DISTRIBUTED OPERATING SYSTEM PRINCIPLES

PROJECT 4

AAYUSH SRIVASTAVA, GAURAV PATHAK

STEPS TO RUN:

- Start an erl shell

- Start the server as:

    - `'twitter_dashboard:runTwitter().'`

```
gau4x4@Gauravs-MacBook-Air DOSP-Project-4-main-3 % erl
Erlang/OTP 24 [erts-12.1.4] [source] [64-bit] [smp:8:8] [ds:8:8:10] [async-threads:1] [dtrace]

Eshell V12.1.4  (abort with ^G)
1> twitter_dashboard:runTwitter().

Welcome to The DOSP Twitter Clone
```

- Starting the clients:

    - Open a new erl shell for any new client

    - Run `'client:clientRunner().'`

```
gau4x4@Gauravs-MacBook-Air DOSP-Project-4-main-3 % erl
Erlang/OTP 24 [erts-12.1.4] [source] [64-bit] [smp:8:8] [ds:8:8:10] [async-threads:1] [dtrace]

Eshell V12.1.4  (abort with ^G)
1> client:clientRunner().
Client is Running

Connection request sent


Please Choose from the Given Menu register/tweet/retweet/subscribe/query:
```

USING THE APPLICATION:

- On the client shell, choose an option between register/tweet/retweet/subscribe/query

    - Start with a registration for this client (gaurav)

```
Please Choose from the Given Menu register/tweet/retweet/subscribe/query: register
register
Please Enter Username: gaurav
Source: <0.79.0>
User Registration Successful

User has been registered


Please Choose from the Given Menu register/tweet/retweet/subscribe/query:
```

- You can see the registered client on the server

```
Data Packet Received

Received Packet: [<<"register">>,<<"gaurav">>,<<"<0.79.0>">>]


Packet Type: "register"


PID:"<0.79.0>"

Socket:#Port<0.5>
Type: "register"

"gaurav" wants to register an account
The Username Found is: []
Found Uname As:{"gaurav",[{"followers",[]},{"tweets",[]}]}Processing Cleared Path to Entry

Data Packet Received
```

- On the client shell, send a tweet

```
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: tweet
tweet
Go for Tweet:hello dosp

Tweet Successful
```

- See the tweet on the server

```
Data Packet Received

Received Packet: [<<"tweet">>,<<"gaurav">>,<<"hello dosp\n">>]


Packet Type: "tweet"


 "gaurav" Tweet Sent: "hello dosp\n"Tweet Found: [{"gaurav",[{"followers",[]},{"tweets",[]}]}]
["hello dosp\n"]

New Timeline: [{"gaurav",[{"followers",[]},{"tweets",["hello dosp\n"]}]}]
0 Followers
```

- Open a separate shell and register a new user (aayush)

```
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: register
register
Please Enter Username: aayush
SELF: <0.79.0>

User Registration Complete
User has been registered
```

- You can see the new client on the server as well

```
Packet Type: "register"


PID:"<0.79.0>"

Socket:#Port<0.7>
Type: "register"

"aayush" wants to register an account
The Username Found is: []
Found Uname As:{"aayush",[{"followers",[]},{"tweets",[]}]}Processing Cleared Path to Entry
```

- Retweet gaurav's tweet from aayush's shell

```
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: retweet
retweetEnter username of the tweet to retweet: gaurav
Enter tweet for retweeting: hello dosp

 Retweet Successful
```

- Check the retweet success on the server

```
Received Packet: [<<"retweet">>,<<"gaurav">>,<<"aayush">>,<<"hello dosp\n">>]


Packet Type: "retweet"

 Subscribed User: "gaurav"
Reposting Tweet As: "hello dosp\n"
0 Followers
Tweet is Processing

 "aayush" Retweeting!Data Packet Received

Received Packet: [<<"subscribe">>,<<"aayush">>,<<"gaurav\n">>]
```

- Subscribe to gaurav using aayush's shell

```
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: subscribe
subscribeEnter User to Subscribe:gaurav

Subscription Successful!
Subscribed!
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: █
```

- Check the subscription on the server

```
Packet Type: "subscribe"

  ["aayush"]

Subscription Successful: [{"gaurav",
                          [{"followers",["aayush"]},
                           {"tweets",["hello dosp\n"]}]}]
Data Packet Received
```

- Create a new user and query tweets

```
PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: register
register
Please Enter Username: test1
SELF: <0.79.0>

User Registration Complete
User has been registered


PleaseChoose from the Given Menu register/tweet/retweet/subscribe/query: query
queryAvailable SubMenu Option:

 1. Tags

 2. Tagged Search

 3. Other User's Tweet

Input SubMenu Option in Number: 1
Related Tweets
```

- Check the query on the server

```
Data Packet Received

Received Packet: [<<"query">>,<<"test1">>,<<"1">>]


Packet Type: "query"

  Query: The current username is -> "test1"
My mentions!

The User "test1" is Searching...Data Packet Received
```

WHAT IS WORKING

All the required features register/tweet/retweet/subscribe/query are working as expected. We can perform the following operations on several clients (in separate shells) and can see the expected response on the client as well.

ZIPF DISTRIBUTION

ZipF distribution is used to rank the popularity or weight of a small part of a large sample set.

Using the simulator.erl, we can generate a graph for the throughput of the application, that is, number of tweets per second per users for ZipF constants 1 and 2.
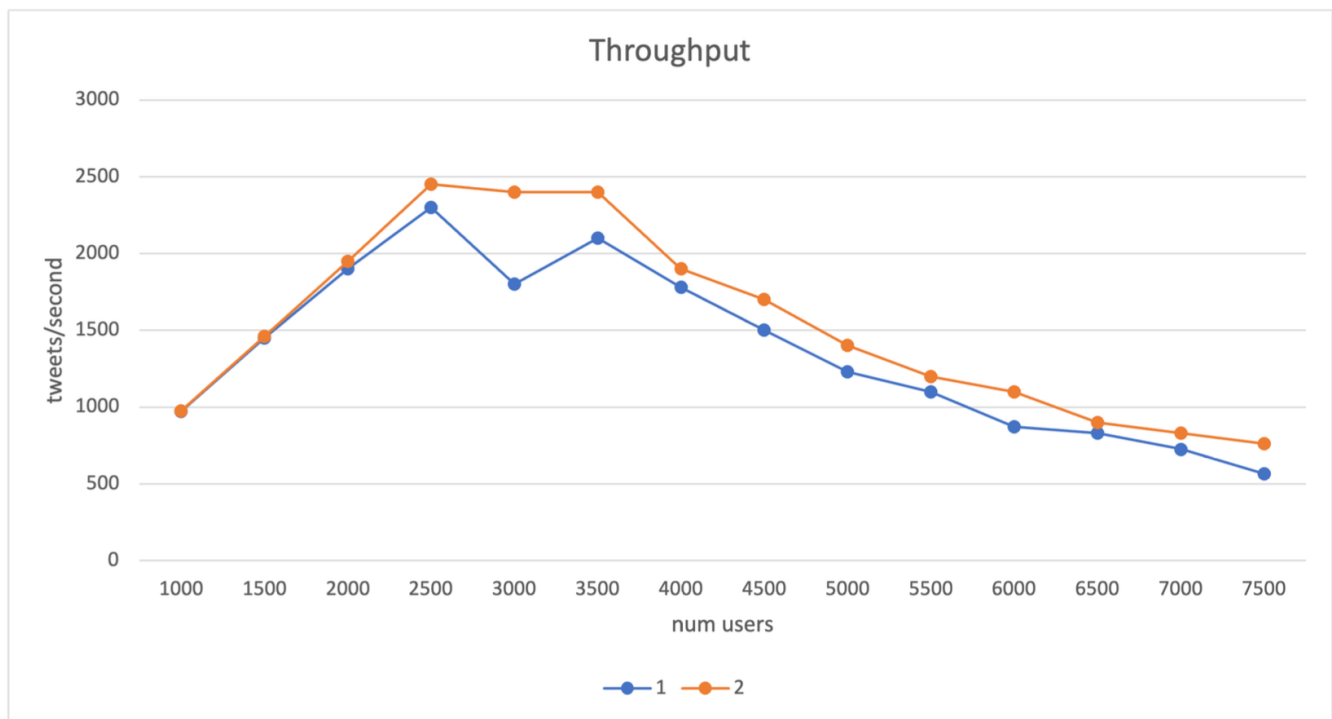
Using the above graph, we can observe that

1. Approximately 10% users are always disconnected after a certain number of clients are online. Even when these users connect again, some other 10% users are disconnected.
2. Throughput increases with increasing ZipF constant as ZipF constant is 'inversely proportional' to number of users.
3. The throughput peaks at about 3000 users as till this point, as more users leads to more tweets.
4. After 3000 users, the throughput tends to decrease again due to point (1).

Let us say we are using N clients, therefore, each client will have a rank between 1 and N.

The server is receiving 1/rank requests from each client each millisecond.