3) Handle Table data structure on the server.

a.

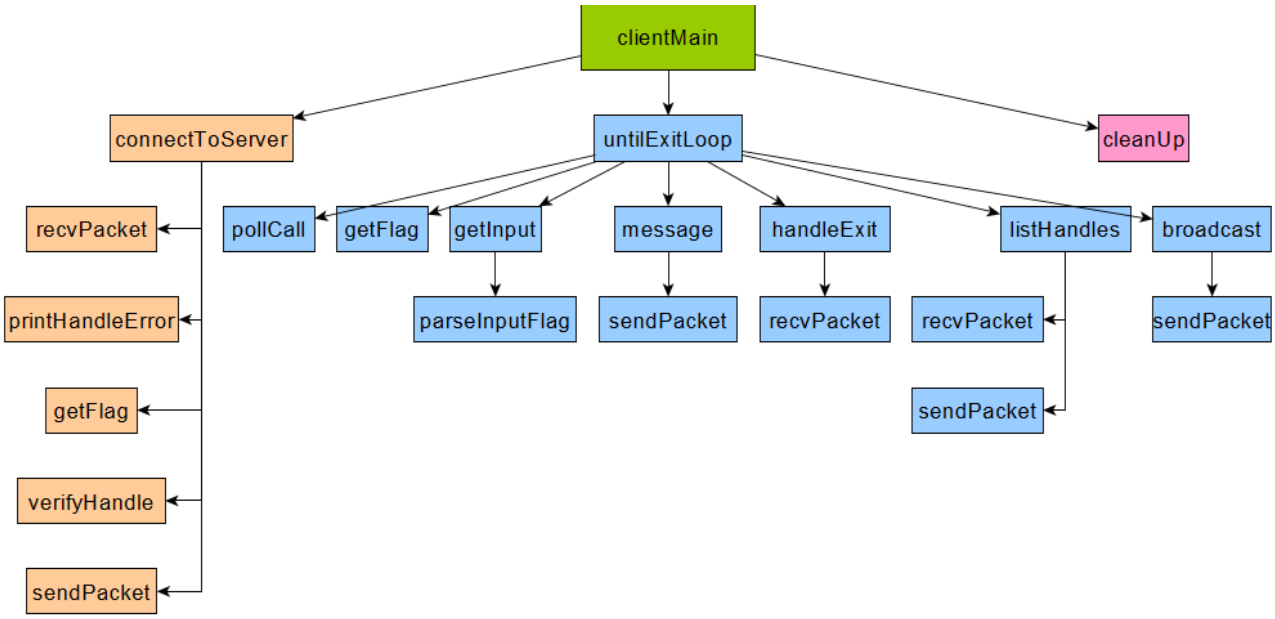
Socket/Handle State on the <u>Server</u>	**How can this happen (what can cause this on the server)**	**If you looked at your socket/handle table, how do you know the socket/handle is currently in this state (what in your data structure would tell you this)**
Client socket is opened but handle not valid	A client attempted to connect with a bad handle, but the server did not close the socket.	I would indicate this with a null value for the handle in the table.
Client Socket open and client handle is valid	A client successfully connected to the server with a valid handle	Entry in the socket/handle table for the open client and valid handle.
Socket was opened and had a handle, but then the socket was closed	Client successfully connected then exited.	No entry for the handle or socket

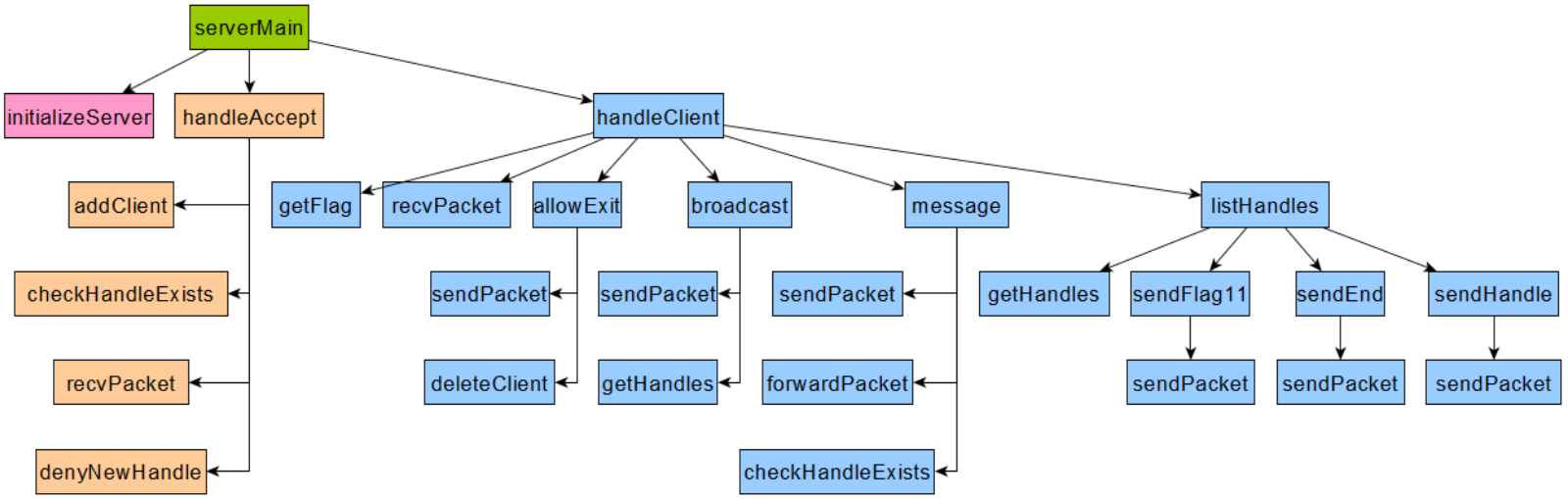
b.

- getSocket(handle) -> returns socket number associated with that handle or null if there is no such handle
- getHandle(socket) -> returns the handle associated with that socket if it exists, else null
- addSocketHandle(socketNumber, handle) -> returns 0 if the handle is invalid, 1 on success: checks for valid handle then creates a new entry in the table for socketNumber/handle and adds the socketNumber to the poll set
- closeSocketHandle(socketNumber) -> returns 0 if no such socket exists, 1 on success: closes socket, removes socket from poll set, and deletes entry in table
- getAllHandles(char **list) -> returns number of handles and fills given list with the handles

Part II – Hierarchical drawing and listing common code

a. **Hierarchical drawing:**





b. **Common Code**:

- Flag macros
- Uint16_t getPacketLen(char * buf)
- Int getFlag(char * buf)
- sendPacket()
- recvPacket()
- pollLibrary