**Emmett Kogan**

Gainesville, FL 32601 • (904) 571-7566 • [emmett.kogan@gmail.com](mailto: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,* **GPA: 3.66**

*Reconfigurable Computing, Operating Systems, Algorithm Abstraction and Design*

**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