# Team Member Names:

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Overview:

This project utilizes the MQTT protocol to send a mp3 file from one client to another. Afterwards, the other client will use MQTT to receive the mp3 file and then utilizes fast fourier transform processing technique to process the file and print the text. This system is trying to achieve cryptography through audio files.

Design Diagram:
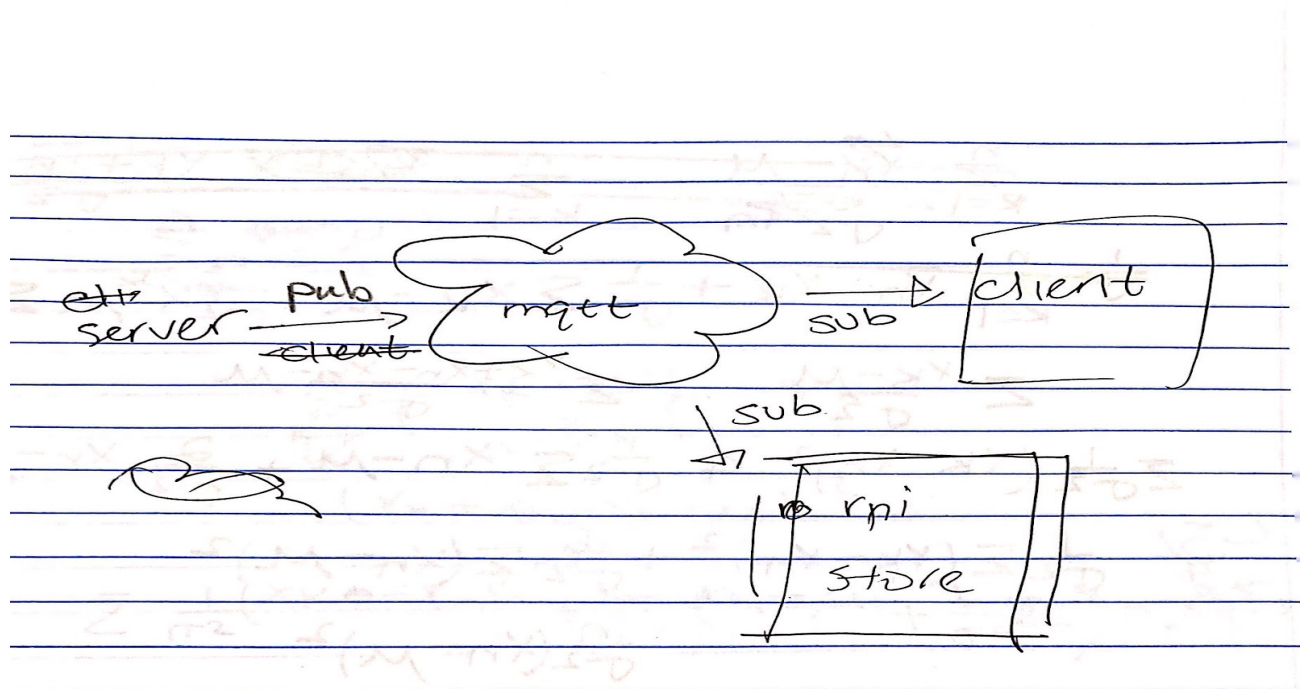
- ## Components
    - Raspberry Pi
        - The raspberry pi serves as a data collector by storing the audio files.
    - Laptop
        - The laptop serves as a client. The user can use multiple windows to create multiple clients.

- Protocols
  - MQTT
    - This protocol allows clients to publish and subscribe mp3 files in this IoT system.
- Signal Processing Techniques
  - Fast Fourier Transform
    - This technique combined with dual-tone multi-frequency is used to analyze and decode the mp3 file.

Reflection

The table used to interpret the mp3 file has to be kept confidential. One of the limitations of this project is that this IoT system isn't the most secure. If a malicious user hacked into this system and found the table, then they could interpret the message in the mp3 file.

Another limitation of this system is that it only encodes with lowercase letters. If the user were to enter an input containing capital letters, then the program would first convert the input to lowercase to avoid errors.

Another thing we learned is that the length of the audio file affects the amount of time it takes to process it. If we were to publish a larger mp3 file, it would take longer to process it.