IDEA 310L - Final Project End-Of-Semester Stress Reliever

agenda

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problem statement

stressed out!

- This semester was particularly busy for me with projects (including this class)

- By the end of the semester I was really feeling it, and I jokingly told my husband that I wished I could be wrapped up in bubble wrap and listen to whale sounds

design process

design thinking

DEFINE
what do people do to destress?
what is a feasible way to destress from a desk?

EMPATHIZE
I'm a stressed-out student who needed a quick break from the computer

IDEATE
rain sounds, bubble wrap, pleasing lights

PROTOTYPE
using NeoTrellis, OLED TFT /w SD card, rotary encoder, UDA1334A breakout

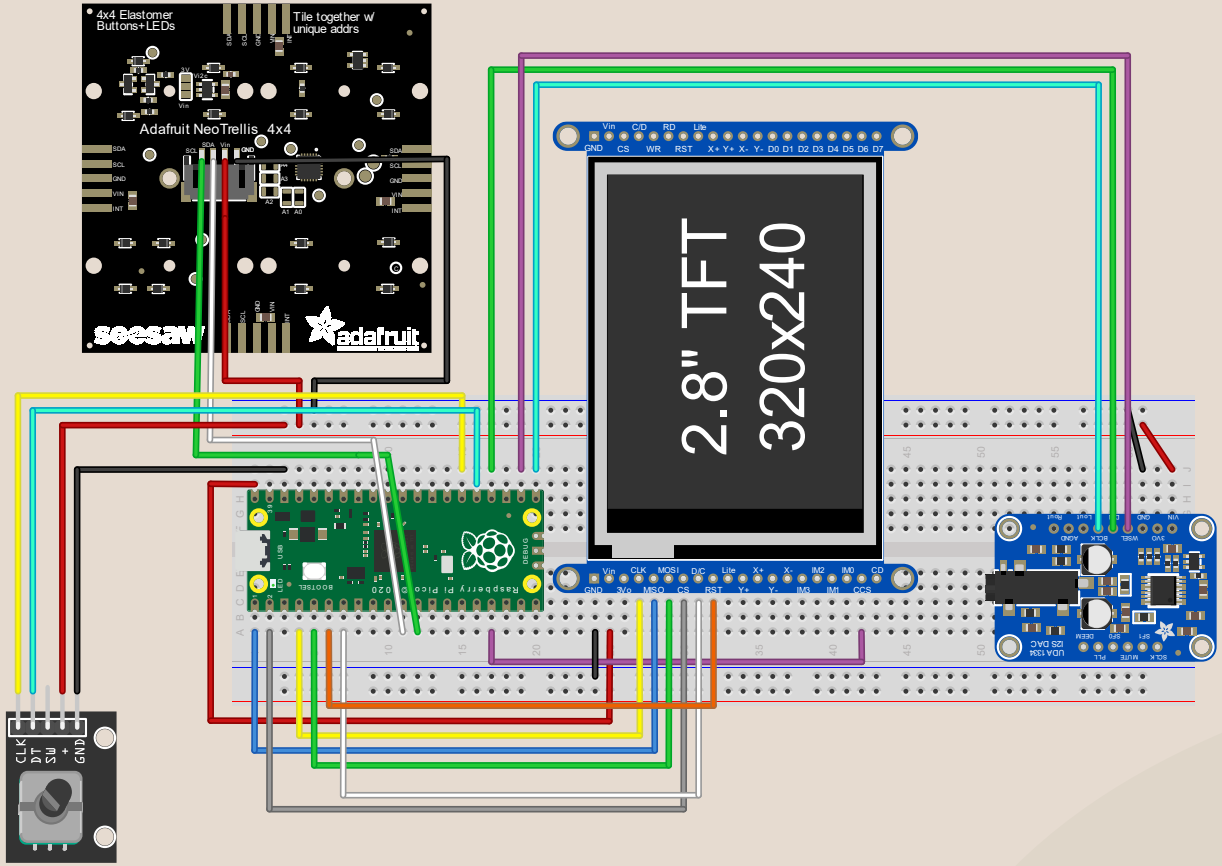
TEST
using Thonny and Micropython

libraries used

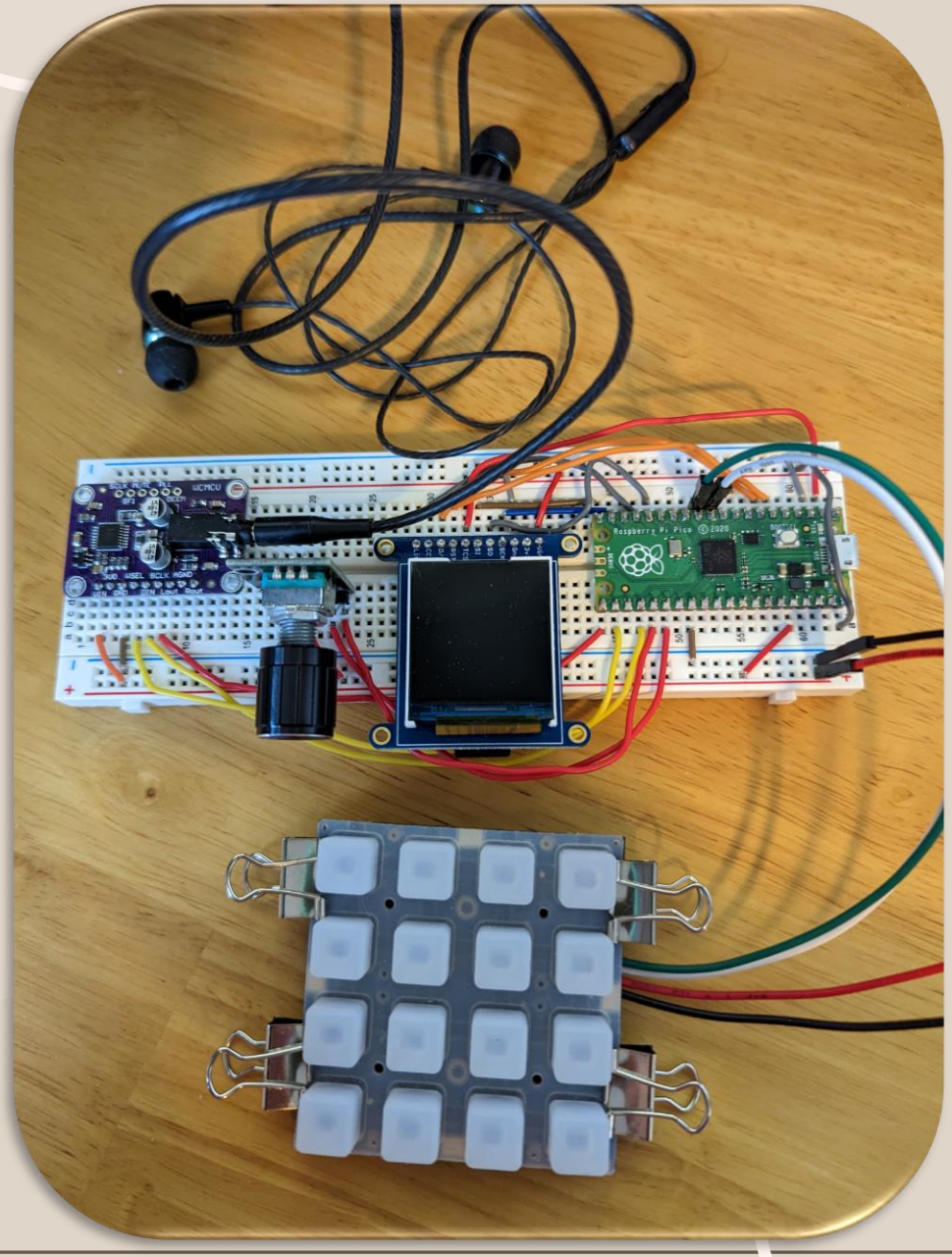
ili934x	to use the OLED TFT to display the song file name
uasyncio	to use the two cores of the RP2 Pico for both the NeoTrellis and the wav_player function to be used simultaneously
sdcard	to read audio for the user to relax to
pico_neotrellis	for using the NeoTrellis as “bubble wrap”
rotary_irq_rp2	for rotary encoder debouncing, range initialization, and easy-to-use callback implementation

design result

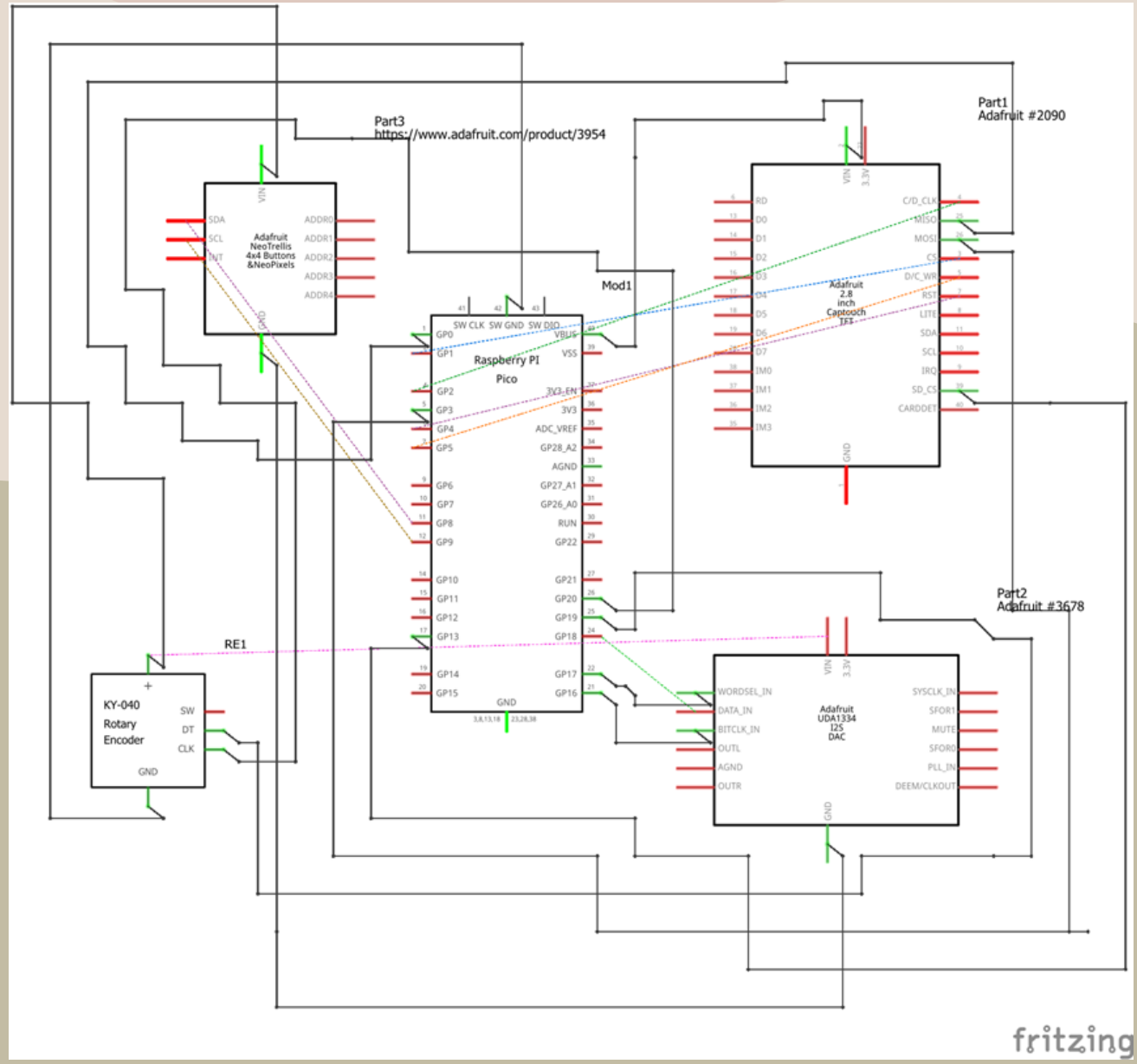
design schematic



fritzing



circuit diagram



demonstration

- I'm really sorry, but I could not for the life of me get the Pico to read the SD card more than once per format. For some reason, playing the audio would work just ONCE, then I would get an OSERROR saying that that SD card could not be found.
- I tried troubleshooting and spent many, many hours Googling my problem, but I just couldn't find any definitive answer or solution.
- That being said, the project will sit on my desk if you'd still like to help me troubleshoot before the semester ends, because I'd like to actually finish the project, but a lot of it depends on the TFT-based SD card slot.
- Also, I'm turning this in as-is because I've pulled three all-nighters this week attempting to finish my projects
  - Also, ALSO, I'd like to apologize for missing class the last week and not presenting because of said all-nighters
- I had an amazing time in this class and learned so much, it motivated me to learn more about microcontrollers and make projects of my own at home ☺

hurdles...

- Figuring out how to get I2S to work with the SD card
  - Turns out that the TFT sharing the same SPI bus as the UDA1334A breakout and the SD card reader adds an extra layer of complexity
  - Also, the SD card has to be initialized before anything else for it to work
- Was only able to find two inputs to use on this project

…and accomplishments!

- Rotary encoder interrupts
- I2S volume changing (using bit shifting)
- Getting the SD card to work with the UDA1334A breakout
- Using uasyncio to schedule using the NeoTrellis
- ~~Troubleshooting the SPI issues, when I didn't know what I didn't know~~
  - ~~It was a fluke that someone in the Micropython forum mentioned a TFT sharing a SPI bus with the SD card reader, and it clicked why I was having issues~~
  - Edit: Still doesn't work for some reason ☹

thank you