Syed Noorul Saad

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Education

University of Waterloo — Waterloo, ON
Candidate for B.A.Sc Computer Engineering — Sep 2022 - May 2027
Relevant courses: Reconfigurable Computing (FPGA Architecture), Real Time Operating Systems, Digital Hardware Systems, Computer Architecture, Compilers, Embedded Microprocessor Systems

Projects

Matrix-Vector Engine + Activation Unit *SystemVerilog, AMD/Xilinx Vivado, PYNQ-Z1 FPGA*

- Designed and implemented a pipelined Matrix-Vector Multiplication (MVM) engine in SystemVerilog, inspired by Microsoft Brainwave's deep learning inference accelerator.
- Optimized for throughput and latency using DSP48e1 slices, capable of calculating **27 outputs in parallel at 280 MHz**.
- Built a fully pipelined hyperbolic tangent (tanh) approximation unit based on a Taylor series approximation for nonlinear activation. **Improved performance from 170 MHz to 320 MHz**.

Single Cycle RISC-V Processor *SystemVerilog, Assembly*
Developed a single-cycle RISC-V processor (RV32I), supporting full instruction decoding and execution; verified correctness using custom assembly test cases.

Shell Jr *C++, OpenAI API*
A custom terminal built from scratch in C++, intended for beginners who have little experience with the command line. Includes an AI "explain" command which can explain any CLI functionality.

Experience

UW ASIC Design Team — Waterloo, ON
Digital Design Team — August 2025 - Ongoing

- Leading the design of a lightweight **RISC-V core** with custom instructions and an **AXI interface** for integration into an analog ASIC project.
- Implemented a **Serial Peripheral Interface (SPI)** module in Verilog, incorporating flip-flop synchronizers to handle **clock domain crossing** and prevent metastability.
- Developed and executed verification tests using **Cocotb**, a Python-based testbench framework, as part of the team's **TinyTapeout** ASIC flow.

VCast Online — Dubai, UAE
Software Engineer — January 2025 - May 2025

- Led the full-stack development of a collaborative mind-map platform, enabling real-time feedback and map sharing, **driving community engagement up by 25%**.
- Built and deployed a scalable SvelteKit + Node.js web app from scratch, integrating dynamic graph editing (Cytoscape.js), Google OAuth, JWT authentication, and enforced access control logic (owner vs viewer privileges).
- Architected and integrated a Mongoose-based feedback system, enabling structured insights collection on nodes, edges, and the graph as a whole — **improving data access times by 18%**.

Dematic — Waterloo, ON
Technical Writer — May 2024 - August 2024

- Developed comprehensive technical documentation for Dematic's mechanical and control systems, enhancing user understanding and supporting the seamless integration of advanced automation technologies.
- Authored detailed user manuals and technical guides for Dematic's InSights logistics software, ensuring clarity in functionality and facilitating efficient software deployment across multiple industries.

Matrox Imaging | Zebra Technologies — Dorval, QC (Remote)
Technical Writer — January 2023 - April 2023

- Documented and tested new features added to the company's proprietary software, Matrox Design Assistant, which is a flowchart-based software allowing users to design their own imaging apps.
- Collaborated with software engineers to document new functions and capabilities in the company's C Library (Matrox Imaging Library).

Languages and Tools

Languages:	C/C++, SystemVerilog/Verilog, JavaScript, Python
Tools:	Git, AMD Vivado, Quartus, GTKWave, VTR, OpenFPGA, Visual Studio Code, JIRA