Caleb Joseph

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Education

Bachelor of Engineering, Computer Engineering (Co-op) Sep. 2021 – Apr. 2026 (Exp.)
Toronto Metropolitan University *Toronto, ON*

- **Relevant Courses**: Digital Systems & Software, Computer Architecture, Electronic Circuits, Data Structures & Algorithms, Embedded Systems & Microprocessors, Object-Oriented Programming (OOP), Solid State Physics
- **Affiliations**: National Society of Black Engineers, ColorStack, Career Pathways Program, IEEE TMU, IEEE CSTMC

Technical Skills

Languages: Python, Java, C/C++, VHDL, SystemVerilog, Verilog, TCL, Perl, Bash/CSH
Technologies: Arduino, Multisim, Simulink, Intel Quartus II, ASIC/FPGA, RTL, UVM, VCS, Verdi, Linux, UNIX, MATLAB
Frameworks, Dev. Tools & Libraries: React, Node.js, JUnit, Git, VS Code, Visual Studio, NumPy, Matplotlib, JSON
Other: Verification, Validation, Debugging, Scripting, CMOS, Digital Systems, VLSI Design, Digital Design, Test Coverage

Experience

Video Domain Engineer Intern May 2024 – Present
Advanced Micro Devices (AMD) *Toronto, ON*

- Standardized a custom report generator using Python and RegEx for design verification regressions, reducing error repeatability by 30% and accelerating error identification by 40%.
- Orchestrated a full-stack solution using React, Node.js, Python, JSON and ThreadPoolExecutor, enhancing software security with CodeQL for Code Scanning AI Hackathon, improving vulnerability detection by 20% within Git.
- Streamlined frontend development with GitHub Copilot, enhancing UI creation, code generation, refactoring, and real-time error detection, resulting in a 50% increase in development speed.
- Optimized automated design release flows using Bash, Perl, and TCL, improving efficiency by 2 hours per week.
- Completed UVM Synopsys lab in SystemVerilog, enhancing ASIC design validation & testbench development.
- Created Crontab job for weekly lint regression, eliminating manual checks and speeding up report delivery by 50%.

Information Technology Intern May 2023 – Aug. 2023
Environics Analytics *Toronto, ON*

- Spearheaded donation of 30+ laptops, gaining expertise in computer software architecture, including BIOS, OS, and drivers, while ensuring data integrity via secure boot and UEFI, showcasing hardware diagnostics.
- Resolved firmware incompatibility for 150+ internal phones using IPv4, achieving annual cost savings of $5,000.
- Automated inventory cost allocation with a Python script for over 300 assets, improving efficiency by 40%.

Projects

Multi-stage RISC Pipelined Processor | *VHDL, Quartus II, Cyclone-IV EP4CE115F29C7*

- Constructed a 32-bit 3-stage pipeline RISC CPU using VHDL on an Altera DE2-115 FPGA board with Intel Quartus II for synthesis and simulation, achieving a target frequency of $>$50MHz.
- Designed and simulated a register set, program counter, ALU, data path, and control unit, leveraging instruction set architecture, register transfer, and control hardware, achieving efficient RISC processing.

Ray Tracing Application | *C, C++, ImGui, Visual Studio, Walnut Framework*

- Built a ray tracing app in C++, optimizing the Renderer class and multi-threading to cut render times by 30%.
- Deployed an interactive ImGui UI for real-time adjustments integrating the Walnut framework in Visual Studio while assessing GPU & gaming acceleration techniques for potential CUDA implementation to enhance performance.

Bluetooth RC Robot Car | *C, C++, Arduino UNO, L298 Motor, HC-05 Module*

- Engineered a Bluetooth-controlled RC robot car using Arduino, enabling remote control from smart devices and achieving seamless communication and control.
- Integrated obstacle detection in robot, achieving a detection range of 0.2 meters and enhancing safety features.

General Purpose ALU Implementation | *VHDL, Quartus II, Cyclone-IV EP4CE115F29C7*

- Developed an 8-bit ALU with control unit, FSM, and decoder in VHDL, simulated using Quartus II, and deployed on a Cyclone-IV FPGA to perform various arithmetic and logical operations displaying results on 7-segment displays.

Helicopter Prison Escapes | *Python, Jupyter Notebook, Wiki API, SQL*

- Analyzed 30 years of prison escape data using Python, creating dynamic visualizations that revealed a 10% increase in successful escapes over time while improving Python algorithmic proficiency with nested loops and conditionals.

Open to relocation. Canadian Citizen.