SALAH-ELDIN HASSEN

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EDUCATION

- **Cairo University Faculty of Engineering Department of Electronics and Electrical Communication Engineering (CUFE EECE).**

WORK EXPERIENCE

- **Robotics & Embedded Instructor // Beta Engineering Training Academy // Seasonal // Jan 2023 - Present.**
  Teaching both Arduino and AVR embedded systems started as technical support in the session's tasks, then became the main instructor and taught over 600+ students with great feedback.
- **Coding AI Trainer // Outlier // Freelancing // Nov 2024 – Dec 2024**.
  teaching and optimizing AI models for coding tasks. The role involves training, evaluating outputs, refining models, and creating scenarios to improve AI's proficiency in coding.
- **Data Entry Clerk // Covo Connect // Full time // Jun 2023 - Jul 2023.**
  Entering banking data from photos to text. which improved my touch-typing skills.

SKILLS

- **Embedded Systems:**
  - Atmega16/32 (AVR) – PIC18F2XK20/4XK20 (PIC) – STM32.
  - Fundamentals of Embedded Systems – ARM Cortex-M Architecture.
  - Embedded C – FreeRTOS – SOMEIP.
- **Software:**
  - C / C++ - OOP – MATLAB – Assembly – Rust – Data Structure – Algorithms – Python – Automation – Scripting.
  - Kali Nethunter – Ubuntu – Debian – CentOS – AI tools – Qt – Git & Git-Hub – Latex.
- **Digital Electronics:**
  - HDL languages (VHDL, Verilog, System Verilog).
- **Web:**
  - HTML5 – CSS3 – JavaScript – Bootstrap – jQuery – Laravel – SQL.
- **Tools:**
  - Visual Studio – Eclipse – Cube IDE – MPLAB code Configurator – MATLAB – Proteus – Intel 8086 emulator.
  - Cadence – Multisim – Questa/Modelsim – Vivado – Arduino IDE – QT Creator – DataGrip – Altium.

PROJECTS

- **FreeRTOS-Based Dual Microcontroller-Based Door Locker Security System.**
  - Description: Developed a door security system using two microcontrollers with FreeRTOS for task management. Designed to enhance access control through password authentication, I2C-based EEPROM storage, and automated door mechanisms.
  - Key Elements: ATMega32**, I2C, USART, EEPROM, FreeRTOS, Semaphores, Queue,** PIR sensor**,** H-bridge.
- **Advanced Digital Multimeter on PCB.**
  - Description: Developed a digital multimeter circuit capable of measuring voltage, current, and resistance. Voltage measurement range of -200V to 200V, current measurement range of 0.5 mA to 2A, and resistance measurement range of 0 to 5 Mega Ohm. Designed from scratch and performed on PCB.
  - Key Elements: **ATMega32**, **PCB**, GPIO, LCD, Keypad, ADC, Relays, MUX, DEMUX.
- **I2C-Integrated Control Unit.**
  - Description: Monitor temperature and control a motor. The project integrates multiple I2C devices, including a temperature sensor, RTC, external EEPROM, and a slave MCU.
  - Key Elements: **PIC18F46K20, MCC** (MPLAB Code Configurator), I2C, USART, RTC, EEPROM.
- **Concurrent Rust TCP Server with Test Suite Optimization.**
  - Description: Developed a multithreaded TCP server in Rust, transitioning from a buggy single-threaded implementation. Enhanced client handling with Protocol Buffers for structured communication. Optimized the test suite by resolving port conflicts using port isolation and serial execution strategies.
  - Key Elements: **Rust**, **Multithreading**, Protocol Buffers, Thread Safety, Non-blocking I/O.

- **Maze-Solving Line-Follower Robot Car.**
  - Description: Developed a maze-solving robot car that autonomously moves from the starting point to the endpoint and saving the path. Features a Bluetooth module for remote control via a mobile application.
  - Key Elements: **Arduino,** DC Motors, H-Bridge, Bluetooth Module, IR Sensors.
- **Laravel Workshops System.**
  - Description: Developed a comprehensive Laravel-based system to manage workshop sessions. The system allows creating, scheduling, and managing workshops, handling participant registrations, and tracking attendance.
  - Key Elements: **Laravel, PHP, MySQL, Bootstrap,** Git.
- **Advanced Tic Tac Toe Game.**
  - Description: Developed a C++ Tic Tac Toe game with user authentication, personalized history, and AI using the minimax algorithm. Features an interactive GUI, secure user management, and performance optimization. Tested using Qt Test.
  - Key Elements: **C++, Minimax Algorithm, Secure Hashing, Qt, Qt Test, SQLite, Git, GitHub Actions**.

COURSES

- **Advanced Embedded Diploma // Eng: Ahmed Abdel-Gafar // Dec 2024 – Current.**
  - ARM Cortex-M4 Processor: Architecture, Programmer's Model, Debugging, and Memory Systems.
  - Embedded Systems Development: Compilation Process, Linker Script, and Startup Code.
  - Device Driver Development: GPIO, RCC, SysTick Timer, Flash Memory Interface, and NVIC.
  - Bootloaders: Flash Bootloader Design, Implementation, and Testing.
  - Automotive Protocols: LIN and CAN Protocols.
  - AUTOSAR Fundamentals: Layered Architecture, Modular Programming, and Data Abstraction.
  - MISRA C Standards: Compliance and Implementation Rules.
- **SOME/IP Workshop // BULLET - Eng/Hazem // OCT 2024 - OCT 2024.**
  - Gained hands-on experience in SOME/IP protocol through a practical workshop. Implemented sample client-server communication as a basis for networked embedded systems, understanding service-oriented middleware for automotive and IoT applications.
- **Linux Fundamentals // IEEE ASU // Aug 2024 – Sep 2024.**
  - Linux Basics: Learned file management, shell scripting, and user permissions.
  - System Operations: Gained skills in process control, package handling, and filesystem management.
  - Networking & SSH: Developed expertise in Linux networking, SSH, and web server setup.
- **Embedded PIC Diploma // Eng: Ahmed Abdel-Gafar // Jul 2024 - Sep 2024.**
  - Basic Concepts of Embedded Systems - C Programming - Embedded Tools.
  - PIC Micro-controllers Interfacing (Implement all the drivers) - C For Embedded Applications (Embedded C).
  - Communication protocols (USART - SPI - I2C).
- **Embedded AVR Diploma // Eng: Mohammed Tarek // 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).
- **Digital Design and Verification Diploma // Eng: Kareem Waseem // Jan 2025 – Current.**
  - Solid understanding of Digital/RTL Design, including Verilog and SystemVerilog for synthesis and simulation.
  - Proficient in using QuestaSim for basic simulation and developing verification plans, functional coverage models, and SystemVerilog assertions.
  - Knowledge in Static Timing Analysis (STA), clock domain crossing techniques, low power design, and formal verification techniques.
  - Familiar with FPGA design flow, including Vivado design flow, IP catalog, debug cores, and FPGA-based prototyping challenges.
  - Simulation-based verification using UVM, UVM structures, sequences, configuration, and emulators.

EXTRACURRICULAR ACTIVICITES

- **Aug & Sep 2022:** First place in Robotics competition with my team in both projects at Beta Academy (Smart Garage) & (Robot Car Line Follower & Maze Solver).
- **Aug 2022 – Jun 2023:** Chemistry Teaching Assistant**.**
- **May 2023:** Fifth place at TCCD competition with my team in math project.
- **Nasa Hackathon 2023:** 2-days Hackathon, we created a website for scientific research community.
- **ECPC Contestant 2022 & 2023.**