PV259
Generative Design Programing

Week 8

Audio-reactive visuals

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FI

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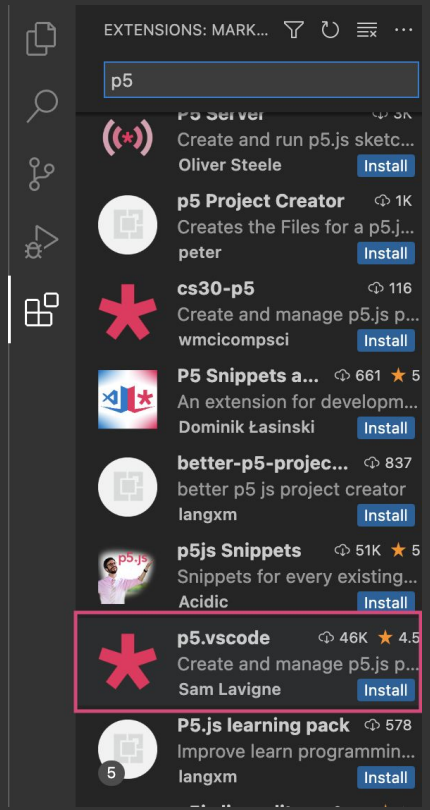
p5 in VScode

Install p5.vscode

1. Open Visual Studio Code
2. Open Extensions tab (Shift + Ctrl + X)
3. Search “p5”
4. Install “p5.vscode”



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Useful extensions

- **Live Preview from Microsoft**
  Allows you to see the sketch in the

- **GitHub Copilot**

Computer audition

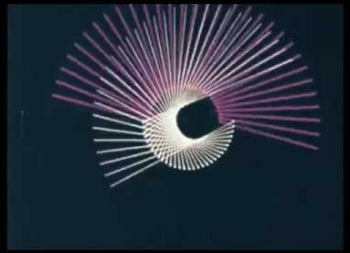
→

Matrix III

John Whitney, 1971

Pioneer in audio-visuals.

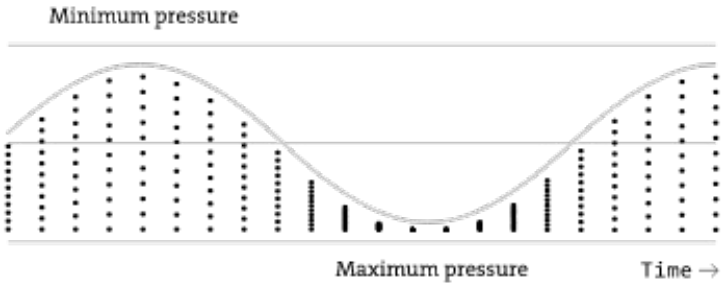
Recreating the visuals in Processing.



A Personal Search For the Complementarity of Music and Visual Art (1992)

“Musical language, visual action, symbol, and color. But are these elements united in true complementarity? I do not know. But I do know, that the union of color and tone is a very special gift of computer technology.”

Sound



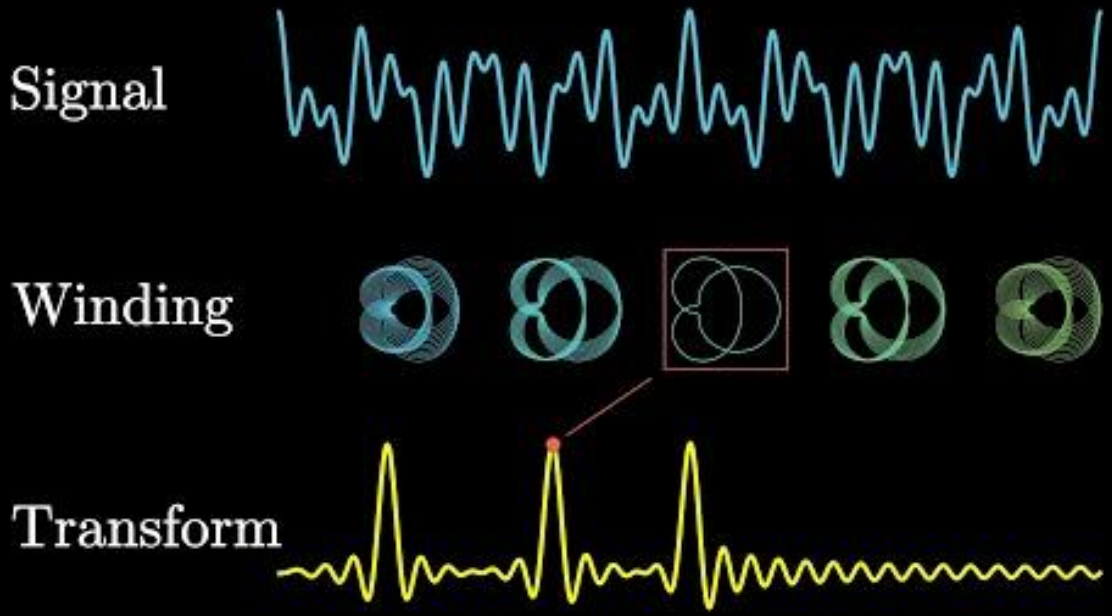
amplitude,
frequency

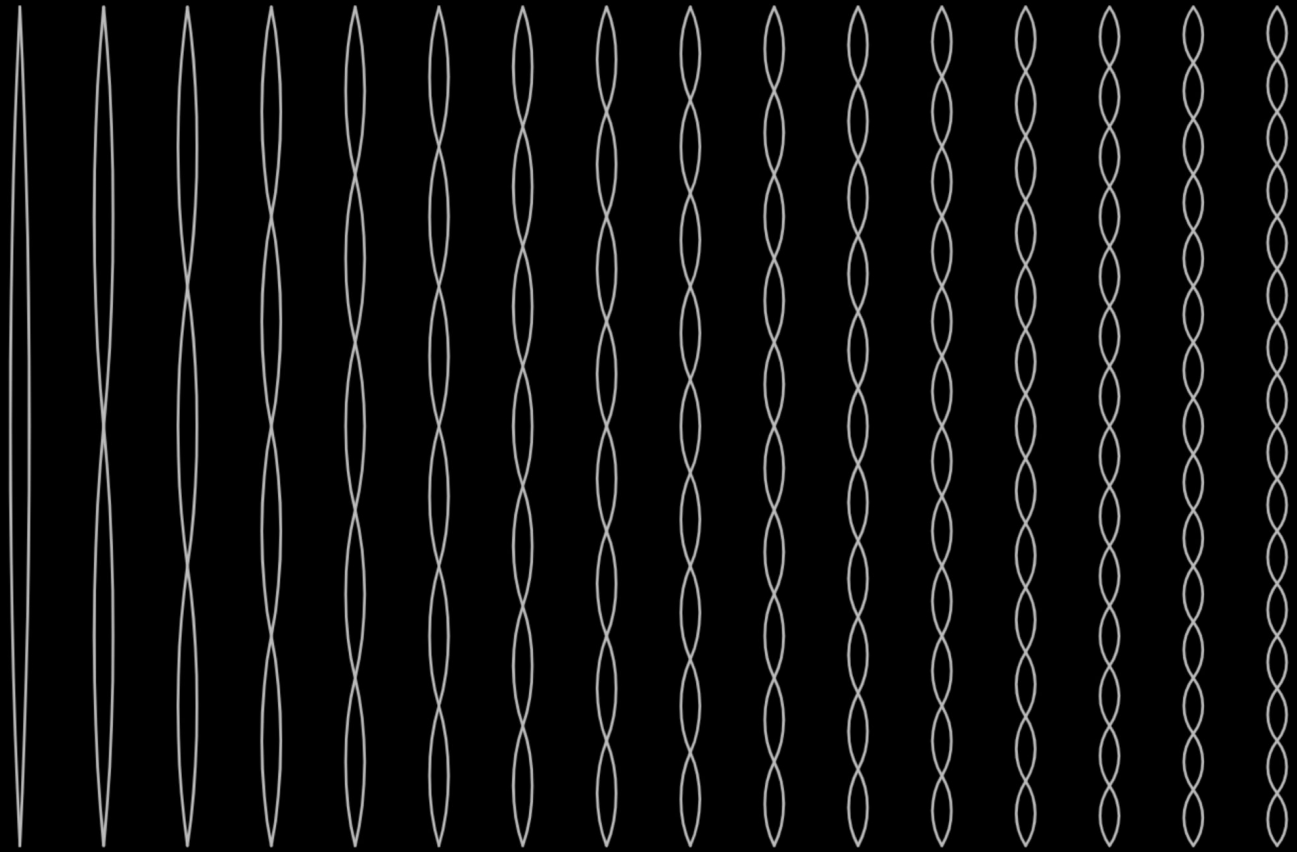
https://processing.org/tutorials/sound/#music-and-sound-programming-in-the-arts

What can we do?

- ❏ **amplitude**
- ❏ **frequency**
- ❏ beat
- ❏ pitch detection
- ❏ lyrics, pre-analyzed data about songs (look at Spotify API)
- ❏ music score – MIDI

Decomposing soundwaves

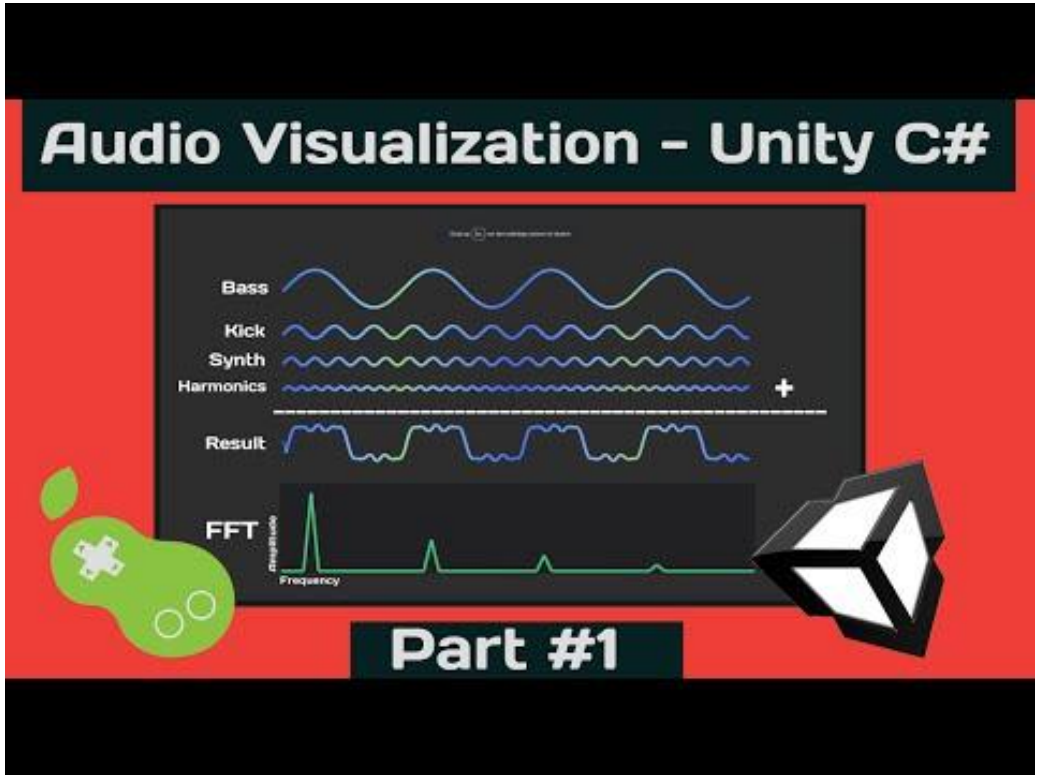




https://alexanderchen.github.io/harmonics/

Division of the audio spectrum

subbass 20-60 hertz
bass 60-250
mid 250-4k
high 4k-20k



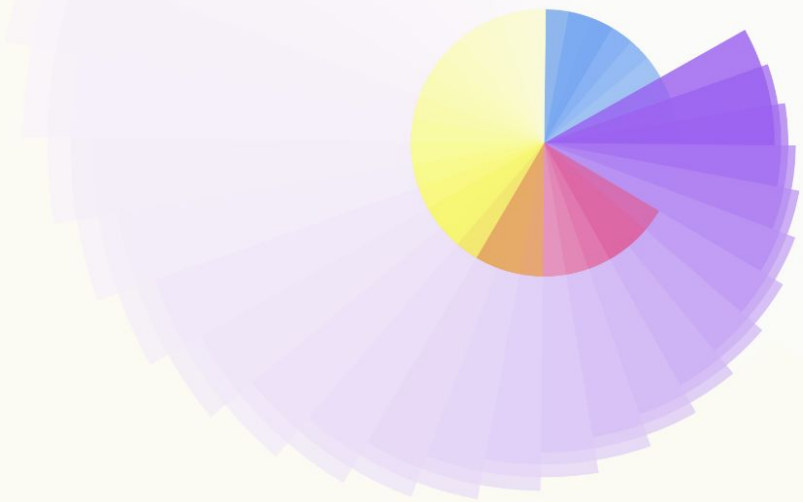
FFT

- music to download (Nicolas Jaar)
- p5.sound library reference, most important p5.FFT
- analyze frequencies using **`fft.analyze([smoothing=0.8], [bins=1024])`**
  - returns array of length ***bins***, with each value representing the volume of frequencies corresponding to that bin (*frequency spectrum divided into 1024 parts*)
- get the volume of bass using **`fft.getEnergy(“ ... ”)`**
  - try arguments "bass", "lowMid", "mid", "highMid", "treble"
- connect to microphone, if you have one

```
mic = new p5.AudioIn();
mic.start();
```

- detect beat
  - demo, demo 2
- other examples

Code ->



https://therewasaguy.github.io/p5-music-viz/demos/08_echonestPitchSegment/

→ IMAGE

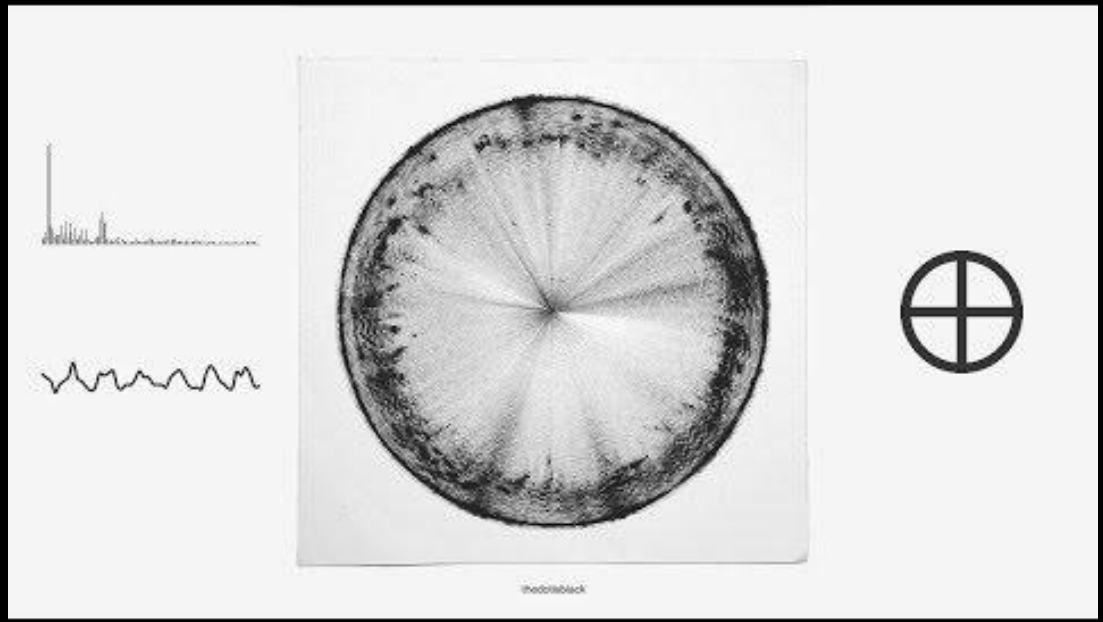
Sound of EARTH ⊕ SOUND OF SPACE

thedotisblack, 2017

The audiovisual is made with Processing based on an audible collage constructed from various plasma wave recordings of NASA's Voyager 1 and 2 spacecrafts. The audible collage is part of a collection of works by Brain/Mind Research that was inspired by these audible-frequency plasma waves and arranged selections from these recordings into a "musical" form. Launched in 1977 by NASA, Voyager 1 and 2 passed near different planetary and moon bodies within our solar system.

The astrological symbol for the planet Earth is ⊕. It represents the cardinal directions.

The audiovisual consists of one original "audio" file, cut down to 3 minutes, and edited with a beginning and end transition for a perfect loop.

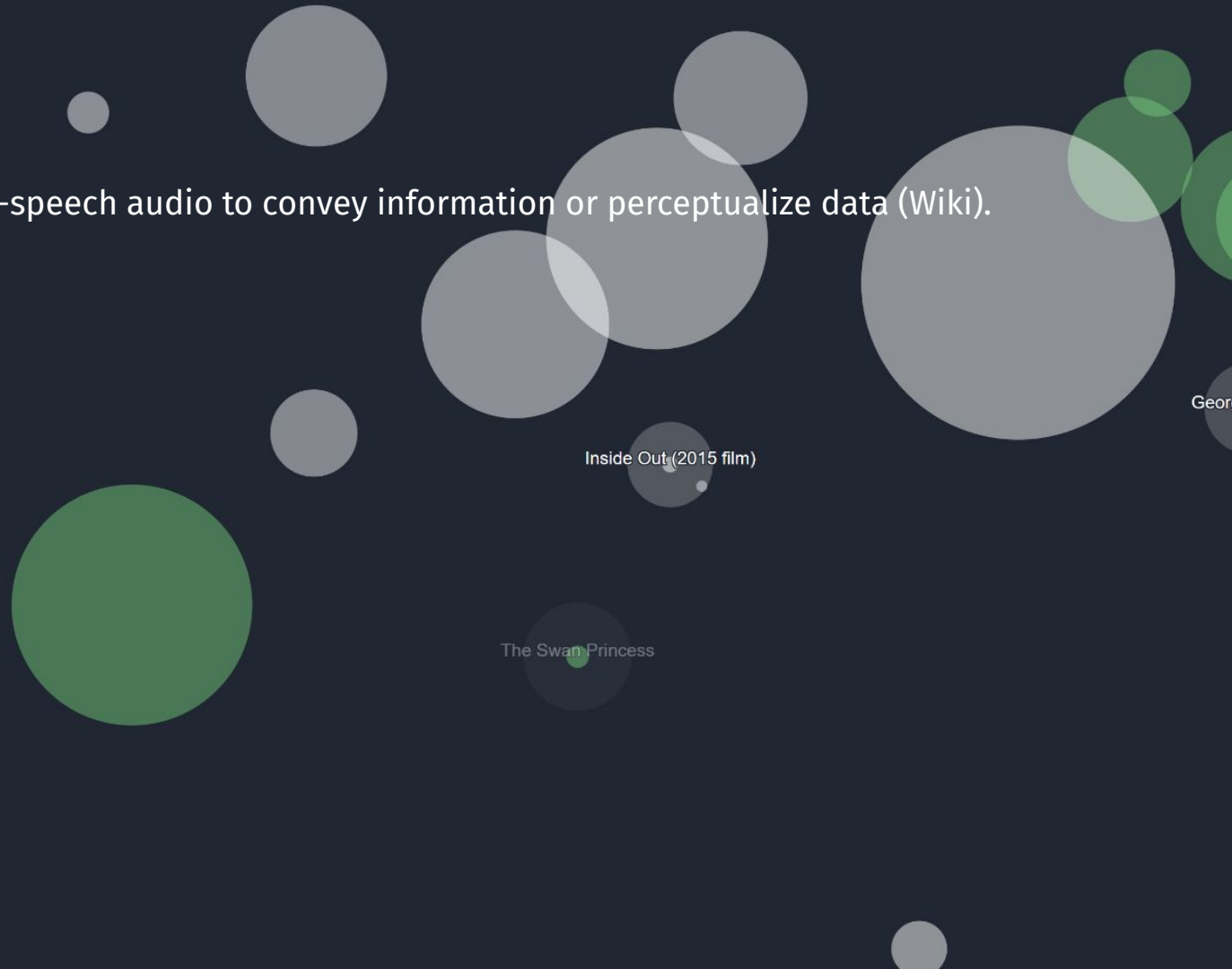


Sonification

Sonification is the use of non-speech audio to convey information or perceptualize data (Wiki).

Listen to wikipedia:
http://listen.hatnote.com/

Listen to bitcoin:
https://www.bitlisten.com/



→ LIVE PERFORMANCE

Messa di Voce (placing the voice)

Tmema, 2003

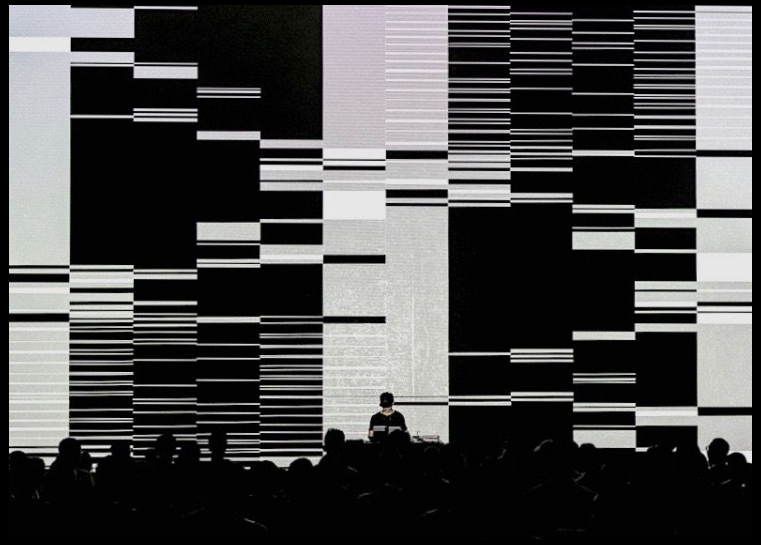
An audiovisual performance in which the speech, shouts and songs produced by two abstract vocalists are radically **augmented** in real-time by custom interactive visualization software. The performance touches on themes of abstract communication, synaesthetic relationships, cartoon language, and writing and scoring systems, within the context of a sophisticated, playful, and virtuosic audiovisual narrative.

https://www.tmema.org/messa/messa.html

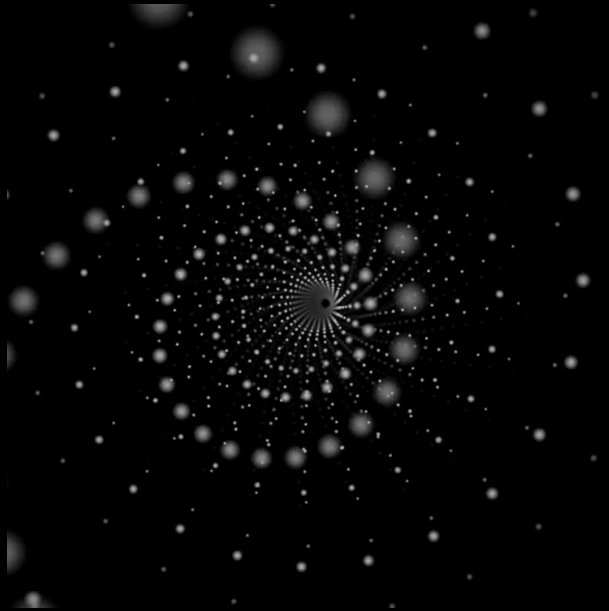
→ AUDIO-VISUALS

Transfinite

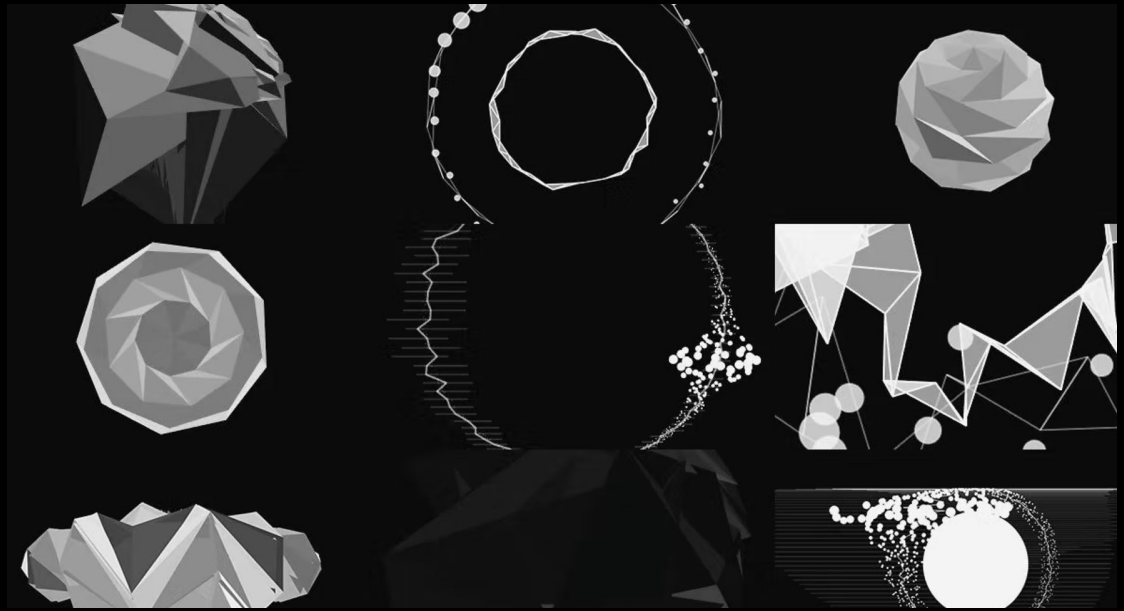
RYOJI IKEDA



Party visuals



https://vimeo.com/116097721



https://vimeo.com/68161863

Algoraves

An ***algorave*** (from an algorithm and rave) is an event where people dance to music generated from algorithms, often using ***live coding*** techniques.

An example of a live coding dev environment for real-time visual performance:
www.visor.live

Make it react

Take any of your previous sketches, select proper music, and make it audio-reactive.

Calming thing

Make a calming thing.

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