William Pete Bingham

CS-499

Southern New Hampshire University

3/28/2020

Milestone Three: Narrative

**A.**

The Artifact that I had chosen for milestone three is from CS-350: Emerging Systems Architectures and Technologies. This artifact was created in September of 2019. The purpose of this program was to implement python code with a raspberry pi hardware set up, using a HAT (Hardware Attached on Top), called grovePi. From here the purpose was to set up a weather station application that could read and write data to a JSON file of temperature and humidity in specific area. The application would turn on with a light sensor and then from there would run the logic behind it to use all sensors and tell the user the temperature in the house. Along with the reading, would be a green, red and blue LED light that would light up during specific temperature readings.

**B.**

The purpose of this artifact being chosen for my ePortfolio is for a few reasons. I not only thought this was one of my best pieces of work here at SNHU, but it was the first class that we implemented code with hardware. I believe this will be a great piece of work to show future employers and will show a great set of skills of hardware and software integration knowledge. Another great reason behind this, is there are many different components that I used for this artifact and added to the artifact as well. I ended up changing most if not all the original code, besides the logic of the temperature and humidity readings. To start off, I removed the light sensor, and added a button instead. The reasoning for this, is because the light sensor was incredibly unstable and would make a user to have to have a light source of some kind to use. Since I removed the sensor, I replaced it with a button sensor, which will turn off the device and all recordings when the button is pressed.

Next, I added a buzzer, the reason for this is because my red LED light is broken, and I wanted to display the urgency and danger of temperatures that reached above 95 degrees. Thus, when the temperature sensor reads a temperature over 95 degrees, a loud buzzer will notify the user as it buzzes and beeps every other second. This next part that I changed in the code is where I wanted to display my algorithm and data structure techniques. I created separate functions that called upon other functions within the program. To start off, I implemented a user information function which will ask the user for a specific username and password (username: “William”,password: “admin1”). If the user did not enter the correct username and or password, then the program will not allow access to the user and will exit the program. From here, the user can sign in with the example above, and this is where I implemented an array data structure which read information from the readUserInfo function on which admin was added. If a specific admin was granted access, the adminData function will look for the username in which was granted access, and will display a specific message to them, that was stored in an array.

The next function that I created I the readData function, which is all of the logic in reading and writing data to the display of the user, the sensor LCD screen which was included with the HAT sensors grovePi kit, and to a JSON file. As stated above, the logic behind the temperature and humidity readings are similar to the original, with the small change of adding a buzzer for temperatures above 95, a portable LCD screen that displays the temperature, humidity and changes color, due to specific conditions, and a button in which exits the system. The last thing that I did was use that JSON data and call it in an html file in which I created a graph that will display temperature and humidity changes for all JSON data entries, as a plot and line graph.

**C.**

I believe that I did meet the course requirements and outcome of this project. Overall, I added more content to the artifact than I originally intended, and that was the security algorithm and array data structure. This gives the application a more secure way of using and gaining information, that some users may or may not be authorized to use. I am overall very pleased with the progress that I made with this artifact.

**D.**

Some of the things that I learned from this project was how to properly set up a data structure and secure algorithm. It wasn’t very hard to use some sort of array to display information to a specific user, but I did have to research a bit from previous notes, since I have not done a task like this for quite a bit of time. The only thing that was challenging, was getting my button to work properly with my code, and the reason for this is finding and understanding the logic of the grovePi sensors and what syntax you need in order to get these to work properly. When I reflect on this project, it made me smile because I know that I have improved since I first started here at SNHU when it comes to programming. I can now safely say that I have clear knowledge on how to properly set up code that runs smoothly and is secure. On top of this, I used to have to ask a teacher for help on specific areas of my program, but this time I was independent in my own way, to perform my own research and gain the overall goal that I was seeking.

**Side Note to Professor:** Hi Professor, I am not sure you will be able to test this out or not, assuming you do not have either a raspberry pi and or the grovePi HAT and specific sensors that I used. However, if you would like to see a video of this working, then please let me know and I can do so for you. If you would like to test the sign in username and password process, you can easily do so with username: “William”, password: “admin1” and or username: “Breunna”, password: “admin2”. Once you do so, you will see the different display messages that were stored inside an array for each specific user that was granted access. As for checking out the html line graph that uses the JSON data entries, you can open the html file that will be provided but open it as Microsoft Edge. I am not sure why but Google Chrome and or Firefox do not open the graph, but Edge will display the graph. Other than that, I am very proud of this artifact and find this to be a great piece of work to show to future employers. Thanks!