

IMCA 221
Programming for Artists
Winter 2025

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**Class is on Zoom even in the classroom
for sharing, find the details on Moodle**

<https://moodle.concordia.ca/>

Download the slides!

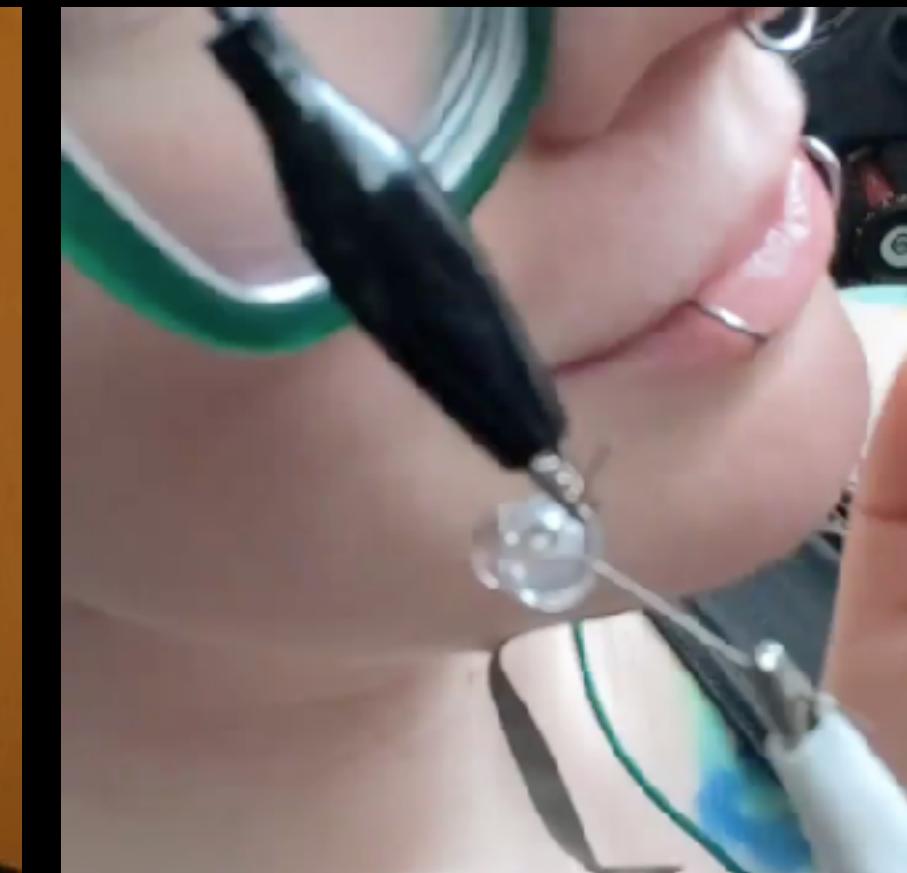
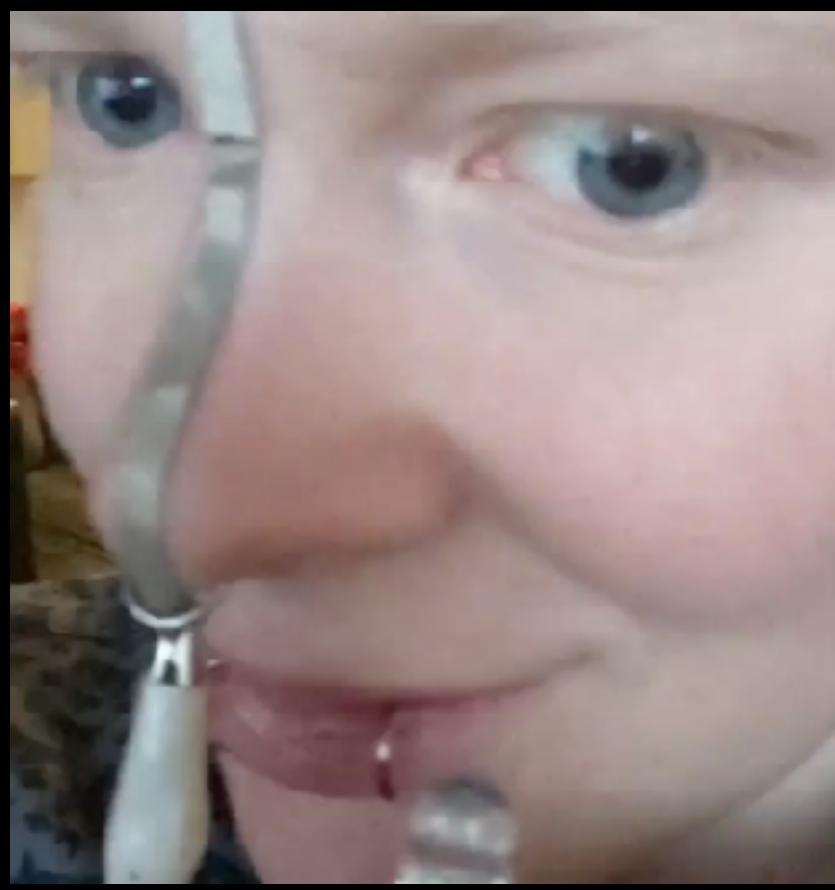
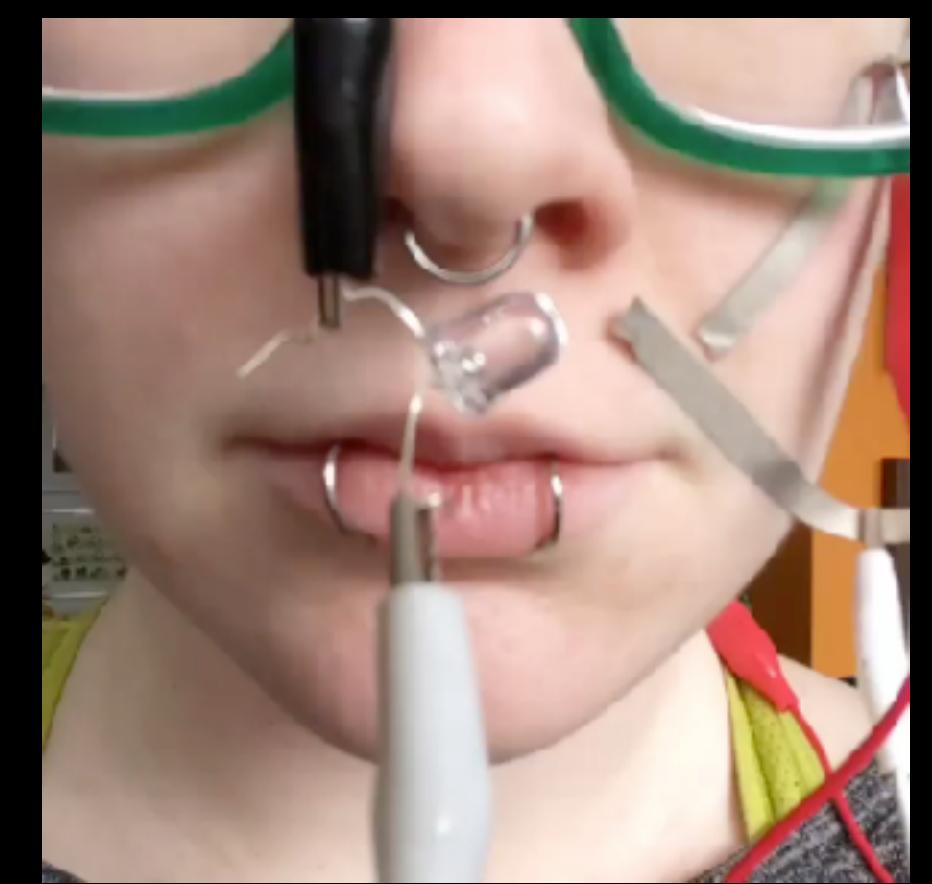
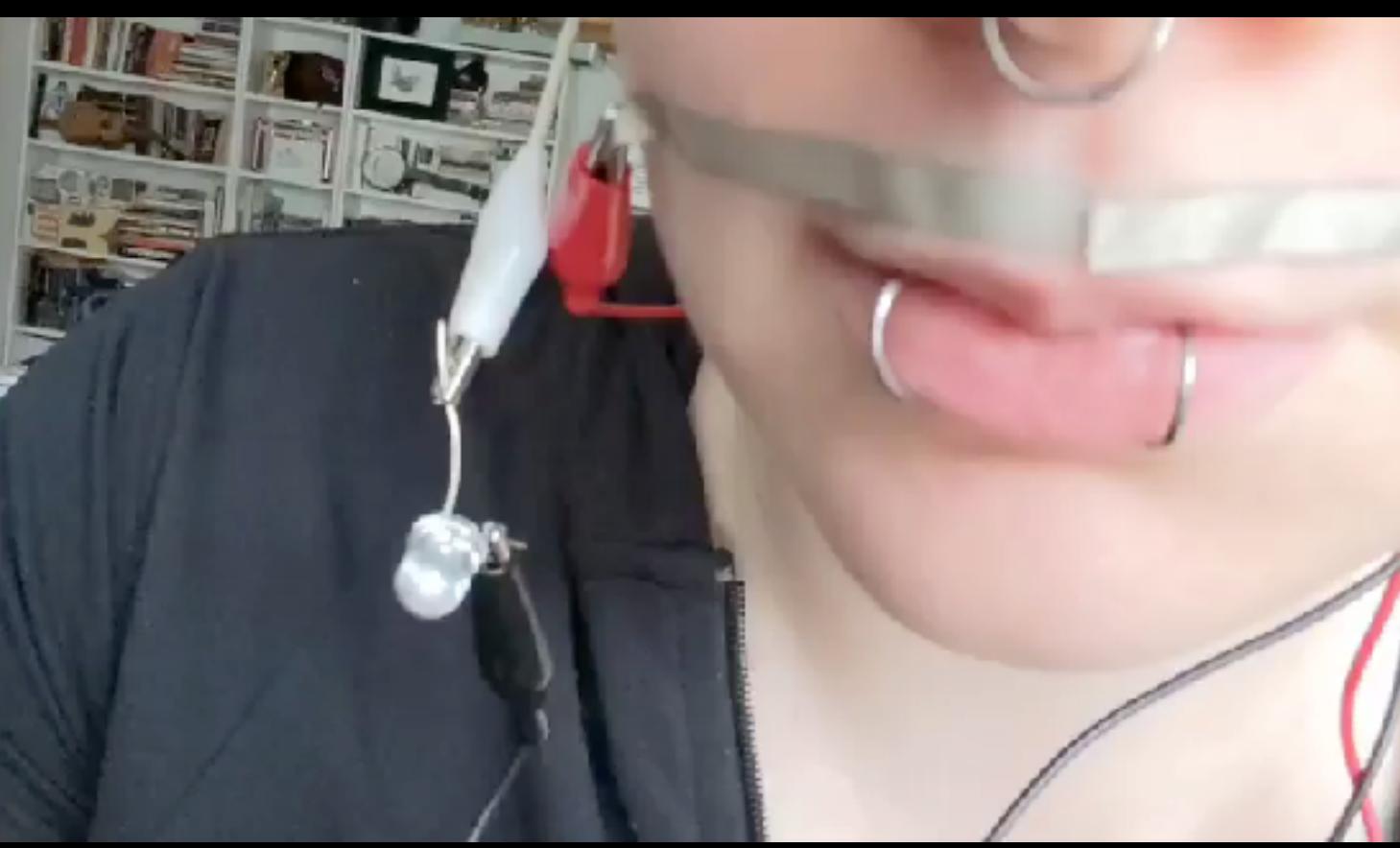
Introduce Yourself

Your Name/pronouns:

Your program/year:

What are you interested in learning this year? It can be anything!

What is your favourite breakfast food?









YES

ARCANA

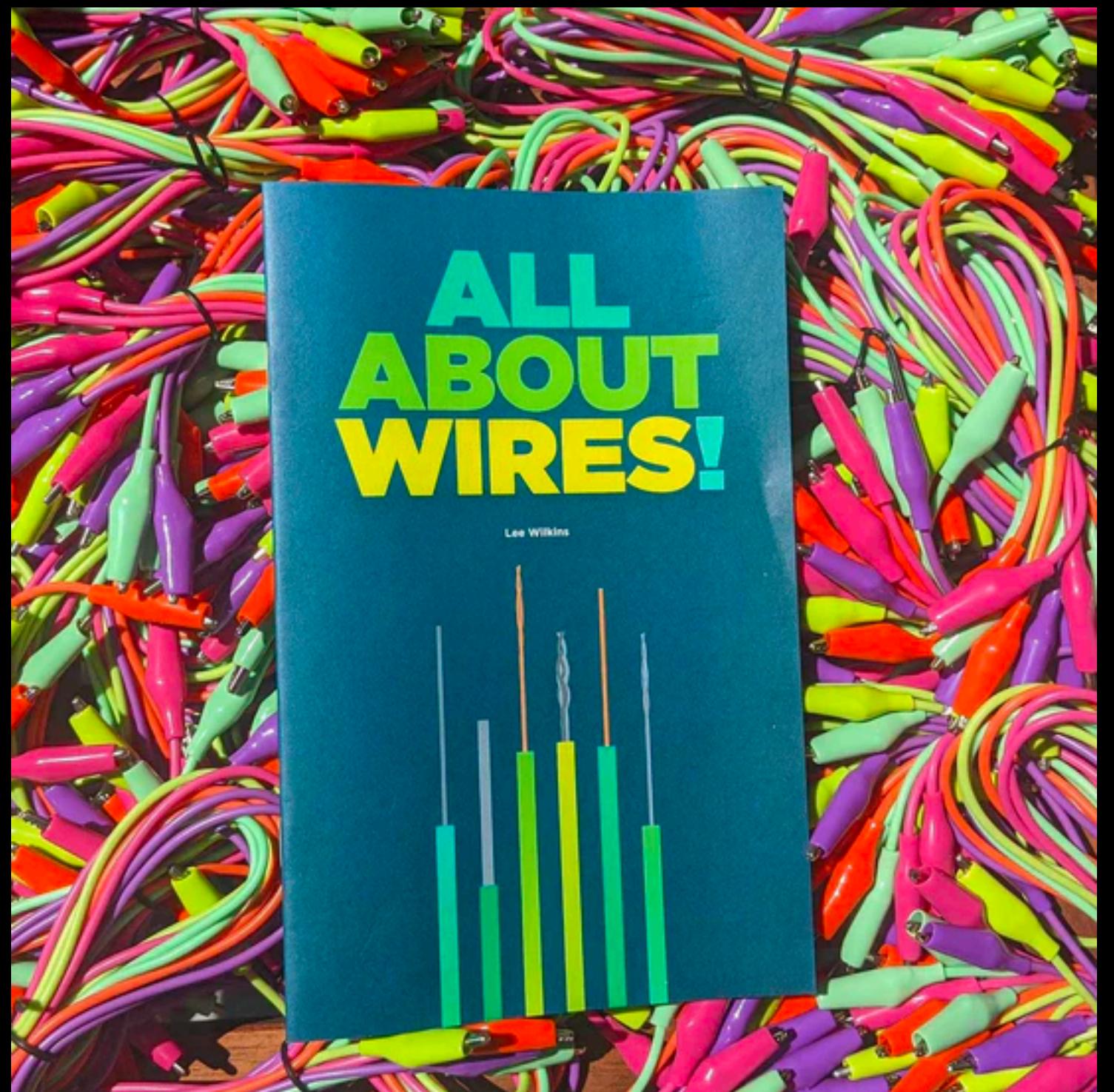
NO

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z

X
1 2 3 4 5 6 7 8 9 0

.....
GOOD BYE





Open Source Hardware Association





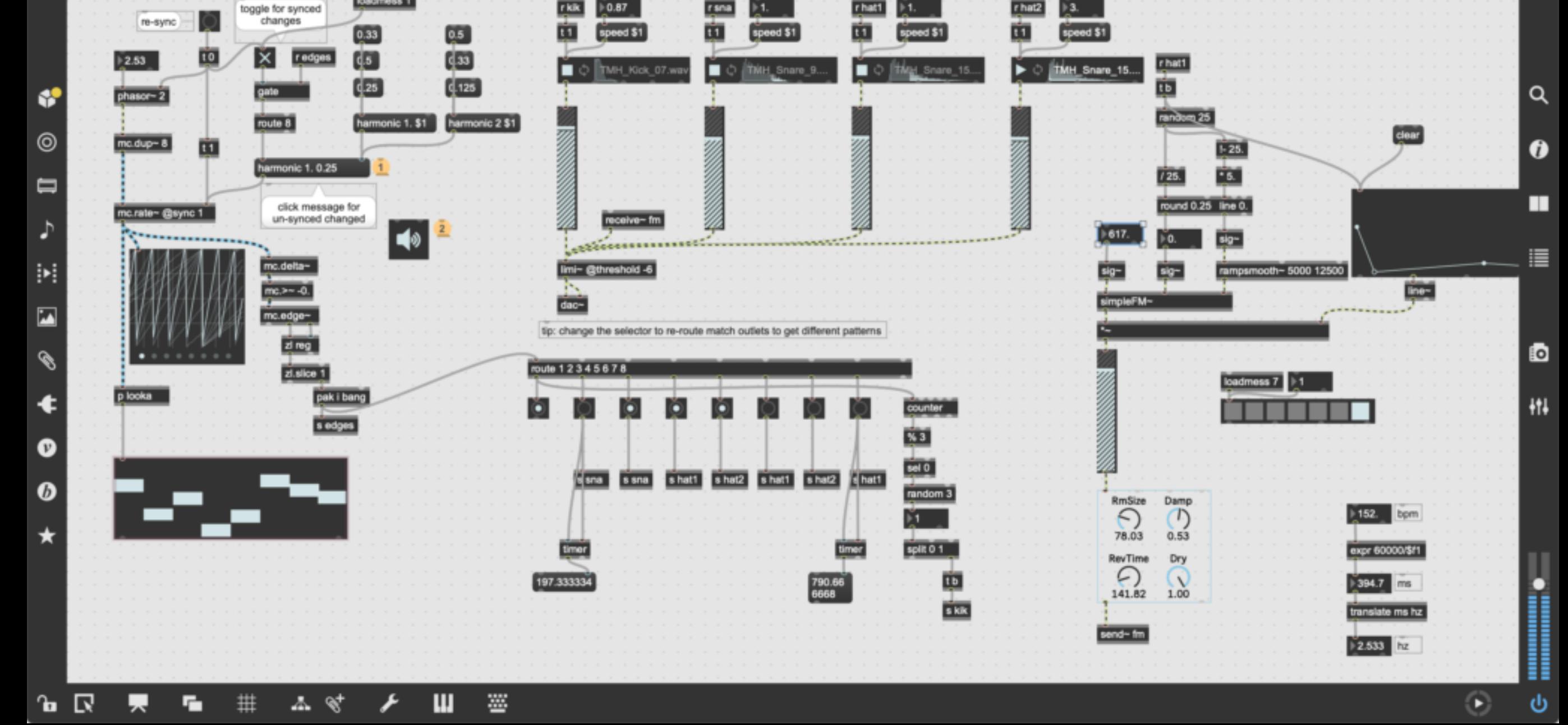
Learning Objectives

- Learn the basics of interactive installation using MaxMSP
- Learn the basics of Arduino based interactive installation
- Explore the possibilities of interactive installation in a variety of contexts
- Learn how to constructively critique work
- Learn to document your work

What is programming for artists?

- Controlling audio, video or physical objects using your computer
- Automatically sensing the world and outputting it in different ways
- Experimenting with computation and code to enhance your existing practice
- Remember, you can make it your own!

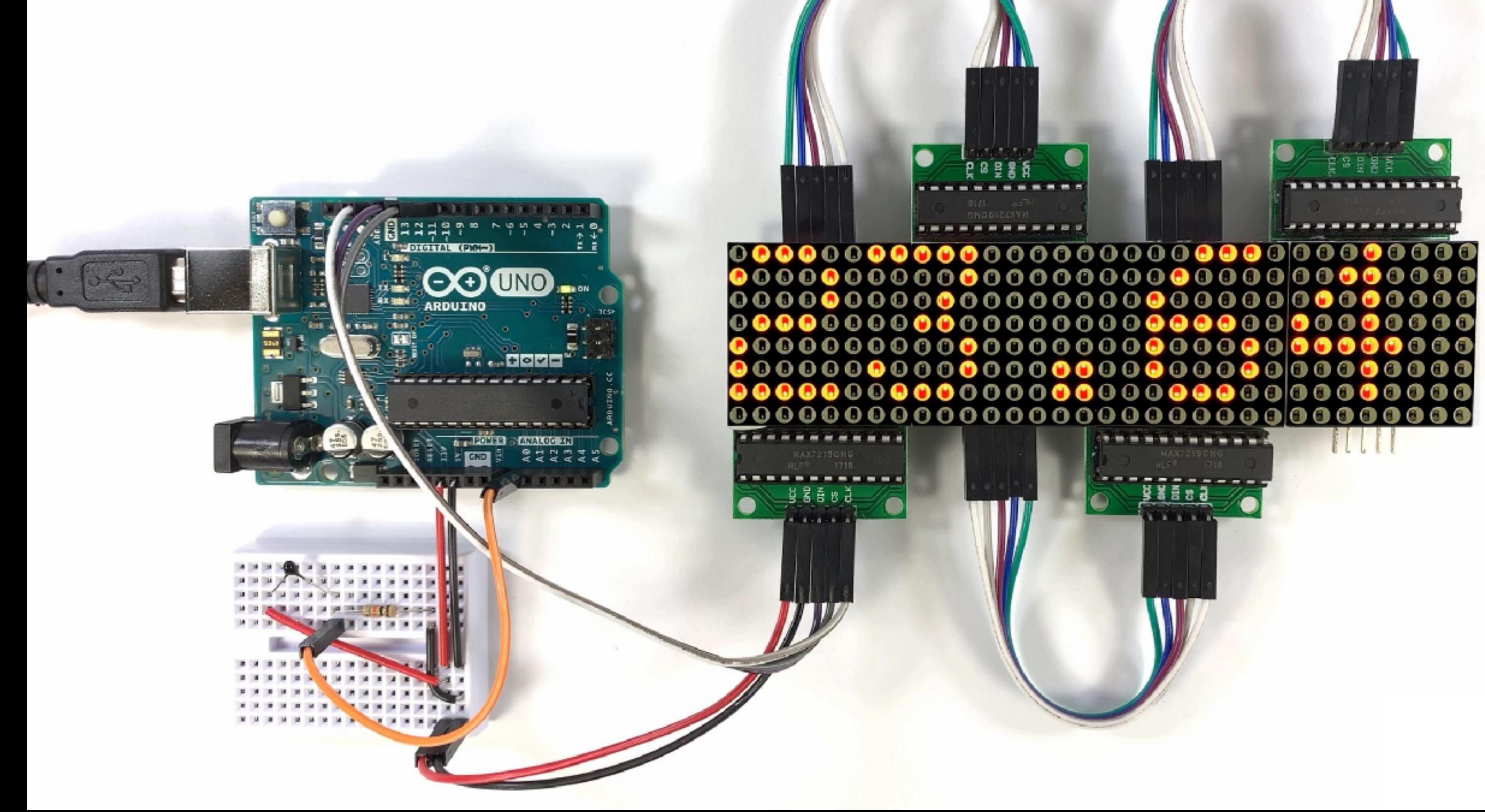
Max/MSP/Jitter



A visual interface to program a whole variety of tools. If you've coded before, it may be familiar but is also very different!

Arduino

A physical platform for prototyping
circuits and sensors.



Modules:

Audio control: Create audio signals and manipulate audio with interactive elements

Video and graphic Control: Control video input and output for projections or installations. Create graphics, detect movement, manipulate video

Sensors and physical computing: Use sensors and actuators (motors, movement & more)

Grade Outline

Main Projects

Mid-term: Site Specific Installation (groups) 25% March 6
Final project (individual) 35% April 10

Prototype 10% March 27

Final 25%

In class work:

Audio Experiment 10% Jan 30

Video Experiment 10% Feb 13

Sensor Experiment 10% March 20

Participation 10%

Grade Breakdown

25% Exploration & Functionality:

The goal of this grade is to help you push your boundaries but work within your capabilities. Having a more complex project is part of the grade, but it is more important that your work functions. Be intentional and spend time trying to understand your problems instead of abandoning things that don't work.

A good way to excel in this area is to explore a new technique we did not touch on in class OR expand meaningfully on something we touched on in class.

25% Creativity & Concept:

Every project should have a concept. Concepts don't have to be elaborate or in depth, they can be as simple as evoking a feeling, exploring a moment, explaining a subject or cause, sharing something you like, making the viewer feel something briefly. Keep your concepts simple as you start. This grade is measured by how effective your concept is on the viewer so don't try anything complex when you start. Some really simple ideas: colours, nostalgia for a particular time, surprise, de-contextualize a space, etc. As you get better at concepts, you can explore larger ideas. Always have a concept, no matter how simple.

A good way to excel in this area is to have a clear concept that is evident to the viewers without explanation.

Grade Breakdown

25% Execution & presentation quality:

This is measured by how well presented your work is. This is aside from the creativity, but how well it is physically or digitally assembled. How would it look in a gallery?

A good way to excel in this area is to make sure your work is polished and clean. This can vary widely depending on the work. Clean up your cables, good presentation, well made objects or assets etc. Be mindful of how the work is shown and viewed. Its okay if you can't make it perfect, but have an idea of how you'd like to finish the work.

25% Documentation:

Project is documented as outlined below. Remember: if you don't document your project, nobody else will know it happened!

Part of your documentation grade is how you present your work in class during critique. Come ready to discuss your work and tell us about your process and purpose.

Class Structure

Outside of class: Practice & explore

Part 1: Live coding + Concepts

Part 2: Studio time and exercises

**You are expected to work 3-4 hours
outside of class time per week.**

Software

MaxMSP/Jitter: download at <https://cycling74.com/> for free trial (you can't save your work) or use a lab computer with a full licence.

Arduino: download at <https://www.arduino.cc/> on your computer or use at the lab. Arduino physical hardware can be found in EV-S2-618 with James.

Zoom: <https://zoom.us/download> used for in-class video tutorials.

Moodle: : <https://moodle.concordia.ca/moodle/login/index.php> used to post all of the class materials, assignments, and hand-ins

Weekly Breakdown

January 16

Week 1: Introduction, Studio Tour + intro to MaxMSP

January 23

Week 2 - Using Audio & Midi, loops

January 30

Week 3 - More audio, studio time & Audio Experimentation due by midnight & in class sharing

February 6

Week 4 - Using Jitter, video input/output, controlling video -

February 13

Week 5 - More video, studio time & Video Experimentation due by midnight & in class sharing

February 20

Week 6 - Open GL graphics + Jitter

February 27

>> NO CLASS, HAVE A GOOD BREAK! <<

Weekly Breakdown

March 6

Week 7 - Mid Term Project due - Group Project: Site Specific Installation Critique (Presentations in class)

March 13

Week 8 - Arduino & sensors introduction

March 20

Week 9 - More sensors & Sensor Exploration due by midnight & in class sharing

March 27

Week 10 - Prototype/Progress Critique

April 3

Week 11 - Studio time

April 10

Week 12 - Final Critique

Get Help!

TA: Hailey Guzik

Office Hour: By appointment

Email: hailey.guzik@concordia.ca

Technician: James Schidlowsky

Office: EV-S2-618

E-mail: james.schidlowsky@concordia.ca

Critique Policy

See Critique Cheat Sheet on Moodle for additional information. Critiques are critical opportunities for artistic development and growth. Students are expected to be both supportive and constructively critical with each other. You are expected to engage actively in critique and be prepared to engage deeply with concept and technical aspects of projects.

Late Work Policy

All projects are expected to be handed in by midnight of the due date. Feel free to make changes after critique or finish documentation. Students will be deducted 5% per day after that. If there is any reason why you can't meet the deadline, notify the instructor via email or in class. The sooner you notify the instructor, the sooner they can help you find a solution or avoid late marks. If you need help accessing student services or resources, please reach out.

On Plagiarism

In Simple Words:

Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it.

In a class like this, you will frequently use other people's code and examples. This is totally fine, but you should indicate where you get it from AND change it meaningfully. Work that is a direct copy from a tutorial will not be accepted, even if it is cited. Work based on a tutorial should be indicated and linked.

Moodle Tour!

Resources:

Max Documentation: <https://docs.cycling74.com/max8>

Max Cookbook <https://music.arts.uci.edu/dobrian/maxcookbook/>

Andrew Robinson Video Tutorials <https://www.youtube.com/@AndrewRobinson26>

Inspo



The Stone Pad instrument was played on tracks from the latest album by Jhon William Castaño Montoya, a Colombian violinist and researcher.

[https://www.dezeen.com/
2014/05/07/fabrica-stone-
pad-musical-instrument/](https://www.dezeen.com/2014/05/07/fabrica-stone-pad-musical-instrument/)

Behnaz Farah

**Blindness: [https://
behnazfarahi.com/
blindness/](https://behnazfarahi.com/blindness/)**



**Iridescence: [https://
behnazfarahi.com/
Iridescence/](https://behnazfarahi.com/iridescence/)**



Daniel Rozin: Mirrors

<https://www.youtube.com/watch?v=kV8v2GKC8WA&t=203s>
& <https://www.thisiscoLOSSAL.com/2015/05/an-interactive-fur-mirror-by-daniel-rozin/>



Jeremie Bellot
Projection
Mapping
[https://](https://www.youtube.com/shorts/OQXS-KIWqTw)
[www.youtube.co](https://www.youtube.com/shorts/OQXS-KIWqTw)
[m/shorts/OQXS-](https://www.youtube.com/shorts/OQXS-KIWqTw)
[KIWqTw](https://www.youtube.com/shorts/OQXS-KIWqTw)

Interactive Audio Composition



Concept: Jacob Hedges, Rein Liu.

Music and Sound: Rein Liu and Jacob Hedges.

Visual: Edited from the Max msp patch from Federico Foderaro. Programmed in Max MSp by Rein Liu.

Performer: Max Taylor.

[https://www.youtube.com/
watch?v=PjIXpNqCerA&t=76s](https://www.youtube.com/watch?v=PjIXpNqCerA&t=76s)



Radom International
Rain Room: it's
raining, but you
won't get wet

[https://
www.youtube.com/
watch?v=EkvazlZx-
F0](https://www.youtube.com/watch?v=EkvazlZx-F0)



Terminology

Patch: A max program

Objects: Blocks that do something

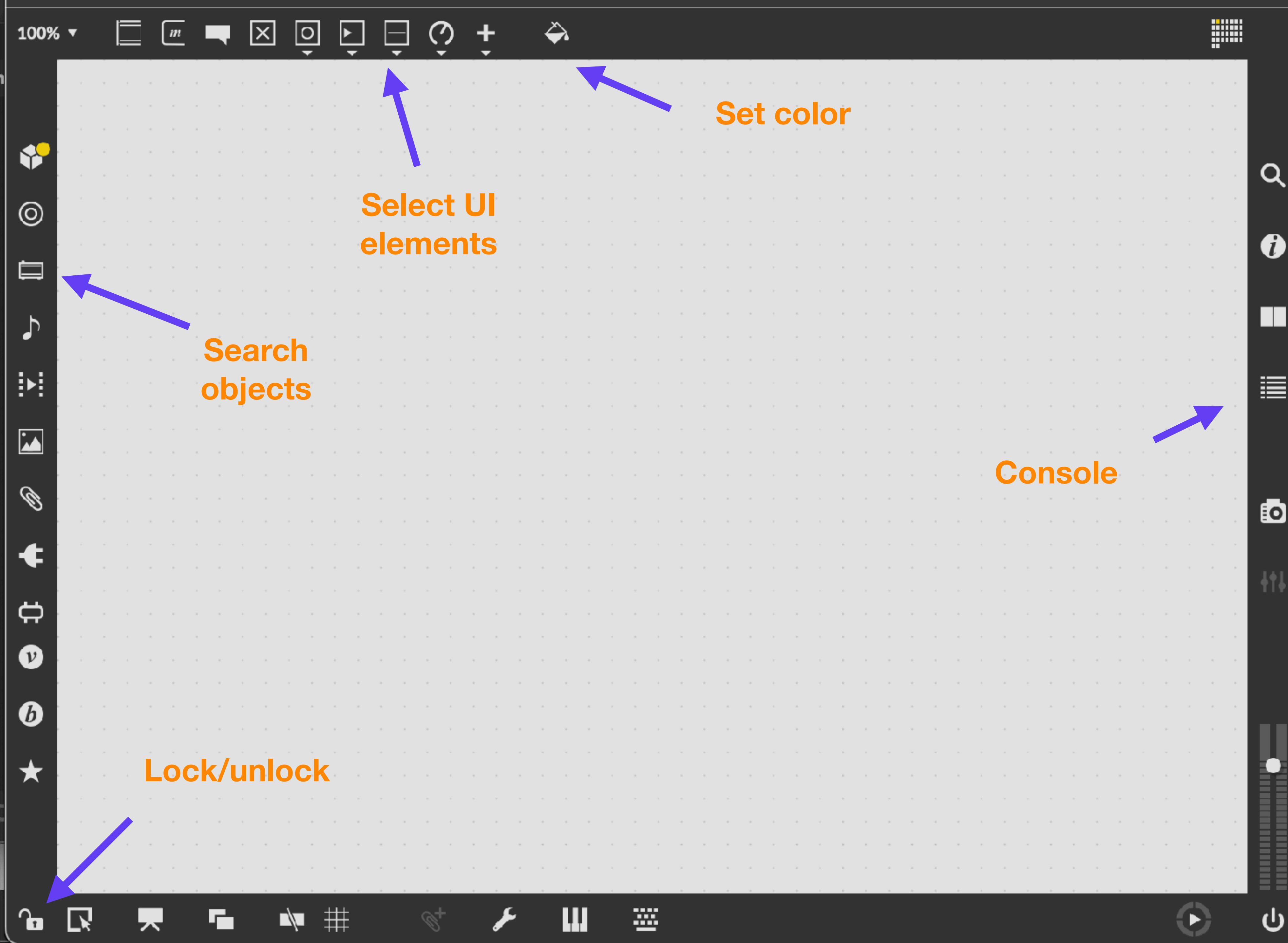
Patch Wires: Connect each block

Lock/Unlock: The patch is editable or not
editable

Bang: A signal sent often to active an object

Console: a text output useful for debugging

A project can contain multiple patches, so its a good idea to start a new project for each assignment. You can save just the .maxpatch file if you only have one to submit.



Make a new object

- Make sure your patch is unlocked
- Type n to make a blank object
- Start typing the name of the object
- Select the object you want

All objects have:

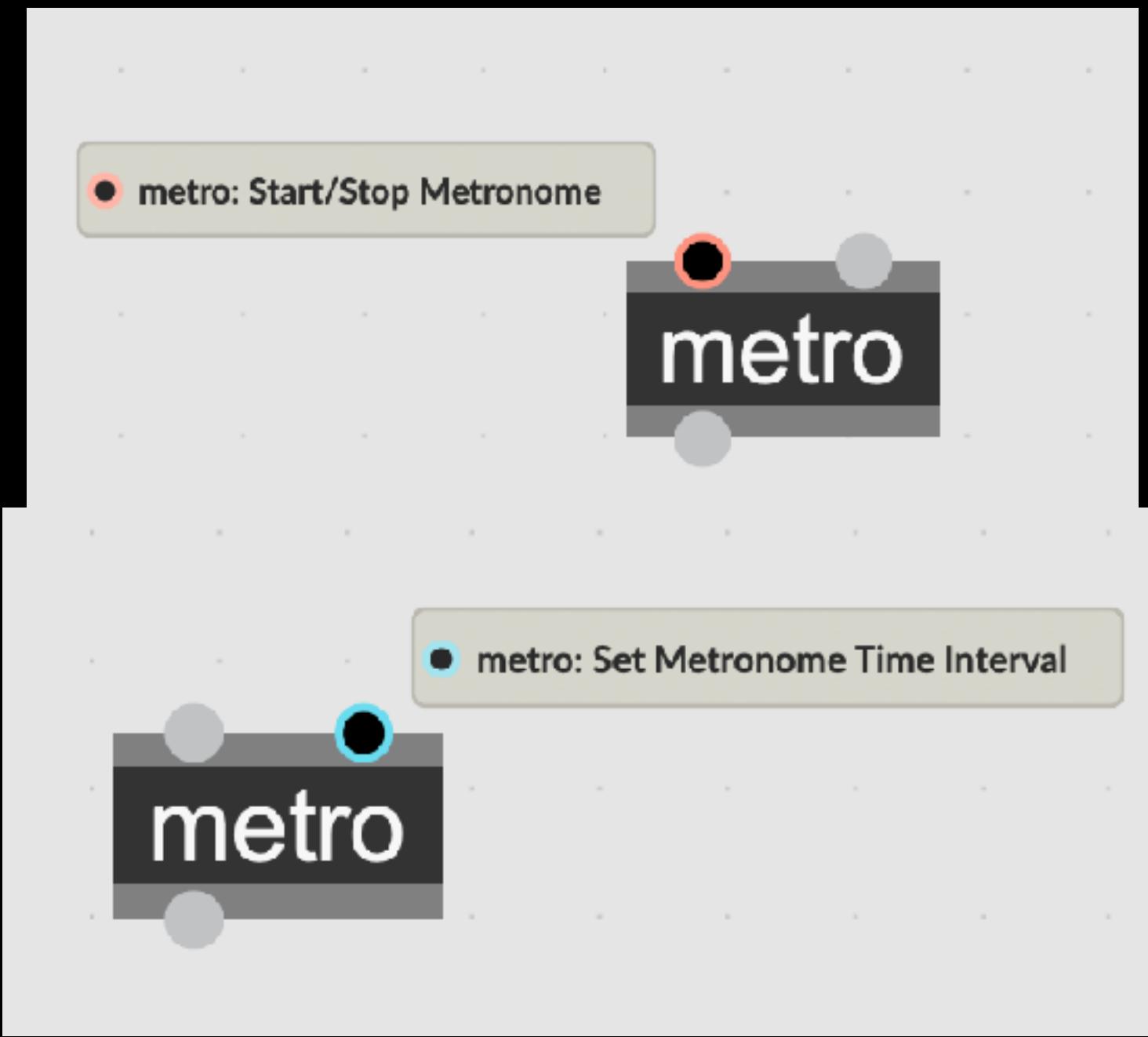
Inlets: Data that the object accepts to perform its function

Outputs: Data the object sends out to another object or output

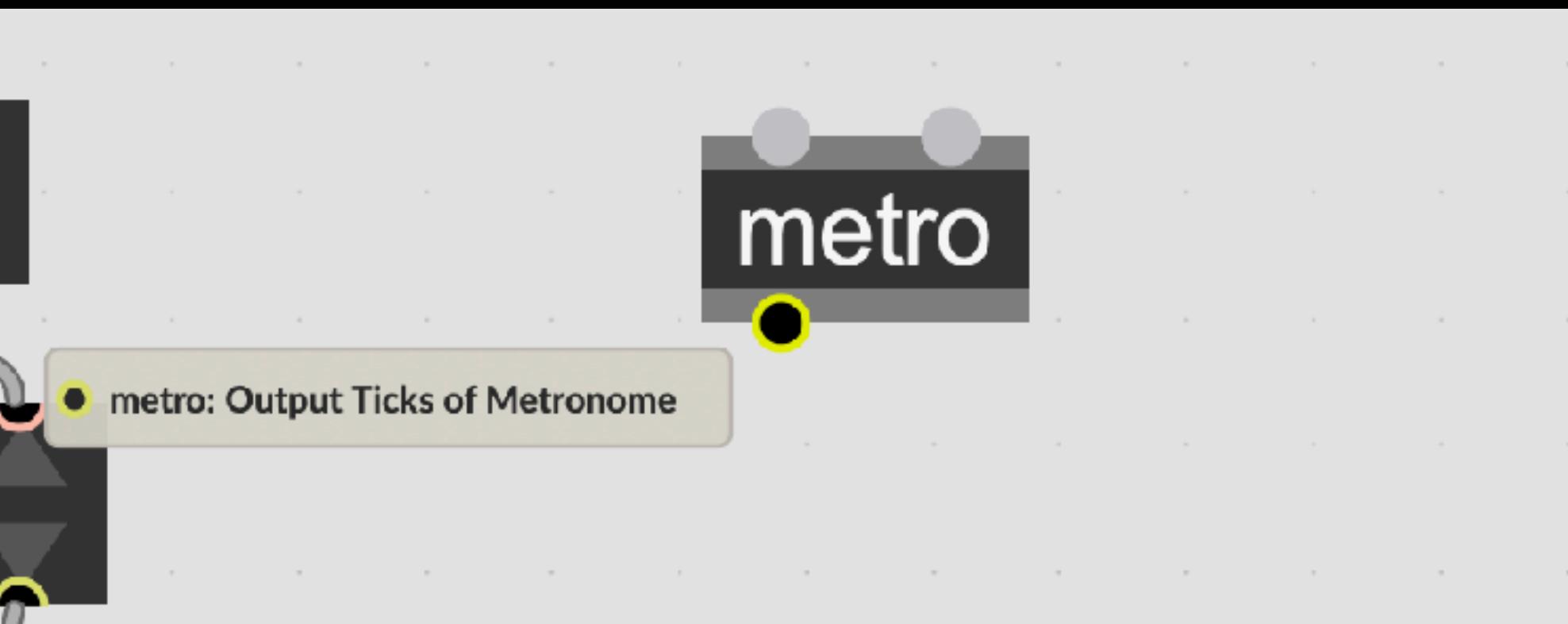
Some have:

Arguments: Pieces of data to make the object have a specific behaviour

Red: Hot Inlets triggers outputs when they come in



Blue: Cold Inlets: setting a variable not NOT triggering a response

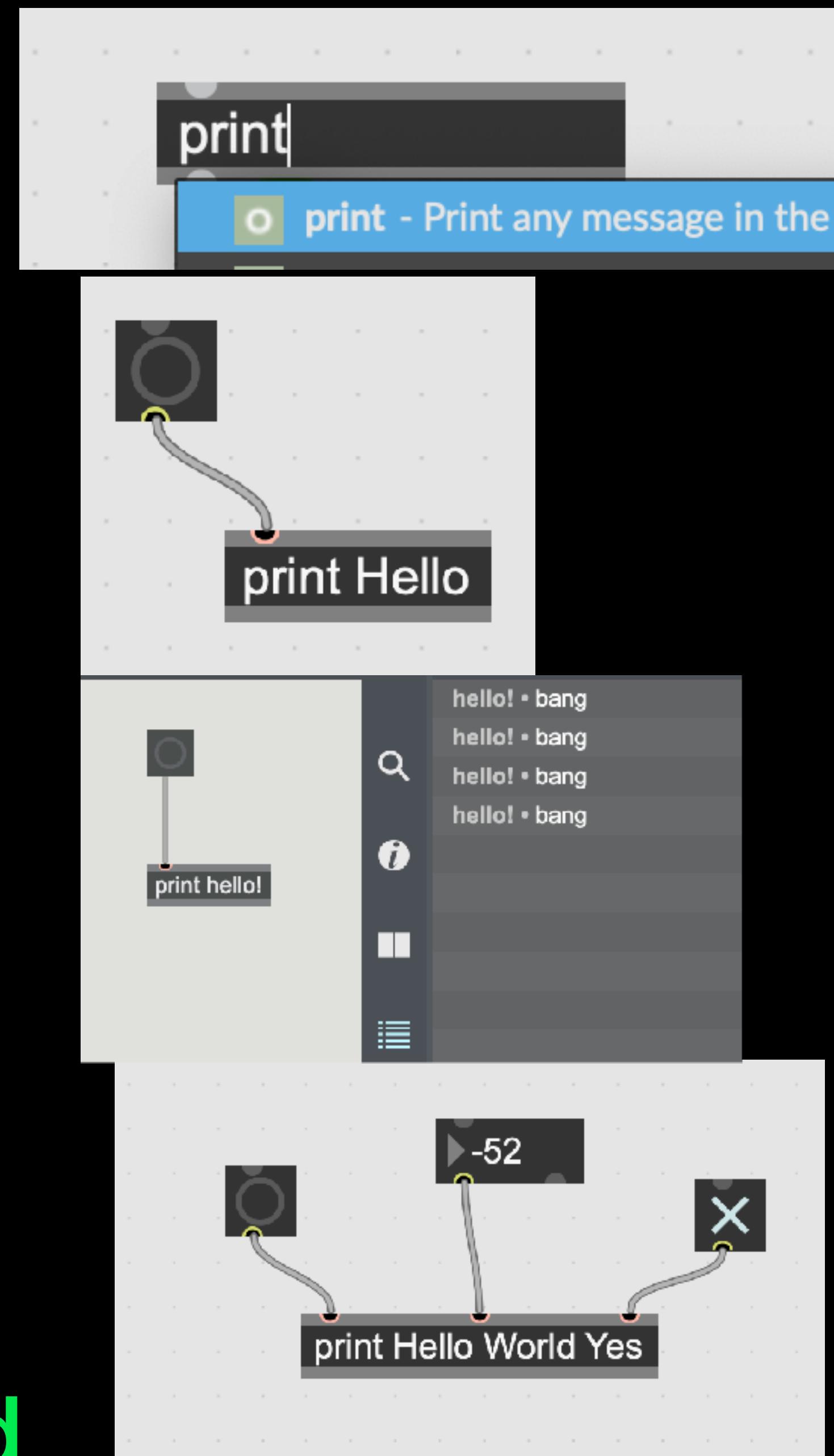


Yellow: Outputs data to whatever is patched to it

Hover over an outlet/inlet to see more information about it

Make a new object

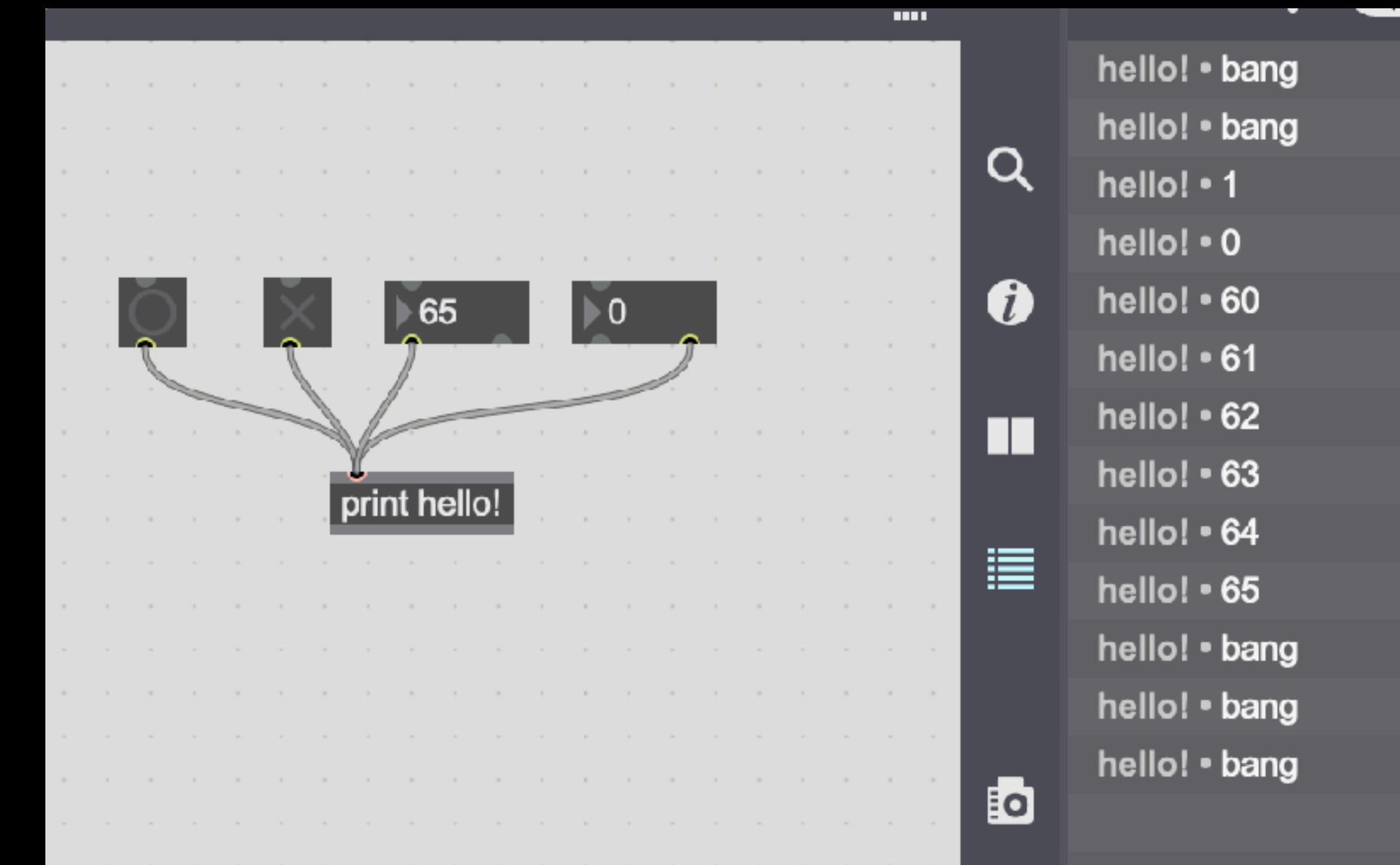
- Lets make a print object. Press n and then start typing print
- Lock your patch and open the console
- Nothing happens! Why? You need to trigger a change in your inlet
- We can try a button. Press b, connect the button to the print inlet. Lock the patch and press the button!
- Now try with a number and a toggle
- A new outlet gets created for each word



Print

-We can see print output different results with different inputs.

- Button is always a bang
- Toggle is on/off
- number left inlet is the number in the box
- Number right inlet is bang on tab

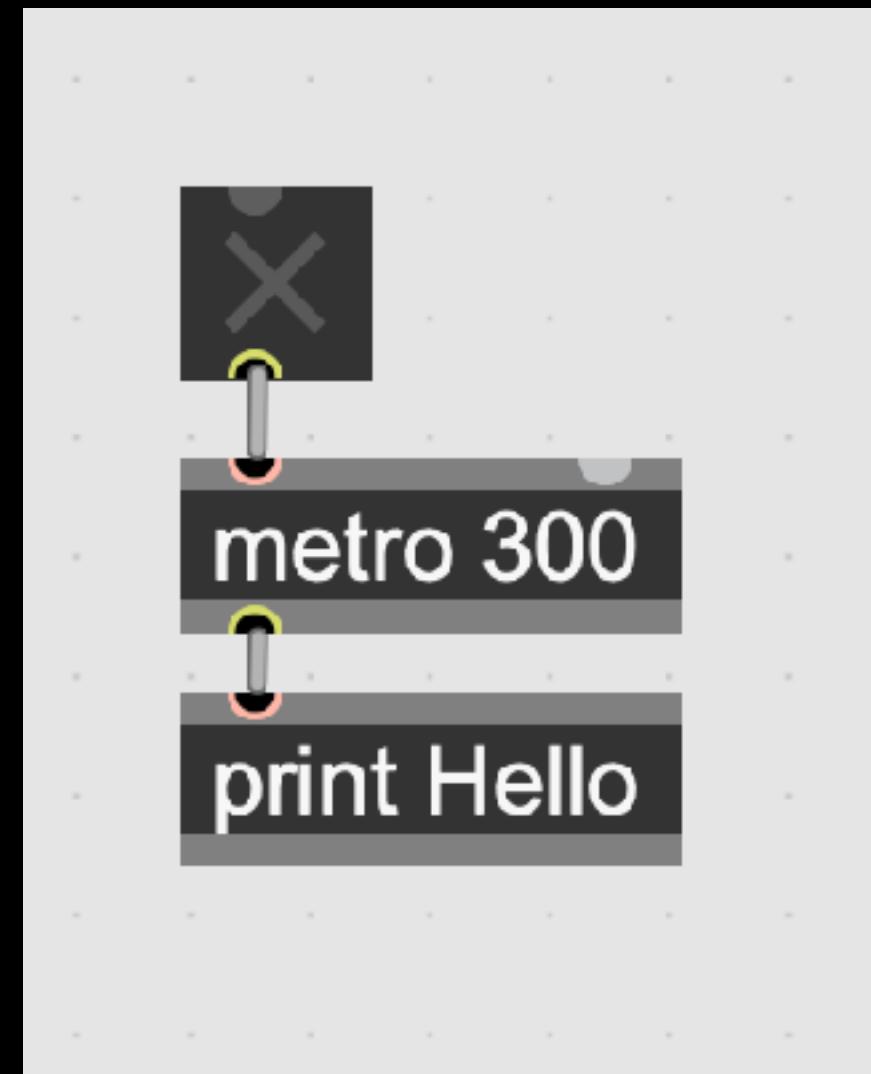


Lets get more dynamic with... metro! Short for metronome.



Metro has 1 argument, which is the number of milliseconds between each output. Default is 50 if you put nothing

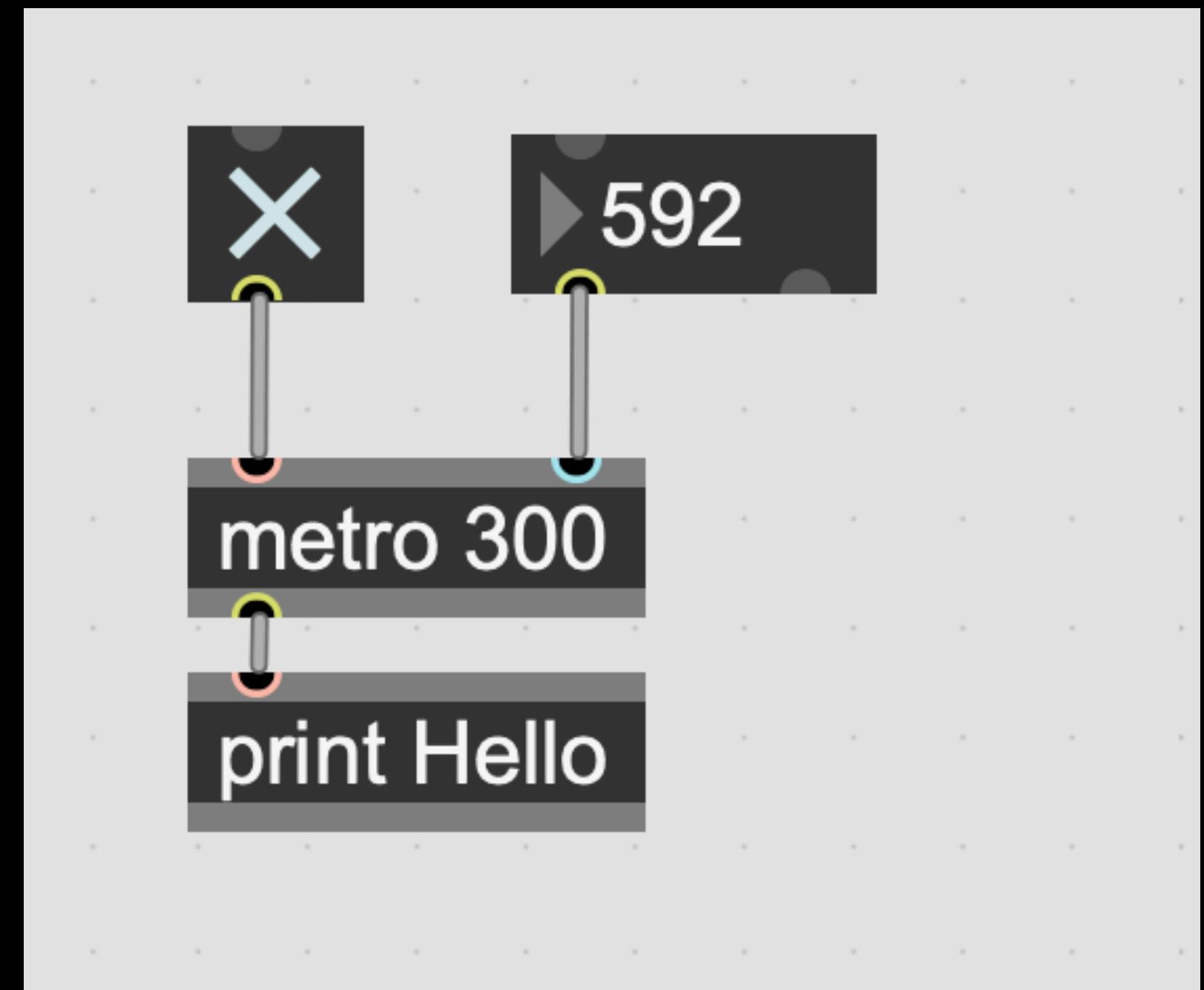
We can use the TOGGLE object to turn it on or off. Lock your patch and try it.



Metro

I can add a number object that lets me change the internal. Lock your patch and try this.

** Why does it update if it is a cold inlet? Because the metronome is continuous!



Variable & message

The image shows a Scratch script on the left and its corresponding log on the right.

Scratch Script:

- A variable **metro 1000** is set to **-108**.
- A variable **\$1** is set to **21**.
- A **broadcast "print ok!"** message is sent.
- The **Add a number \$1 to a complex message** message is sent 1000 times.

Log:

- ok! • Add a number 15 to a complex message
- ok! • Add a number 15 to a complex message
- ok! • Add a number 15 to a complex message
- ok! • Add a number 16 to a complex message
- ok! • Add a number 17 to a complex message
- ok! • Add a number 18 to a complex message
- ok! • Add a number 19 to a complex message
- ok! • Add a number 20 to a complex message
- ok! • Add a number 21 to a complex message

Shortcuts:

n: new object

b: new button

t: new toggle

Ctrl + click lock/unlock

Make sure your patch is unlocked!

Some useful objects

Button: sends a bang

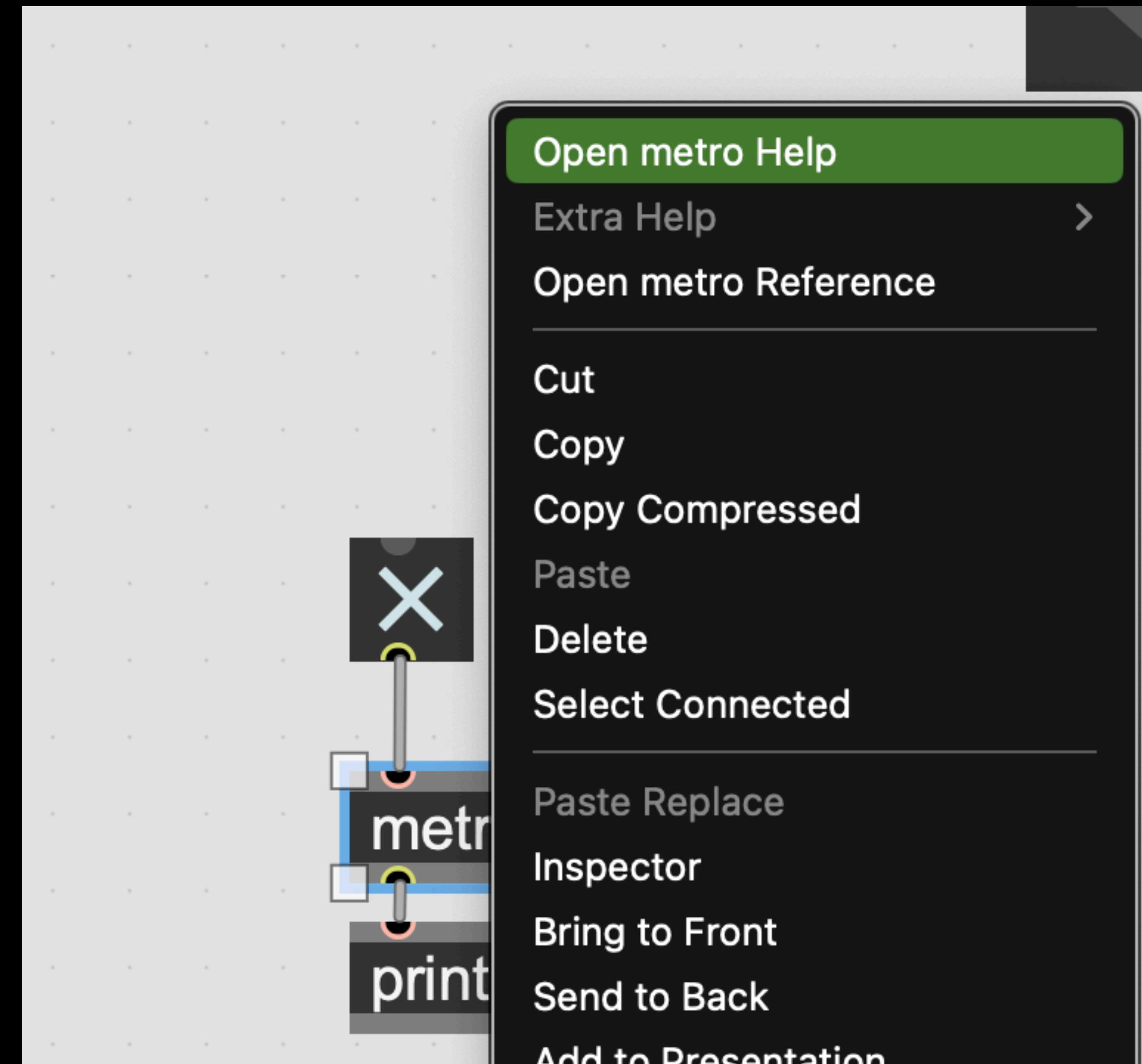
Toggle: on/off

Metro: does something repeatedly at an interval

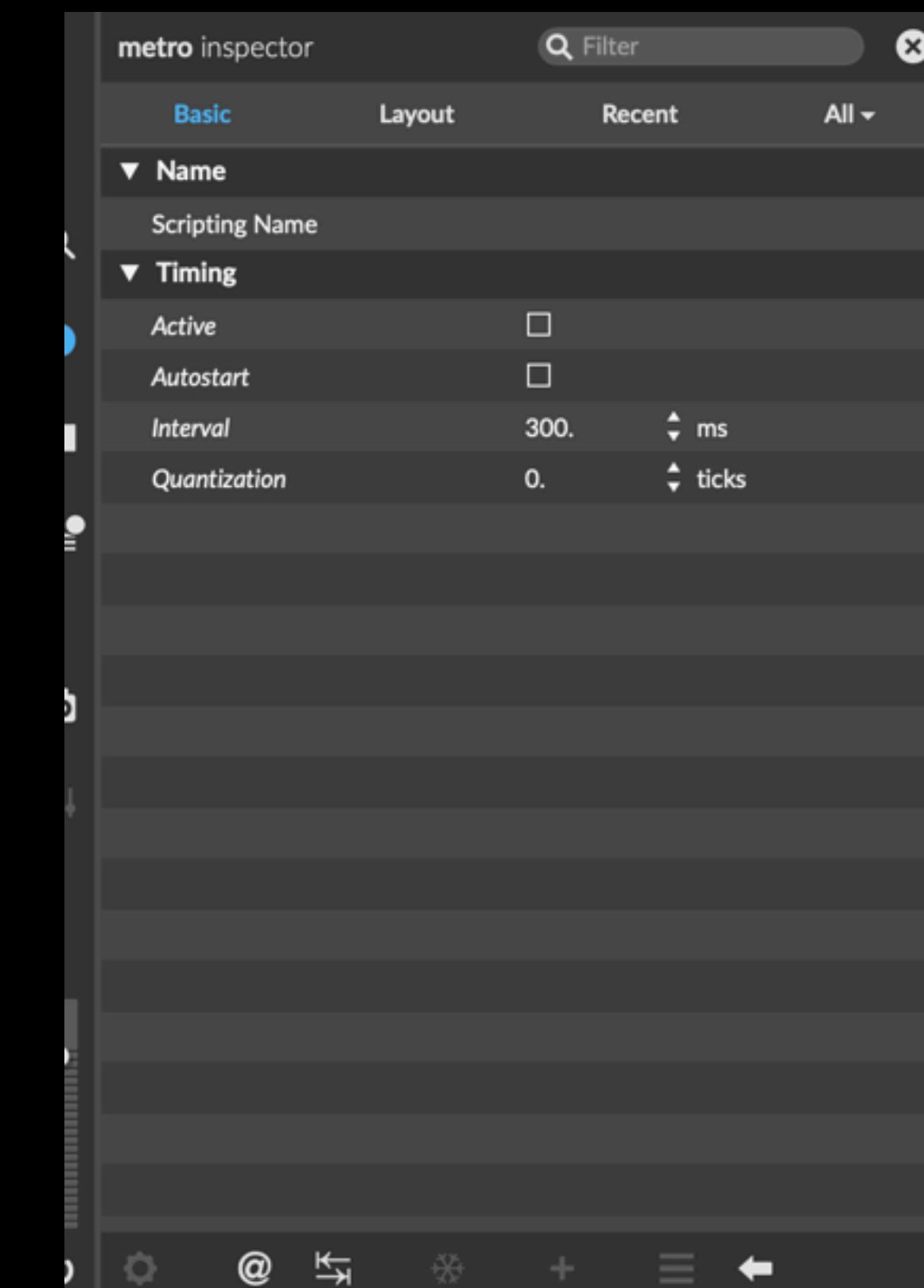
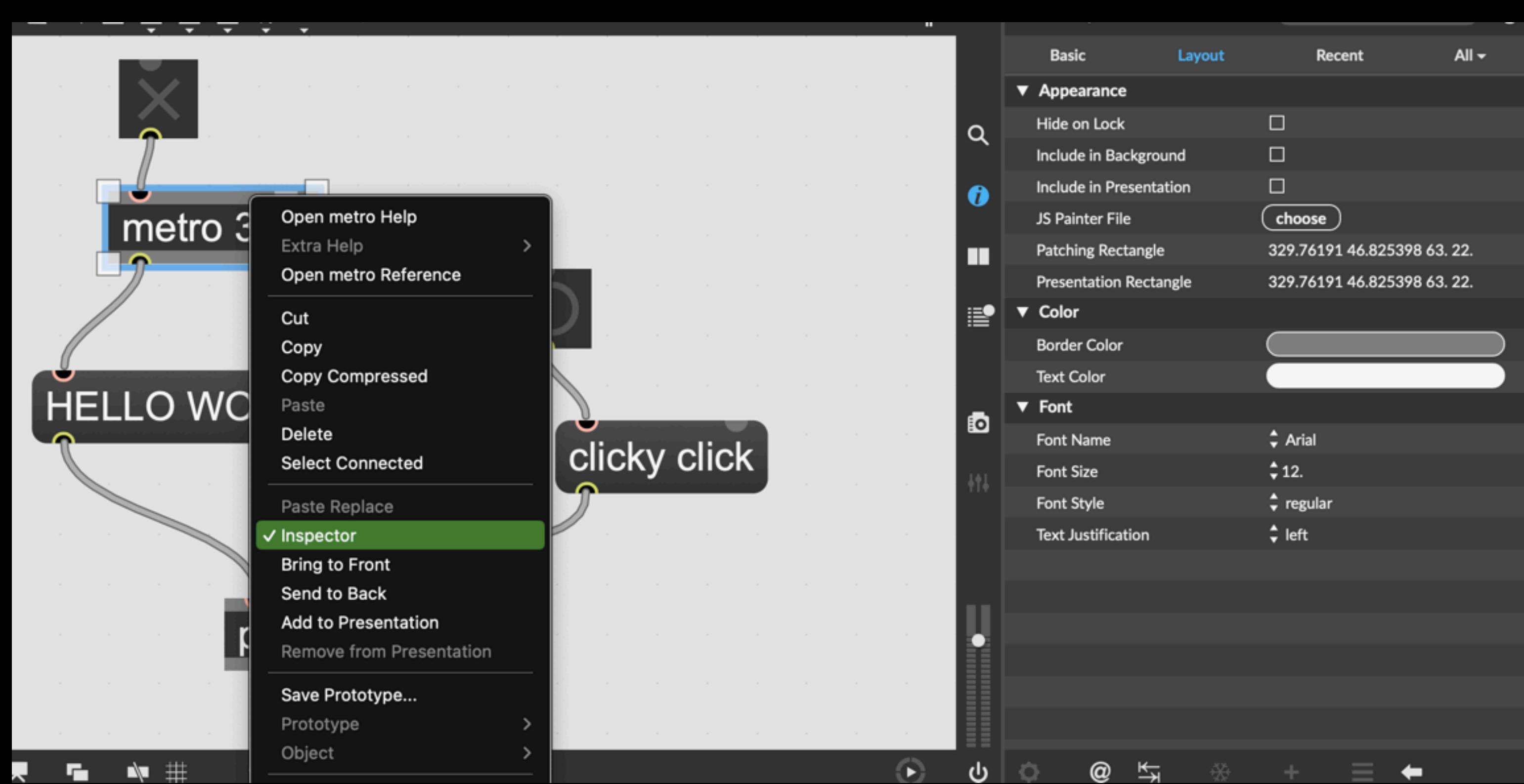
Print: Sends message to console

Right click on a object and click help.

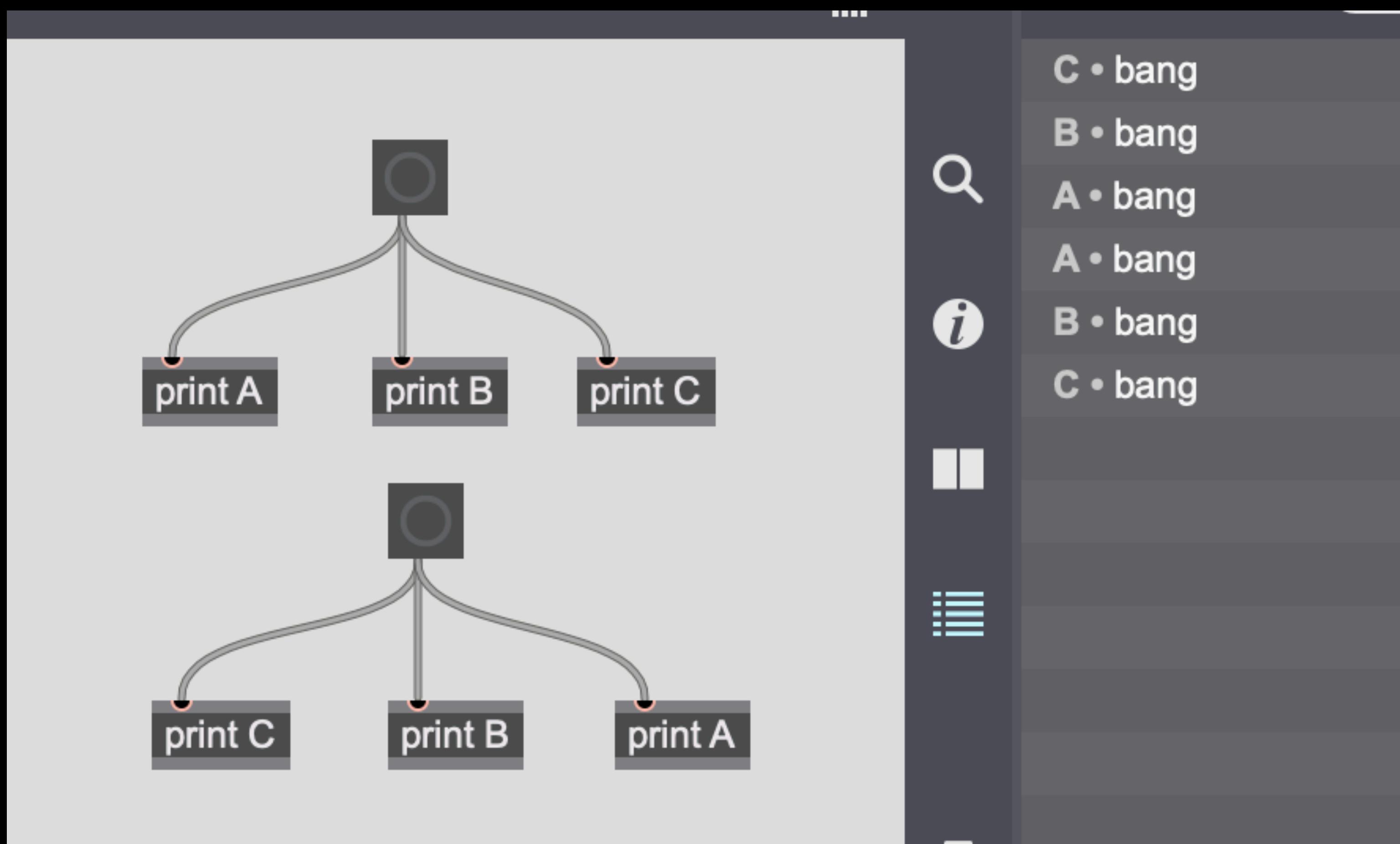
Help files are interactive



Inspect



Flow right > left



Make your first annoying sound

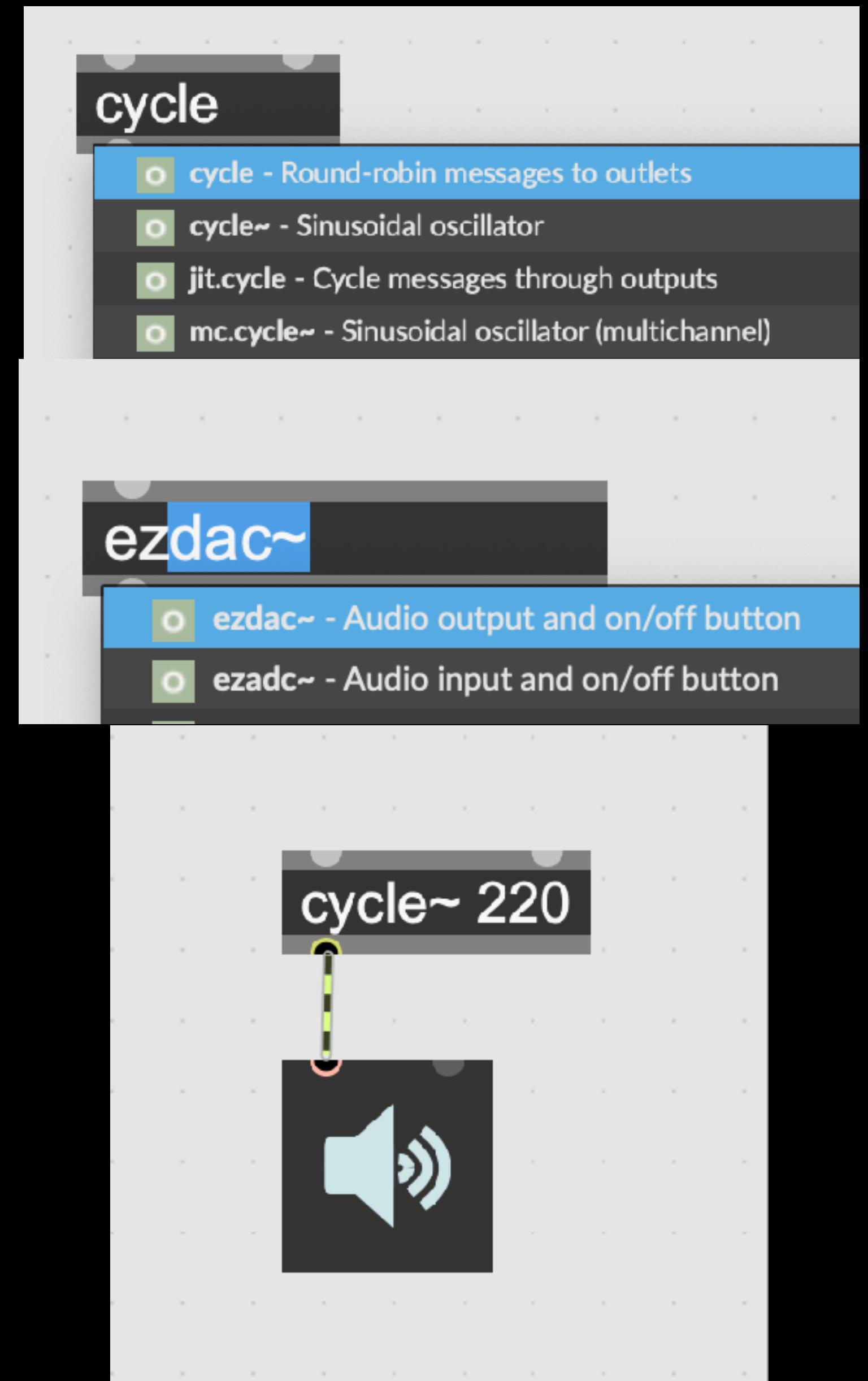
- Create a **cycle** object, its an oscillator.

Make sure to use the one with ~ because that means audio signals! I put 220 for the frequency.

- Create an **ezdac~** object. Its a simple digital to audio converter. It makes sound

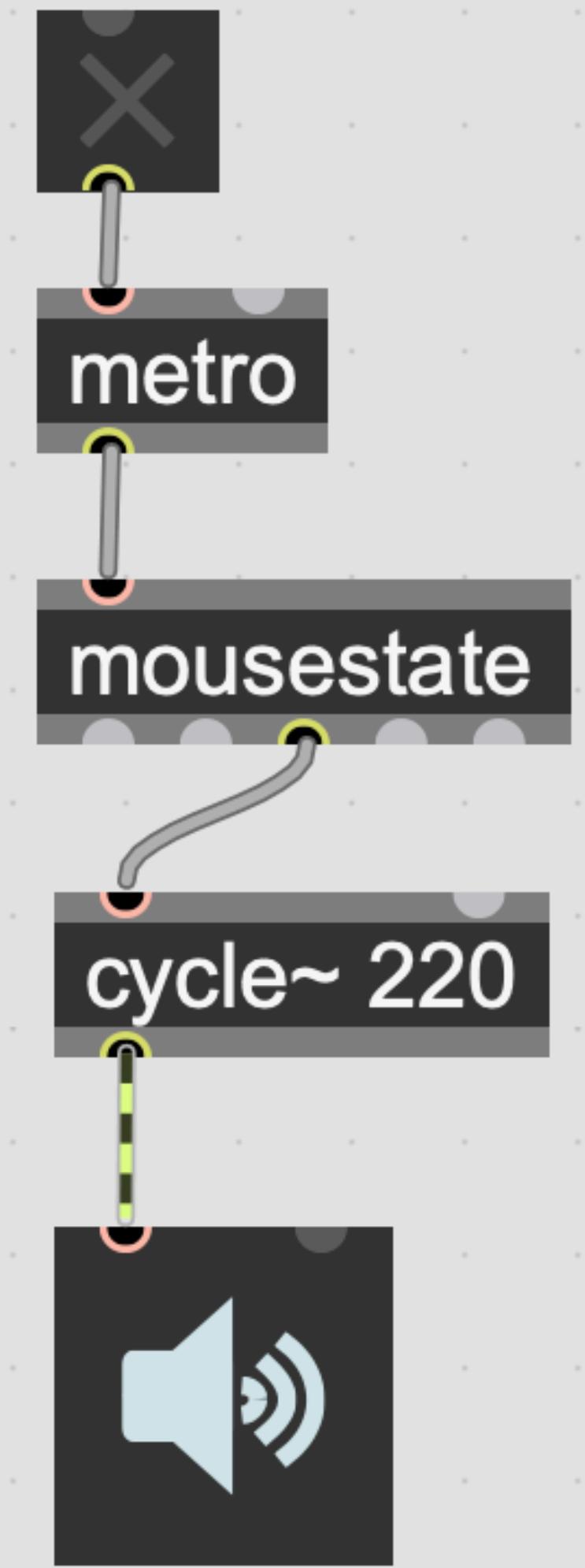
- Connect them, see it uses a **YELLOW AND BLACK** patch cable, this means its an audio signal patch

- Unlock your patch a d enjoy



Integrate mouse position

- Mouse state has a variety of different outputs, check them out in Help
- But it needs to be updated, so we'll use a metro
- Metro needs to be toggled on and off!

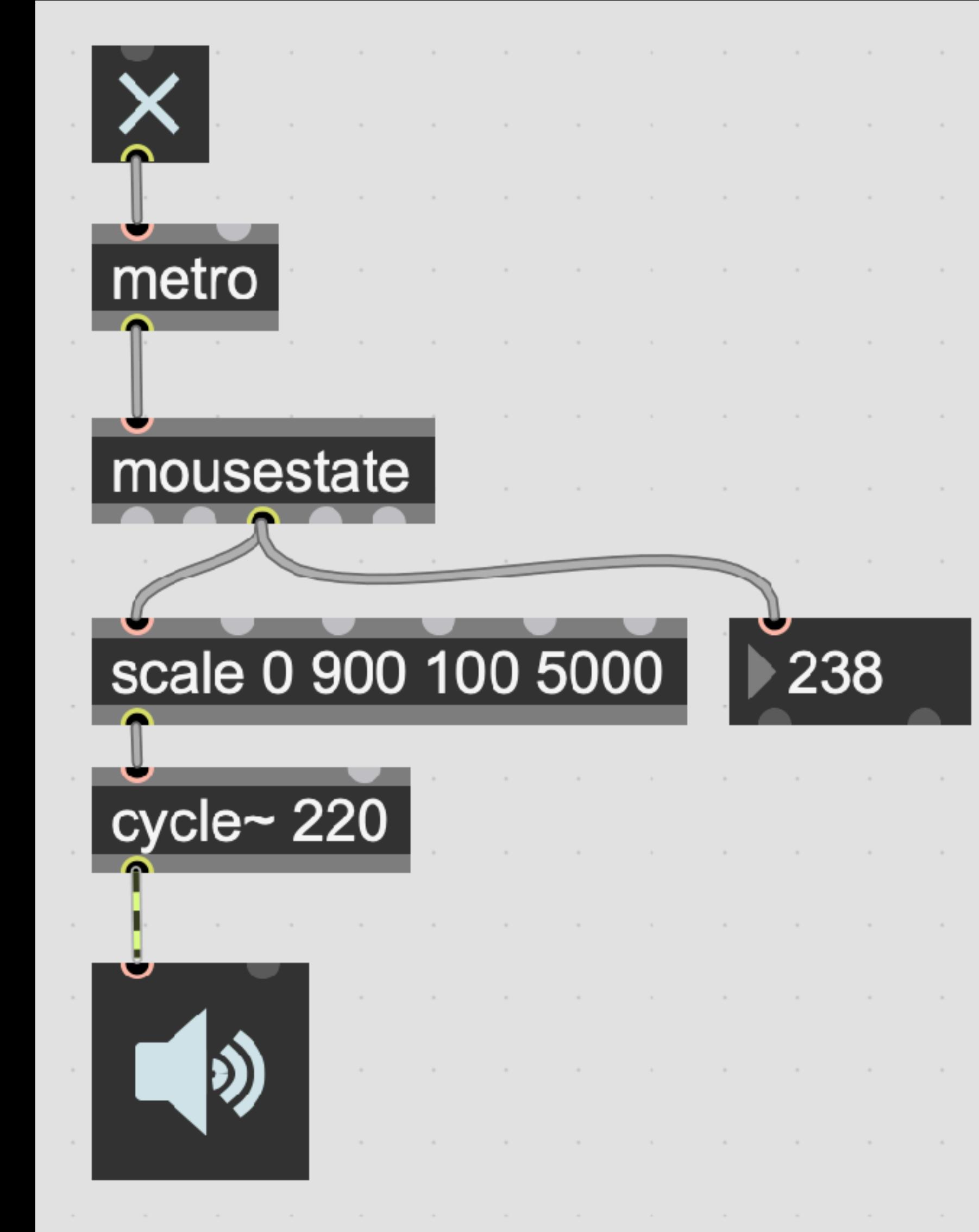


Scale to change the sound

- Frequencies are the note of the sound. Here we're using whatever mouse is. Lets look..

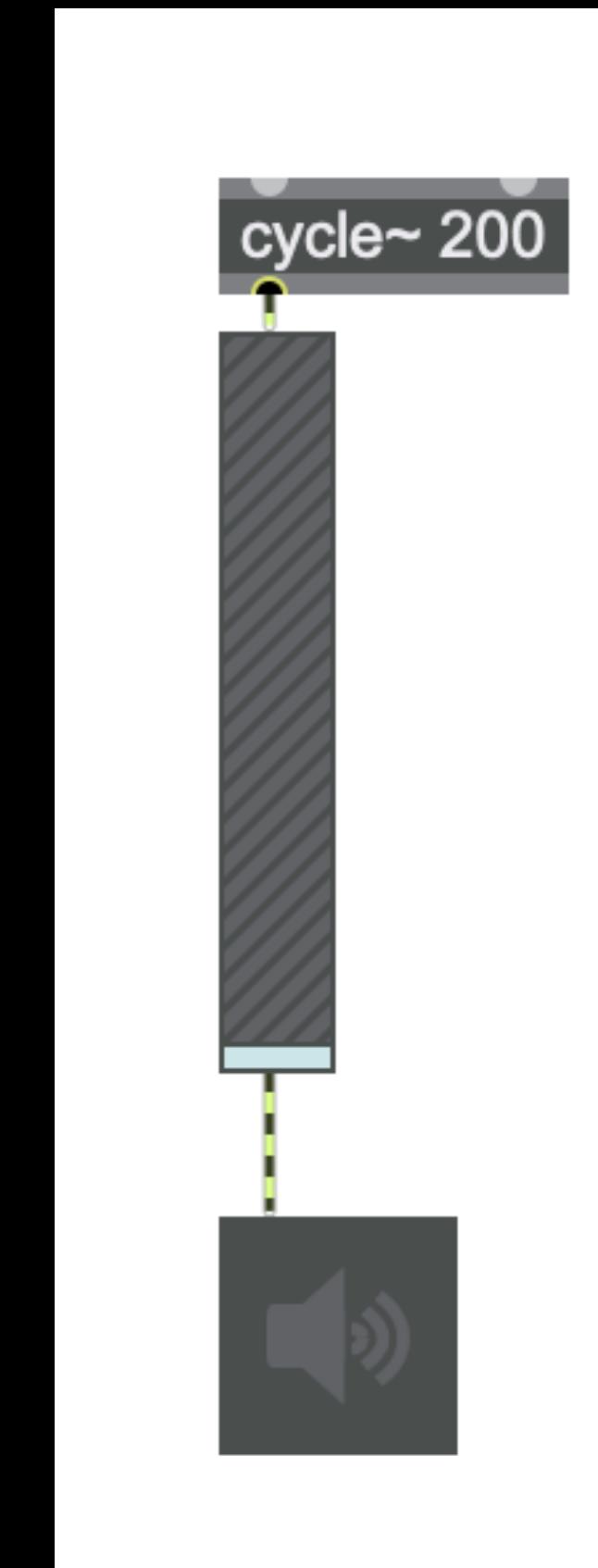
I get between 0 and 900 for the vertical value

- I can use scale to change that into a much wider range, I get a more interesting sound!



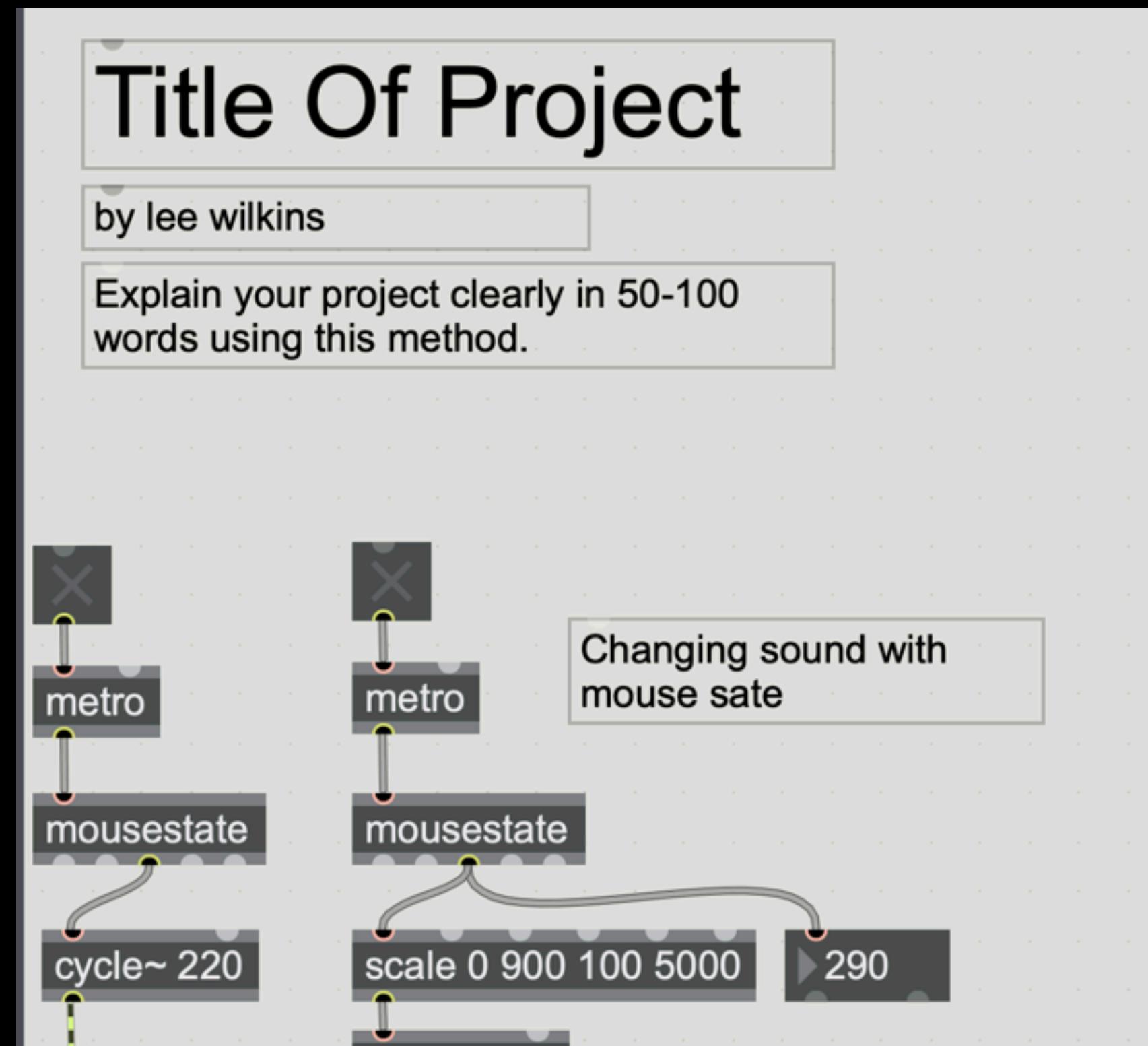
Click on the audio icon to turn off the sound or add a Gain object.

You may need to change your audio output when you add headphones. Find the menu under Options > Audio Status



Comments & Layout

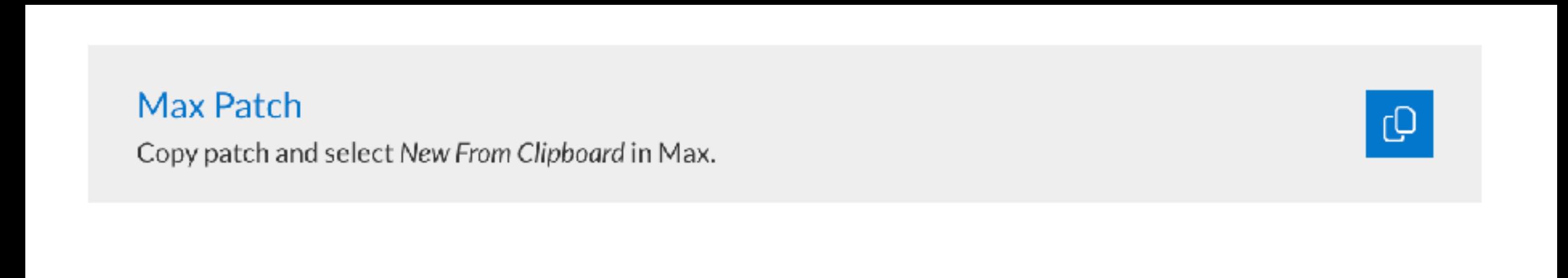
All project should have clear comments, title and authorship. Use the Comment object.



You can copy Max code and paste it directly into your patch as text.

CMD + V (paste)

```
{  
  "boxes": [  
    {  
      "box": {  
        "maxclass": "gain~",  
        "patching_rect":  
          [ 385.792366743087769,  
            357.923513054847717, 22.0, 140.0 ],  
        "outlettype": [ "signal", "" ],  
        "multichannelvariant": 0,  
        "id": "obj-114",  
        "parameter_enable": 0,  
        "numinlets": 1,  
        "numoutlets": 0  
      }  
    }  
  ]  
}
```



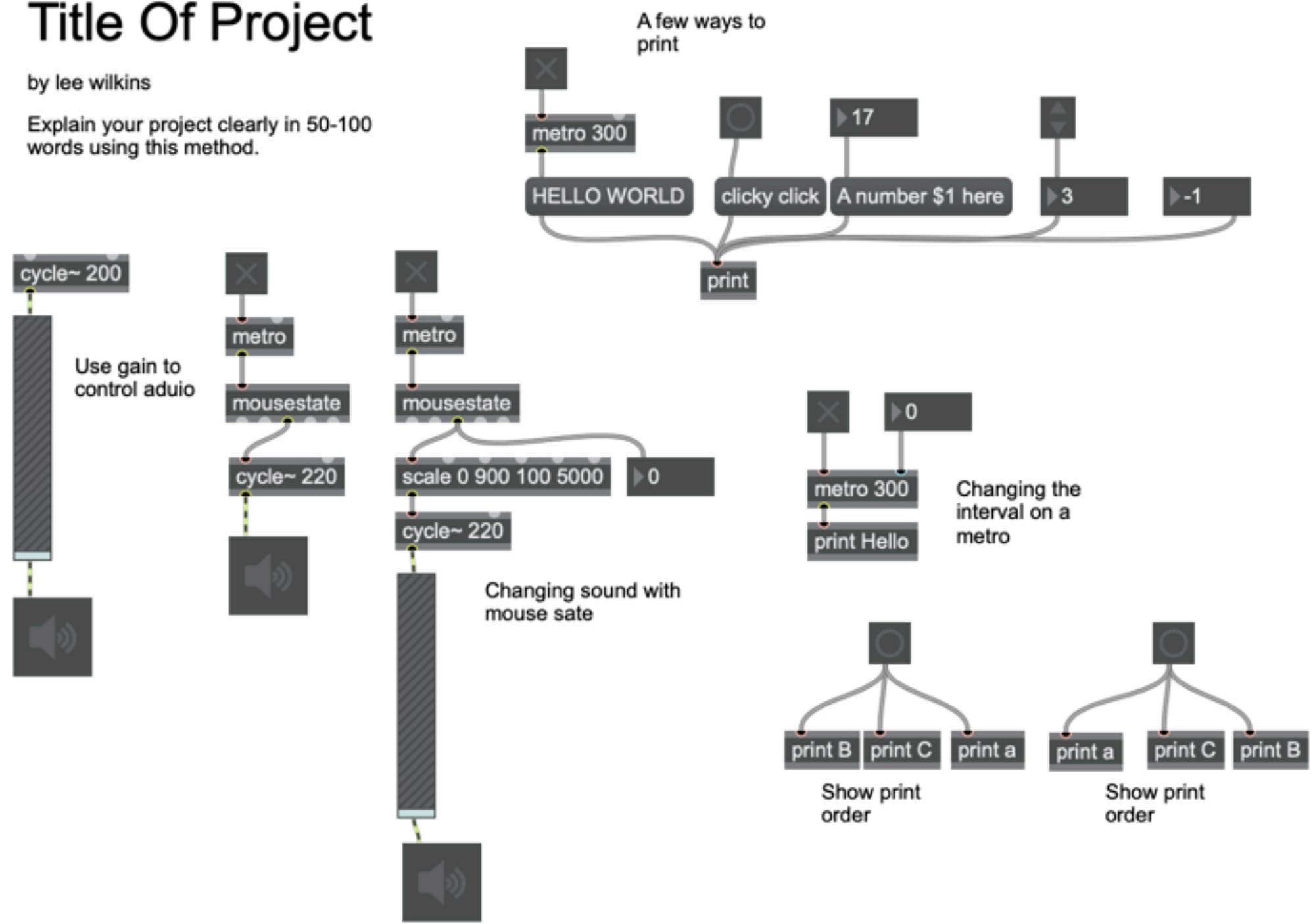
Using max / Saving

- MaxMSP is on all of the lab computers here and in the studios
- You can purchase a license either month by month or lifetime
- You can download MaxMSp for free, but you can't save. What you can do is copy the code and save it on your computer, GitHub, or email it to yourself and paste it back in later.

Title Of Project

by lee wilkins

Explain your project clearly in 50-100 words using this method.



Download todays patch
on Moodle

Handing in projects

Each project should include a .zip file that contains:

- A saved file (File > Save) .maxpat
- A screen capture of your max patch
- A video or audio recording of your project working (can be a video or a link to a private video on YouTube, Vimeo or Google)
- A 50-100 word explanation of your project inside your maxpatch

Be sure to name files properly (no untitled-1.zip, no screen shot 2343242342134)

All files are expected to be cleaned up and arranged in a reasonable, legible way. Videos should be clear, well light and show your project working.

Homework:

Start thinking about Audio Experiment

Follow 2 tutorials from any source.