# CALEB JOSEPH

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## EDUCATION

**Bachelor of Engineering, Computer Engineering (Co-op)**                              Toronto, ON
*Toronto Metropolitan University*                                       *Sep. 2021 – Apr. 2026 (Exp.)*
- **Relevant Courses**: Digital & Systems, Computer Organization & Architecture, Electronic Circuits, Data Structures & Algorithms, Embedded & Microprocessor Systems, Object-Oriented Programming (OOP), Solid State Physics

## 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
**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, Computer Architecture

## 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 steps by 30% and speeding up error identification by 40%.
- Set up a UVM test bench using SystemVerilog and Verdi for graphics encoder verification, ensuring accurate testing.
- Orchestrated a full-stack solution using React, Node.js, Python, JSON, and ThreadPoolExecutor, enhancing software security with CodeQL for static testing and reducing runtime by 50% through parallelized Git commits.
- Streamlined frontend development with GitHub Copilot, enhancing UI creation, code generation, refactoring, and real-time vulnerability detection, improving development efficiency.
- Utilized Bash scripting for automation and process improvement in various tasks, enhancing workflow efficiency.

**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*
- Developed 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%.
- Designed an interactive ImGui UI for real-time adjustments, integrating the Walnut framework in Visual Studio.
- Assessed GPU acceleration techniques for future implementation of CUDA for further performance improvements.

**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.
- Designed and built a Bluetooth-controlled RC robot car using Arduino, implementing advanced motor control algorithms for precise movements and achieving an obstacle detection range of 0.2 meters.

**Bookstore Application Design Project** | *Java, JavaFX, JUnit*
- Led a team in developing a JavaFX Bookstore app, using UML diagrams and state design patterns to create a secure, directed GUI and achieved 100% in design documentation through effective organization and problem-solving.

**Helicopter Escapes** | *Python, Jupyter Notebook, Wiki API, SQL*
- Interpreted escape data using Python, implementing dynamic bar plots to enhance communication of complex trends and demonstrating algorithmic proficiency through nested loops and conditional statements.