SHAHD GAMAL MAHMOUD

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EDUCATION

Cairo University Faculty of Engineering (CUFE) *2021 - 2026*

- Bachelor of Electronics and Electrical Communications Engineering (EECE).
- Maintained a GPA of 3.3 (Very Good).
- Related Courses: Logic Design, Microprocessors, Analog IC Design I&II, Embedded Systems, Data Structure.

SKILLS

Software: C/C++ - OOP - MATLAB - Assembly - Data Structures - Algorithms - Qt - Git & GitHub - AI tools.

Embedded: Atmega16/32 (AVR) - Embedded C - FreeRTOS - I2C - USART - SPI.

Digital: HDL languages (VHDL, Verilog, System Verilog) - TCL - FPGA Xilinx - Linting.

OS: Linux - Windows.

PROJECTS

Dual Microcontroller Door Locker System | Link *Summer 2024*

- Designed a dual-microcontroller door lock system with password auth and EEPROM data logging.
- Included PIR-based motion sensing and H-Bridge controlled door actuation.
- Technologies: ATMega32 - I2C - USART - EEPROM - PIR - H-Bridge.

Smart Home Automation | Link *Summer 2024*

- Built a smart home system for automated lighting and fan control based on temperature and light intensity.
- Integrated fire detection with alerts and real-time LCD status display.
- Technologies: ATMega32 - LCD - LM35 - LDR - Flame Sensor - PWM - Buzzer - GPIO - ADC - Timer.

Advanced Digital Multimeter on PCB | Link *Spring 2024*

- Measuring voltage (-200V to 200V), current (0.5mA to 2A), and resistance (0 to 5M ohm).
- Designed the circuit from scratch and implemented it on a custom PCB.
- Technologies: ATMega32 - PCB - GPIO - LCD - Keypad - ADC - Relays - MUX - DEMUX.

Real-Time Operating System (RTOS) Project *Spring 2024*

- Implemented a FreeRTOS-based system with task scheduling, semaphores, and queue management.
- Ensured efficient task prioritization using preemption and time slicing.
- Technologies: FreeRTOS - C Programming - Semaphores - Timers - Dynamic Memory Allocation.

Student Management System | Link *Summer 2024*

- Built a CLI-based student DB with CRUD operations, GPA calc, and memory safety.
- Used linked lists and structs to efficiently manage dynamic data.
- Technologies: C - Linked Lists - Structs - Pointers - File I/O.

Advanced Tic Tac Toe Game | Link *Spring 2024*

- Developed a C++ Tic Tac Toe game with AI using minimax, user authentication, and GUI.
- Integrated secure hashing and tested with Qt Test for reliability.
- Technologies: C++ - Minimax Algorithm - Secure Hashing - Qt - Qt Test - SQLite - Git - GitHub Actions.

Reverse Tic-Tac-Toe AI Development | Link *Fall 2023*

- Designed an AI for Reverse Tic-Tac-Toe using Minimax with Alpha-Beta Pruning.
- Built a web-based simulation with advanced heuristics and multi-tape Turing strategies.
- Technologies: C++ - Minimax - Alpha-Beta Pruning - Linear Algebra - Decision Trees - Web Development.

Self-Driving Robots - Path Planning & Obstacle Avoidance *Spring 2023*

- Developed an autonomous robot navigation system using Fast-Marching Method 2 (FMM2).
- Compared FMM2 with A* algorithm, achieving smoother paths in MATLAB simulations.
- Technologies: MATLAB - FMM2 - A* Algorithm - Path Planning.

SPI Slave with Single-Port RAM | Link *Spring 2025*

- Designed SPI slave with FSM and RAM in Verilog, verified via testbench in QuestaSim.
- Compared FSM encodings (Gray, One-Hot, Seq) to optimize timing and resource use.
- Technologies: Verilog - SPI - FSM - QuestaSim - Vivado - QuestaLint - FPGA.

DSP48A1 Implementation on Spartan-6 FPGA | Link *Spring 2025*

- Implemented a DSP slice with registers and multiplexers for arithmetic operations.
- Verified RTL design using QuestaSim and performed synthesis in Vivado.
- Technologies: Verilog - QuestaSim - QuestaLint - Vivado - FPGA.

CMOS Analog Circuit Design *Fall 2023*

- Designed CMOS circuits using UMC 0.13um technology, including current mirrors and amplifiers.
- Conducted simulations for DC, transient, and noise analysis in Cadence.
- Technologies: UMC 0.13um - Cadence Simulator - NMOS Transistors - Current Sources.

Stopwatch with Dual Mode | Link *Summer 2024*

- Developed a digital stopwatch with increment and countdown modes, featuring pause, resume, and reset.
- Used push buttons for user input and LEDs for visual feedback.
- Technologies: ATMega32 - 7-Segment Displays - BCD Decoders - Push Buttons - Interrupts - Timers.

Car Parking Sensor | Link *Summer 2024*

- Designed a parking sensor system to detect obstacles using ultrasonic sensors.
- Displayed distance on LCD with LED and buzzer alerts based on proximity.
- Technologies: ATMega32 - HC-SR04 Ultrasonic Sensor - LCD - LEDs - Buzzer.

Maze-Solving Line-Follower Robot Car *Summer 2022*

- Built an autonomous robot car for maze navigation with path memory and Bluetooth control.
- Used IR sensors for line following and DC motors for movement.
- Technologies: Arduino - DC Motors - H-Bridge - Bluetooth Module - IR Sensors.

OTHER PROJECTS

- MATLAB Signal Processing and Simulink Control System Projects.
- Analog IC Design Projects on Cadence.

COURSES

Embedded AVR Diploma | Eng: Mohammed Tarek | Certificate *Jun 2024 - Oct 2024*

- Basic Concepts of Embedded Systems - C Programming - Embedded Tools - Real Time OS(RTOS).
- Data Structures (Linked-List, Stack and Queue) - Software Engineering - HW Labs.
- AVR Micro-controllers Interfacing (Implement all the drivers) - C For Embedded Applications (Embedded C).

Robotics Workshop | Beta Academy *Jul 2022 - Sep 2022*

- Arduino board - Basic Concepts of Embedded Systems - Basics of C Programming.
- HW components: LED, Resistor, Breadboard, potentiometer, sensors, 7-segment display, Motors, H-bridge.

Digital Design Diploma | Eng: Kareem Waseem | Certificate *Jan 2025 - Mar 2025*

- RTL Design & FPGA Flow - Verilog, synthesis, timing analysis, and optimization.
- FPGA Prototyping - Vivado flow, constraints, IP integration, and validation.
- Advanced Design - CDC, low-power, and protocol implementation.

Digital Verification Workshop | IEEE CUSB *Apr 2025 - Current*

- Verification Flow - SystemVerilog (SV) Basics - OOP & Constrained Randomization.
- Functional & Code Coverage - Assertions - SV Interfaces - UVM Fundamentals.
- Testbench Development - Stimulus Generation - Checkers & Subscribers.

FPGA Workshop | IEEE ASUSB *Aug 2024 - Sep 2024*

- SoC Design - FPGA Basics - Scripting Skills (TCL).
- Optimization Techniques (Area, timing, and power) - CDC Techniques.

Solar PV Training | ECOEGY *Jul 2023 - Aug 2023*

- Engineering design and shop drawings, Solar project development and calculations.
- Project management for grid-connected stations, Field installations experience.