Symphonic Harmonics

♪ Neereja Sundaresan
♪ Surekha Muralidharan
♪ Vikram Rajkumar
♪ Wayne Chiang
Concept: Portable, flexible, and interactive composing tool that interfaces with the Android to display and playback scores.

Parts Ordered:
- Arduino Mega
- Bluetooth Extension
- Accelerometer with Breakout Board
- Buttons
- Multicolor LED’s
- Android Phone
UseCases

Starting Device

1. Press Start Button on SH → SH power Indicator LED turns on
2. Start Android app. w/ Bluetooth → SH connection Indicator LED turns on
3. Start Android app. w/o Bluetooth → Android sends error message and waits

Using SH

1. User presses instrument note key → SH key press indicator LED turns on
   → Arduino relays event via bluetooth to Android
   → Android processes, plays, displays note
2. User presses instrument selection key → Current instrument LED turns on
   → Previous instrument LED turns off
Use Cases cont...

Using Android

1. User selects playback/display on Android
2. Android retrieves, plays, displays score
3. User powers off master power on SH
   - Power and connection indicator LED turn off
   - Arduino turns off
   - Android signals disconnection
3. User clicks to close Android app
   - Android app. closed
   - If SH on connection LED off
## Risks vs Mitigations

<table>
<thead>
<tr>
<th>Risks</th>
<th>Mitigations</th>
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<tbody>
<tr>
<td>Loss of bluetooth connection</td>
<td>Re-establish bluetooth connection, use back-up speaker on device</td>
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<tr>
<td>Too much delay between Android and Arduino (bluetooth)</td>
<td>Attempt to reconnect until timeout, show connection problems by turning connection indicator LED off. Use back-up speaker on device</td>
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<tr>
<td>Rough usage damages hardware</td>
<td>Thorough testing of hardware, build secure padding for Arduino and other critical components. Select hardware components that are durable</td>
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<tr>
<td>Loss of battery life</td>
<td>Replace battery</td>
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<tr>
<td>Music played on keyboard does not reach Android</td>
<td>Arduino error light turns on: Arduino has not received acknowledgement from Android and therefore alerts user that the notes being played are not being saved.</td>
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