WebMaze

CompSci 311 (SP23), Duke Kunshan University

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WebMaze is a client-server pair implemented using remote procedure calls (RPCs) through a REST interface. The project consists of a Web server and a client to allow execution of your NetMaze client and report statistics.

Getting Started

Prerequisites

- Python 3.6 or later
- Flask (install using pip install flask)

Start the server

To start the server, run the following command:

```
python3 server.py
```

This will output the following in your terminal:

The server will start on `http://localhost:5000` by default. You can change the host and port by modifying the `app.run()` statement in `server.py`.

Running the Client

The client program is a command-line tool that issues REST requests toward the server. Here's how to use it:

```
python3 client.py <host_address> <port> <action> [<args>]
```

- `host_address`: The address of the REST API server.
- `port`: The port of the REST API server.
- `action`: The command to execute. Valid commands are:
  - `submit [--id <id>]`: Run a NetMaze client with the given ID.
  - `queries [--runid <runid>] [--limit <limit>] [--start <start>]`: Retrieve the queries of running of the given RunID. The `--limit` and `--start` options are optional and specify the maximum number of runs to return and the starting index of the queries to return, respectively.
  - `list [--limit <limit>] [--start <start>]`: List completed runs. The `--limit` and `--start` options are optional and specify the maximum number of runs to return and the starting index of the runs to return, respectively.
  - `statistics`: Compute the mean and variance of the number of queries across all completed NetMaze runs on the server.

Example Usage

Here are some examples of how to use the client:

1. Run a NetMaze client with ID `yz605_1`:

```
vcm@vcm-32999:~/WebServer$ python3 client.py localhost 5000 submit --id yz605_1
{'runId': '618417a1-ec95-434d-983f-e6776d750e0d'}
```

2. Retrive the queries with RunID `457ab73a-650d-4923-80fe-044ed9f47c91`

```
vcm@vcm-32999:~/WebServer$ python3 client.py localhost 5000 queries --runid 457ab73a-650d-4923-80fe-044ed9f47c91 --limit 10 --start 1
{'limit': 10, 'next': '/api/queries?run=457ab73a-650d-4923-80fe-044ed9f47c91&limit=10&start=11', 'prev': None, 'queries': ['{"connection_source": "cli
ent", "connection_port": 51300, "query_target": 51320}', '{"connection_source": "client", "connection_port": 51320, "query_target": 51325}', '{"connec
tion_source": "client", "connection_port": 51325, "query_target": 51318}', '{"connection_source": "client", "connection_port": 51318, "query_target":
51328}', '{"connection_source": "client", "connection_port": 51328, "query_target": 51319}', '{"connection_source": "client", "connection_port": 51319
, "query_target": 51346}', '{"connection_source": "client", "connection_port": 51346, "query_target": 51332}', '{"connection_source": "client", "conne
ction_port": 51332, "query_target": 51320}', '{"connection_source": "client", "connection_port": 51320, "query_target": 51320}', '{"connection_source"
: "client", "connection_port": 51320, "query_target": 51336}'], 'runId': '457ab73a-650d-4923-80fe-044ed9f47c91', 'start': 1}
```

3. List completed runs with a limit of 10 and starting index of 1:

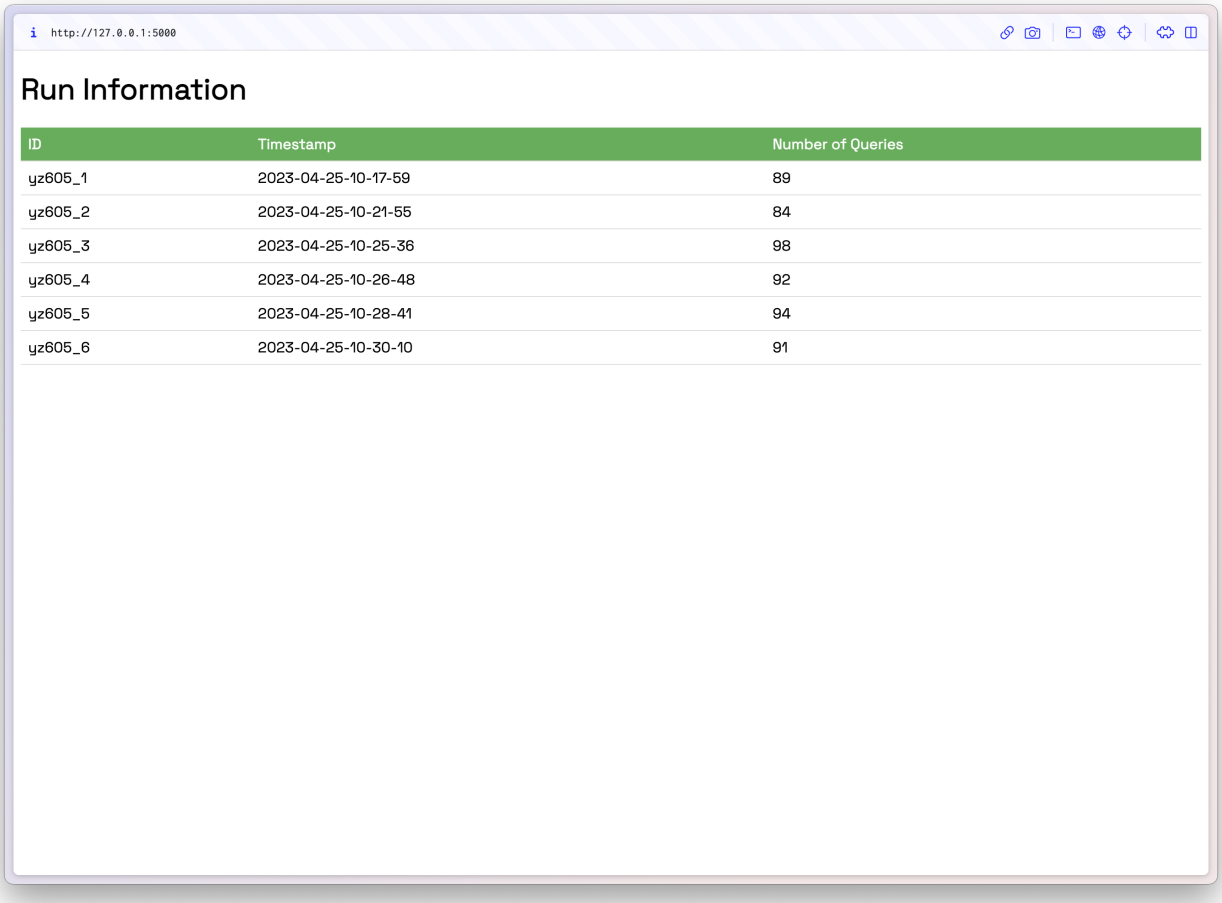
```
vcm@vcm-32999:~/WebServer$ python3 client.py localhost 5000 list --limit 10 --start 1
{'limit': 10, 'next': None, 'prev': None, 'runIds': ['457ab73a-650d-4923-80fe-044ed9f47c91', '9aae429f-f25e-4fd2
-95bf-d918f7751d32', '8656bf45-036c-4cfe-a0fe-96a1b089ef4e', '3969cb19-150a-4210-a47a-561373c8863d', 'f058c8a2-5
690-4b75-a082-be3383a9c365', '5eb19222-1c19-46f6-a3fa-af14bad13df5'], 'start': 1}
```

4. Compute the mean and varience of the number of queries across all completed runs:

```
vcm@vcm-32999:~/WebServer$ python3 client.py localhost 5000 statistics
run_ids: ['457ab73a-650d-4923-80fe-044ed9f47c91', '9aae429f-f25e-4fd2-95bf-d918f7751d32', '8656bf45-036c-4cfe-a0
fe-96a1b089ef4e', '3969cb19-150a-4210-a47a-561373c8863d', 'f058c8a2-5690-4b75-a082-be3383a9c365', '5eb19222-1c19
-46f6-a3fa-af14bad13df5']
{'mean': 91.33333333333333, 'variance': 22.266666666666666}
```

Web Interface

By opening a web browser and navigate to `http://localhost:5000/`, you can also view a web interface to better manage the runs.



- The home page will display a table with information about each completed run, including its ID, the submission time, and the number of queries of this run.

Access historical information in file

All completed runs will be stored in the `runs.json` file in the root directory. You can open and view the details of each run.

client.py | server.py | index.html | runs.json ● | runNetMaze.py | main.

WebServer > runs.json > { } 9aae429f-f25e-4fd2-95bf-d918f7751d32


```
{
    "457ab73a-650d-4923-80fe-044ed9f47c91": {
        "id": "yz605_1",
        "queries": [...
        ],
        "count": 89,
        "submit_time": "2023-04-25-10-17-59"
    },
    "9aae429f-f25e-4fd2-95bf-d918f7751d32": {
        "id": "yz605_2",
        "queries": [...
        ],
        "count": 84,
        "submit_time": "2023-04-25-10-21-55"
    },
    "8656bf45-036c-4cfe-a0fe-96a1b089ef4e": {
        "id": "yz605_3",
        "queries": [...
        ],
        "count": 98,
        "submit_time": "2023-04-25-10-25-36"
    },
    "3969cb19-150a-4210-a47a-561373c8863d": {
        "id": "yz605_4",
        "queries": [...
        ],
        "count": 92,
        "submit_time": "2023-04-25-10-26-48"
    },
    "f058c8a2-5690-4b75-a082-be3383a9c365": {
        "id": "yz605_5",
        "queries": [...
        ],
        "count": 94,
        "submit_time": "2023-04-25-10-28-41"
    },
    "5eb19222-1c19-46f6-a3fa-af14bad13df5": {
        "id": "yz605_6",
```

WebServer > {..} runs.json > {} 9aae429f-f25e-4fd2-95bf-d918f7751d32 > [ ] queries


```
{
    "457ab73a-650d-4923-80fe-044ed9f47c91": {
        "id": "yz605_1",
        "queries": [
            "{\"connection_source\": \"client\", \"connection_port\": 51300, \"query_target\": 51320}",
            "{\"connection_source\": \"client\", \"connection_port\": 51320, \"query_target\": 51325}",
            "{\"connection_source\": \"client\", \"connection_port\": 51325, \"query_target\": 51318}",
            "{\"connection_source\": \"client\", \"connection_port\": 51318, \"query_target\": 51328}",
            "{\"connection_source\": \"client\", \"connection_port\": 51328, \"query_target\": 51319}",
            "{\"connection_source\": \"client\", \"connection_port\": 51319, \"query_target\": 51346}",
            "{\"connection_source\": \"client\", \"connection_port\": 51346, \"query_target\": 51332}",
            "{\"connection_source\": \"client\", \"connection_port\": 51332, \"query_target\": 51320}",
            "{\"connection_source\": \"client\", \"connection_port\": 51320, \"query_target\": 51320}",
            "{\"connection_source\": \"client\", \"connection_port\": 51320, \"query_target\": 51336}",
            "{\"connection_source\": \"client\", \"connection_port\": 51336, \"query_target\": 51327}",
            "{\"connection_source\": \"client\", \"connection_port\": 51327, \"query_target\": 51326}",
            "{\"connection_source\": \"client\", \"connection_port\": 51326, \"query_target\": 51339}",
            "{\"connection_source\": \"client\", \"connection_port\": 51339, \"query_target\": 51349}",
            "{\"connection_source\": \"client\", \"connection_port\": 51349, \"query_target\": 51320}",
            "{\"connection_source\": \"client\", \"connection_port\": 51320, \"query_target\": 51311}",
            "{\"connection_source\": \"client\", \"connection_port\": 51311, \"query_target\": 51308}",
            "{\"connection_source\": \"client\", \"connection_port\": 51308, \"query_target\": 51340}",
            "{\"connection_source\": \"client\", \"connection_port\": 51340, \"query_target\": 51317}",
            "{\"connection_source\": \"client\", \"connection_port\": 51317, \"query_target\": 51338}",
            "{\"connection_source\": \"client\", \"connection_port\": 51338, \"query_target\": 51346}",
            "{\"connection_source\": \"server\", \"connection_port\": 51424, \"query_target\": 51347}",
            "{\"connection_source\": \"client\", \"connection_port\": 51347, \"query_target\": 51345}",
            "{\"connection_source\": \"client\", \"connection_port\": 51345, \"query_target\": 51328}",
            "{\"connection_source\": \"server\", \"connection_port\": 51424, \"query_target\": 51313}",
            "{\"connection_source\": \"client\", \"connection_port\": 51313, \"query_target\": 51326}",
            "{\"connection_source\": \"client\", \"connection_port\": 51326, \"query_target\": 51348}",
            "{\"connection_source\": \"client\", \"connection_port\": 51348, \"query_target\": 51334}",
            "{\"connection_source\": \"client\", \"connection_port\": 51334, \"query_target\": 51329}",
            "{\"connection_source\": \"client\", \"connection_port\": 51329, \"query_target\": 51331}",
            "{\"connection_source\": \"client\", \"connection_port\": 51331, \"query_target\": 51336}",
            "{\"connection_source\": \"server\", \"connection_port\": 51434, \"query_target\": 51350}",
            "{\"connection_source\": \"client\", \"connection_port\": 51350, \"query_target\": 51332}",
            "{\"connection_source\": \"client\", \"connection_port\": 51336, \"query_target\": 51306}",
            "{\"connection_source\": \"client\", \"connection_port\": 51332, \"query_target\": 51349}",
```


Contacts

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