COMP9331 Assignment One
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ScnChat 1.0

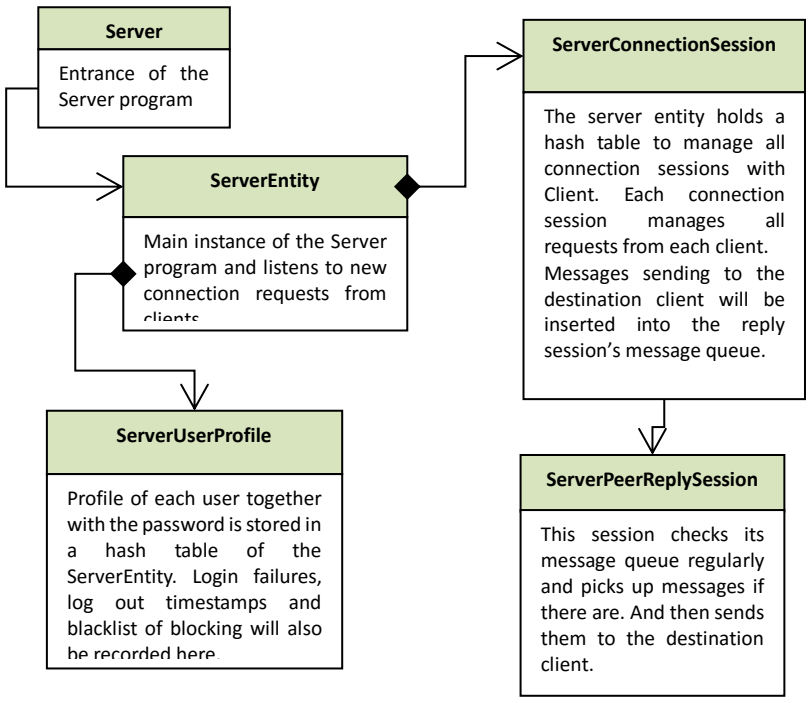
0. Brief Introduction

ScnChat is an online chat program developed by JAVA with socket interfaces from java.net and java.io. This program has a Server module and a Client module as two main components. The client can be launched by multiple users simultaneously while the Server could only run on one machine as a single instance.

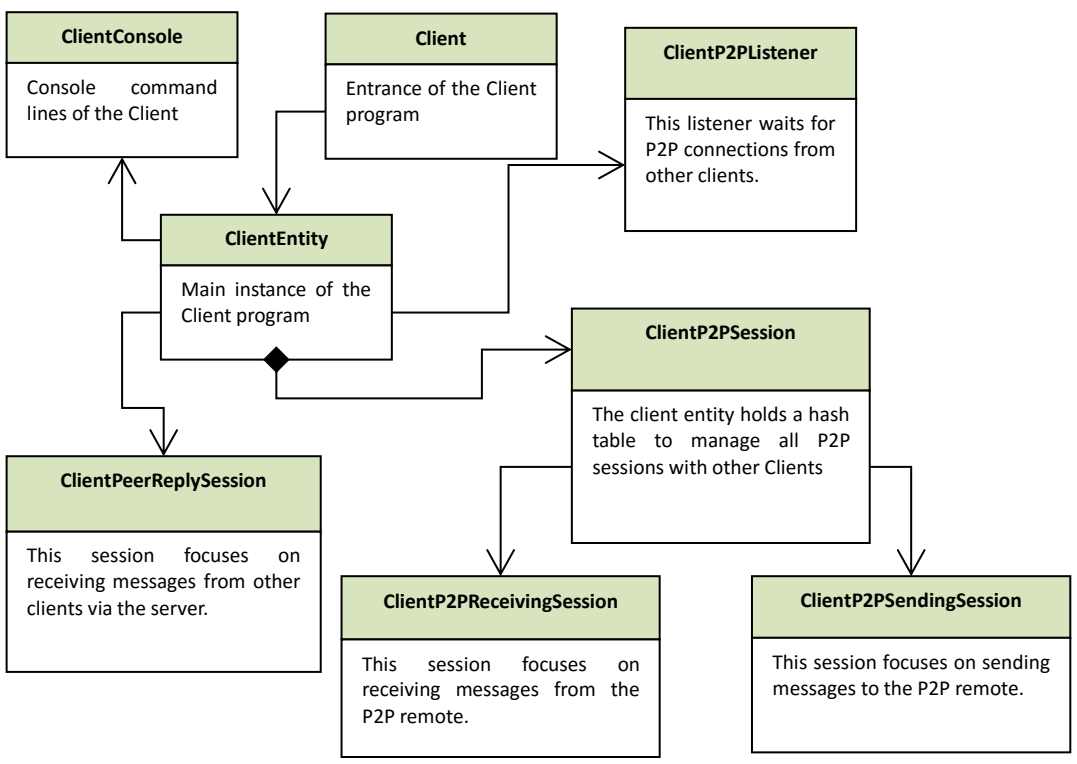
This program has covered all the requirements documented in the specification of Assignment One including both mandatory features and extended features. In addition, extra P2P commands are introduced in **ScnChat 1.0** for user convenience: ***stopprivate <user>*** to terminate the P2P connection and ***privatewhoelse*** to check online P2P users connected with this client.

1. Software Design Overview

Structure of the Server



Structure of the Client



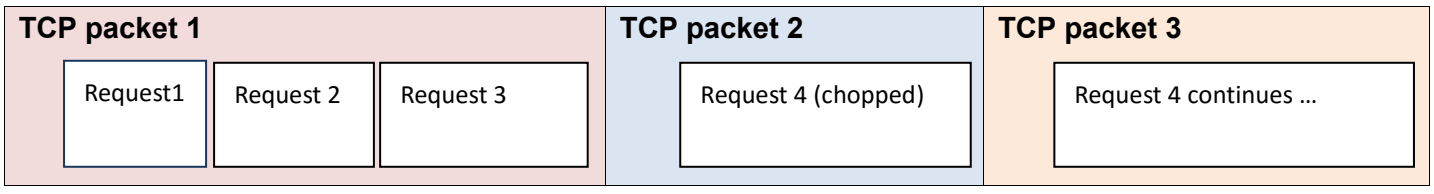
2. Instruction of the protocol

Comparison of packets between application (ScnChat) level and transport (TCP) level

JAVA socket stream allows data buffering and the "flush" function can be executed if it is time for the program to send out all the buffered data. In other words, multiple APP level requests may be included in a single TCP packet.

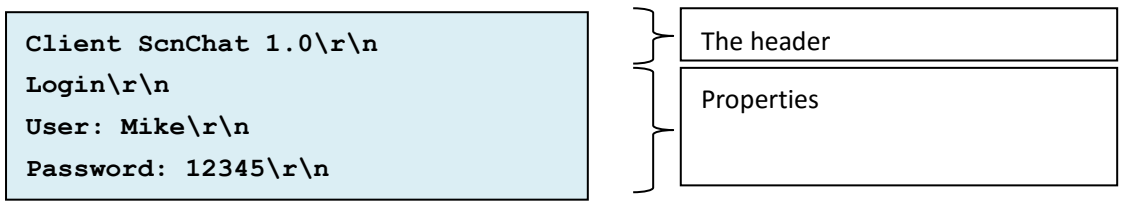
On the other hand, one request of APP level could be chopped into multiple TCP packets if the message sent by the client is too long.

Therefore, each APP level packet should be structurally designed with headers and properties, so that the software can determine the beginning and the ending of each request.



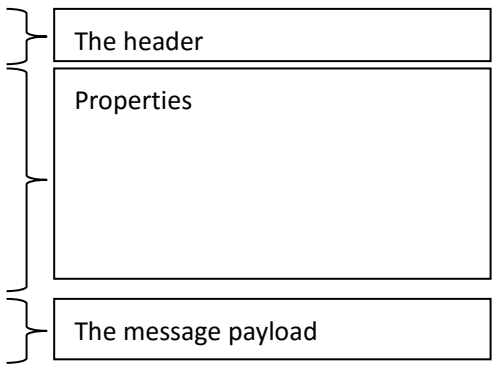
2.1 Packets sent by the client (examples):

Structure of a login request:



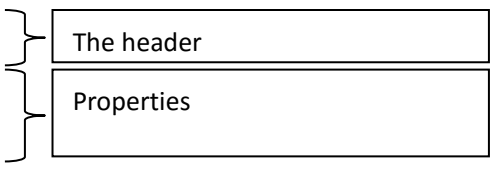
Structure of a message sent from a client to another client via the server.

```
Client ScnChat 1.0\r\n
Message\r\n
Host: 192.120.0.125\r\n
Sender: Mike\r\n
Receiver: Lily\r\n
Sent Time: 20170325 15:00:23\r\n
Content Length: 30\r\n
How are you? It is a nice day!
```



Structure of a whoelsesince request

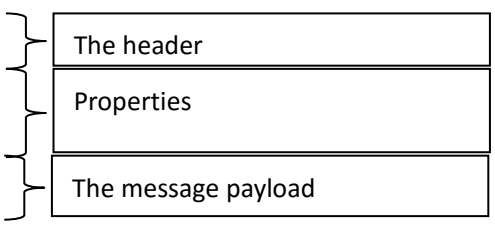
```
Client ScnChat 1.0\r\n
Whoelsesince\r\n
Time: 20170412 00:54:02\r\n
```



2.2 Packets sent by the server (examples):

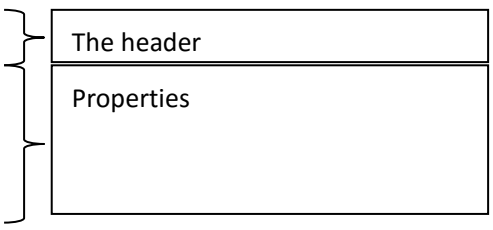
A request acknowledgement sent to the client

```
Server ScnChat 1.0\r\n
Acknowledge\r\n
Content Length: 19\r\n
Error. Invalid user
```



A notification that a new client (Yoda) is online

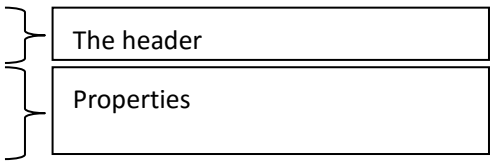
```
Server ScnChat 1.0\r\n
Presence\r\n
Type: Login\r\n
User: Yoda\r\n
Time: 20170325 15:00:23\r\n
```



2.3 Packets sent via P2P connections (examples):

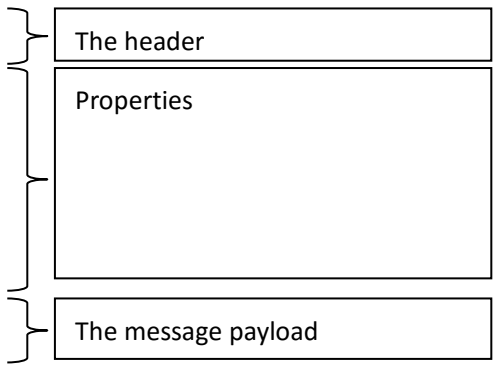
A application from one client (Yoda) to another client for a P2P sending connection

```
Client ScnChat 1.0\r\n
P2PSend\r\n
User: Yoda\r\n
```



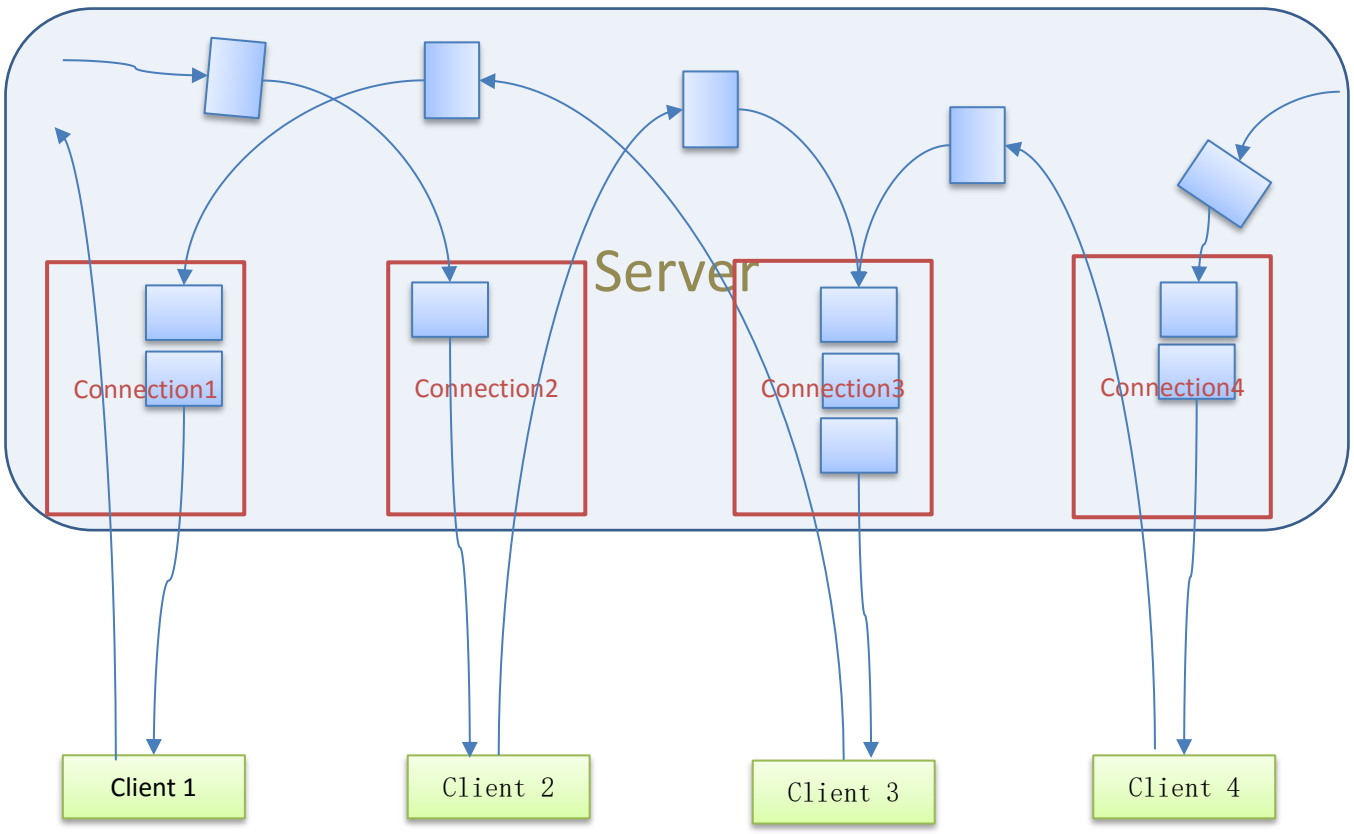
A message sent privately from a client to another client

```
Client ScnChat 1.0\r\n
P2PMessage\r\n
Host: 192.120.0.125\r\n
Sender: Mike\r\n
Receiver: Lily\r\n
Sent Time: 20170325 15:20:25\r\n
Content Length: 34\r\n
We don’t let other people know us!
```



3. The multi-thread mechanism of the server

Each connection session of the server receives messages from the client and distribute these messages to other connection sessions’ message queues according to whom the message should be sent to. Sending thread of each session would check its message queue regularly, remove messages and send them to its client. Synchronizations between threads are needed for this mechanism.



The multi-thread mechanism of P2P connections

A client could establish P2P connections with multiple clients. Messages send by this client's terminal would be distributed to the right P2P connections' message queues according to whom these messages should be sent to. Each P2P connection session checks the queue regularly, removes messages from its queue and sends them to the corresponding receiver.