Using open source music software to teach live electronics in pre-college music education

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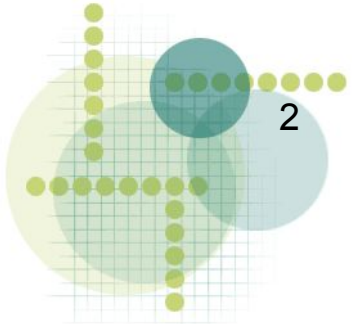
Outline

1. Basic components of a live-electronics course

2. Is open source music software suited for such a course?

3. Demonstration of Abunch, a library in Pure Data



Bio

- Piano and Composition studies at the University College of Ghent - Faculty of Music
- Active as a professional composer
- Piano teacher (1995-2007) and teacher of practical harmony and accompaniment courses in pre-college music schools
- Concert producer in the Logos Foundation (2001-2008), a centre for audio arts
- Since 2008: Research (on contemporary polyphony) and teaching (electronic music) at the University College of Ghent - Faculty of Music

Special Project

- Since 2007: special project to teach live electronics in the music school of Deinze (B)
- Focus: performing live electronic music
- For amateur musicians older than 14 years
- A course of 2 hours / week
- Number of students: 12 (2007) - 8 (2008) - 8 (2008)
- In 2009 this special project was officially turned into a course 'experimental music'.

Unique opportunity

- Home computers are powerful enough
- Computers are widely available in households and schools
- Open source music software available for live electronic music

Rethink and redesign our music education !

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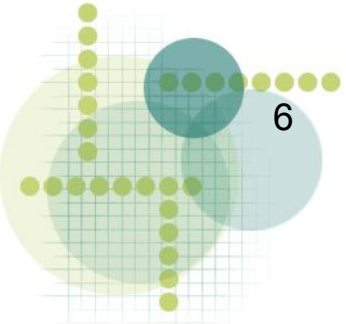


Is a Digital Musical Instrument unique ?

- No acoustical link between user interface and sound production unit
- A multimodal information stream between composers and performers
- An important off-stage component
- Less difference between composer, improviser, performer and instrument-builder

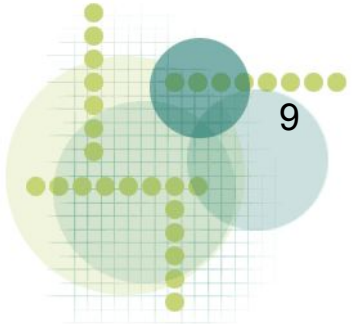
= ?

Content of a live electronic course

- Digital Signal Processing techniques
- Basic audio hardware
- Mapping techniques
- History of electronic music
- Auditory training
- Sound organisation in real time
- Performance training

Mapping techniques

- Basic math
- Basic boolean operators
- Comparison operators
- Assignment operator
- Relay switch
- A module or system to order all this logic and math in time



Methodology

- Performance and action based method with integration of theory
- Auditory based (multimodal information stream, modular instrument)
- Creativity and autonomy (blurring boundaries between composing, performing and instrument-building)

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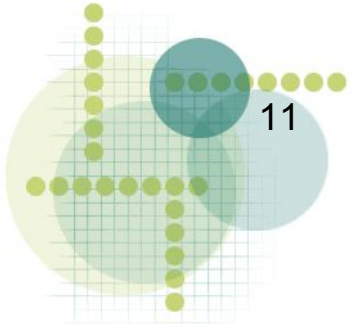

Pros and cons

Advantages

- Regular Access
- Mapping techniques are available and flexible
- Transparancy (source code)
- Strong User Community

Disadvantages

- Massive range of possibilities
- Simple *(and applied?)* information is difficult to find
- Too many syntax rules to be creative with instrument design

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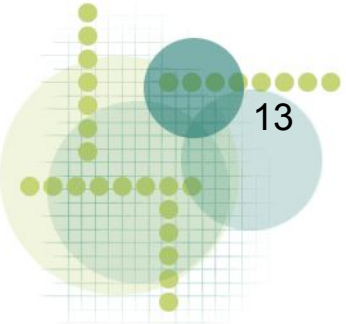
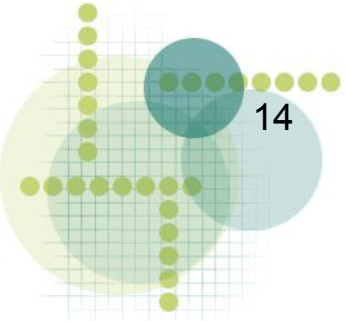


3. Abunch - Goal

A tool with an open-ended architecture that enables beginners to learn more about the musical possibilities in real time of a computer



Abunch - content

- performance objects
- demonstration and analysis objects
- information objects and files

abstractions

record and play sound files
manipulate and process sound
generate sounds
prepare control data (sequencers)
synchronize control data (clocks)
analyse sound and control data
record control data to a score
receive data from common interfaces
algorithmically generate control data

All objects in Abunch (version 048)

AUDIO EFFECTS

- phaser
- simple-delay
- long-delay
- feed-delay
- reverb
- simple-chorus
- simple-pitchshift
- envelopes
- simple-filter
- 8band-filter
- lowhigh-filter
- disto-filter
- old-vocoder
- matrix4
- panning
- al-disto

SOUND SOURCES

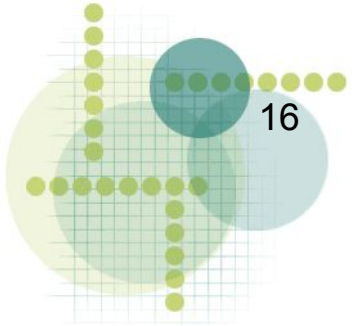
- waves
- waves-add
- play-file
- record-file
- play-sample
- simple-sampler
- record-sample
- scratch-sample
- crackle
- sound-out
- addy
- ozzy
- tarra
- crynth
- grain-sample
- grain48-sample
- graino-sample
- grain-synth
- grain-live
- wa-synth
- simple-fm
- 2mod-fm
- syna-fm
- cross-fm
- wind-synth

CONTROL

- timeline
- sequencer
- sequencer
- multi-seq
- multi-seqn
- keyboard-azerty
- keyboard-qwerty
- clock
- multi-clock
- random-out
- scales
- scales-div
- play-score
- record-score
- midi-ctlin
- metronome
- o-scope
- e-scope
- spectrum
- analyse

PRESETS

- presets

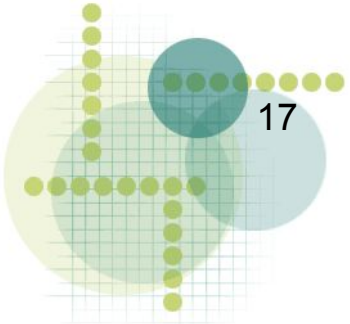


Simplified Procedures

- requires Pd Vanilla (any version >= 0.40)
- one folder

- one preset systeem
- reduced messages
- argument of an object relates to presets
- normalized control connections

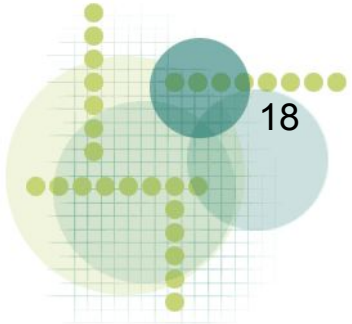
- colour indicates audio or control object
- popup windows for common mistakes



Required knowledge

Required knowledge to start playing with Abunch:

- audio on/off
- procedure to create and open a new object
- flow from top to bottom
- audio and control connections and in- and outputs
- names of Abunch objects
- every Abunch object needs an unique number
- only one opened main file at the same time

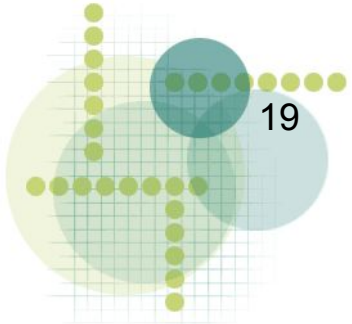


Future

- Abunch development mostly dictated by short-term educational demands
- Unfinished
- New goal: own research and performances

To do :

- More example files (about the musical application of techniques)
- A more attractive and diverse layout (data structures?)
- A neat and uniform structure within each object
- A style guide for other developers
- An easy-to-use template for algorithms



Conclusions

- Abunch enables to use a performance and sound centered methodology
- Abunch enables newbies to be creative with the instrument design in a very early stage
- Students and pupils use Abunch at home to play

www.hansroels.be/abunch.htm