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CS-350

## Peripherals

The peripherals used in this project are the I2C, GPIO, and Uart which are all supported and work with the thermostat. The three architectures of Ti, Microchip, and Freestyle support the use of these peripherals. I2C is used to read the temperature sensor data, this data is then sent to the GPIO which reads the temperature data and turns on an LED based on the temperature range. GPIO also capable of setting a desire temperature with the use of buttons. Uart’s job is to output all information to the server, it takes the I2C temperature reading as well as GPIO set temperature and LED indicator. The thermostat is what supports the function of all three peripherals, without a temperature sensor working there will be no data for each peripheral to use.

## Connecting to Cloud

For the thermostat to connect to the cloud it needs to have a wi-fi module that allows it to connect wirelessly to the internet through a local wi-fi network. The thermostat can then communicate with cloud servers to send data and receive commands that can be sent through HTTPS. TI has microcontrollers that are used in IoT through their wi-fi simple link family. Microchip has PIC and AVR microcontrollers as well as wireless internet controller modules that are commonly used. Freescale’s microcontrollers have solutions including wi-fi modules and integrated wi-fi Bluetooth chipsets. The biggest step in connecting to the cloud is authentication and security, this is done by WPA2 for wi-fi connections and HTTPS for cloud server connection.

## Flash and Ram

Flash memory is memory that can be stored even after power is lost to the microcontroller, while ram is memory that is sort term and is only active when power us supplied to the device. Ram itself works faster than flash memory when sending data to the CPU and outputting data. When it comes to choosing an architecture either Ti, Microchip, or Freescale the main concern is having the right amount of ram and flash memory for the task needed. Each architectures offers a wide variety of microcontrollers with various amounts of ram and flash, in the case of the thermostat choosing a microcontroller with just enough ram and flash would be best. Choosing one with more than will ever be needed would be a waste and choosing one that does not fit our requirements would lead to slower systems and possibility of the thermostat not working correctly.

References

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