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CSC-332
Project 1
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Morse Code Transmitter/Receiver

I. The Problem

Morse code was invented as a mode of communication through the usage of dots and dashes to represent character and numbers, along with several other actions. This was used more in the past in regards to sending encrypted messages without any large motions/sound, such as a tiny beep on a phone line, or a light in the distance that would be listened to/seen and then decrypted. Now in modern times, morse code is not used as often as in the past, but it is still an important skill to understand, even in special circumstances such as transmitting S.O.S (... --- ...) when stranded. The purpose of this project was to understand how to convert text into morse code on one end and then be able to receive this on another end and convert the sequence of dots/dashes back into english text. Additionally, this project allowed for the understanding of a useful skill/technique used in past history as an early method of communication.

II. The Design

With the use of 2 Arduino Uno boards, we have a transmitter and receiver end connected to the computers that shall be communicating. The transmitter end consists of 3 Red LEDs along with a Piezo Buzzer that when connected to the computer, would flash/buzz the sequence of morse code from the converted message that was entered into the serial monitor. On the other end, there is a Photoresistor with a cone attached to its end facing the 3 LED's of the transmitter end such as to only focus on the light coming from the LEDs. When the flash sequence begins, the receiver times the duration of each flash and then determines if it is a dot/dash. Once a sequence of dots/dashes is created, it is then converted back into english that will show up on the computer screen connected to the receiver end.

III. Performance

When running the test between the two ends, the transmitter end worked well, successfully converting the inputted text and being able to flash the correct light sequence and buzz in unison, delivering a clear message. As for the receiver end, it had some difficulties with the synchronization of communications between itself and the transmitter. When plotting the values of the photoresistor live - in conjunction with the flashes of light from the transmitter - we see that the receiver accurately distinguishes between dots and dashed, the only difficulty is having the system recognize when the pattern ends and then convert the pattern of dots/dashes to a letter. Other than that, the performance of the devices is great, because even if the receiver end

cannot fully decrypt the message in between the flashes of light from the LED, it still can be interpreted live while hearing the buzz, or watching the lights flash.

IV. Result/Future

Although the concept of having a transmitter and receiver that could communicate with each other through morse code, it is very tedious in having both synchronize and accurately obtain a message. As discussed previously in the Performance section, the transmitter works perfectly, but the receiver still has some kinks to work out before it can accurately translate a morse code message back into english. In terms of how to improve this project, there are several changes we can make to more better accurately send and receive a message. To begin, rather than just using a light and photoresistor to transmit and receive a message, using the sound created by the Piezo Buzzer and a microphone could be useful as well. Additionally, upgrading the sensors used in this device would be useful given that not every location has an equal ambient light level than the area in which this project was created. Therefore with a better photoresistor that can ignore the additional light and only focus on off and on phases of the LED, then we could eliminate the “fuzz” that disrupts the transmission. Finally, the ability to combine the two ends into one device that could be portable would be interesting, with the process of using a button to create a morse code sequence that could be transmitted, or following a transmitted sequence by pressing the button in the same pattern and having the text appear on an LCD screen. Given this implementation, the user would know how to translate text into morse code and the library would have to be expanded with special characters (. , “ , ‘ , ! , @ , etc.) and numbers if they were to be transmitted. Overall, this project was fun and interesting to work on, and in the process, you are learning an old language that was very useful in the past, and still could be in the future.