

GEBZE TECHNICAL UNIVERSITY
CSE344 – FINAL REPORT

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1) SYSTEM DESIGN:

1.a) Server Side

Threads:

a) Cook Thread:

- There are given number of cook threads in the system.
- These thread take orders from the queue by taking the manager mutex so that manager come here and assigns the order to the cook. It takes if there are any orders in the queue and start preparing it.
- After it prepares, this cook is added into the oven opening waiting queue so that this cook can take the oven after a while if there are any cooks before this cook waiting the oven without causing any deadlock.
- When the cook inserts its food into the oven, it starts to check if there are any other orders to prepare while the food is cooking. The cook is cooked in a oven slot thread which is explained below.
- When the food is cooked, the cook mutex is taken and cook takes the apparatus and removes the food from the oven.

b) Oven Opening Thread:

- There is only 1 oven opening thread since the shop has 1 oven and 1 opening for the insertion.
- This thread is used to synchronize the food inserting process.
- The cooks are waiting in the oven opening queue, oven opening thread takes one of them and allows them to insert its prepared food into the oven.
- This prevents the possible deadlocks that can be caused by taking apparatus.

c) Oven Slot Threads:

- There are 6 oven slot threads since there are 6 available slots to insert food inside oven.
- These threads are waiting oven slot queue so that when the cook inserts a food into an empty slot, it is taken into the one of the slots and it starts cooking there.
- After cooking is done, this thread tries to take the cook's mutex so that cook is come here and removes the food by taking the necessary apparatus.

- While the food is being removed, the manager mutex is taken so that it takes the fully prepared order and put it into the delivery waiting queue.

d) Delivery Waiting Person Threads:

- There are given number of delivery waiting person threads in the system.
- These threads look for the delivery waiting order queue and takes if there are any orders there by taking the manager mutex so that manager comes here and assigns the order to the delivery personnel.
- After taking the order it checks if it has 3 orders in its bag, if it is then it starts delivering or it goes back to listening to the queue otherwise.

Mutexes, Semaphores, Flags:

For queue mutexes: There are mutexes for preventing race conditions for queues in both adding and removing.

For queue semaphores: There are semaphores to block the threads in waiting for the queues so that there is a gain in CPU time and synchronization between threads in using queue.

For cancel, server stop flags: There are flags that determines if the server cancel request has come or an order cancellation request has come. Using these flags, threads are exited or dropped their orders properly and quickly.

Matrix Inverse and Waiting Time:

- In server start, a 30×40 matrix is pseudo inversed and the time is calculated.
- After this point, the cook and cooking food times are adjusted accordingly such that the cook's preparing time has the same amount of time and food's cooking time has the half amount of time.

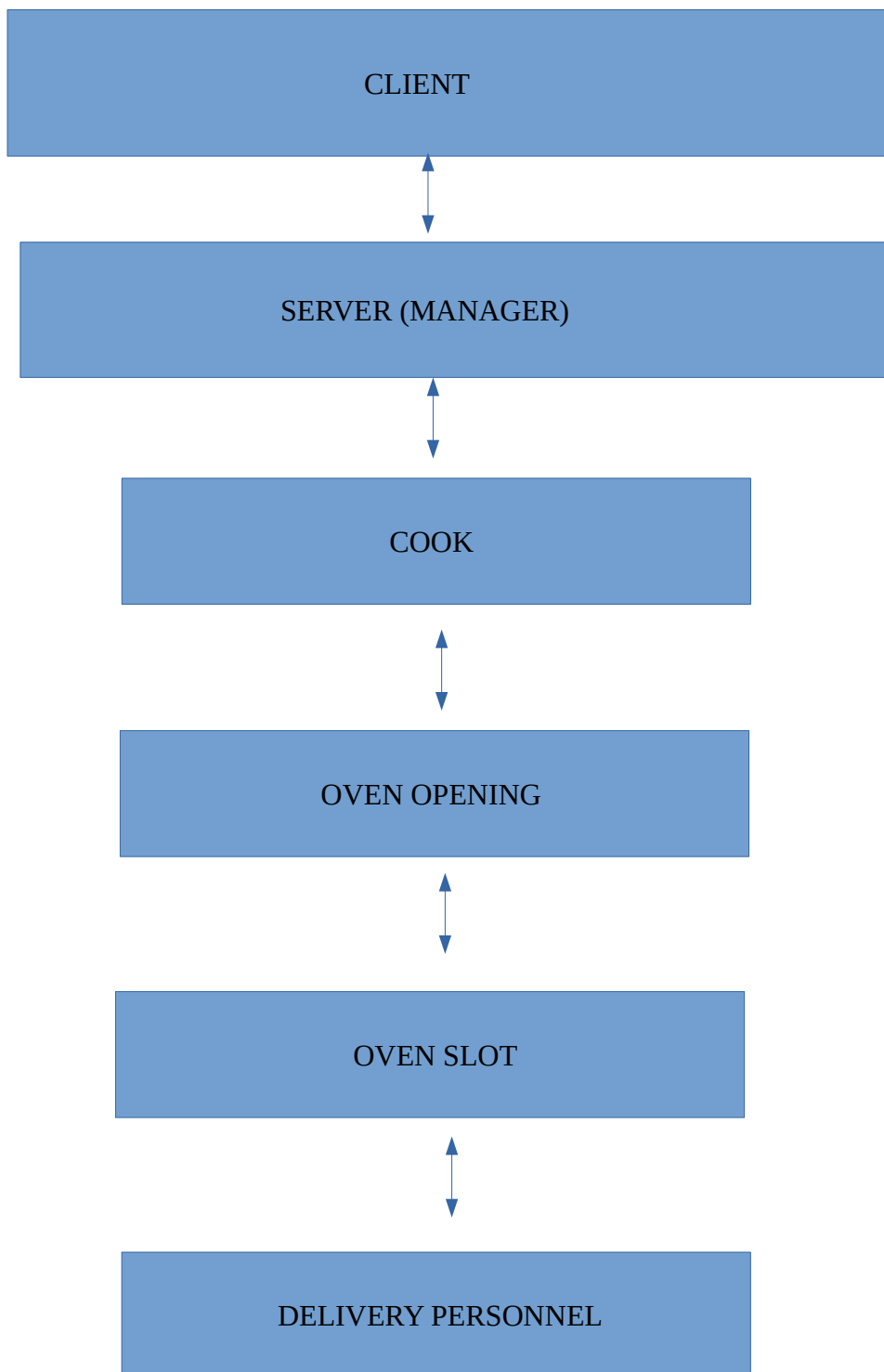
Delivery Personnel Deliver Route:

- Delivery personnel delivers the orders in the exact same order such that:

- 1) Shop to first order
- 2) First order to second order
- 3) Second order to third order
- 4) Third order to Shop

- If there are less amount of orders to deliver such that the given number of orders is not divided by 3, then it follows the same path but it does not go the missing orders such that if there are 2 orders to deliver then it follows the steps 1, 2, and second to shop.

Flowchart for Overall System Design:



NOTE: There are some transitions not shown here such that each thread (rectangle) in the server side, can communicate with the client using the socket and mutex so that they can send order's information for preparing, cooked, in the way or delivered etc.

Delivery Personnel Speed:

- Since it takes very very long to deliver an order if the p and q are in KM unit and k is in M unit, therefore I take the k as KM unit so that appropriate speed values are enough like 100, 1000.

Socket Connection:

- The IP and port are given as parameters.
- It creates a socket for this given IP and port for IPv4.
- It creates a STREAM socket so that it is more portable in different machines and easy to manage by sending and receiving bytes by bytes.

Socket Synchronization:

- Socket Write:

- 1) Send the number of characters to be sent as metadata with a fixed-size string always.
- 2) Then, sent the actual data while checking if there is any interrupt or if all characters are sent. If all characters are not sent and the socket connection is open, then try to send the remaining ones.

- Socket Read:

- 1) Read the number of characters that will be read first with a fixed-size string always as we handshake with the write size.
- 2) Then, read the actual data while checking if there is any interrupt or if all characters are read. If all characters are not read and the socket connection is open, then try to read the remaining ones.

- Acknowledgment Message (ACK) :

- ACK message is sent when the communication will be end.
- When the server is done with all stuff and writing, it will close the socket but before that it needs to send an ACK message and then wait until a message comes or the client socket is disconnected. This way we prevent the unexpected behaviour or data loss.

1.b) Client Side:

- Client side only takes the given parameters, generates orders with random positions in the $(-p/2, q/2)$ and $(p/2, q/2)$ interval.
- It first writes these into the server socket, and then reads until ACK message come.

2) Compiling and Running the Program:

Compiling: You can use “make” to compile all source code and “make clean” to remove them.

- Running Server:

```
./PideShop 127.0.0.1 5002 10 10 1000
```

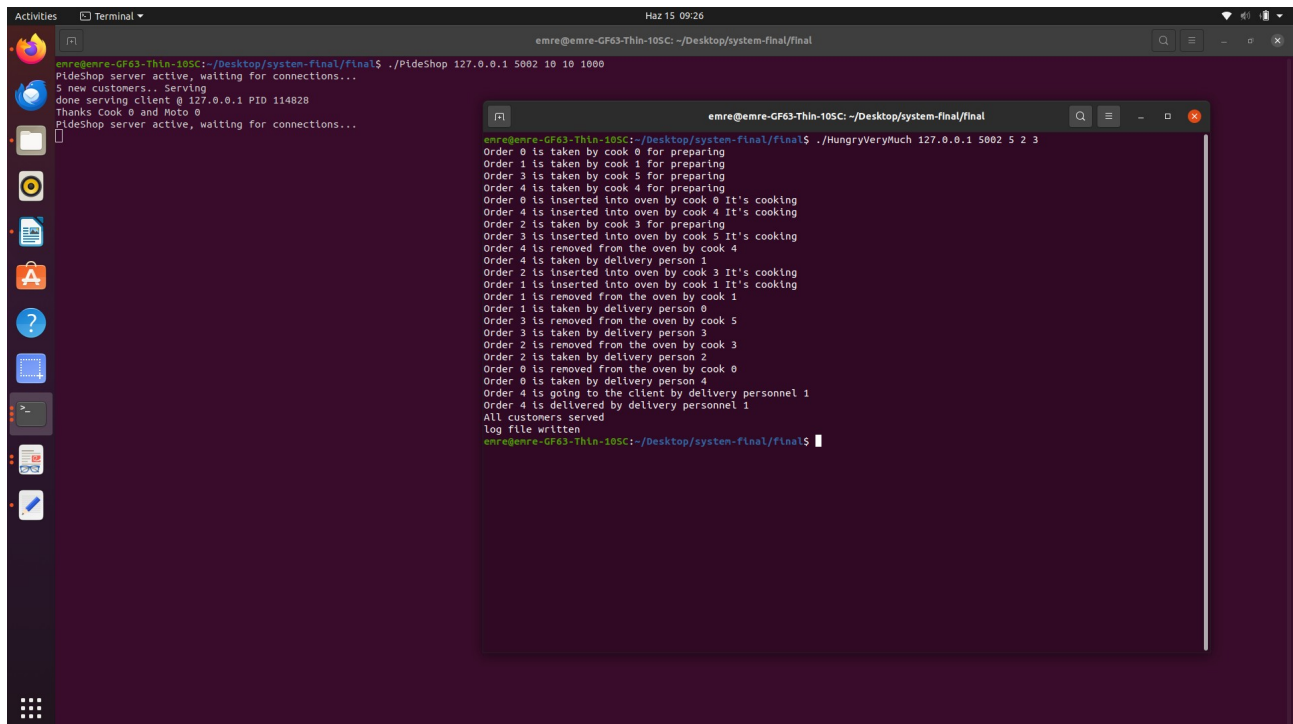
- Running Client:

```
/HungryVeryMuch 127.0.0.1 5002 5 2 3
```

NOTE: If it says “port in use”, just change the port because it’s related to the O/S’s wait time.

3) Screenshots:

Case 1:

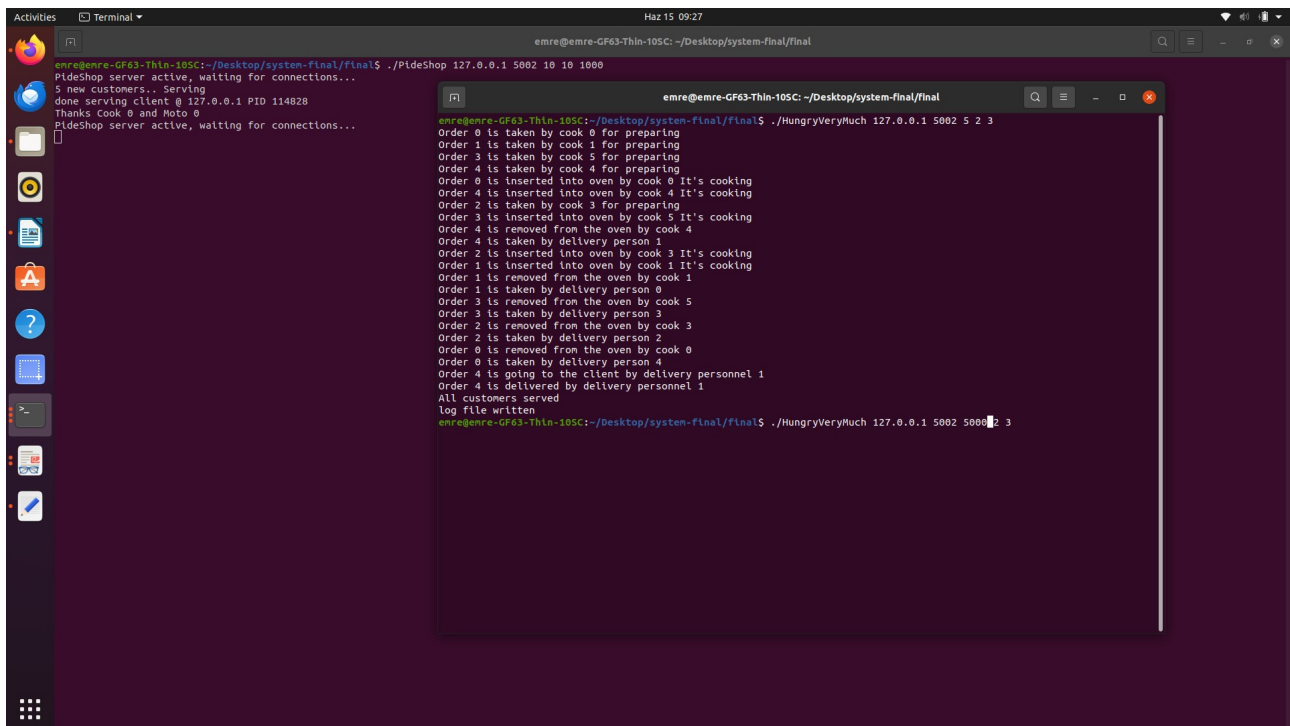


```
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
5 new customers.. Serving
done serving client @ 127.0.0.1 PID 114828
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5002 5 2 3
Order 0 is taken by cook 0 for preparing
Order 1 is taken by cook 1 for preparing
Order 3 is taken by cook 5 for preparing
Order 4 is taken by cook 4 for preparing
Order 0 is inserted into oven by cook 0 It's cooking
Order 4 is inserted into oven by cook 4 It's cooking
Order 2 is taken by cook 3 for preparing
Order 3 is inserted into oven by cook 5 It's cooking
Order 4 is removed from the oven by cook 4
Order 4 is taken by delivery person 1
Order 2 is inserted into oven by cook 3 It's cooking
Order 1 is inserted into oven by cook 1 It's cooking
Order 1 is removed from the oven by cook 1
Order 1 is taken by delivery person 0
Order 3 is removed from the oven by cook 5
Order 3 is taken by delivery person 3
Order 2 is removed from the oven by cook 3
Order 2 is taken by delivery person 2
Order 0 is removed from the oven by cook 0
Order 0 is taken by delivery person 4
Order 4 is going to the client by delivery personnel 1
Order 4 is delivered by delivery personnel 1
All customers served
log file written
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$
```

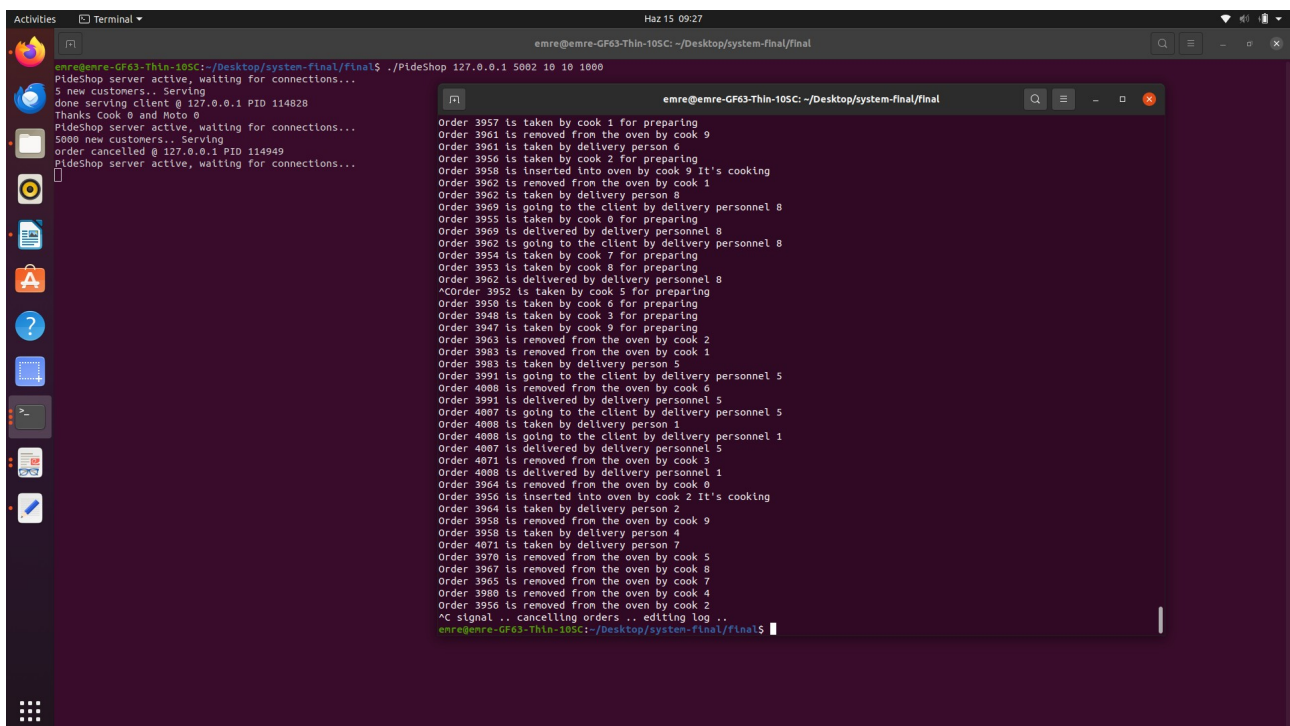
- As, it is seen the given 5 orders are processed and the client is informed about it. At the end, it properly exits and server waits connection as specified in the PDF.

Case 2:



```
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
5 new customers.. Serving
done serving client @ 127.0.0.1 PID 114828
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5002 5 2 3
Order 0 is taken by cook 0 for preparing
Order 1 is taken by cook 1 for preparing
Order 3 is taken by cook 5 for preparing
Order 4 is taken by cook 4 for preparing
Order 0 is inserted into oven by cook 0 It's cooking
Order 4 is inserted into oven by cook 4 It's cooking
Order 2 is taken by cook 3 for preparing
Order 3 is inserted into oven by cook 5 It's cooking
Order 4 is removed from the oven by cook 4
Order 4 is taken by delivery person 1
Order 2 is inserted into oven by cook 3 It's cooking
Order 1 is inserted into oven by cook 1 It's cooking
Order 1 is removed from the oven by cook 1
Order 1 is taken by delivery person 0
Order 3 is removed from the oven by cook 5
Order 3 is taken by delivery person 3
Order 2 is removed from the oven by cook 3
Order 2 is taken by delivery person 2
Order 0 is removed from the oven by cook 0
Order 0 is taken by delivery person 4
Order 4 is going to the client by delivery person 1
Order 4 is delivered by delivery person 1
All customers served
log file written
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5002 5000 2 3
```



```
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
5 new customers.. Serving
done serving client @ 127.0.0.1 PID 114828
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
5000 new customers.. Serving
order cancelled @ 127.0.0.1 PID 114949
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$
Order 3957 is taken by cook 1 for preparing
Order 3961 is removed from the oven by cook 9
Order 3961 is taken by delivery person 6
Order 3956 is taken by cook 2 for preparing
Order 3958 is inserted into oven by cook 9 It's cooking
Order 3962 is removed from the oven by cook 1
Order 3962 is taken by delivery person 8
Order 3969 is going to the client by delivery person 8
Order 3955 is taken by cook 0 for preparing
Order 3969 is delivered by delivery person 8
Order 3962 is going to the client by delivery person 8
Order 3954 is taken by cook 7 for preparing
Order 3953 is taken by cook 8 for preparing
Order 3962 is delivered by delivery person 8
^COrder 3952 is taken by cook 5 for preparing
Order 3950 is taken by cook 6 for preparing
Order 3948 is taken by cook 3 for preparing
Order 3947 is taken by cook 9 for preparing
Order 3963 is removed from the oven by cook 2
Order 3983 is removed from the oven by cook 1
Order 3983 is taken by delivery person 5
Order 3991 is going to the client by delivery person 5
Order 4008 is removed from the oven by cook 6
Order 3991 is delivered by delivery person 5
Order 4007 is going to the client by delivery person 5
Order 4008 is taken by delivery person 1
Order 4008 is going to the client by delivery person 1
Order 4007 is delivered by delivery person 5
Order 4071 is removed from the oven by cook 3
Order 4008 is delivered by delivery person 1
Order 3964 is removed from the oven by cook 0
Order 3956 is inserted into oven by cook 2 It's cooking
Order 3964 is taken by delivery person 2
Order 3958 is removed from the oven by cook 9
Order 3958 is taken by delivery person 4
Order 4071 is taken by delivery person 7
Order 3970 is removed from the oven by cook 5
Order 3967 is removed from the oven by cook 8
Order 3965 is removed from the oven by cook 7
Order 3980 is removed from the oven by cook 4
Order 3956 is removed from the oven by cook 2
^C signal ... cancelling orders ... editing log ..
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$
```

- As it is seen, the client (at the right) sends a cancel order request to the server and server cancels the order while informing the client.

Case 3:

```
Activities Terminal Haz 15 09:30
emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5802 10 1000
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115250
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5802 3 2 3
Order 0 is taken by cook 0 for preparing
Order 0 is inserted into oven by cook 0 It's cooking
Order 1 is taken by cook 1 for preparing
Order 0 is removed from the oven by cook 0
Order 0 is taken by delivery person 0
Order 1 is inserted into oven by cook 1 It's cooking
Order 2 is taken by cook 2 for preparing
Order 1 is removed from the oven by cook 1
Order 2 is inserted into oven by cook 2 It's cooking
Order 1 is taken by delivery person 2
Order 2 is removed from the oven by cook 2
Order 2 is taken by delivery person 1
Order 2 is going to the client by delivery personnel 1
Order 1 is going to the client by delivery personnel 2
Order 2 is delivered by delivery personnel 1
Order 1 is delivered by delivery personnel 2
All customers served
log file written
emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 3 5000 2 3
Connection to the server failed: Connection refused
emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5802 3 2 3
```

```
Activities Terminal Haz 15 09:30
emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5802 10 1000
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115250
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115448
Thanks Cook 1 and Moto 2
PideShop server active, waiting for connections...
1000 new customers.. Serving
done serving client @ 127.0.0.1 PID 115500
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-10SC: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5802 1000 10 7
Order 0 is taken by cook 2 for preparing
Order 1 is taken by cook 1 for preparing
Order 0 is inserted into oven by cook 2 It's cooking
Order 1 is inserted into oven by cook 1 It's cooking
Order 2 is taken by cook 4 for preparing
Order 1 is removed from the oven by cook 1
Order 1 is taken by delivery person 5
Order 2 is inserted into oven by cook 4 It's cooking
Order 3 is taken by cook 9 for preparing
Order 0 is removed from the oven by cook 2
Order 0 is taken by delivery person 2
Order 2 is removed from the oven by cook 4
Order 3 is inserted into oven by cook 9 It's cooking
Order 2 is taken by delivery person 0
Order 3 is removed from the oven by cook 9
Order 4 is taken by cook 8 for preparing
Order 3 is taken by delivery person 4
Order 4 is inserted into oven by cook 8 It's cooking
Order 5 is taken by cook 7 for preparing
Order 4 is removed from the oven by cook 8
Order 5 is inserted into oven by cook 7 It's cooking
Order 6 is taken by cook 6 for preparing
Order 4 is taken by delivery person 9
Order 6 is inserted into oven by cook 6 It's cooking
Order 5 is removed from the oven by cook 7
Order 6 is removed from the oven by cook 6
Order 6 is taken by delivery person 3
Order 7 is taken by cook 3 for preparing
Order 5 is taken by delivery person 8
Order 7 is inserted into oven by cook 3 It's cooking
Order 8 is taken by cook 5 for preparing
Order 7 is removed from the oven by cook 3
Order 8 is inserted into oven by cook 5 It's cooking
Order 7 is taken by delivery person 1
Order 9 is taken by cook 0 for preparing
Order 8 is removed from the oven by cook 5
Order 9 is inserted into oven by cook 0 It's cooking
Order 10 is taken by cook 2 for preparing
Order 8 is taken by cook 5 for preparing
Order 10 is inserted into oven by cook 2 It's cooking
Order 11 is taken by cook 1 for preparing
Order 9 is removed from the oven by cook 0
```



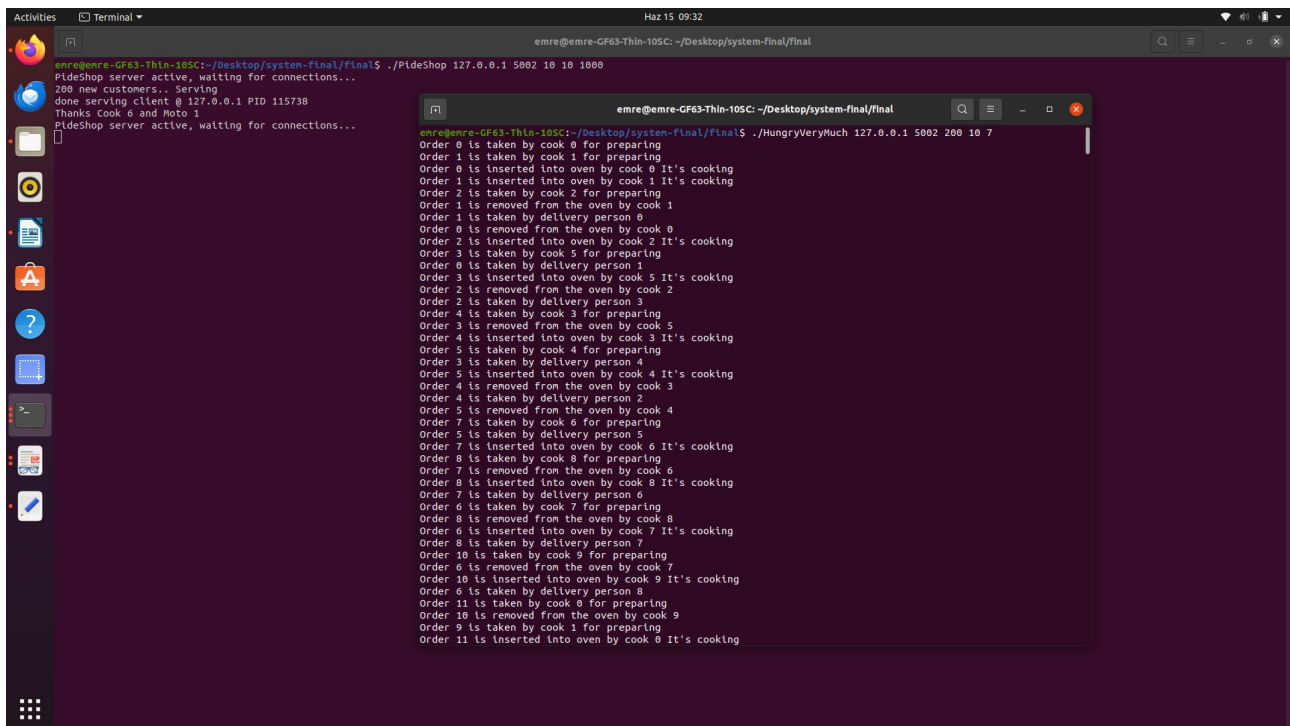
```
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115250
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115448
Thanks Cook 1 and Moto 2
PideShop server active, waiting for connections...
1000 new customers.. Serving
done serving client @ 127.0.0.1 PID 115500
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...

Order 82 is going to the client by delivery personnel 4
Order 37 is taken by cook 2 for preparing
Order 82 is delivered by delivery personnel 4
Order 59 is going to the client by delivery personnel 4
Order 40 is removed from the oven by cook 1
Order 59 is delivered by delivery personnel 4
Order 41 is going to the client by delivery personnel 4
Order 38 is inserted into oven by cook 1 It's cooking
Order 36 is taken by cook 3 for preparing
Order 41 is delivered by delivery personnel 4
Order 39 is removed from the oven by cook 4
Order 49 is removed from the oven by cook 2
Order 49 is taken by delivery person 2
Order 37 is inserted into oven by cook 2 It's cooking
Order 38 is removed from the oven by cook 1
Order 38 is taken by delivery person 9
Order 50 is removed from the oven by cook 3
Order 50 is taken by delivery person 5
Order 58 is going to the client by delivery personnel 5
Order 36 is inserted into oven by cook 3 It's cooking
Order 55 is inserted into oven by cook 0 It's cooking
Order 69 is inserted into oven by cook 9 It's cooking
Order 37 is removed from the oven by cook 2
Order 58 is delivered by delivery personnel 5
Order 57 is going to the client by delivery personnel 5
Order 37 is taken by delivery person 1
Order 83 is inserted into oven by cook 8 It's cooking
Order 57 is delivered by delivery personnel 5
Order 50 is going to the client by delivery personnel 5
Order 84 is inserted into oven by cook 5 It's cooking
Order 39 is taken by delivery person 7
Order 50 is delivered by delivery personnel 5
Order 127 is inserted into oven by cook 6 It's cooking
Order 128 is inserted into oven by cook 7 It's cooking
Order 69 is removed from the oven by cook 9
Order 69 is taken by delivery person 3
Order 68 is going to the client by delivery personnel 3
Order 83 is removed from the oven by cook 8
Order 68 is delivered by delivery personnel 3
Order 46 is going to the client by delivery personnel 3
Order 83 is taken by delivery person 8
Order 46 is delivered by delivery personnel 3
Order 69 is going to the client by delivery personnel 3
```

```
Order 55 is removed from the oven by cook 0
Order 84 is removed from the oven by cook 5
Order 84 is taken by delivery person 4
Order 55 is taken by delivery person 8
Order 53 is going to the client by delivery personnel 0
Order 128 is removed from the oven by cook 7
Order 53 is delivered by delivery personnel 0
Order 45 is going to the client by delivery personnel 0
Order 128 is taken by delivery person 2
Order 51 is going to the client by delivery personnel 2
Order 45 is delivered by delivery personnel 0
Order 55 is going to the client by delivery personnel 0
Order 51 is delivered by delivery personnel 2
Order 49 is going to the client by delivery personnel 2
Order 55 is delivered by delivery personnel 0
Order 36 is removed from the oven by cook 3
Order 49 is delivered by delivery personnel 2
Order 128 is going to the client by delivery personnel 2
Order 36 is taken by delivery person 9
Order 40 is going to the client by delivery personnel 9
Order 128 is delivered by delivery personnel 2
Order 127 is removed from the oven by cook 6
Order 40 is delivered by delivery personnel 9
Order 38 is going to the client by delivery personnel 9
Order 127 is taken by delivery person 1
Order 38 is delivered by delivery personnel 9
Order 36 is going to the client by delivery personnel 9
Order 83 is going to the client by delivery personnel 4
Order 83 is going to the client by delivery personnel 8
Order 48 is going to the client by delivery personnel 1
Order 39 is going to the client by delivery personnel 7
Order 36 is delivered by delivery personnel 9
Order 84 is delivered by delivery personnel 4
Order 83 is delivered by delivery personnel 8
Order 48 is delivered by delivery personnel 1
Order 37 is going to the client by delivery personnel 1
Order 39 is delivered by delivery personnel 7
Order 37 is delivered by delivery personnel 1
Order 127 is going to the client by delivery personnel 1
Order 127 is delivered by delivery personnel 1
All customers served
log file written
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$
```

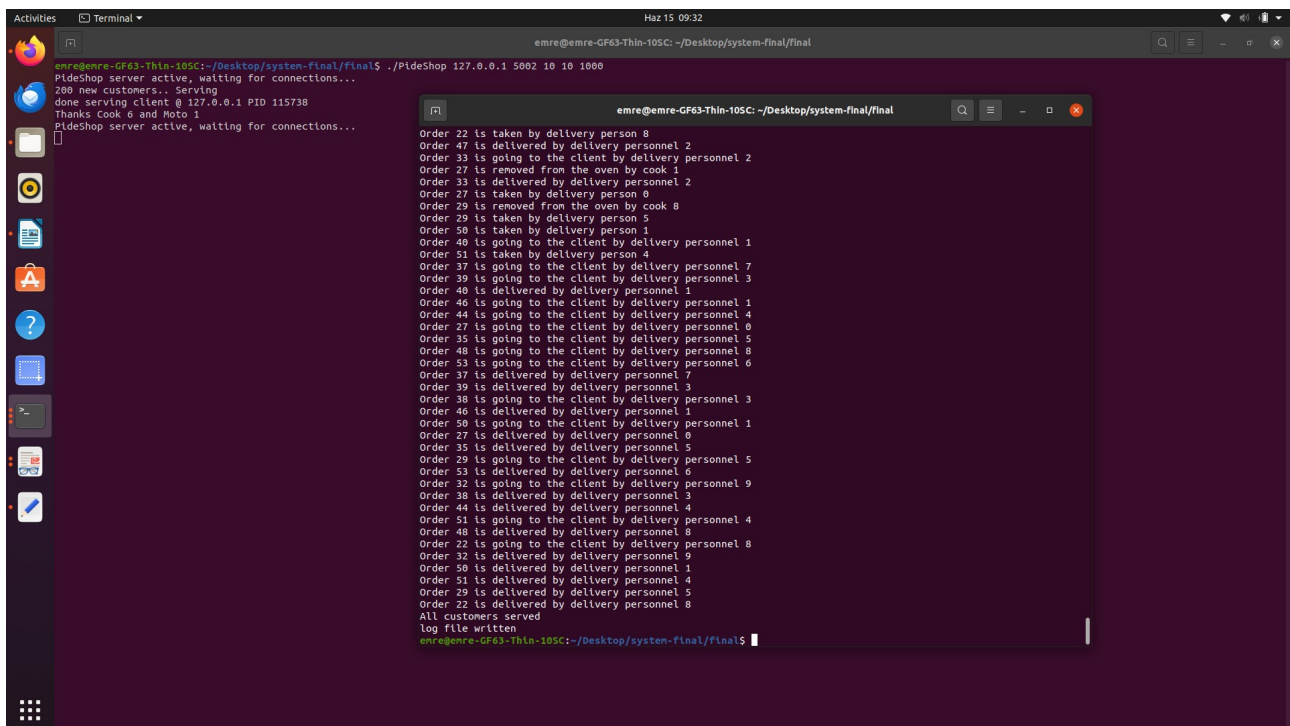
- It's a long-run test case with a lot of orders. Server is handling them properly without causing any deadlocks and informing the client in the meantime.

Case 4 :



```
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5802 10 10 1000
PideShop server active, waiting for connections...
200 new customers... Serving
done serving client @ 127.0.0.1 PID 115738
Thanks Cook 6 and Moto 1
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5802 200 10 7
Order 0 is taken by cook 0 for preparing
Order 1 is taken by cook 1 for preparing
Order 0 is inserted into oven by cook 0 it's cooking
Order 1 is inserted into oven by cook 1 it's cooking
Order 2 is taken by cook 2 for preparing
Order 1 is removed from the oven by cook 1
Order 1 is taken by delivery person 0
Order 0 is removed from the oven by cook 0
Order 2 is inserted into oven by cook 2 it's cooking
Order 3 is taken by cook 5 for preparing
Order 0 is taken by delivery person 1
Order 3 is inserted into oven by cook 5 it's cooking
Order 2 is removed from the oven by cook 2
Order 2 is taken by delivery person 3
Order 4 is taken by cook 3 for preparing
Order 3 is removed from the oven by cook 5
Order 4 is inserted into oven by cook 3 it's cooking
Order 5 is taken by cook 4 for preparing
Order 3 is taken by delivery person 4
Order 5 is inserted into oven by cook 4 it's cooking
Order 4 is removed from the oven by cook 3
Order 4 is taken by delivery person 2
Order 5 is removed from the oven by cook 4
Order 7 is taken by cook 6 for preparing
Order 5 is taken by delivery person 5
Order 7 is inserted into oven by cook 6 it's cooking
Order 8 is taken by cook 8 for preparing
Order 8 is removed from the oven by cook 6
Order 8 is inserted into oven by cook 8 it's cooking
Order 7 is taken by delivery person 6
Order 6 is taken by cook 7 for preparing
Order 8 is removed from the oven by cook 8
Order 6 is inserted into oven by cook 7 it's cooking
Order 8 is taken by delivery person 7
Order 10 is taken by cook 9 for preparing
Order 6 is removed from the oven by cook 7
Order 10 is inserted into oven by cook 9 it's cooking
Order 6 is taken by delivery person 8
Order 11 is taken by cook 0 for preparing
Order 10 is removed from the oven by cook 9
Order 9 is taken by cook 1 for preparing
Order 11 is inserted into oven by cook 0 it's cooking
```



```
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5802 10 10 1000
PideShop server active, waiting for connections...
200 new customers... Serving
done serving client @ 127.0.0.1 PID 115738
Thanks Cook 6 and Moto 1
PideShop server active, waiting for connections...

emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$
Order 22 is taken by delivery person 8
Order 47 is delivered by delivery personnel 2
Order 33 is going to the client by delivery personnel 2
Order 27 is removed from the oven by cook 1
Order 33 is delivered by delivery personnel 2
Order 27 is taken by delivery person 0
Order 29 is removed from the oven by cook 8
Order 29 is taken by delivery person 5
Order 50 is taken by delivery person 1
Order 40 is going to the client by delivery personnel 1
Order 51 is taken by delivery person 4
Order 37 is going to the client by delivery personnel 7
Order 39 is going to the client by delivery personnel 3
Order 40 is delivered by delivery personnel 1
Order 46 is going to the client by delivery personnel 1
Order 44 is going to the client by delivery personnel 4
Order 27 is going to the client by delivery personnel 0
Order 35 is going to the client by delivery personnel 5
Order 40 is going to the client by delivery personnel 8
Order 53 is going to the client by delivery personnel 6
Order 37 is delivered by delivery personnel 7
Order 39 is delivered by delivery personnel 3
Order 38 is going to the client by delivery personnel 3
Order 46 is delivered by delivery personnel 1
Order 50 is going to the client by delivery personnel 1
Order 27 is delivered by delivery personnel 0
Order 35 is delivered by delivery personnel 5
Order 29 is going to the client by delivery personnel 5
Order 53 is delivered by delivery personnel 6
Order 32 is going to the client by delivery personnel 9
Order 44 is delivered by delivery personnel 4
Order 51 is going to the client by delivery personnel 4
Order 48 is delivered by delivery personnel 8
Order 22 is going to the client by delivery personnel 8
Order 32 is delivered by delivery personnel 9
Order 50 is delivered by delivery personnel 1
Order 51 is delivered by delivery personnel 4
Order 29 is delivered by delivery personnel 5
Order 22 is delivered by delivery personnel 8
All customers served
log file written
emre@emre-GF63-Thin-105C: ~/Desktop/system-final/final$
```

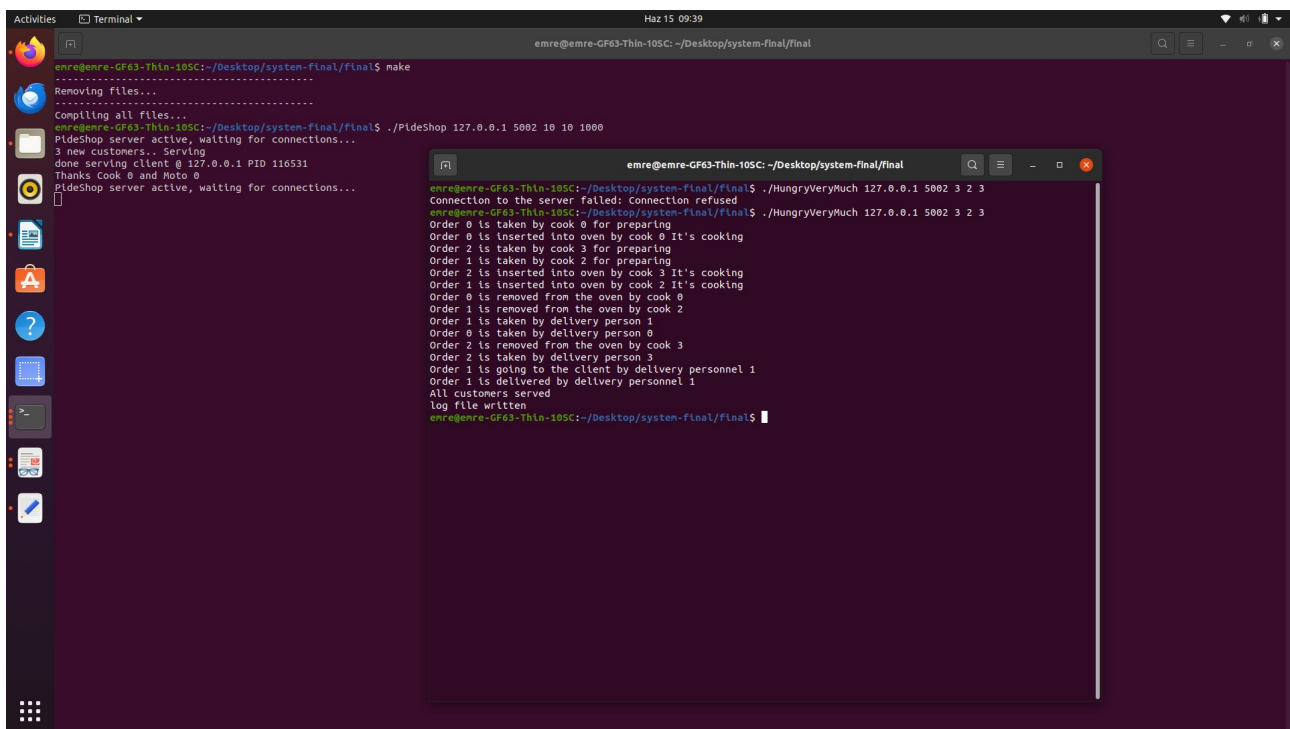
- Another test with 200 number of orders.

Case 5 :

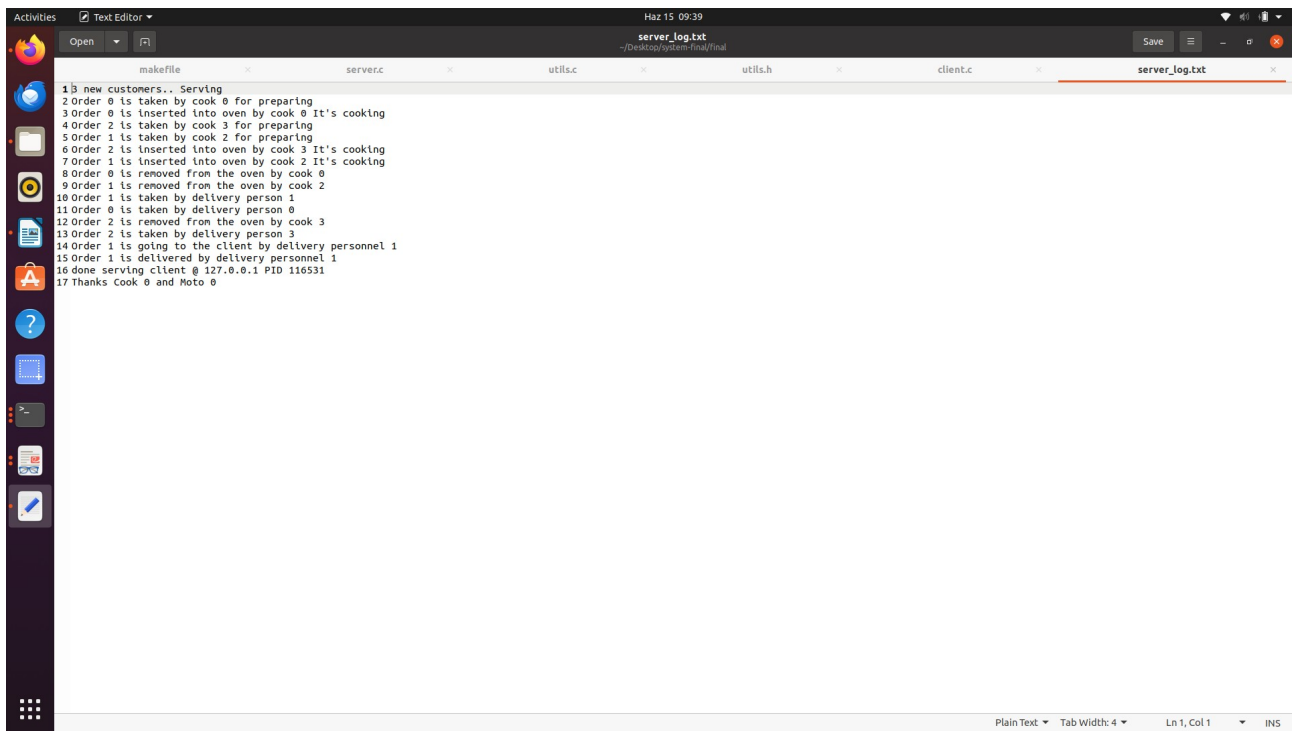
```
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115250
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 115448
Thanks Cook 1 and Moto 2
PideShop server active, waiting for connections...
1000 new customers.. Serving
done serving client @ 127.0.0.1 PID 115500
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
^Cemre@emre-GF63-Thin-105C:~/Desktop/system-final/final$
```

- After a while, server is closed properly when Ctrl+C hit.

Case 6:



```
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ make
Removing files...
Compiling all files...
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ ./PideShop 127.0.0.1 5002 10 10 1000
PideShop server active, waiting for connections...
3 new customers.. Serving
done serving client @ 127.0.0.1 PID 116531
Thanks Cook 0 and Moto 0
PideShop server active, waiting for connections...
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5002 3 2 3
Connection to the server failed: connection refused
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$ ./HungryVeryMuch 127.0.0.1 5002 3 2 3
Order 0 is taken by cook 0 for preparing
Order 0 is inserted into oven by cook 0 it's cooking
Order 2 is taken by cook 3 for preparing
Order 1 is taken by cook 2 for preparing
Order 2 is inserted into oven by cook 3 it's cooking
Order 1 is inserted into oven by cook 2 it's cooking
Order 0 is removed from the oven by cook 0
Order 1 is removed from the oven by cook 2
Order 1 is taken by delivery person 1
Order 0 is taken by delivery person 0
Order 2 is removed from the oven by cook 3
Order 2 is taken by delivery person 3
Order 1 is going to the client by delivery personnel 1
Order 1 is delivered by delivery personnel 1
All customers served
log file written
emre@emre-GF63-Thin-105C:~/Desktop/system-final/final$
```



```
13 new customers.. Serving
2 Order 0 is taken by cook 0 for preparing
3 Order 0 is inserted into oven by cook 0 It's cooking
4 Order 2 is taken by cook 3 for preparing
5 Order 1 is taken by cook 2 for preparing
6 Order 2 is inserted into oven by cook 3 It's cooking
7 Order 1 is inserted into oven by cook 2 It's cooking
8 Order 0 is removed from the oven by cook 0
9 Order 1 is removed from the oven by cook 2
10 Order 1 is taken by delivery person 1
11 Order 0 is taken by delivery person 0
12 Order 2 is removed from the oven by cook 3
13 Order 2 is taken by delivery person 3
14 Order 1 is going to the client by delivery personnel 1
15 Order 1 is delivered by delivery personnel 1
16 done serving client @ 127.0.0.1 PID 116531
17 Thanks Cook 0 and Moto 0
```

- As it is seen, the server prints the logs into the log file while processing the orders as specified in the PDF. In the PDF, it is mentioning about log file and logging the order/shop activities in the server side section. Therefore, there is only logging in the server side