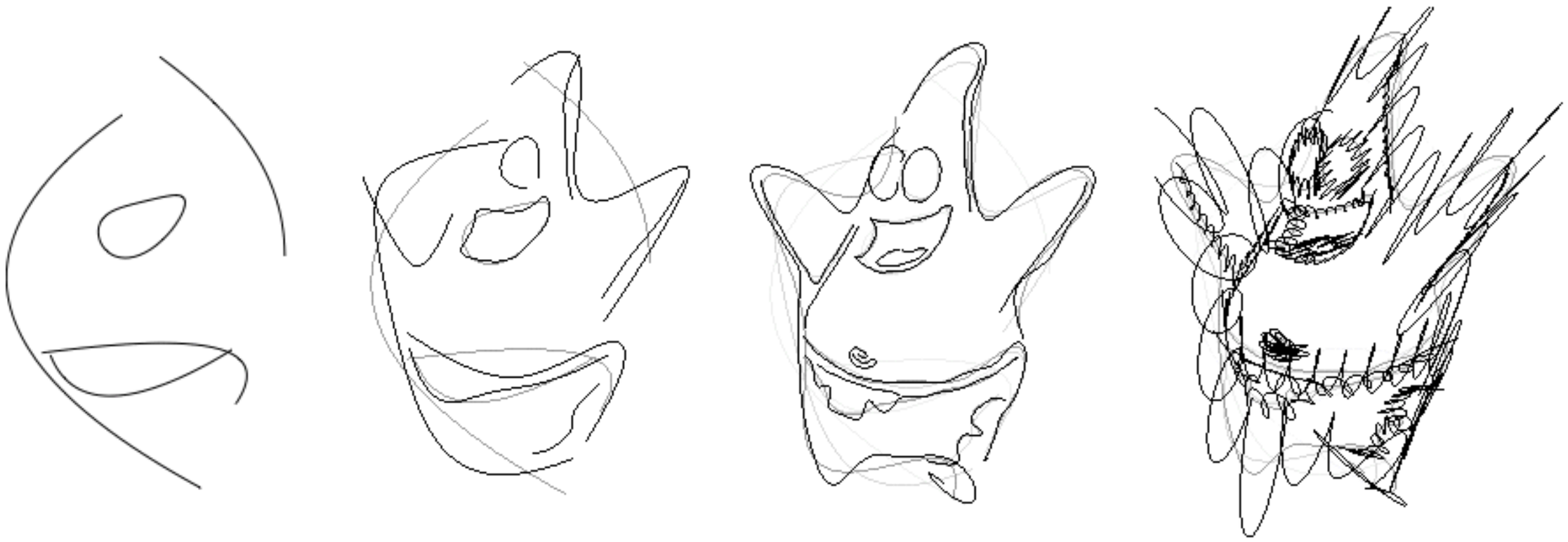
TURNING USERS INTO DESIGNERS:

a Recipe for Success



Matt Jacobs & Olivia Walch

Hackathons

Mark Zuckerberg: *"Hacking just means building something quickly or testing the boundaries of what can be done."*

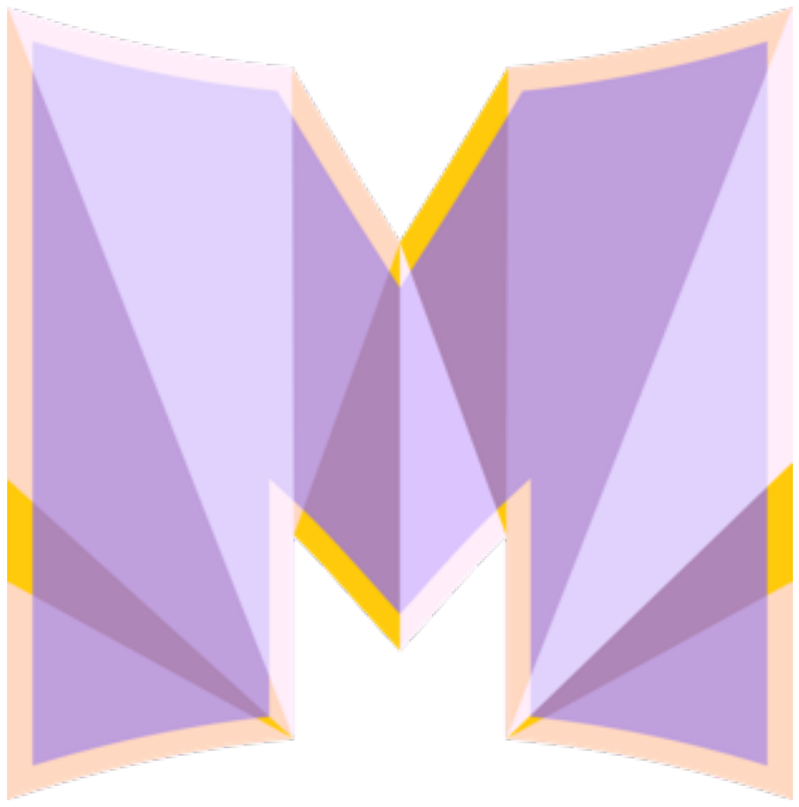
- ~12 - 40 hours to prototype and showcase a new product

- Hacks are usually software (mobile apps, web platforms or hardware (Arduino, Raspberry Pi, etc.)

- Prizes for use of sponsor APIs, creativity, functionality, design

UNIFYING THEME:

Algorithms replacing design



MHACKS V,

January 2015

Making Formulas… for Everything—From Pi to the Pink Panther to Sir Isaac Newton

May 17, 2013 — Michael Trott

WolframAlpha computational… knowledge engine

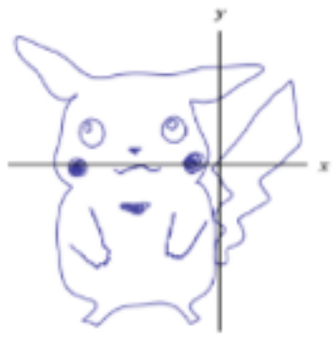
pikachu curve

Examples Random

Input interpretation:

Pikachu-like curve (popular curve)

Plot:



(plotted for t from 0 to 52π)

Enable interactivity

Associated entities:

Pikachu | Ash's Pikachu

Equations:

Parametric equations:

$$x(t) = \left(\left(-\frac{1}{4}\sin\left(\frac{10}{7}-23t\right)-\frac{3}{10}\sin\left(\frac{4}{3}-22t\right)-\frac{2}{5}\sin\left(\frac{7}{5}-19t\right)-\frac{1}{5}\sin\left(\frac{7}{5}-16t\right)-\frac{3}{7}\sin\left(\frac{10}{7}-15t\right)-\frac{3}{8}\sin\left(\frac{13}{9}-9t\right)-\frac{19}{13}\sin\left(\frac{11}{7}-3t\right)+\frac{222}{5}\sin\left(t+\frac{11}{7}\right)+\frac{41}{2}\sin\left(2t+\frac{11}{7}\right)+\frac{34}{9}\sin\left(4t+\frac{11}{7}\right)+\frac{1}{3}\sin\left(5t+\frac{8}{5}\right)+\frac{3}{8}\sin\left(6t+\frac{8}{5}\right)+\frac{12}{7}\sin\left(7t+\frac{13}{8}\right)+\frac{11}{7}\sin\left(8t+\frac{13}{8}\right)+\frac{1}{4}\sin\left(10t+\frac{20}{13}\right)+\frac{2}{9}\sin\left(11t+\frac{16}{9}\right)+\frac{3}{8}\sin\left(12t+\frac{8}{5}\right)+\frac{1}{3}\sin\left(13t+\frac{7}{4}\right)+\frac{1}{2}\sin\left(14t+\frac{17}{10}\right)+\frac{5}{7}\sin\left(17t+\frac{17}{10}\right)+\frac{1}{28}\sin\left(18t+\frac{9}{2}\right)+\frac{1}{2}\sin\left(20t+\frac{12}{7}\right)+\frac{3}{7}\sin\left(21t+\frac{16}{9}\right)+\frac{6}{11}\sin\left(24t+\frac{7}{4}\right)-\frac{979}{9}\right)\theta(51\pi-t)\,\theta(t-47\pi)+\left(-\frac{6}{5}\sin\left(\frac{14}{9}-22t\right)-\frac{1}{9}\sin\left(\frac{7}{5}-19t\right)-\frac{9}{\quad}\sin\left(\frac{14}{\quad}-18t\right)-\frac{1}{\quad}\sin\left(\frac{15}{\quad}-15t\right)-\frac{6}{\quad}\sin\left(\frac{11}{\quad}-12t\right)-\frac{7}{\quad}\sin\left(\frac{11}{\quad}-8t\right)-\frac{29}{\quad}$$

WolframAlpha computational… knowledge engine

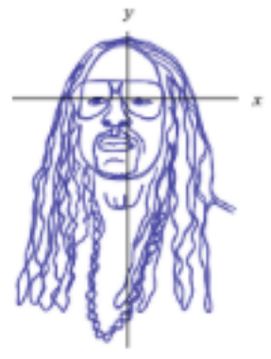
2 Chainz curve

Examples Random

Input interpretation:

2 Chainz curve (popular curve)

Plot:



(plotted for t from 0 to 100π)

Enable interactivity

Alternate names:

Tauheed Epps curve | Tity Boi curve

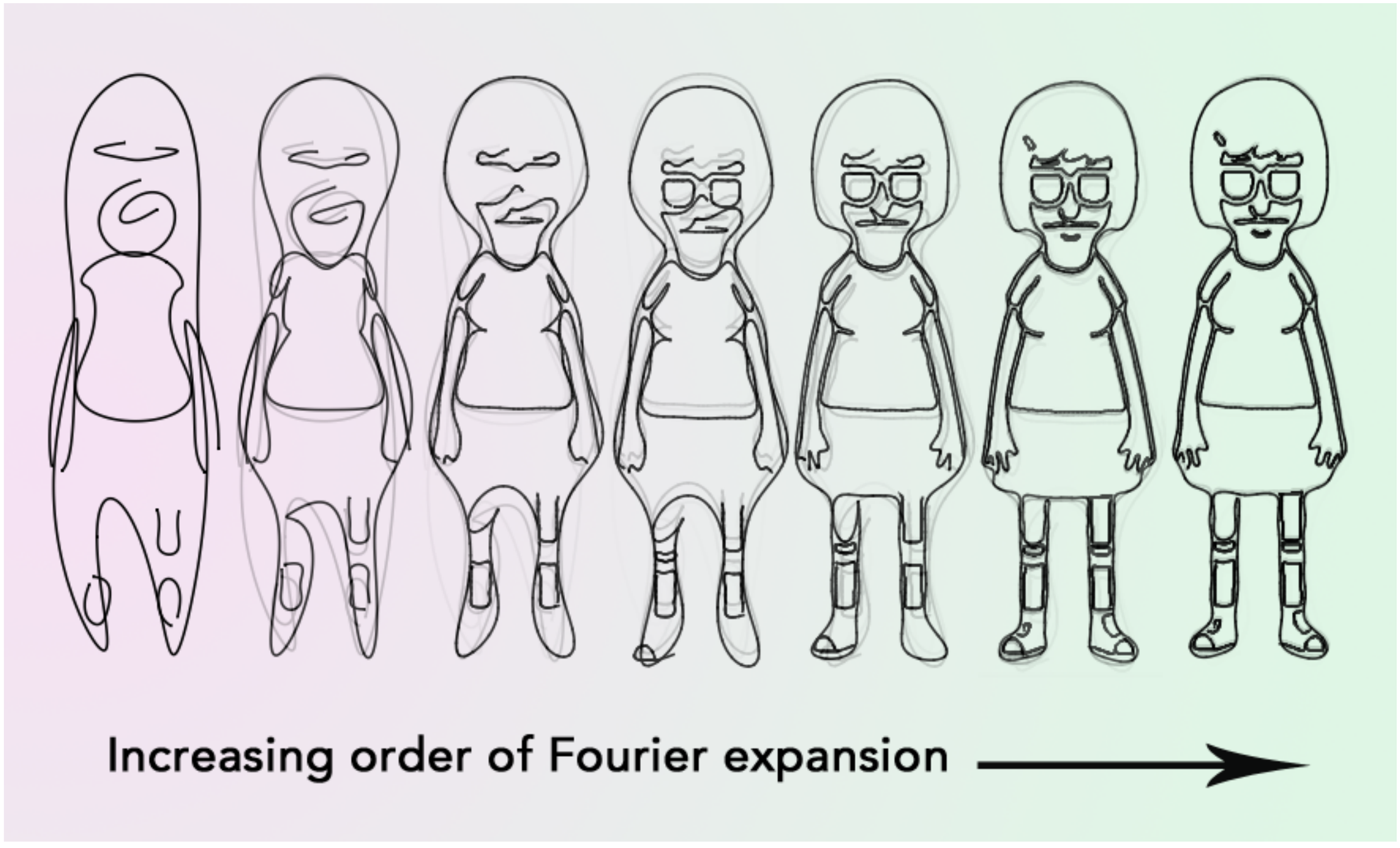
Associated person:

2 Chainz

Equations:

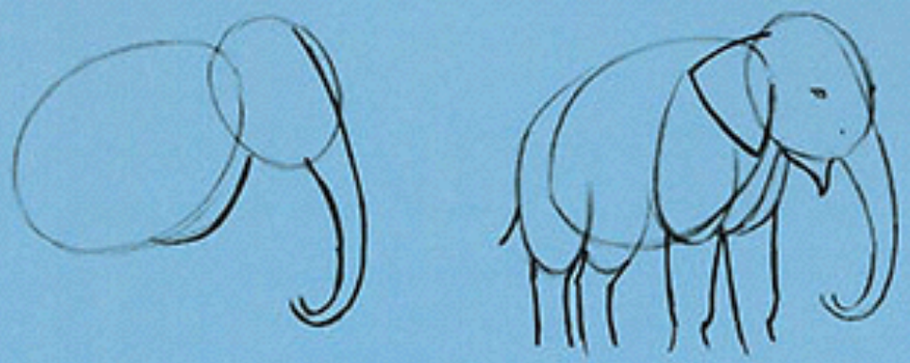
Parametric equations:

$$x(t) = \left(\left(-\frac{1}{6}\sin\left(\frac{3}{5}-74t\right)-\frac{1}{3}\sin(1-71t)-\frac{5}{3}\sin\left(\frac{10}{7}-68t\right)-\sin\left(\frac{3}{2}-64t\right)-\sin\left(\frac{10}{7}-60t\right)-\frac{4}{3}\sin\left(\frac{16}{11}-59t\right)-\frac{2}{5}\sin\left(\frac{29}{28}-53t\right)-\frac{4}{3}\sin\left(\frac{7}{5}-50t\right)-\frac{32}{11}\sin\left(\frac{4}{3}-49t\right)-\frac{25}{12}\sin\left(\frac{3}{2}-48t\right)-\frac{4}{7}\sin\left(\frac{6}{5}-42t\right)-\frac{9}{7}\sin\left(\frac{10}{7}-41t\right)-\frac{1}{2}\sin\left(\frac{7}{5}-37t\right)-\frac{2}{3}\sin\left(\frac{13}{9}-36\right.\right.$$

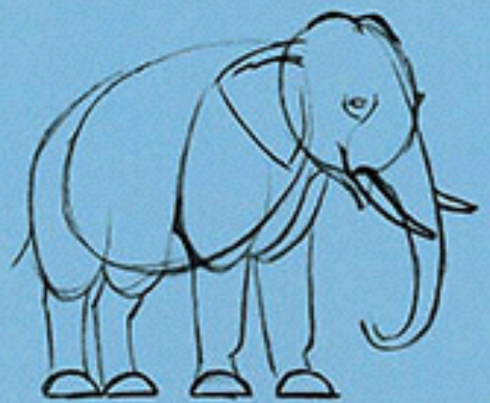

Increasing order of Fourier expansion

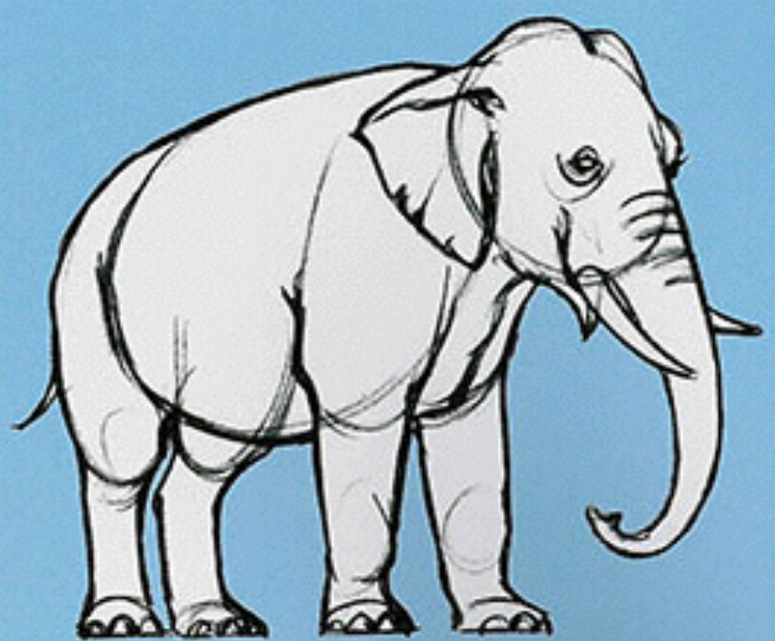
DRAW 50 ANIMALS

THE STEP-BY-STEP WAY TO DRAW
Elephants, Tigers, Dogs, Fish, Birds, and Many More . . .

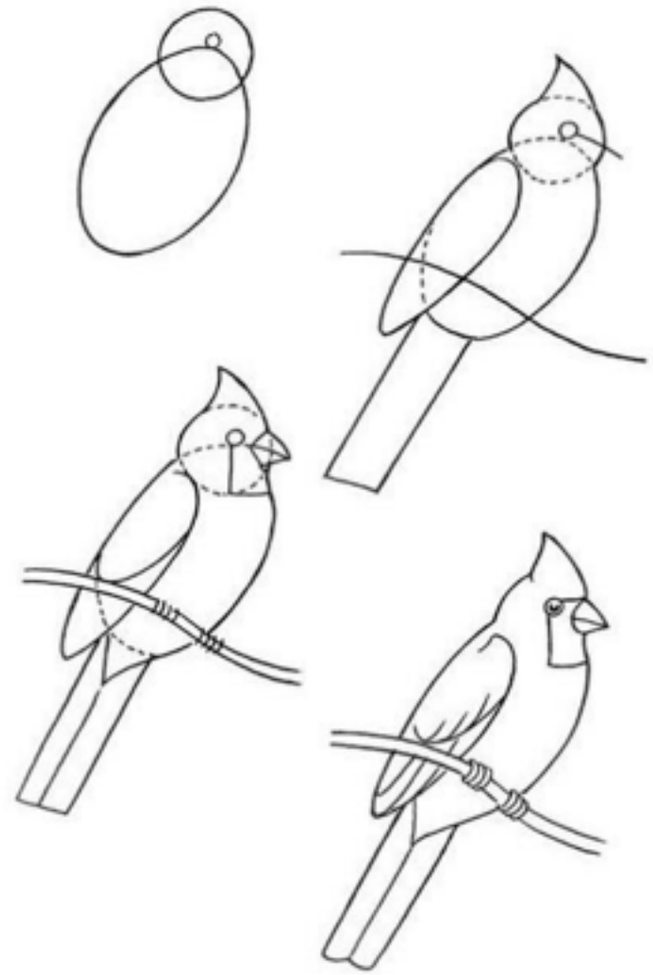


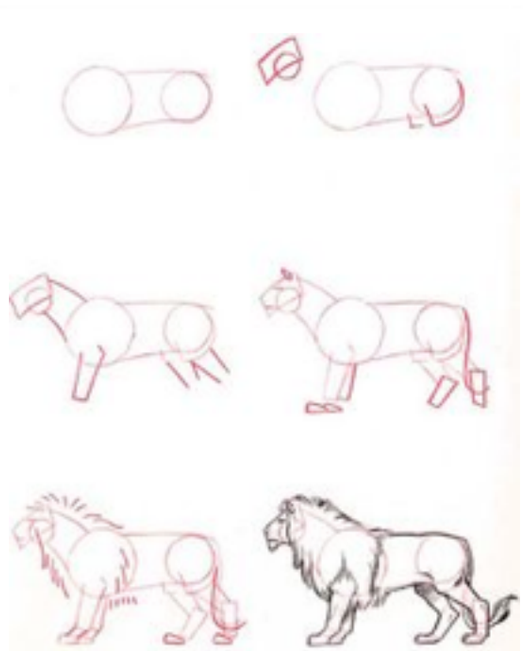
LEE J. AMES





DRAW 50





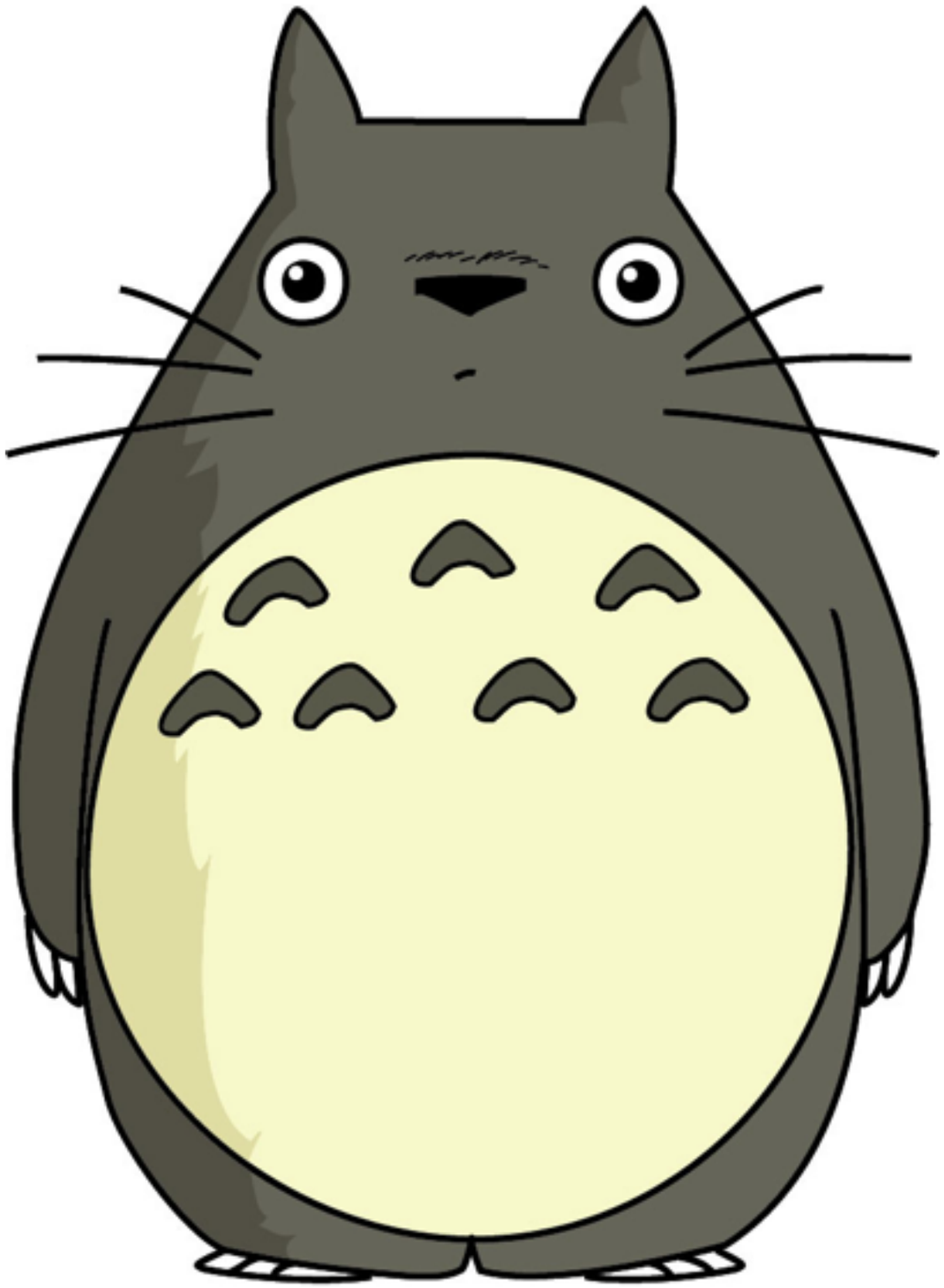
Sketch ~~Draw~~ Anything

BETA VERSION. WE'RE WORKING ON IT.

Enter the URL of the picture you want to draw.

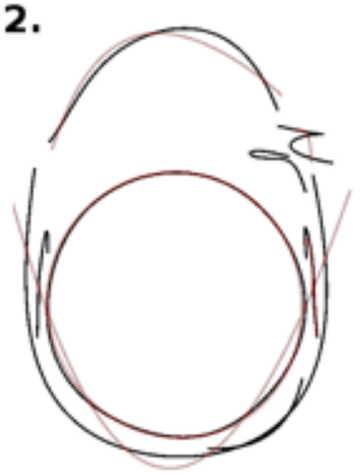
HTTP://WWW.YOUR WEBSITE.COM/YOUR PICTURE.JPG

SUBMIT



1.

2.



3.

4.

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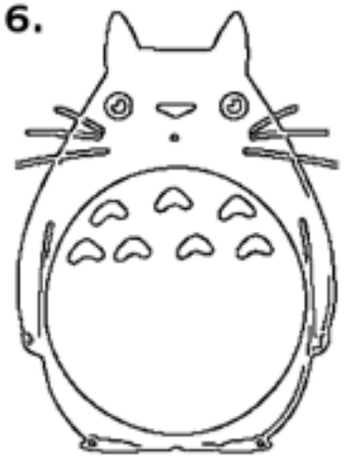

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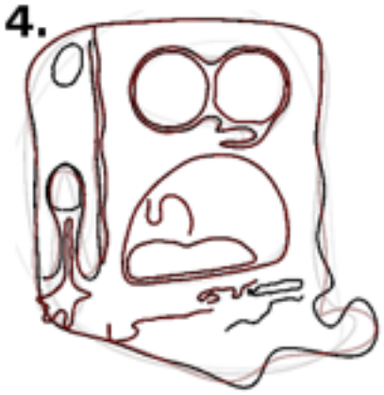

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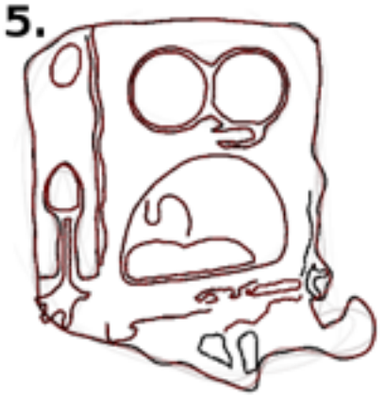

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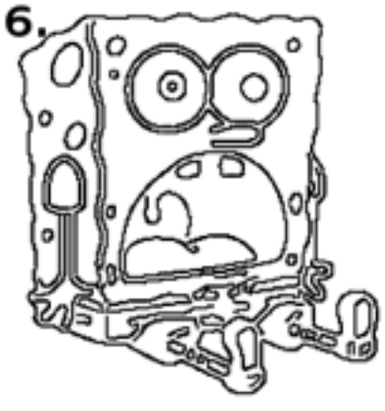

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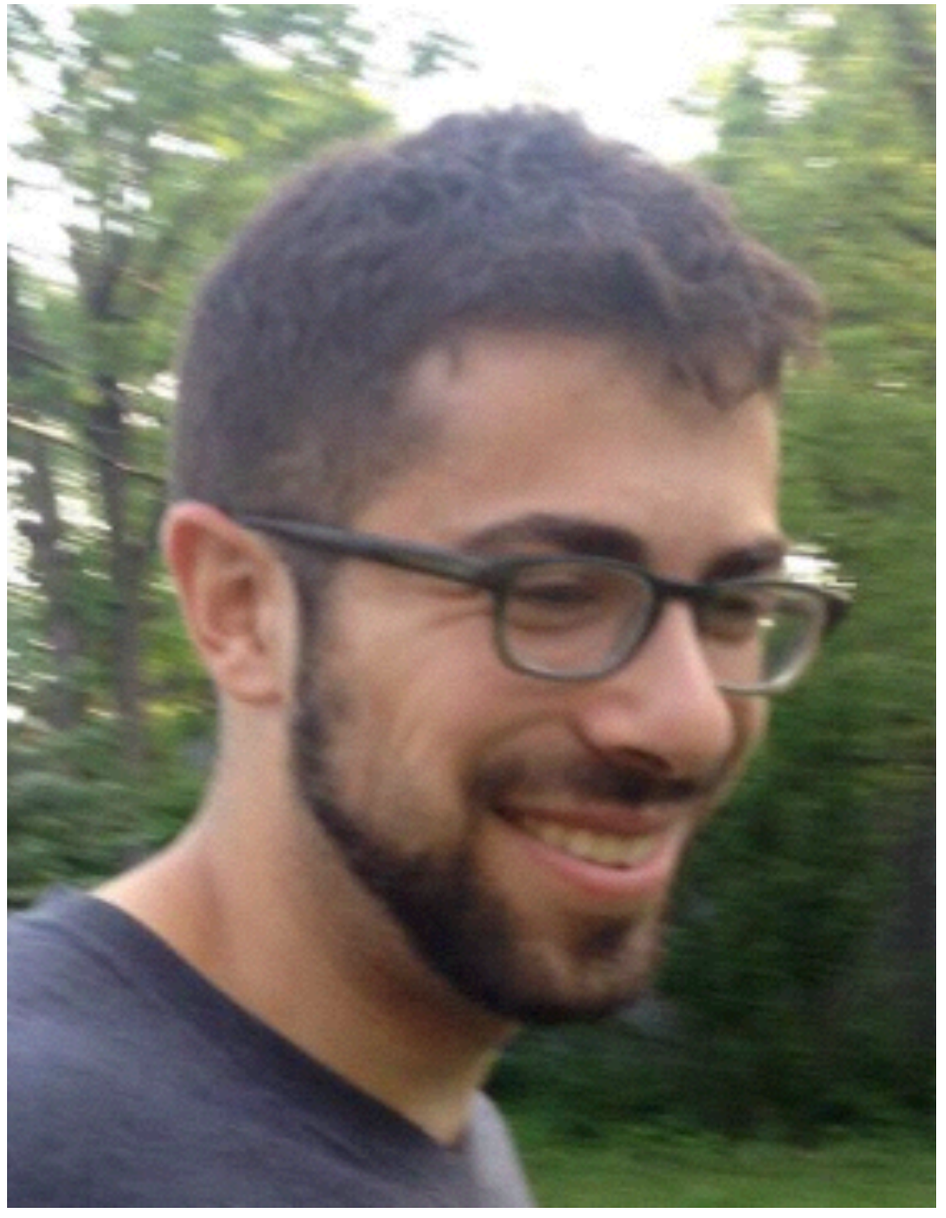
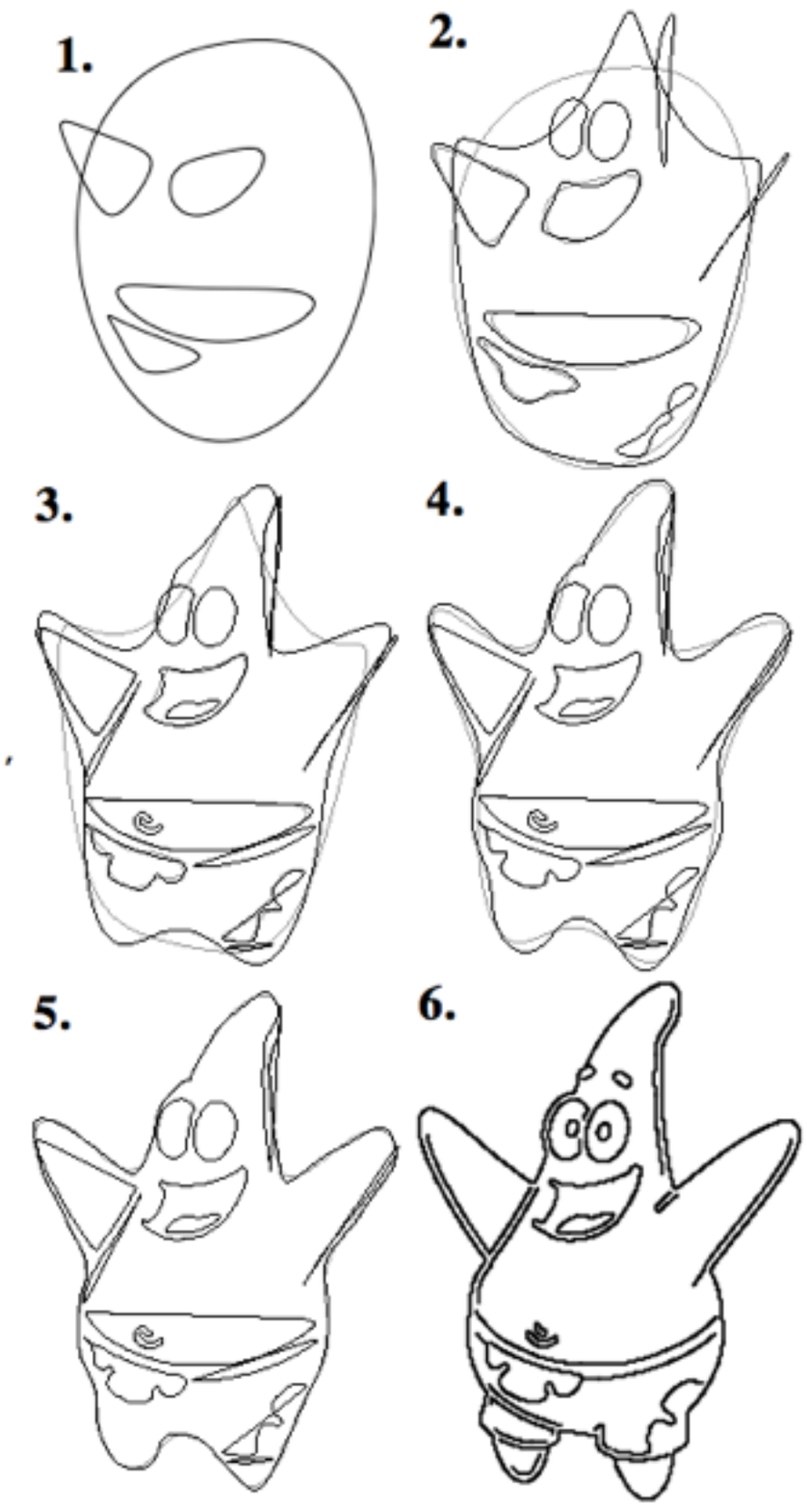


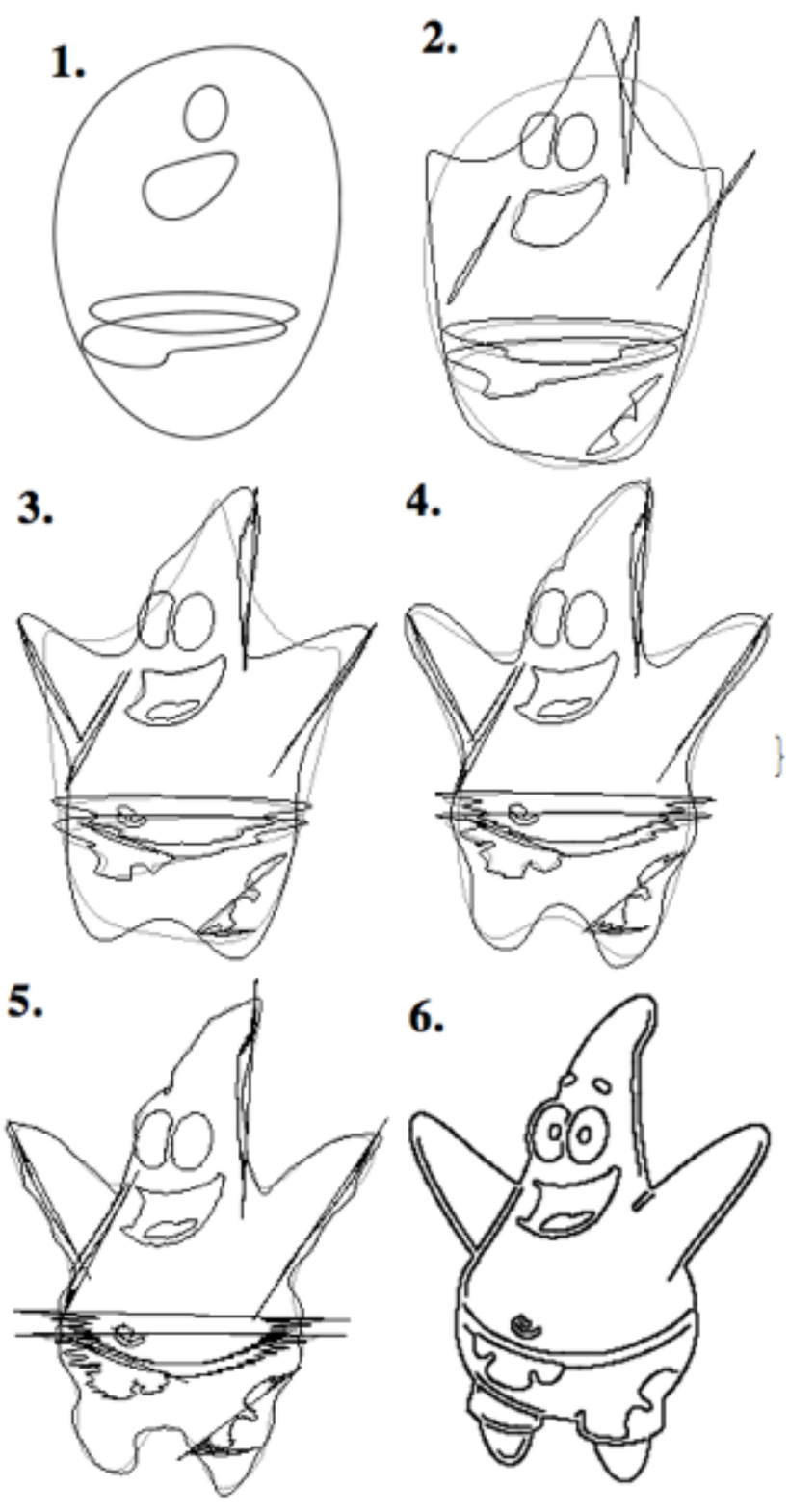
Algorithm

- Perform edge detection of some kind (e.g. Canny)
- Iterate over the set of edge pixels, sewing them into distinct line segments
- Compute Fourier series approximation for x(t) and y(t) from parametric representation of each line segment

With closed curves



Without



Demos

HACK NTU,

August 2015

The Wolfram Language
Image Identification Project

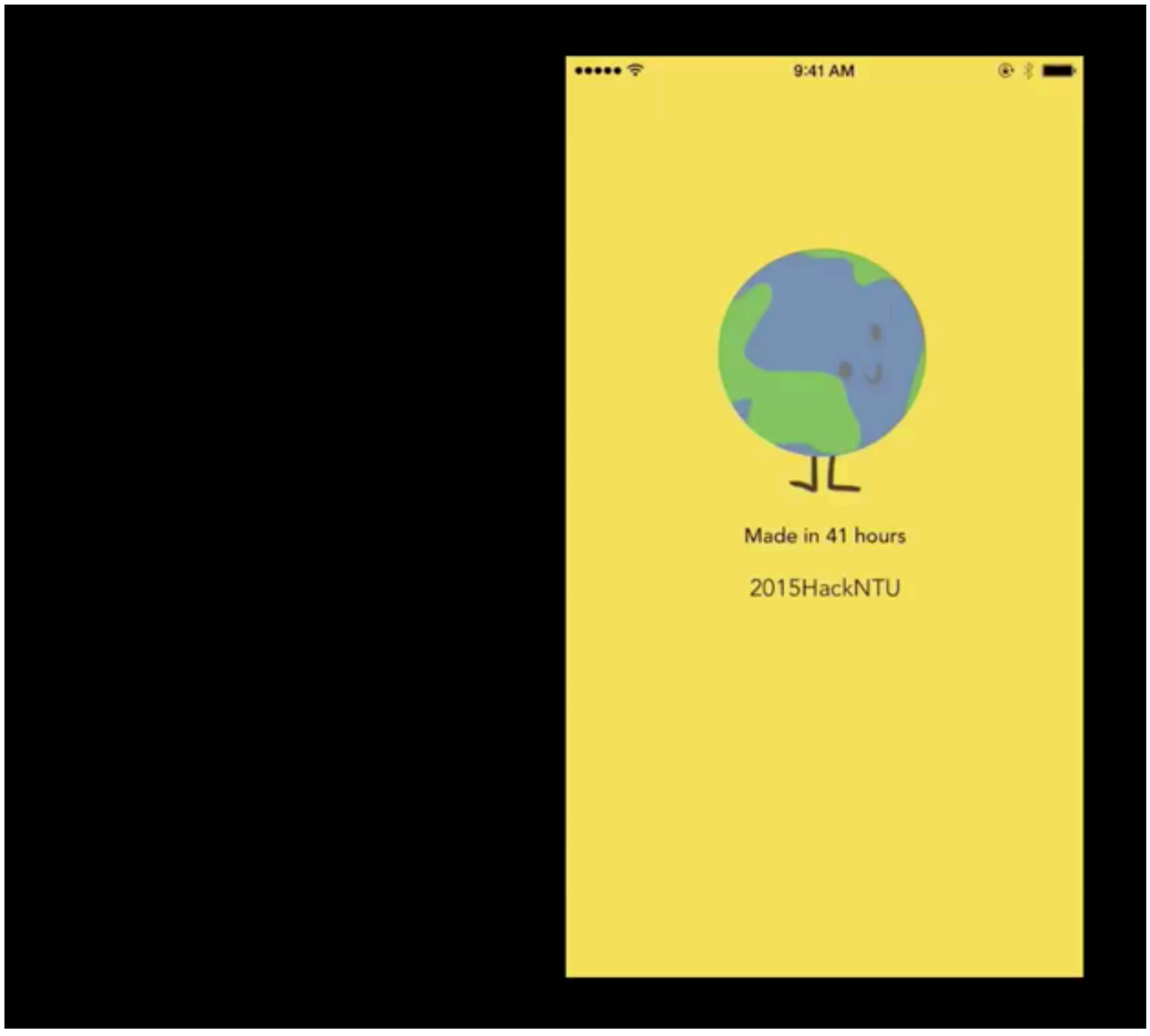
ImageIdentify[]

Australian sea lion

Twig!

LEARN FOR FUN

2015 枝




THE LARGEST HACKATHON IN TAIWAN
First Prize
200,000 NTD
1
2015 HackNTU
HACK INTO THE CITY

Demos

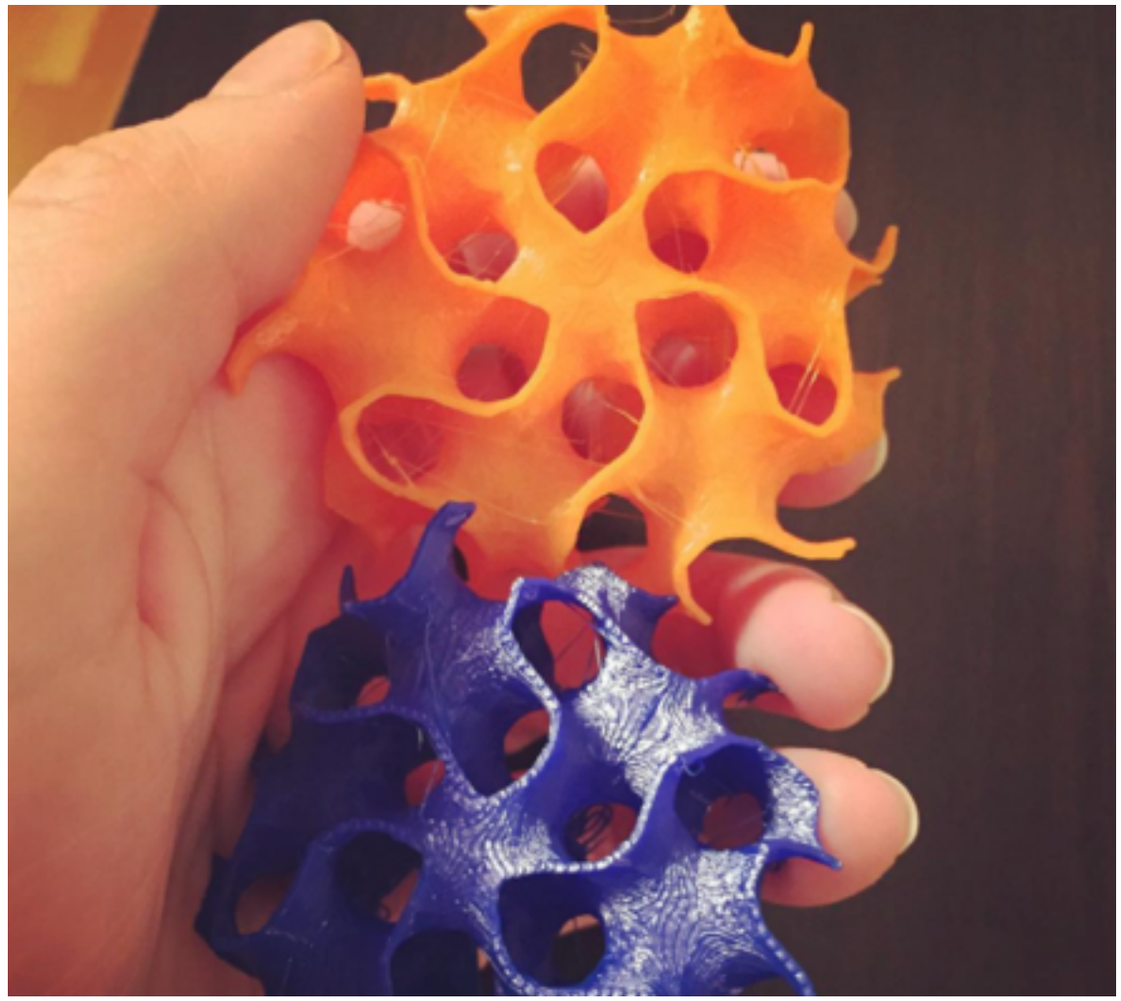
MHACKS VI,

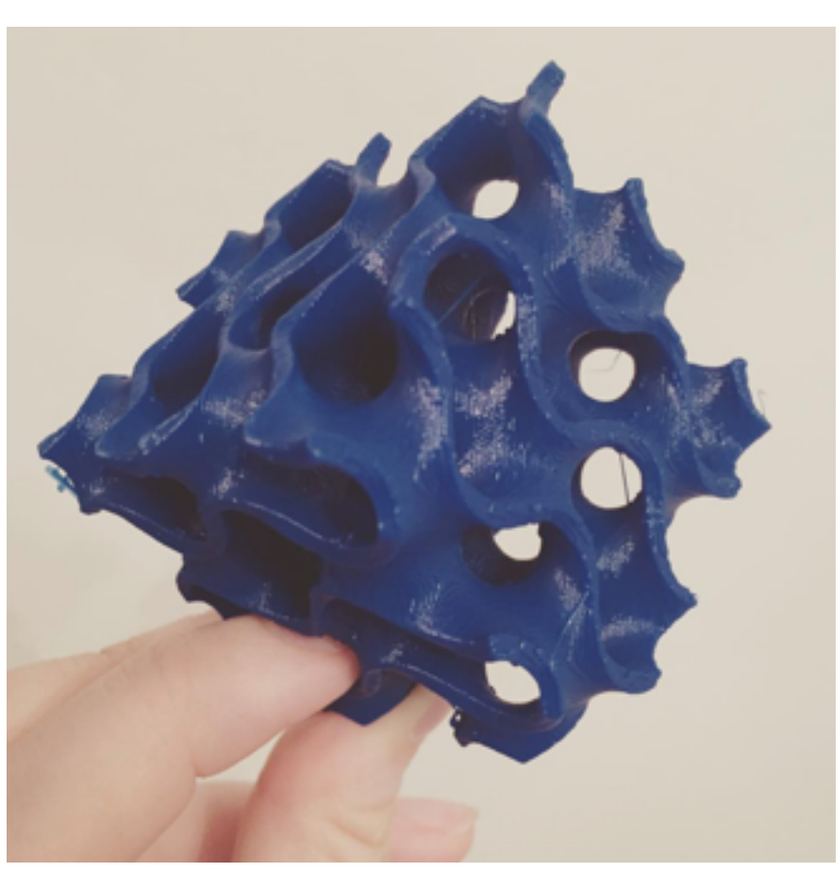
September 2015

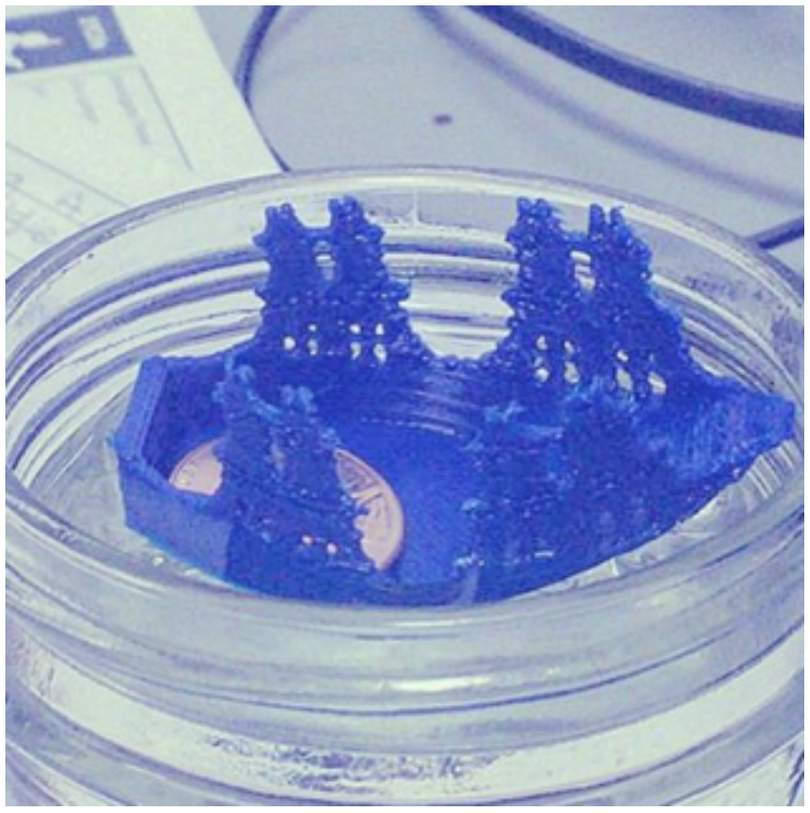
3D Printing

STL files

```
facet normal ni nj nk
    outer loop
        vertex v1x v1y v1z
        vertex v2x v2y v2z
        vertex v3x v3y v3z
    endloop
endfacet
```







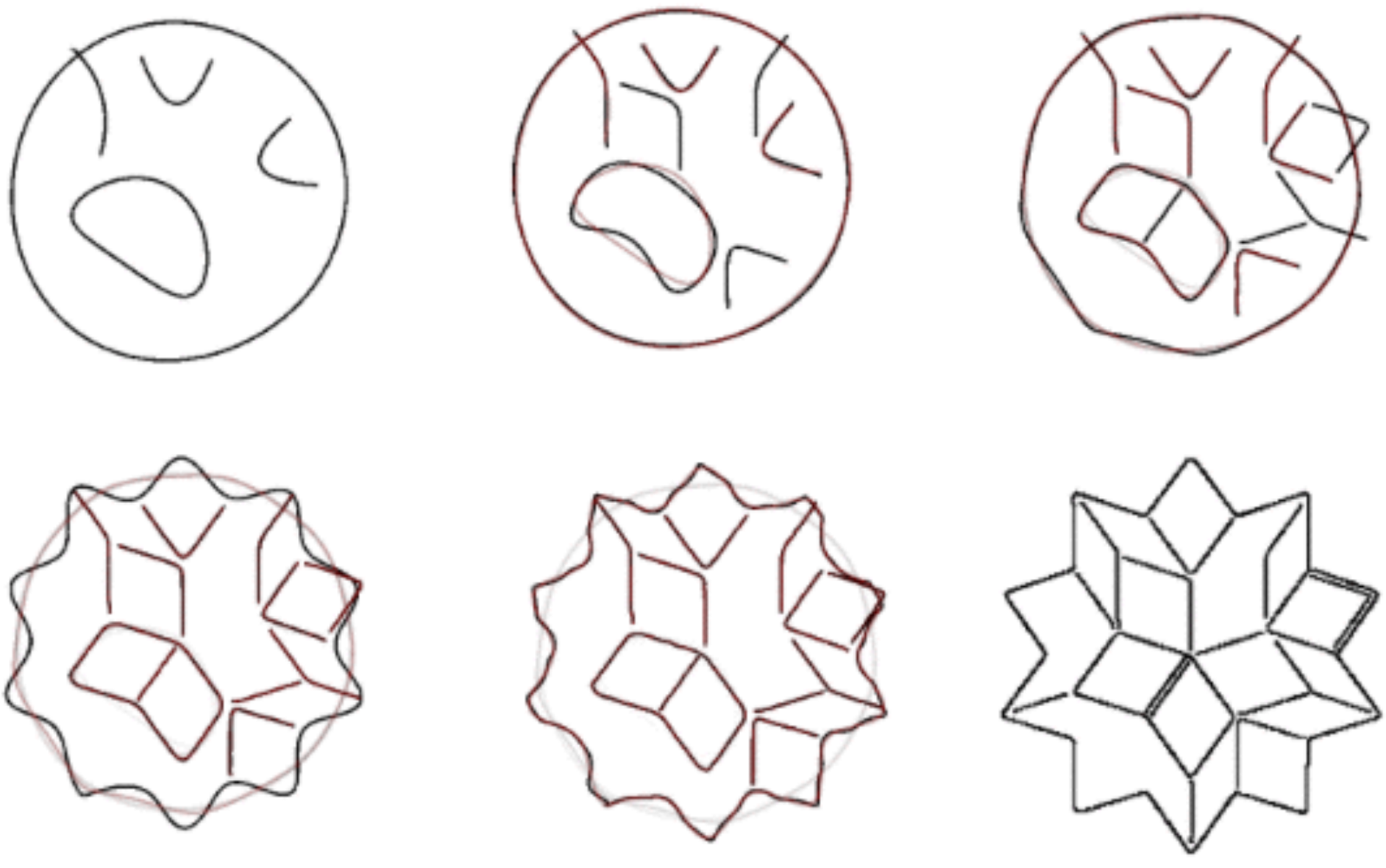
Fusion furniture

- Create boolean function from two silhouettes (return true on the interior and false elsewhere)
- Use RegionPlot3D with one boolean function in (*x, y)* and one in (*x, z)*
- Wolfram Instant API

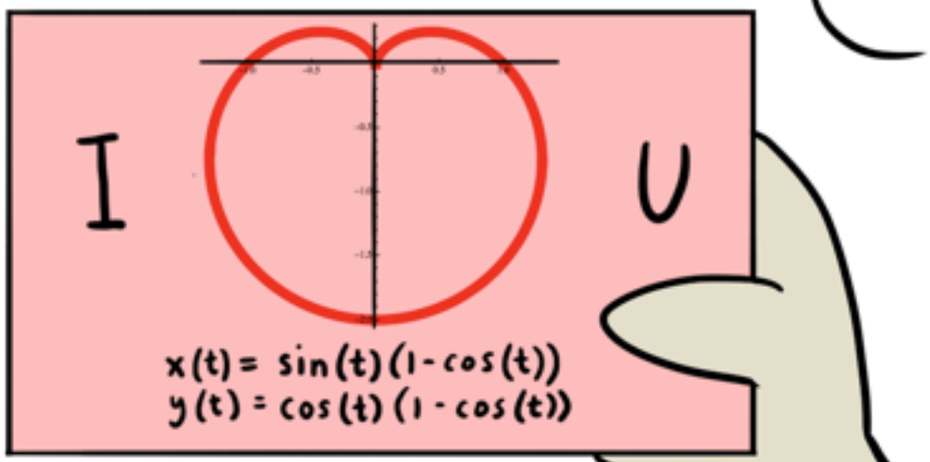
fusion-furniture.azurewebsites.net

Demos

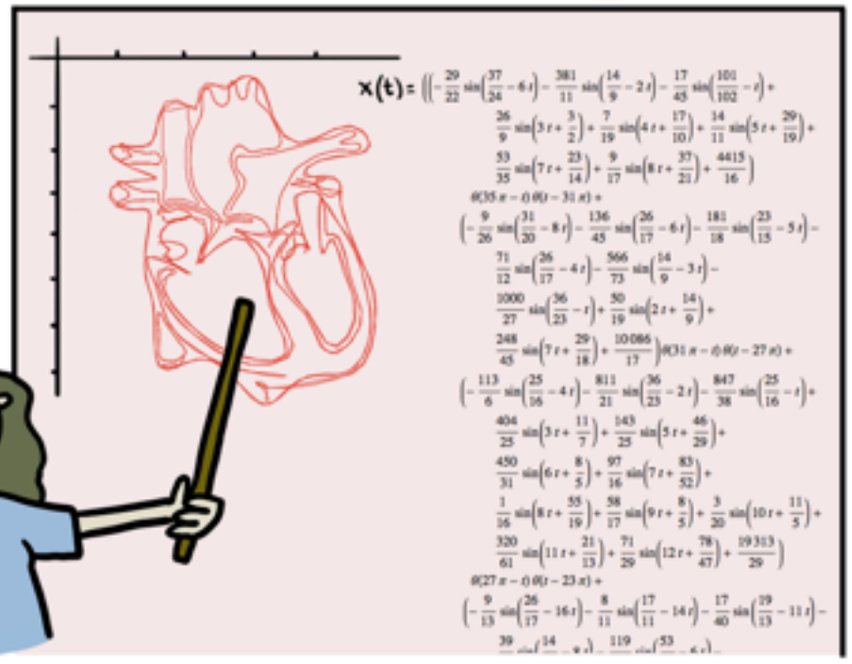
Conclusion: *Users-driven design through mathematics (and Mathematica)*



WHAT, IS THAT SUPPOSED TO BE A HEART OR SOMETHING? PATHETIC.



THESE ARE EQUATIONS FOR A HEART (



IT'S LIKE YOU'RE NOT EVEN TRYING.