Campanile-Carillon Model
Sddec18-01

Team: Johnathan Germick, Zachary Reznicek, Rob Holm, Nicolaus Cory, and Cody Neltner

Client: Dr. Tin-Shi Tam

Advisor: Gary Tuttle

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

- Educate public
- Musical instrument
- Mobile Campanile-carillon model
- Campanile tutorial
- Use at school events
Our Team

- Passion for music
- Love the ISU campanile
- Necessary technical skills acquired through coursework
  - Basic Programming background
  - Circuit design/soldering experience
- Desire to learn new skills
Task Responsibility/Contributions

- John: Team Leader
- Nic: Application Engineer
- Rob: Quality Engineer
- Cody: Scribe
- Zach: Lead Software Engineer
Educating the public

- Display history
- Showcase Engineering student skills
- Experience the Bells of Iowa State
- Spread ISU pride
Carillon tutorial

- Anyone can play
- Inspire people to make/play music
- Falling notes
- Light up keys
Front View
Functional requirements

- Carillon Tutorial with song library
- Display electronic sheet music
- Allows layperson to play instrument
- Display Historical Information
- Weather Resistant
Non-functional requirements

- User friendly interface
- Non intrusive for carillonneurs
- Diagnostic manual for troubleshooting
- Classical appearance, minimally invasive
Constraints

- Must be weather resistant
- Must run off batteries and 120V power
- All solutions must fit on the model
- Must be prepared to implement design in November of 2018
Market Survey

- Others
  - “Standard-sized” carillons (more than 47 bells)
  - Few are mobile
  - None with a tutorial software
Market Survey Continued

- Other software:
  - Synthesia, Guitar Hero
Potential Risks

- Electrical connections/solder joints
- Circuit minimally intrusive to instrument
- Troubleshooting guide/operating manual
- Hardware/Software replacement
Resource/Cost Estimate

- Hardware cost: $600
- Monitors: $650
- Battery solution: $1000
- Total Cost: $2250*

*Approximate cost
Major Milestones from this semester

- Display “Falling notes”
- Illuminate lights through software commands
- Integrated LEDs into baton
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++
  - Python: serial port to Arduino
  - Arduino IDE
  - Solidworks
Test Plan

- Tested multiple LED strings
- LED durability test, vibration, brightness
- Software testing
- Waterproofing tests
Current status

- Began building prototype
- Developing code
  - RPI
  - Arduino
Schedule for Fall and Future Milestones

- Obtain custom keys from Rick Watson, carillon designer
- Bells are cast
- Model fully built
- Select monitors*
- Develop Power supply solution*
- Write diagnostic manual*
- Implement proposed design
Summary

● Create interface that enables anyone to play
  ○ RPI Falling Notes software
  ○ Display sheet music
  ○ Addressable LEDs from Arduino
● Integrate with current design
  ○ Develop prototype
● Display documentary