





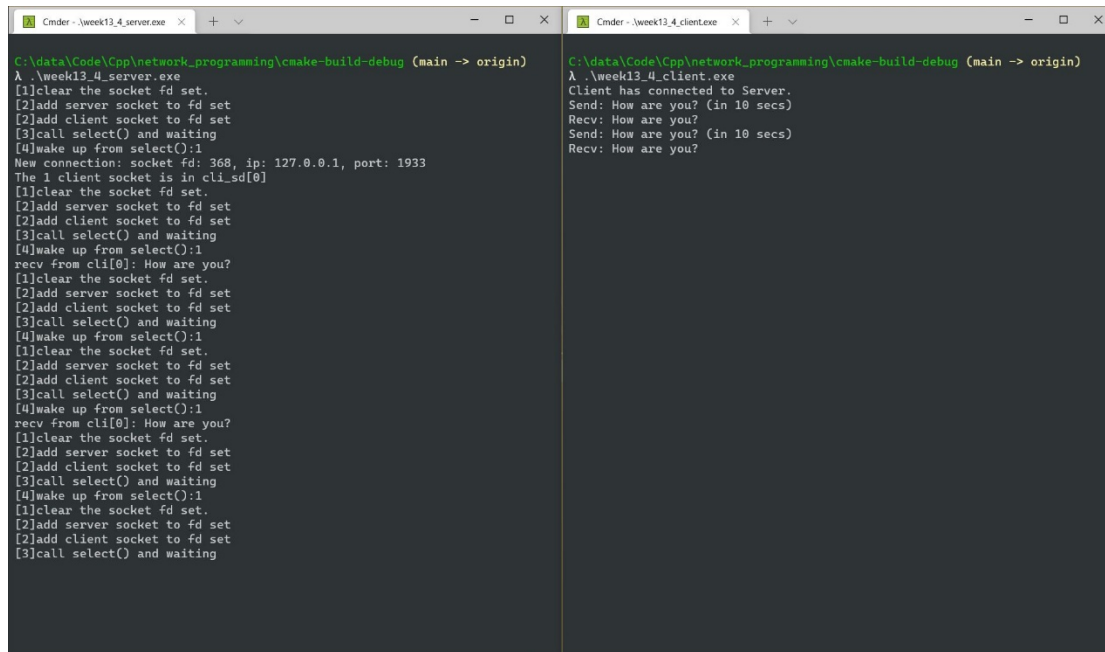
```
cmdr
recv from and echo to cli[1]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
New connection: socket fd: 396, ip: 127.0.0.1, port: 1141
The 3 client socket is in cli_sd[2]
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from and echo to cli[0]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
Host disconnected unexpectedly
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from and echo to cli[2]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from and echo to cli[0]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from and echo to cli[2]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
```

## 練習 4：服務多個 client 的 echo server

左方視窗為 server 端的畫面，右方視窗為 client 端的畫面。

server 端接收 client 端傳來的訊息，並將收到的訊息回傳給 client 端，可看到每次 client 端傳送訊息時 server 端會 select()兩次，因 send 跟 recv 各一次。

client 端每 10 秒傳送 1 次 How are you? 到 server。



```

C:\data\Code\Cpp\network_programming\cmake-build-debug (main -> origin)
λ .\week13_4_server.exe
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
New connection: socket fd: 368, ip: 127.0.0.1, port: 1933
The 1 client socket is in cli_sd[0]
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from cli[0]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
[2]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from cli[0]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
[2]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting

C:\data\Code\Cpp\network_programming\cmake-build-debug (main -> origin)
λ .\week13_4_client.exe
Client has connected to Server.
Send: How are you? (in 10 secs)
Recv: How are you?
Send: How are you? (in 10 secs)
Recv: How are you?

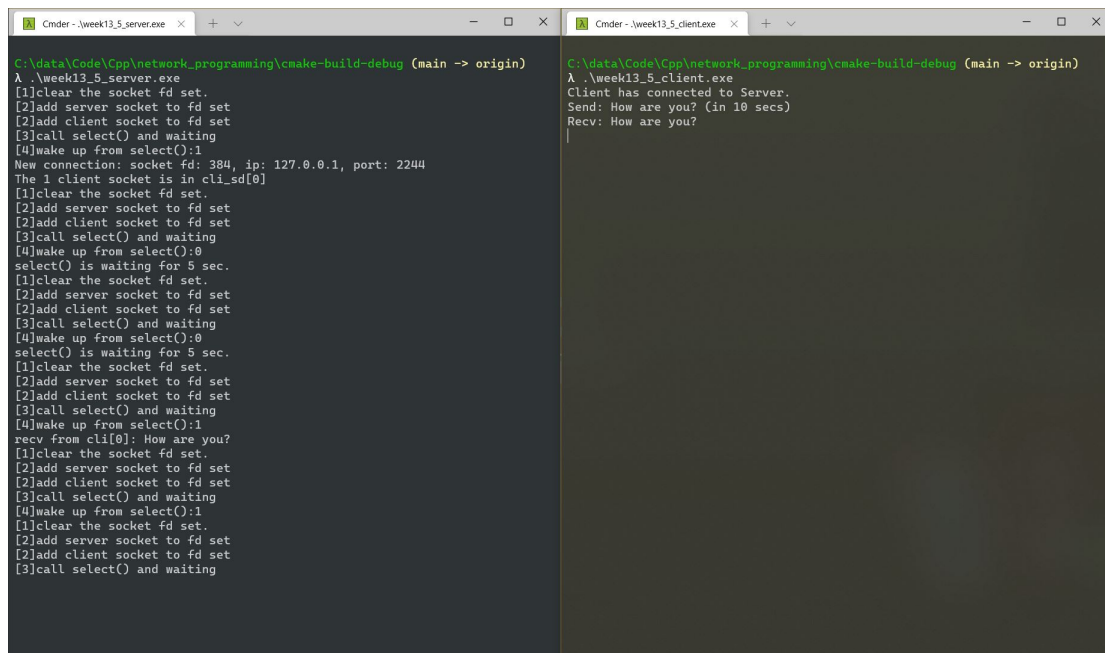
```

## 練習 5：服務多個 client 的 echo server

左方視窗為 server 端的畫面，右方視窗為 client 端的畫面。

server 端接收 client 端傳來的訊息，若未收到，但逾時 (5 秒) 會有 timeout 顯示。

client 端每 10 秒傳送 1 次 How are you? 到 server。



```

C:\data\Code\Cpp\network_programming\cmake-build-debug (main -> origin)
λ .\week13_5_server.exe
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
New connection: socket fd: 384, ip: 127.0.0.1, port: 2244
The 1 client socket is in cli_sd[0]
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():0
select() is waiting for 5 sec.
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():0
select() is waiting for 5 sec.
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
recv from cli[0]: How are you?
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting
[4]wake up from select():1
[1]clear the socket fd set.
[2]add server socket to fd set
[2]add client socket to fd set
[3]call select() and waiting

C:\data\Code\Cpp\network_programming\cmake-build-debug (main -> origin)
λ .\week13_5_client.exe
Client has connected to Server.
Send: How are you? (in 10 secs)
Recv: How are you?

```

## 二、心得

這次作業使用了 select 來做，讓我學到了很多，因為疫情的關係，不能到場現場上課令我覺得很可惜，有很多想跟老師的事項，不論課內或課外的事，沒辦法當面討論，覺得有點可惜。