CS342 – Operating Systems Lab

Assignment-5

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1. The main thread creates ten threads. Then it waits for the threads to terminate, printing the status returned by each thread. The last thread was cancelled which is recorded in the output. Write a C program for this behaviour.

Ans:

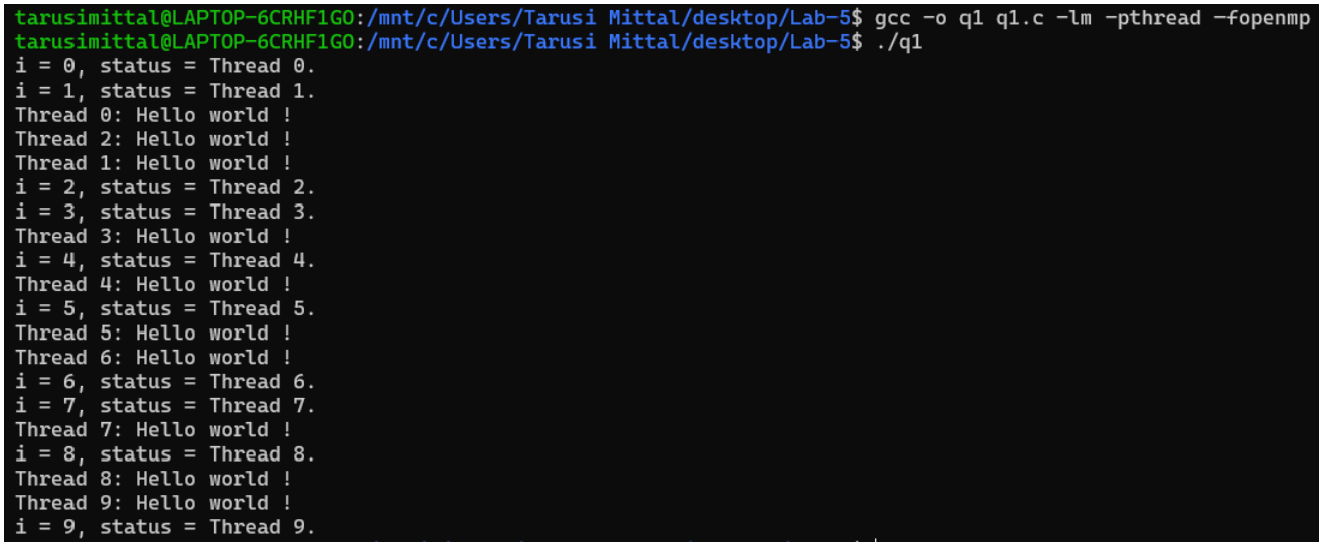
Compilation: gcc -o q1 q1.c -lm -pthread -fopenmp

Syntax: ./q1

Examples of Execution:

Input: gcc -o q1 q1.c -lm -pthread -fopenmp

./q1



2. Write a C program using two threads to write a text file where first thread writes all the lines except prime numbered lines and second thread writes all the prime numbered lines. The third thread should parallelly count the number of characters being written in each line of the file.

Compilation: gcc -o q2 q2.c -lm -pthread -fopenmp

Syntax: ./q2 file1 file2

Examples of Execution:

Input: gcc -o q2 q2.c -lm -pthread -fopenmp

./q2 file1.txt file2.txt

```
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ gcc -o q2 q2.c -lm -pthread -fopenmp
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ ./q2 read.txt write.txt
The thread used for line no 1(which is not prime) is : 2
Number of characters in line 1 are = 54
The thread used for line no 2(which is prime) is : 1
Number of characters in line 2 are = 71
The thread used for line no 3(which is prime) is : 1
Number of characters in line 3 are = 35
The thread used for line no 4(which is not prime) is : 2
Number of characters in line 4 are = 36
The thread used for line no 5(which is prime) is : 1
Number of characters in line 5 are = 43
The thread used for line no 6(which is not prime) is : 2
Number of characters in line 6 are = 40
The thread used for line no 7(which is prime) is : 1
Number of characters in line 7 are = 55
The thread used for line no 8(which is not prime) is : 2
Number of characters in line 8 are = 68
The thread used for line no 9(which is not prime) is : 2
Number of characters in line 9 are = 71
The thread used for line no 10(which is not prime) is : 2
Number of characters in line 10 are = 27
The thread used for line no 11(which is prime) is : 1
Number of characters in line 11 are = 64
The thread used for line no 12(which is not prime) is : 2
Number of characters in line 12 are = 25
The thread used for line no 13(which is prime) is : 1
Number of characters in line 13 are = 43
The thread used for line no 14(which is not prime) is : 2
Number of characters in line 14 are = 72
The thread used for line no 15(which is not prime) is : 2
Number of characters in line 15 are = 65
The thread used for line no 16(which is not prime) is : 2
Number of characters in line 16 are = 33
The thread used for line no 17(which is prime) is : 1
Number of characters in line 17 are = 28
The thread used for line no 18(which is not prime) is : 2
Number of characters in line 18 are = 61
The thread used for line no 19(which is prime) is : 1
Number of characters in line 19 are = 41
```

3. There are "M" vending machines linked to single petrol tanker with capacity of "L" litres. "ni, where 0<i<=M" number of customers are coming to each machine in "M" different queues to take some petrol in parallel manner. The vending machine should dispense only if the required amount of petrol is available in the tanker. And after dispensing to each customer the amount of petrol present in the tanker should be updated. Write a C program using thread for the petrol dispensing system.

Ans:

Compilation: gcc -o q3 q3.c -lm -pthread -fopenmp

Syntax: ./q3

Input:

NOTE: Because of the nature of the input, we are not taking the input from the command line instead we are taking the input from an input file which can simply be edited in notepad or we can use the cat command to read the file on the terminal also.

M -> No of vending machines

Capacity -> the Total litres of petrol capacity in the tank

N_1 -> No of customers coming to the first machine

$I_1, I_2, I_3 \ldots\ldots\ldots\ldots I_{N1}$ -> Amount of petrol the I^{th} person wants to fill

N_2 ->

$I_1, I_2, I_3 \ldots\ldots\ldots\ldots I_{N2}$

.

.

.

N_m

$I_1, I_2, I_3 \ldots\ldots\ldots\ldots I_{Nm}$

Examples of Execution:

Example1

(input file used in example1.txt)

Input: gcc -o q3 q3.c -lm -pthread -fopenmp

./q3

```
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ gcc -o q3 q3.c -lm -pthread -fopenmp
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ ./q3
Capacity of Petrol in the Tank: 500
Machine Number: 0, Required capacity Of Petrol: 12
New Capacity: 488
Capacity of Petrol in the Tank: 488
Machine Number: 1, Required capacity Of Petrol: 34
New Capacity: 454
Capacity of Petrol in the Tank: 454
Machine Number: 2, Required capacity Of Petrol: 40
New Capacity: 414
Capacity of Petrol in the Tank: 414
Machine Number: 4, Required capacity Of Petrol: 32
New Capacity: 382
Capacity of Petrol in the Tank: 382
Machine Number: 6, Required capacity Of Petrol: 34
New Capacity: 348
Capacity of Petrol in the Tank: 348
Machine Number: 3, Required capacity Of Petrol: 34
New Capacity: 314
Capacity of Petrol in the Tank: 314
Machine Number: 7, Required capacity Of Petrol: 62
New Capacity: 252
Capacity of Petrol in the Tank: 252
Machine Number: 5, Required capacity Of Petrol: 51
New Capacity: 201
Capacity of Petrol in the Tank: 201
Machine Number: 8, Required capacity Of Petrol: 31
New Capacity: 170
Capacity of Petrol in the Tank: 170
Machine Number: 9, Required capacity Of Petrol: 31
New Capacity: 139
Capacity of Petrol in the Tank: 139
Machine Number: 10, Required capacity Of Petrol: 12
New Capacity: 127
Capacity of Petrol in the Tank: 127
Machine Number: 11, Required capacity Of Petrol: 51
New Capacity: 76
Capacity of Petrol in the Tank: 76
Machine Number: 1, Required capacity Of Petrol: 52
New Capacity: 24
Capacity of Petrol in the Tank: 24
Machine Number: 0, Required capacity Of Petrol: 22
New Capacity: 2
Capacity of Petrol in the Tank: 2
Machine Number: 4, Required capacity Of Petrol: 44
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 6, Required capacity Of Petrol: 23
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 7, Required capacity Of Petrol: 29
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 5, Required capacity Of Petrol: 25
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
```

```
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 3, Required capacity Of Petrol: 57
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 8, Required capacity Of Petrol: 22
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 9, Required capacity Of Petrol: 44
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 11, Required capacity Of Petrol: 21
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 10, Required capacity Of Petrol: 32
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 0, Required capacity Of Petrol: 31
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 3, Required capacity Of Petrol: 20
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 4, Required capacity Of Petrol: 22
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 7, Required capacity Of Petrol: 34
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 5, Required capacity Of Petrol: 16
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 6, Required capacity Of Petrol: 56
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 1, Required capacity Of Petrol: 17
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 8, Required capacity Of Petrol: 33
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 11, Required capacity Of Petrol: 33
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 10, Required capacity Of Petrol: 34
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 0, Required capacity Of Petrol: 12
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 3, Required capacity Of Petrol: 44
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 7, Required capacity Of Petrol: 32
```

```
Machine Number: 7, Required capacity Of Petrol: 32
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 2
Machine Number: 4, Required capacity Of Petrol: 1
New Capacity: 1
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 14
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 6, Required capacity Of Petrol: 66
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 1, Required capacity Of Petrol: 19
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 44
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 10, Required capacity Of Petrol: 12
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 0, Required capacity Of Petrol: 9
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 7, Required capacity Of Petrol: 12
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 4, Required capacity Of Petrol: 21
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 12
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 6, Required capacity Of Petrol: 23
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 1, Required capacity Of Petrol: 9
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 23
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 10, Required capacity Of Petrol: 32
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 0, Required capacity Of Petrol: 2
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 4, Required capacity Of Petrol: 8
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 7, Required capacity Of Petrol: 34
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 19
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
```

```
Machine Number: 5, Required capacity Of Petrol: 19
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 1, Required capacity Of Petrol: 30
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 24
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 10, Required capacity Of Petrol: 11
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 7, Required capacity Of Petrol: 54
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 23
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 1, Required capacity Of Petrol: 40
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 25
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 10, Required capacity Of Petrol: 45
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 7, Required capacity Of Petrol: 23
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 20
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 19
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 7, Required capacity Of Petrol: 11
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 5, Required capacity Of Petrol: 21
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 50
Sorry Petrol Low!!
Capacity of Petrol in the Tank: 1
Machine Number: 8, Required capacity Of Petrol: 65
Sorry Petrol Low!!
```

Example2

(input file used in example2.txt)

Input: gcc -o q3 q3.c -lm -pthread -fopenmp

./q3

```
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ gcc -o q3 q3.c -lm -pthread -fopenmp
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$ ./q3
Capacity of Petrol in the Tank: 1000
Machine Number: 0, Required capacity Of Petrol: 100
New Capacity: 900
Capacity of Petrol in the Tank: 900
Machine Number: 1, Required capacity Of Petrol: 20
New Capacity: 880
Capacity of Petrol in the Tank: 880
Machine Number: 3, Required capacity Of Petrol: 10
New Capacity: 870
Capacity of Petrol in the Tank: 870
Machine Number: 2, Required capacity Of Petrol: 22
New Capacity: 848
Capacity of Petrol in the Tank: 848
Machine Number: 0, Required capacity Of Petrol: 78
New Capacity: 770
Capacity of Petrol in the Tank: 770
Machine Number: 1, Required capacity Of Petrol: 65
New Capacity: 705
Capacity of Petrol in the Tank: 705
Machine Number: 3, Required capacity Of Petrol: 76
New Capacity: 629
Capacity of Petrol in the Tank: 629
Machine Number: 2, Required capacity Of Petrol: 12
New Capacity: 617
Capacity of Petrol in the Tank: 617
Machine Number: 0, Required capacity Of Petrol: 48
New Capacity: 569
Capacity of Petrol in the Tank: 569
Machine Number: 1, Required capacity Of Petrol: 13
New Capacity: 556
Capacity of Petrol in the Tank: 556
Machine Number: 3, Required capacity Of Petrol: 45
New Capacity: 511
Capacity of Petrol in the Tank: 511
Machine Number: 2, Required capacity Of Petrol: 8
New Capacity: 503
Capacity of Petrol in the Tank: 503
Machine Number: 0, Required capacity Of Petrol: 76
New Capacity: 427
Capacity of Petrol in the Tank: 427
Machine Number: 1, Required capacity Of Petrol: 22
New Capacity: 405
Capacity of Petrol in the Tank: 405
Machine Number: 3, Required capacity Of Petrol: 98
New Capacity: 307
Capacity of Petrol in the Tank: 307
Machine Number: 1, Required capacity Of Petrol: 1
New Capacity: 306
Capacity of Petrol in the Tank: 306
Machine Number: 3, Required capacity Of Petrol: 34
New Capacity: 272
Capacity of Petrol in the Tank: 272
Machine Number: 3, Required capacity Of Petrol: 87
New Capacity: 185
tarusimittal@LAPTOP-6CRHF1GO:/mnt/c/Users/Tarusi Mittal/desktop/Lab-5$
```

END