Fuad Ismail

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SUMMARY

I have 2 years of experience as a software engineer and 4 years of R&D experience in the hardware industry. Currently, I am a software engineer at Samsung, maintaining & developing systems software running on Tizen OS and independently working on optimizing the .NET runtime Just-In-Time compiler for RISC-V architecture.

I have contributed to various C++ & Rust open source projects: .NET runtime, Verilator, uutils/coreutils, and uutils/util-linux. I am also currently working on my own open source project: Oombak, an interactive SystemVerilog simulator UI that runs on the terminal.

I am a self-motivated person, frequently showed initiative at the workpace. I am also a passionate learner, currently interested in learning more about compilers, operating systems, computer graphics, and embedded systems.

EDUCATION

Bandung Institute of Technology   Bandung, Indonesia
Electrical Engineering (BSc), ABET Accredited, GPA 3.81/4.0   *2014 - 2018*

TECHNICAL SKILLS

Programming Languages: Modern C++, C, Rust, RISC-V Assembly, Go, JavaScript, Python, Bash, SQL, SystemVerilog, MATLAB
Developer Tools: CMake, Make, RPM, GDB, Git, Docker/Podman, GBS
Libraries, Frameworks, Standards: POSIX, GLib, GTK, OpenGL, React, Ratatui, FreeRTOS, Tizen NUI
Knowledge Domains: Compilers/Runtimes, Operating Systems, GNU/Linux, Embedded Systems, Digital/Analog/RF electronics, Schematic & PCB Design

OPEN SOURCE CONTRIBUTIONS

.NET runtime : #112978, #113250, #113676, #113999, #114470, #114488, #114728, #117408
Verilator : #4966, #5006
uutils/coreutils : #6951
uutils/util-linux : #152, #160, #167

EXPERIENCES IN S/W INDUSTRY

Samsung   June 2024 - Present
Software Engineer (TV S/W Platform)   *Jakarta, Indonesia*

- Demonstrated intiative by independently introducing multiple optimizations to upstream .NET runtime RISC-V Just-In-Time compiler which improved multiple micro-benchmarks performance scores on Samsung's RISC-V TV chipset by up to 70%.
- Resolve various issues and implement new features for Tizen OS's App Framework & .NET Framework systems software (e.g. installer & application launcher) written in C++.
- Involved in the development of a new Tizen OS daemon written in C++.
- Lead the development of an in-house Tizen .NET application written in C#.
- Initiated the porting of a systems component to Rust.
- Received an employee of the quarter award.

Lumina Industries   February 2021 - October 2021
Software Engineer   *Jakarta, Indonesia*

- Wrote the Windows middleware for a Virtual Camera software using Win32 API.
- Developed image processing features using C++ with OpenCV.
- Worked remotely in a medium-sized team from various nationalities (USA, Taiwan, and Indonesia).

Experiences in H/W Industry

Keysight Technologies
January 2022 – August 2023

R&D Hardware Engineer
Penang, Malaysia

- Initiated the development of NAALG, a network analyzer algorithms C++ library.
- Significantly improve the measurement accuracy of an embedded VNA product by introducing and implementing a better calibration algorithm.
- Successfully extend the measurement bandwidth of an embedded VNA product.
- Fixed a technical issue in an embedded VNA product and wrote a technical paper on it.
- Collaborate in a team from various time zones (USA, Europe, and Malaysia).

Hariff Daya Tunggal Engineering
August 2020 – February 2021

R&D Radio Frequency Engineer
Bandung, Indonesia

- Wrote MATLAB simulations to evaluate system-level design tradeoffs for the development of a fully custom telecommunication device.
- Implemented the PHY and MAC layer of a fully custom telecommunication device on an APSoC using Verilog and C.
- Designed a schematic for a fully custom telecommunication device.

Labs247 (SOLUSI247)
August 2018 – August 2020

R&D Electronic Design Engineer
Jakarta, Indonesia

- Lead the development of telecommunication product (AIS SART) which is still in production up till now.
- Involved in the development of medical product (CPAP BiPAP machine).
- Demonstrated initiative by suggesting cost-saving solutions that avoids vendor lock in and introduced an efficient production workflow.

Open Source Projects

Oombak
November 2024 – Present

github.com/fuad1502/oombak

Oombak (/ˈɔmbak/, "waves" in Indonesian) is an interactive SystemVerilog simulator UI that runs on your terminal! Oombak is written in Rust & C++ and uses Ratatui, Verilator, and slang libraries, among others.

Rubbler
November 2023 – March 2024

github.com/fuad1502/rubbler

Rubbler is a RISC-V assembler written in Rust. This library was written with the main purpose of embedding a simple RISC-V assembler inside of a RISC-V CPU test bench code written with Verilator.

Bilbob: A Social Media for Your Pets
February 2024 – March 2024

github.com/fuad1502/bilbob

Bilbob is a Social Media platform written in Go with Gin web framework for the backend and Javascript with React for the frontend. This project originally meant as a learning exercise on end-to-end web development. Therefore, all functionality, such as registration and password storage management, authentication and session management, resource querying, are all written from scratch.

RVSV
November 2023 – March 2024

github.com/fuad1502/rvsv

RVSV is a SystemVerilog implementation of a 5-stage pipelined RISC-V CPU. Verification code is written in C++ using Verilator and Rubbler.

Open Running Watch
April 2024 – May 2024

github.com/fuad1502/open-running-watch-hw

An open source GPS running watch schematic & PCB design.

OTHER PROJECTS

NAALG: Network Analyzer Algorithms C++ Library
Keysight Technologies

I initiated the development of NAALG due two things. First, I was tasked with developing a novel Time Domain Reflectometry (TDR) calculation from Vector Network Analyzer (VNA) measurements. Second, on a different project, I had just implemented a new calibration algorithm for an embedded VNA. Since both of this project involves calculation on VNA measurements, I realize that it would be nice to have a library that provides all of these VNA algorithms in one place. NAALG is similar to scikit-rf, but uses high performant implementation in C++ to enable usage in embedded real-time measurement applications.

Custom Telecommunication Device (GMSK + TDM Transceiver)
Hariff Daya Tunggal Engineering

My team was tasked with developing a fully custom telecommunication device. My role was in developing the physical (PHY) and medium access control (MAC) layer on an *All Programmable SoC (APSoC)*. The PHY layer is written in Verilog, while the MAC layer is written in C. Communication between the two layers uses Direct Memory Access (DMA).

Automatic Identification System Search and Rescue Transponder
Labs247

Automatic Identification System (AIS) Search and Rescue Transponder (SART) is a radio device used to locate distressed vessels. My role was in developing all of the electronic and embedded software aspect of the device, and production. We use FreeRTOS Real-Time Operating System to enable low power usage and multiple tasks management. Up till now the device is still in production.