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EECS 303
Lab 2 Report

Assignment Statement
Reading temperature sensor: RPi transaction with DHT11 sensor

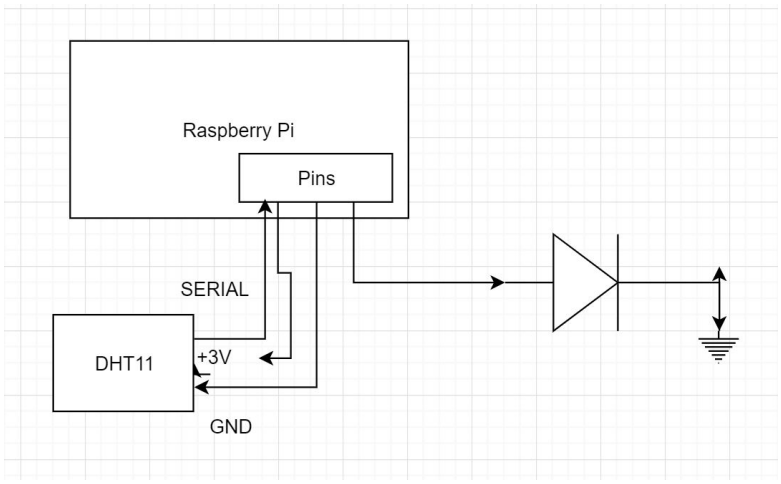
Objective
The goal of this lab is to learn to communicate with sensors and working with interrupts. By reading the sensor using multiple methods (polling and interrupts) we can get accustomed to the nuances of sensor communication while exploring new hardware features of the Pi.

Approach
Part 1: Reading the DHT11 using polling
Getting the sample code up and running with the correct pins was step 1. After the correct pins were set up we used C's standard libraries for file io and worked through the data buffer that was used to store the read values off of the sensor.

Part 2: Reading the DHT11 using interrupts
Correctly doing this assignment involved setting up the generate checksum method to add the individual bytes into the correct checksum value and compared the value of the checksum byte. The actual collection of bits involved individually collecting the difference in edges of time, storing the individual bits, and incrementing the bit counters.

Part 3: Toggling an LED at a threshold temperature
This part was very straight forward after we got reading working off of the DHT11. We simply added a gpio toggle to another pin and compared an arbitrary threshold value to the correct spot in the data array. Our implementation used the polling method to read from the DHT11.

Circuit Diagram



Results

For all three parts we were able to read values off of the DHT11 sensor. Using polling proved to be more reliable than using interrupts. This could be due to the context switch that has to occur during an interrupt. Performing the interrupts at such a fast rate could have introduced the dropped byte issues we observed.