CSE344 – System Programming Homeowork 4 Report

1) How Did I Solve This Problem?

In this homework, I checked the first command line arguments. To satisfy the requirements I used to getopt function. Thanks to getopt function I got arguments in the proper way and I got the command line arguments. After the get N, C and filepath, I checked the input file whether is proper to arguments or not. I used the two system V semaphores to hold material 1 and material 2. I initialize them as 0 using semcntl function. After that I create consumer threads and supplier thread. I use join for consumer threads and detached the supplier thread as it mentioned in homework pdf. I create several function to post, wait and read semaphores values. I use them to satisfy the synchronization.

2) My Design Decisions

I use error check first mechanism.

I use two System V semaphores.

3) Requirements That I Achived

I think I achieved almost all the requirements. However, I may not have been able to achieve some requirements. (If the input file has 1 line there must be an empty line after that line)

My Files

Makefile - The makefile.

hw4.c - Implementation with named semaphores.

4) Some Outputs From Program

Image 1: Input File

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Sat May 14 04:06:34 2022 ----- Consumer-1 at iteration 0 (waiting). Current amounts: 0 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-8 at iteration 0 (waiting). Current amounts: 0 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-8 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-8 at iteration 0 (waiting). Current amounts: 0 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-0 at iteration 0 (waiting). Current amounts: 0 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-13 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-15 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-16 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-7 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-2 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-9 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-11 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ------ Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Sunmer-10 at iteration 0 (waiting). Current am
     Sat May 14 04:06:34 2022 ----- Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2' Sat May 14 04:06:34 2022 ----- Consumer-4 at iteration 0 (waiting). Current amounts: 0 x '1', 0 x
  Sat May 14 04:06:34 2022 ---- Consumer-10 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Supplier: read from input a '1'. Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-14 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-5 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-5 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-6 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-18 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-17 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-19 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-20 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-21 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-22 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-22 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-23 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-23 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-23 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ---- Consumer-23 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'.
     Sat May 14 04:06:34 2022 ----- Consumer-22 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'
Sat May 14 04:06:34 2022 ----- Consumer-23 at iteration 0 (waiting). Current amounts: 1 x '1', 0 x '2'
Sat May 14 04:06:34 2022 ----- Supplier: delivered a '1'. Post-delivery amounts: 2 x '1', 0 x '2'
   Sat May 14 04:06:34 2022 ----- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: read from input a '1'. Current amounts: 2 x '1', 0 x '2'

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '1'. Post-delivery amounts: 3 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: read from input a '2'. Current amounts: 3 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 2 x '1', 0 x '2'.
    Sat May 14 04:06:34 2022 ----- Supplier: read from input a '2'. Current amounts: 2 x '1', 0 x '2' Sat May 14 04:06:34 2022 ----- Consumer-4 at iteration 1 (waiting). Current amounts: 2 x '1', 0 x '2'. Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 1 x '1', 0 x '2'.
     Sat May 14 04:06:34 2022 ----- Consumer-1 at iteration 0 (consumed). Post-consumption amounts: 1 x '1',0 x '2'.
    Sat May 14 04:06:34 2022 ----- Consumer 1 at iteration 0 (consumed). Post-consumption amounts: 1 x '1', 0 x '2'
Sat May 14 04:06:34 2022 ----- Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.
Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.
      Sat May 14 04:06:34 2022 ----- Consumer-8 at iteration 0 (consumed). rost consumption and a '2' Sat May 14 04:06:34 2022 ----- Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.

Consumer-8 at iteration 1 (waiting). Current amounts: 0 x '1', 0 x '2'.
       Sat May 14 04:06:34 2022 ----- Consumer-8 at iteration 0 (consumed). Post-consumption amounts: 0 x '1',0 x '2'.
    Sat May 14 04:06:34 2022 ---- Supplier: read from input a 1. Current amounts: 0 x '1', 0 x Sat May 14 04:06:34 2022 ---- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x Sat May 14 04:06:34 2022 ---- Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x Sat May 14 04:06:34 2022 ---- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x Sat May 14 04:06:34 2022 ---- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x
    Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Consumer-3 at iteration 0 (consumed). Post-consumption amounts: 0 x '1',0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.
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Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'
Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.
Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.
Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.
Consumer-5 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.
Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.
Consumer-5 has left.
     at May 14 04:06:34 2022
 Sat May 14 04:06:34 2022 -----
Sat May 14 04:06:34 2022 -----
Sat May 14 04:06:34 2022 -----
Sat May 14 04:06:34 2022
                                                                                                                                                                  Consumer-5 has left.

Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.

Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.

Consumer-6 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.
 Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
                                                                                                                                                                Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.
Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.
Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.
Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.
Consumer-18 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.
Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022 ---- Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'

Sat May 14 04:06:34 2022 ---- Consumer-18 has left.

Sat May 14 04:06:34 2022 ---- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '1'. Current amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: delivered a '1'. Post-delivery amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '1'. Current amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: delivered a '1'. Post-delivery amounts: 3 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '2'. Current amounts: 3 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: delivered a '2'. Post-delivery amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Consumer-17 at iteration 1 (consumed). Post-consumption amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '2'. Current amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '2'. Current amounts: 2 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ---- Supplier: read from input a '2'. Current amounts: 2 x '1', 0 x '2'.
 Sat May 14 04:06:34 2022 ----- Consumer-17 has left.

Sat May 14 04:06:34 2022 ----- Supplier: delivered a '2'. Post-delivery amounts: 1 x '1', 0 x '2'.

Sat May 14 04:06:34 2022 ----- Consumer-19 at iteration 1 (consumed). Post-consumption amounts: 1 x '1',0 x '2'.

Sat May 14 04:06:34 2022 ----- Consumer-19 has left.

Sat May 14 04:06:34 2022 ----- Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.
                                                                                                                               Consumer-19 has left.

Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.

Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Current amounts: 1 x '1', 0 x '2'.

Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.

Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.

Consumer-21 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.

Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.

Supplier: read from input a '2'. Current amounts: 0 x '1', 0 x '2'.

Supplier: read from input a '2'. Current amounts: 0 x '1', 0 x '2'.

Consumer-22 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.

Consumer-22 has left.
Sat May 14 04:06:34 2022
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
   Sat May 14 04:06:34 2022
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
                                                                                                                                 ----- Supplier: read from input a '1'. Current amounts: 0 x '1', 0 x '2'
----- Consumer-22 has left.
----- Supplier: delivered a '1'. Post-delivery amounts: 1 x '1', 0 x '2'.
----- Supplier: read from input a '2'. Current amounts: 1 x '1', 0 x '2'.
----- Supplier: delivered a '2'. Post-delivery amounts: 0 x '1', 0 x '2'.
----- Consumer-23 at iteration 1 (consumed). Post-consumption amounts: 0 x '1', 0 x '2'.
----- Consumer-23 has left.
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
   Sat May
  Sat May 14 04:06:34 2022
Sat May 14 04:06:34 2022
                                          14 04:06:34 2022
                                          14 04:06:34 2022
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Image 2: Output of hw4