# Campanile-Carillon Model

Sddec18-01

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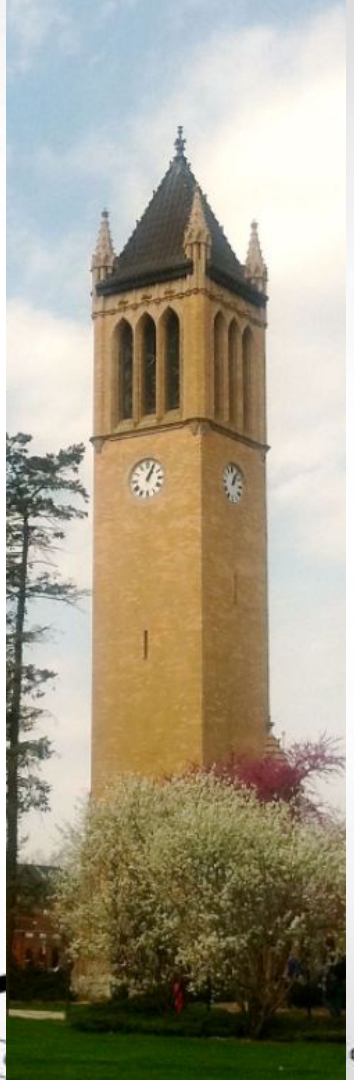
Client: Dr. Tin-Shi Tam

Advisor: Gary Tuttle

http://sddec18-01.sd.ece.iastate.edu/

# Overview

- Educate public
- Musical instrument
- Mobile Campanile-carillon model
  - Carillon tutorial system



# Task

- Carillons are not mobile in general
  - None have tutorial software
- Make an effective tutorial
- Retrofit our components to current model design

# Software Inspiration

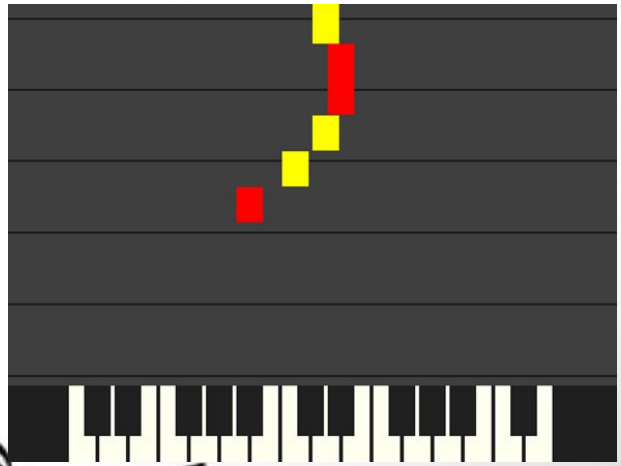
- Synthesia, Guitar Hero

# Hardware Inspiration

- Light up keys
- Play by light

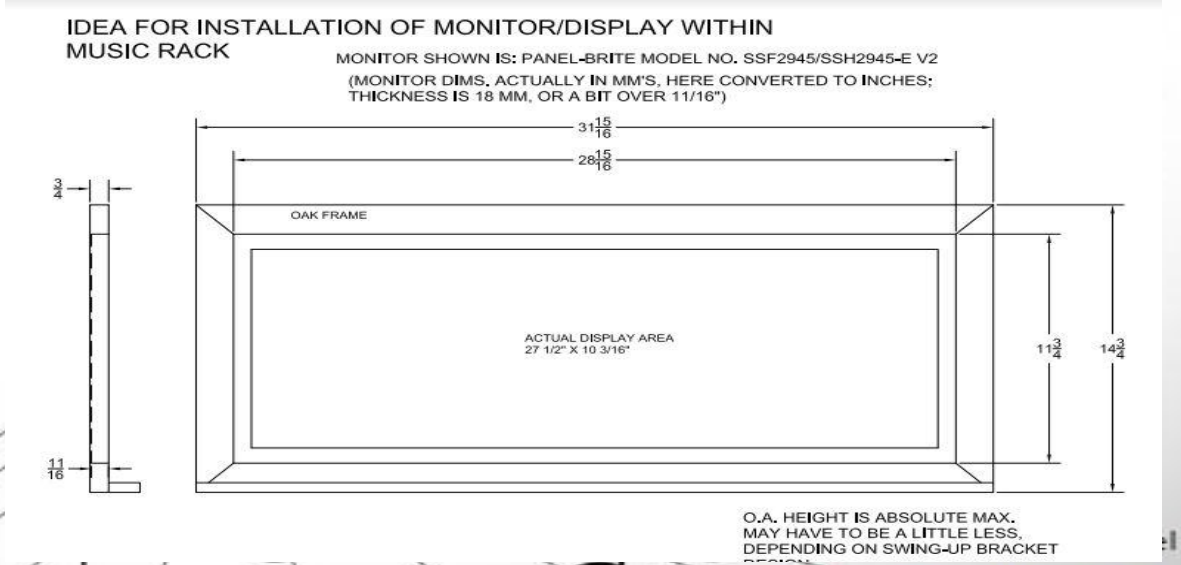

# Falling Notes Software

- Runs on Raspberry pi on startup
- Uses C++ and OpenGL
- Features menu to select midi files from USB
- Midi files are processed and serial communication is synchronized with “falling notes”
- Arduino sends pulse stream, reshaped and passed through each LED

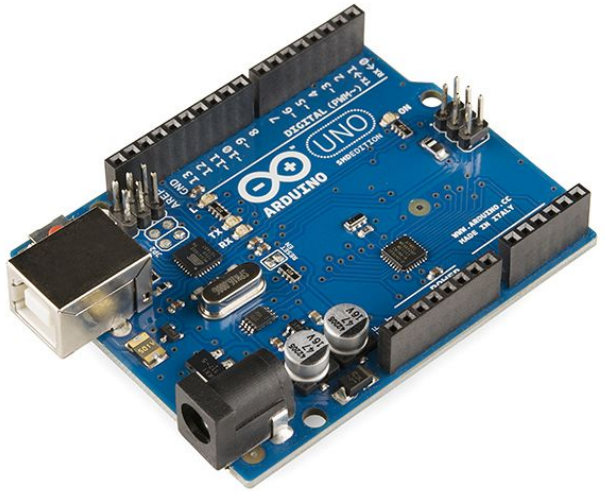
# Monitor / Music stand

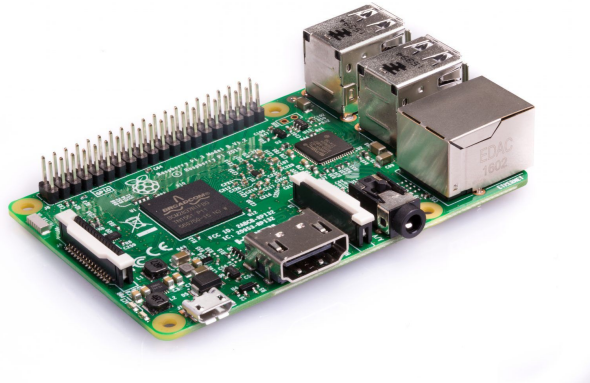
- Run software
- Ultra wide screen
- 1000 nits
- Durable and Thin

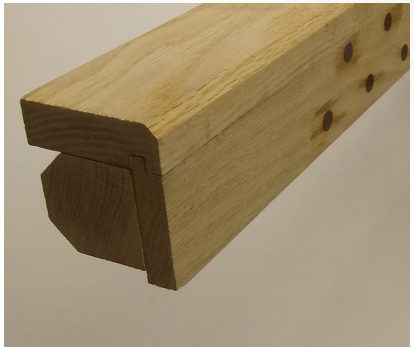
# HW/SW used

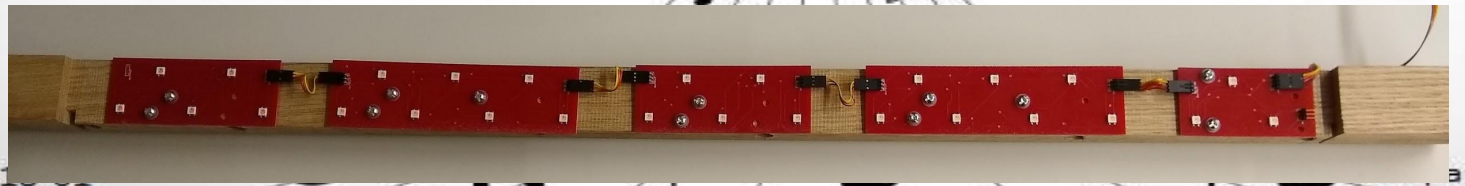
- HW:
  - Raspberry Pi: Display and communicate to arduino
  - Arduino: Communication to LEDs
  - WS2812b LEDs: addressable LEDs need one data wire
- SW:
  - C++,OpenGL
  - Arduino IDE
- Modeling SW
  - Solidworks
  - Multisim



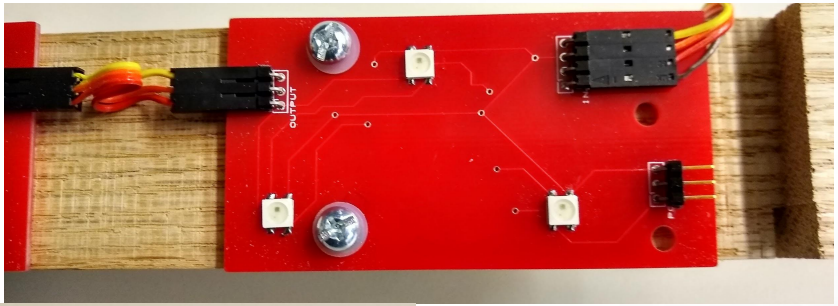
# Spreader Design

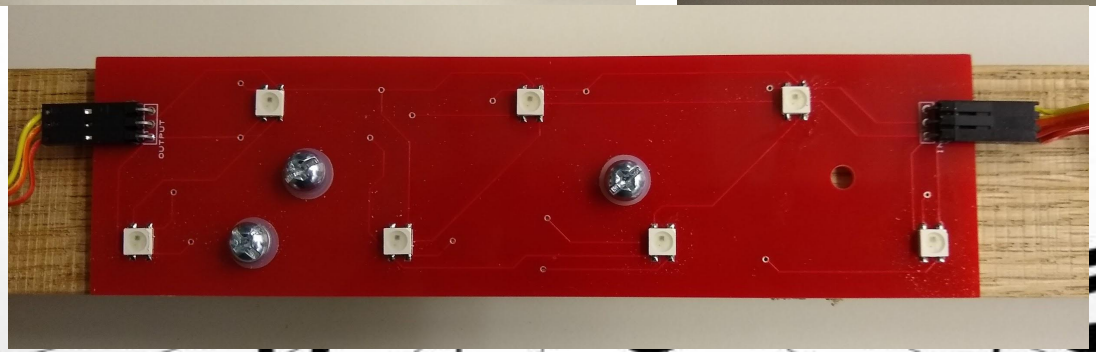




# Custom Circuit boards

- Connected with ribbon cable and Molex connector
- Fit within the spreader

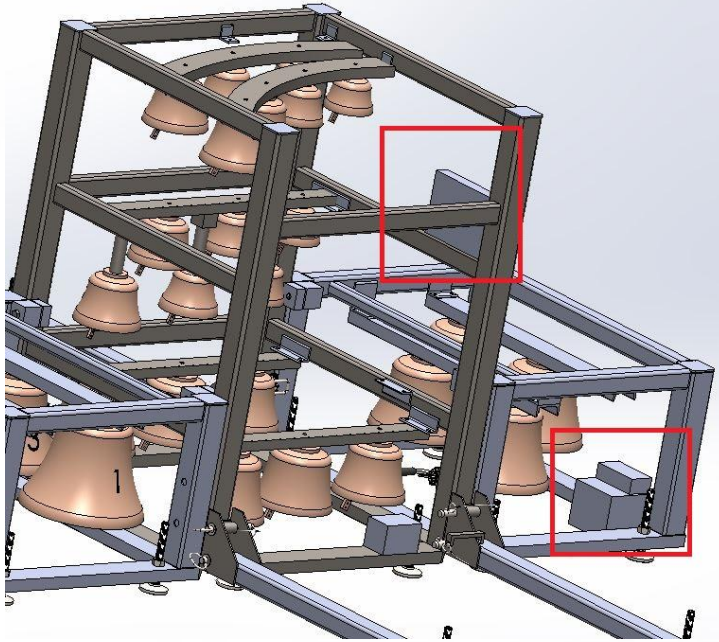



# Power Requirements

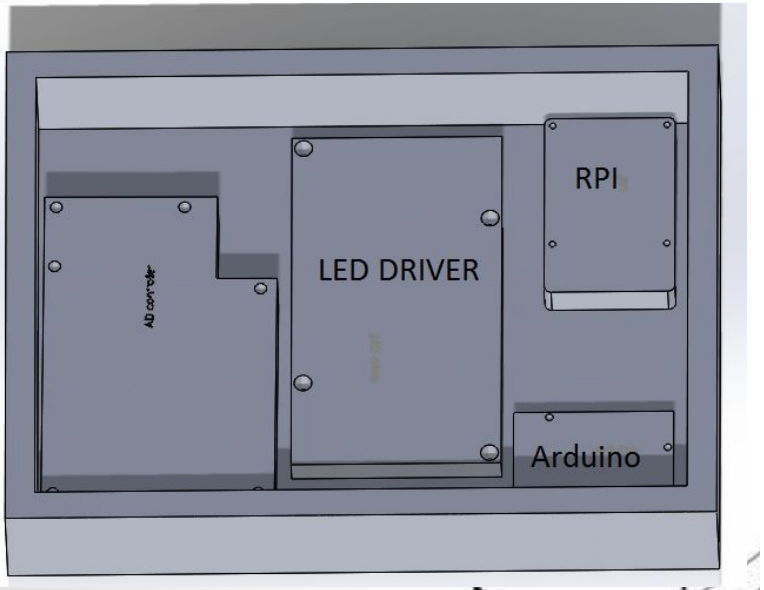
- Operate without constant power
- Easily switch between power sources
- Power monitor
- Run for 8 hours
- Ability to recharge

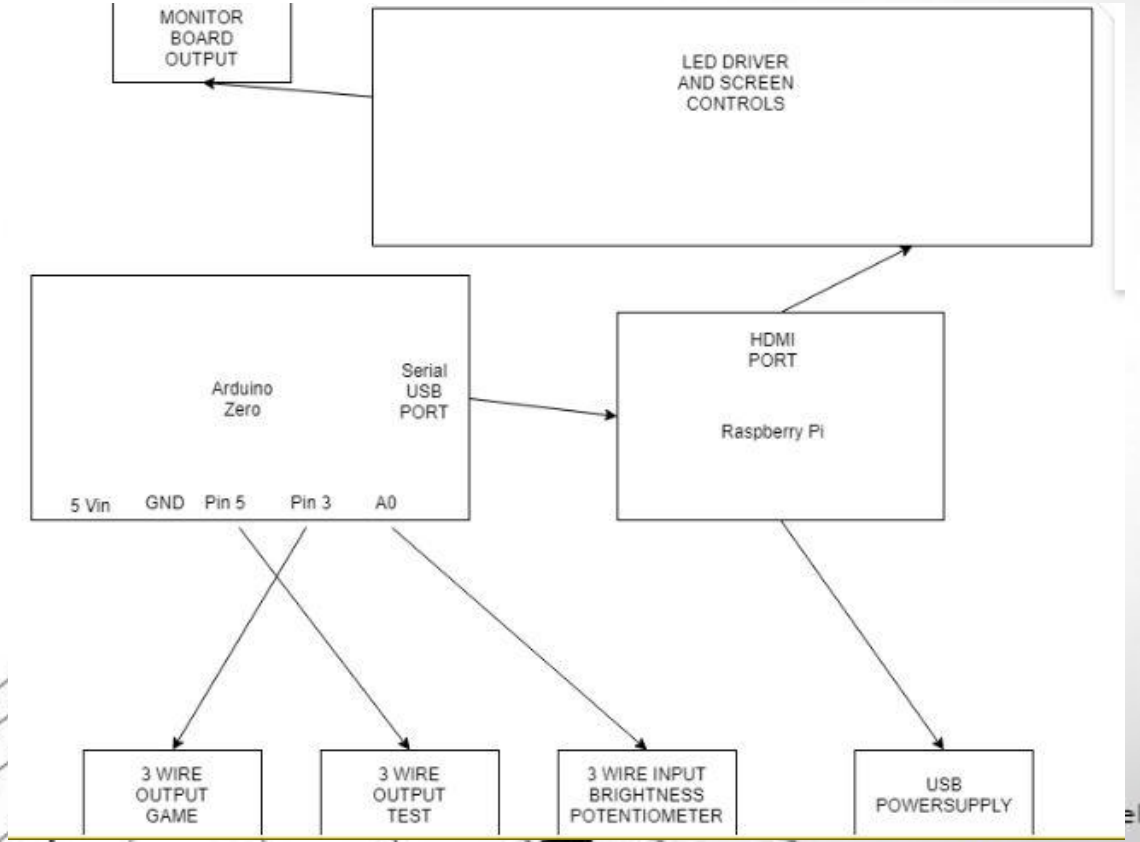
# Box Placements

- Meeting with the ME team
- Re-evaluation of power requirements
- Routing wires
- Avoiding all Mechanical linkages
- Saving space



# Control Box


RPI
LED DRIVER
Arduino


MONITOR BOARD OUTPUT
LED DRIVER AND SCREEN CONTROLS
Arduino Zero
Serial USB PORT
5 Vin
GND
Pin 5
Pin 3
A0
HDMI PORT
Raspberry Pi
3 WIRE OUTPUT GAME
3 WIRE OUTPUT TEST
3 WIRE INPUT BRIGHTNESS POTENTIOMETER
USB POWERSUPPLY

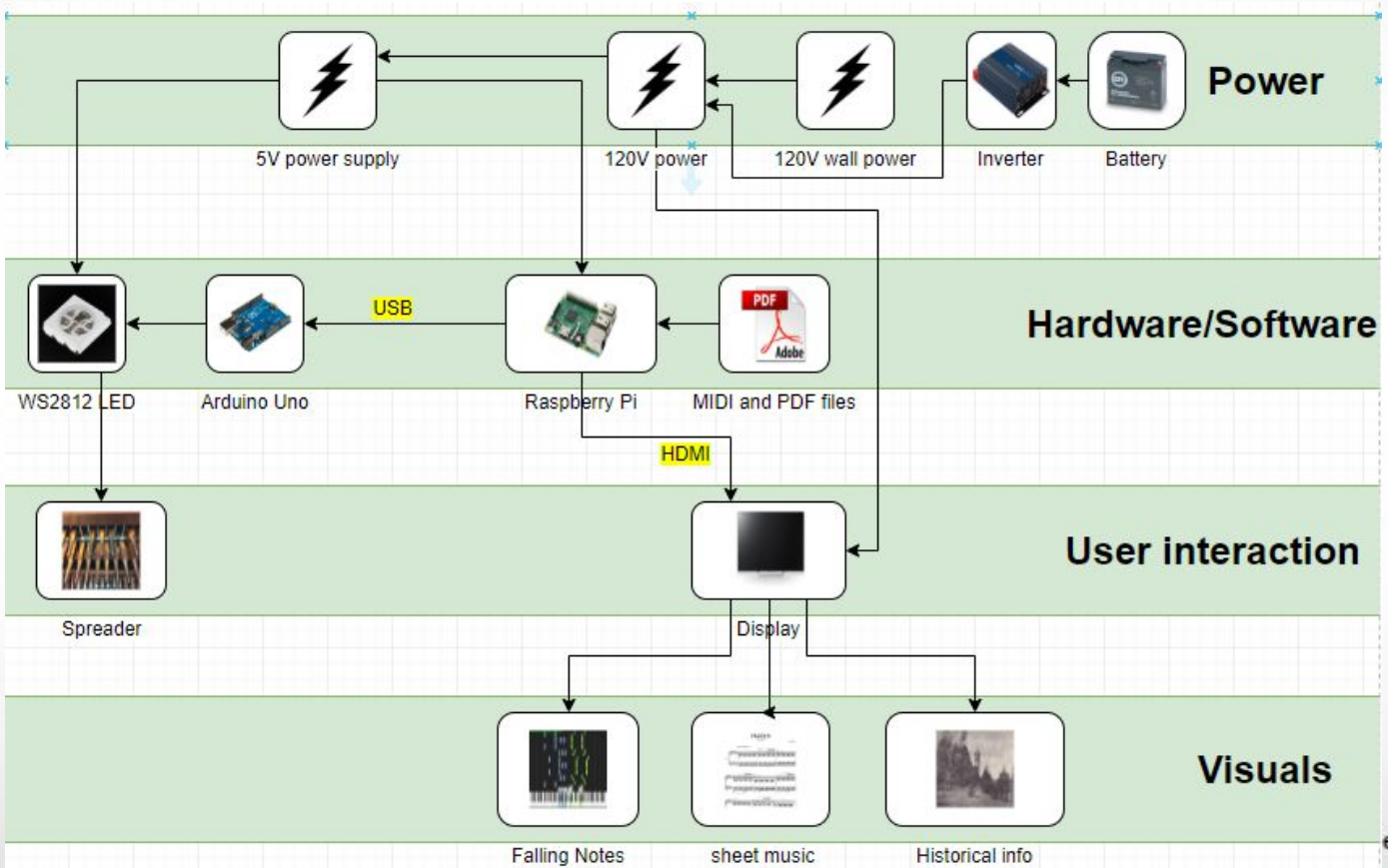
# Previous Design

- Scraped by Client
- LED’s integrated into baton keys
- Concern with structure of baton
- Concern routing wires
- Maintenance concerns

# Previous Design Cont.

- Secondary monitor
- Plans on making a 3D model display
- Power limitations

# Basic Diagram



# Acknowledgements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- Craig Severson, Boyd lab
- Rick Watson, Carillon Designer
- Nicolaus Cory, team member from S2018