

OS HW2 Programming projects

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分工: $\frac{1}{3}$ for each

Environment

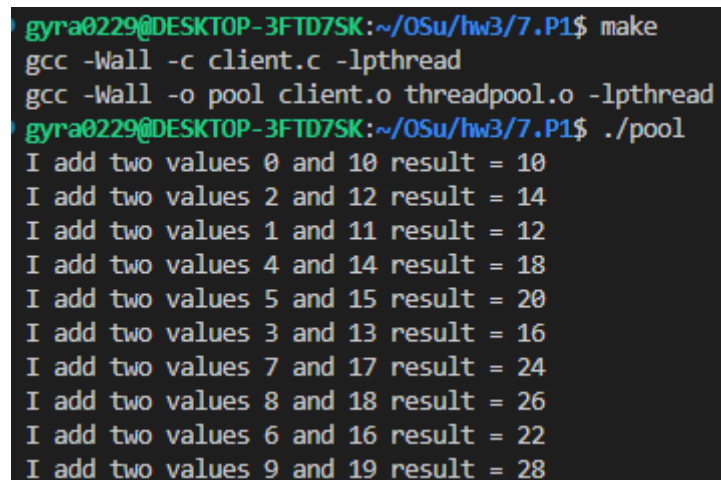
- OS: Ubuntu 22.04
- Kernel: Linux 5.15.153.1-microsoft-standard-WSL2
- Compiler: gcc 13.1.0

Ch7 project 1

Commands

```
cd 7.P1  
make  
./pool
```

Result image



```
gyra0229@DESKTOP-3FTD7SK:~/OSu/hw3/7.P1$ make  
gcc -Wall -c client.c -lpthread  
gcc -Wall -o pool client.o threadpool.o -lpthread  
gyra0229@DESKTOP-3FTD7SK:~/OSu/hw3/7.P1$ ./pool  
I add two values 0 and 10 result = 10  
I add two values 2 and 12 result = 14  
I add two values 1 and 11 result = 12  
I add two values 4 and 14 result = 18  
I add two values 5 and 15 result = 20  
I add two values 3 and 13 result = 16  
I add two values 7 and 17 result = 24  
I add two values 8 and 18 result = 26  
I add two values 6 and 16 result = 22  
I add two values 9 and 19 result = 28
```

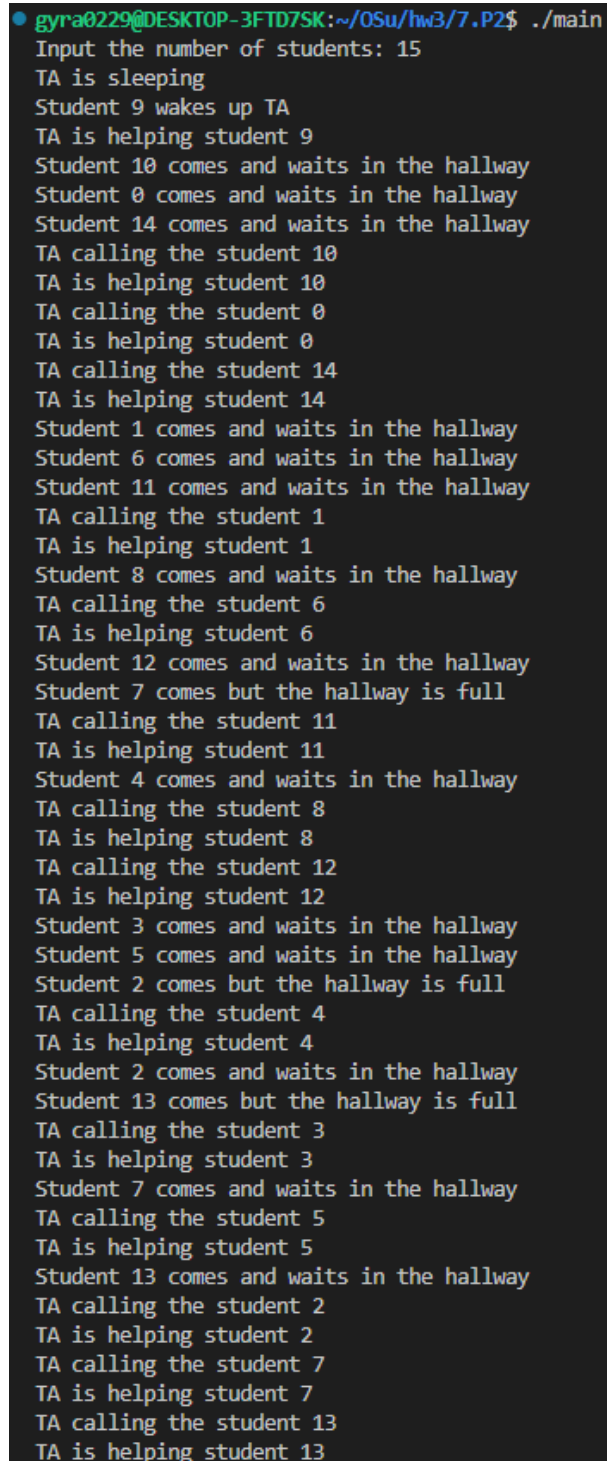
Figure 1: The result for ./main in 4.P1

Ch7 project 2

Commands

```
cd 7.P2
gcc main.c -pthread -o main
./main
```

Result image



```
gyra0229@DESKTOP-3FTD7SK:~/OSu/hw3/7.P2$ ./main
Input the number of students: 15
TA is sleeping
Student 9 wakes up TA
TA is helping student 9
Student 10 comes and waits in the hallway
Student 0 comes and waits in the hallway
Student 14 comes and waits in the hallway
TA calling the student 10
TA is helping student 10
TA calling the student 0
TA is helping student 0
TA calling the student 14
TA is helping student 14
Student 1 comes and waits in the hallway
Student 6 comes and waits in the hallway
Student 11 comes and waits in the hallway
TA calling the student 1
TA is helping student 1
Student 8 comes and waits in the hallway
TA calling the student 6
TA is helping student 6
Student 12 comes and waits in the hallway
Student 7 comes but the hallway is full
TA calling the student 11
TA is helping student 11
Student 4 comes and waits in the hallway
TA calling the student 8
TA is helping student 8
TA calling the student 12
TA is helping student 12
Student 3 comes and waits in the hallway
Student 5 comes and waits in the hallway
Student 2 comes but the hallway is full
TA calling the student 4
TA is helping student 4
Student 2 comes and waits in the hallway
Student 13 comes but the hallway is full
TA calling the student 3
TA is helping student 3
Student 7 comes and waits in the hallway
TA calling the student 5
TA is helping student 5
Student 13 comes and waits in the hallway
TA calling the student 2
TA is helping student 2
TA calling the student 7
TA is helping student 7
TA calling the student 13
TA is helping student 13
```

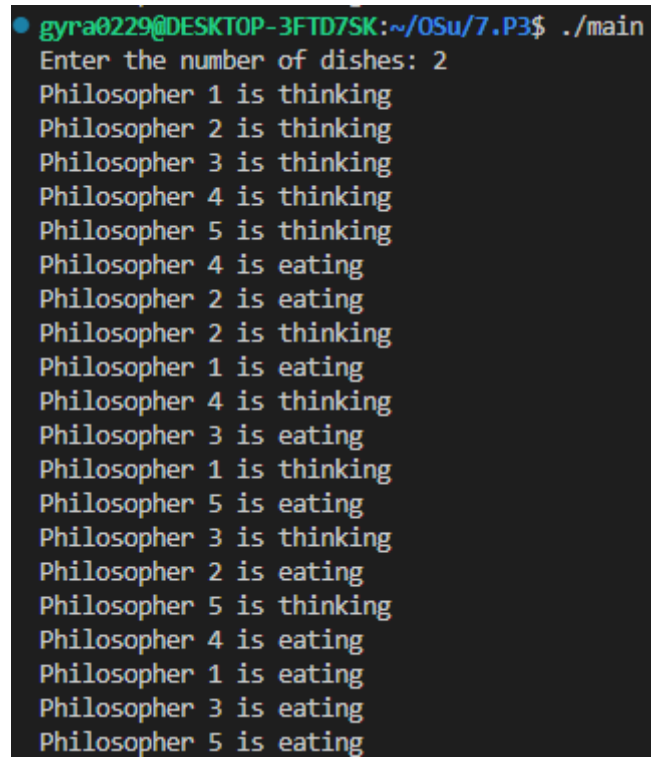
Figure 2: The result for ./main in 7.P2

Ch7 project 3

Commands

```
cd 7.P3  
gcc main.c -pthread -o main  
./main
```

Result image



```
gyra0229@DESKTOP-3FTD7SK:~/OSu/7.P3$ ./main  
Enter the number of dishes: 2  
Philosopher 1 is thinking  
Philosopher 2 is thinking  
Philosopher 3 is thinking  
Philosopher 4 is thinking  
Philosopher 5 is thinking  
Philosopher 4 is eating  
Philosopher 2 is eating  
Philosopher 2 is thinking  
Philosopher 1 is eating  
Philosopher 4 is thinking  
Philosopher 3 is eating  
Philosopher 1 is thinking  
Philosopher 5 is eating  
Philosopher 3 is thinking  
Philosopher 2 is eating  
Philosopher 5 is thinking  
Philosopher 4 is eating  
Philosopher 1 is eating  
Philosopher 3 is eating  
Philosopher 5 is eating
```

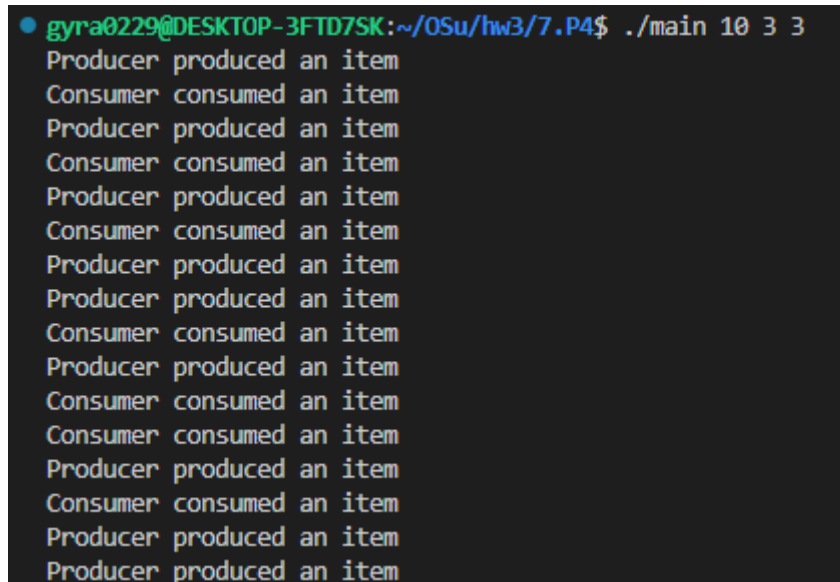
Figure 3: The result for ./main in 7.P3

Ch7 project 4

Commands

```
cd 7.P4
gcc main.c -pthread -o main
./main
```

Result image

A terminal window with a dark background and light green text. The prompt is 'gyra0229@DESKTOP-3FTD7SK:~/OSu/hw3/7.P4\$'. The command entered is './main 10 3 3'. The output consists of 18 lines, alternating between 'Producer produced an item' and 'Consumer consumed an item', starting and ending with a producer message. The messages are interleaved, showing concurrent execution of producer and consumer threads.

```
● gyra0229@DESKTOP-3FTD7SK:~/OSu/hw3/7.P4$ ./main 10 3 3
Producer produced an item
Consumer consumed an item
Producer produced an item
Consumer consumed an item
Producer produced an item
Consumer consumed an item
Producer produced an item
Producer produced an item
Consumer consumed an item
Producer produced an item
Consumer consumed an item
Consumer consumed an item
Producer produced an item
Consumer consumed an item
Producer produced an item
Producer produced an item
```

Figure 4: The result for ./main in 7.P4

Ch8 project 1

Commands

```
cd 8.P1
gcc main.c -pthread -o main
./main
```

Result image

```

Customer 2 request resources
resource 0: request 6, allocation 1, need 16
resource 1: request 0, allocation 1, need 1
resource 2: request 0, allocation 2, need 0
resource 3: request 1, allocation 4, need 14
request granted
-----
Customer 1 request resources
resource 0: request 0, allocation 91, need 0
resource 1: request 1, allocation 2, need 1
resource 2: request 0, allocation 5, need 1
resource 3: request 0, allocation 24, need 0
request granted
-----
Customer 2 request resources
resource 0: request 9, allocation 7, need 10
resource 1: request 0, allocation 1, need 1
resource 2: request 0, allocation 2, need 0
resource 3: request 3, allocation 5, need 13
request denied
-----
Customer 0 request resources
resource 0: request 0, allocation 0, need 46
resource 1: request 7, allocation 0, need 15
resource 2: request 2, allocation 0, need 17
resource 3: request 10, allocation 0, need 25
request denied
-----
Customer 4 request resources
resource 0: request 18, allocation 0, need 18
resource 1: request 12, allocation 0, need 13
resource 2: request 2, allocation 0, need 12
resource 3: request 14, allocation 0, need 15
request denied
-----
Customer 3 request resources
resource 0: request 85, allocation 0, need 85
resource 1: request 0, allocation 0, need 2
resource 2: request 0, allocation 0, need 3
resource 3: request 2, allocation 0, need 23
request denied
-----

```

Figure 5: Part of the result for ./main in 8.P1

Ch9 project 1

Commands

```

cd 9.P1
gcc main.c -pthread -o main
./main

```

Result image

```

● gyra0229@MSI:~/OSu/hw3/9.P1$ gcc main.c -o allocator
● gyra0229@MSI:~/OSu/hw3/9.P1$ ./allocator 100
allocator> RQ P0 10 W
allocator> RQ P1 15 W
allocator> RQ P2 20 W
allocator> RQ P3 25 B
allocator> RQ P4 30 F
allocator> STAT
Address [0:9] Process P0
Address [10:24] Process P1
Address [25:44] Process P2
Address [45:69] Process P3
Address [70:99] Process P4
allocator> C
allocator> STAT
Address [0:9] Process P0
Address [10:24] Process P1
Address [25:44] Process P2
Address [45:69] Process P3
Address [70:99] Process P4
allocator> RL P1
allocator> RL P3
allocator> STAT
Address [0:9] Process P0
Address [10:24] Unused
Address [25:44] Process P2
Address [45:69] Unused
Address [70:99] Process P4
allocator> RQ P5 5 F
allocator> STAT
Address [0:9] Process P0
Address [10:14] Process P5
Address [15:24] Unused
Address [25:44] Process P2
Address [45:69] Unused
Address [70:99] Process P4
allocator> RQ P6 1 W
allocator> STAT
Address [0:9] Process P0
Address [10:14] Process P5
Address [15:24] Unused
Address [25:44] Process P2
Address [45:45] Process P6
Address [46:69] Unused
Address [70:99] Process P4
allocator> RQ P7 9 B
allocator> STAT
Address [0:9] Process P0
Address [10:14] Process P5
Address [15:23] Process P7
Address [24:24] Unused
Address [25:44] Process P2
Address [45:45] Process P6
Address [46:69] Unused
Address [70:99] Process P4
allocator> C
allocator> STAT
Address [0:9] Process P0
Address [10:14] Process P5
Address [15:23] Process P7
Address [24:43] Process P2
Address [44:44] Process P6
Address [45:74] Process P4
Address [75:99] Unused
allocator> Q

```

Figure 6: The result for ./main in 9.P1