

**Gebze Technical University
Computer Engineering**

CSE 344 - 2021 Spring

FINAL REPORT

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1 INTRODUCTION

1.1 Problem Definition

SQL database server simulation with multi-thread synchronization.

1.2 System Requirements

Any computer with Ubuntu 14.04 LTS 32-bit Operating System.

2 METHOD

2.1 Problem Solution Approach

Server:

Firstly, the server program reads the parameters. If the parameters are invalid, the program exits. Then temporary creates a file because the daemon only have one instance. Basically, the file prevents to create another instance. After that, the server program reads the database and stores in a data structure. Then creates the threads with size of -l parameter. The program opens a socket in order to communication. Then, the program waits in a while loop. When a connection comes, it accepts the connection and adds into a queue. The program wakes a thread with using condition variable. When SIGINT signal occurs, the program waits for thread, frees its all resources and terminates.

Threads:

The threads are waits until the server wakes them up. The threads takes a socket file descriptor from queue and reads the query. Then, they parse the query and execute. They send the data using socket file descriptor. When all the queries are done, they waits for a connection or takes another socket file descriptor (if it's available).

Client:

The client reads the parameters. If the parameters are invalid, the program exits. Reads the query file and selects the row related to -i parameter. Opens a socket in order to communicate with server. Sends the queries and waits for the results. Then prints the results into the terminal and exits.

NOTE: UPDATE command is not implemented.

3 RESULT

3.1 Test Cases and Running Results

I used a dataset includes flag codes and flag labels.

Running examples(server):

```
≡ logfile.txt
1  2021-06-10 03:22:31 Executing with parameters
2  2021-06-10 03:22:31 -p 1234
3  2021-06-10 03:22:31 -o logfile.txt
4  2021-06-10 03:22:31 -l 4
5  2021-06-10 03:22:31 -d database2.csv
6  2021-06-10 03:22:31 Loading dataset...
7  2021-06-10 03:22:31 Dataset loaded in 0.040898 seconds with 260 records.
8  2021-06-10 03:22:31 Thread #0: waiting for connection
9  2021-06-10 03:22:31 Thread #1: waiting for connection
10 2021-06-10 03:22:31 Thread #2: waiting for connection
11 2021-06-10 03:22:31 A pool of 4 threads has been created.
12 2021-06-10 03:22:31 Thread #3: waiting for connection
13 2021-06-10 03:22:42 A connection has been delegated to thread id #0
14 2021-06-10 03:22:44 Thread #0: waiting for connection
15 SIGINT caught. Terminating...
```

Running examples(client):

```
2021-06-10 03:22:42 Server's response to Client 1: Tokelau
2021-06-10 03:22:42 Server's response to Client 1: Timor-Leste
2021-06-10 03:22:42 Server's response to Client 1: Turkmenistan
2021-06-10 03:22:42 Server's response to Client 1: Tunisia
2021-06-10 03:22:42 Server's response to Client 1: Tonga
2021-06-10 03:22:42 Server's response to Client 1: Turkey
2021-06-10 03:22:42 Server's response to Client 1: Trinidad and Tobago
2021-06-10 03:22:42 Server's response to Client 1: Tuvalu
2021-06-10 03:22:42 Server's response to Client 1: Taiwan
2021-06-10 03:22:42 Server's response to Client 1: Tanzania
2021-06-10 03:22:42 Server's response to Client 1: Ukraine
2021-06-10 03:22:42 Server's response to Client 1: Uganda
2021-06-10 03:22:42 Server's response to Client 1: United States Minor Outlying Islands
2021-06-10 03:22:42 Server's response to Client 1: United States of America
2021-06-10 03:22:42 Server's response to Client 1: Uruguay
2021-06-10 03:22:42 Server's response to Client 1: Uzbekistan
2021-06-10 03:22:42 Server's response to Client 1: Vatican City State
2021-06-10 03:22:42 Server's response to Client 1: St Vincent and the Grenadines
2021-06-10 03:22:42 Server's response to Client 1: Venezuela
2021-06-10 03:22:42 Server's response to Client 1: Virgin Islands, British
2021-06-10 03:22:42 Server's response to Client 1: Virgin Islands, United States
2021-06-10 03:22:42 Server's response to Client 1: Viet Nam
2021-06-10 03:22:42 Server's response to Client 1: Vanuatu
2021-06-10 03:22:42 Server's response to Client 1: Wales
2021-06-10 03:22:42 Server's response to Client 1: Wallis and Futuna
2021-06-10 03:22:42 Server's response to Client 1: Samoa
2021-06-10 03:22:42 Server's response to Client 1: Not Stated
2021-06-10 03:22:42 Server's response to Client 1: Yemen
2021-06-10 03:22:42 Server's response to Client 1: Mayotte
2021-06-10 03:22:42 Server's response to Client 1: South Africa
2021-06-10 03:22:42 Server's response to Client 1: Ships' Bunkering
2021-06-10 03:22:42 Server's response to Client 1: Destination Unknown - EU
2021-06-10 03:22:42 Server's response to Client 1: Zambia
2021-06-10 03:22:42 Server's response to Client 1: Destination Unknown - Non-EU
2021-06-10 03:22:42 Server's response to Client 1: Passengers' Effects
2021-06-10 03:22:42 Server's response to Client 1: Ships' Stores
2021-06-10 03:22:42 Server's response to Client 1: Zimbabwe
2021-06-10 03:22:42 Server's response to Client 1: Total
2021-06-10 03:22:42 Server's response to Client 1: Total goods - cost including insurance and f
2021-06-10 03:22:42 Server's response to Client 1: Total goods - free on board
2021-06-10 03:22:42 Server's response to Client 1: Total goods - value for duty
2021-06-10 03:22:42 Server's response to Client 1: Total goods - Balance of Payments basis
2021-06-10 03:22:42 Server's response to Client 1: Balance of Payments conceptual adjustment
2021-06-10 03:22:42 Server's response to Client 1 is 260 records, and arrived in 0.496251 second
2021-06-10 03:22:43 Server's response to Client 1: UPDATE is not implemented.
2021-06-10 03:22:43 Server's response to Client 1 is 1 records, and arrived in 0.463538 seconds
madtracks@PC-MADTRACKS:/mnt/c/Users/MadTracks/Desktop/CSE344/FINAL$
```

