

Assignment 2

Matthew Benedict

26 November 2024

In this assignment, I implement solutions to the dining philosophers and producer-consumer problems in C using POSIX-conformant APIs.

Dining Philosophers

The dining philosophers program can be compiled by `clang dining_philosophers.c -o dining_philosophers --std=c99`. The program takes one argument, the number of seconds for which to execute before terminating, e.g. `./dining_philosophers 30`.

```
Last login: Tue Nov 26 15:18:43 on ttys005
matthewbenedict@MatthewMac156 ~ % cd ~/Documents/git/CS5343-A2/DiningPhilosophers; clang dining_philosophers.c -o dining_philosophers --std=c99; ./dining_philosophers 30
Philosopher 0 has arrived
Philosopher 3 has arrived
Philosopher 1 has arrived
Philosopher 1 is thinking deeply
Philosopher 0 is thinking deeply
Philosopher 4 has arrived
Philosopher 4 is thinking deeply
Philosopher 2 has arrived
Philosopher 2 is thinking deeply
Philosopher 3 is thinking deeply
Philosopher 1 is hungry
Philosopher 1 picked up chopsticks
Philosopher 4 is hungry
Philosopher 4 picked up chopsticks
Philosopher 4 put down chopsticks
Philosopher 4 is thinking deeply
Philosopher 0 is hungry
Philosopher 0 is sad because there are not enough chopsticks left
Philosopher 3 is hungry
Philosopher 3 picked up chopsticks
Philosopher 3 put down chopsticks
Philosopher 3 is thinking deeply
Philosopher 2 is hungry
Philosopher 2 is sad because there are not enough chopsticks left
Philosopher 1 put down chopsticks
Philosopher 0 received chopstick from 1
Philosopher 2 received chopstick from 1
Philosopher 1 is thinking deeply
matthewbenedict@MatthewMac156 DiningPhilosophers %
```

Producer-Consumer

The producer-consumer program can be compiled by `clang producer_consumer.c -o producer_consumer --std=c99`. The program takes three arguments: the number of seconds for which to execute before terminating, the number of producer threads, and the number of consumer threads, e.g. `./producer_consumer 30 4 3`

```
[matthewbenedict@MatthewMac156 ~ % cd Documents/git/CS5343-A2/ProducerConsumer; clang producer_consumer.c -o]
producer_consumer --std=c99; ./producer_consumer 30 4 3
Producer produced -294367601
Consumer consumed -294367601
Producer produced -2030060980
Consumer consumed -2030060980
Producer produced -30182969
Consumer consumed -30182969
Producer produced 162388059
Consumer consumed 162388059
Producer produced 287996237
Producer produced 287439312
Producer produced 203953083
Producer produced -1915128810
Consumer consumed 287996237
Consumer consumed 287439312
Consumer consumed 203953083
Producer produced -173080106
Producer produced -408546491
Producer produced 1541195198
Producer produced -856233783
Consumer consumed -1915128810
Consumer consumed -173080106
Consumer consumed -408546491
Consumer consumed 1541195198
Producer produced 1522016309
Producer produced 210706788
Consumer consumed -856233783
Producer produced -677785697
Consumer consumed 1522016309
Producer produced 493446275
Producer produced -1058525159
Producer produced 1179485333
Consumer consumed 210706788
Producer produced 1629133313
Consumer consumed -677785697
Producer produced -963768023
Consumer consumed 493446275
Producer produced -1231725691
Consumer consumed -1058525159
Producer produced -1448006963
Consumer consumed 1179485333
Producer produced 2140537913
Consumer consumed 1629133313
Producer produced 2069279184
Consumer consumed -963768023
Producer produced -1102526388
Consumer consumed -1231725691
Producer produced 1421164290
```