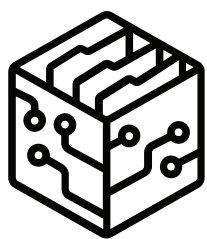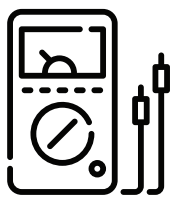# EMBEDDED SYSTEMS

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

BASICS

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

- Create a CI/CD System
- Write a Real Time Operating System (RTOS)
- Write a bootloader
- Write a datasheet
- Edit binary / hex to fix a problem after release
- Use trace debugging to troubleshoot a problem
- Fix 49-day reboot problem with a calendar
- Add Machine Learning (ML) to a device
- Create a software release process
- 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
- Implement Direct Memory Access (DMA) in a proejct
- Reverse engineer communication protocols
- Run unit tests in an algorithm sandbox
- Identify burden voltage issue
- 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 With 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

START **HERE**

Name: _____