

Test output:

```
→ test git:(main) x ORDER_HOST=127.0.0.1 python3 test_order.py
.....
-----
Ran 12 tests in 0.112s

OK
→ test git:(main) x CATALOG_HOST=127.0.0.1 python3 test_lookup.py
...
-----
Ran 3 tests in 0.020s

OK
→ test git:(main) x
```

Program output locally:

```
pshekar@Pranavs-MacBook-Pro: ~/COLLEGE/cs677/spring23-lab-3-pshekar-and-willis/...
Starting order service replica #2: 127.0.0.1:50056
Previous transaction log found, starting with Transaction ID #171
Previous transaction log found, starting with Transaction ID #171
Previous transaction log found, starting with Transaction ID #171
Order gRPC starting (127.0.0.1:50055)
Order gRPC starting (127.0.0.1:50056)
Order gRPC starting (127.0.0.1:50054)
+ order git:(main) x sudo sh clean_by_port.sh 50054 50055 50056
50054: Killing process with pid 72796...Success
50055: Killing process with pid 72797...Success
50056: Killing process with pid 72798...Success
+ order git:(main) x sudo sh run_front-end_service.sh
sh: run_front-end_service.sh: No such file or directory
+ order git:(main) x sudo sh start_order_service.sh
Starting order service replica #0: 127.0.0.1:50054
Starting order service replica #1: 127.0.0.1:50055
Starting order service replica #2: 127.0.0.1:50056
Previous transaction log found, starting with Transaction ID #171
Previous transaction log found, starting with Transaction ID #171
Previous transaction log found, starting with Transaction ID #171
Order gRPC starting (127.0.0.1:50055)
Order gRPC starting (127.0.0.1:50054)
Order gRPC starting (127.0.0.1:50056)
+ order git:(main) x

sudo sh run_catalog_service.sh
adinto
return self._sock.recv_into(b)
KeyboardInterrupt
+ client git:(main) x cd ../catalog
+ catalog git:(main) x sudo sh run_catalog_service.sh
Password:
Catalog gRPC starting
^CShutting down the catalog service...
+ catalog git:(main) x sudo sh run_catalog_service.sh
Password:
Catalog gRPC starting
^CShutting down the catalog service...
+ catalog git:(main) x sudo sh run_catalog_service.sh
Database file not found. Creating new database storage with default values...
Catalog gRPC starting
^CShutting down the catalog service...
+ catalog git:(main) x sudo sh run_catalog_service.sh
Password:
Sorry, try again.
Password:
Catalog gRPC starting

sudo sh run_front-end_service.sh
I server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
^C
+ front-end git:(main) x sudo sh run_front-end_service.sh
Selected 50056 as the order service leader
Informed replica 50054 of the leader replica (50056)
Informed replica 50055 of the leader replica (50056)
Informed replica 50056 of the leader replica (50056)
* Serving Flask app 'frontend'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
127.0.0.1 - - [01/May/2023 17:47:27] "GET /stocks/Haha HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:27] "POST /invalidate_cache HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:27] "POST /orders HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:27] "GET /orders/171 HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:27] "GET /stocks/Humerous HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:29] "POST /invalidate_cache HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:29] "POST /orders HTTP/1.1" 200 -
127.0.0.1 - - [01/May/2023 17:47:29] "GET /orders/172 HTTP/1.1" 200 -

{
  "data": {
    "max_volume": 500,
    "name": "Funny",
    "num_avail": 87,
    "price": 100.0,
    "volume": 149
  },
  "transaction_number": 58
}
+ client git:(main) x python3 client.py 1
{"data": {"max_volume": 500, "name": "Tulsa", "num_avail": 100, "price": 100.0, "volume": 112}, {"transaction_number": 59}}
+ client git:(main) x python3 client.py 1
{"data": {"name": "Tulsa", "order": 59, "quantity": 8, "type": "buy"}}
+ client git:(main) x python3 client.py 1
{"data": {"max_volume": 500, "name": "Humerous", "num_avail": 99, "price": 100.0, "volume": 141}, {"transaction_number": 60}}
+ client git:(main) x python3 client.py 1
{"data": {"name": "Humerous", "order": 60, "quantity": 1, "type": "buy"}}
+ client git:(main) x python3 client.py 1
{"data": {"max_volume": 500, "name": "MenhirCo", "num_avail": 99, "price": 175.0, "volume": 143}, {"transaction_number": 61}}
+ client git:(main) x python3 client.py 1
{"data": {"name": "MenhirCo", "order": 61, "quantity": 1, "type": "sell"}}
+ client git:(main) x python3 client.py 1
{"data": {"max_volume": 500, "name": "Haha", "num_avail": 46, "price": 100.0, "volume": 198}, {"transaction_number": 171}}
+ client git:(main) x python3 client.py 1
{"data": {"name": "Haha", "order": 171, "quantity": 7, "type": "buy"}}
+ client git:(main) x python3 client.py 1
{"data": {"max_volume": 500, "name": "Humerous", "num_avail": 85, "price": 100.0, "volume": 181}, {"transaction_number": 172}}
+ client git:(main) x
```

Program output with local docker instance:

```

# spring23-lab-3-pshekar-and-willis git:(main) x docker compose up
[+] Running 5/6
 # Container spring23-lab-3-pshekar-and-willis-catalog-1   Recreated    0.2s
 # Container spring23-lab-3-pshekar-and-willis-order-2-1   Recreated    0.2s
 # Container spring23-lab-3-pshekar-and-willis-order-1     Recreated    0.2s
 # Container spring23-lab-3-pshekar-and-willis-order-1     Recreated    0.2s
 # Container spring23-lab-3-pshekar-and-willis-frontend-1   Recreated    0.1s
Attaching to spring23-lab-3-pshekar-and-willis-catalog-1, spring23-lab-3-pshekar-and-willis-fronten
d-1, spring23-lab-3-pshekar-and-willis-order-1, spring23-lab-3-pshekar-and-willis-order-1, spring2
3-lab-3-pshekar-and-willis-order-2-1
spring23-lab-3-pshekar-and-willis-order-2-1 | Previous transaction log found, starting with Transa
ction ID #49
spring23-lab-3-pshekar-and-willis-order-1-1 | Previous transaction log found, starting with Transa
ction ID #49
spring23-lab-3-pshekar-and-willis-order-1-1 | Order gRPC starting (order1:500S5)
spring23-lab-3-pshekar-and-willis-order-2-1 | Order gRPC starting (order2:500S6)
spring23-lab-3-pshekar-and-willis-order-1-1 | Previous transaction log found, starting with Transa
ction ID #49
spring23-lab-3-pshekar-and-willis-order-1-1 | Order gRPC starting (Order:500S4)
spring23-lab-3-pshekar-and-willis-catalog-1 | Catalog gRPC starting
spring23-lab-3-pshekar-and-willis-frontend-1 | Selected 500S6 as the order service leader
spring23-lab-3-pshekar-and-willis-frontend-1 | Informed replica 500S4 of the leader replica (500S6)
spring23-lab-3-pshekar-and-willis-frontend-1 | Informed replica 500S5 of the leader replica (500S6)
spring23-lab-3-pshekar-and-willis-frontend-1 | Informed replica 500S6 of the leader replica (500S6)
spring23-lab-3-pshekar-and-willis-frontend-1 | * Serving Flask app 'frontend'
spring23-lab-3-pshekar-and-willis-frontend-1 | * Debug mode: off
spring23-lab-3-pshekar-and-willis-frontend-1 | WARNING: This is a development server. Do not use it
in a production deployment. Use a production WSGI server instead.
spring23-lab-3-pshekar-and-willis-frontend-1 | * Running on http://frontend:5000
spring23-lab-3-pshekar-and-willis-frontend-1 | Press CTRL+C to quit
172.29.0.1 - - [01/May/2023 21:44:36] "GET /stocks/gc
172.29.0.4 - - [01/May/2023 21:44:36] "POST /invalid
172.29.0.1 - - [01/May/2023 21:44:36] "POST /orders
172.29.0.1 - - [01/May/2023 21:44:36] "GET /orders/4
172.29.0.1 - - [01/May/2023 21:44:43] "GET /stocks/M
172.29.0.4 - - [01/May/2023 21:44:43] "POST /invalid
172.29.0.1 - - [01/May/2023 21:44:43] "POST /orders
172.29.0.1 - - [01/May/2023 21:44:43] "GET /orders/5
172.29.0.1 - - [01/May/2023 21:44:47] "GET /stocks/H
172.29.0.1 - - [01/May/2023 21:44:58] "GET /stocks/H
172.29.0.4 - - [01/May/2023 21:44:58] "POST /invalid

```

Program output with AWS hosted application:

[illegible]

Replica recovery:

```
lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/order$ ./start_order_service.sh
Starting order service replica #0: 127.0.0.1:50054
Starting order service replica #1: 127.0.0.1:50055
Starting order service replica #2: 127.0.0.1:50056
lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/order$ P
Previous transaction log found, starting with Transaction ID #171
Previous transaction log found, starting with Transaction ID #171
Order gRPC starting (127.0.0.1:50054)
Order gRPC starting (127.0.0.1:50055)
Previous transaction log found, starting with Transaction ID #171
Order gRPC starting (127.0.0.1:50056)

lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/catalog$ ./run_catalog_service.sh
Catalog gRPC starting

lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/front-end$ ./run_front-end_service.sh
Selected 50056 as the order service leader
Informed replica 50054 of the leader replica (50056)
Informed replica 50055 of the leader replica (50056)
Informed replica 50056 of the leader replica (50056)
* Serving Flask app 'frontend'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit

lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/order$ ./clean_by_port.sh 50054
50054: Killing process with pid 19848...Success
lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/order$ ./restart_order_replica.sh
Restarting order service replica: 127.0.0.1:50054
lillie@DESKTOP-1H3O3N6: /mnt/c/Users/willl/source/repos/spring23-lab-3-pshekar-and-willlis/src/order$ P
Previous transaction log found, starting with Transaction ID #171
Order gRPC starting (127.0.0.1:50054)
Successfully recovered the transaction log!
```