

# ECE 196 - FALL 2017

## Project Introduction



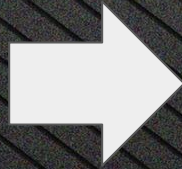
**UC San Diego**

Electrical and Computer Engineering  
**JACOBS SCHOOL OF ENGINEERING**

Team #6: Voice Controlled Hardware



**OUR PROJECT IDEA IS:  
VOICE → HARDWARE CONTROL**





# Learning Objectives



BitVoicer Server



- Arduino - C/Pi - Python
- Coding logic associated with voice commands
- Hardware + software integration
- Github/Slack Documentation
- Voice Libraries (Google API, BitVoicer Server)



## Project Cost and Budget

Material	Link	Amount	Cost	Total
Arduino MEGA 2560	<a href="#"><u>Arduino</u></a>	1	\$15.99	\$15.99
Jumper Wires	<a href="#"><u>Jumper Wires</u></a>	1	\$6.98	\$6.98
Breadboard	<a href="#"><u>Breadboards</u></a>	1	\$11.99	\$11.99
Sound Sensor Module/Sensor	<a href="#"><u>Adafruit Microphone</u></a>	1	\$7.99	\$7.99
Voice Recognition Libraries	<a href="#"><u>Voice Library</u></a>	1	\$0.00	\$0.00
Raspberry Pi	<a href="#"><u>Raspberry Pi</u></a>	1	\$34.88	\$34.88
Level Shifter	<a href="#"><u>Level Shifter</u></a>	2	\$8.00	\$16.00
Protoboard Pack	<a href="#"><u>Protoboard</u></a>	1	\$7.00	\$7.00
<b>GRAND TOTAL COST = \$100.83</b>				



# Build Steps

The main functionality

- Record speech from microphone input in order for the speech file to be sent to the speech recognition server
- Request Client/Server connection with the server & check for response
- Process the data received
- Arduino / Pi output pins are controlled based on command given
- Hardware input & response



# BitVoicer Server



Speech Recognition  
Server



Connects to an input  
device (Microphone)



Identifies Input  
Device and assigns  
SRE (Speech  
Recognition Engine)



Constantly analyze  
audio streams for any  
predefined sentences.

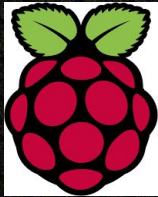


If predefined sentence  
or command is  
recognized => Takes  
pre-defined action given  
by user

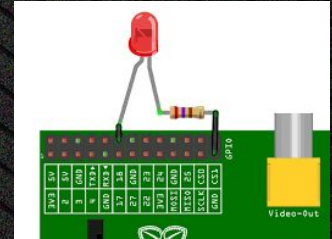
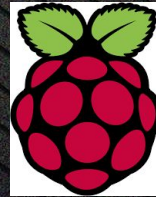


# Google API

- Alternate route of using wifi to connect to the Google Server (Pi) and have it return text
- Then the raspberry pi will run logic to process and return a GPIO output



Google





## Week 6 (11/8 - 11/12)

- Set up bit logic controls on the Heart Circuit and the Binary Clock.
- Part 1: Bit Voice
  - @ Arduino code pushed
- Part 2: Google API
  - @ preliminary voice logic (if == key word + bit logic )
  - @ Google API Key code
  - @ GPIO code

@ = Github



# Week 7 (11/12 - 11/18)

## Part 1: Finished

- Receives commands ( Heart on/off, Clock on/off)
- Check with hardware team
- Check any possible software expansion/limitations
- Test level shifter functionality, build LED matrix, and start developing LED matrix bit logic controls

## Part 2:

- Integrate API code
- Optimize text file input and logic
- @ GPIO output
- @ Code trigger events

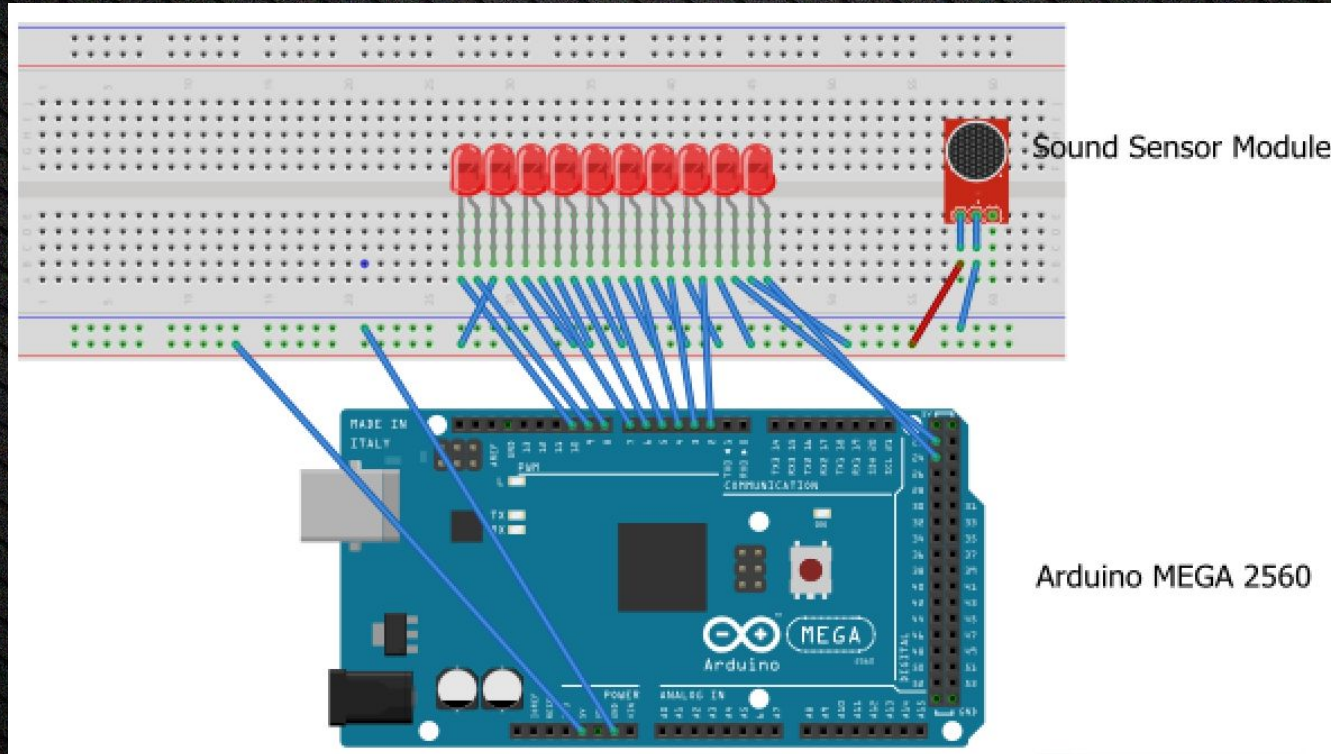


## Week 8 and 9 (11/19 - 12/3)

- Push boundaries of Arduino with extended software (button trigger, voice trigger, dictionary)
- Test Raspberry Pi integration with software, and debug/check extensions
- Elaborate previous code with larger inputs and clearer descriptions
- Encasement for presentability, build all of the connection circuits on protoboards. Make sure all of the bit logic controls match up with the proper outputs from the voice commands.
- In Github
  - GPIO code
  - API code
  - Several types of logic code
  - Mic input receive code PI/Arduino
  - Documentation

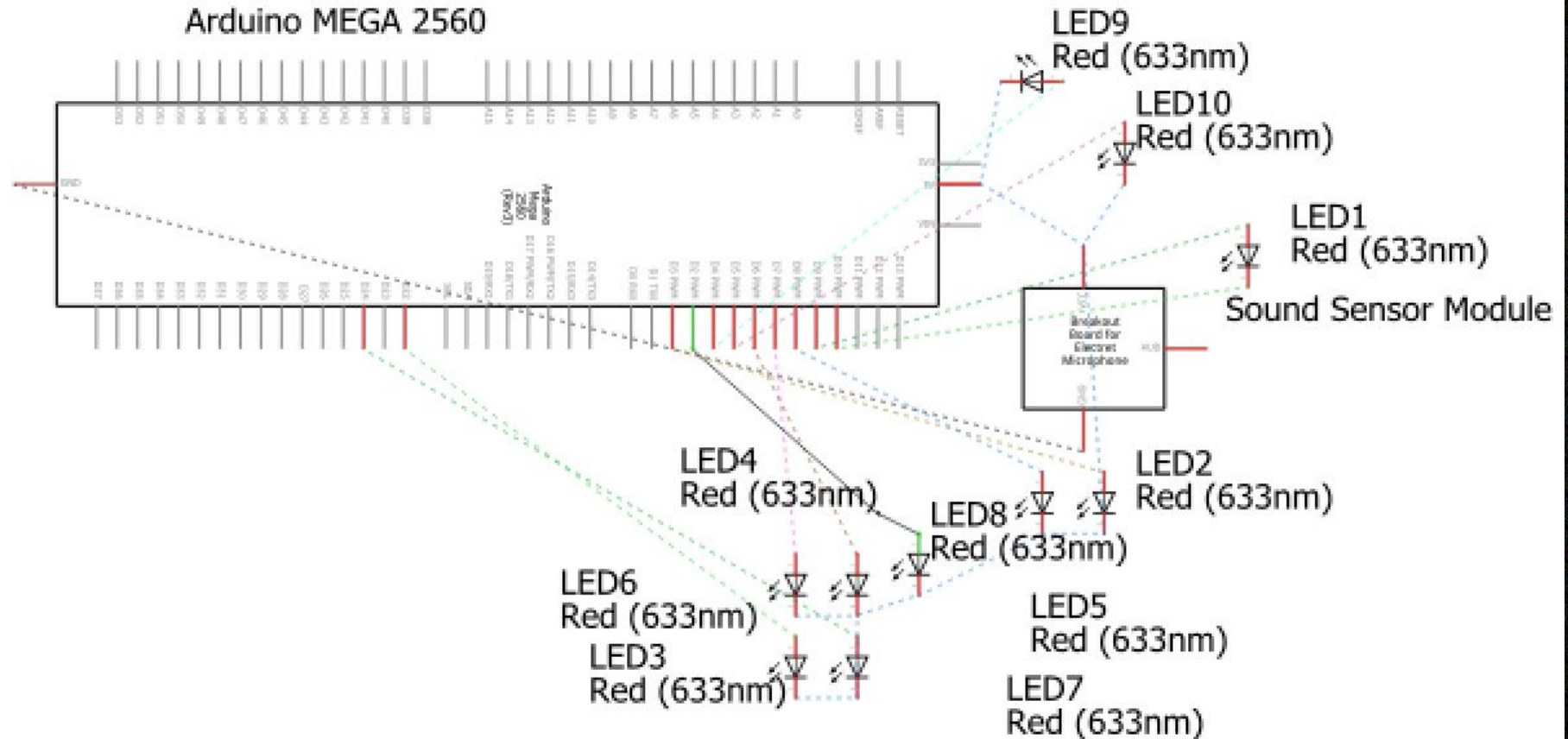


Basic, first prototype: Simple Switch ON/OFF LED circuit with sound sensor/microphone module to detect sound. The sound input received with the appropriate voice-recognition libraries control LED lights.





# Schematic





# Team Member Responsibilities

Build hardware connectivity and hardware coding integration

- Samuel
- Mike

Voice recognition software implementation

- Victor
- Kenil



# Resources

1. Arduino Website

<https://www.arduino.cc/en/Main/Documentation#>

2. Sparkfun - Arduino Tutorials

<https://learn.sparkfun.com/tutorials/what-is-an-arduino>

3. Adafruit

<https://www.adafruit.com>

4. BitVoicer Server

[BitVoicer Server Download](#)

5. Raspberry Pi Voice Recognition

<https://diyhacking.com/best-voice-recognition-software-for-raspberry-pi/>



Thank You!

Any Questions?