

Composição Assistida por Computador

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Composição *não é* Edição de Partituras

- Ex: Musescore
<http://www.musescore.org/en>
- Composição Assistida por Computador:
 - Escolha de estrutura musical , partes
 - p.ex. Concerto (3 movm: 'allegro-adagio-allegro')
 - Escolha de ritmos
 - Escolha de sons, timbres, notas e sua serialização (melodia) e verticalização (harmonia, acordes)
 - Edição, (re)arranjo, (re)organização, experimentação (audição)

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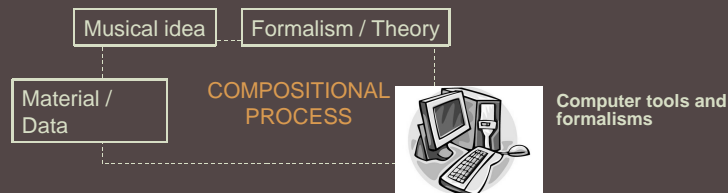
Foundations of CAC

Otto Laske, *Composition Theory in Koenig's Project One and Project Two*. Computer Music Journal (1981):

"We may view composer-program interaction along a trajectory leading from purely manual control to control exercised by some compositional algorithm (composing machine). The zone of greatest interest for composition theory is the middle zone of the trajectory, since it allows a great flexibility of approach. The powers of intuition and machine computation may be combined."

Jean-Claude Risset, *Musique, un calcul secret ?* (1977)

⇒ The musician must be able to communicate with the computer in order to control and organize the details and global aspects of his musical works, and eventually to build his own musical universe in it.



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Foundations of CAC the concept of Compositional Modeling

Study, simulation, explication of an **object** (concept, concrete object, phenomenon, situation, etc.)

"Modeling aims at gathering in a common coherent discourse a number of experiences and observations related by a means which is to determine during the modeling process itself"

D. Berthier. Le savoir et l'ordinateur (2002).

Computer model => abstract representation focusing on particular aspects of an object and supporting effective experiments and operations on this object

G. Assayag, J.-P. Cholleton, *L'appareil musical*, Résonance (1994).

"The objective is to define **computer models** which can be used in situations when a composer wishes to prepare complex and structured musical materials according to a given formalization or to a set of rules and constraints that he is able to describe formally."

Computer-Aided Composition system:

⇒ Allow to determine and create a **musical object** through **compositional models**

M. Malt. *Concepts et modèles, de l'imaginaire à l'écriture dans la CAO*. Séminaire Musique, Instruments, Machines (2003).

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Fundations of CAC Objects / Processes duality

Gérard Grisey, *Tempus ex Machina, A composer's reflexions on musical time*, Contemporary Music Review, 2, 1987:

"Object and process are analogous. The sound object is only a process that can be contracted, the process is nothing more than a dilated sound object. [...] The process makes perceptible what the rapidity of the object hides from us: its internal dynamism."

⇒ Computer-Aided Composition environments must allow to devise, formulate, represent and execute the processes leading to the creation of musical structures

Programme = Symbolic Representation
of a musical object / process
of a compositional model
Depicts musical **intentions**

CAC Environments <==> **Programming
Languages**

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Computer-Aided Composition

Formes

(Rodet, Coite, 1982-85)

PreForm / Esquisse

(Duthen, Byton, Baisnee, 1987)

Crime

(Assayag, Malherbe, 1985)

Boards

(Assayag, 1987-88)

Carla

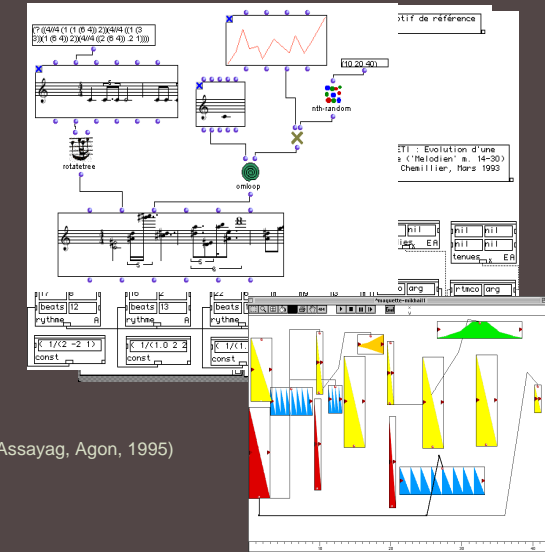
(Courtot, 1993)

Patchwork

(Laurson, Duthen, Rueda, Assayag, Agon, 1995)

OpenMusic

(Agon, Assayag, 1998)



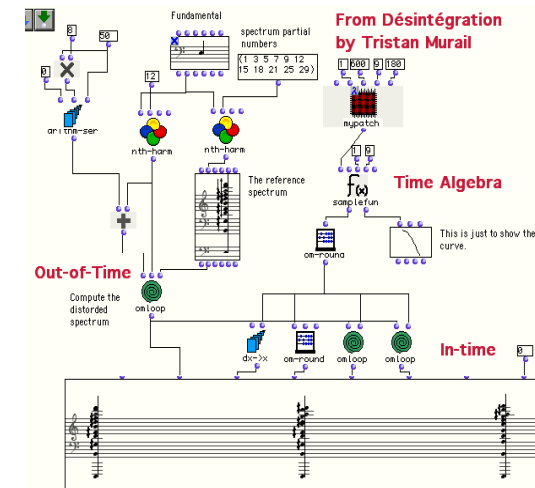
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OpenMusic (IRCAM)

- a visual programming language based on CommonLisp/CLOS
- icon oriented, uses extensively drag&drop
- built-in visual control structures classes and libraries for music composition
- OpenMusic:
 - <http://www.ircam.fr/openmusic>
 - <http://sourceforge.net/projects/ircam-openmusic>

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OpenMusic Spectral Music Revisited



Desintegration (T. Murail)

[0'18"]

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Nyquist

- A language for sound synthesis and music composition
- Implemented in C and C++ and runs on Win32, OSX, and Linux.
- Nyquist combines a powerful functional programming style with efficient signal-processing primitives.

- Nyquist

- <http://sourceforge.net/projects/nyquist/>

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Bol Processor

- Produz música a partir de um conjunto de regras (a compositional grammar)
- 'BP2 handles glossaries enabling it to communicate comprehensively with various brands of MIDI devices, among which General MIDI. It imports and exports data in MIDI files.'

- **Links:**

- <http://aune.lpl.univ-aix.fr/~belbernard/music/BolProcessorOverview/>
 - <http://bolprocessor.sourceforge.net/bp2intro.htm>

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Bol Processor – exemplo de gramática

// Composed by Thierry Montaudon - November 1997

-or.NotReich
-se.NotReich

```
RND
_mm(60.0000) _striated
gram#1[1] S --> _chan(1) _vel(50) _volumecont _volume(80) A' B' C'
-----
RND
gram#2[1] A' --> A A A A A A A
gram#2[2] B' --> B B B" B" C C D D D D E E E
gram#2[3] C' --> C C C D E E E C D C D E E E C C C B" B" B A A _volume(80) A A A _volume(0)

gram#2[4] A --> {1, C4 -, _vel(40) - E#3 G3, A#5, - D5}
gram#2[5] B --> {A A, _vel(60) C2}
gram#2[6] B" --> {B, - F5}
gram#2[7] C --> {B, { _vel(55) - C5}}
gram#2[8] D --> {B, - {C4 F5 E#4}}
gram#2[9] E --> {D, D#4 F4 C5 G#3}
```

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Music Creation by Novices: CODES !!! [sbcm2009]

- Most of Computer Music (CM) environments/tools are oriented to **musicians** !!
 - Music composition process assumes:
 - Musical Ideas
 - Musical Knowledge
 - theory, concepts, Skills in instrument playing
 - Music notations
- Our intention is to investigate novice-orientation!!

music creation by novices (?)

- Music creation process assumes:
 - NO ASSUMPTIONS AT ALL !!!
- Music creation as Design activity
 - Experimentation, trial&error
- Music creation as social activity
 - Web 2.0 – new user profile :
 - a) browsers, b) producers, c) (creators)?

How we make it possible? CODES!

- Music creation as design activity > music prototyping
 - Cyclical and incremental refinement
 - Visual manipulation of existing icons representing 4 seconds mp3 sound patterns
 - Result: Music Prototype (MP), non linear music
- Music creation as social activity > cooperation
 - Not a solitary activity
 - Exchange of ideas, questions, answers, comments

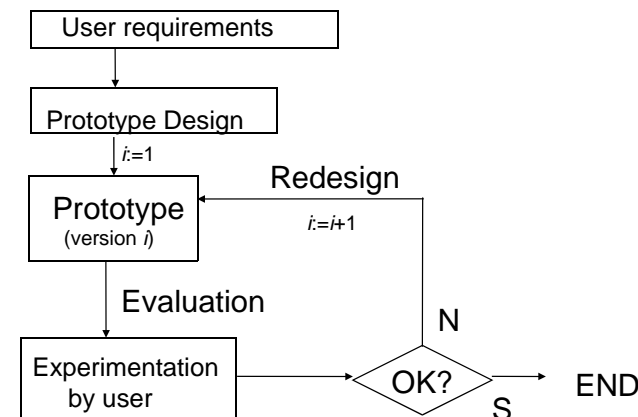
prototypical issues

- Engaging novices in music experimentation

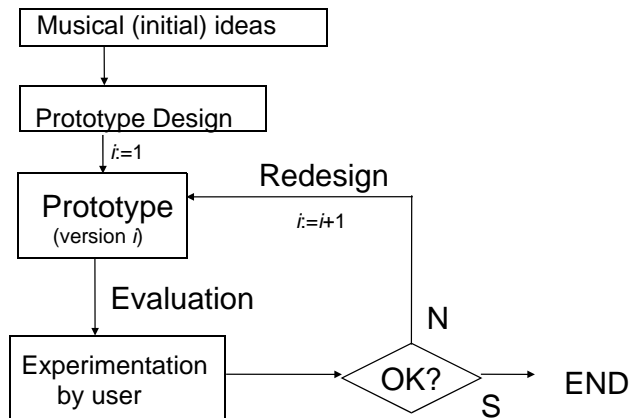
~~Formalism~~ ~~Theory~~ Musical Idea

- Visual notation (icons = sound patterns)
- MPs built using sound patterns as 'building blocks'
 - Direct manipulation metaphor
- Music Prototyping cyclic Process:
 - Cycles of edition, Listening

Software prototyping



Music prototyping



Cooperative issues

- To understand WHAT my partners are doing:
 - Awareness [IHC2006]
 - Version control **preserving authoring** - layers
 - Modification marks
 - Modification requests
- To understand WHY my partners are doing it
 - **Music Prototyping Rationale**
- Social network built by Explicit invitations
- Negotiation

Cooperation for non-technical design

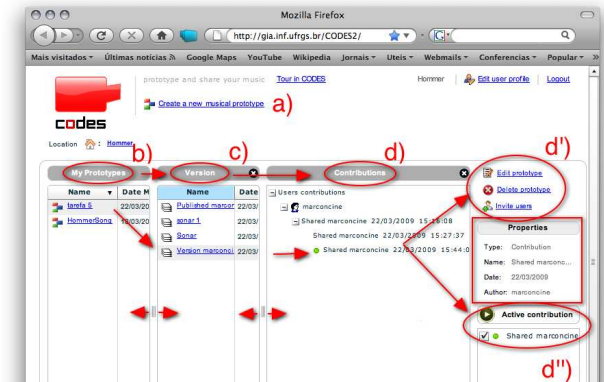
	Collaboration for Technical Product Design	Collaboration for <u>non-Technical</u> Product Design
Main Goal	according to a product (or requirements) model	mutual understanding
Group Topology	Typically, hierarchical group with a leader	Typically non-hierarchical, no formal leaders
Control	Coordination	Argumentation
Planning and Decisions	Rigid, systematic plan definition,	Unsystematic and opportunistic negotiation
Roles and Tasks	Fixed roles, pre-defined task allocation	No fixed roles, flexible task allocation
Example	manufacturing, construction, etc	arts, cooperative music prototyping (CMP)

[CSCWD2009]

final considerations

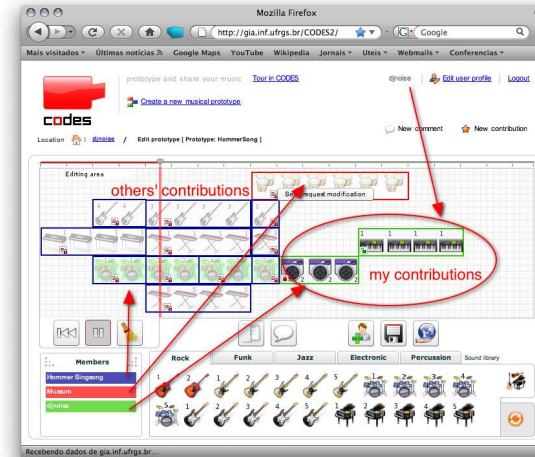
- Music creation by novices: **fun and entertainment**
NOT (serious) music composition...
- In CODES, novices cooperate by means of:
 - explicit actions on a shared object space
 - explicit conversation
 - Interpretation of actions
 - argumentations and comments of other actors
- Novices “feel” like musicians
- BUT Musicians “feel” like novices as well by experimenting new ideas and changing opinions

creating and organizing my MPs



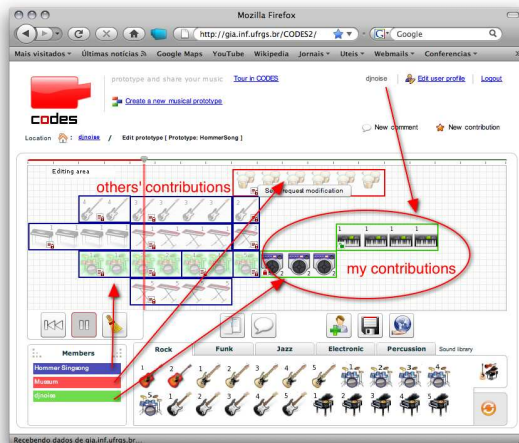
- a) new
- b) My
- c) versions
- d) contributions
- d', d'') actions

editing my MPs

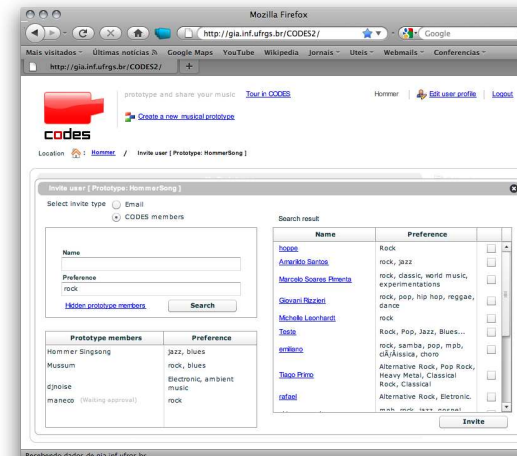


- prototypical
- cooperative

Cooperative editing level

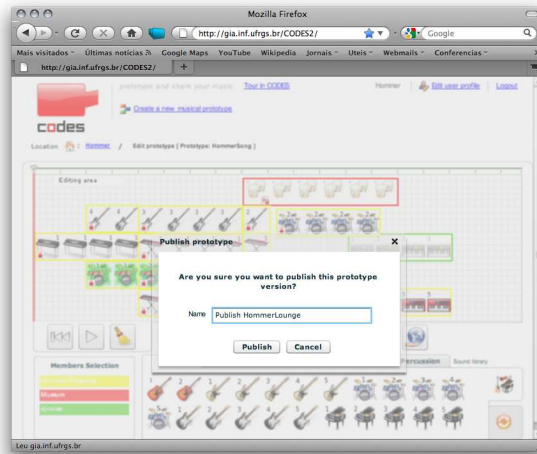


sharing my MPs



- Search members
- Invite by e-mail

publishing my MPs



- Public MPs are available at CODES home page.
- Can be listened
- Can be rated

CAC - Links interessantes

- Arpege Music
 - 'You can write, play, record, print and publish your music with Pizzicato, a music notation software'
 - <http://www.arpeggemusic.com/>
- www.myspace.com/stephentravispope
- Computer Aided Composition Software (Free)
 - http://www.hitsquad.com/smm/freeware/COMPUTER_AIDED_COMPOSITION/

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Audição

- Kraftwerk
 - Primórdios: Ruckzuck (Kraftwerk1, 1970)
 - Embrião da Música Eletrônica Dançante: Das Model (Die Mensch Maschine, 1978)
 - Auge: Electric Cafe , The Telephone Call (Electric Cafe, 1986)

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