```
[dg3718@vm-shell2:~/Documents/semaphores$ make
g++     -c -o helper.o helper.cc
g++ -Wall -c helper.cc main.cc
g++ -Wall -pthread -o main helper.o main.o
[dg3718@vm-shell2:~/Documents/semaphores$ ./main 5 6 2 3
Producer(2): Job id 1 duration 8
Consumer(1): Job id 1 executing sleep duration 8
Producer(2): Job id 2 duration 4
Consumer(2): Job id 2 executing sleep duration 4
Producer(1): Job id 3 duration 7
Consumer(3): Job id 3 executing sleep duration 7
Producer(2): Job id 4 duration 10
Producer(2): Job id 5 duration 3
Producer(1): Job id 1 duration 1
Consumer(2): Job id 2 completed
Consumer(2): Job id 4 executing sleep duration 10
Producer(2): Job id 2 duration 4
Consumer(1): Job id 1 completed
Consumer(1): Job id 5 executing sleep duration 3
Consumer(3): Job id 3 completed
Consumer(3): Job id 1 executing sleep duration 1
Producer(2): Job id 3 duration 1
Producer(2): No more jobs to generate.
Producer(1): Job id 4 duration 7
Consumer(3): Job id 1 completed
Consumer(3): Job id 2 executing sleep duration 4
Consumer(1): Job id 5 completed
Consumer(1): Job id 3 executing sleep duration 1
Consumer(1): Job id 3 completed
Consumer(1): Job id 4 executing sleep duration 7
Producer(1): Job id 5 duration 7
Consumer(3): Job id 2 completed
Consumer(3): Job id 5 executing sleep duration 7
Producer(1): Job id 1 duration 9
Consumer(2): Job id 4 completed
Consumer(2): Job id 1 executing sleep duration 9
Producer(1): Job id 2 duration 10
Producer(1): No more jobs to generate.
Consumer(1): Job id 4 completed
Consumer(1): Job id 2 executing sleep duration 10
Consumer(3): Job id 5 completed
Consumer(2): Job id 1 completed
Consumer(1): Job id 2 completed
Consumer(3): No more jobs left.
Consumer(2): No more jobs left.
Consumer(1): No more jobs left.
[dg3718@vm-shell2:~/Documents/semaphores$ ./main 5 6 2 3 > my_output.txt
```

Compilation

execution and output

another instance of the execution with output redirected to my_output.txt (attached below)

```
Producer(2): Job id 1 duration 8
Consumer(1): Job id 1 executing sleep duration 8
Producer(2): Job id 2 duration 4
Consumer(2): Job id 2 executing sleep duration 4
Producer(1): Job id 3 duration 7
Consumer(3): Job id 3 executing sleep duration 7
Producer(2): Job id 4 duration 10
Producer(2): Job id 5 duration 3
Producer(1): Job id 1 duration 1
Consumer(2): Job id 2 completed
Consumer(2): Job id 4 executing sleep duration 10
Producer(2): Job id 2 duration 4
Consumer(1): Job id 1 completed
Consumer(1): Job id 5 executing sleep duration 3
Consumer(3): Job id 3 completed
Consumer(3): Job id 1 executing sleep duration 1
Producer(2): Job id 3 duration 1
Producer(2): No more jobs to generate.
Producer(1): Job id 4 duration 7
Consumer(3): Job id 1 completed
Consumer(3): Job id 2 executing sleep duration 4
Consumer(1): Job id 5 completed
Consumer(1): Job id 3 executing sleep duration 1
Consumer(1): Job id 3 completed
Consumer(1): Job id 4 executing sleep duration 7
Producer(1): Job id 5 duration 7
Consumer(3): Job id 2 completed
Consumer(3): Job id 5 executing sleep duration 7
Producer(1): Job id 1 duration 9
Consumer(2): Job id 4 completed
Consumer(2): Job id 1 executing sleep duration 9
Producer(1): Job id 2 duration 10
Producer(1): No more jobs to generate.
Consumer(1): Job id 4 completed
Consumer(1): Job id 2 executing sleep duration 10
Consumer(3): Job id 5 completed
Consumer(2): Job id 1 completed
Consumer(1): Job id 2 completed
Consumer(3): No more jobs left.
Consumer(2): No more jobs left.
Consumer(1): No more jobs left.
```