UNIVERSITY OF
ILLINOIS
URBANA-CHAMPAIGN

# Anti Procrastination Device

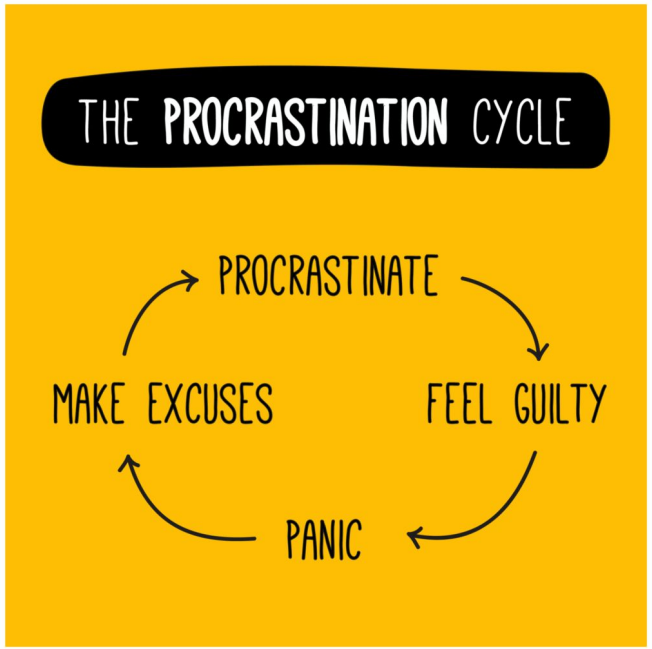
Group 19
Kyle Chiu, Brandon Wong, and Taylor Plummer

Spring 2022

# Objective - Problem

- Procrastination is a habit of life that is plaguing our society

- Productivity and throughput and even quality of life is hindered by procrastination



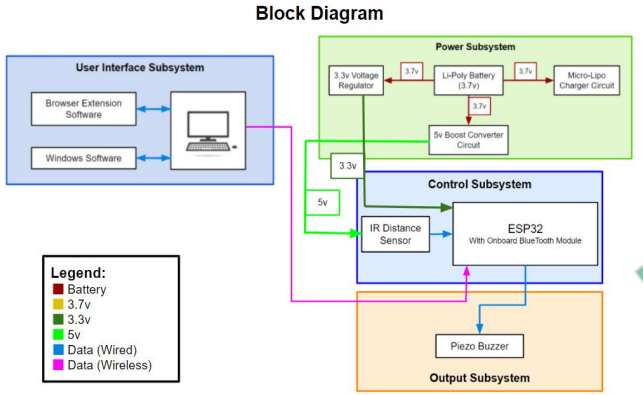
# The World Without Procrastination

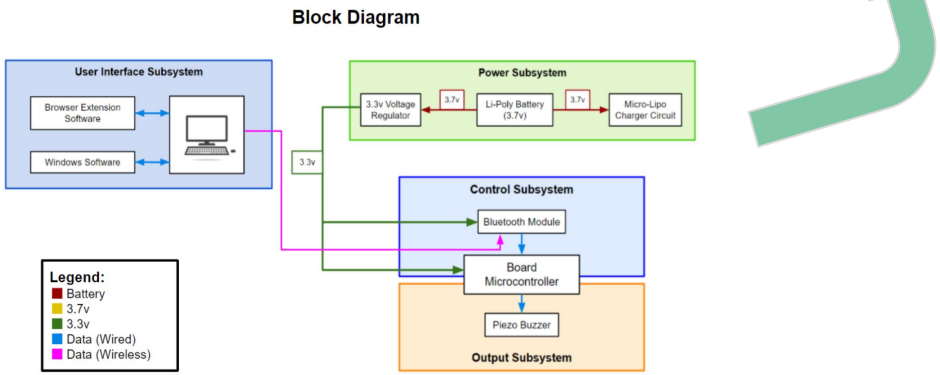
# The World With Procrastination

# Introduction - What is the solution?

- Designed to discourage procrastination while working online.
- Connects to either a PC or laptop via bluetooth
- Emits an annoying buzz when on specific websites/applications or away from the computer

# Evolution of the Design




# Final Design

Main Changes From Previous Versions:

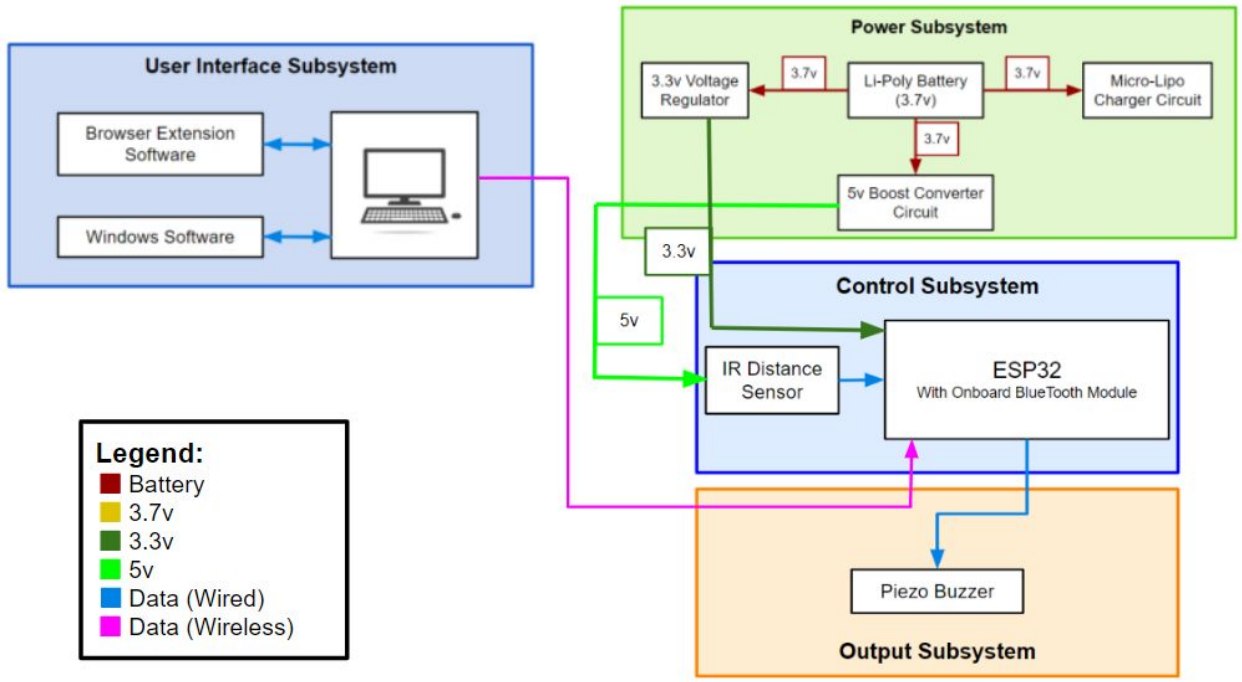
- No longer a shocking watch, instead annoys user with an annoying sound
- Replaced ATtiny microcontroller and BlueTooth module with ESP32
- Added IR sensor and 5v boost converter circuit

# Final Design

Subsystem Overview:

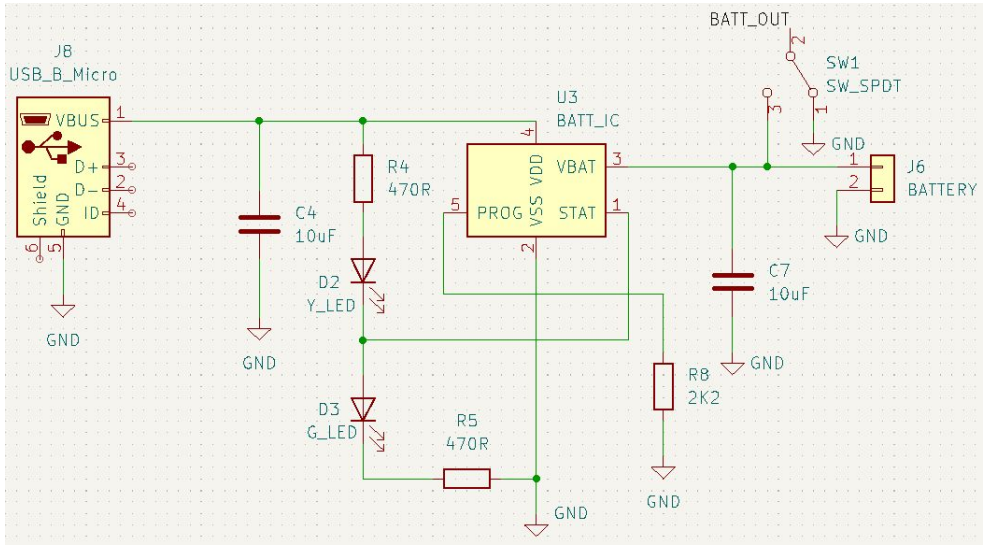
- Power Subsystem
  - 3.3v Voltage Regulator
  - LiPo Charging Circuit - MCP73831 IC
  - 5v Boost Converter Circuit - UM3429S IC
- Control Subsystem
  - ESP32 and BlueTooth
  - IR Sensor
- Output Subsystem
  - Piezo Buzzer
- User Interface Subsystem
  - Chrome Extension Software
  - Main Desktop Application
  - Frontend Software

**Block Diagram**

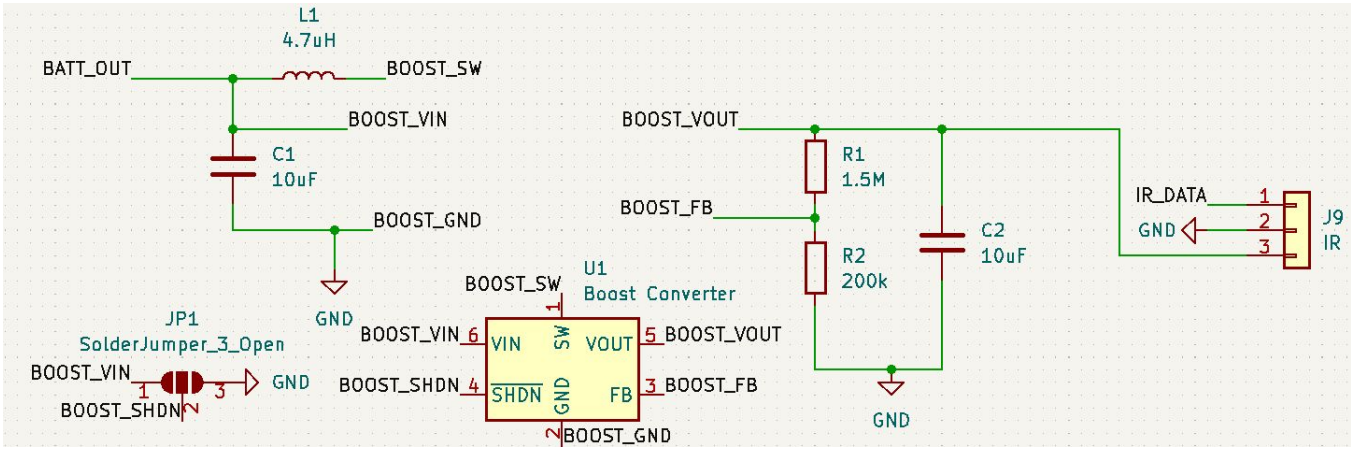


# Design - Power Subsystem

## Charging Circuit



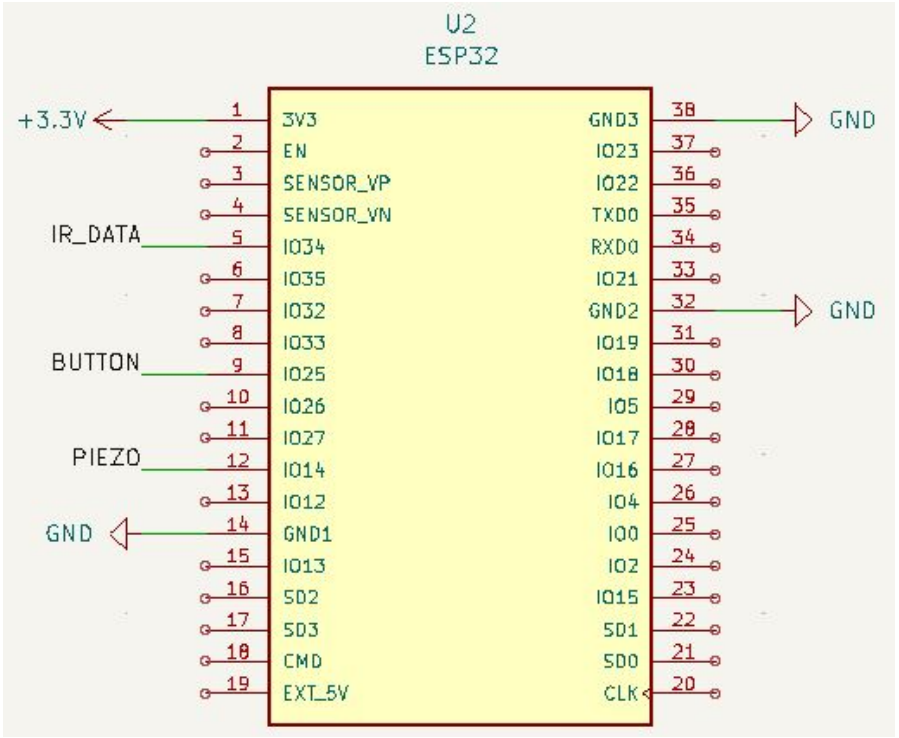

## 5v Boost Converter Circuit



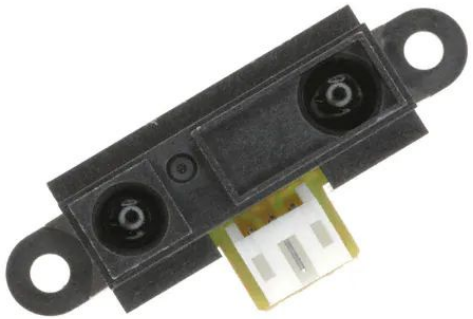

## 3.3v Regulator

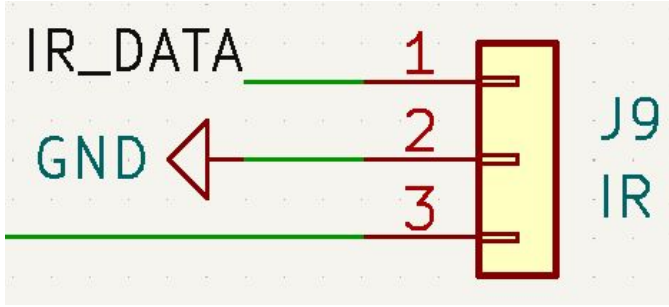
# Design - Control Subsystem

## ESP32



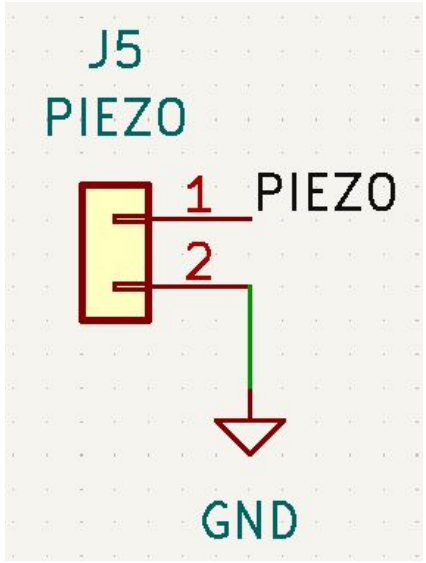

## IR Sensor



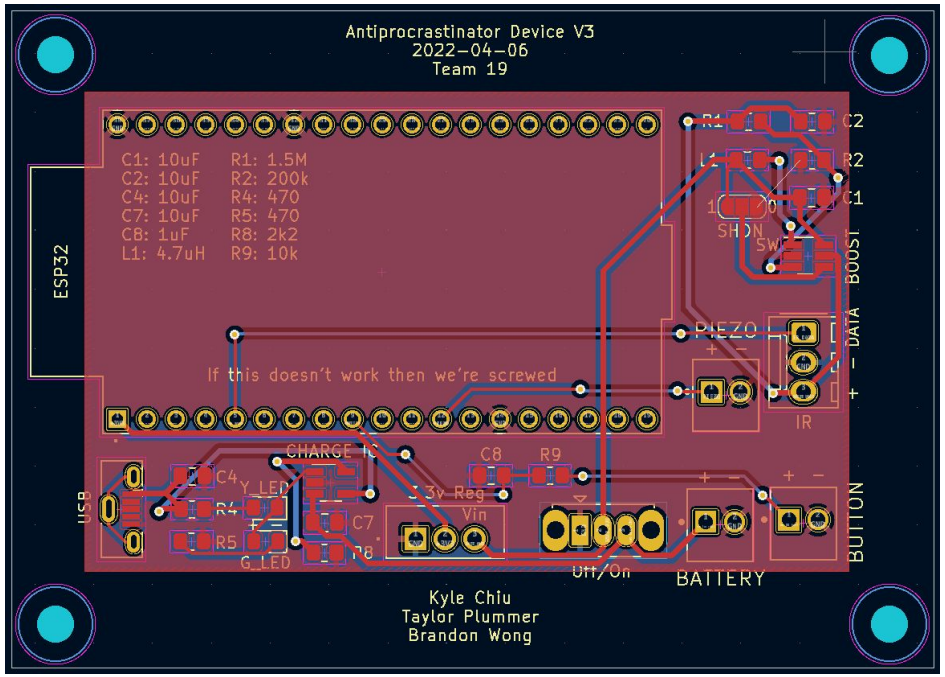


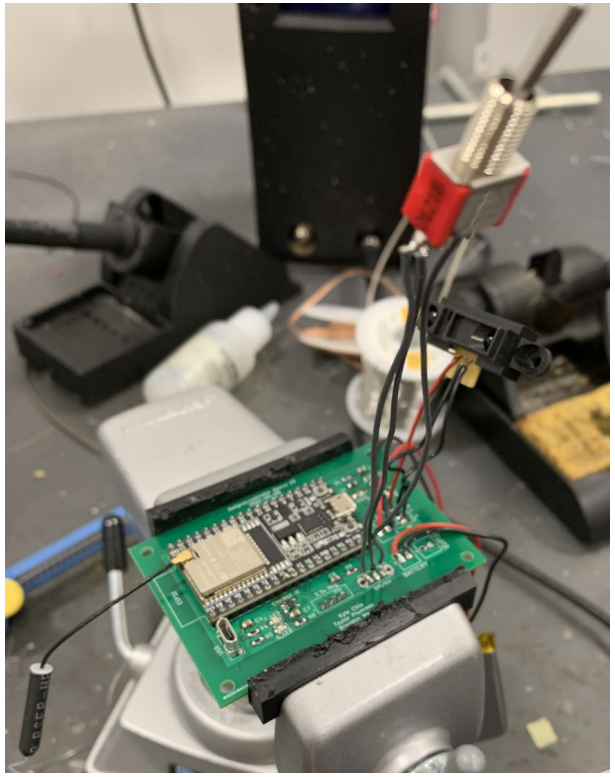
# Design - Output Subsystem

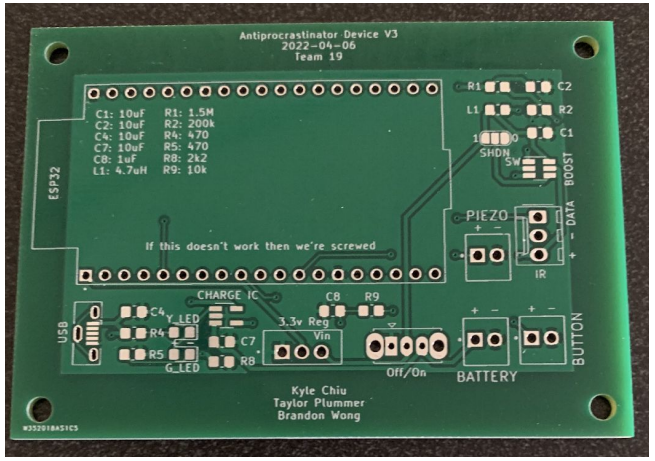
## Piezo Buzzer

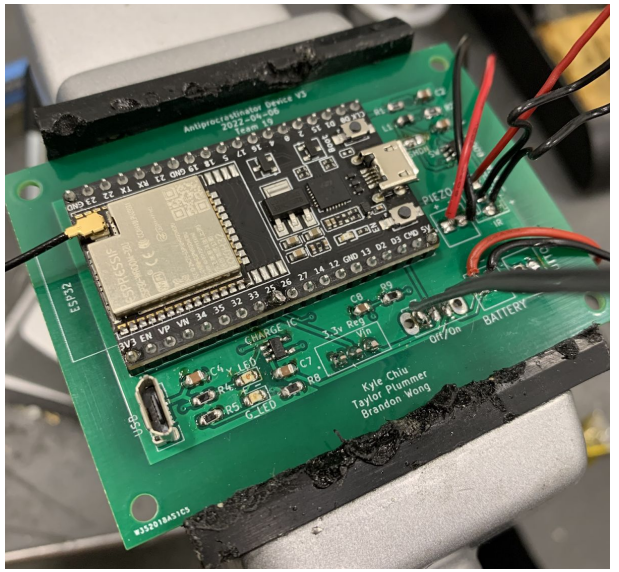



# PCB Design


Antiprocrastinator Device V3
2022-04-06
Team 19
C1: 10uF R1: 1.5M
C2: 10uF R2: 200k
C4: 10uF R4: 470
C7: 10uF R5: 470
C8: 1uF R8: 2k2
L1: 4.7uH R9: 10k
ESP32
If this doesn't work then we're screwed
CHARGE IC
C8
R9
C4
Y_LED
3.3v Reg
Vin
C7
R4
R5
R8
G_LED
USB
SHDN
SW
BOOST
PIEZO
DATA
IR
BUTTON
Off/On
BATTERY
Kyle Chiu
Taylor Plummer
Brandon Wong




Antiprocrastinator Device V3
2022-04-06
Team 19
If this doesn't work then we're screwed
Kyle Chiu
Taylor Plummer
Brandon Wong



# Hardware Challenges

- PCB Issues
  - Incorrect Footprints
  - PCB Ordering

- Connection Header Compatibility Issues

- IR Sensor Pins

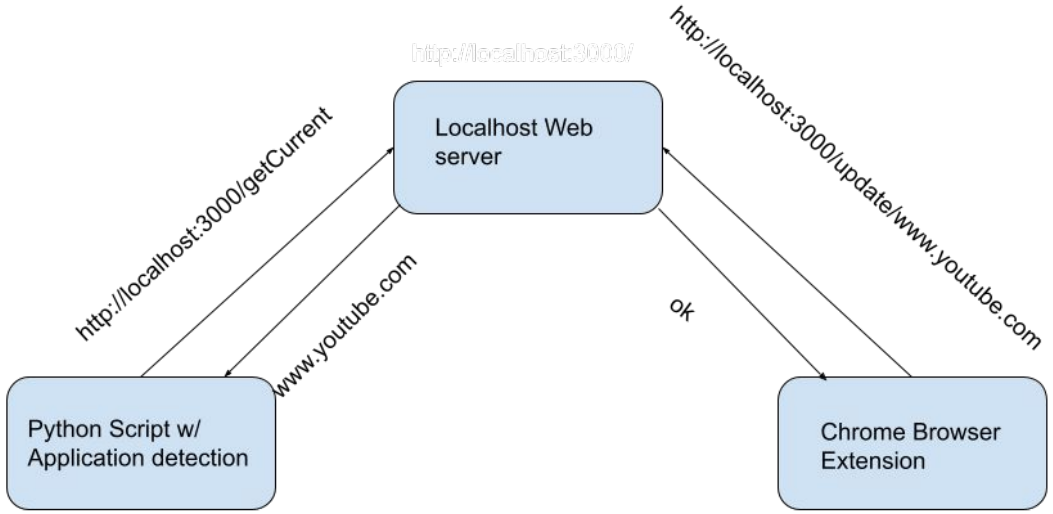
# Design - User Interface Subsystem (Software)

Main Components:

- Website and Application Detection
- Communication Between ESP32 and Python Script
- ESP32 Arduino Code
- GUI For Blacklist/Whitelist Modification

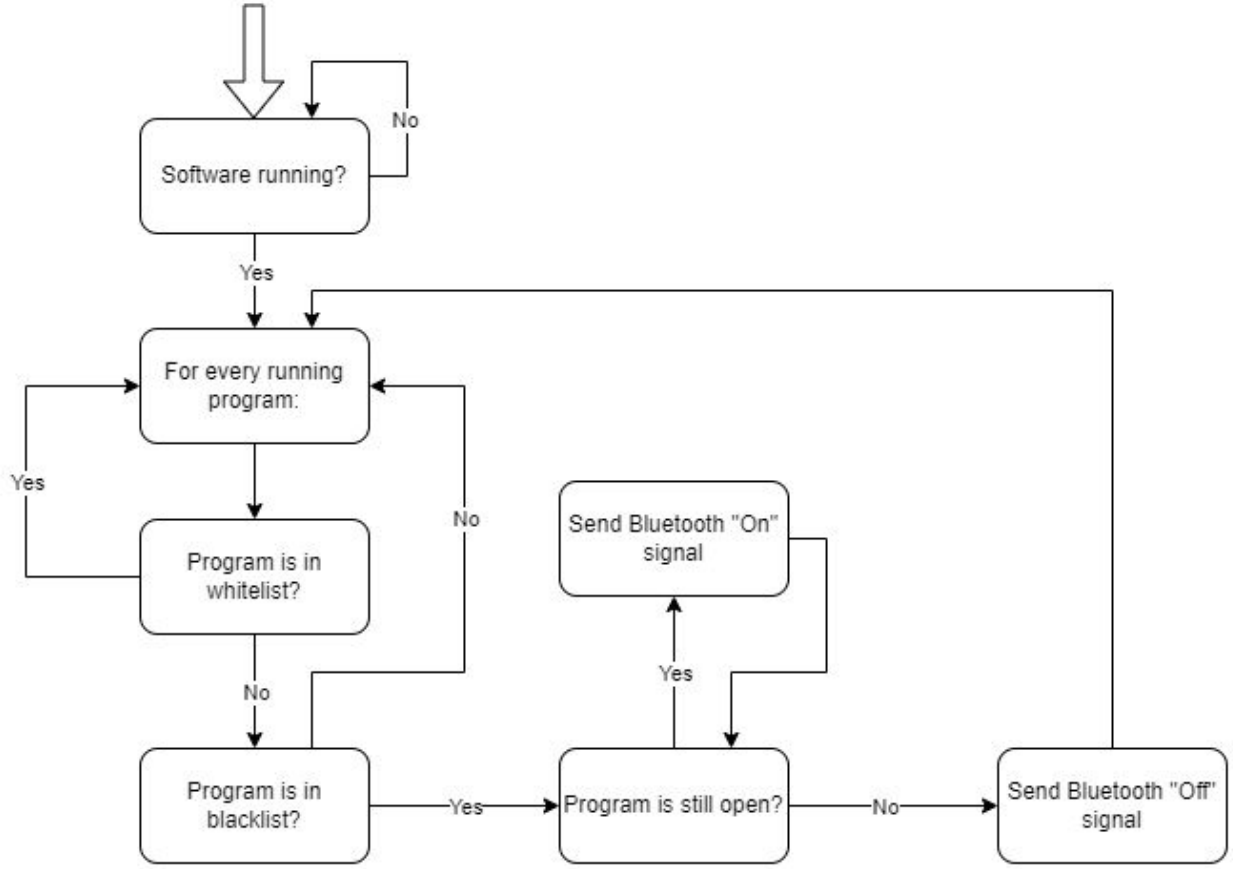
# Current Tab and Application Detection

- Chrome extension detects tab that is currently in focus
- Localhost server keeps track of the current focused website, needs to be updated by the chrome extension, and can be queried by the python script
- Python script has lists of blacklisted and whitelisted websites and apps. Gathers a list of all open applications and queries server for current url every 2 seconds and looks for matches in blacklist.

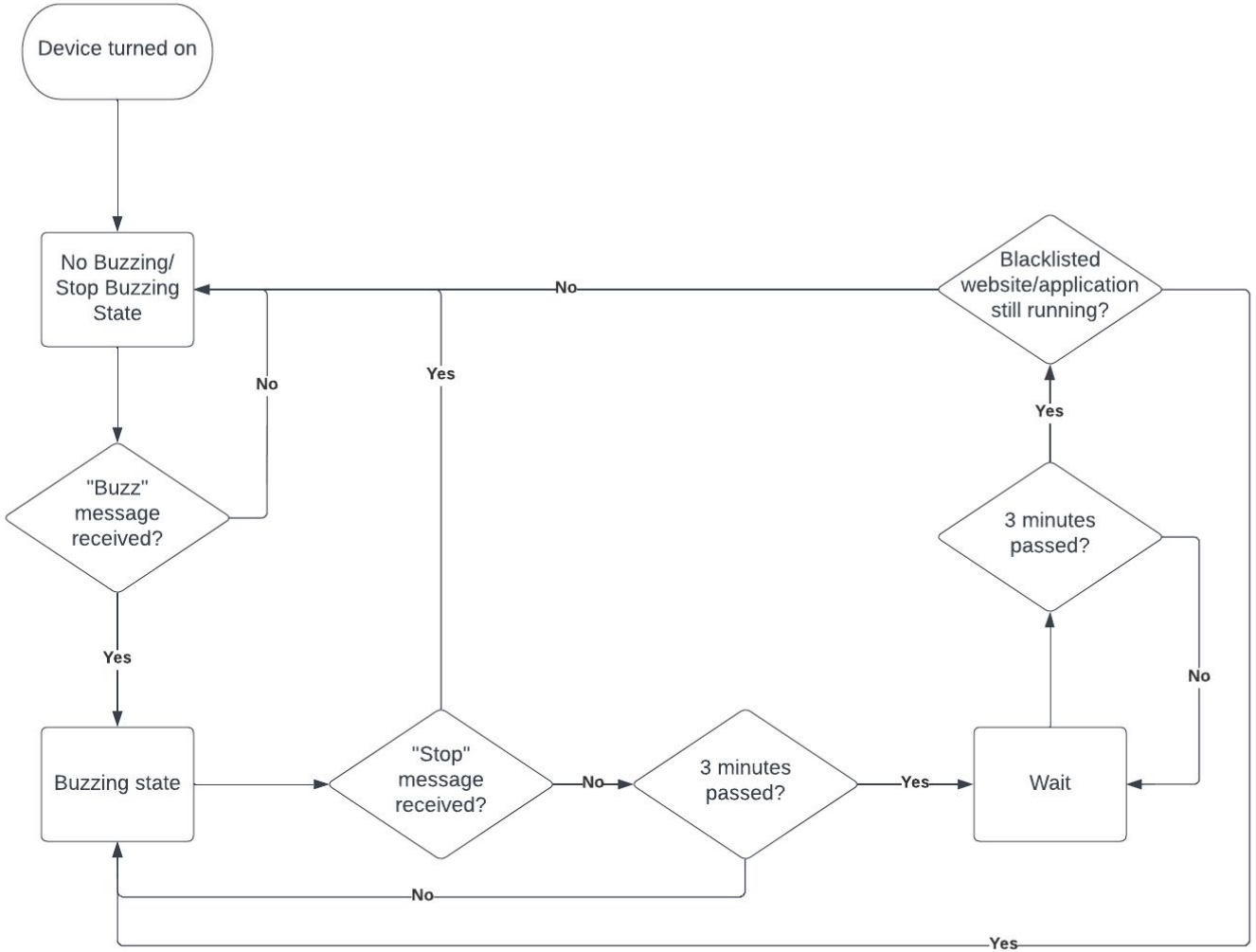


# Communication Between ESP32 and Python Script

- If the Python script detects a blacklisted website/application, it will send a message to the ESP32 to start buzzing
- If the Python script does not detect blacklisted websites/applications it will send a message to the ESP32 to stop buzzing
- ESP32 sends messages back to the Python script terminal based on its status

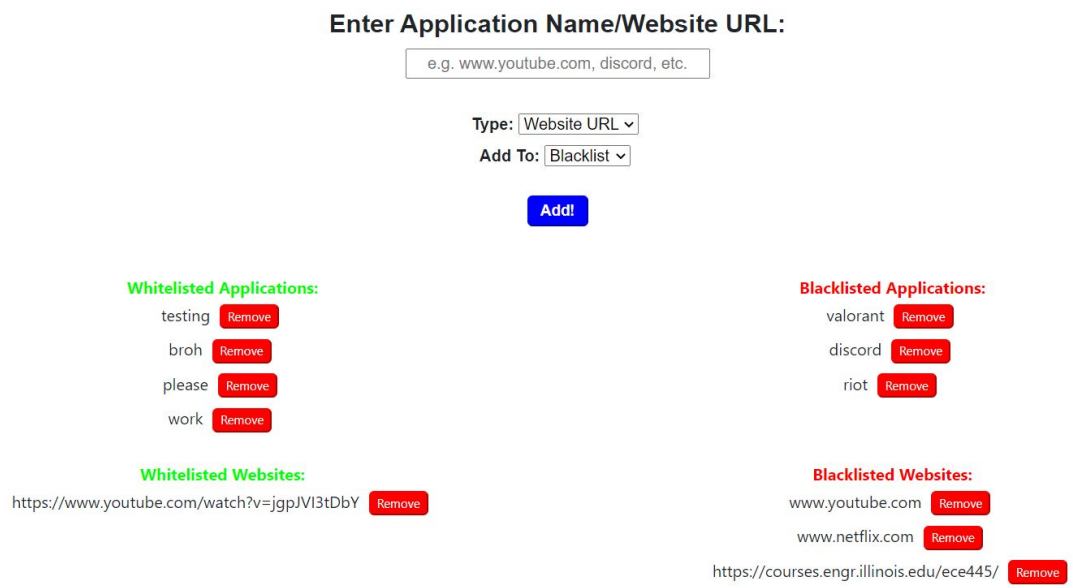


# ESP32 Flowchart

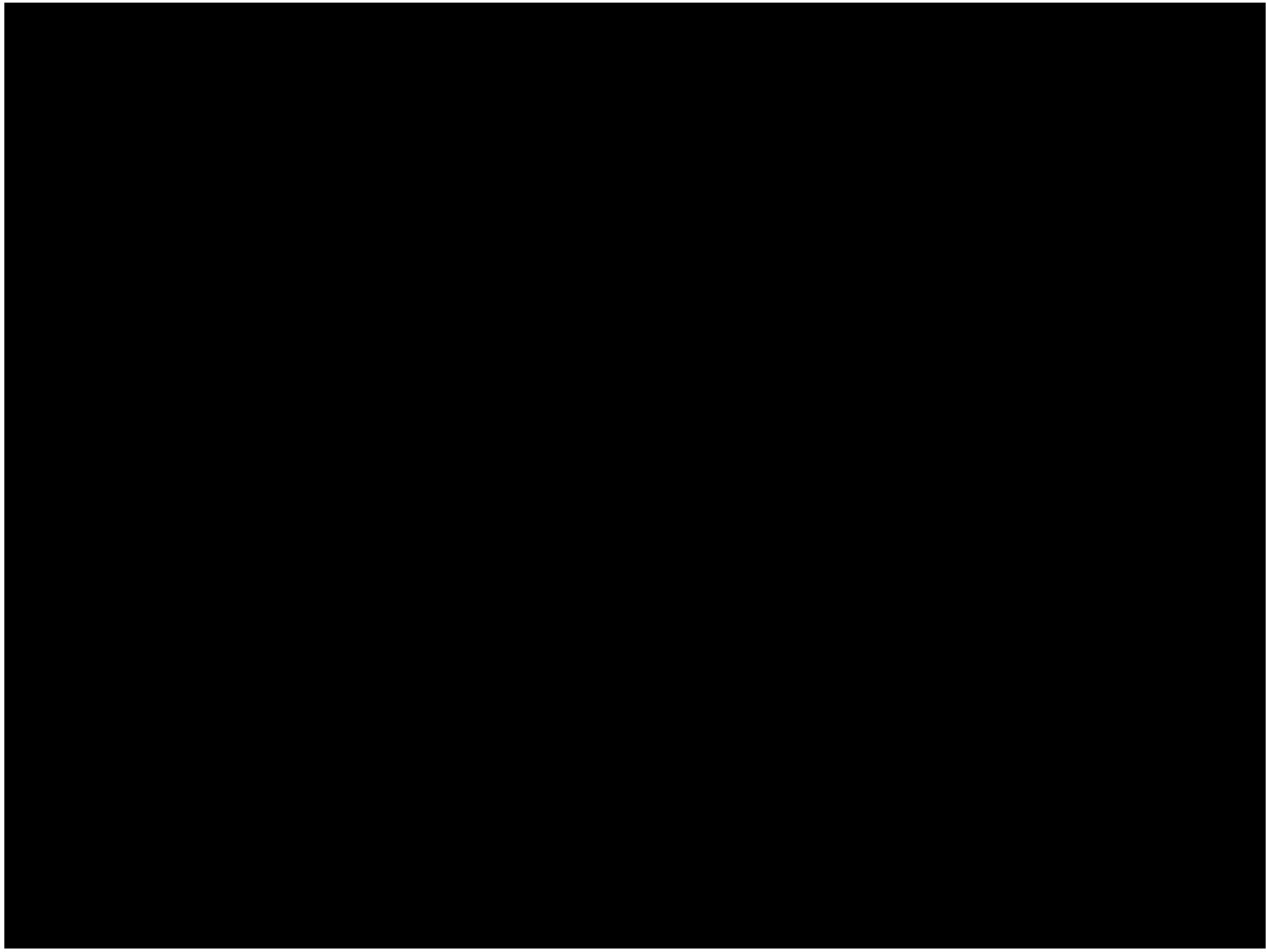


# GUI For Blacklist/Whitelist Modification

- Allows for visualized addition and deletion of applications/websites to a whitelist/blacklist
- GUI created with React framework
- Data stored in JSON file and modified via local Express backend server
- Changes in JSON updates to our software in real-time



# Demonstration



# Conclusion

- Overall we are happy with how our project turned out. It works well in the areas that we hoped, detection of distracting apps or websites and keeping the user at their desk. We were disappointed that our snooze button was unable to be integrated and we believe that it was due to setting a pin to digital high on the ESP was not the same as the soldering assignment which we based out button on.

- One important thing that we learned was to get hardware working as soon as possible, because software does not have shipping delays like hardware!

- If we were to redesign the project we would do more testing with the ESP and button to make sure we have a way to register button presses.

- Further work that can be done to improve the device would be to allow the user to set parameters for the IR detection to allow for different postures and placements of the device.

# Thank You

# Any Questions?

# The Grainger College of Engineering

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN