CP320 Exploration Project
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December 3, 2018

Overview

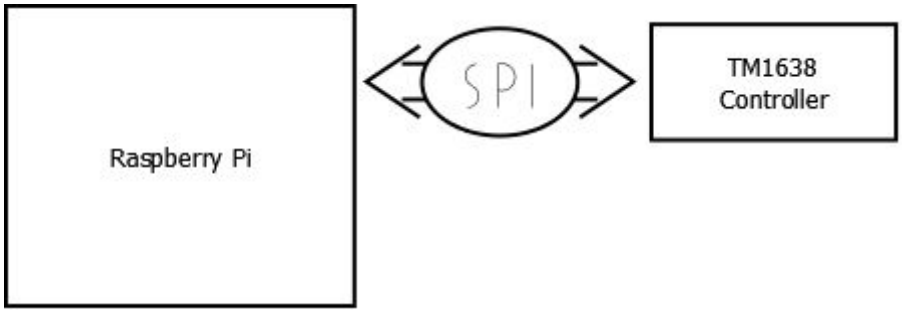
We have produced a Python library that enables the programmer to easily handle the situation where they want to wait for user input on the button panel from the TM1638 multi-purpose board. To do this, the user would create a function they wish to be called on the button press; they would pass the function name to our library with a statement similar to the familiar *input* or *raw_input* calls, which imply that the program will wait for user action. The button press is then captured, processed, and the relevant number (1-8) is then passed to the user's function, acting as a callback.

Additionally, to showcase the operation, we have created a small memorization game. The player watches the LED strip at the top of the board, and presses the buttons in sequence to advance to the next level of difficulty. Each level requires more numbers be memorized, and they are displayed faster as the player moves on. Other information, such as success or failure messages, are presented to the player depending on their status in the game.

Hardware and Software Used

For this project, the following components have been used.
- Raspberry pi 2
- TM1638 - 7-segment display with buttons and LEDs
- python

Circuit Diagram



Notes

- The circuit diagram is quite simple, and the TM1638 uses the SPI interface on the RBPi
- The TM1638 is rated to run off of a 5v supply, however it is possible to run it on 3.3v directly from the RBPi. Note that the brightness of the LED's will not be as high, and therefore some brightness settings on the device may be difficult to read.

Packages & Libraries Needed

The *pytm1638.py* python package is needed to run the code for this project. The primary use of this package is to interface with the display portion for the memorization game. Other helper functions are included that make working with the TM1638 easier. Other packages not explicitly listed here include those from the standard RBPi suite and Python standard library, such as *time*, *random*, and *RPi*.

Packages needed:
- pytm1638.py

Challenges & Issues

The biggest challenge we have faced with the exploration project was figuring out how we might interact with the TM1638. Documentation is available, however there were times that it was difficult to parse out exactly what we were trying to do vs the information that we were presented with. Aside from that, little information other than the documentation is available regarding working with the buttons specifically; there was some trouble in determining how to answer the simple question of “What button number is currently being pressed”, which led to the creation of our library.

Useful Links

- Martin’s Atelier - Overview of using TM1638 with Raspberry Pi
- MicroPython TM1638 LED Driver - Sample GitHub repo with TM1638 examples
- py-tm1638 - Another sample GitHub repo with TM1638 examples

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