Operating Systems

Lab Report 3

(8-10)

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LAB 08

TASK 1:

Write C++ program that declares an array of size 1000 and populates it with random numbers between 1 and 100. Then it finds factorial of these numbers and checks how many of these prime numbers are.

```
#include <iostream>
#include <cstdlib>
#include <ctime>
#include <cmath>

using namespace std;

//Function to find the factorial of a number
long long int factorial(int n){
        if(n==0)
                return 1;

        return n* factorial(n-1);
}

//Function to check if a number is prime
bool isPrime(int n){
        if(n<=1)
                return  false;
        if(n<=3)
                return true;

        if(n%2==0 || n%3==0)
                return false;

        for(int i=5; i* i<=n; i+=6)
                if(n%i==0 || n%(i+2)==0)
                        return false;
```

```
        return true;
}

int main(){
//Declare and populate the array with random numbers
const int SIZE = 1000;
int arr[SIZE];

for(int i=0; i<SIZE; i++)
        arr[i] = rand() % 100 +1;

//Find the factorial and check if prime for each number

int numPrimes = 0;
for(int i=0; i<SIZE ; i++){
        long long int fact = factorial(arr[i]);
        if(isPrime(fact))
                numPrimes++;
}

//Print the number of prime factorials
cout << "Number of prime factorials: " << numPrimes << endl;

return 0;
}
```

```
zaki@zaki-VirtualBox:~/Desktop/lab8$ g++ task1.cpp -o task1
zaki@zaki-VirtualBox:~/Desktop/lab8$ ./task1
Number of prime factorials: 5
```

TASK 2:

Now, create two thread such that the first thread process finds the factorial of these numbers (given in the above array) while the other finds how many of these are prime.

```
#include <iostream>
#include <cstdlib>
#include <ctime>
#include <cmath>
#include <thread>

using namespace std;

const int SIZE = 1000;
int arr[SIZE];
int factorials[SIZE];


//Function to find the factorial of a number
long long int factorial(int n){
        if(n==0)
                return 1;

        return n* factorial(n-1);
}

//Function too check if number is prime
bool isPrime(int n){
        if(n<=1)
                return false;
        if(n<=3)
                return true;
        if(n%2==0 || n%3==0)
                return false;

        for(int i=5; i*i<=n; i+=6)
                if(n%i==0 || n%(i+2)==0)
                        return false;

        return true;
}

//Thread function to find the factorials
void findFactorials(){
for(int i=0; i<SIZE; i++)
        factorials[i] = factorial(arr[i]);
}

//Thread fucntion to find the number of prime factorials
int findNumPrimes(){
        int numPrimes=0;
        for(int i=0 ; i<SIZE ; i++){
                if(isPrime(factorials[i]))
                        numPrimes++;
        }
        return numPrimes;
}
```

```
int main(){
//Populate the array with random numbers
for(int i=0; i< SIZE ; i++)
        arr[i] = rand() % 100 +1;

//Create Threads
thread t1(findFactorials);
thread t2(findNumPrimes);

//Wait for the threads to finish
t1.join();
t2.join();

//Get the result from the second thread
int numPrimes = findNumPrimes();

//Print the number of primes factorials
cout << "Number of prime factorials: " << numPrimes << endl;

return 0;
}
```

```
zaki@zaki-VirtualBox:~/Desktop/lab8$ g++ task2.cpp -o task2 -pthread
zaki@zaki-VirtualBox:~/Desktop/lab8$ ./task2
Number of prime factorials: 5
```

LAB 10

```
52          for(int i = 0; i <= 5000000; i++){
53                  counter++;
54                  if(counter % 1000000 == 0){
55                          cout << "Val of counter => TH -> 1, 3" << counter << endl;
56                  }
57          }
58
59          pthread_mutex_unlock(&lk);
60
61          return NULL;
62  }
63  int main(){
64
65          pthread_mutex_init(&lk, NULL);
66          pthread_t t1, t2;
67
68          pthread_create(&t1, NULL, thread_1, NULL);
69          pthread_create(&t2, NULL, thread_2, NULL);
70
71          pthread_join(t1, NULL);
72          pthread_join(t2, NULL);
73
74          cout << "Fin val -> Counter "<< counter << endl;
75          return 0;
76  }
77
```

```
sam@sam-VirtualBox:~/Desktop$ gedit lab10M.cpp
sam@sam-VirtualBox:~/Desktop$ gedit lab10M.cpp
sam@sam-VirtualBox:~/Desktop$ g++ lab10M.cpp -o lb -pthread
sam@sam-VirtualBox:~/Desktop$ ./lb
cnt -> T2-1000000
cnt -> T2-2000000
cnt -> T2-3000000
cnt -> T2-4000000
cnt -> T2-5000000
Val of counter => TH -> 1, 1-5000000
Val of counter => TH -> 1, 1-4000000
Val of counter => TH -> 1, 1-3000000
Val of counter => TH -> 1, 1-2000000
Val of counter => TH -> 1, 1-1000000
Val of counter => TH -> 1, 10
Val of counter => TH -> 1, 21000000
Val of counter => TH -> 1, 22000000
Val of counter => TH -> 1, 23000000
Val of counter => TH -> 1, 24000000
Val of counter => TH -> 1, 25000000
Val of counter => TH -> 1, 36000000
Val of counter => TH -> 1, 37000000
Val of counter => TH -> 1, 38000000
Val of counter => TH -> 1, 39000000
Val of counter => TH -> 1, 310000000
Fin val -> Counter 10000002
sam@sam-VirtualBox:~/Desktop$
```

TASK 03

```
#!/bin/bash
echo "Enter the name of the file"
read name
echo "Enter the path of the file"
read path
echo "Enter the word to find"
read word
cd ~/$path
grep $word $name
echo "Found!"
```

```
sam@sam-VirtualBox:~/Desktop$ gedit scripts
sam@sam-VirtualBox:~/Desktop$ sudo chmod  777 scripts
[sudo] password for sam:
sam@sam-VirtualBox:~/Desktop$ sudo mv scripts /usr/bin
sam@sam-VirtualBox:~/Desktop$ scripts
Enter the name of the file
file.txt
Enter the path of the file
Desktop
Enter the word to find
hi
hi
hi
hi
hi
Found!
sam@sam-VirtualBox:~/Desktop$
```

```
hi
hi
I guess Peter Pan was right
again untill i found her
snaping 1 2 3, where are you?
hi
hi
```

TASK 04

```
#!/bin/bash
echo "Enter the name of the files"
read name
cd ~/Desktop
touch final
cat $name >> final
cat final
echo "Here you go :)"
```

```
sam@sam-VirtualBox:~/Desktop$ touch file1 file2 file3
sam@sam-VirtualBox:~/Desktop$ cd
sam@sam-VirtualBox:~$ gedit scripts
sam@sam-VirtualBox:~$ sudo chmod  777 scripts
sam@sam-VirtualBox:~$ sudo mv scripts /usr/bin
sam@sam-VirtualBox:~$ scripts
Enter the name of the files
file1 file2 file3
Hi
Hola
Bonjour
Here you go :)
sam@sam-VirtualBox:~$
```