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Voice Control Lights Blinking Cycle

Abstract of your project.

We want to display leds in different styling with mainly using voice control and to also have a button to perform this task manually. This will then inform the user of the current styles being displayed and will suggest other alternative styles. The main goal for this project is to have it perform using our voices as effectively as possible.

Overall Description of Project Idea

We have a Bluetooth connection with a phone which enables voice recognition, then through voice recognition, we can command different functionality of LEDs so that they display various blinking methods. We also have a button to control the blinking, and a LCD to display the current functionality being used, and suggestions for the next.

Detailed Project Ideas:

We have one arduino that we want to connect to the phone through a bluetooth connection. However, I think it has to be a Android phone, since I can't download the required app to connect to bluetooth for an iphone. We have done research on how to connect through bluetooth between your phone and the arduino, and all the possible designs required us to download an app, and they are all android phones. I don't know what apps are available, but our intention is to get an app that only handles the bluetooth connection, and maybe voice recognition, so that all the functionality can be coded from our side.

Once we connect the phone and the arduino with a bluetooth communication, we can then program the arduino to take in voice speak to the phone. To handle the voice, we need to consider the voice as a string, so when we get the voice input, I think we can call some function to receive the voice signal from the phone, and then handle those voice to translate them into strings, so that we can process the string and use that as an input to the appropriate function to signal the LEDs the blink in certain cycle states. However, I think we have to filter out unnecessary strings as well since the voice can pick background noises, and other words or sentences that we don't want.

Based on the string we receive, we can then make them as input to different functions. We have 2 functions. One function functionality is displaying the led similar to a wave, and the other function is to

display multiple leds similar to blinking randomly not restricted to any patterns. Next, we have an LCD, that prints out the functionality of the current blinking function, such as if it's a wave blinks, then LCD will display blinking in wave, then the next line will have the suggestive function in the list, if the name of function too long, then we will have it scrolling.

Finally we have a button, we can use this button to select through the blinking process, the button can only cycle all the blinking functions, if someone were to hold the button down, it will cause the led to blink continuously differently. I suggest to not use delay() function but rather a loop that records the millis().

Design stating Expected Inputs/Outputs :

Our expected device will transmit our voices through the android phone app and send our voice frequency into the bluetooth adapter that is connected to our breadboard. As mentioned before our voices will be transmitted as a string that will be converted into bits. Once they are in bits, the bits will determine how brightly each led light will light up and depending on the amount of bits, will determine whether all four different colors of led lights will display. The led lights that display will continue lighting up in a cycle. At the same time, the lcd screen will display how high our voices are. Also, we are going to be using a switch to determine which led light will receive power. This will help in determining how high our voices are.

Here is an example on how our voices will be inputted into the app, and how our voice will be output. Assume one of our group members' voices was high, when speaking into the app on the android device. His voice will transfer into the bluetooth adapter, that will input a string,used in determining the amount of bits once converted into bits. The bits are used to determine whether his voice frequency is high enough for the switch to turn on all the led lights in a cycle forming a disco light display. At the same time the voice frequency will be used to display a wave frequency that will provide evidence on how high his voice was.

Expected Plan for Communication:

To communicate effectively, our team members decided to use discord and texting. Texting will be the main focus when attention is needed, and discord is where we can meet and chat about the project. This is where the weekly meetings will occur.

Expected plan for communication is that the arduino will be connected to a bluetooth enabler which catches bluetooth signals from a phone. The main communication here is between the phone and the arduino.

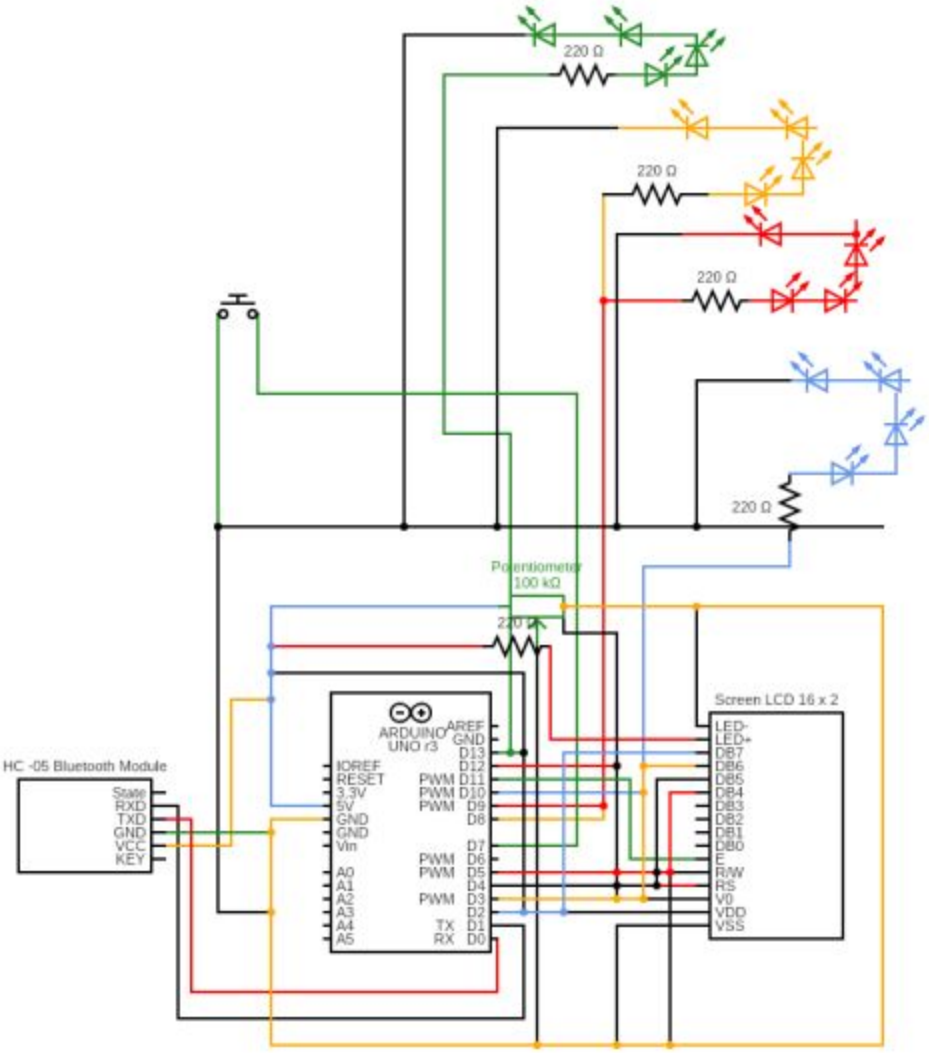
Description of the original work being attempted by our project:

Our projects involve original work such as we have functions to display multiple leds blinking. However the leds don't blink in a default way such as blink then off, but more so that they have a variety of functionality, such as the leds demonstrate breathing cycle, wave cycle, disco cycle or random cycle. There are two ways this functionality will be performed, one is using our voice where it'll take our voice and translate into a string which then will be used to input into different functions to perform different functionality. The other is a button which will do things manually in case there is some kind of problem

with the voice control. The button in this case is used as a backup and our main focus will be making the voice control as effective as possible.

We also will display the name of these functionalities to the LCD screen on the top row, and the second row can be displayed to suggest the functionalities. We have also searched the internet looking for the exact project and guarantee that our project is original.

Project Hardware diagram:



Code Sketches:

declared variable for lcd, leds, and buttons,
Setup function for leds, and lcd.
//led functionality
BlinkCycle() // First function of leds similar to lab1
WaveCycle()// 2 Function of leds
DiscoCycle() // 3 functionality of led
RadomCycle() // 4 functionality of led

LCDText() // Display Text for Function we having and Next Function as Suggestion
ReceivingVocieFromPhone() // will receive our voice from phone
HandleString() // to handle the string received from voice command and will convert our voice to string
loop() // will loop

List of Materials Expected to be Needed:

1. One Arduino Uno R3.
2. 16 LED lights 4 different colors.
3. Hook up wires.
4. An LCD display
5. 3 or more breadboards
6. 2 or more switches
7. 2 or more 10 k resistors, used for the switches.
8. 4 or more 220 resistors, used for the led lights and lcd.
9. Bluetooth adaptor
10. 10k ohm potentiometer
11. The app “BT Voice Control for Arduino”
12. An Android device

Timeline:
Note: Each part of the code will be complete separately, depending on the date provided.

- Part 1 of the project and code connect and test the lcd properly Due on Sunday 10/25/2020

- Part 2 of the project and code is to connect the bluetooth adaptor on a second breadboard and make sure our voices work, using the app the frequency on our android devices and make sure the LCD screen is able to read our voice frequency.Due on Sunday 11/15/2020.

- Design Presentation on Monday 11/23/2020

- Part 3 of the project and code connect the LED lights to the third breadboard and connect the switch button properly. Test to see if the switch works correctly. Due Sunday 11/29/2020.

- Final Report and Final Design Document Friday 12/04/2020

- Team Work Assessment - done individually, critique of group performance, submitted via web form before Monday of week 16, 12/07/2020 at 11:59pm.

References:

1. Arduino.cc. 2019. *Arduino - Softwareserial*. [online] Available at: <https://www.arduino.cc/en/Reference/SoftwareSerial> [Accessed 5 October 2020].

2. Arduino.cc. 2018. *Button*. [online] Available at: <https://www.arduino.cc/en/Tutorial/BuiltInExamples/But ton> [Accessed 5 October 2020].

3. Arduino.cc. 2018. *Scrolldisplayleft() And Scrolldisplayright() Methods*. [online] Available at: <https://www.arduino.cc/en/Tutorial/LibraryExamples/LiquidCrystalScroll> [Accessed 5 October 2020].

4. .Arduino Project Hub. 2020. *Arduino Frequency Counter With 16×2 LCD Display*. [online] Available at: <https://create.arduino.cc/projecthub/jasirtp/arduino-frequency-counter-with-16x2-lcd-display-c99779?ref=similar&ref_id=61668&offset=5> [Accessed 5 October 2020].

5. Ladyada.net. 2020. *Arduino Tutorial - Lesson 5*. [online] Available at: <http://www.ladyada.net/learn/arduino/lesson5.html> [Accessed 5 October 2020].

6. Sabaa, Y., 2015. *Bluetooth Control Led With Lcd Led Status Display Real Time.*. [online] Arduino Project Hub. Available at: <https://create.arduino.cc/projecthub/YoussefSabaa/bluetooth-control-led-with-lcd-led-status-display-real-time-58f9ca?ref=similar&ref_id=57135&offset=5> [Accessed 5 October 2020].