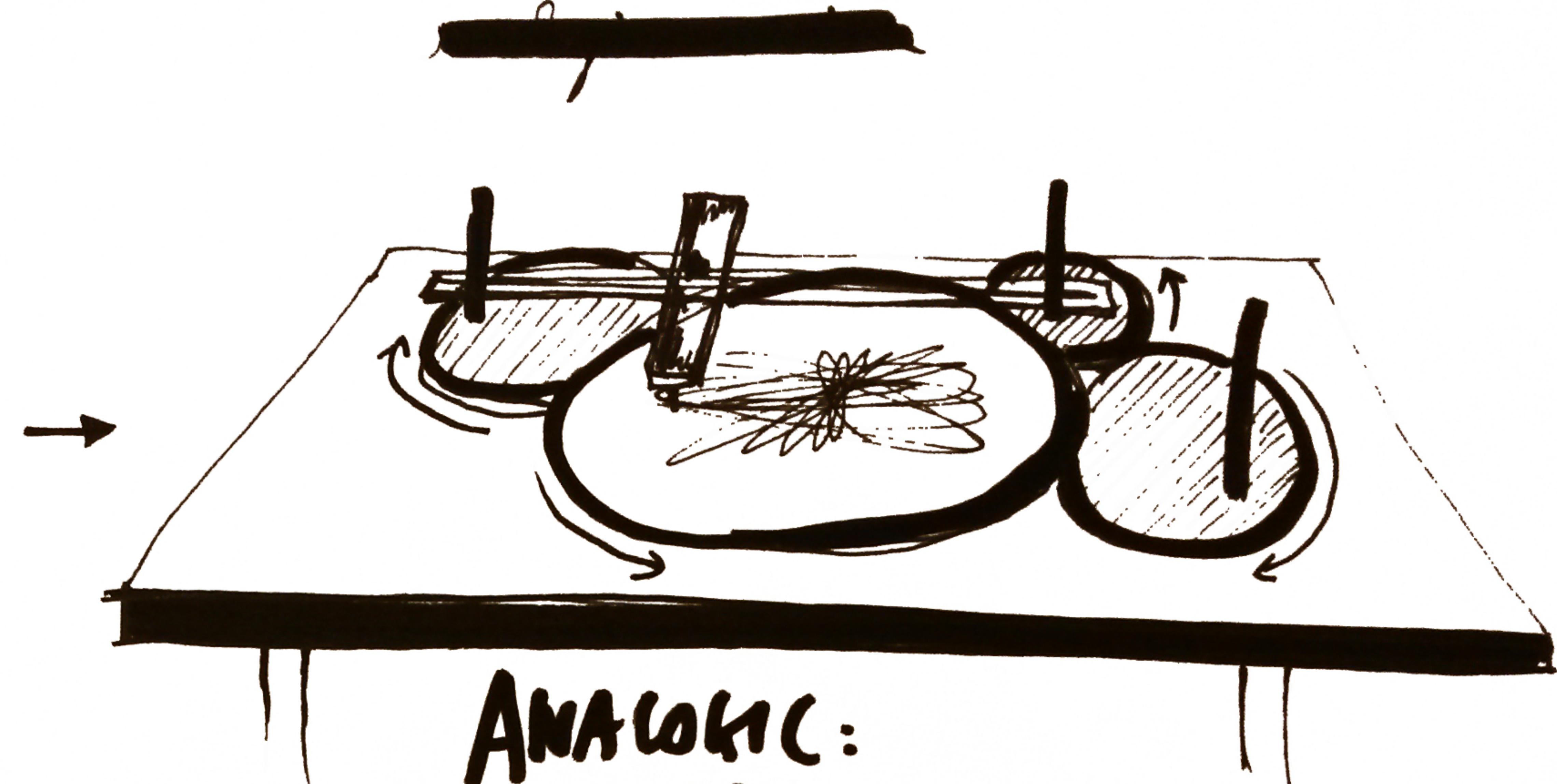


AN HARMONOGRAPH

IS A MACHINE MADE OF
2 OR MORE PENDULUMS,
GEARS AND A DRAWING
ARM.

IT PRODUCES NICE
CYCLOID-LIKE DRAWINGS.



ANALOGIC:
3-PENDULUM MECHANISM

EDUCATIONAL APP/GAME

2-mode application:

I. set the mechanism
and draw

II. look at the drawing
& retweak the mechanism

But can we design a Python version?
Let's do it!

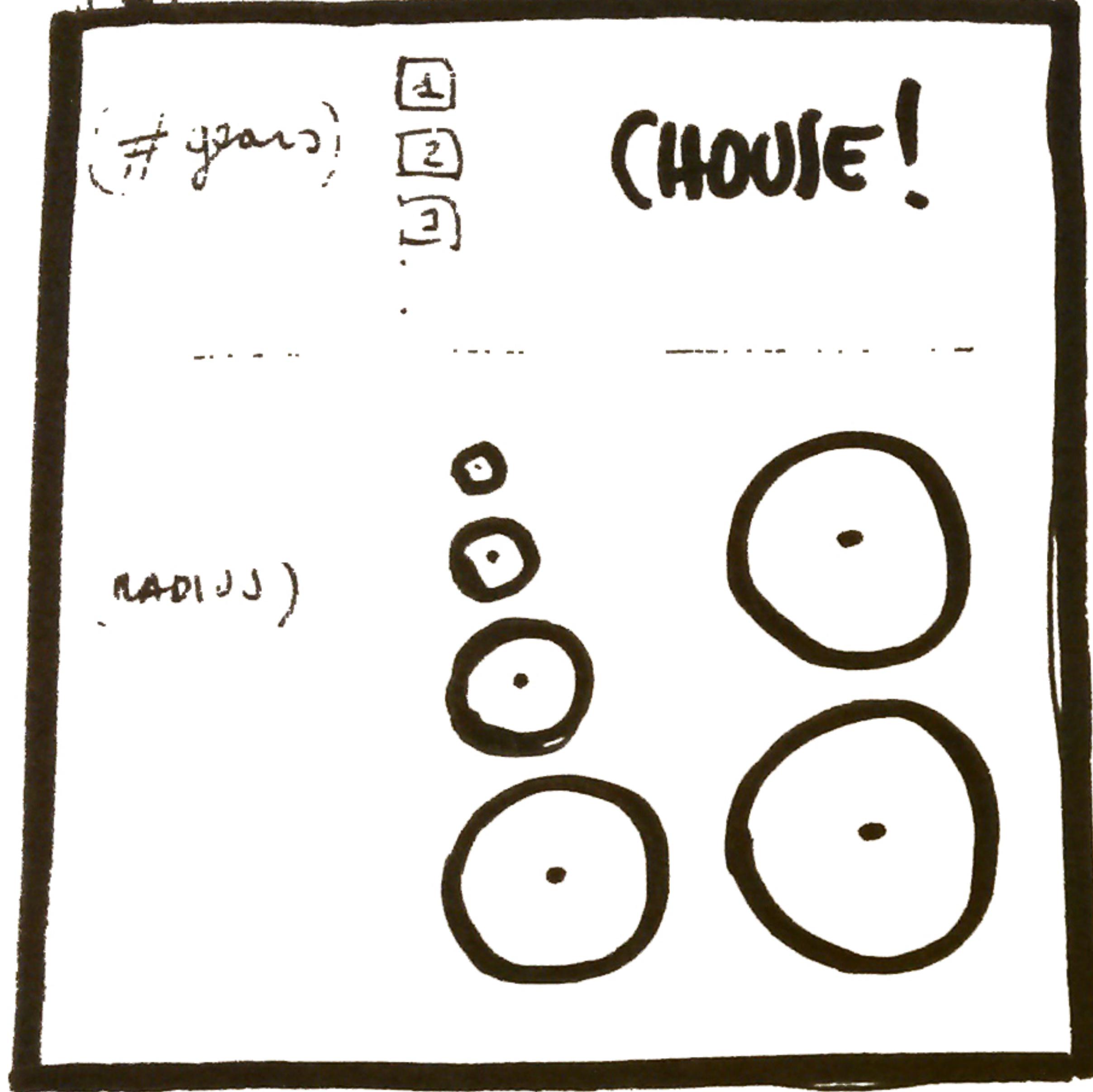
GOAL: design a TKinter Harmonograph on Python
to teach kids the beauty of pendulums,
cycloids and trigonometry

DIGITAL:
PYTHON TKINTER

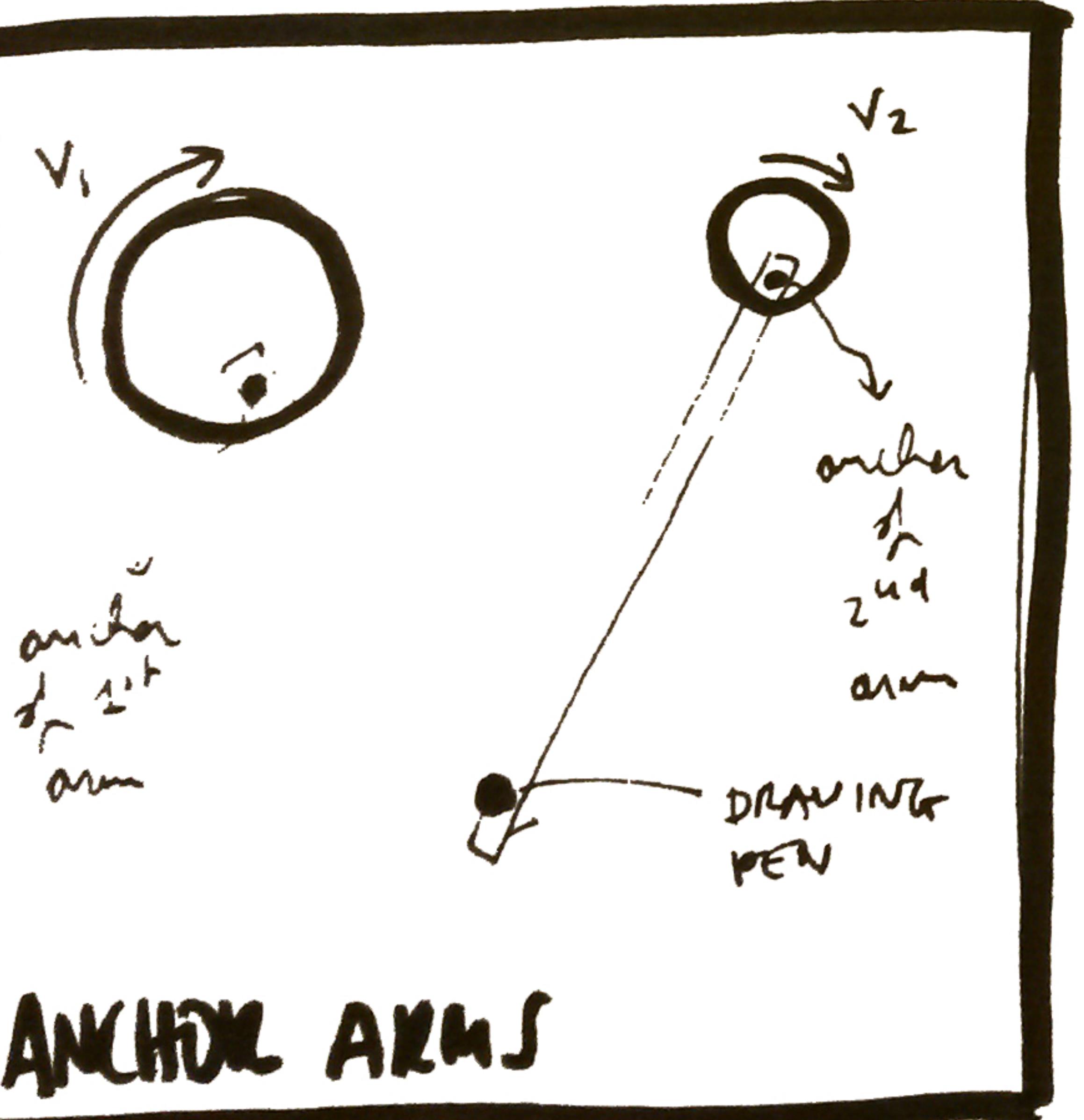
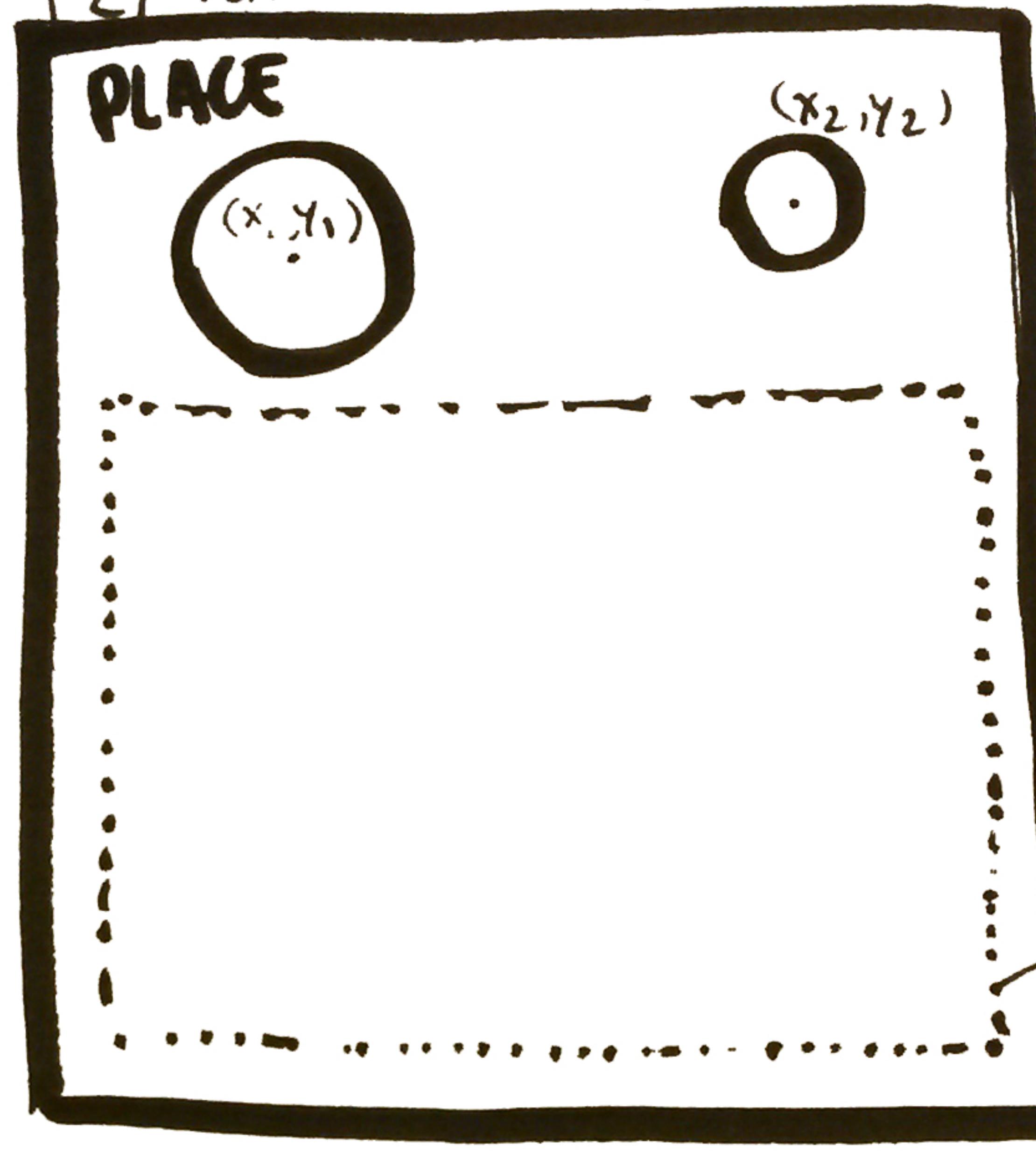
MODE (I)

JET THE MECHANISM, SEE THE RESULT

[1] SELECT THE GEARS

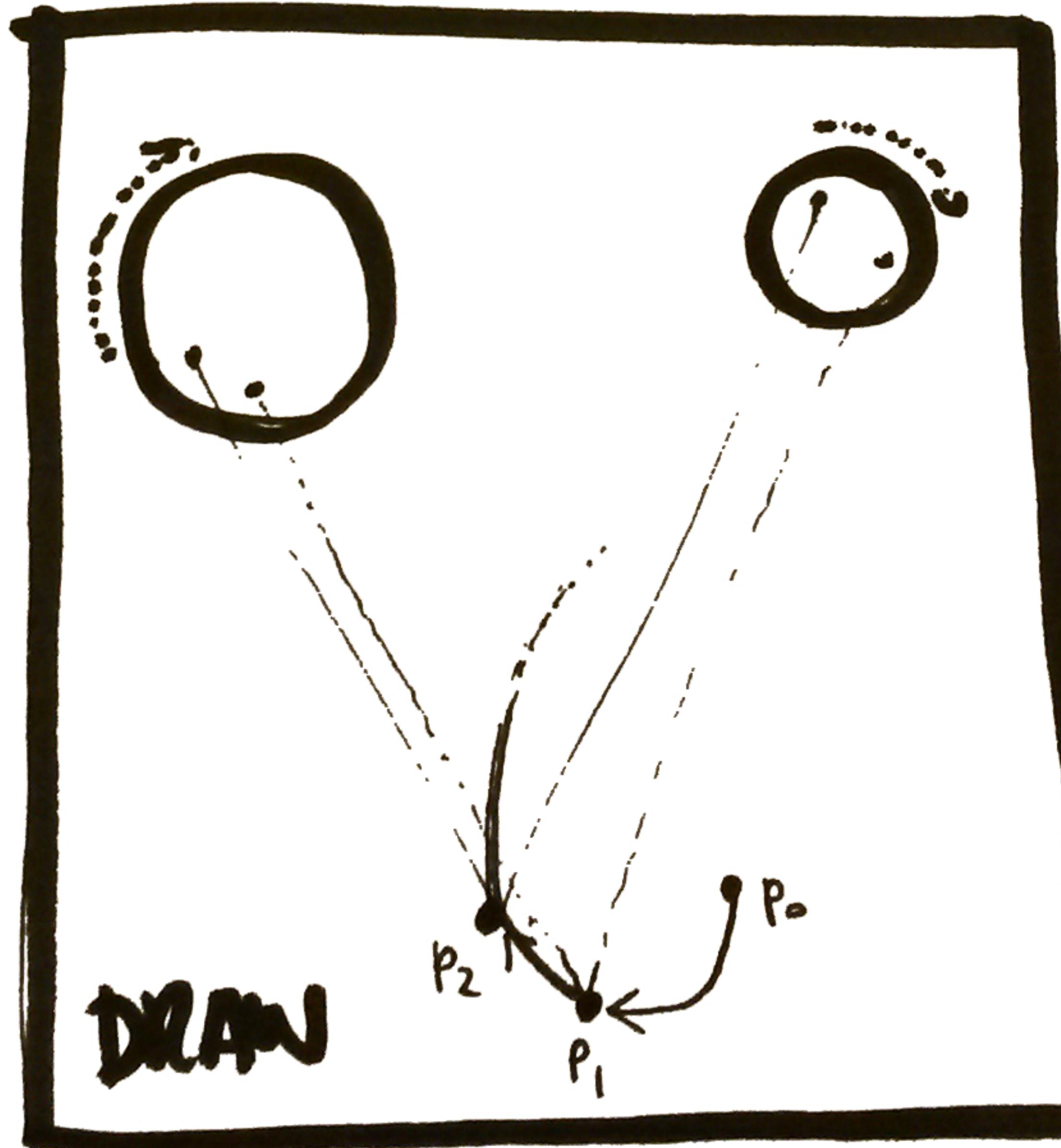


[2] PLACE THE GEARS ON THE CANVAS

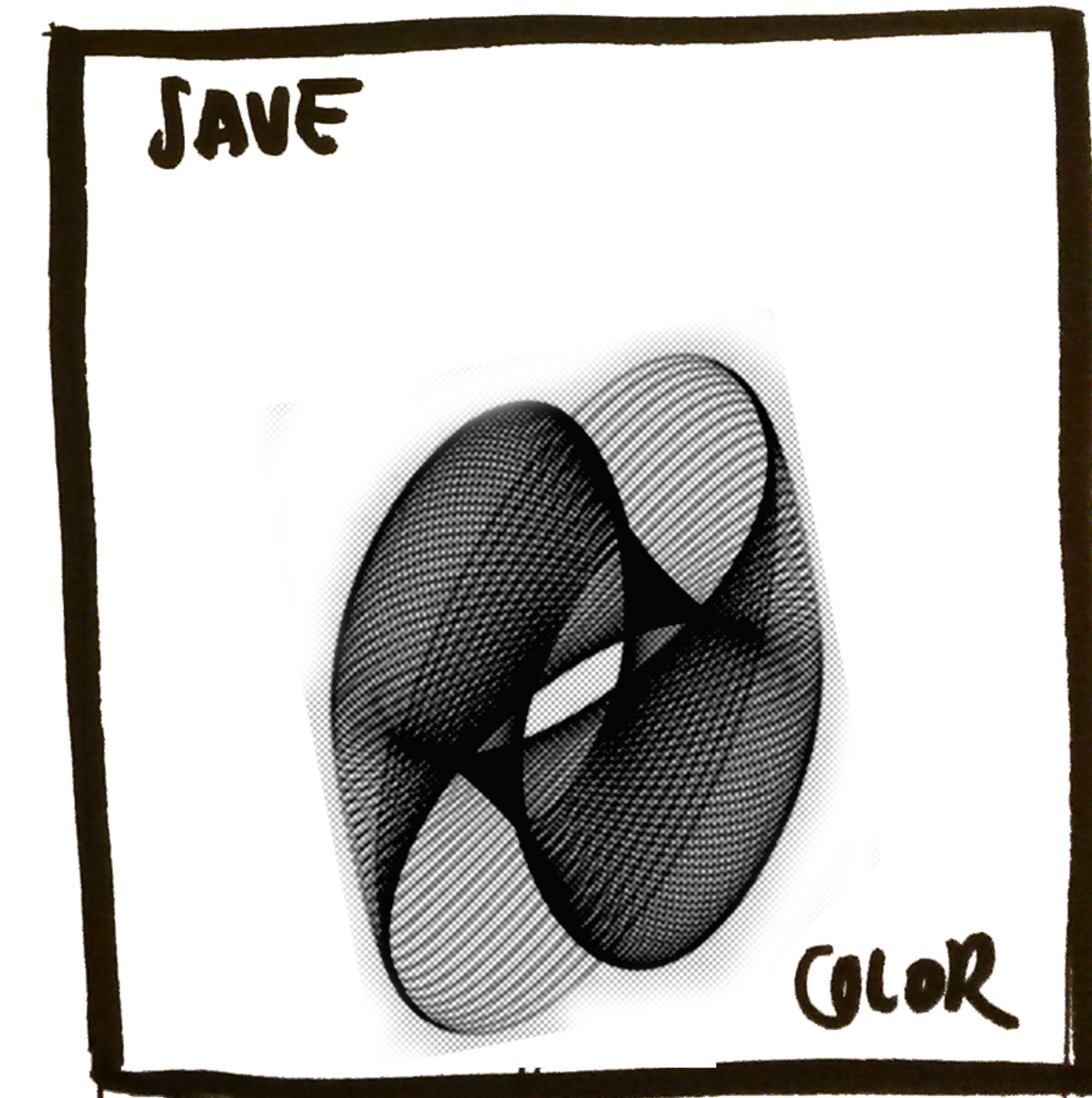


ANCHOR ARMS

[3] choose rotation speed,
choose the drawing arms



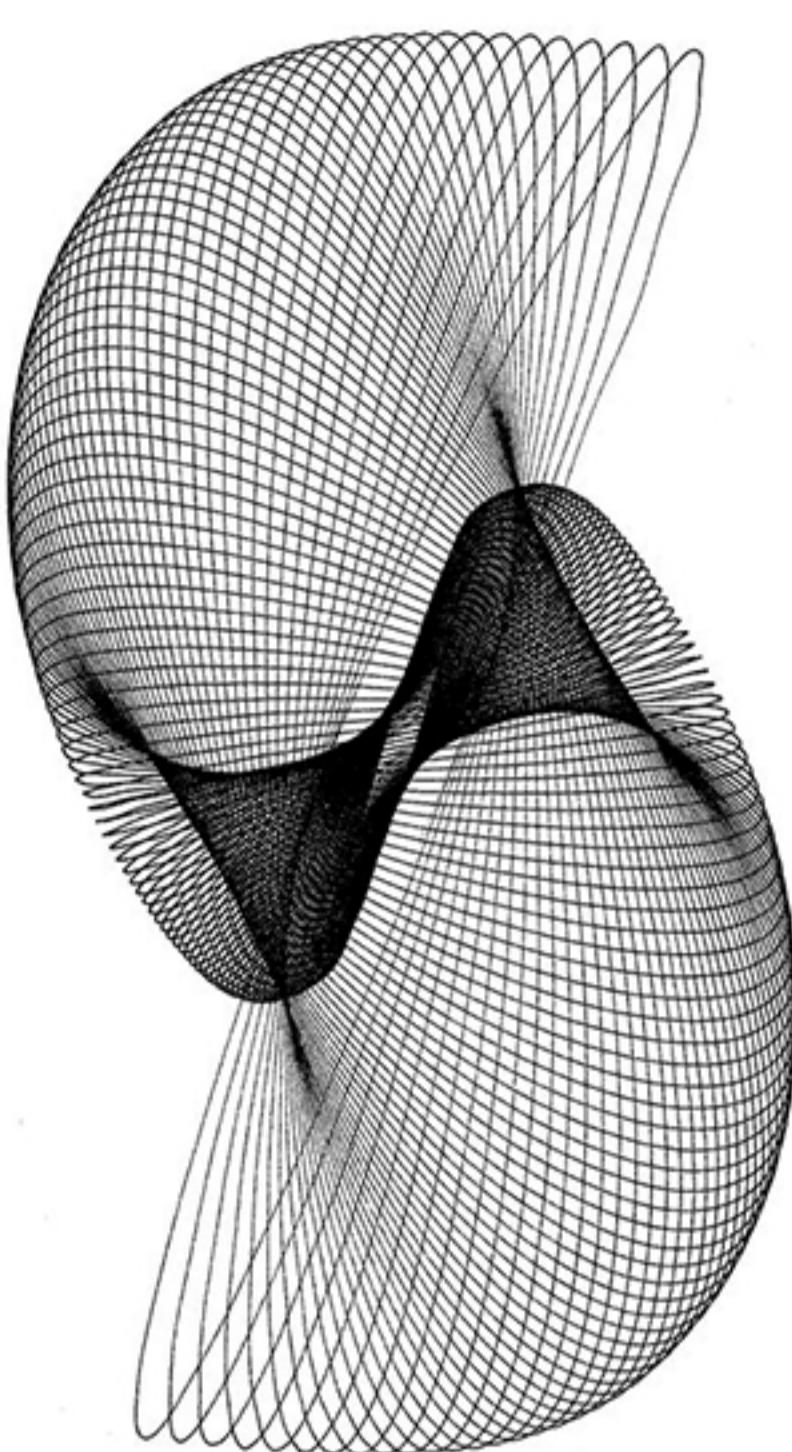
[4] start draw of



[5] Speed up and
SEE THE RESULT

1 look at this cycloid

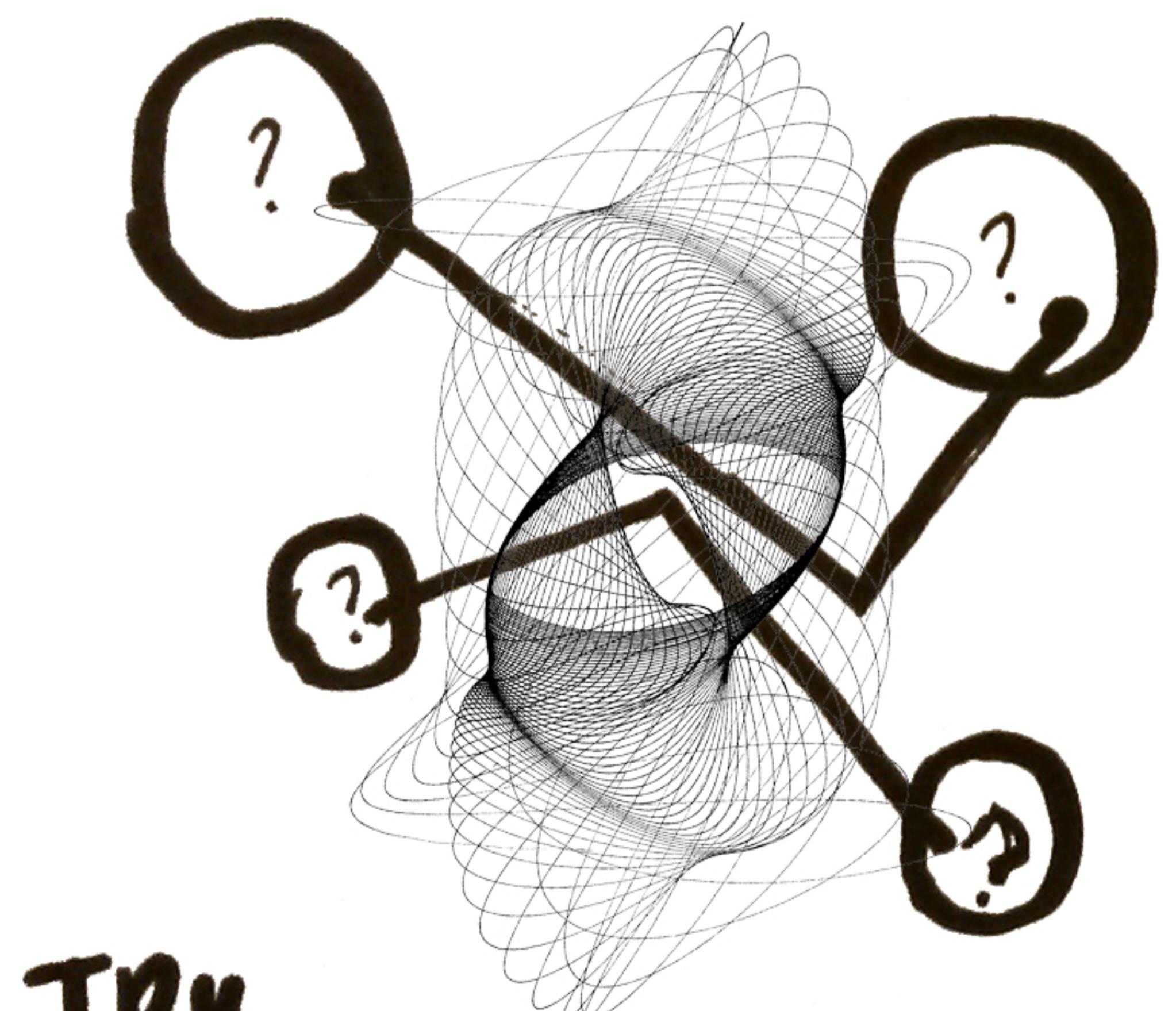
LOOK!



2 retrieve the gears position & dimensions

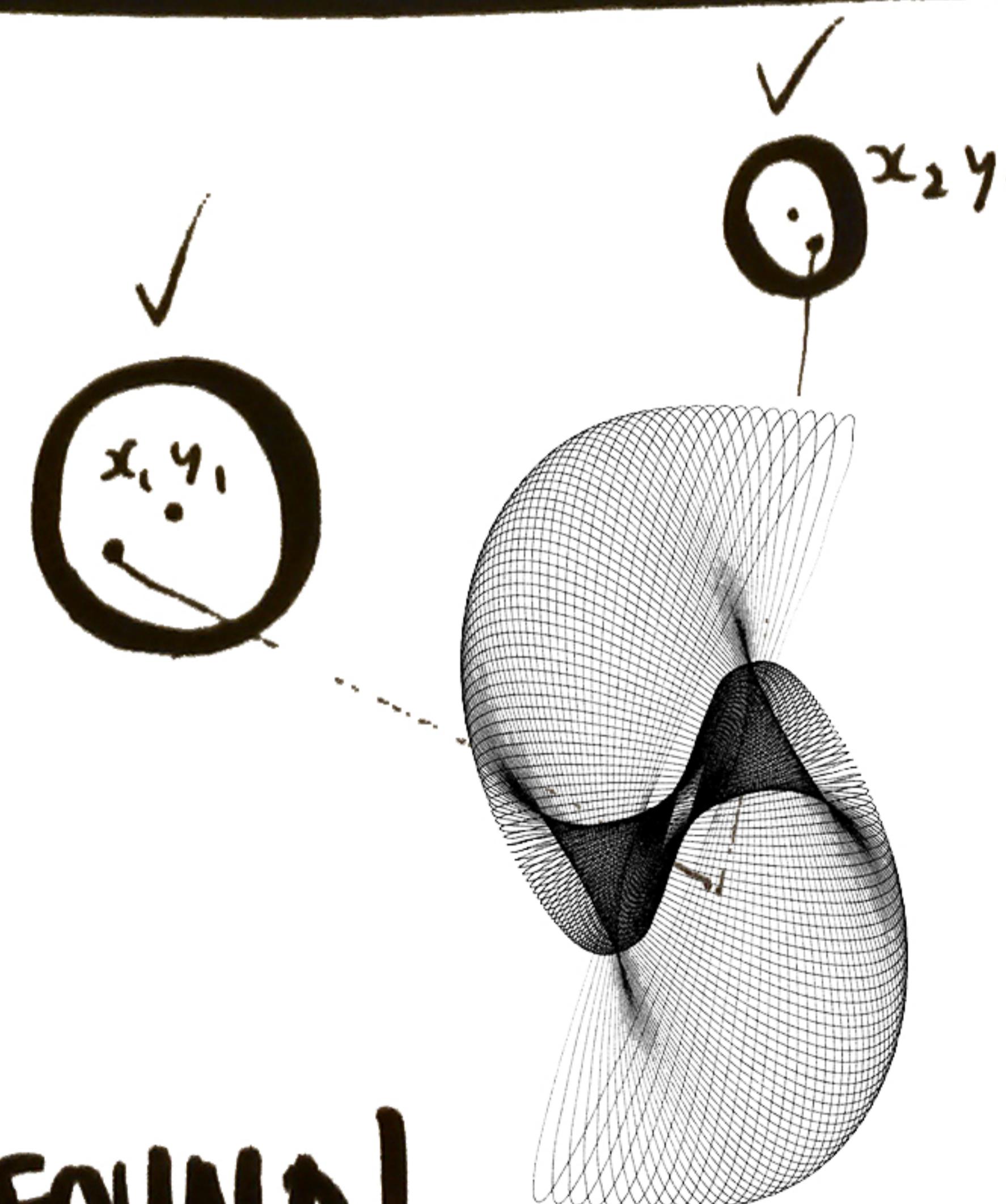
HOW WAS IT
MADE?

2 how was it made?
which gears? which radii?



TRY...

3 You Win!



FEATURES
and display

- speed up the drawing process (or slow down)
→ use threshold properly
- gears visualization $\langle^{\text{on}}_{\text{off}}$
- visualize with brushes
- color the cycloid by clicking inside the white spaces
- let Python do the drawing rendering

MODE II

LOOK AT THE DRAWING, RETRIEVE THE ORIGINAL MECHANISM

CHALLENGES :

- TRIGONOMETRY (HARD MATH TO RECREATE THE MECHANISM)
- GRAPHIC USER INTERFACE (simple but precise!)
- EDUCATIONAL GOAL

EXTRA POSSIBLE FEATURES :

- COLOR THE CYCLOID ON TKINTER
- EXPORT TO DXF / DWG ...
- HISTORIC / MATH EXPLANATIONS