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)
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(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
Teach a class on embedded systems
Create a software release process
Make a dashboard for monitoring remote units
Fix 49-day reboot problem with a calendar
Write software for programming and testing many boards in manufacturing
Add Machine Learning (ML) to a device

Bit bang a communication driver
Use a .map file to debug a crash
Write custom BLE GATT to communicate between devices
Adapt RTOS to a new board
Use a multi core processor
Optimize assembly code
Create your own custom PCB

Use multiple architectures in a software image
Reverse engineer a communication protocol
Blow fuses to test security in a project
Run unit tests in an algorithm sandbox
Modify a Linker File
Identify a burden voltage issue
Debug a project with a logic analyzer

Use Direct Memory Access (DMA)
Use a camera in a project
Debug a hard fault on a microcontroller
Bring up a custom board for the first time
Write manufacturing test software
Check a .lst or .map file to troubleshoot a problem
Debug a project with an oscilloscope

Use an IMU sensor to track motion in multiple axes
Implement MCU sleep in a low power project
Update firmware remotely using secure encryption
Use USB, Wifi, Ethernet or CAN
Set up a cross compiler
Use closed loop control (PID) to regulate a project
Use a mutex to safeguard a resource

Create a circular buffer that uses more than 2 pointers
Use a step-through debugger to troubleshoot a problem
Update firmware remotely (OTA, DFU, FWUP)
Use pulse width modulation (PWM) to control RGB LEDs
Display text on a screen in a different font
Use a Real Time Operating System (RTOS)
Implement an interrupt service routine (ISR)

Analyse a signal with Fast Fourier Transform (FFT)
Configure a timer
Use Bluetooth Low Energy (BLE)
Use Pulse Width Modulation (PWM)
Move a motor
Implement a state machine
Buy someone else a dev board

Understand how to use a circular buffer
Use I2C communication
Send data to the cloud
Blink an LED
Debounce a button
Commit to a version control system (such as Github)
Use continuity check on a Multimeter (Beepy mode!)

Convert a signal from analog to digital (ADC)
Use circuit python for the first time
Use UART serial communication
Get an Arduino
Use SPI to send/recieve data
Use a Hardware Simulator eg. WokWi
Solder in your own header pins

BASICS

START HERE

Name: _____

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