Theo Kroening

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EDUCATION

Carnegie Mellon University May 2025
BS in Computer Science (Concentration in Computer Systems) Pittsburgh, PA

- Coursework: Computer Systems, Parallel Data Structures and Algorithms, Algorithm Design, AI, Computer Security, Programming Language Theory, Compiler Design, Software Engineering, Automated Program Verification
- Dean's List Spring 2023

EXPERIENCE

School of Computer Science, Carnegie Mellon University Aug 2023 - Dec 2023
Teaching Assistant, 15-213 (Introduction to Computer Systems) Pittsburgh, PA

- Taught recitations on systems concepts, including virtual memory and process/thread-level programming.
- Taught x86-64 assembly using `gdb`, focusing on exploiting and guarding against security vulnerabilities.
- Helped students implement a dynamic memory allocator (`malloc`), a shell, and a caching multi-threaded web proxy.

School of Computer Science, Carnegie Mellon University Jan 2022 - Aug 2023
Teaching Assistant, 15-112 (Fundamentals of Programming and Computer Science) Pittsburgh, PA

- Mentored students on their final (>1000 line) Term Projects. Advised on algorithms (pathfinding, maze generation, network programming) and code organization.
- Designed and led seminars on course content (backtracking) and advanced Python features (magic methods).

PROJECTS

C0 Compiler Spring 2024

- Implemented a compiler for C0 (a memory-safe subset of C) in OCaml, targeting x86-64 assembly. The compiler supports all C0 language features, including branching, functions, structs, arrays, and runtime bounds checks. Implemented lexing, parsing, semantic analysis, and a graph-based register allocator.

FRPico Fall 2023

- Wrote embedded CircuitPython to integrate a Raspberry Pi Pico with hardware components including joysticks and LCDs. Implemented UI to control the hardware and module-to-module communication over UART.

Wean 9 Fall 2021

- Implemented a dungeon crawler game in Python and tkinter for 15–112, making heavy use of OOP. The project was selected from nearly 500 as the winner of the course's term project showcase.

Dragonfly 2021

- Developed a learning management system (LMS) with a Python Flask backend using a sqlite database and Amazon S3. Built a custom question and rubric builder UI using vanilla JavaScript.

TECHNICAL SKILLS

Languages Python, C, C++, JavaScript, TypeScript, SML, OCaml, SQL, HTML, CSS, Bash
Tools `git`, `gdb`