

21M.269 Spring 2012

Assignment 3: Problem Set 2

Part A —Developing Digital Notation for Unusual Repertories

Traditionally-notated scores are currently heavily privileged in the world of digital musicology. Repertories relying on standard western notation comprise a large majority of the body of encoded music, and most programs and interfaces available for notation and playback are specifically suited to the needs of musicians and researchers working within that idiom. However, as we move into the twenty-first century and digital representation of information becomes the new standard, interest in digitally preserving, transmitting, and analyzing non-traditional repertories is greatly increasing.

Choose a non-traditional repertory (a list has been provided below to help you get started) and design a digital notational scheme that would allow you to encode, analyze, and transmit the pieces comprising your repertory. Questions below have been provided to guide your design process. Provide brief answers to each.

(N.B.: you DO NOT actually have to implement your notational scheme (as in, you do not have to provide the actual code or encode an entire score), simply describe how you would go about implementing it and analyze the implications of your design.)

Some ideas of unusual repertories to get you started:

- Jianpu, or numbered musical notation (http://en.wikipedia.org/wiki/Numbered_musical_notation)
- Turntablist transcription method, or “scratch notation” (<http://ttmethod.com/>)
- Aleatoric, or “chance” music (Cage, Stockhausen...many, many others)
- Frequency-based music (ex. Stockhausen’s *Studie II*, music using non-equal temperament tuning systems)
- Graphic notation (ex. Lachenmann’s *Pression*)
- Non-Western music (music for Balinese gamelan, West African drumming, California Indian Music, etc.)

1) Familiarizing yourself with your repertory

a) Find a few relevant scores (if any exist) and listen to recordings of the pieces (again, if they exist). Think about how the current physical notational system organizes relevant information and how that information relates to the audible manifestation of the music. List the basic structural units of the music. How are they organized?

b) Similarly, what types of instruments, techniques, or equipment are needed to perform the music?

2) Research utility and impact

a) What type of analysis might researchers be interested in carrying out on your repertory? Who would be the various groups affected by the outcomes of that research and what might those effects be?

b) Similarly, think about the traditions and cultural considerations associated with your repertory, as well as the skills and limitations of the researchers and musicians working with the repertory (for instance, is the music in your repertory associated with a primarily oral tradition? Would the musicians or researchers interacting with the repertory be classically trained? Is a competence with digital signal processing necessary for the performance of the works comprising your repertory? etc.). Explain how your implementation would take into account these factors.

3) Designing a digital notational schema

a) Choose a language(s), file type(s), and any associated software and add-ons that would be necessary for your implementation to be useful for score analysis, notation editing, performance, etc. Implement a bit of the notational system so we can see how it works. Document this system.

b) Map out a class hierarchy to organize the relevant structural units of your system. Think about the attributes associated with each object, and the methods that might be involved with each.

c) Provide some basic documentation that gives an overview of how your system works and how the various large-scale components (files, display and playback programs, storage systems, etc) interact.

4) Consider the efficiency, overhead, and reuse of your encoding.

a) What types of pre-existing notations, encoding standards, languages, or interfaces could be used to implement your schema? Are there any particular advantages/disadvantages to using these?

b) What is the most efficient means by which your repertory could be stored and accessed? Think about file size, transportability, and compatibility with existing file types, programs, and software suites necessary for analysis, viewing, and playback.

Part B – Similarity and Search

1. Develop two similarity metrics or measures for the first four bars of all the Bach Chorales and show some examples of very similar and very different chorales. One might show patterns of intervals (skips vs. steps, etc.) in the bass voice. One might show differences in rhythmic density vs. sparseness. Or you might decide to show differences in consonance vs. dissonance patterns. Evaluate your metrics: does one do a better job of finding chorales that you find intuitively similar vs. another?

2. Consider the melodies in one of the files in the Essen Folk Song repertory such as `ballad10.abc`. Recreate Huron's Table 5.1 for the songs in this repertory, showing the probability that an ascending step would be followed by a descending step (etc.); then calculate the percentage of a change of direction for each interval size (a la Figure 5.3, but you do not need to graph it). Discuss whether your results accord with Huron Table 5.1 and Figure 5.3 or not. If they are different, to what might you attribute the differences?

Implementation details: ABC files are often rendered as Opus objects, which contain many scores. To get an Opus object, use this `music21` command.

```
from music21 import *
ballads = corpus.parse('essenFolkSong/ballad10.abc')
```

then to get a list of all the numbers in the Opus object, run:

```
ballads.getNumbers()
```

and to get a particular number, say 5, call:

```
ballads.getScoreByNumber(5).
```

Or to iterate call:

```
for i in ballads.getNumbers():
    thisBallad = ballads.getScoreByNumber(i)
```

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21M.269 Studies in Western Music History: Quantitative
and Computational Approaches to Music History
Spring 2012

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