Homework 2: Tiny Social Network Service

This assignment is based on Google Protocol Buffers and gRPC to build a Tiny Social Network Service, similar in concept with posting and receiving status updates on Facebook or Twitter.

How to Compile?

make

```
protoc --cpp_out=. sns.proto
g++ -pthread -std=c++11 -I/usr/local/include -pthread  -c -o sns.pb.o sns.pb.cc
protoc --grpc_out=. --plugin=protoc-gen-grpc=`which grpc_cpp_plugin` sns.proto
g++ -pthread -std=c++11 -I/usr/local/include -pthread  -c -o sns.grpc.pb.o sns.grpc.pb.cc
g++ -pthread -std=c++11 -I/usr/local/include -pthread  -c -o tsc.o tsc.cc
g++ -pthread sns.pb.o sns.grpc.pb.o tsc.o -L/usr/local/lib `pkg-config --libs protobuf grpc++ grpc` -Wl,--no-as-needed -lgrpc++_reflection -Wl,--as-needed -ldl -g
 -o tsc
g++ -pthread -std=c++11 -I/usr/local/include -pthread  -c -o tsd.o tsd.cc
g++ -pthread sns.pb.o sns.grpc.pb.o tsd.o -L/usr/local/lib `pkg-config --libs protobuf grpc++ grpc` -Wl,--no-as-needed -lgrpc++_reflection -Wl,--as-needed -ldl -g
 -o tsd
```

How to Run?

1. Run server on the router:

./tsd -t router -p <router_port> -h <router_ip>

```
|router|192.168.100.2|3010|
Server listening on 192.168.100.2:3010

New message broadcast configuration:
192.168.100.2:5000 --> head
```

2. Master & slave connect to the router:

./tsd -t master -q <router_ip> -r <router_port> -s slave -h <host_addr> -p <master_port>

```
|master|192.168.100.2|5000|
|slave|192.168.100.2|5001|
```

3. Run the client to connect to router:

./tsc -h <router_ip> -p <router_port> -u user1

```
========= TINY SNS CLIENT =========
 Command Lists and Format:
 FOLLOW <username>
 UNFOLLOW <username>
 LIST
 TIMELINE
====================================
Cmd>
```

Server:

The server has the previous features with the addition of ***timeline***. The user is allowed to post to his/her own timeline. That is, whenever new user appears, the server needs to create new timeline for the new user. When the servers receive a follow/unfollow command from the client they broadcast this information to the router, keeping them up to date.

In the timeline mode, the router manages a linked list for users. When a message is received from a client it opens up another session to its designated target to let it know it is a new messages. All timeline is persistent and stored these information in the local file named **data.csv**. The timeline command switches a user from command mode to timeline mode and allows the user to post some updates to both his/her and followers' timeline. Once a user issues the timeline command, it can not return to the command mode, and it will stay only in timeline mode. All communications is using Google Protocol Buffers v3 and gRPC.

Client:
The client is almost the same with previous version and the only additions to the client was in timeline mode. Checking on the reader and writer thread connections to the server and monitoring if they are closed. A user operates in two modes: “command mode” and “timeline mode”. When the client program starts, it automatically starts in command mode. The commands the client can send are: FOLLOW, UNFOLLOW, LIST, TIMELINE. The LIST command retrieves from the server the list of existing users and the list of users who follow the current user. Following is the results from the client.

Running result:

user1:

```
========= TINY SNS CLIENT =========
 Command Lists and Format:
 FOLLOW <username>
 UNFOLLOW <username>
 LIST
 TIMELINE
====================================
Cmd> LIST
Command completed successfully
All users: user1,
Followers:
Cmd> LIST
Command completed successfully
All users: user1,
Followers:
Cmd> LIST
Command completed successfully
All users: user1, user2,
Followers: user2,
Cmd> FOLLOW user2
Command completed successfully
Cmd> LIST
Command completed successfully
All users: user1, user2,
Followers: user2,
Cmd> timeline
Command completed successfully
Now you are in the timeline

user2(Fri Feb  7 23:24:43 2020)>> p2


user2(Fri Feb  7 23:24:45 2020)>> p3


user2(Fri Feb  7 23:24:40 2020)>> p4


user2(Fri Feb  7 23:24:40 2020)>> p4


user2(Fri Feb  7 23:24:40 2020)>> p5


user2(Fri Feb  7 23:24:40 2020)>> p5


user2(Fri Feb  7 23:24:40 2020)>> p6
```

user2:

```
========= TINY SNS CLIENT =========
 Command Lists and Format:
 FOLLOW <username>
 UNFOLLOW <username>
 LIST
 TIMELINE
====================================
Cmd> LIST
Command completed successfully
All users: user1, user2,
Followers:
Cmd> FOLLOW user1
Command completed successfully
Cmd> LIST
Command completed successfully
All users: user1, user2,
Followers:
Cmd> TIMELINE
Command completed successfully
Now you are in the timeline
jinhao
hello world
hellow
p1
Connection Complete
p2
p3
p4
p5
p6
```