System structure

In this project, we use simple b/s structure to support multi-pairs players playing at the same time

1. frontend:
2. backend:
   backend is written in golang using multi-threads and channels to support concurrency. To see the detail structure, go to the next part: how to support multiple player concurrently.

C/S communication

We use websocket protocol to build a steady channel between client and server

1. message from user:"play-pawn", "join-room", "leave-room"

```
        Action   string `json:"action"`
        RoomName string `json:"message"`
        X        int32  `json:"x"`
        Y        int32  `json:"y"`
```

```
Besides actions above, user can also disconnect the websocket connection
without notifying server.
```

2. message from server
   user can parse the json file in websocket connection to sync with other players
   this structure bellow maintains the metadata of a gomoku Room
   the 10-by-10 board is encoded in a single row 100 bytes array

```
    RoomName      string    `json:"roomName"`
    Player        int32     `json:"player"`
    Player1Online bool      `json:"player1Online"`
    Player2Online bool      `json:"player2Online"`
    Turn          int32     `json:"turn"`
    Board         [100]byte `json:"board"`
```

how to support multiple players concurrently

We use 3 diffenrent kinds of threads to support multi-players in multi-rooms.

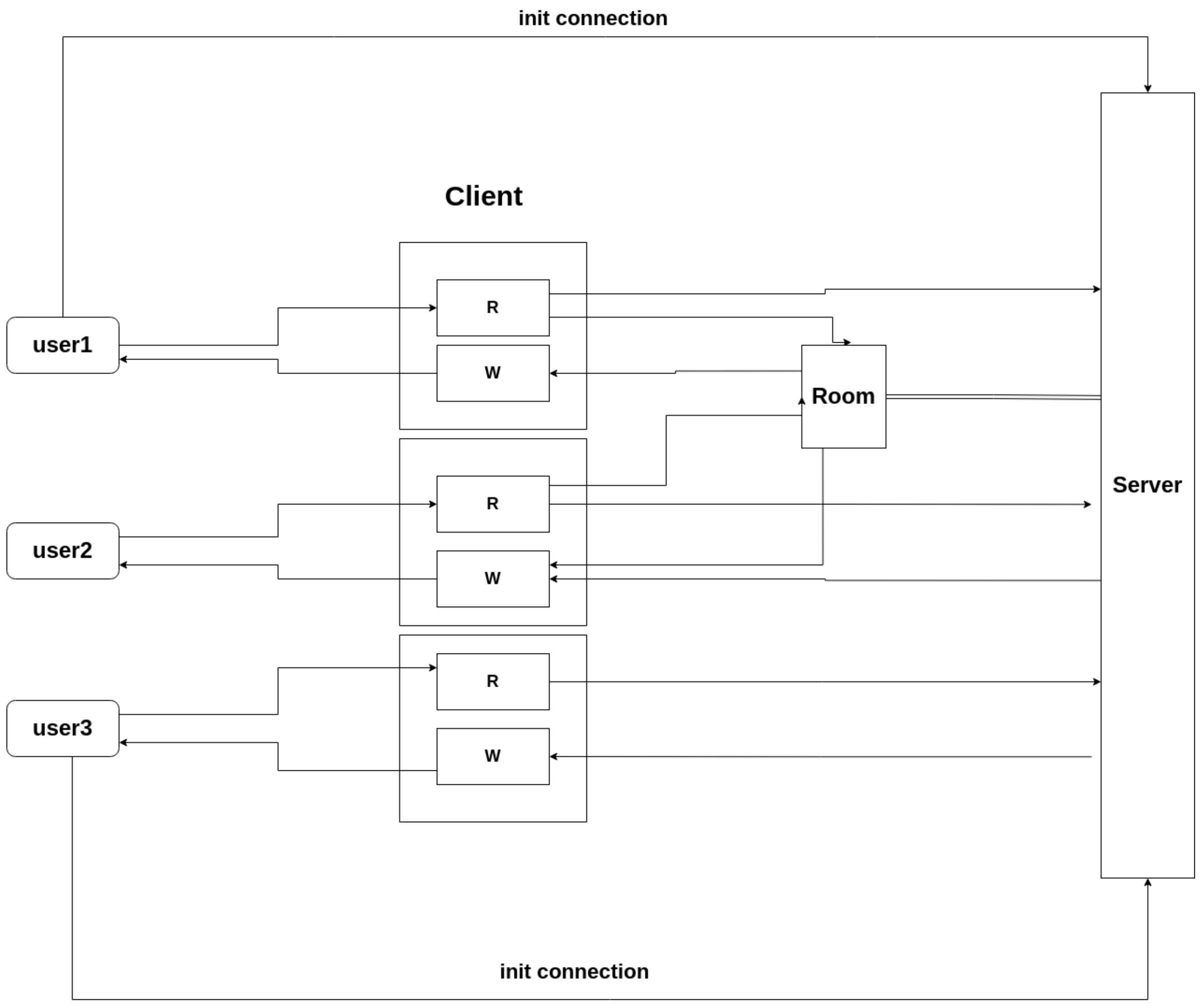
1. server thread
    1. handle http handleshake and upgrade its to websocket connection
    2. maintain users' and rooms' registration
2. client thread

    the client thread consists of 2 sub threads:

    1. read thread: read data from user and send them to correct handler
    2. write thread: send msg back to user
3. room thread

    room thread maintain the metaData of a gomoku game, including players' info, game info.

    1. handle user join/leave room
    2. handle user play a pawn in the room


init connection
Client
R
W
R
W
R
W
user1
user2
user3
Room
Server
init connection