**7-1 Final Project**

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**Report**

The goal of this report is to create prototype of a smart thermostat with our microcontroller. We have completed the base thermostat by using the lcd screen to display the temperature, the temperature sensors, the two buttons for controlling the temperature, and UART to simulate sending the data. We utilize the GPIO pins in the previous assignments when we connected all the sensors and buttons, this means we have ample space to add or remove items, as necessary. But to make this a smart thermostat we need it to be able to connect to the WI-FI network and have the RAM/Flash to support it. Our Pi 4 can as the Wi-Fi can be accessed, and the users can access the controller through ssh as a way to monitor activity on the back end.

Throughout this course we can see that it has all the capabilities or peripherals needed for this project to come into fruition. The main one being the ability to connect to the network meaning it could connect to a server. With after connecting to the network, it can be programmed to send data for the users. We need to compare architecture to see which would be the best to proceed with. We well compare Raspberry PI 4 vs Microchip the first thing that I notice is power consumption between the two. Raspberry PI has a higher power consumption than Microchip. Next, the most important in my opinion is the Wi-Fi connectivity while PI has built-in Wi-Fi the microcontroller is integration via modules. Next thing I would consider to be up there is ease of development and Pi takes this one in my opinion because it’s easy to develop.

After reviewing everything I have decided to recommend the continue use of the raspberry PI. It supports all peripherals, it has built-in WI-FI and has the Flash/RAM for cloud connectivity. However, it will consume more power but the ease of development, rich ecosystems, and rapid prototyping I think outweigh the drawbacks in the development of the smart thermostat. Having built-in Wi-Fi goes with the ease of development we don’t need an external or module to use the Wi-Fi connectivity its easier since it’s all there at any given time. Also, with the increased popularity with development in PI’s there are plenty of resources out there to learn from.