2015 Advanced Computer Networks Homework 3

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利用TCP Socket實作一個多人聊天室。

練習在 mininet 下執行這個程式。

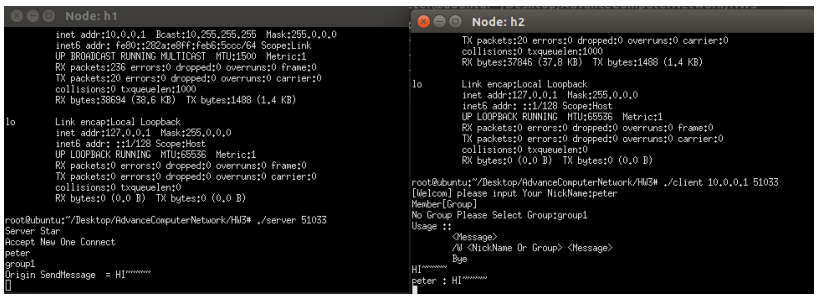
1. **Server:** (70%)

1. Use multi-thread to handle requests from clients.

```
while(1){


    if ( (ClientDescriptor = accept(SockDescriptor, (struct sockaddr*)&client_addrIpv4, &CliAddressLen)) < 0)
            perror("accept_error");exit(1);
    }

    printf("%s\n","Accept New One Connect");
    Member *temp    = (Member *)malloc(sizeof(Member));
    temp->fd        =ClientDescriptor;
    temp->prev=NULL;
    temp->next=NULL;


    pthread_create(&(temp->thread),  &attr, &recv_from_client,(void *)temp );
}
```

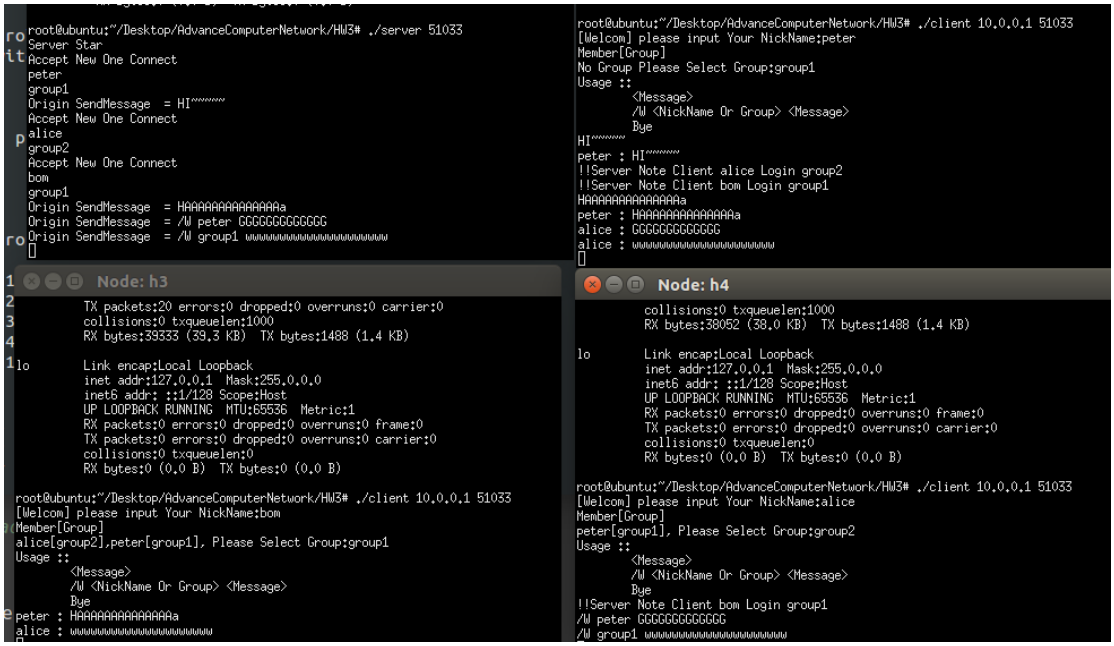
2. List all the members and chat room online, client can choose which room to join.

(if no group then user create group,
B0X3040ABC→5XABC B013040033 port is 51033)



H2建group1, H4建group2,H3加入group1

(List all the members and chat room online)



3. Handle clients request: (都同上圖)

i 訊息傳送給同一個群組下的成員。

H2 (peter) say HAAAAAAAAAA , H3(bom)can listen it,H4 can not listen

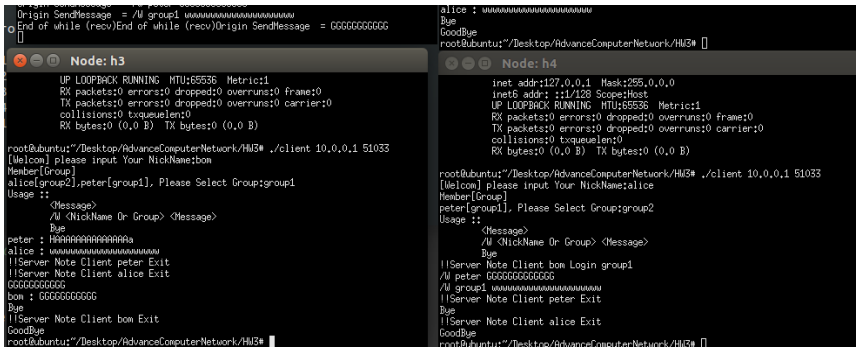
ii 判斷訊息傳送的對象是人還是群組並將訊息傳給指定的人或者群組。

H4 say /W peter GGGGGGGGGGGG，H2 can listen

H4 say /W group1 wwwwwwwwwwwwwww ，H2& H3can listen

iii 有人加入聊天室或者離開聊天室時,通知所有的成員。

H2(peter) say Bye ,other gets message !!Server Note Client peter Exit



2. **Client:** (15%)前面的圖片 皆有

Usage: ./client <Server IP> <Port number>

1. Connect to server.

2. 2. Handle input:

i <Message>

訊息傳送給同一個群組下的成員

ii /W <Name or room> <Message>

判斷訊息傳送的對象是人還是群組並將訊息傳給指定的人或者群組

iii Bye

中斷連線

3. 執行環境: (15%)

練習在 mininet 下建立不只 2 個 host 並且可以互相 ping 到

建立

```
cpeter@ubuntu:~/Desktop/AdvanceComputerNetwork/HW3$ sudo mn --topo single,4
*** Creating network
*** Adding controller
*** Adding hosts:
h1 h2 h3 h4
*** Adding switches:
s1
*** Adding links:
(h1, s1) (h2, s1) (h3, s1) (h4, s1)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
*** Starting 1 switches
s1
*** Starting CLI:
mininet>
```

PingAll,net

```
cpeter@ubuntu: ~/Desktop/AdvanceComputerNetwork/HW3
s1
*** Adding links:
(h1, s1) (h2, s1) (h3, s1) (h4, s1)
*** Configuring hosts
h1 h2 h3 h4
*** Starting controller
*** Starting 1 switches
s1
*** Starting CLI:
mininet> pingall
*** Ping: testing ping reachability
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped (12/12 received)
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
h3 h3-eth0:s1-eth3
h4 h4-eth0:s1-eth4
s1 lo:  s1-eth1:h1-eth0 s1-eth2:h2-eth0 s1-eth3:h3-eth0 s1-eth4:h4-eth0
c0
mininet>
```

Xterm

```
cpeter@ubuntu: ~/D
h1 h2 h3 h4
*** Starting controller
*** Starting 1 switches
s1
*** Starting CLI:
mininet> pingall
*** Ping: testing ping r
h1 -> h2 h3 h4
h2 -> h1 h3 h4
h3 -> h1 h2 h4
h4 -> h1 h2 h3
*** Results: 0% dropped
mininet> net
h1 h1-eth0:s1-eth1
h2 h2-eth0:s1-eth2
h3 h3-eth0:s1-eth3
h4 h4-eth0:s1-eth4
s1 lo:  s1-eth1:h1-eth0 s1-eth2:h2-eth0 s1-eth3:h3-eth0 s1-eth4:h4-eth0
c0
mininet> xterm h1
mininet> xterm h2
mininet> xterm h3
mininet> xterm h4
mininet>
```

```
Node: h1
root@ubuntu:~/Desktop/AdvanceComputerNetwork/HW3#
```

Ifconfig h1~h4 is 10.0.0.1~4

```
Node: h1
root@ubuntu:~/Desktop/AdvanceComputerNetwork/HW3# ifconfig
1-eth0    Link encap:Ethernet  HWaddr 2a:2a:e8:b6:5c:cc
          inet addr:10.0.0.1  Bcast:10.255.255.255  Mask:255.0.0.0
          inet6 addr: fe80::282a:e8ff:feb6:5ccc/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:236 errors:0 dropped:0 overruns:0 frame:0
          TX packets:20 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:38694 (38.6 KB)  TX bytes:1488 (1.4 KB)

o         Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@ubuntu:~/Desktop/AdvanceComputerNetwork/HW3#
```

```
Node: h2
root@ubuntu:~/Desktop/AdvanceComputerNet
h2-eth0   Link encap:Ethernet  HWaddr 1a
          inet addr:10.0.0.2  Bcast:10.2
          inet6 addr: fe80::181a:64ff:fe
          UP BROADCAST RUNNING MULTICAST
          RX packets:231 errors:0 droppe
          TX packets:20 errors:0 droppe
          collisions:0 txqueuelen:1000
          RX bytes:37846 (37.8 KB)  TX b

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:6553
          RX packets:0 errors:0 dropped:
          TX packets:0 errors:0 dropped:
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0

root@ubuntu:~/Desktop/AdvanceComputerNet
```

```
Node: h3
root@ubuntu:~/Desktop/AdvanceComputerNetwork/HW3# ifconfig
3-eth0    Link encap:Ethernet  HWaddr e6:38:21:8b:e9:08
          inet addr:10.0.0.3  Bcast:10.255.255.255  Mask:255.0.0.0
          inet6 addr: fe80::e438:21ff:fe8b:e908/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:236 errors:0 dropped:0 overruns:0 frame:0
```

```
Node: h4
root@ubuntu:~/Desktop/AdvanceComputerN
h4-eth0   Link encap:Ethernet  HWaddr
          inet addr:10.0.0.4  Bcast:10
          inet6 addr: fe80::4cb5:6aff:
          UP BROADCAST RUNNING MULTICA
          RX packets:232 errors:0 drop
```