Jyotirmay Shelly

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EDUCATION

University of Alberta Edmonton, AB

Bachelor of Science in Computing Science, Specialization September 2020 - April 2025

WORK EXPERIENCE

BlackBerry QNX Ottawa, ON

Core OS Kernel Test Automation Student September 2023 - August 2024

- Worked on various aspects of a project aimed at achieving **100% code coverage** for **QNX's (RTOS)** LibC:
- Developed a custom **runtime code coverage tool** in **C** to validate static analysis coverage. Implemented as an **interposer** library leveraging GCC **function instrumentation** hooks to gather coverage data.
- **Automated** instrumentation and data collection across **Raspberry Pi** and **x86** targets using **Expect Tcl** and **ksh**, then parsed and consolidated results into HTML reports with a **Python**-based parser (regex, pandas).
- Developed **automated regression tests** in **C** for QNX's LibC APIs, including **highly concurrent** scenarios employing **mutexes**. Leveraged **QEMU**, **GDB**, and **Valgrind** for testing, debugging, and profiling. Used **Git** and **SVN** for source control, contributed to **code reviews**, and helped maintain test environments.
- Improved a Coverage Static Analysis **Jenkins Pipeline** (in **Bash** and **Python**), achieving a **12x performance boost** via parallelization, legacy refactoring, avoiding redundant disk writes, benefitting multiple teams. Used utilities like **objdump**, **nm** for and binary analysis.
- Wrote a **Python** script using heuristics to find the dedicated test for a given function, guiding the test plan.
- Demonstrated **leadership** skills by managing a team of 10, analyzing existing coverage reports, creating detailed **Jira** tickets based on missing coverage, and delegating tasks to interns.
- Delivered regular coverage reports to upper management, tracked project progress, and collaborated with multiple teams to align **test strategies** with evolving project requirements and priorities.
- Was awarded the highest performance rating of 'exceeds expectations' in all 3 terms.

MAJOR PROJECTS

Embedded:Snake Game on SAMD51 Microcontroller in Rust: [LINK]

- Developed a Snake game on an **ARM**-based SAMD51 microcontroller **embedded system** in a bare-metal environment. Contributed it to **open source** as an accepted official example in the HAL's GitHub repository.

Multiplayer Terminal-based client-server Uno game in Rust: [LINK]

- Interprocess communication done by sending messages over **TCP**, (de)serialized efficiently.
- Intraprocess (interthread) synchronization done by using **mutexes** and message passing among threads.
- Used **ngrok** to expose the local **TCP** port to the internet, to enable playing over different networks possible.

Compiler for IBM's Gazprea, in C++ (CMPUT 415) [LINK TO LANGUAGE SPECIFICATION]

- Developed a compiler with **ANTLR** (parser generator), **C++**, **C**, and **LLVM** in a team of 4, featuring functional programming, type inference, static typing, and I/O streams. Utilized **TDD** and **fuzzer testing** for validation.

QR Code hunting Android app, in Java (CMPUT 301) [LINK]

- **Led a team of six**: orchestrated **scrums**, followed **agile guidelines**, employed **Test Driven Development**, and communicated with the customer (the TA & professor) to ensure timely software delivery.
- Worked on UI, QR validation, Firebase integration (NoSQL), software architecture/design, and **Unit testing**.

TECHNICAL SKILLS

- **Languages:** C, Python, Bash, Ksh, Rust, C++, Java, C#, JS, HTML, CSS, MySQL, SQLite, RISC-V Asm, Julia
- **Tools:** Linux, QNX, Git, SVN, GDB, Jenkins, LLVM, Docker, Unity, Firebase, MongoDB, SQLite, Jira