

Derek Karpinski

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EDUCATION

New York University

B.A. in Computer Science | GPA 3.9

Expected May 2028

Relevant Coursework: Operating Systems, Computer Architecture, Data Structures, Basic Algorithms, Computer Systems Organization

COMPETITIVE PROGRAMMING

NYU Competitive Programming Club | Member

Sep 2025 - Present

- Solve timed algorithmic problems in C++ involving graphs, dynamic programming, greedy algorithms, and data structures.
- Apply combinatorics and number theory to competition problems.

TEACHING EXPERIENCE

Computer Science Tutor

Sep 2026 - Present

New York University

- Tutor students in Computer Systems Organization, Data Structures, and introductory C/C++.
- Explain pointers, memory management, and data structures.
- Help students understand assembly and binary representation.
- Guide students through debugging C programs with GDB and reasoning about low-level program behavior.

PROJECTS

Reverse Proxy | C, POSIX Sockets

- Built an HTTP reverse proxy that forwards IPv4 GET and HEAD requests to a configurable upstream server and relays responses to clients.
- Handled concurrent connections with a child process per client, supported partial reads and writes, and validated request headers with HTTP error responses.

HTTP Server | C, POSIX Sockets

- Built a static HTTP server that parses GET requests and serves files with MIME types and Content-Length headers, using a child process per connection.
- Decoded URL paths and used descriptor-relative file access to block directory traversal and symbolic links, returning HTTP errors for invalid or inaccessible requests.

Unix Shell | C, POSIX

- Implemented a Unix-style shell with fork, execvp, and waitpid, combining multi-stage pipelines, input/output redirection, and background process execution.
- Built command parsing with environment variable expansion, quoting, and escaping; added cd, pwd, and exit built-ins, Ctrl-C handling, and child process cleanup.

Packet Analyzer | C, Linux Raw Sockets

- Captured Ethernet frames using Linux raw sockets and parsed IPv4, TCP, UDP, and ICMP headers.
- Reported IP addresses, TCP/UDP ports, and ICMP type/code; validated packet lengths and skipped non-initial fragments.

UDP File Transfer | C, POSIX Sockets

- Implemented an IPv4 UDP transfer protocol with sequence numbers, stop-and-wait acknowledgements, and retransmissions.
- Used poll-based timeouts and duplicate detection; supported empty files and multi-packet transfers.

Terminal Text Editor | C, POSIX, termios

- Built a terminal editor with raw-mode input, insertion/deletion, scrolling, UTF-8 cursor movement, and incremental search.
- Implemented file loading and saving with temporary files, fsync, and rename; preserved permissions and warned on unsaved changes.

TECHNICAL SKILLS

Languages: C, C++, Python, x86-64 Assembly, Bash

Systems: Linux, POSIX APIs, process management, IPC, signal handling

Networking: TCP/IP, UDP, HTTP, socket programming, packet analysis

Tools: Git, GDB, GCC, Make, Vim/Neovim