

GNG 1106: Fundamentals of Engineering Computation

Lab4 Report

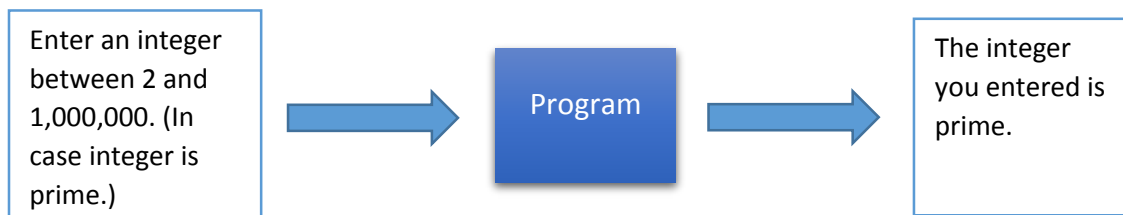
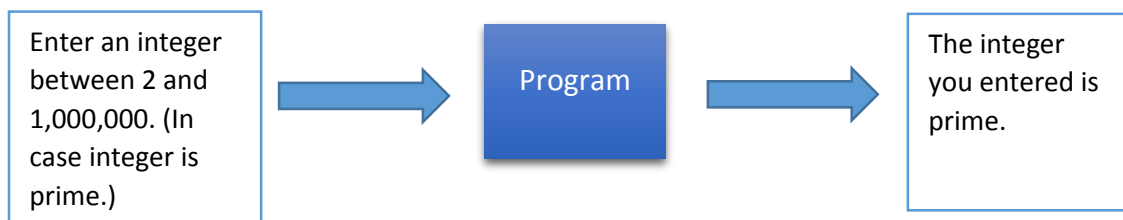
Problem Identification and Statement:

Write a program that prompts the user to input an integer between 2 and 1,000,000. The program is to find whether this integer is prime or not, in case the integer is prime it should simply say “The integer you have entered is prime. In case it’s not prime, the program should print the factorization of the number as a product of primes in ascending order.

Gathering of information and I/O Description:

A **prime number** is an integer that is greater than 1 and that is only divisible by 1 and itself.

I/O Layout:



Test Cases and Algorithm Design:

The following table will provide test cases that can be used to verify that the algorithm of the software is working properly and that the program is free of errors.

Input	Output
21	The number 21 is not prime $21 = 3 \times 7$
50	The number 50 is not prime $50 = 2 \times 5 \times 5$
29	The number 29 is prime

Print "Enter a positive integer between 2 and 1000000:"

Define x,y,z as integers

$z = 0$

Read a value for x

if ($x < 2$ or $x > 1000000$)

 Print "Invalid integer, Please Try Again"

Return to first function main

for($y = 2, y \leq x/2, y++$)

{

 if ($x \% y == 0$)

```
z = 1
```

```
break
```

```
if(z == 0)
```

```
    Print "The number x is prime"
```

```
else
```

```
    Print "The number x is not prime"
```

```
    define temp and m as integers
```

```
    temp = x
```

```
    m = 2
```

```
    while(temp ≠ m)
```

```
        if (temp% m==0)
```

```
            Print "m*"
```

```
            temp/=m;
```

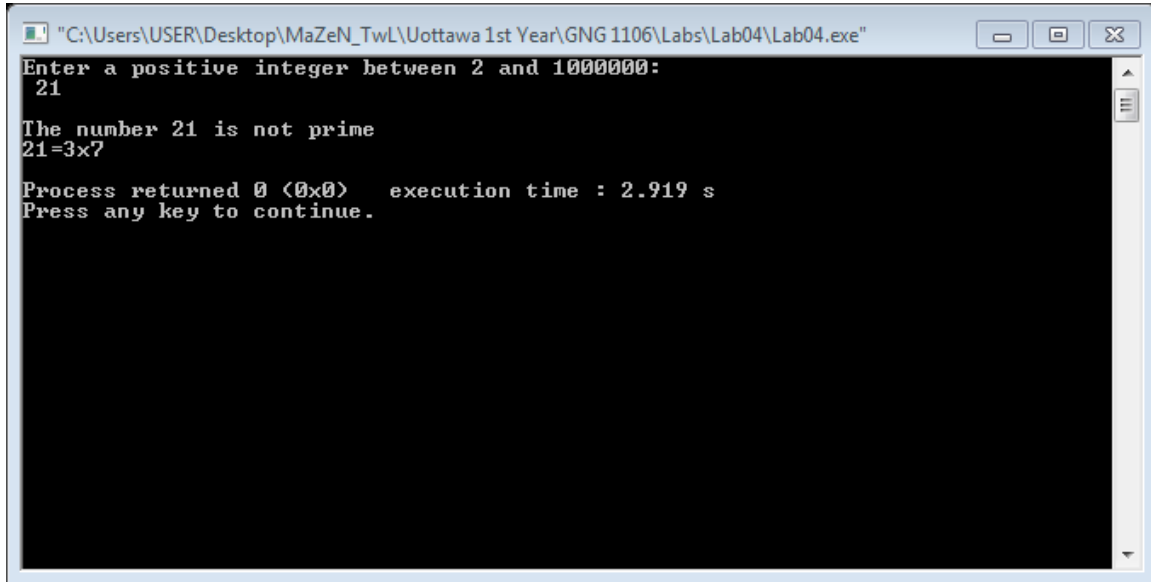
```
        else
```

```
            increment m
```

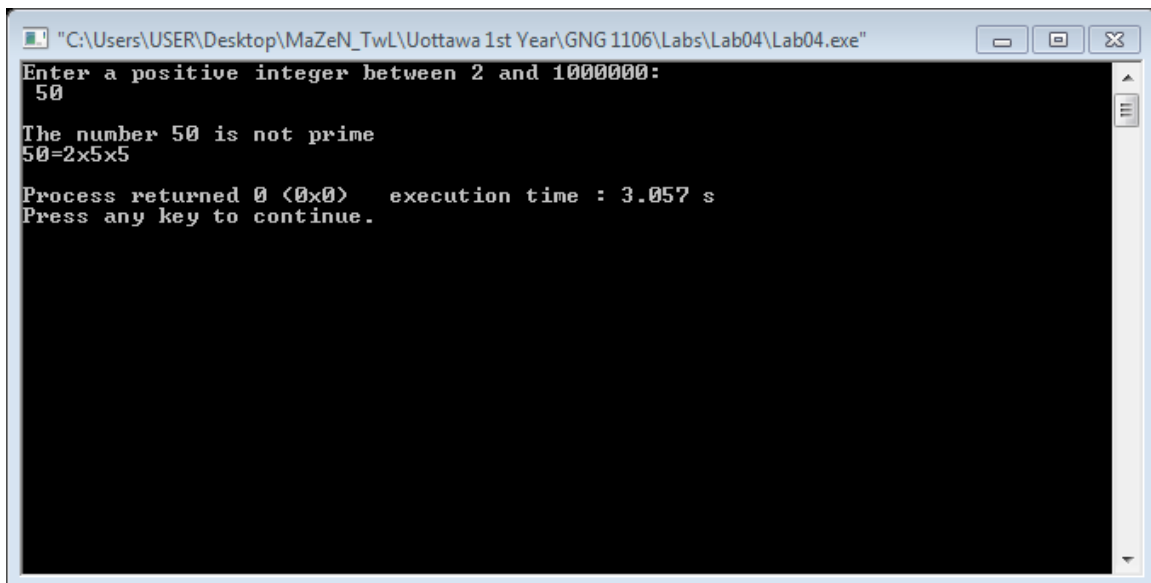
```
    Print "m"
```

Program Testing and Verification:

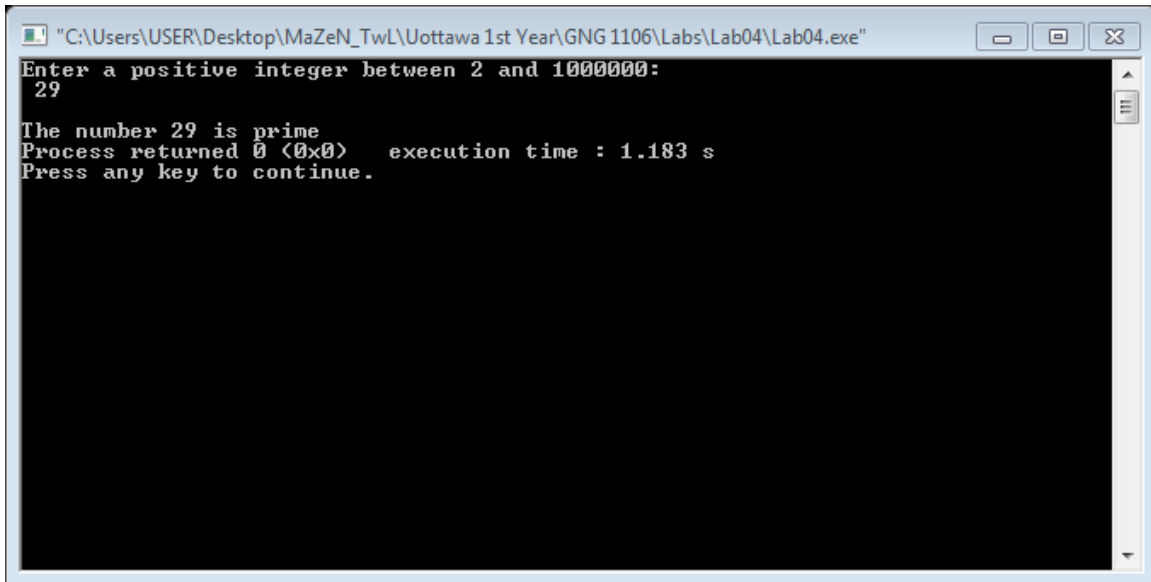
The testing and verification for a program that prompts the user to enter an integer. The program then checks if the number is prime or not.



```
"C:\Users\USER\Desktop\MaZeN_TwL\Uottawa 1st Year\GNG 1106\Labs\Lab04\Lab04.exe"
Enter a positive integer between 2 and 1000000:
21
The number 21 is not prime
21=3x7
Process returned 0 (0x0)   execution time : 2.919 s
Press any key to continue.
```



```
"C:\Users\USER\Desktop\MaZeN_TwL\Uottawa 1st Year\GNG 1106\Labs\Lab04\Lab04.exe"
Enter a positive integer between 2 and 1000000:
50
The number 50 is not prime
50=2x5x5
Process returned 0 (0x0)   execution time : 3.057 s
Press any key to continue.
```



```
"C:\Users\USER\Desktop\MaZeN_TwL\Uottawa 1st Year\GNG 1106\Labs\Lab04\Lab04.exe"
Enter a positive integer between 2 and 1000000:
29
The number 29 is prime
Process returned 0 (0x0) execution time : 1.183 s
Press any key to continue.
```

Implementation:

(Check the Lab04.c file)