EMBEDDED SYSTEMS

Skill Tree: Color in the boxes and level up your skills

Use for individuals or as a group by picking a colour each and coloring in a part of the box. Everyone's journey is different and you can interpret the goals flexibly. The aim is to inspire you to learn and try new things. Not everything needs to be completed.

ADVANCED

(set your own goal)
(set your own goal)
(set your own goal)
(set your own goal)
(set your own goal)

Write a datasheet
Create a CI/CD System
Edit binary / hex to fix a problem after release
Write a Real Time Operating System (RTOS)
Write a bootloader

Use trace debugging to troubleshoot a problem
Create a software release process
Fix 49-day reboot problem with a calendar
Add Machine Learning (ML) to a device

Teach a class on embedded systems
Make a dashboard for monitoring remote units
Write a software for programming and testing many boards in manufacturing

Bit bang a communication driver
Write custom BLE GATT to communicate between devices
Use a multi core processor
Create your own custom PCB

Use a .map file to find a crash
Adapt RTOS to a new board
Optimize assembly code

Use multiple architectures in a software image
Blow fuses to test security in a project
Modify a Linker File
Debug a project with a logic analyzer

Reverse engineer communication protocols
Run unit tests in an algorithm sandbox
Identify burden voltage issue

Implement Direct Memory Access (DMA) in a project
Debug a fault in the hardware on a microcontroller
Write manufacturing test software
Debug a project with an oscilloscope

Use a camera in a project
Bring a custom board through the bring-up process
Check a .lst or .map file to troubleshoot a problem

Use an IMU sensor to track motion in multiple axes
Update firmware for a project 'Over the Air' (OTA) using secure encryption
Set up a cross compiler
Use Mutual Exclusion (Mutex) in a project

Implement MCU Sleep in a low power project
Use USB, Wifi, Ethernet or CAN to communicate with a microcontroller
Use closed loop control (PID) to regulate a project

Create a circular buffer that uses more than 2 pointers
Update firmware for a project 'Over the Air' (OTA)
Display text on a screen in a different font
Use an Interrupt in a project

Use a step-through debugger to troubleshoot a problem
Use Pulse With Modulation (PWM) to control RGB LEDs
Use a Real Time Operating System (RTOS)

Analyse a signal with Fast Fourier Transform (FFT)
Use Bluetooth Low Energy (BLE) for a project
Move a Motor
Buy someone else a dev board

Configure a timer
Use Pulse Width Modulation (PWM) to control something
Use a state machine

Understand how to use a circular buffer
Send data to the cloud
Debounce a button
Use continuity check to test conductivity on a Multimeter

Use I2C communication
Blink an LED
Commit to a version control system, eg. Github or others

Convert a signal from analog to digital (ADC)
Use UART Serial Communication
Use SPI to send data
Solder in your own header pins

Use circuit python for the first time
Get an Arduino
Use a Hardware Simulator eg. WokWi

BASICS

START HERE

Name: _____

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