

Emmett Kogan

Gainesville, FL 32601 • (904) 571-7566 • emmett.kogan@gmail.com • <https://github.com/Emmett-Kogan>

EDUCATION

University of Florida / Bachelor of Science, Computer Engineering / Gainesville, FL

Graduation Date: May 2024

Relevant Coursework: Microprocessor Applications 1&2, Advanced Systems Programming, Computer Architecture, Reconfigurable Computing, Operating Systems, Algorithm Abstraction and Design

GPA: 3.66

WORK EXPERIENCE

Computer Organization Peer Mentor / University of Florida / Gainesville, FL

Fall 2022 - Present

- Instructed over 40 students on the fundamentals of RISC processor architecture – instruction set architecture, digital logic, caching schemes, and parallel processing
- Recorded various tutorial videos and lectures on setting up and working with qemu, ARM assembly programming, and various debugging techniques, such as using GDB
- Developed various shell and python scripts to automate testing programming assignments, report on issues with tests or evidence towards submission issues, and manage a grade book database
- Hosted help sessions that often involved helping students debug assignments, re-explaining concepts from lectures, or details towards completing a cache simulator

Undergraduate Researcher – Embedded Systems Lab / University of Florida / Gainesville, FL

Summer 2023

- Learned Racket for developing models for formal verification using an SMT solver and Verilog to maintain a DARPA-sponsored hardware cryptographic library containing IP for various encryption and hashing algorithms
 - Worked on a team of four engineers to examine Trusted Execution Environments (TEE) to formally verify the security of various implementations, including Intel's SGX and TDX
 - Developed a model of Intel TDX's memory confidentiality mechanisms to apply invariants on to prove whether each guest's cryptographic keys and caches did not leak data against a threat model where the host machine is compromised
 - Independently documented progress and functionality of the TDX project and presented this and research on other upcoming fields to the lab
-

PROJECT EXPERIENCE

Class Projects

- Developed an RTOS for a TM4C series microcontroller that included process synchronization with blocking semaphores, sleeping threads, and dynamic thread management
- Wrote numerous applications using the RTOS, including a 3D graphics application on a TFT LCD, an audio visualizer using the CMSIS DSP library, and a face detection/Bluetooth application
- Implemented a 1D-time domain convolution AXI peripheral for a ZedBoard with a Xilinx Zynq-7000 SoC that involved a DMA controller, smart buffer, and multiply and add tree that yielded a speedup of 15 over the onboard MCU
- Lead a team with three other students while implementing a CRUD web app, with a frontend using Angular and a backend from scratch in Golang
- Designed a REST API backend in Golang that supported basic CRUD requests, used bcrypt to provide secure account management, and managed user sessions with cookies

Personal Projects

- Wrote and maintained numerous scripts for testing programming assignments, whether it be for work or for class, and a set of scripts to update and push changes to grade books on Canvas
 - Created a clone of Classic Tetris on top of the RTOS class project that used all of the functionality as well as wrote additional drivers for peripherals, including a more sophisticated TFT LCD driver that could efficiently draw bit-packed sprites and text and an improved joystick drivers that utilized more complex ADC sequences to reduce input latency
-

Skills

Languages: C/C++, Python, VHDL, Verilog, Bash, Make, CMake, MATLAB, Golang, Racket, Rust, ARM and AVR assembly

Software and Tools: Git, Linux, Docker, Quartus, Vivado, Altium, KiCad, SolidWorks

Platforms – TI TM4C, BeagleBone Black, Atmel ATxmega128A1U, NRF52840, RP2040