Intro to embedded systems and drivers as selected subject

DHT22 Temp/humidity and LCD1602 display on Pi Pico W microcontroller

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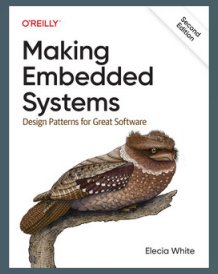
For: **IFT-769** (Theoritical concepts CS)

📖 **Project overview (1/2) -** Read 'Making Embedded Systems' by Elecia White

Making Embedded Systems 2nd edition by Elecia White



Book overview:

- **Introduction** to embedded systems architecture and design
- How to work with various **I/O** devices (sensor, display, etc.)
- Learn how to **optimize** and **debug** within resource constraints
- **Advanced** topics like **RTOS**, **networking**, **security**, etc.

🛠️ **Project overview (2/2) -** Apply the concepts from 1st half of reference book

Make a **Temperature** 🌡️ and **humidity** 💧 station with DHT22 sensor and LCD1602 display on Raspberry Pi Pico W microconstroller.

➡️ **Design** a simple embedded system with a microcontroller.
➡️ **Learn** to work with I/O on a microcontroller.
➡️ **Write custom C drivers** for each peripheral.

(Optional goal)
Take advantage of the Pico W microcropressor's 📡 chip and write a custom **web server** in C to **display** the data on a web page.

🗨️ **Project overview (3/3) -** Present and apply relevant concepts from the main reference

Relevant concepts (from the 1st half of the book):

- Create **system diagram** and **flowchart** for the project (ch. 2)
- Choosing and understanding **hardware** (ch.3)
- **I/O** and **interrupts** (ch. 4-5)
- Drivers and **communication protocols** (ch. 7)
- **Flow** of activity and **hollistic system** view (ch.6 and 8)

🎯 Project goals

1. **Understand** the basics of embedded systems and drivers.
2. **Learn** to work with I/O devices on a microcontroller.
3. **Write** custom C drivers for each peripheral.
4. **Apply** the concepts from the reference book to the project.
5. **Present** and **apply** relevant concepts from the main reference.

📅 Project timeline - (1/2)

Theoritical concepts

- Read a chapter of the book every week

Applied Project

- Write **System diagram** and **flowchart** for the project
- **Choosing** and **understanding** hardware
- Setup **development environment** and **toolchain**
- Start **writing** the DHT22 driver

📅 **Project timeline -** End-of-term objectives

Theoritical concepts

Continue reading the book past the applied objectives.

Applied project

- **Finish** the DHT22 driver
- **Write** the LCD1602 driver
- **Integrate** the drivers and **test** the system
- (OPTIONAL) Write a **web server** to display the data

BREADBOARD IMAGE HERE

📋 System diagram

TODO ADD STATIC FILE

⚙️ Hardware Components

🛠️ Development environment