

NO LOCK

```
bottle read inventory
...Inventory: [PC 7]; [book 5]; [card 11];

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2    PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 0]; [card 11];
customer4      SOLD OUT! Cannot buy.

customer2 Finished return... 9 bottle

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer5 Buy...
customer6 Return... 1    card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [7      card read inventory

...Inventory: [PC 6]; [book 5]; card 11];
[bottle 9]; [card 11];

customer5 Finished buy... 7    card

...Inventory: [PC 6]; [book
customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 5]; [bottle 9]; [card 12];
12];

***Correct/Expected Inventory:
...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];
Actual Inventory:
...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 12];

Process finished with exit code 0
```

```
#####  
No lock. ROUND 10  
#####  
  
customer1 Buy... 2      PC  read inventory  
  
...Inventory: [PC  7]; [book  5]; [card 11];  
  
customer2 Return... 9  
customer4 Buy... 2      bottle read inventory  
customer3 Return... 1   PC  read inventory  
  
...Inventory: [PC  7]; [book  5]; [card 11];  
              bottle read inventory  
  
...Inventory: [PC  7]; [book  5]; [card 11];
```

WITH LOCK

```
#####
```

```
With lock. ROUND 10
```

```
#####
```

```
customer1 Buy... 2      PC  read inventory
```

```
...Inventory: [PC  7]; [book  5]; [card  11];
```

```
customer1 Finished buy... 2      PC
```

```
...Inventory: [PC  5]; [book  5]; [card  11];
```

```
customer2 Return... 9  bottle  read inventory
```

```
...Inventory: [PC  5]; [book  5]; [card  11];
```

```
customer2 Finished return... 9  bottle
```

```
...Inventory: [PC  5]; [book  5]; [bottle  9]; [card  11];
```

```
customer3 Return... 1  PC  read inventory
```

```
...Inventory: [PC  5]; [book  5]; [bottle  9]; [card  11];
```

```
customer3 Finished return... 1  PC
```

```
...Inventory: [PC  6]; [book  5]; [bottle  9]; [card  11];
```

```
customer4 Buy... 2      bottle  read inventory
```

```
...Inventory: [PC  6]; [book  5]; [bottle  9]; [card  11];
```

```
customer4 Finished buy... 2      bottle
```

```
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  11];
```

```
customer5 Buy... 7      card  read inventory
```

```
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  11];
```

```
customer5 Finished buy... 7      card
```

```
#####
With lock. ROUND 1
#####

customer1 Buy... 2      PC  read inventory
...Inventory: [PC  7]; [book  5]; [card  11];

customer1 Finished buy... 2      PC
...Inventory: [PC  5]; [book  5]; [card  11];

customer2 Return... 9   bottle  read inventory
...Inventory: [PC  5]; [book  5]; [card  11];

customer2 Finished return... 9   bottle
...Inventory: [PC  5]; [book  5]; [bottle  9]; [card  11];

customer3 Return... 1   PC  read inventory
...Inventory: [PC  5]; [book  5]; [bottle  9]; [card  11];

customer3 Finished return... 1   PC
...Inventory: [PC  6]; [book  5]; [bottle  9]; [card  11];

customer4 Buy... 2      bottle  read inventory
...Inventory: [PC  6]; [book  5]; [bottle  9]; [card  11];

customer4 Finished buy... 2      bottle
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  11];

customer5 Buy... 7      card  read inventory
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  11];

customer5 Finished buy... 7      card
```

```
***Correct/Expected  Inventory:
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  5];
Actual Inventory:
...Inventory: [PC  6]; [book  5]; [bottle  7]; [card  5];
```

```
#####
With lock. ROUND 10
#####

customer1 Buy... 2      PC  read inventory
...Inventory: [PC  7]; [book  5]; [card  11];

customer1 Finished buy... 2      PC
...Inventory: [PC  5]; [book  5]; [card  11];

customer2 Return... 9   bottle  read inventory
```

C:\Users\caroh\CLionProjects\concurrency\cmake-build-debug\concurrency.exe

#####

With lock. ROUND 1

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 2

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 5]; [book 5]; [bottle 7]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 7]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 3

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

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With lock. ROUND 4

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 6]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 5

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer4 SOLD OUT! Cannot buy.

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 0]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 0]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 0]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 5];

#####

With lock. ROUND 6

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 6]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 7

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 8

#####

customer1 Buy... 2 PC read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2 PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9 bottle read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####

With lock. ROUND 9

#####

customer2 Return... 9 bottle read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer2 Finished return... 9 bottle

...Inventory: [PC 7]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 7]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 8]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 8]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 8]; [book 5]; [bottle 7]; [card 11];

```

customer1 Buy... 2    PC  read inventory

...Inventory: [PC 8]; [book 5]; [bottle 7]; [card 11];

customer1 Finished buy... 2    PC

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7    card  read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7    card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1  card  read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1  card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:
...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];
Actual Inventory:
...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

#####
With lock. ROUND 10
#####

customer1 Buy... 2    PC  read inventory

...Inventory: [PC 7]; [book 5]; [card 11];

customer1 Finished buy... 2    PC

...Inventory: [PC 5]; [book 5]; [card 11];

customer2 Return... 9  bottle  read inventory

...Inventory: [PC 5]; [book 5]; [card 11];

```


customer2 Finished return... 9 bottle

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Return... 1 PC read inventory

...Inventory: [PC 5]; [book 5]; [bottle 9]; [card 11];

customer3 Finished return... 1 PC

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Buy... 2 bottle read inventory

...Inventory: [PC 6]; [book 5]; [bottle 9]; [card 11];

customer4 Finished buy... 2 bottle

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Buy... 7 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 11];

customer5 Finished buy... 7 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Return... 1 card read inventory

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 4];

customer6 Finished return... 1 card

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

***Correct/Expected Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Actual Inventory:

...Inventory: [PC 6]; [book 5]; [bottle 7]; [card 5];

Process finished with exit code 0

