**Reflection**

Over the course of the semester this embedded systems design project has prepared us for our future careers. We have gone through the life cycle of an embedded systems design project from design, fabrication and firmware. Skills such as soldering, printed circuit board design and test analysis were learned. Other skills such as circuit theory and digital logic, that we’ve already learned, were improved. At the beginning of the semester, we learned how to choose the correct components for our project by testing them and understanding their uses. We also learned how to solder which is a key skill in PCB design. After the components were chosen and a breadboard prototype was built, it was time to convert the schematic to a PCB design. By far, this step was the most difficult because the PCB cannot have any flaws. The firmware was another big step of the project. During the prototype stage, Arduino libraries were used but for the final project AVR needed to be implemented. The skills we learned in embedded systems design prepared us for coding the firmware of our system. Once the PCBs were printed, the components were soldered on and testing resumed. Testing was done until the system seemed to work perfectly and completed the task for the user which was to set a desired room temperature and notify the user when the occupancy of the room was maxed.

**Post Mortem**

Our finished product completed the task of providing the user with a climate control and room occupancy system. Although we switched sensors throughout the semester, the DHT22 temperature/humidity sensor did its job. The only problem with the DHT22 was the accuracy of the temperature reading which was not too far off from the experimental temperature result measured by a temperature probe. The IR sensor was also changed throughout the semester. During the UAT, the IR sensors were manipulated so that if an entity entered the doorway and left, the room count would increase by one but they weren’t actually in the room. This could have been fixed by designating an enter and an exit door which a person could only enter the front door and could only exit the back door. The LCD seemed to work efficiently through our own testing but during the UAT a problem occurred when the PCB was reset. Due to the refresh rate of the LCD compared to the reset time, the board reset too quickly and the LCD did not have time to completely clear the screen. A solution to this could have been to implement a longer delay on reset so all the components of the PCB had time to reset themselves. The placement of the PCB was not a problem but to make the user experience flow more smoothly, the buttons could have placed on the back of the board and the board could have been mounted on the side of the closed environment next to the LCD. Although these problems were minor and did not affect the task or results that our system completed, it would have been nice for the system to work flawlessly for the user’s experience. Practice makes perfect and the importance of testing can be seen by the minor flaws of our system.