Ho Quoc Thai

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PROFILE

Final year student in software engineering enthusiasm in embedded software development. Hands-on experience developing a complete operating system in C for ARM-based micro controller and building an end-to-end IoT weather station with cloud integration. Seeking for internship or entry-level embedded software engineer role to apply skills in software development, hardware interfacing, and system-level problem-solving.

EDUCATION

RMIT University Vietnam October 2021 – February 2026 (EXPECTED GRADUATION DATE)

Bachelor of Software Engineering

Key Courses:

Software Engineering: Embedded System OS and Interfacing, Embedded Systems Design and Implementation

Core Concepts: Data Structures & Algorithms, Object-Oriented Programming

WORK EXPERIENCE

IoT Weather Station **August – September 2025**

- Designed and built a Wi-Fi-enabled weather station using an ESP32 to collect and transmit real-time environmental data.
- Engineered a robust data pipeline, transmitting sensor readings as JSON payloads to a cloud MQTT broker for remote access.
- Developed firmware in C++/Arduino to interface with a SEN0501 sensor via I2C, for temperature, humidity and UV
- Visualizing the collected time-series data using a Node Red web dashboard, with additional feature of logging data to Google Sheet.
- Tracked my own budget and assessed where resources should be spent.

Technologies: C++, ESP32, Platform IO, I2C, MQTT, JSON, Git, Node Red.

RELATIVE COURSEWORK

Bare Metal OS and App development for Micro controller **March – September 2024**

- Contribute to develop a complete bare-metal operating system in C for the Raspberry Pi platform, focusing on low-level hardware interfacing and OS fundamentals.
- Developing a robust Command Line Interpreter (CLI) with features like command history, tab-based auto-completion, and dynamic parameter handling.
- Responsible for implementing UART communication, allowing for real-time changes to baud rate and stop bit configurations.
- Develop a frame buffer graphics driver to render complex visuals, including custom bitmap fonts, ARGB32 images, and a video playback system achieved by decoding and displaying sequential image frames.
- Handling user keyboard input and logging game state data back to the CLI for debugging of a multi-level interactive game application.

Technologies: C, ARM Assembly, Bare-Metal Development, ARMv8 Architecture, QEMU, GCC, UART & Frame buffer Drivers.

Multi-Peripheral Embedded Systems Project on Nuvoton MCU **October 2023 – January 2024**

- Developed a UART communication driver to establish a robust serial data link between the microcontroller and a PC, enabling file/map loading and command-line interaction.

- Engineered an interrupt-driven system using an ADC to monitor an analog sensor. Triggered an SPI data transmission and visual LED feedback when a voltage threshold was exceeded.
- Validated SPI signal integrity and data accuracy for the transmitted message using an oscilloscope.
- Designed and implemented a complete Battleship game featuring a state machine for game logic, keypad matrix scanning for user input, and real-time updates to a 7-segment display for player feedback.

Technologies: C, UART, SPI, ADC, Interrupts (ISRs), GPIO, State Machine Design, Nuvoton ARM-based MCU

Digital Traffic Light Control System Simulation **October 2022 – January 2023**

- Modelled a cyclical traffic controller using fundamental digital logic blocks, including a master counter, relational operators, and logic gates (AND/OR) to manage fixed timings.
- Developed a more advanced, interactive system using a state flow state machine that defaults to a state and only initiates a cycle when triggered by a simulated button press.
- Implemented state transitions governed by a combination of external user input and internal timers to manage the system's operational flow.
- Designed and implemented a complete Battleship game featuring a state machine for game logic, keypad matrix scanning for user input, and real-time updates to a 7-segment display for player feedback.
- Verified system performance and debugged logic by analysing signal waveforms and state changes using Simulink's Scope and Logic Analyzer tools

Technologies: MATLAB, Simulink, Stateflow, State Machine Design, Digital Logic Design, System Simulation & Modelling

KEY SKILLS

Technical skills:

- Languages: C/C++, Python and Java
- Development Tools & Software: MATLAB, Simulink, Oscilloscope, Serial Terminals (PuTTY, Tera Term), IDEs
- Hardware & Communication Protocols:
    - Microcontrollers: Nuvoton ARM-based MCUs, Raspberry Pi 4, ESP32S3
    - Protocols: UART, SPI, I2C and MQTT
    - Peripherals: ADC, GPIO, Keypad Matrix Scanning, 7-Segment Displays, LEDs, Buzzers

Soft skills:

- Team working
- Hardworking
- Communication & Presentation
- Strong Critical thinking skills
- Leadership
- Problem Solving
- Organizing

LANGUAGES

- Vietnamese: Native
- English: Fluent (TOEFL iBT: 94)

INTERESTS & HOBBIES

- I am a big fan of IoT solutions for home management, living quality enhancement and environmental.
- I enjoy learning and implementing new technologies in software development and embedded systems.
- I’m currently self-learning Python for AI and Machine Learning implementation.