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Assignment: ECE 4564 Assignment 1 - “Otexta”

Section 1:

Before starting the actual project, our design approach was to get everything up and running about 5 days before the deadline. We saw the issues some groups had and decided to get the Raspberry Pi operational for our project early. This included the imaging, setting up the PI for the network, and installing the required packages.

For the actual project we chose to start with the GPIO code in order to gain experience with python. We then moved on to the sockets, pickling, and lastly the cryptography. Our design method was really effective in that we tackled each task with increasing difficulty and we could see our progress. Our main design approach in the beginning was to separate all major functionalities into separate files. However, this became harder to implement certain functions, so we decided this wasn’t the best approach for this project. We also found out that the major functionalities didn’t need their own files. They were just a few lines of code. The only exception to this was the GPIO code. We decided to keep this code in a separate file because it was already written that way and we were able to easily integrate it into the main.

Section 2:

Sushant worked on the GPIO and Wolfram API. He had trouble at first finding the right board for the setup function. He didn’t know they had two options, the GPIO pin version and the Broadcom version that goes into the setup function. Nothing worked until he switched from .BOARD to .BCM. He also had some trouble unpickling/decrypting the answer payload from the server. It didn’t need to be unpickled after it was decrypted but needed to be pickled when encrypted.

Tom worked on the Socket Setup and Communication. He was able to properly set up the sockets so the client and the server can establish connection to send the encrypted messages.

Ben worked on Socket Communication and Integration. He was able to test the servers ability of receiving a package from the client and then returning useful data back. He verified the checksum and was able to decrypt the package so that wolfram alpha could be asked a valid question.

Jacob worked on the Cryptography and Pickling. He went through the processes of encryption and decryption for the different payloads. He also had to figure out the pickling process to send to the server.

Section 3:

All-in-all we found this project to be a huge success. One problem we ran into was getting automatic connection to eduroam off of a reboot. This presented a big problem because we would need a monitor and keyboard every time we used the PI. Luckily for us, we found clues on how to do this online and were able to successfully create an eduroam.conf in the wpa directory. Considering it was the first time a few of us have ever worked with a Raspberry Pi, this project was a phenomenal learning experience. We all learned how to properly interact with the Raspbian environment to ensure the most convenient and efficient work environment. This included learning how to ssh and control the Pi remotely from our laptop. Along with this, we learned how to use the wolfram API/setup key and other important cryptography principle like symmetric key and checksum. We also learned more about how to serialize data through pickling. Each team member was an essential part to this team and successfully completing the project.