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

Experience

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

- Contributing to pre-silicon verification of video-related IP using SystemVerilog and UVM, ensuring full functional coverage and root-causing critical issues, leading to a 15% improvement in verification completeness.
- Collaborating with 6+ cross-functional teams, including architects and design engineers, to implement verification strategies and troubleshoot critical bugs in regression flows, resulting in a 20% reduction in build failures
- Automated a Python-based custom report generator using RegEx to track and categorize errors in release regression flows, improving error detection and root-cause analysis, and reducing build failures by 30%.
- Implemented weekly lint regressions via Crontab, eliminating manual checks and improving report turnaround times by 50%, enabling quicker verification cycles for the entire team.
- Improved automated design flows with CSH, TCL and Perl scripts leading to 10% increase in design flow efficiency.
- Completed UVM Synopsys lab, enhancing knowledge in ASIC design validation and testbench creation, covering 20% of Synopsys Design Verification tailored course work.

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 | *Altera DE2-115, VHDL, Quartus II, Cyclone-IV EP4CE115F29C7 FPGA*

- 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.
- Simulated a custom testbench to simulate RISC CPU performance, debugging instruction flows and validating data accuracy across various stages of the pipeline.
- Optimized data path for A 20% reduction in latency and implemented hazard detection to ensure smooth pipeline operation.

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.

Technical Skills

Languages & Scripting: Python, C, C++, VHDL, Java, SystemVerilog, Verilog, TCL, Perl, Bash/CSH, Cron
Verification Tools & Technologies: UVM, VCS, Verdi, MATLAB, Intel Quartus II, Linux, UNIX, Perforce, Arduino, Git
Other: Verification, Validation, ASIC Design, FPGA, RTL, Synthesis, SoC, Firmware

Open to relocation. Canadian Citizen.