C-major



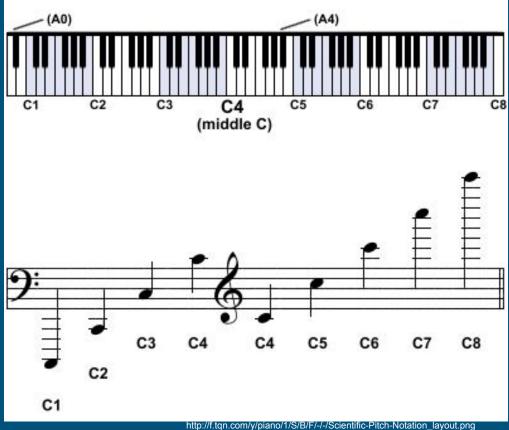
A Music Production Language

The Ensemble



Overview

- Musical Composition language with C-Style syntax
- Common constructs loops, conditionals
- Dedicated types to represent musical elements
- Designed to abstract computerized composition in a context of Turingcomplete features



Pitches



http://alishagabriel.com/wp-content/uploads/2012/06/skipping_rope_rhythms.gif

Rhythm

Tutorial

- 1. Compile source code: make
- 2. Run test suite: ./test.sh
- 3. Write your program: *.cmaj
- 4. Compile into CSV "bytecode" using the cmajor compiler
- 5. Use Java CSVPlayer to render audio output



Architecture

Program (*.cmaj) \rightarrow Compiler (cmajor) \rightarrow Bytecode (*.csv) \rightarrow CSVPlayer

Language Implementation

<.cmaj file> Scanner: scanner.mll

Parser: parser.mly

Semantic Analyzer / Translator : compile.ml

MIDI Converter: CSVPlayer.java, NotesPlayer.java

<MIDI file>

Data Types

- Int
- Dur
- Pitch
- Note
- Chord
- Phrase
- Score

Operators and Type Inferences

- Arithmetic: Addition, Subtraction, Multiplication, Division
- No floating point numbers: all fractions treated as rational numbers consisting of two integers
- Advanced array manipulation: Repeat/Fill, Concatenate
- Layer: Two musical types to be rendered simultaneously in audio output
- Concatenate: Provides audio sequencing

Testing

test.sh

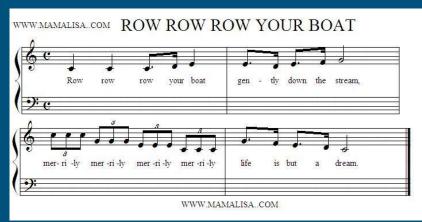
- System testing framework using shell script
- Compares each .cmaj program in the Tests directory with a reference file of its expected .out output
- Ends report by displaying number of passed tests and total tests run
- Collects failed and total test outputs
- Tests: interpreter, parser, semantics
- [arithmetic, equality, array, pitch, array, array concat, function, compose, play, layer, blocks, statements, comments, etc]

Demos

Row, Row, Row Your Boat

Demonstrates loops, assorted operators

An old favorite

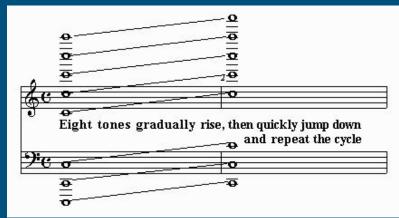


http://www.mamalisa.com/images/scores/row_your_boat.jpg

Shepard Scale

Demonstrates functions, loops, conditionals

A "sonic barber pole"



http://www.cafemuse.com/soundgarden/images/shepard_tone2.gif

Summary and Summary and Lessons Learned:

- Weekly Meetings and Waffle
- Share and Listen to Ideas
- Ocaml: Do a lot with a little