## MAX/MSP/JITTER

- MAX is the most well known:
   Graphic programming environment for digital signal processing
  - Interactive Audio/Video prototyping environment
- Brainchild of mathematician Miller Puckette and music programmer David Zicarelli.
  - Developped at IRCAM in the late 80s,
  - Commercialised in 1990 and named after music pioneer Max Mathews.

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- MSP (1997) is the extention for sound: set of audio synthesis and signal processing objects
- JITTER (2003) is the extention for real-time video and 3D graphics
- Commercialised by Cycling'74 (see Web site)

MAX/MSP

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- Max is an object-based visual programming language for creating interactive audio and multimedia systems, or patches.
- Each Max object is an autonomous software 'device' that carries out a specific task, such as multiplying two numbers, reading the coordinate of the mouse or synthesising a digital sine wave.
- Objects communicate with each other via virtual patch cords, much as in a modular synthesizer.
- Max's 400+ built-in objects can control virtually all aspects of digital audio/video.
- If you run into a limitation, you can build your own objects using C, C++ or Java

## MAX/MSP

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- MAX is a must for anyone who work in the new media arena
- · Max excels at real-time interactive processing.
- Max is developped in C

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- This technology can be used to control and interface with all manner of systems – audio, graphics, lights, movies, CD/DVD players, power gloves, body suits, and just about any electronically controlled interactive device
- Max patches can be exported as standalone applications (Z) or as plugins (Pluggo, Mode Hypno...)
- Let's look at an example

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## MAX objects

Anatomy of a normal object:

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- 0 or more inputs (at the top)
- 0 or more outputs (at the bottom)
- The left input is the "hot" input which triggers the object behavior
- Initialisation: some objects can take arguments



## -----MAX objects

**Objects exchange messages:** 

- Int: Integer number, 123
- Float: real numbers (indicated by the .), 3.97
- List: up to 256 items (space is the separator)
- Symbol: any non number message (often use to encode commands for objects, "start", "stop", ...)
  Bang: "do whatever it is you do" type of message (for example when the random object receive a bang it outputs a random number)
- Audio object (MSP) are noted with a tilde noise~
- Max takes care of the low level details: for example, the Fast Fourrier Transform is one object (fft)

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- Project in interactive Sound Design:
  - Either a standalone application or a plugin - Can:
    - · Proccess incoming sound stream(s) or an audio files · Generate sound

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- Be purely software or integrating hardware components
- Has a graphical interface - Start thinking about it!
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	"I like to listen. I have learned a great deal from listening carefully. Most people never listen." Ernest Hemingway		
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