

Compilation

```
File Edit Options Buffers Tools Compile Help
1 #include <helper.h>
2 #include <iostream>
3
4 using namespace std;
5
6 extern int errno;
7
8 //Declares semaphores
9 sem_t semEmpty, semFull, semMtx;
10
11 void *producer (void *ptr_prod);
12 void *consumer (void *ptr_cons);
13
14
15 int main (int argc, char **argv)
16 {
17     //Reads in inputs and checks if valid; otherwise returns 22 (errno invalid arguments)
18     if (!validInput(argc, argv)) {
19         return 22;
20     }
21
22     int size_queue = atoi(argv[1]);
23     int num_jobs = atoi(argv[2]);
24     int num_prod = atoi(argv[3]);
25     int num_cons = atoi(argv[4]);
26
27     //Creates circular buffer using the imported library in the header file
28     cb circ_buff(size_queue);
29     for (int count = 0; count < size_queue; count++) {
30         circ_buff[count] = nullptr;
31     }
32
33     //Initializes semaphores
34     if (sem_init(&semEmpty, 0, size_queue) < 0) {
35         perror("Error msg");
36         return errno;
37     }
38     if (sem_init(&semFull, 0, 0) < 0) {
39         perror("Error msg");
40         return errno;
41     }
42     if (sem_init(&semMtx, 0, 1) < 0) {
43         perror("Error msg");
44         return errno;
45     }
46
47     //Sets up array of producers; one thread for each producer
48     pthread_t pt_array[num_prod];
49     for (int count = 0; count < num_prod; count++) {
50         prod_struct* ptr_prod = new prod_struct (count + 1, num_jobs, &circ_buff);
51
52         if (pthread_create(&pt_array[count], NULL, producer, ptr_prod) != 0) {
53             printf("Error msg: producer thread %u could not be created", count + 1);
54             return 1;
55         }
56     }
57
58     //Sets up array of consumers; one thread for each consumer
59     pthread_t ct_array[num_cons];
60     for (int count = 0; count < num_cons; count++) {
61         cons_struct* ptr_cons = new cons_struct (count + 1, &circ_buff);
62
63         if (pthread_create(&ct_array[count], NULL, consumer, ptr_cons) != 0) {
64             printf("Error msg: consumer thread %u could not be created", count + 1);
65         }
66     }
67
68     return 0;
69 }
```

```
make -k
g++ -c -o helper.o helper.cc
g++ -Wall -c helper.cc main.cc
g++ -Wall -pthread -o main helper.o main.o
Compilation finished at Thu Dec 8 22:33:35
```

```
UUU:~---F1 main.cc Top L1 Git-master (C++//I Abbrev)
Compilation finished
```

Execution and output

```
File Edit Options Buffers Tools Complete In/Out Signals Help
pab22@texe138:Coursework_Consumer_Producer$ ./main 5 0 2 3
Producer(1): job id 0 duration 4
Consumer(1): job id 0 executing sleep duration 4
Producer(2): job id 1 duration 7
Consumer(2): job id 1 executing sleep duration 7
Producer(2): job id 0 duration 4
Consumer(3): job id 0 executing sleep duration 4
Producer(2): job id 0 duration 7
Producer(1): job id 1 duration 10
Consumer(1): job id 0 completed
Consumer(1): job id 0 executing sleep duration 7
Producer(1): job id 1 duration 3
Consumer(3): job id 0 completed
Consumer(3): job id 1 executing sleep duration 10
Producer(2): job id 1 duration 1
Consumer(2): job id 1 completed
Consumer(2): job id 1 executing sleep duration 3
Producer(1): job id 1 duration 4
Consumer(2): job id 1 completed
Consumer(2): job id 1 executing sleep duration 1
Producer(2): job id 1 duration 1
Producer(1): job id 2 duration 3
Consumer(1): job id 0 completed
Consumer(1): job id 1 executing sleep duration 4
Consumer(2): job id 1 completed
Consumer(2): job id 1 executing sleep duration 1
Consumer(2): job id 1 completed
Consumer(2): job id 2 executing sleep duration 3
Producer(1): job id 1 duration 9
Producer(2): job id 1 duration 2
Consumer(1): job id 1 completed
Consumer(1): job id 1 executing sleep duration 2
Consumer(3): job id 1 completed
Consumer(3): job id 1 executing sleep duration 9
Consumer(2): job id 2 completed
Producer(1): No more jobs to generate
Consumer(1): job id 1 completed
Producer(2): No more jobs to generate
Consumer(3): job id 1 completed
Consumer(2): No more jobs left.
Consumer(1): No more jobs left.
Consumer(3): No more jobs left.
pab22@texe138:Coursework_Consumer_Producer$
```

```
UUU:~---F1 #shell# All L43 [Shell:run]
```