Samir Rashid

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"Software engineer interested in building observable, safe operating systems."

Education

University of California San Diego — *San Diego, CA*

Double B.S. Math and Computer Science, Classical Studies minor | GPA: 3.9 — *June 2024*

- **Relevant Coursework:** Graduate-Level Operating Systems, Compilers, Networking, Cryptography, Algebra, Analysis

Experience

Tock Operating System — *San Diego, CA*

Research Software Engineer — *June 2023 - Current*

- Contributed to networking stack in **Rust** by adding syscalls and designing interfaces to securely run OpenThread on Tock.
- Working on **formally verifying** Tock to prove memory isolation guarantee can never be violated.

Viasat — *Carlsbad, CA*

Software Engineering Intern — *June - September 2023*

- Ported **Linux drivers** to latest kernel for software router. Researched kernel changes to update deprecated function calls.
- Did bringup of drivers on OpenWRT based OS and debugged issues across the OS and networking stack by using strace and gdb.
- Maintain backwards compatibility of new OS by containerizing code with **LXC containers**.

Twitter — *Remote*

Quality Engineering Intern — *September - December 2021*

- Designed fault tolerant integration with testing framework that catalogues automated test results for manual testers.
- Used Java stream processing to aggregate test results in real time, enabling analytics on historical test results.
- Spoke with key stakeholders to design a solution. Worked with multiple teams to make sure solution can be adopted company-wide.

Projects

Triton Unmanned Aerial Systems — *C++, Python*

Programmer — *Dec 2020 - Current*

- Collaborating with team to design, build, and fly an unmanned aerial vehicle (UAV). **Placed 5th place internationally**.
- Built a 3D real time dynamic path planning system using RRT*. Created model to detect unknown obstacles and avoid them.
- Created robust testing framework to simulate and visualize generated paths.

IDE Profiler Visualizer — *Python, Typescript*

- Made VSCode extension which inserts novel performance profiling visualizations into IDE. — *November 2023*

Snek Compiler — *Rust, x86*

- Created compiler in Rust from Python subset to x86 assembly with a custom breakpoint debugger using ptrace. — *June 2023*
- Supports IO, heap, garbage collection, comments, debug statements.

IP Networking Stack — *C*

- Implemented IPv4 compatible router in C that can send/receive/forward ARP, ICMP, and IP packets. — *Apr 2023*

Deep Neural Networks from Scratch — *NumPy, PyTorch*

- Wrote IBM machine translation; deep neural network (MLP) **from scratch with no libraries** for CIFAR-10. — *Sept 2022*
- Used **PyTorch** to implement image captioner (LSTM+CNN) on CoCo; Fine tuned BERT for Alexa intent classification.

ACM Attendance Visualizer — *React*

Fullstack Developer — *Sept-Dec 2020*

- Developed online dashboard for analyzing the organization's event attendance data, using **D3, Express, React, and PostgreSQL**.
- Defined schema, implemented protected backend data processing routes, and documented APIs using Postman.

Triton Schedule Scraper — *Python, Tkinter, Selenium WebDriver*

- Python script uses WebDriver and automatically scrapes UCSD course schedule to create an iCal file. — *Oct 2020*
- Created native GUI for the program using Python and Tkinter.

DIY Projects

- Have built: mechanical keyboard, FPV quadcopter, maintain a home (computer) lab, analog turntable — using household parts, trackball (WIP) — design CAD and electronics for ergonomic mouse, air filter — 3D printed and CADed to combat indoor wildfire smoke.
- Latin poetry reader (prosody) — Python script uses Text-to-Speech API and morphs audio to match dactylic hexameter rhythm.
- Ancient Greek keyboard firmware mod — custom QMK firmware that natively supports Ancient Greek and its accents.

Awards

Xerox Award for Innovation and Information Technology — *2019*

Skills

Language Python, Java, C, C++, Rust, JavaScript, TypeScript, SystemVerilog, Bash, LaTeX, MATLAB, R, Nix, Haskell, Google Apps Script

Software PyTorch, React, SQL, AWS, Docker, Linux, Unity, Fusion 360, Blender, JUnit, Flask, pytest, Jest, GDB, ASP.NET, cProfile, Kubernetes