

# Embed Threads



## Bridge the Gap

A Roadmap to a  
Successful Career



## Phase 1: Understanding the Basics

1. C Programming
  - Data Types
  - Variables and Constants
  - Control Structures
  - Functions
  - Pointers
2. Microcontroller Architecture
  - CPU and Memory
  - Input/Output (I/O) Ports
  - Timers and Counters
  - Interrupts
3. Electronics Fundamentals
  - Resistors, Capacitors, and Inductors
  - Diodes, Transistors and MOSFET
  - Basic Circuit Analysis
4. Embedded Tools and IDEs
  - Toolchain Setup
  - Arduino IDE
  - MPLAB X
  - Keil uVision
  - STM32CubeIDE

## Phase 2: Hands-On Learning

1. Embedded Protocols
  - GPIO Interfacing
  - UART, RS232 and RS485
  - SPI
  - I2C
2. Projects
  - Start with Small Projects
  - Intermediate Projects
  - Collaborative Projects
3. Version Control
  - Git Fundamentals
  - Collaboration on GitHub
4. Debugging and Testing
  - Debugging & Testing Techniques
  - Unit Testing
5. Low Power Optimization
  - Sleep Modes
  - Power Management
6. Embedded Security
  - Threats and Vulnerabilities
  - Secure Boot and Firmware Updates

## Phase 3: Advanced Topics

1. Advanced C Programming
  - Memory Management
  - Function Pointers
  - Data Structures
2. Peripheral Interfacing
  - ADC and DAC
  - PWM (Pulse Width Modulation)
  - DMA (Direct Memory Access)
3. RTOS Concepts & Implementation
  - Porting an RTOS
  - Real-Time Analysis
  - Task Management
  - Task Scheduling
  - Inter-Task Communication
  - Synchronization and Deadlocks
4. Wireless Communication
  - Bluetooth Low Energy (BLE)
  - Wi-Fi
5. Documentation
  - Hardware Connection
  - Software Flow
  - Troubleshooting Steps

## Phase 4: Final Touches

1. Project Portfolio
2. Networking and Collaboration
3. Internships or Entry-Level Jobs
4. Technical Interview Preparation
5. Continued Learning
6. Soft Skills Development
7. Job Search Strategies
8. Side Projects and Hobbies



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