Taheer Khan

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EDUCATION

Toronto Metropolitan University (Formerly Ryerson)   2022-2027
Bachelors of Engineering (Computer Engineering)   *Toronto, ON*
Relevant Courses: Digital Systems, Electric Circuit Analysis & Design, Signal and Systems, Data Structures & Algorithms, Object Oriented Programming, Control Systems (ongoing)

TECHNICAL SKILLS

Languages: C/C++, VHDL/Verilog, Java, Python, Matlab, JavaScript, HTML/CSS
Technologies/Tools: MultiSim, Quartus, Microchip Studio, KiCad, Git, Matplotlib, JavaFX
Hardware: AVR MCU, ARM MCU, FPGA, Arduino

PROJECTS

AC Signal Generator and Oscilloscope | *C, Python, MatPlotlib, MultiSim, Microchip Studio, KiCad, ATM328p*
- Developed an oscilloscope using the **ATmega328P microcontroller** and **Python's matplotlib library**, enabling real-time visualization of analog signals via **UART communication**, allowing efficient data transfer.
- Designed a function generator circuit capable of generating square, triangle, and sine signals with adjustable frequency by applying key signal conditioning stages, including a **comparator**, **integrator**, **wave shaper**, and **amplifier**.
- Designed custom PCB boards for both the oscilloscope and function generator circuits using **KiCad**, enabling compact layouts and significantly enhancing circuit reliability and performance

Central Processing Unit | *VHDL, Quartus*
- Developed three custom CPUs using **VHDL** and **FPGA**, integrating logic units such as **decoders**, **FSMs**, and **flip-flops**, to enhance processing for operations such as arithmetic, logic functions, parity checking, and bit rotation.
- Improved processing accuracy by implementing **ALU cores** that modify inputs and execute Boolean functions, displayed via **seven-segment display**, resulting in enhanced operational flexibility.
- Constructed a **Mealy FSM** and a **4:16 decoder** to control ALU operations, increasing the CPUs' flexibility to handle multiple operations, such as input comparisons and arithmetic checks, improving processor functionality.

GoPro Gimbal | *SolidWorks, Arduino, I2C, MPU-6050*
- Designed a two-axis gimbal system for drone stabilization using **SolidWorks**. Incorporated a PS2 controller joystick for manual camera planning.
- Implemented **I2C** communication between the **MPU6050** and **Arduino** using the **Wire.h** library and utilized MPU6050 **datasheets** to interpret gyroscope and accelerometer data, calculating movements in degrees per second.

Cascaded BJT Amplifier Design | *Multisim*
- Designed a multi-stage **BJT amplifier** in **MultiSim** by cascading Common-Emitter and Common-Collector stages, achieving efficient signal amplification
- Simulated and analyzed circuit performance using **DC sweep** and frequency response in MultiSim, verifying **gain**, **bandwidth**, and **distortion** to ensure stability under varying operating conditions.

Banking Application GUI | *Java, JavaFX*
- Developed a banking application with secure login verification for clients and admins, using **Java**, to support banking transactions including deposits, withdrawals, and balance checks.
- Designed a User Interface using **JavaFX**, enhancing a seamless user experience through responsiveness and a visually appealing layout.

WORK EXPERIENCE

Toronto Met. Baja Racing   Sept 2024 – Current
Electrical/Powertrain   *Toronto, ON*
- Helped engineer the vehicle telemetry systems, contributing to real-time data transmission of performance to a digital dashboard, which enhanced vehicle diagnostics
- Assisted in the research and construction of critical vehicle circuitry, such as spark plugs and kill switches, ensuring safe operation and improving electrical control and reliability.