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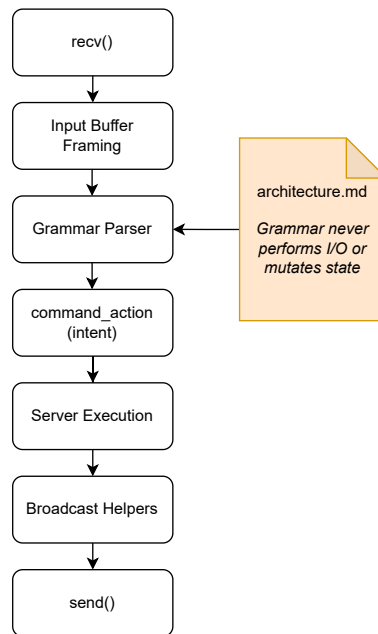
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Portfolio – Selected Projects

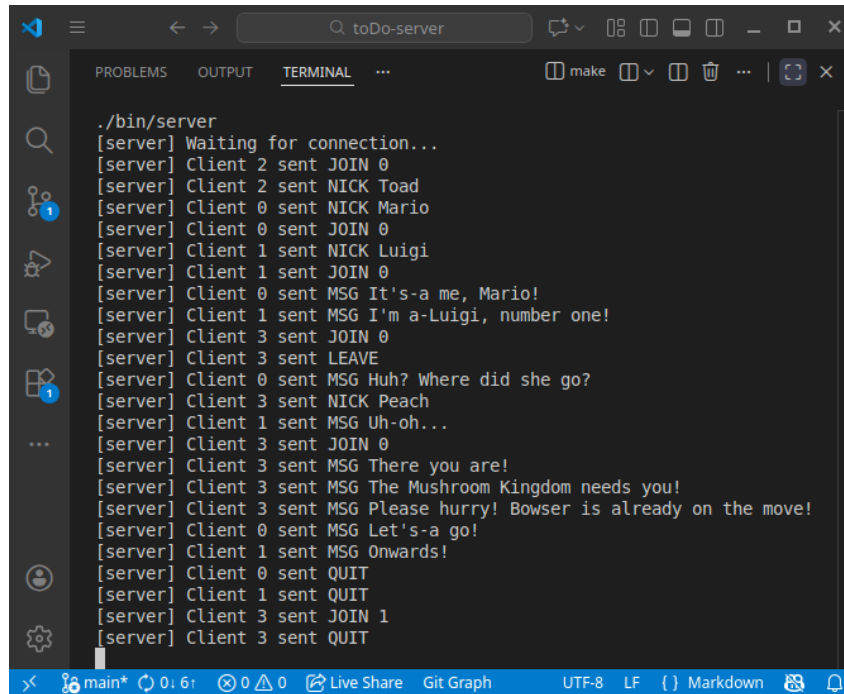
Event-Driven Chat Server in C

2025

- Single-process, event-driven chat server using UNIX domain stream sockets and `select()`.
- Explicit protocol design with strict layered separation: input framing, command grammar, and execution.
- Manual client lifecycle management via a fixed-size client table (single-threaded, no `fork()`).
- Emphasis on correctness, reproducibility, and explicit ownership of server state over premature concurrency.
- **Repository:** [unix-chat-server](#)

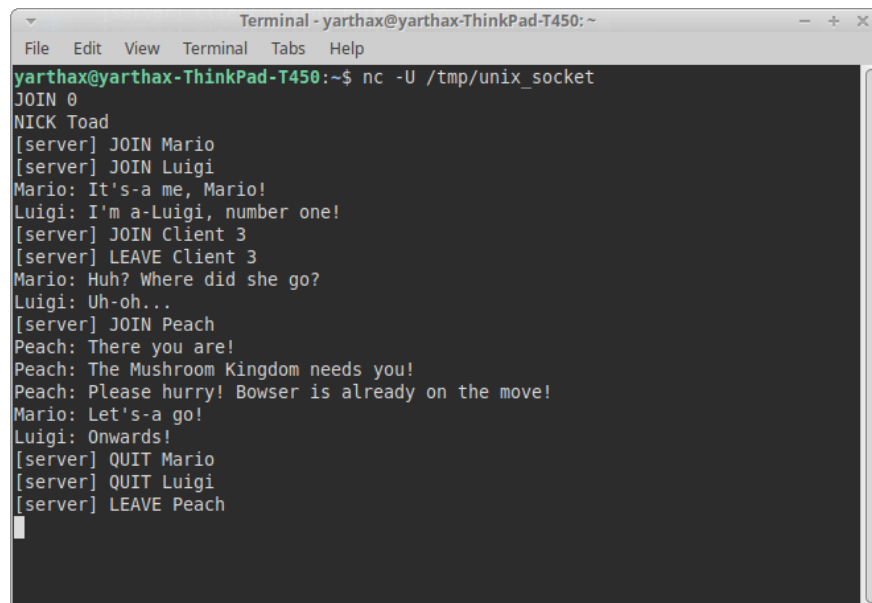


Data flow and separation of responsibilities. Strict pipeline from `recv()` to `send()`, with clear separation between framing, grammar, and execution. The grammar validates input and never performs I/O or state mutation.



```
./bin/server
[server] Waiting for connection...
[server] Client 2 sent JOIN 0
[server] Client 2 sent NICK Toad
[server] Client 0 sent NICK Mario
[server] Client 0 sent JOIN 0
[server] Client 1 sent NICK Luigi
[server] Client 1 sent JOIN 0
[server] Client 0 sent MSG It's-a me, Mario!
[server] Client 1 sent MSG I'm a-Luigi, number one!
[server] Client 3 sent JOIN 0
[server] Client 3 sent LEAVE
[server] Client 0 sent MSG Huh? Where did she go?
[server] Client 3 sent NICK Peach
[server] Client 1 sent MSG Uh-oh...
[server] Client 3 sent JOIN 0
[server] Client 3 sent MSG There you are!
[server] Client 3 sent MSG The Mushroom Kingdom needs you!
[server] Client 3 sent MSG Please hurry! Bowser is already on the move!
[server] Client 0 sent MSG Let's-a go!
[server] Client 1 sent MSG Onwards!
[server] Client 0 sent QUIT
[server] Client 1 sent QUIT
[server] Client 3 sent JOIN 1
[server] Client 3 sent QUIT
```

Server – protocol execution. Event-driven `select()` loop processing a byte stream, emitting JOIN/LEAVE/QUIT events and broadcasting messages to clients in the corresponding room.



```
Terminal - yarthax@yarthax-ThinkPad-T450: ~
File Edit View Terminal Tabs Help
yarthax@yarthax-ThinkPad-T450:~$ nc -U /tmp/unix_socket
JOIN 0
NICK Toad
[server] JOIN Mario
[server] JOIN Luigi
Mario: It's-a me, Mario!
Luigi: I'm a-Luigi, number one!
[server] JOIN Client 3
[server] LEAVE Client 3
Mario: Huh? Where did she go?
Luigi: Uh-oh...
[server] JOIN Peach
Peach: There you are!
Peach: The Mushroom Kingdom needs you!
Peach: Please hurry! Bowser is already on the move!
Mario: Let's-a go!
Luigi: Onwards!
[server] QUIT Mario
[server] QUIT Luigi
[server] LEAVE Peach
```

Spectator client (Toad). Protocol view from a passive client, observing server events and user messages, including a client leaving and rejoining with late nickname assignment.

- **Key design focus:** Ownership of server state, broadcast semantics, and grammar vs execution separation.

Go To-Do Server with PostgreSQL

2025

- REST-style API server written in Go with PostgreSQL persistence.
- Implemented basic CRUD endpoints and database interactions.
- Early Go learning project focused on understanding language fundamentals, standard library usage, and backend structure.
- Project predates adoption of structured commit conventions and formal testing.
- **Repository:** [go-todo-api](#)

Functional Programming Project in Haskell

2025

- University project focused on functional programming using Haskell.
- Implemented core algorithms and data transformations using pure functions and strong type guarantees.
- Emphasis on correctness, immutability, and explicit reasoning about program behavior.
- Early exposure to structured commits and disciplined development practices.
- **Repository:** [Haskell TP \(PLP\)](#)

How I Approach Systems Problems

I prioritize correctness and explicit ownership of state before performance or scalability. I prefer designs where control flow and side effects are visible, debuggable, and easy to reason about. When building systems, I focus on clear boundaries, deterministic behavior, and incremental complexity, delaying concurrency and optimization until semantics are fully understood.