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Lab 1 Output Document
CS677 Distributed and Operating Systems

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1 Output of Latency Tests:

```
1000 requests, randomly choose b/c Lookup and Trade. 1,2,3,4,5 clients tested:
Chriss-MacBook-Pro-2:grpc ChrisShi$ ./run.sh
5 Clients
Average Latency: 0.021772352933883667
Average Latency: 0.021768578052520752
Average Latency: 0.021832784175872803
Average Latency: 0.021835062980651857
Average Latency: 0.021848280906677245

4 Clients
Average Latency: 0.021244797945022584
Average Latency: 0.021314121007919313
Average Latency: 0.021315163135528566
Average Latency: 0.021370147943496703

3 Clients
Average Latency: 0.019940851926803588
Average Latency: 0.019995708227157592
Average Latency: 0.020064426898956298

2 Clients
Average Latency: 0.019757074117660523
Average Latency: 0.019826318979263305

1 Clients
Average Latency: 0.018131174087524415


1000 requests, Lookup ONLY. 1,2,3,4,5 clients tested:
Chriss-MacBook-Pro-2:grpc ChrisShi$ ./run.sh
5 Clients
Average Latency: 0.021429771900177003
Average Latency: 0.02146983766555786
Average Latency: 0.02150288987159729
Average Latency: 0.021515798091888427
Average Latency: 0.021528354167938232

4 Clients
Average Latency: 0.021717621088027952
Average Latency: 0.02171994686126709
Average Latency: 0.021729257345199586
Average Latency: 0.021872428894042967

3 Clients
Average Latency: 0.01980922293663025
Average Latency: 0.019805081844329834
Average Latency: 0.019851078987121584

2 Clients
Average Latency: 0.019543154001235963
Average Latency: 0.019561287879943847

1 Clients
```

Average Latency: 0.01791818904876709

1000 requests, Trade ONLY. 1,2,3,4,5 clients tested:
Chriss-MacBook-Pro-2:grpc ChrisShi$ ./run.sh
5 Clients
Average Latency: 0.023368274927139283
Average Latency: 0.023417399644851684
Average Latency: 0.023435479879379273
Average Latency: 0.023517042875289915
Average Latency: 0.023524046659469604

4 Clients
Average Latency: 0.020387680053710937
Average Latency: 0.020486160039901734
Average Latency: 0.020524583101272583
Average Latency: 0.020505074977874755

3 Clients
Average Latency: 0.020894983768463136
Average Latency: 0.020894516944885255
Average Latency: 0.02092225480079651

2 Clients
Average Latency: 0.0192830069065094
Average Latency: 0.019298137187957764

1 Clients
Average Latency: 0.017991516828536988

1000 requests naive max thread pool implementation. 1,2,3,4,5 test clients tested.
Chriss-MacBook-Pro-2:socket ChrisShi$ ./run.sh
5 Clients
Average Latency: 0.012771163702011108
Average Latency: 0.012774412870407105
Average Latency: 0.012785709857940674
Average Latency: 0.012789972066879273
Average Latency: 0.012818568229675293

4 Clients
Average Latency: 0.01254988694190979
Average Latency: 0.012561802864074706
Average Latency: 0.012562569141387939
Average Latency: 0.012591468095779419

3 Clients
Average Latency: 0.012440057039260865
Average Latency: 0.012453197240829468
Average Latency: 0.012569619178771972

2 Clients
Average Latency: 0.012040464878082276
Average Latency: 0.012057062864303589

1 Clients
Average Latency: 0.012381258964538575

1000 requests naive max thread pool implementation. 1,2,3,4,5,6,7,8,9 test clients tested. Maxpool siz
Chriss-MacBook-Pro-2:part1 ChrisShi$ ./run.sh
5 Clients

```
Average Latency: 0.010724672317504883
Average Latency: 0.010721571922302246
Average Latency: 0.01072832727432251
Average Latency: 0.010717978477478027
Average Latency: 0.010718322277069092

4 Clients
Average Latency: 0.010252741813659668
Average Latency: 0.010261760234832764
Average Latency: 0.010265474319458007
Average Latency: 0.01027018165588379

3 Clients
Average Latency: 0.009725304126739501
Average Latency: 0.009728479385375976
Average Latency: 0.009737892150878906

2 Clients
Average Latency: 0.009623713970184326
Average Latency: 0.00965130615234375

1 Clients
Average Latency: 0.010116312026977539

6 Clients
Average Latency: 0.010234186172485352
Average Latency: 0.010248372077941895
Average Latency: 0.010245125770568847
Average Latency: 0.010252938270568848
Average Latency: 0.010256115913391112
Average Latency: 0.010264577865600586

7 Clients
Average Latency: 0.01019634771347046
Average Latency: 0.010163149833679198
Average Latency: 0.010208431720733643
Average Latency: 0.010190032005310058
Average Latency: 0.010184214115142823
Average Latency: 0.01016023015975952
Average Latency: 0.010161036014556885

8 Clients
Average Latency: 0.010356833934783935
Average Latency: 0.010359385967254638
Average Latency: 0.010358750343322754
Average Latency: 0.01035447359085083
Average Latency: 0.0103262300491333
Average Latency: 0.010326807975769042
Average Latency: 0.010367112159729004
Average Latency: 0.010349952220916748

9 Clients
Average Latency: 0.010319565773010254
Average Latency: 0.01029851198196411
Average Latency: 0.010300946235656739
Average Latency: 0.010297791957855225
Average Latency: 0.010284465789794922
Average Latency: 0.010302209854125976
Average Latency: 0.010307656288146973
Average Latency: 0.010318183898925781
Average Latency: 0.010308311939239503
```

2 Function Returns:

2.1 Part 1:

2.1.1 Lookup():

```
C:\Users\thewi\Desktop\CS677\lab1\part1>py client.py
------------- Lookup -------------
Price of FishCo: 25.47

------------- Lookup -------------
Price of GameStart: 15.99

------------- Lookup -------------
Price of GameStart: 15.99

------------- Lookup -------------
Price of GameStart: 15.99

------------- Lookup -------------
Price of GameStart: 15.99

------------- Lookup -------------
Price of FishCo: 25.47

------------- Lookup -------------
Price of FishCo: 25.47

------------- Lookup -------------
Price of GameStart: 15.99

------------- Lookup -------------
Could not find price for Apple

------------- Lookup -------------
Price of GameStart: 15.99
```

Figure 1: Demonstrates that Lookup() returns the price when stock is found, and considers when a stock is not found.

2.2 Part 2:

2.2.1 Lookup():

```
C:\Users\thewi\Desktop\CS677\lab1\part2>py client.py
------------- Lookup -------------
Apple not found in lookup.

------------- Lookup -------------
Price of GameStart: 38.650001525878906.
Volume of GameStart: 5556

------------- Lookup -------------
Price of BoarCo: 18.93000030517578.
Volume of BoarCo: 4734

------------- Lookup -------------
Price of FishCo: 54.060001373291016.
Volume of FishCo: 4744

------------- Lookup -------------
Price of GameStart: 38.650001525878906.
Volume of GameStart: 5556

------------- Lookup -------------
Price of FishCo: 54.060001373291016.
Volume of FishCo: 4744

------------- Lookup -------------
Apple not found in lookup.
```

Figure 2: Demonstrates that Lookup() returns the price and volume when stock is found, and considers when a stock is not found.

2.2.2 Trade():

```
C:\Users\thewi\Desktop\CS677\lab1\part2>py client.py
-------------- Trade --------------
Successfully sold 22 FishCo stocks.

-------------- Trade --------------
Successfully bought 23 BoarCo stocks.

-------------- Trade --------------
Successfully bought 99 FishCo stocks.

-------------- Trade --------------
Successfully bought 81 FishCo stocks.

-------------- Trade --------------
Successfully sold 99 GameStart stocks.

-------------- Trade --------------
Trade suspended for FishCo.

-------------- Trade --------------
Successfully bought 8 GameStart stocks.

-------------- Trade --------------
Successfully sold 56 BoarCo stocks.

-------------- Trade --------------
Apple not found in lookup.

-------------- Trade --------------
Trade suspended for BoarCo.
```

Figure 3: Demonstrates that Trade() considers type of transaction (i.e. buy or sell), and number of stocks to buy/sell. Also considers if stock is not found, or when trade is suspended.

2.2.3 Update():

Figure 4: Demonstrates that Update() updates the prices of stocks at random intervals. Additionally demonstrates when a stock is not found, or when an invalid stock price is given.