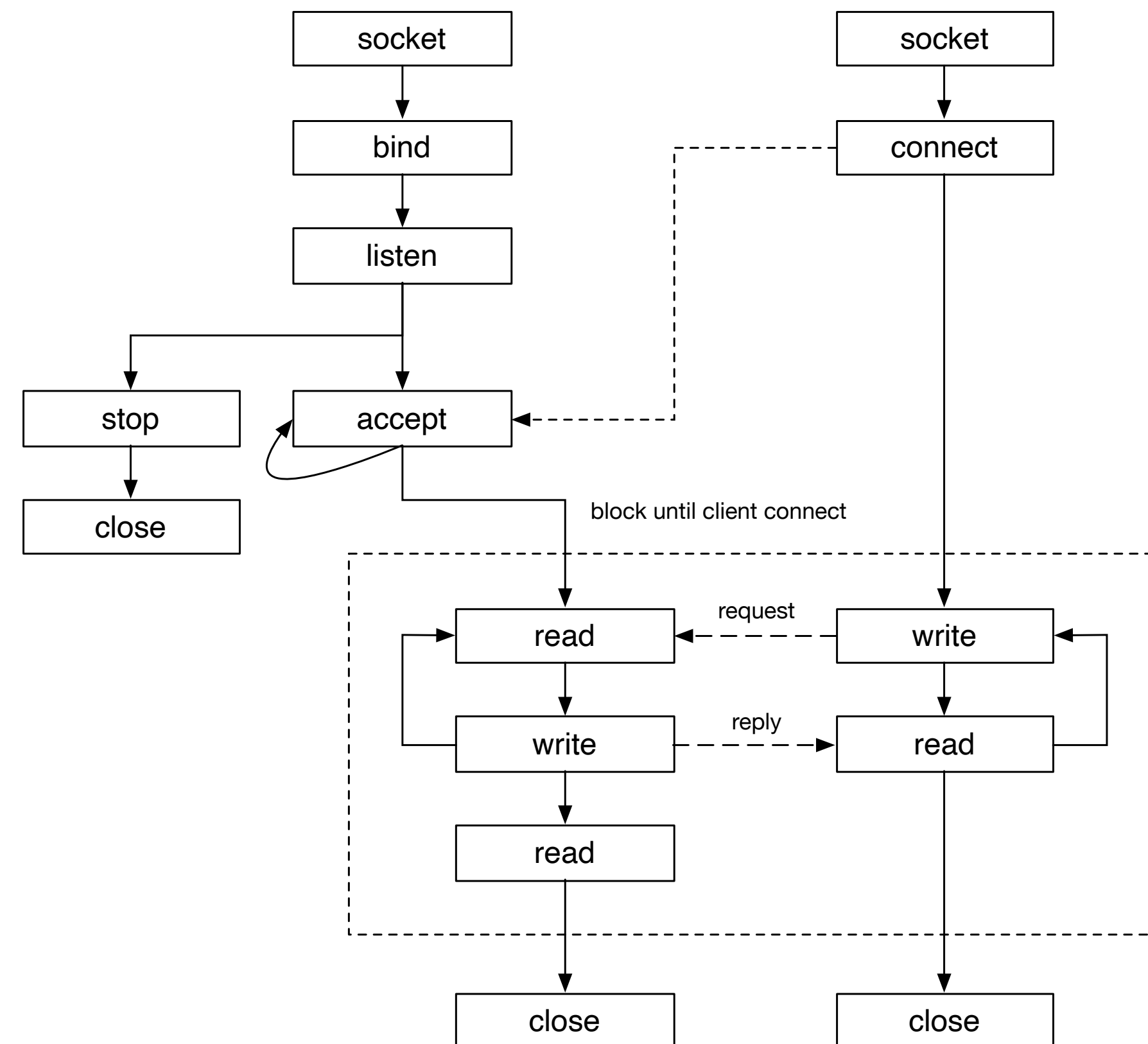


Let's Chat

Arthur Pai

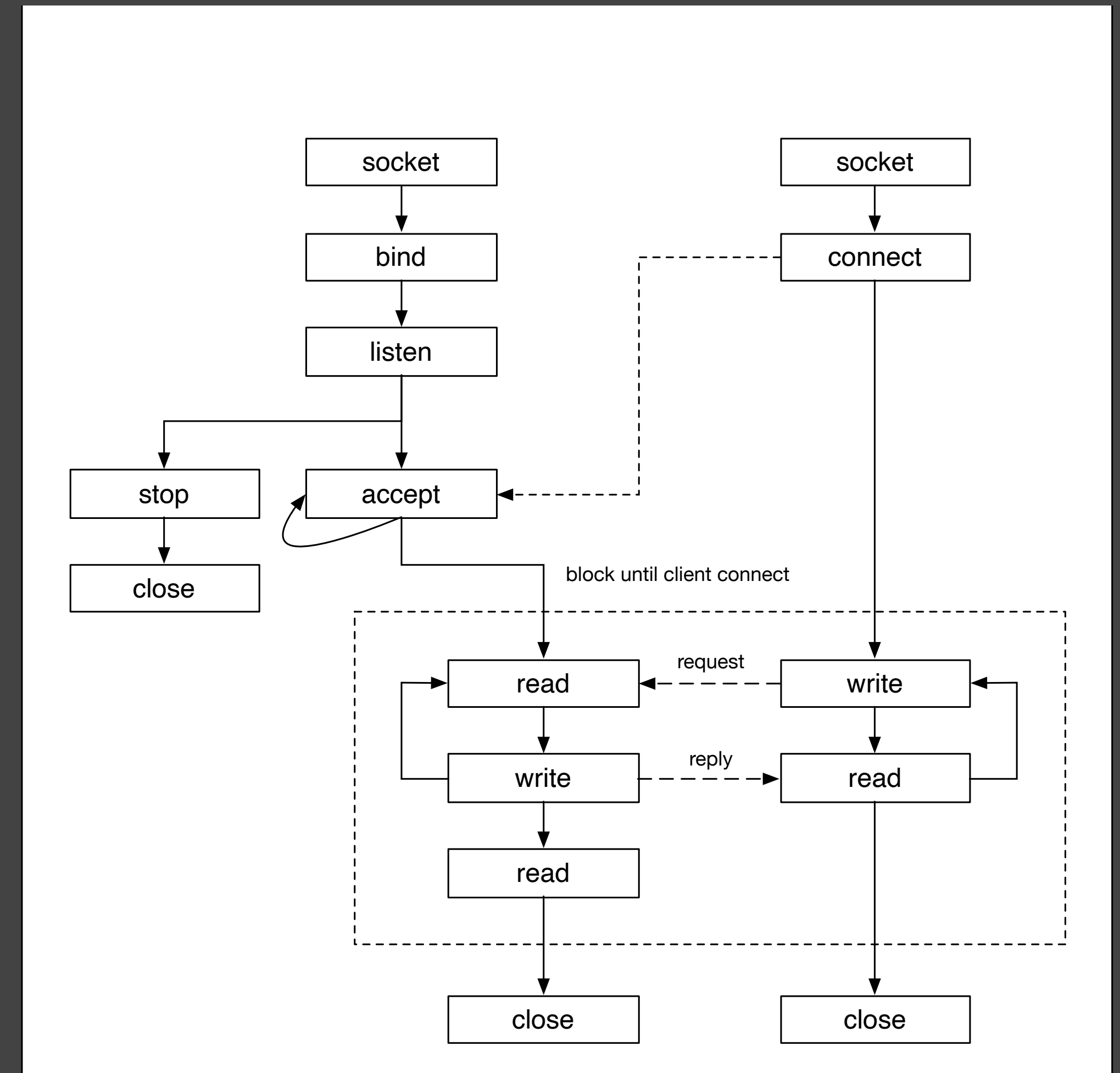
<https://github.com/ispan-umvr09/chat-room>

Socket Flow



1. Create connection

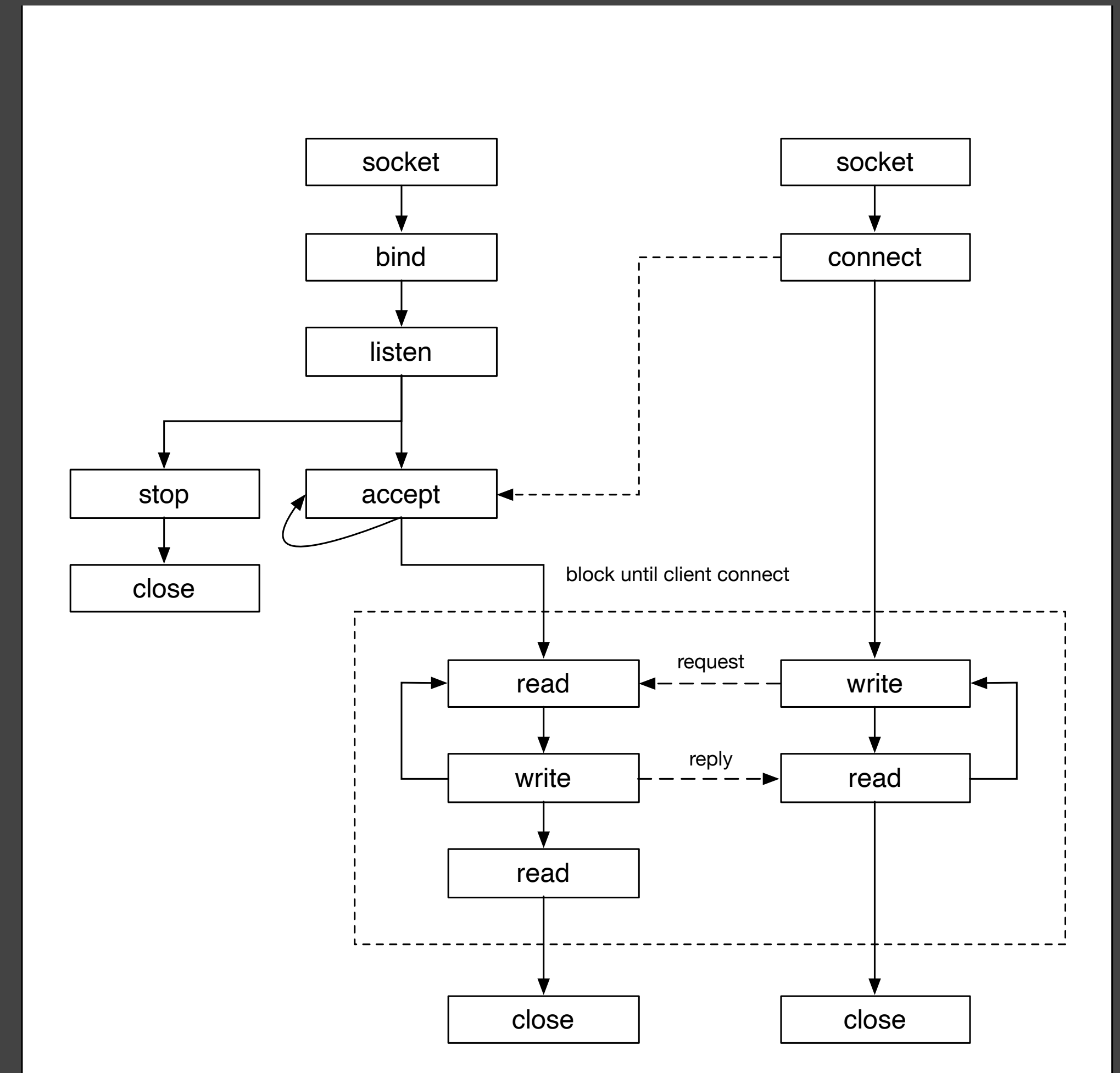
- Using C# TcpSocket Library
 - TcpListener Class
 - TcpClient Class
- Create Connection
 - Server
 - create TcpListener bind & start
 - 127.0.0.1/0.0.0.0, 4099
 - accept & print “Client has connected”
 - Client
 - create TcpClient and connect
 - 127.0.0.1, 4099
- 缺點
 - 只能連接一個 Client !



練習10分鐘

2. Send message to server

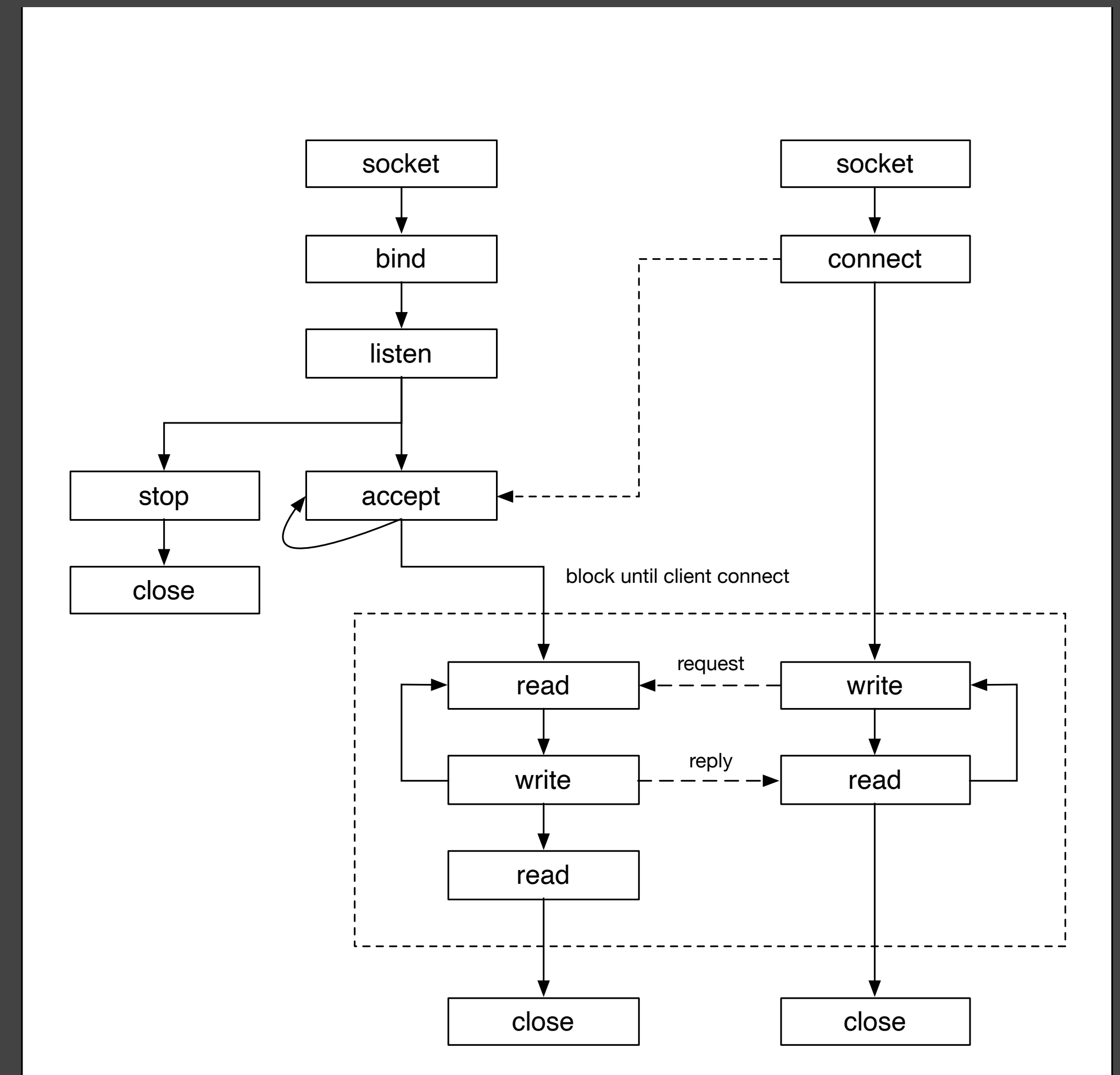
- Client send message to Server
 - ***Send(TcpClient, string)***
 - string to Byte[]
 - Write to TcpClient stream
 - Call *send(client, "msg")* after connected
- Server read message
 - ***Receive(TcpClient)***
 - Read from TcpClient stream
 - Byte[] to string
 - print the message
 - Call *Receive(client)* after accepted
- 缺點
 - Server 沒有 Close Client



練習10分鐘

3. Accept multi-clients

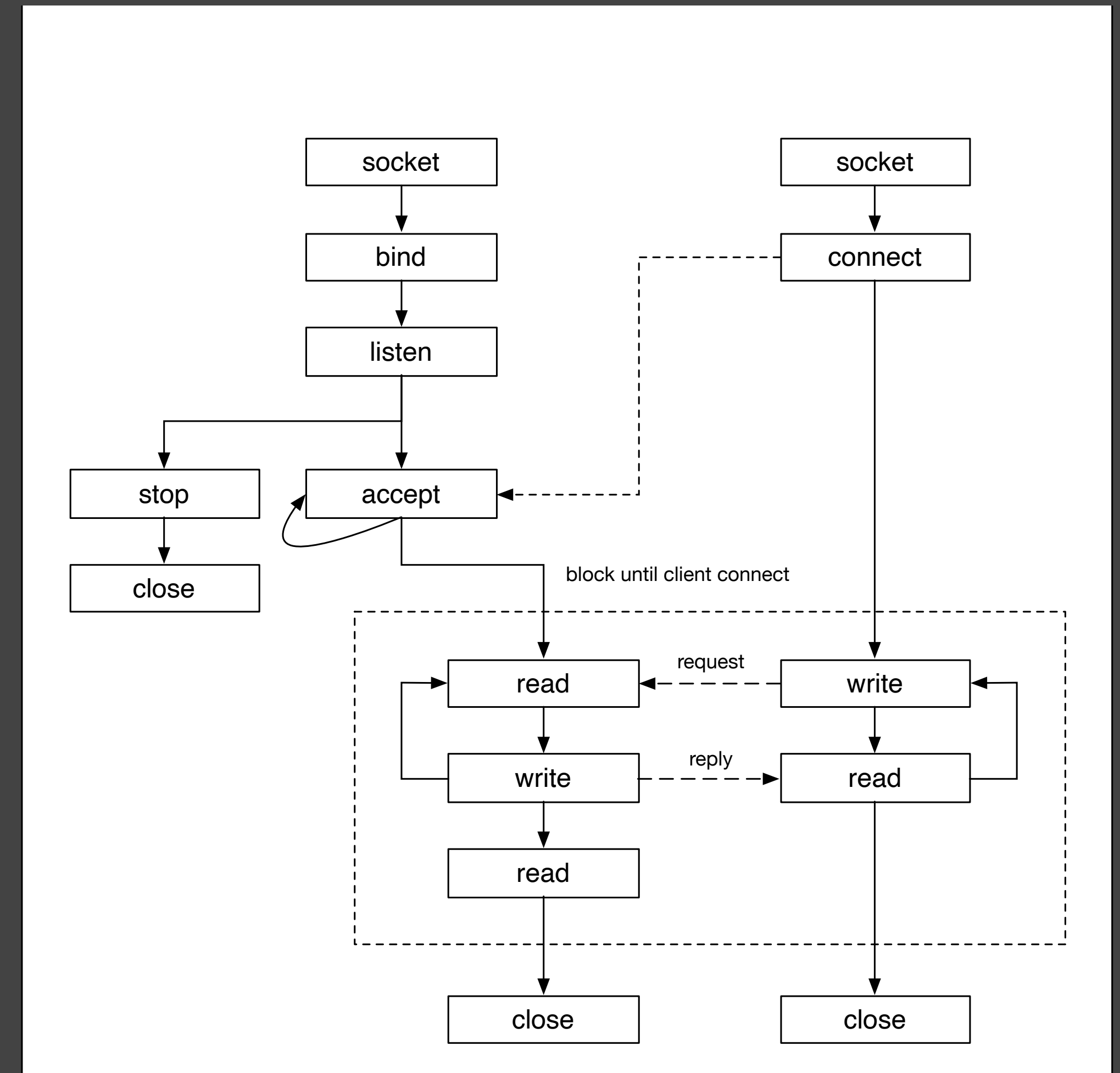
- **Accept Multiple Clients**
 - Server add while loop to accept client
- 缺點
 - 一次只能處理一個 Client



練習10分鐘

4a receive multi-client's message

- Server
 - remove Receive() after accepted
 - add HashSet to store accepted TcpClient
 - **HandleMessages()**
 - Lock the HashSet and Read() each TcpClient's stream in HashSet
 - Check TcpClient's *available* propriety to see whether it should call Read() or not
 - create a Thread and pass HandleMessages function in the constructor and start.
- 缺點
 - Lock memory 會影響運行效能

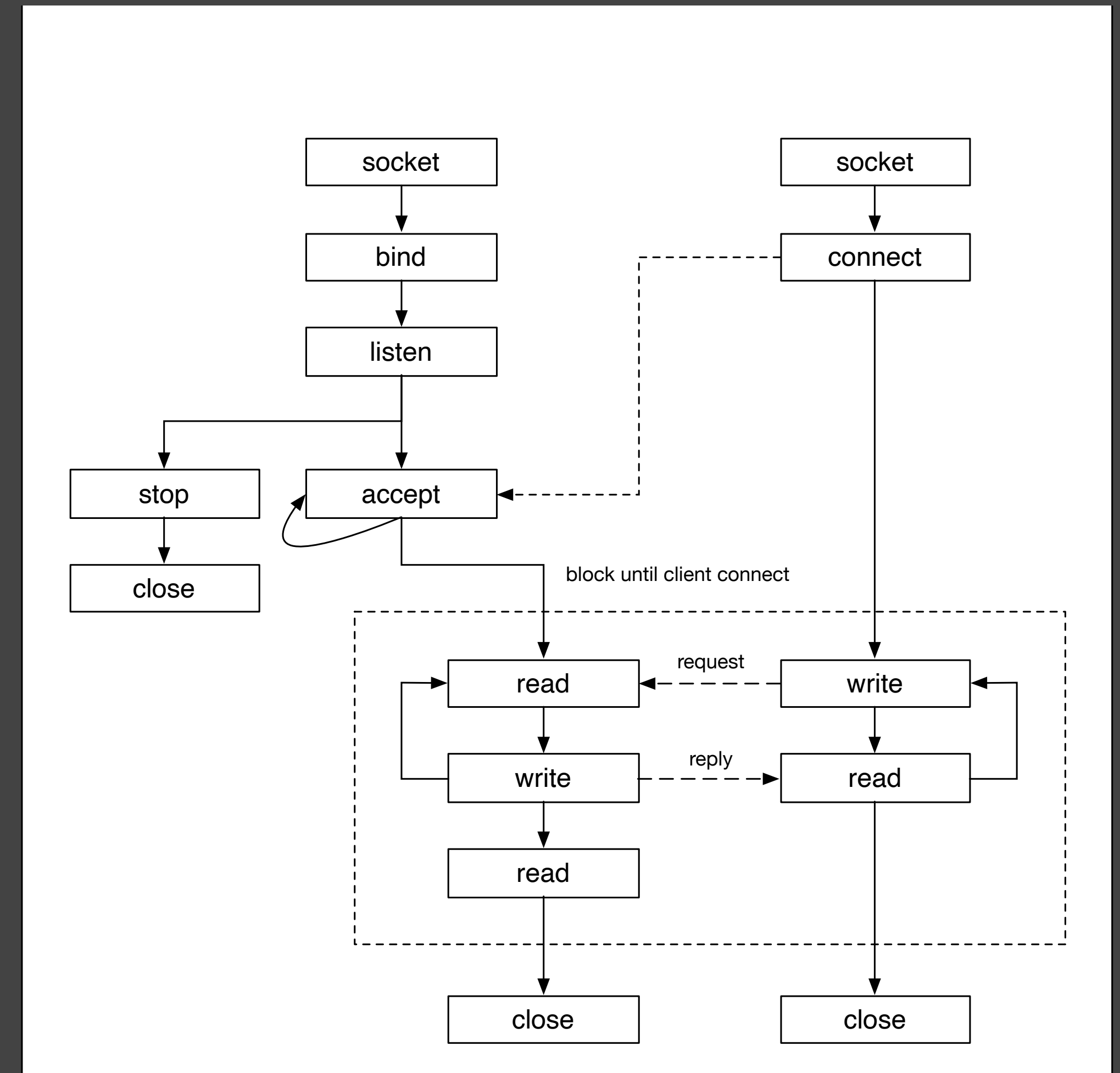


練習10分鐘

4b input any message from client

- Client
 - add while loop to ReadLine a message and send
 - print what you sent

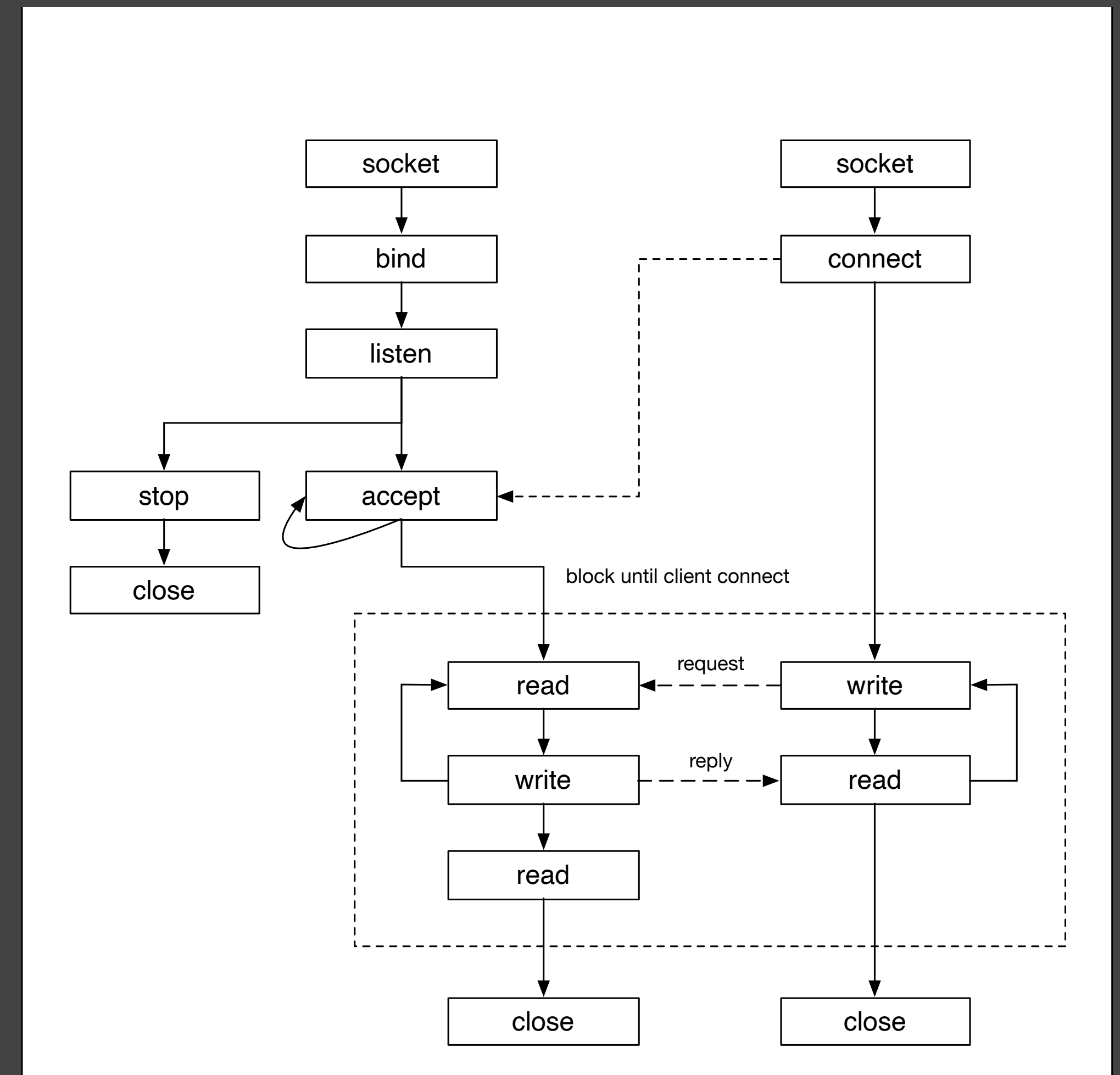
Now server can receive multiple clients' messages



練習10分鐘

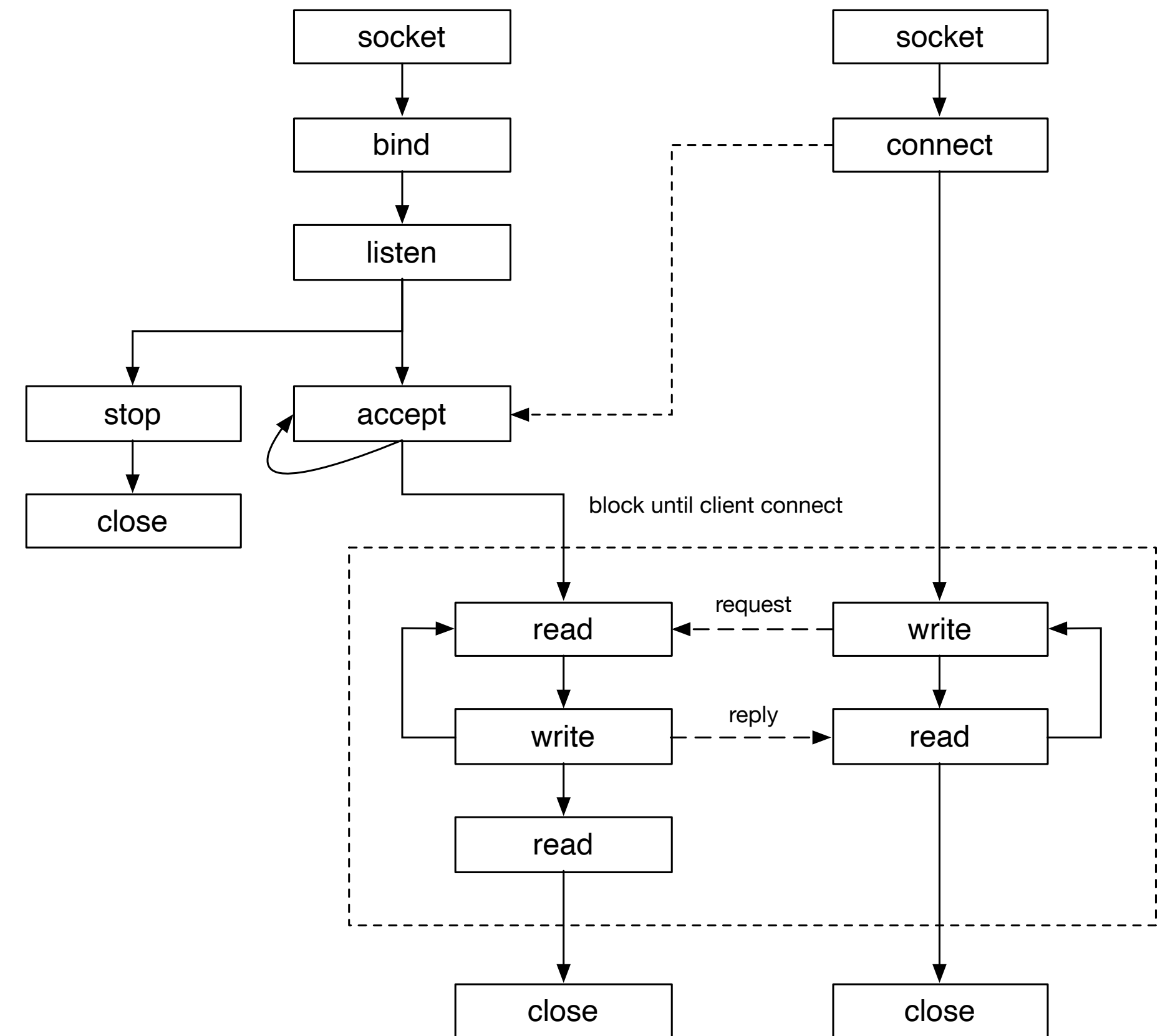
5a Extract ChatServer

- Server
 - use TcpClient's RemoteEndPoint as clientId
 - change using Dictionary<string, TcpClient> to store accepted clients



練習10分鐘

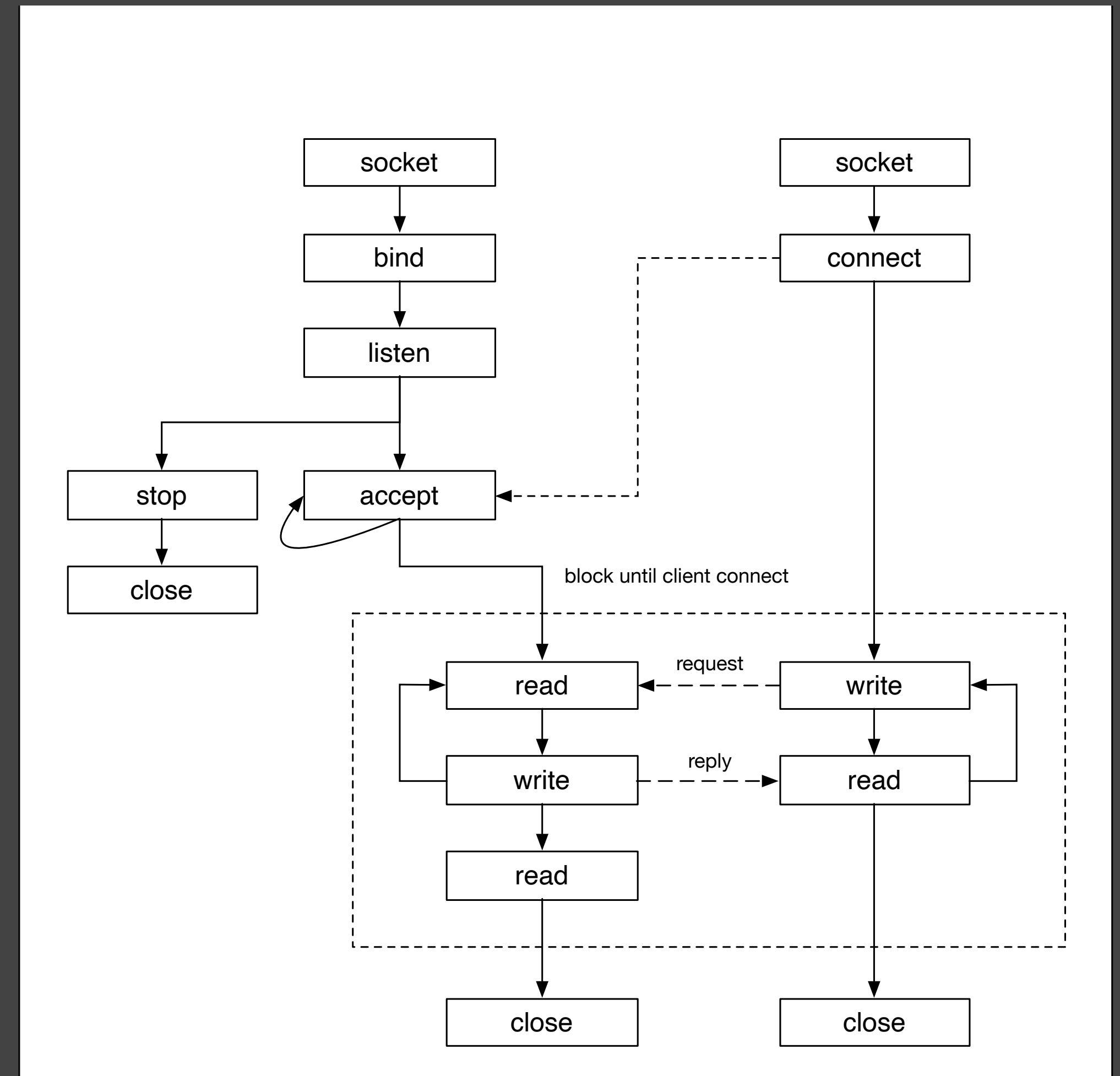
5b Extract ChatClient



練習10分鐘

6 Login

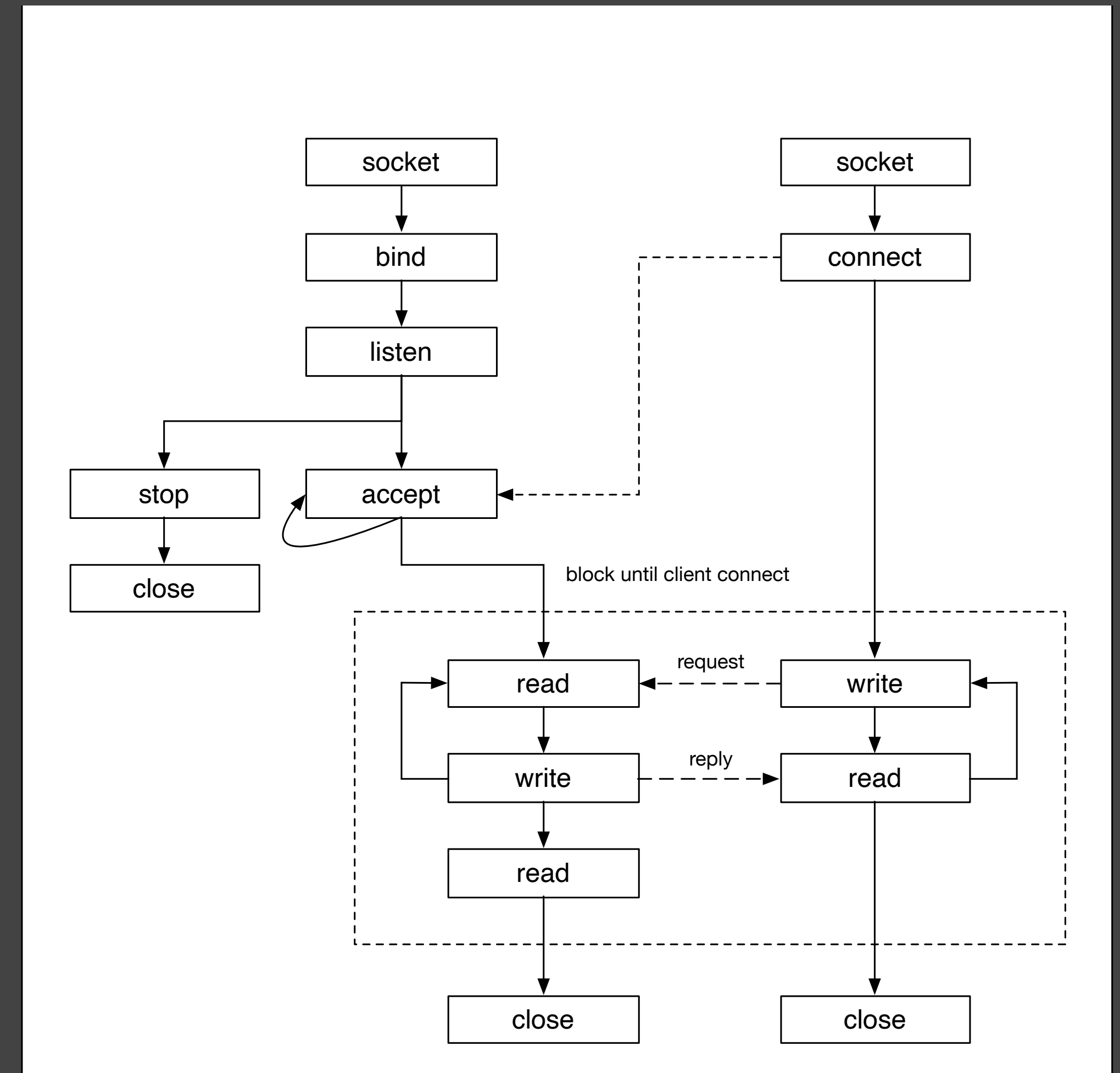
- login flow
 - change send data format
 - using "LOGIN:" "MESSAGE:" to define data type



練習10分鐘

6b Simple Authentication

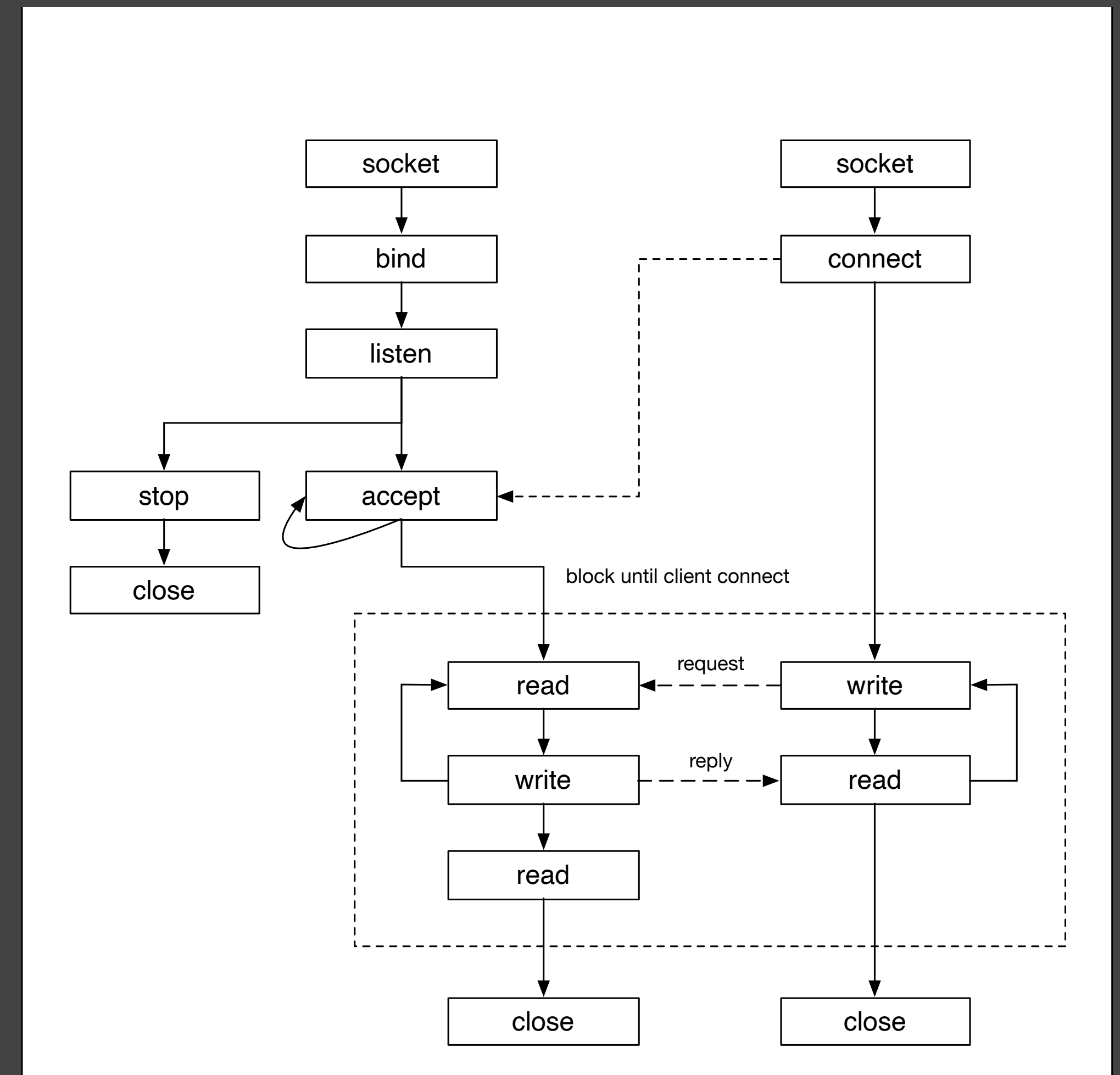
- login flow
 - using “LOGIN:name:password” to authentication user



練習10分鐘

7 Let's Chating

- Server
 - add Broadcast() function to send client message to other clients
 - check TcpClient connected property and remove disconnected client and close it
- Client
 - add HandleReceiveMessages() to receive other clients message



練習10分鐘

WHAT'S THE PROBLEM IN THIS CHATROOM DEMO?

- 使用字串無法表達各種情況，可以使用 event structure 來替代
- 如何處理斷線 (TcpClient close)
- Lock memory issue: 多執行緒(Multi-Thread)
- CPU cost by “while” / blocking API: 非同步(Async)
- 可以使用 Memory footprint 資源監視器來觀察記憶體洩漏