

Swarup Majumder

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EDUCATION

University of Illinois at Urbana-Champaign <i>Bachelors of Science in Computer Engineering</i>	GPA: 3.74/4.00 Graduation: May 2027
Relevant Coursework: Data Structures and Algorithms (C++), Operating Systems (C , RISC-V , UART), FPGA Lab (SystemVerilog , AXI , SPI), GPU Parallel Programming (CUDA), Digital Signal Processing, Analog Signal Processing	

EXPERIENCE

Systems Programming Course Staff <i>University of Illinois at Urbana-Champaign</i>	Aug 2025 – Present <i>Champaign, IL</i>
• Mentored 30+ students weekly, providing technical feedback for C , C++ and Assembly projects	
Undergraduate Research Assistant <i>Parasol Lab, University of Illinois at Urbana-Champaign</i>	May 2025 – Present <i>Champaign, IL</i>
• Benchmarked C++ STAPL and STL algorithm runtimes across 64 samples (99% Confidence Interval) • Enabled multi-GPU STAPL execution using C++ and CUDA , achieving 100x speedup over CPU base • Streamlined compilation, linking and execution for 25+ MPI configurations via Bash and Linux tools • Automated data visualization using Python to graph runtime metrics, accelerating algorithm analysis	
Robotics Software Mentor/Lead <i>FIRST Robotics Competition Team 4096</i>	Dec 2022 – Aug 2024 <i>Champaign, IL</i>
• Used Python to interface with the CAN bus to reliably control 30+ motors across 8 subsystems • Deployed computer vision AI object detection to provide operator feedback, reducing cycle times by 30% • Managed Git workflows to ensure effective parallel development among 7 software team members	

PROJECTS

Camera Vision Pipeline on FPGA <i>SystemVerilog, RTL Design, I2C, Vivado</i>	Nov 2025 – Dec 2025
• Designed real-time camera video streaming pipeline in pure RTL , achieving sub-microsecond latency • Initialized 40 camera registers via I2C with a custom SystemVerilog controller for stable color output • Implemented filters and UV thresholding in SystemVerilog with line buffers for seamless edge detection • Integrated Vivado XADC IP-based brightness dial with 128 discrete levels for precise luminance scaling	
Interactive Thermometer <i>Oscilloscope, Multimeter, Circuit Design</i>	Feb 2025 – May 2025
• Built a temperature measurement circuit with op-amps and comparators, supporting a range of 0–99 °C • Designed an analog-to-digital stage to drive 7-segment displays showing temperature and user thresholds • Verified signal integrity, temperature, and threshold accuracy using an Oscilloscope and Multimeter	
24-Hour Clock <i>Arduino IDE, C++, Circuit Design</i>	Feb 2025
• Built an Arduino-based 24-hour clock using C++ to display time with precise minute-level accuracy • Implemented multiplexed control for 4x7-segment displays, reducing I/O to 11 pins with 4 ms cycles • Integrated a potentiometer interface converting analog input to time values for real-time calibration	

SKILLS

Programming: C, C++, SystemVerilog, Verilog, Python, CUDA, Bash, Java

Protocols/Interfaces: I2C, UART, SPI, CAN, AXI-4 Lite

Tools: Git, Linux, GDB, Vivado, MPI, NVIDIA NSight, Docker

Hardware: Oscilloscope, Logic Analyzer, Function Generator, Multimeter, Soldering