

ABJAD: AN OPEN-SOURCE SOFTWARE SYSTEM FOR FORMALIZED SCORE CONTROL

Introductory Workshop

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The Abjad API for Formalized Score Control extends the Python programming language with an open-source, object-oriented model of common-practice music notation that enables composers to build scores through the aggregation of elemental notation objects.

AN EXAMPLE: RHYTHMIC CONSTRUCTION

ABJAD?

- C into Finale via MIDI (1997)
- Mathematica into Sibelius via MIDI (2001)
- Mathematica into SCORE (2003)
- Mathematica into LilyPond (2004)
- Python into Adobe Illustrator (2004)
- Python into LilyPond (2005)
- Max/MSP into MS Access into Adobe Illustrator (2008)¹
- Public release on GoogleCode (2008)
- Migration to GitHub (2011)
- Abjad 2.16 released (2015)

¹An attempt by Josiah before discovering Abjad.

Table 1: Abjad's Software Stack

Python				
Abjad				
SCORE	LilyPond	Steinberg?

Abjad models musical score as a tree of components

Containers, leaves, spanners & indicators

Relationships between objects are modeled explicitly

Parentage, lineage, logical tie, logical voice

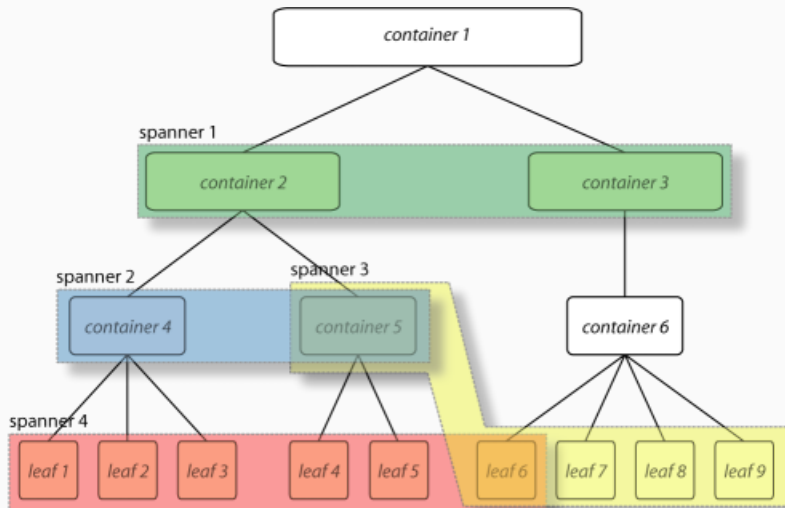
Primitive objects are also modeled explicitly

Duration, Offset, Pitch, PitchClass, Interval, Octave, Accidental

Top-level functions expose higher-level interfaces

Inspection, iteration, selection, mutation, persistence

CONTAINERS, LEAVES & SPANNERS



- 496 public classes
- 387 public functions
- 186,963 lines of code
- 9399 unit tests
- 10190 documentation tests
- 100% free & open source
- platform independent
- runs under both Python 2.7 and 3.3+

MUSIC

2015 **Invisible Cities (iii): Ersilia**

for chamber orchestra

2015 **Invisible Cities (ii): Armilla**

for viola duet

2014 **Invisible Cities (i): Zaira**

for eight players

2014 **Plague Water**

for bari sax, e-guitar, piano and percussion

2011 **Aurora**

for string orchestra

2010 **Lagartija**

for mixed quartet

2015 On the Behavior of Climbing Plants

for chamber orchestra

2013 The World All Around

for Eb clarinet, prepared piano, and harp

2013 +/-

for twenty french horns

2013 Enfilade, Moses All, and Future Calendars

for carillon

2011 Being Pollen

for solo percussion

OTHER COMPOSERS

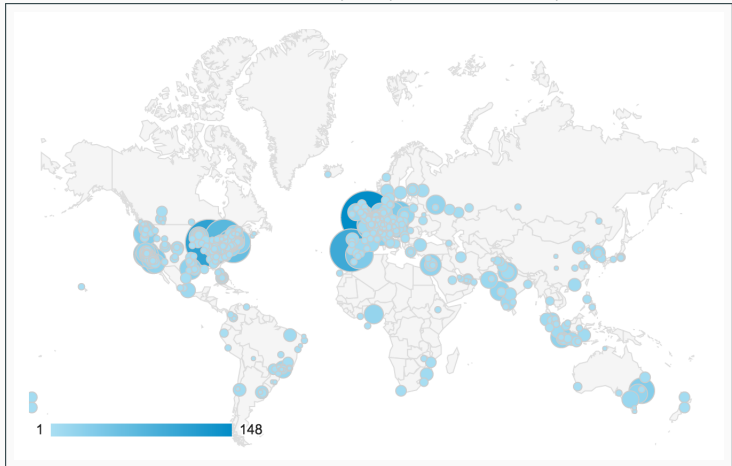
Mike Solomon

Fredrik Wallberg

Oscar Dub

???

Documentation visits by city since January 1st, 2015



COMPANION PROJECTS

Abjad integrates with **IPython** (ipython.org/):

IPython is a command shell for interactive computing in multiple programming languages, originally developed for the Python programming language, that offers enhanced introspection, rich media, additional shell syntax, tab completion, and rich history.

IPython integration was spearheaded by **Prof. George K. Thiruvathukal** (<http://thiruvathukal.com>), Loyola University Chicago.

Sasha provides a database of saxophone multiphonic recordings and their associated fingerings, allowing users to search for related multiphonics by timbral, harmonic and idiomatic descriptors.

- <http://sasha.mbrsi.org>
- <http://github.com/josiah-wolf-oberholtzer/sasha>
- Multiphonics performed by **Eliot Gattegno**
(<http://eliotgattegno.com>)

Abjad acts together with many other Python libraries to handle programmatic notational output, and to perform validation on musical queries.

CONCLUSION

The Abjad API for Formalized Score Control extends the Python programming language with an open-source, object-oriented model of common-practice music notation that enables composers to build scores through the aggregation of elemental notation objects.

Documentation

<http://projectabjad.org>

GitHub Repository

<http://github.com/Abjad/abjad>

User Mailing List

<http://groups.google.com/group/abjad-user>

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