

GTU Department of Computer Engineering
CSE 344 - SPRING 2022
HOMEWORK 4 REPORT

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1.Design Decisions and Concept

- There is a Buffer that has 300000 character limit.
- Also there was a signal handler that changed the value of the keep_running variable.
- Also there is a semun union called "semopts" for returning values of semaphores.
- Supplier takes the inputFilePath and reads the file to a buffer array.
- If found a '1' then increment the related semaphore. Same story for '2'.
- Using semctl for get values of semaphore, also.
- When reached EOF, Supplier left and its thread exited.
- Also there are consumer threads which are C pieces.
- Each of them iterate N times.
- They are waiting for one '1' and one '2' if one material is available only, any consumer doesn't consume it.
- This operation is atomically used by semop.
- Consume 1 and 2 at the same time.
- If one of the consumers iterates N time, then it leaves which means gracefully exit.(using pthread_exit and free etc.)
- Using setvbuf(stdout,NULL,_IOBNF,0) for disable buffer.
- Using sigaction for Signal Handle.

-Using ftok to generate a key.

-I create Supplier Thread as Detached using
pthread_attr_setdetachstate.

-At the end of the program and every signal handle block, I use
semctl(semid,0,IPC_RMID) for destroy the System V Semaphore Set.

```
==13937==
==13937==  HEAP SUMMARY:
==13937==    in use at exit: 0 bytes in 0 blocks
==13937== total heap usage: 552,997 allocs, 552,997 frees, 8,605,300 bytes allocated
==13937==
==13937== All heap blocks were freed -- no leaks are possible
```

```
[2022-05-13 22:20:26] Supplier: read from input a '1'. Current amounts: 4 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Supplier: delivered a '1'. Post-delivery amounts: 5 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Supplier: read from input a '1'. Current amounts: 5 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Supplier: delivered a '1'. Post-delivery amounts: 6 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Supplier: read from input a '1'. Current amounts: 6 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9208 (consumed). Post-consumption amounts: 6 '1', 5 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9209 (waiting). Current amounts: 7 '1', 5 '2'.
[2022-05-13 22:20:26] Supplier: delivered a '1'. Post-delivery amounts: 7 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9209 (consumed). Post-consumption amounts: 6 '1', 4 '2'.
[2022-05-13 22:20:26] Supplier: read from input a '2'. Current amounts: 6 x '1' , 4 x '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9210 (waiting). Current amounts: 6 '1', 4 '2'.
[2022-05-13 22:20:26] Consumer-3 at iteration 9215 (consumed). Post-consumption amounts: 4 '1', 4 '2'.
[2022-05-13 22:20:26] Supplier: delivered a '2'. Post-delivery amounts: 6 x '1' , 5 x '2'.
[2022-05-13 22:20:26] Consumer-3 has left.
[2022-05-13 22:20:26] Consumer-0 at iteration 9210 (consumed). Post-consumption amounts: 5 '1', 4 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9211 (waiting). Current amounts: 5 '1', 4 '2'.
[2022-05-13 22:20:26] Supplier: read from input a '2'. Current amounts: 5 x '1' , 4 x '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9211 (consumed). Post-consumption amounts: 4 '1', 3 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9212 (waiting). Current amounts: 4 '1', 4 '2'.
[2022-05-13 22:20:26] Supplier: delivered a '2'. Post-delivery amounts: 4 x '1' , 4 x '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9212 (consumed). Post-consumption amounts: 3 '1', 3 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9213 (waiting). Current amounts: 3 '1', 3 '2'.
[2022-05-13 22:20:26] The Supplier has left.
[2022-05-13 22:20:26] Consumer-0 at iteration 9213 (consumed). Post-consumption amounts: 2 '1', 2 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9214 (waiting). Current amounts: 2 '1', 2 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9214 (consumed). Post-consumption amounts: 1 '1', 1 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9215 (waiting). Current amounts: 1 '1', 1 '2'.
[2022-05-13 22:20:26] Consumer-0 at iteration 9215 (consumed). Post-consumption amounts: 0 '1', 0 '2'.
[2022-05-13 22:20:26] Consumer-0 has left.
```

```
burakir0@Burak-Lenovo-ideapad-330S-14IKB:~/Desktop/System_HW4$ make clean
rm -f *.o hw4
burakir0@Burak-Lenovo-ideapad-330S-14IKB:~/Desktop/System_HW4$ make
gcc hw4.c -o hw4 -Wall -pthread -lpthread
burakir0@Burak-Lenovo-ideapad-330S-14IKB:~/Desktop/System_HW4$ make clean
rm -f *.o hw4
burakir0@Burak-Lenovo-ideapad-330S-14IKB:~/Desktop/System_HW4$
```