamic_array.txt" /* ar
```

- “LIST_T” and “ARRAY_T” are for writing my calculation time results of questions 3.1, 3.2 and 3.3 of question 2.a and question 2.b. It contains “**PART3**” up to here. And at the end of this list I have, the written time for both of the structures for data between 1 and 1.000.000. This satisfies the “**PART4**”.
- “LIST_F” and “ARRAY_F” are files for to write primes in. I have used this files to calculate the time which mentioned in “**PART4**”.

LIST_T:

```
1 |
2 Calculation time for between 1 and 500000 : 3496.243000 ms
3 Calculation time for between 1 and 750000 : 7308.816000 ms
4 Calculation time for between 1 and 1000000 : 12483.371000 ms
5 File written time: 7.596000 ms
```

ARRAY_T:

```
1 |
2 Calculation time for between 1 and 500000 : 232.976000 ms
3 Calculation time for between 1 and 750000 : 356.363000 ms
4 Calculation time for between 1 and 1000000 : 499.625000 ms
5 File written time: 8.217000
```

LIST_F AND ARRAY_F: (CONTINUES..)

```
1 |
2 2
3 3
4 5
5 7
6 11
7 13
8 17
9 19
10 23
11 29
```

In the main function, I have:

```
36     printf("\nFinding Prime Numbers...");
37     printf("\nThis may take a while..");
38     findPrimeLinkedList(500000);
39     findPrimeLinkedList(750000);
40     findPrimeLinkedList(1000000);
41
42     findPrimeArray(500000);
43     findPrimeArray(750000);
44     findPrimeArray(1000000);
45     printf("\nDone! You can check the files for information...\n");
```

As desired in “**PART3**”,

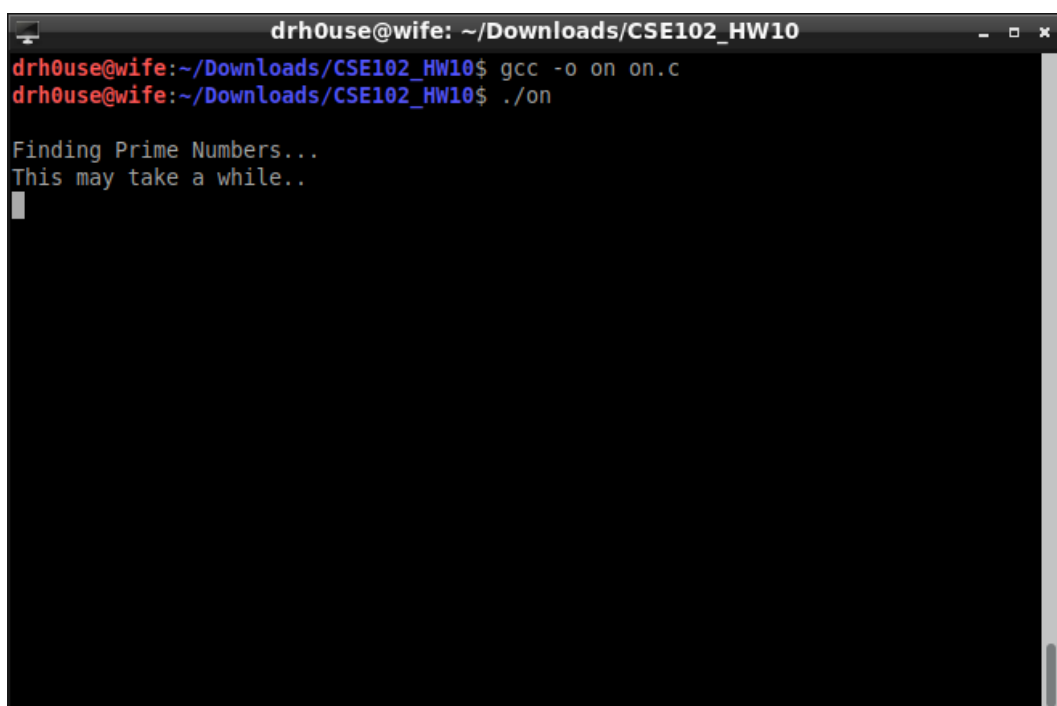
- 1) Between 1 and 500.000
- 2) Between 1 and 750.000
- 3) Between 1 and 1.000.000.

found primes and calculated time for both “**Linked-List**” and “**Array**”.

As desired in “**PART4**”,

when the given parameter is 1.000.000, both the functions will write primes into a file(**ARRAY_F**, **LIST_F**).

Lest check the program screenshots:

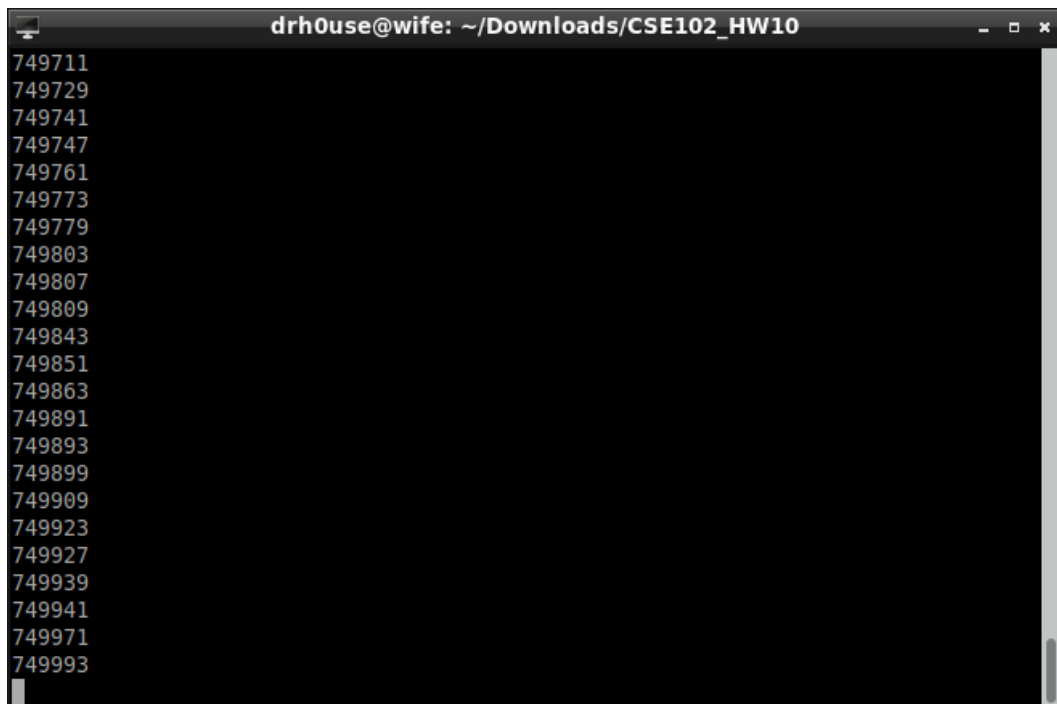


```
drh0use@wife: ~/Downloads/CSE102_HW10
drh0use@wife:~/Downloads/CSE102_HW10$ gcc -o on on.c
drh0use@wife:~/Downloads/CSE102_HW10$ ./on

Finding Prime Numbers...
This may take a while..

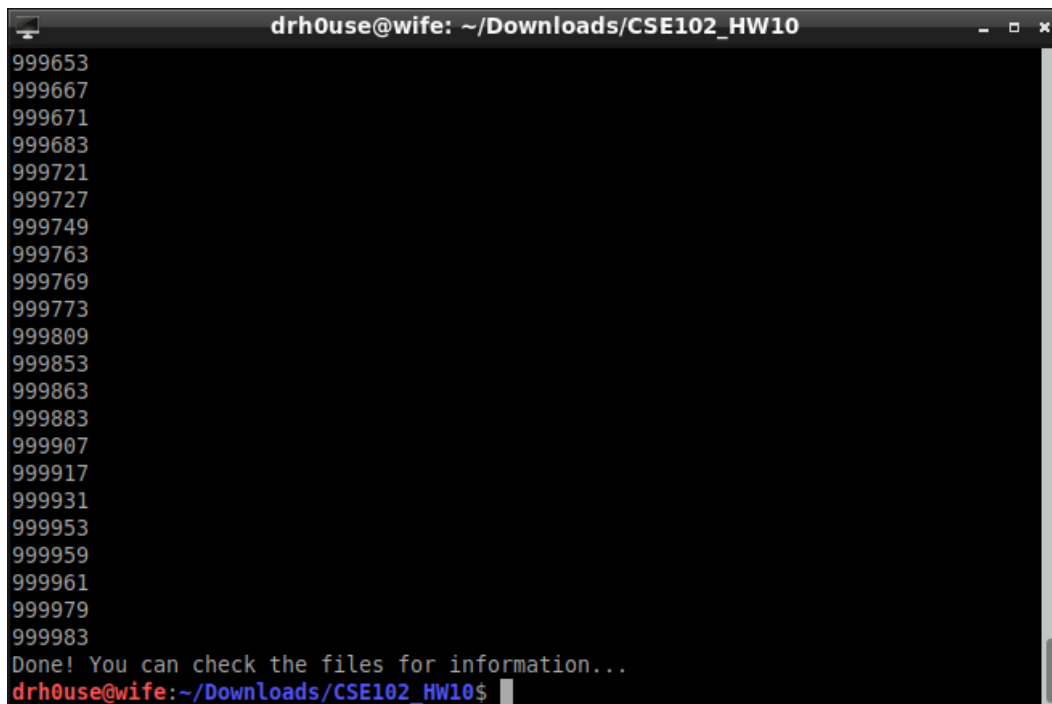
```

When I start the program, It prints this warning messages and calculation progress starts. Which means, we usually have to wait at least 10 seconds for the finish calculations.



```
drh0use@wife: ~/Downloads/CSE102_HW10
749711
749729
749741
749747
749761
749773
749779
749803
749807
749809
749843
749851
749863
749891
749893
749899
749909
749923
749927
749939
749941
749971
749993
```

This is the screenshot of any time in program which calculations in progress.



```
drh0use@wife: ~/Downloads/CSE102_HW10
999653
999667
999671
999683
999721
999727
999749
999763
999769
999773
999809
999853
999863
999883
999907
999917
999931
999953
999959
999961
999979
999983
Done! You can check the files for information...
drh0use@wife:~/Downloads/CSE102_HW10$
```

And it's over. From now on, the files must be created are created.