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Users: Inexperienced music students

Goal: Understand a composition by listening to it

- Sections of the piece
- Timing
- Pitch and Volume
- Instrument roles
- Repetitions
- Harmonies
Music Education Technology
<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Section Overview</th>
<th>Main Riff (intro)</th>
<th>Main Melody</th>
<th>Main Riff (interlude)</th>
<th>Main Melody</th>
<th>Trumpet Solo</th>
<th>Sax Solo</th>
<th>Piano Solo</th>
<th>Main Riff (transition)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:00 – 0:14</td>
<td>Section Duration</td>
<td>4 measures (14 seconds)</td>
<td>6 measures (22 seconds)</td>
<td>4 measures (14 seconds)</td>
<td>6 measures (22 seconds)</td>
<td>4+4+6+6 measures (72 seconds)</td>
<td>4+4+6 measures (70 seconds)</td>
<td>4+4+6+6 measures (70 seconds)</td>
<td>4 measures (15 seconds)</td>
</tr>
<tr>
<td>0:14 – 0:36</td>
<td>Trumpet</td>
<td>Composed melodic duet with sax, using a 2-part hocket structure, built in repeating 2-measure phrases</td>
<td>Improvised duet with sax, using a call (trumpet) and response (sax) structure</td>
<td>Composed melodic duet with sax, using a 2-part hocket structure, built in repeating 2-measure phrases</td>
<td>Improvised solo; built in 2-measure phrases</td>
<td>Section changes at 1:40 and 2:02 start with the same melodic gesture</td>
<td>(silent)</td>
<td>(silent)</td>
<td>(silent)</td>
</tr>
<tr>
<td>0:36 – 0:50</td>
<td>Tenor Saxophone</td>
<td>Composed melodic duet with trumpet, using a 2-part hocket structure, built in repeating 2-measure phrases</td>
<td>Improvised duet with trumpet, using a call (trumpet) and response (sax) structure</td>
<td>Composed melodic duet with trumpet, using a 2-part hocket structure, built in repeating 2-measure phrases</td>
<td>Improvised solo; built in 2-measure phrases</td>
<td>Section changes at 1:40 and 2:02 start with the same melodic gesture</td>
<td>(silent)</td>
<td>(silent)</td>
<td>(silent)</td>
</tr>
<tr>
<td>0:50 – 1:12</td>
<td>Piano</td>
<td>main riff (1 measure), repeated 4 times, played in unison with bass</td>
<td>main riff, repeated 6 times: 2x plain, 2x growing sound, 2x with big, broad sound</td>
<td>main riff, repeated 6 times: 2x plain, 2x growing sound, 2x with big, broad sound</td>
<td>main riff, with improvised variations following the sub-sections</td>
<td>main riff, with 4-measure sub-sections repeat the main riff; the 6-measure sub-sections repeat the main melody support chords, and grow in 2-measure groups as before</td>
<td>main riff, with improvised variations following the sub-sections</td>
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</tr>
<tr>
<td>1:12 – 2:24</td>
<td>Bass</td>
<td>main riff (1 measure), repeated 4 times, played in unison with piano</td>
<td>main riff, repeated 6 times: 2x plain, 2x growing sound, 2x with big, broad sound</td>
<td>main riff, repeated 4 times, played in unison with piano</td>
<td>main riff, 2x plain, 2x growing sound, 2x with big, lower pitch sound</td>
<td>main riff, with improvised variations following the sub-sections</td>
<td>main riff, with improvised variations following the sub-sections</td>
<td>main riff, with improvised variations following the sub-sections</td>
<td>main riff, with improvised variations following the sub-sections</td>
</tr>
<tr>
<td>2:24 – 3:14</td>
<td>Drums</td>
<td>main groove</td>
<td>main groove repeated 6 times: 2x plain, 2x growing sound, 2x with big, broad sound</td>
<td>main groove</td>
<td>main groove</td>
<td>main groove, with improvised variations following the sub-sections</td>
<td>main groove, with improvised variations following the sub-sections</td>
<td>main groove, with improvised variations following the sub-sections</td>
<td>main groove</td>
</tr>
<tr>
<td>4:24 – 4:39</td>
<td>Harmonic Structure (chords)</td>
<td>F7 chord as drone</td>
<td>Need chart</td>
<td>F7 chord as drone</td>
<td>Need chart</td>
<td>Need chart</td>
<td>Need chart</td>
<td>Need chart</td>
<td>F7 chord as drone</td>
</tr>
</tbody>
</table>
1. Reduce the work required of expert music instructors in creating these music maps.

2. Recreate the paper-based music map in a more engaging, interactive form.

3. Provide an output stream of data based on the user’s interactions that can be used to power subsequent animations or lighting displays.
TamTam: Deconstruction

- Strip away music editing and creation
- Support for structural exploration
- Output stream support
- Flexible track creation
- Flexible selection
## Input Format

- Tab delimited text file

<table>
<thead>
<tr>
<th>Track/Region</th>
<th>Inst</th>
<th>1..12</th>
<th>13..24</th>
<th>25..36</th>
<th>37..48</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Piano</td>
<td>melody()</td>
<td>melody()</td>
<td>melody()</td>
<td>melody()</td>
<td>melody()</td>
</tr>
<tr>
<td>2 Basse</td>
<td>tacet()</td>
<td>unison(1)</td>
<td>unison(1)</td>
<td>bass(); harmony(1)</td>
<td></td>
</tr>
<tr>
<td>3 Guit</td>
<td>tacet()</td>
<td>tacet()</td>
<td>harmony(1)</td>
<td>harmony(1, 2)</td>
<td></td>
</tr>
</tbody>
</table>

| Tempo | 1 | 180 | 1/4 |
| Key   | 1 | c   |
| Time  | 1 | 4/4 |

- Midi audio
AudioSavant: Demo

- AudioSavant user experience
  - Flexible track creation
  - Selection
  - Exploration
  - Playback

- Output stream support
Future Work

- MILC study
- Increased automated analysis
- Composition comparisons
- Internal animation support
- Educational exercises
- Ditch TamTam infrastructure
Questions?

Thanks to:
- Our Sponsors: Greg Walsh and Allison Druin
- Members of UMD’s Music Education Department
- Professor Ben Shneiderman
- Our user study participants
- Our paper reviewers