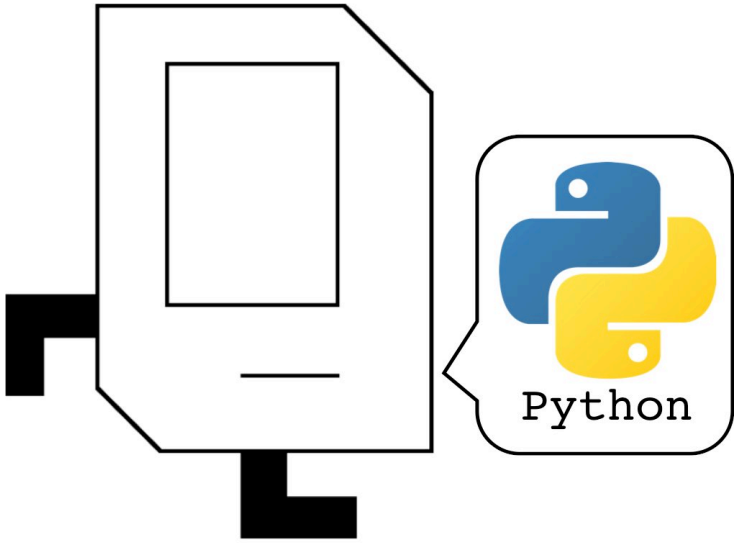
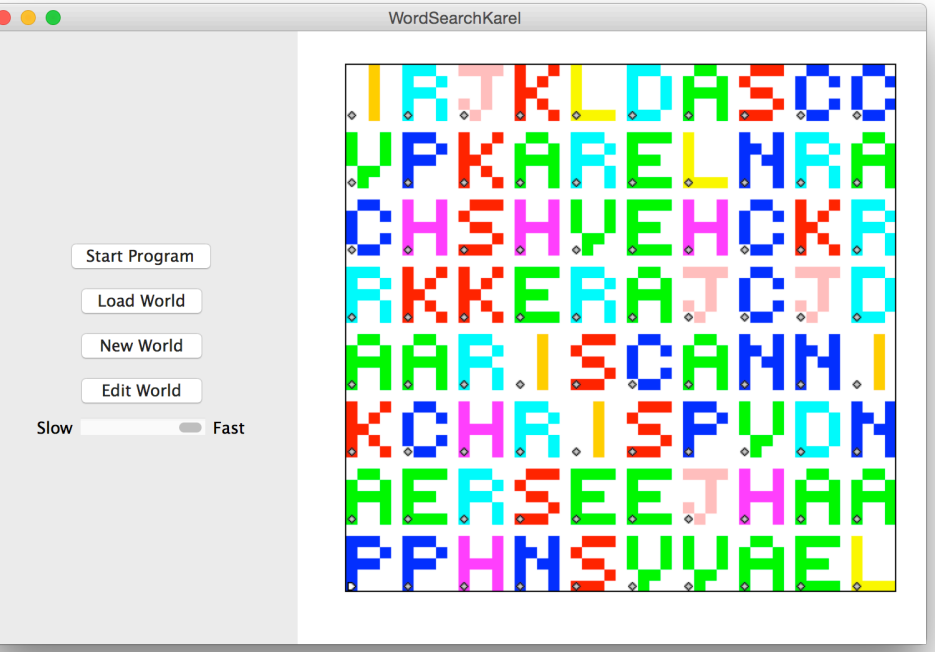
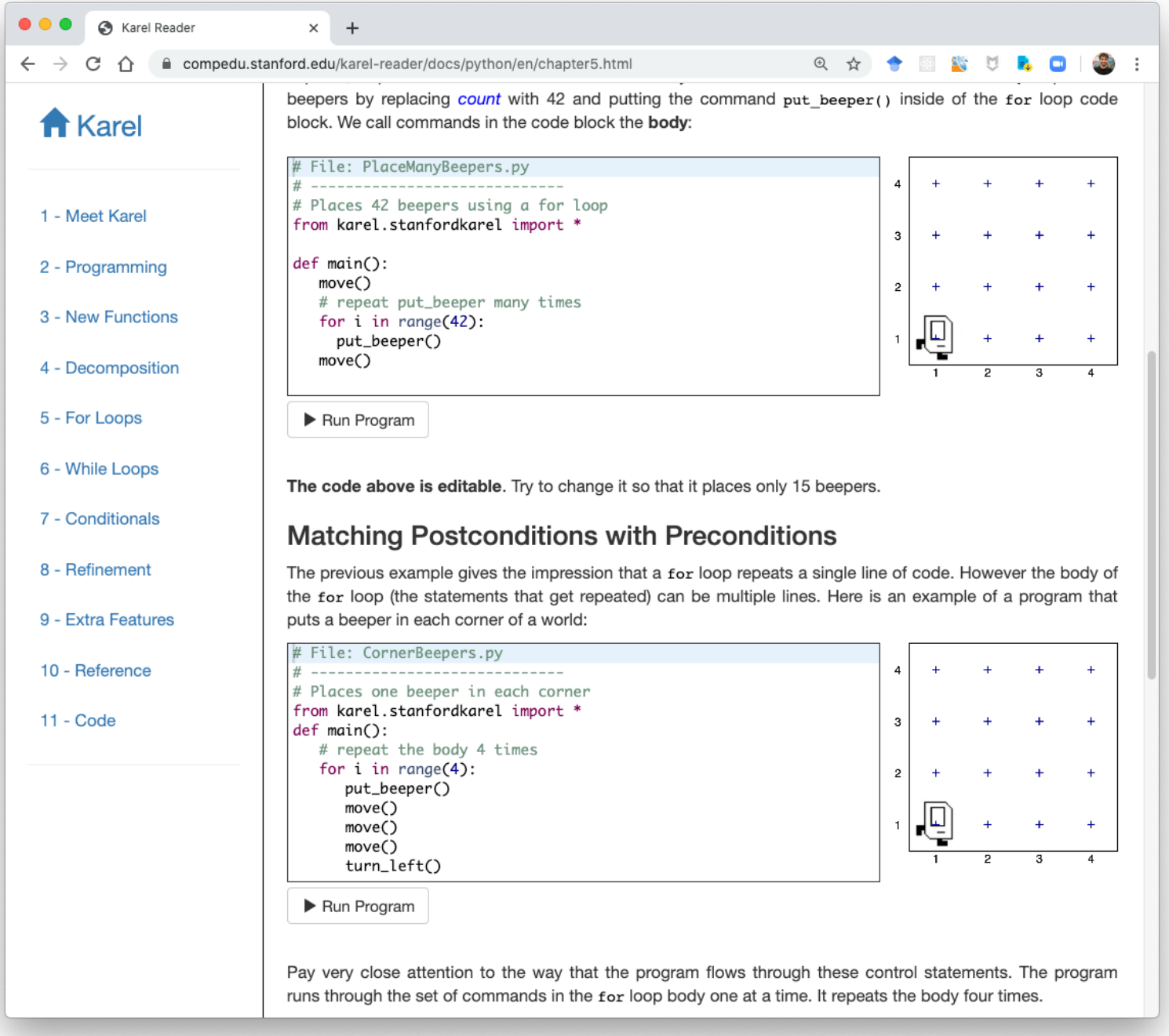
Overview

Chris Piech + Mehran Sahami
CS106A, Stanford University

You have come a long way


Python


WordSearchKarel
Start Program
Load World
New World
Edit World
Slow
Fast


Karel Reader
compedu.stanford.edu/karel-reader/docs/python/en/chapter5.html
Karel
1 - Meet Karel
2 - Programming
3 - New Functions
4 - Decomposition
5 - For Loops
6 - While Loops
7 - Conditionals
8 - Refinement
9 - Extra Features
10 - Reference
11 - Code
beepers by replacing count with 42 and putting the command put_beeper() inside of the for loop code block. We call commands in the code block the body:
# File: PlaceManyBeepers.py
# ----------------------------
# Places 42 beepers using a for loop
from karel.stanfordkarel import *
def main():
move()
# repeat put_beeper many times
for i in range(42):
put_beeper()
move()
Run Program
The code above is editable. Try to change it so that it places only 15 beepers.
Matching Postconditions with Preconditions
The previous example gives the impression that a for loop repeats a single line of code. However the body of the for loop (the statements that get repeated) can be multiple lines. Here is an example of a program that puts a beeper in each corner of a world:
# File: CornerBeepers.py
# ----------------------------
# Places one beeper in each corner
from karel.stanfordkarel import *
def main():
# repeat the body 4 times
for i in range(4):
put_beeper()
move()
move()
move()
turn_left()
Run Program
Pay very close attention to the way that the program flows through these control statements. The program runs through the set of commands in the for loop body one at a time. It repeats the body four times.

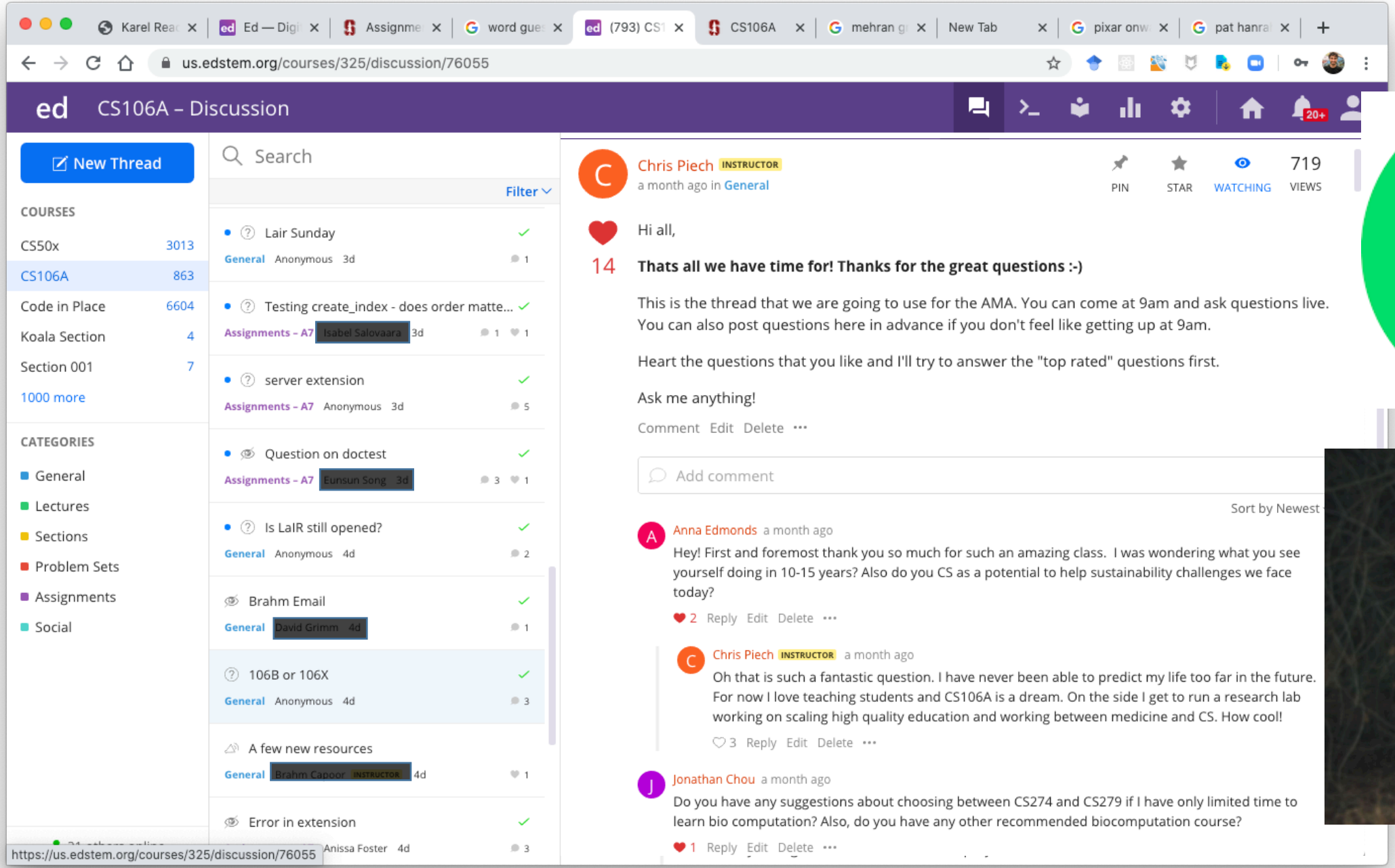
Very first time CS106A has gone fully online

COVID-19 EDITION

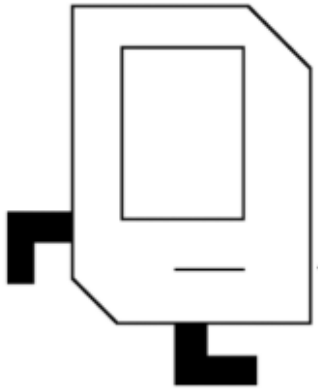
Class is 100% online.
Diagnostics not exams.
Same great projects.
Same great sections.
Just as much feedback.
Mastery & learning +
S/NC. Learn more.

COURSE VALUES

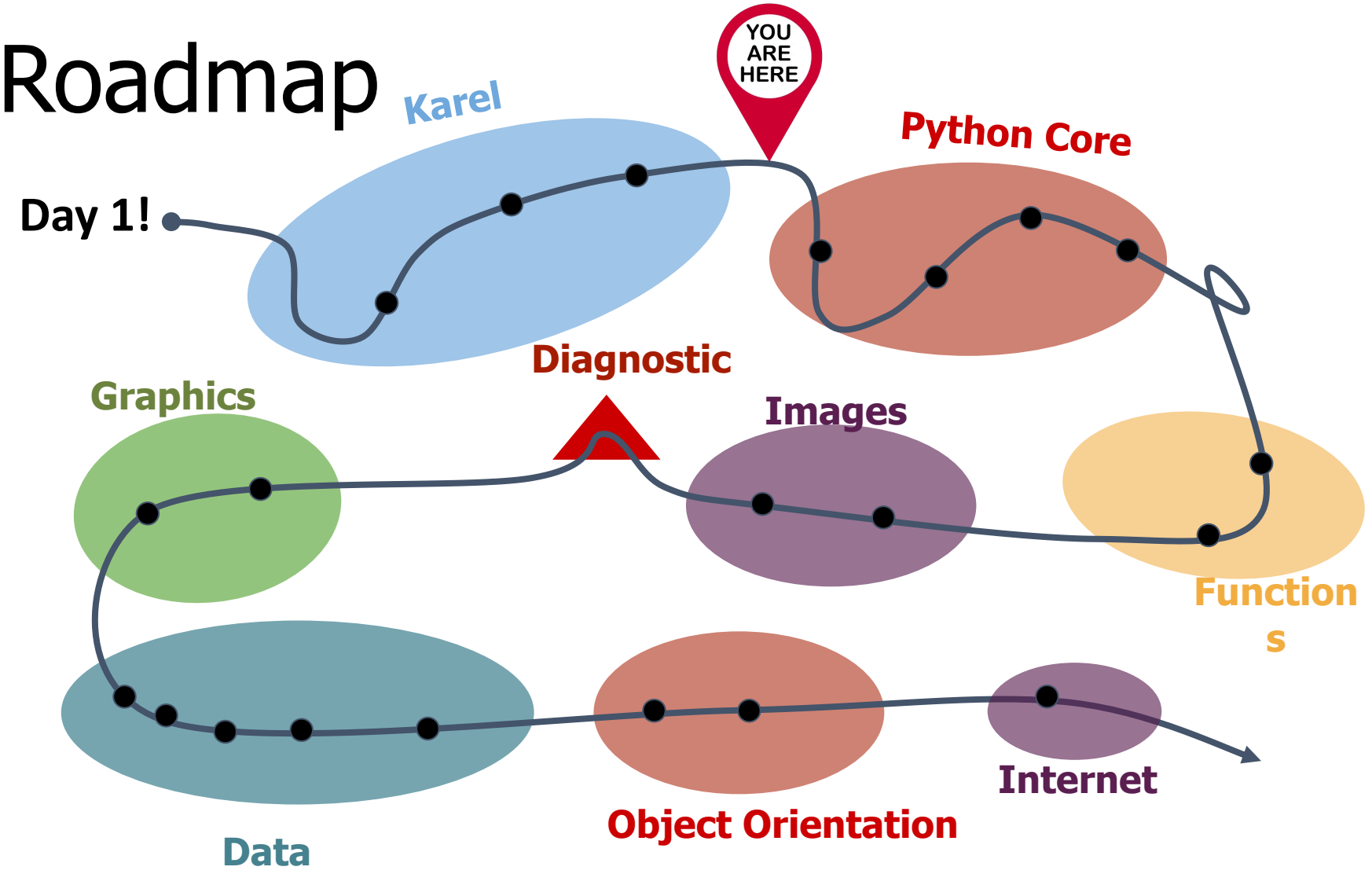
Everyone is welcome.
Intellectual joy.
Be kind. Be humane.
Social connection.
Learn by doing.
Thrill of building.
Adapt to new contexts.
Especially in a hard time.



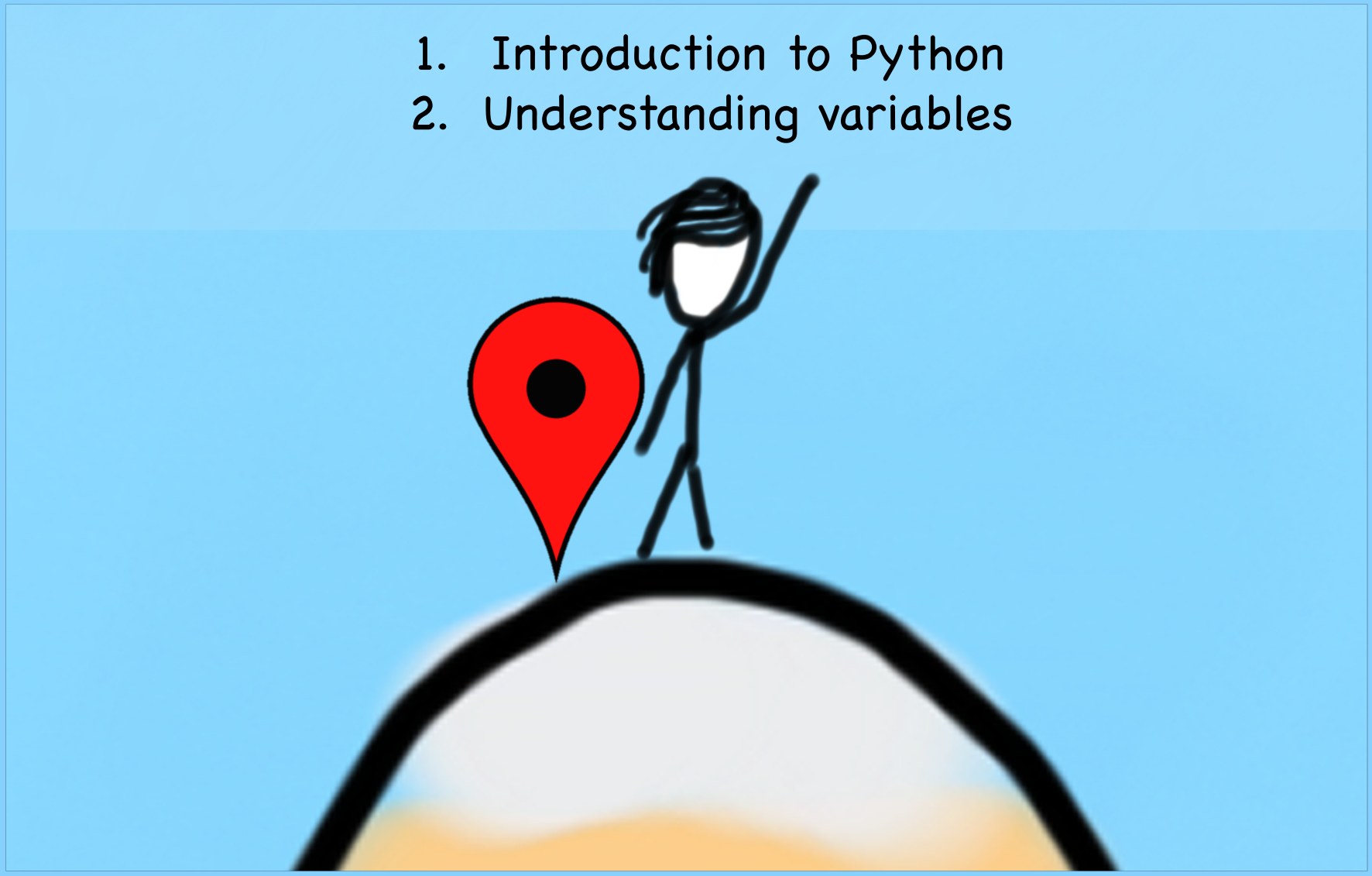
838 Answers
247 Comments

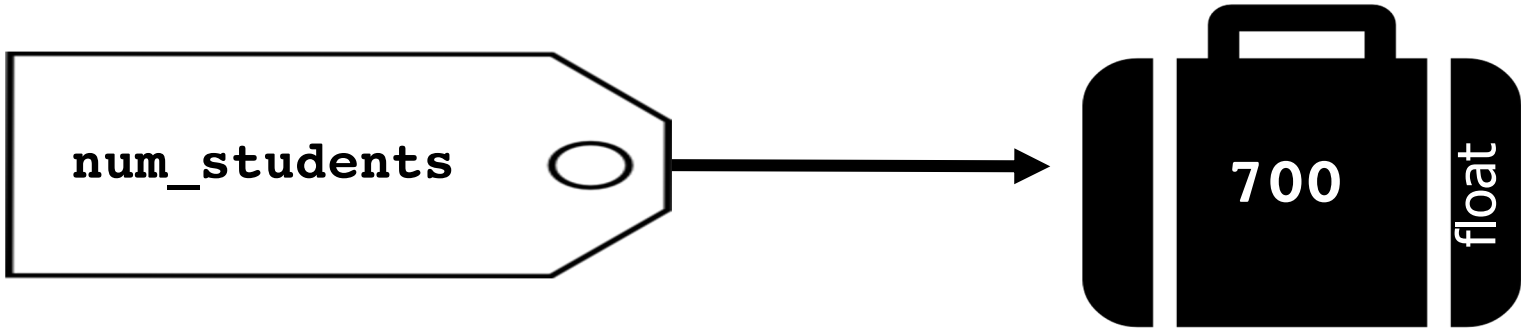

call_me()

Roadmap


YOU ARE HERE
Karel
Python Core
Day 1!
Diagnostic
Graphics
Images
Functions
Data
Object Orientation
Internet

1. Introduction to Python
2. Understanding variables



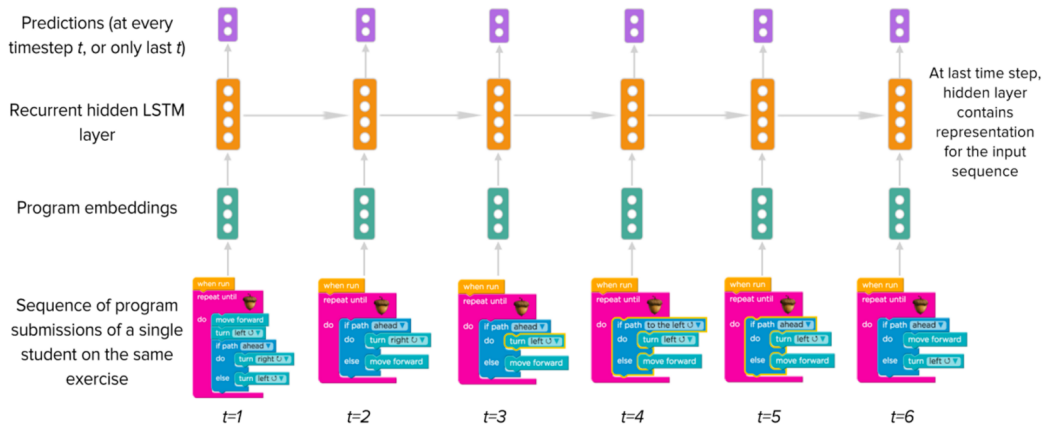


parameter(s) return

GameShow

```
Welcome to the CS106A game show!
Choose a door and win a prize
Door: 2
You chose door 2
You win $
```

KHAN-sole ACADEMY




```
What is 51 + 79?
Your answer: 120
Incorrect.  The expected answer is 130
What is 33 + 19?
Your answer: 42
Incorrect.  The expected answer is 52
What is 55 + 11?
Your answer: 66
Correct!  You've gotten 1 correct in a row.
What is 84 + 25?
Your answer: 109
Correct!  You've gotten 2 correct in a row.
What is 26 + 58?
Your answer: 74
Incorrect.  The expected answer is 84
What is 98 + 85?
Your answer: 183
Correct!  You've gotten 1 correct in a row.
What is 79 + 66?
Your answer: 145
Correct!  You've gotten 2 correct in a row.
What is 97 + 20?
Your answer: 117
Correct!  You've gotten 3 correct in a row.
Congratulations!  You mastered addition.
```

Diagnostic

Karel Reader | Ed — Digital Learning Platform | Assignment | word guessing game - Google | (794) CS106A – Lessons

us.edstem.org/courses/325/lessons/1164/slides/5615

ed CS106A – Lessons

Lessons | Slides | Time's Up | Nondecreasing (15 points) | Challenge | Submissions | Solution (hidden) | Edit Slide | Prev | Next

Diagnostic

- Instructions ✓
- Debugging & Tracing (8 points)
- Short Programs (12 points)
- Ramp Climbing Karel (15 points) ✓
- Nondecreasing (15 points) ✓

Description

Nondecreasing (15 points)

A simple way to achieve great things in life is to make small forward progress every day. Non-decreasing progress is one of the principles behind modern AI.

Write a program that asks the user to enter a sequence of "non-decreasing" numbers one at a time. Numbers are non-decreasing if each number is greater than or equal to the last.

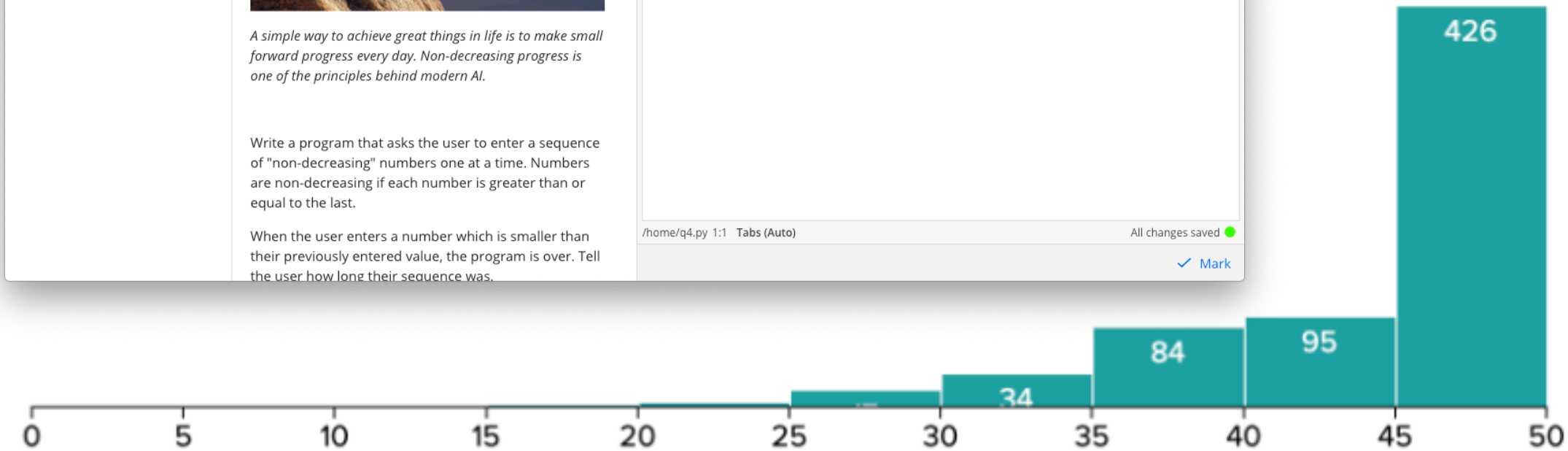
When the user enters a number which is smaller than their previously entered value, the program is over. Tell the user how long their sequence was.

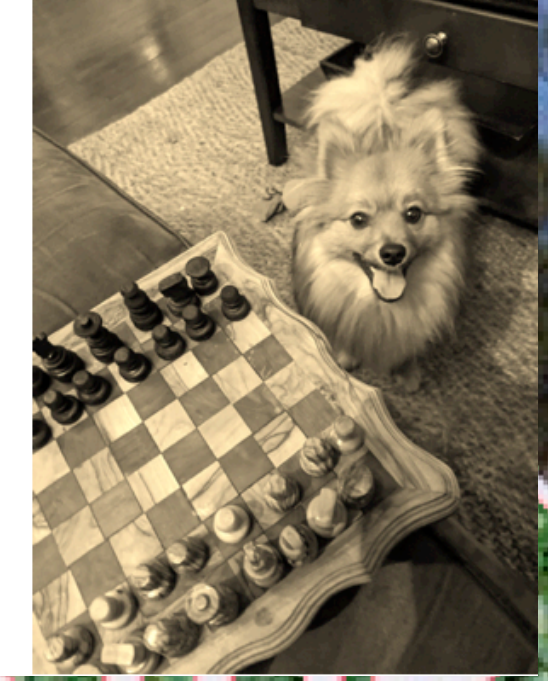
q4.py

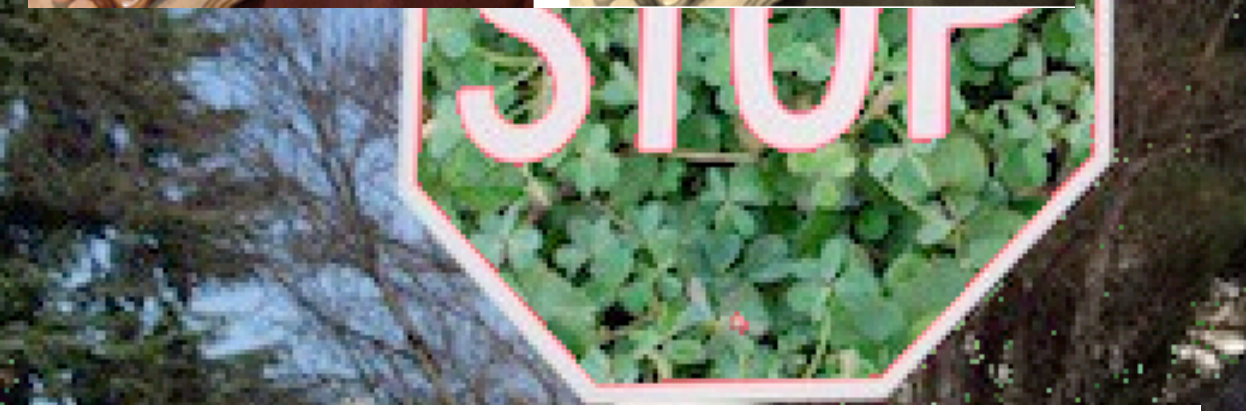
```
1 def main():
2     # TODO write your solution here
3     pass
4
5 if __name__ == "__main__":
6     main()
```

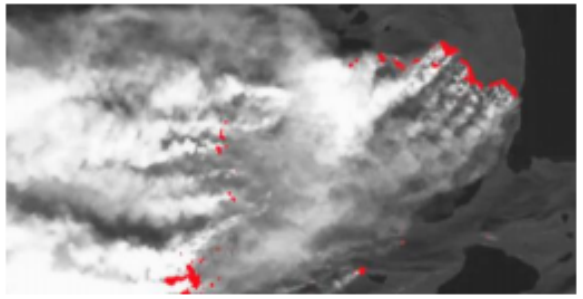
/home/q4.py 1:1 Tabs (Auto) All changes saved

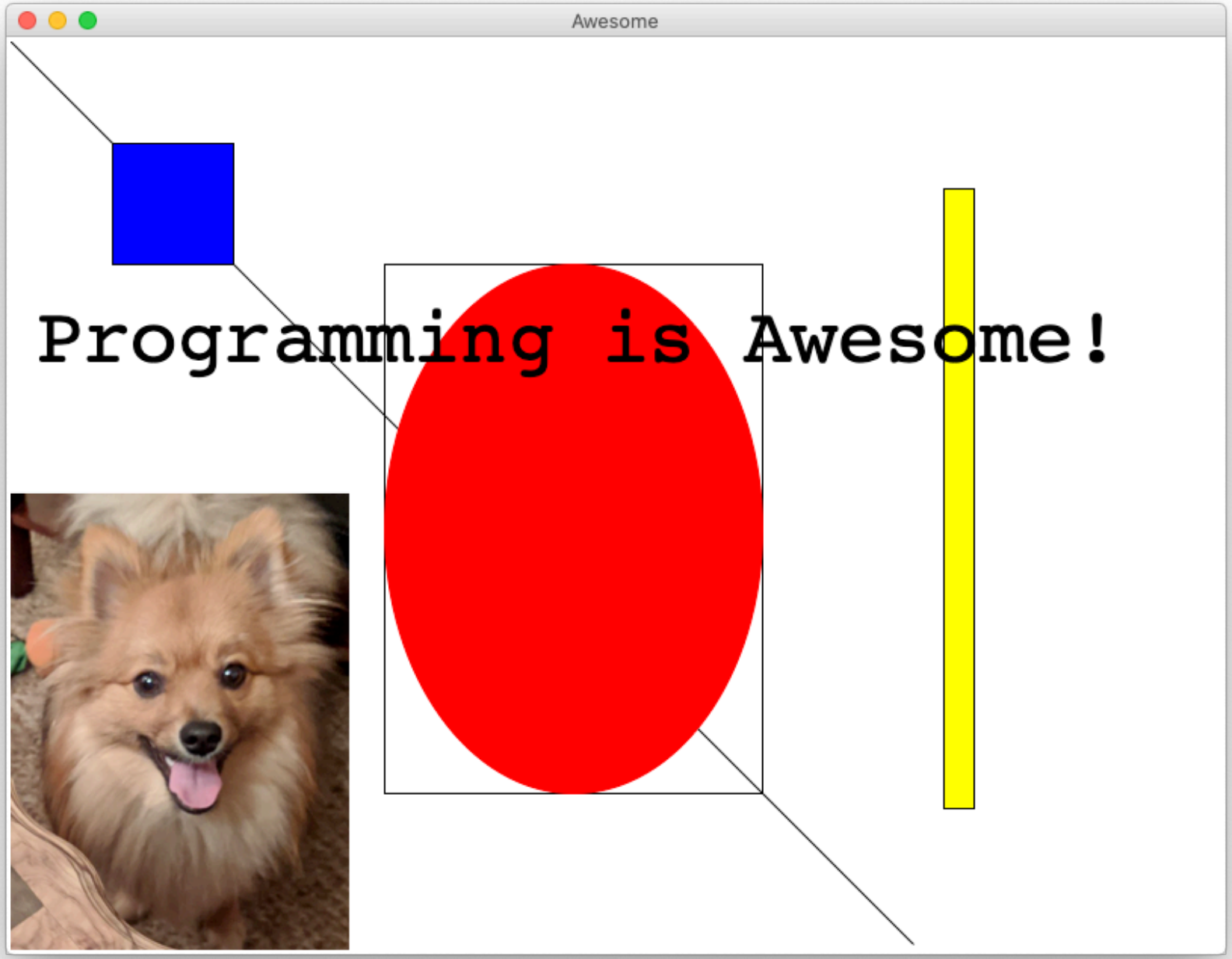
Mark

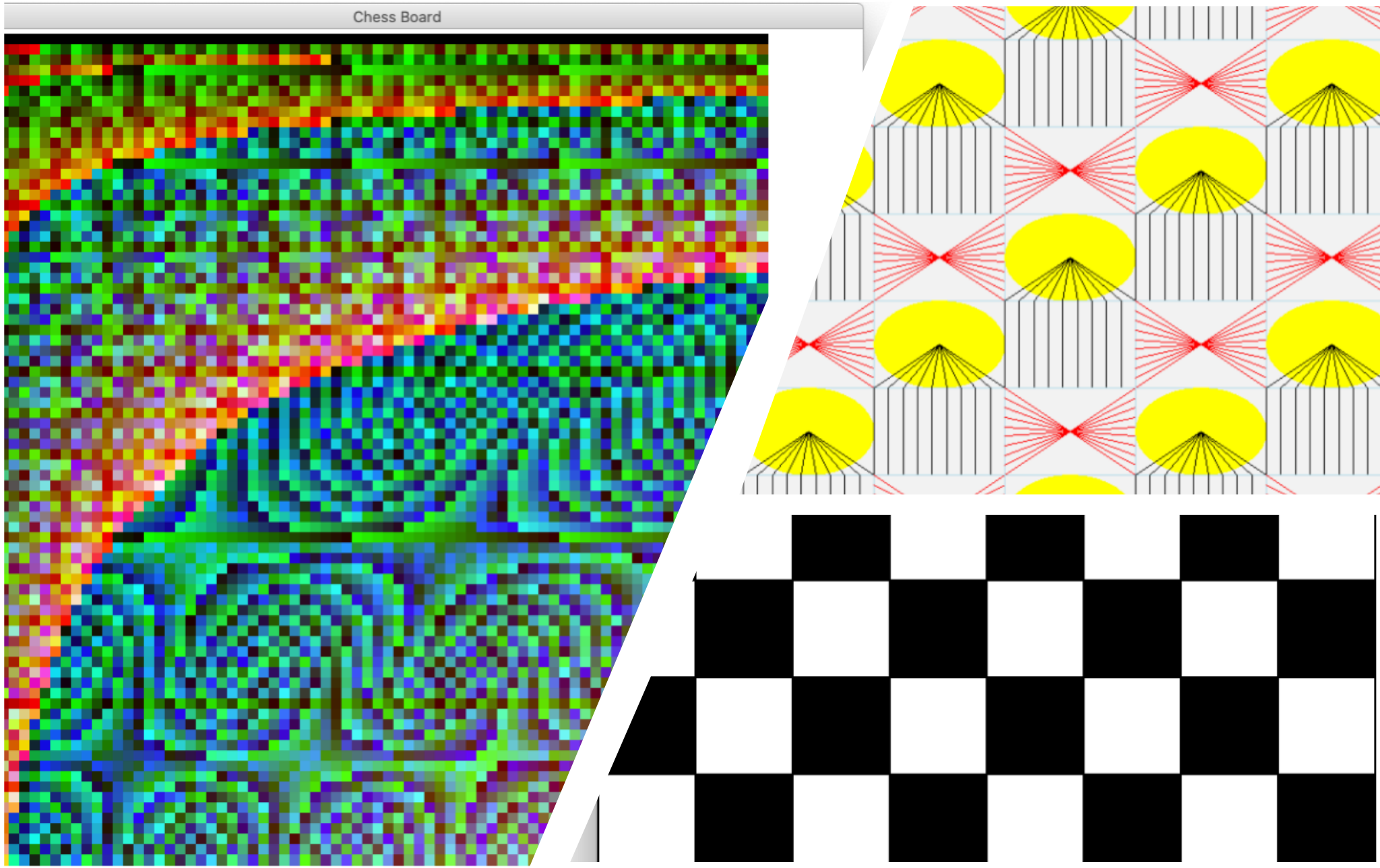





STOP

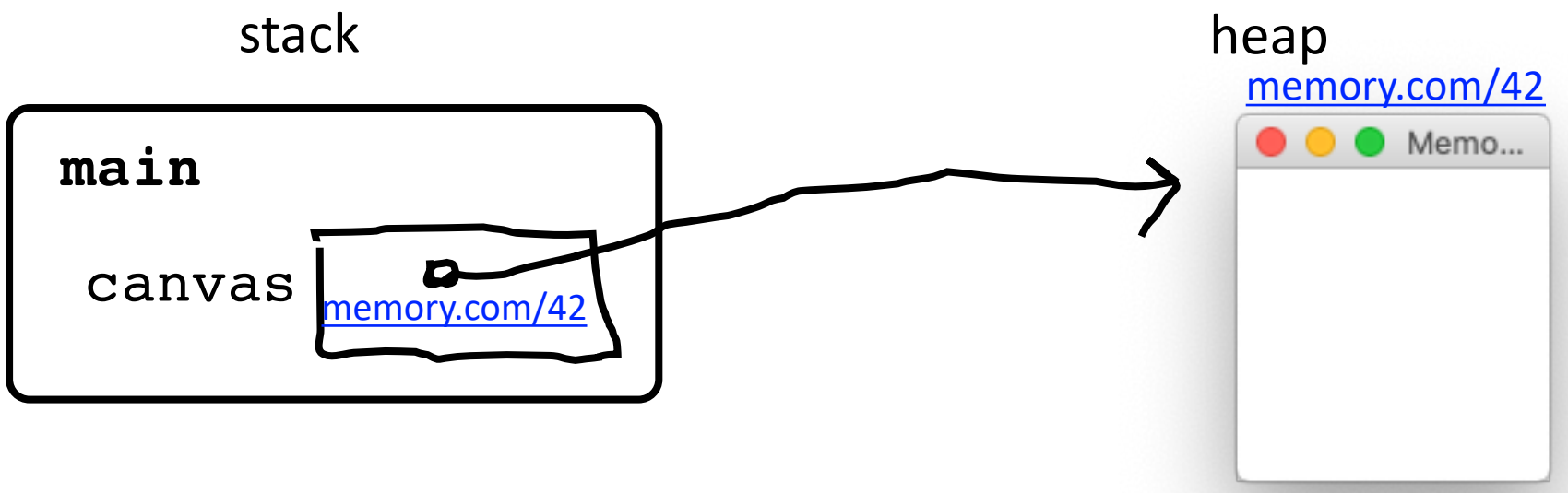


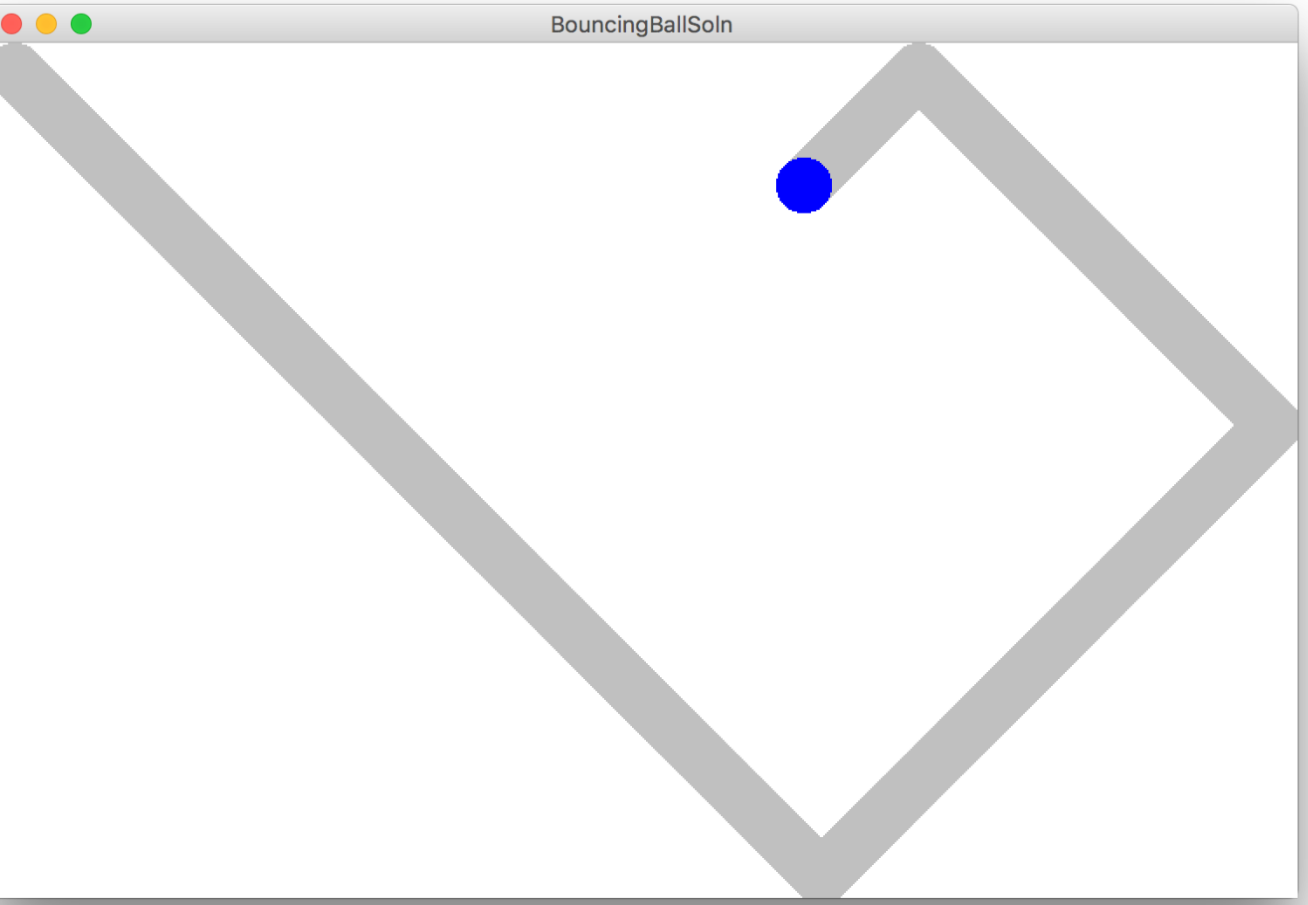

Awesome
Programming is Awesome!

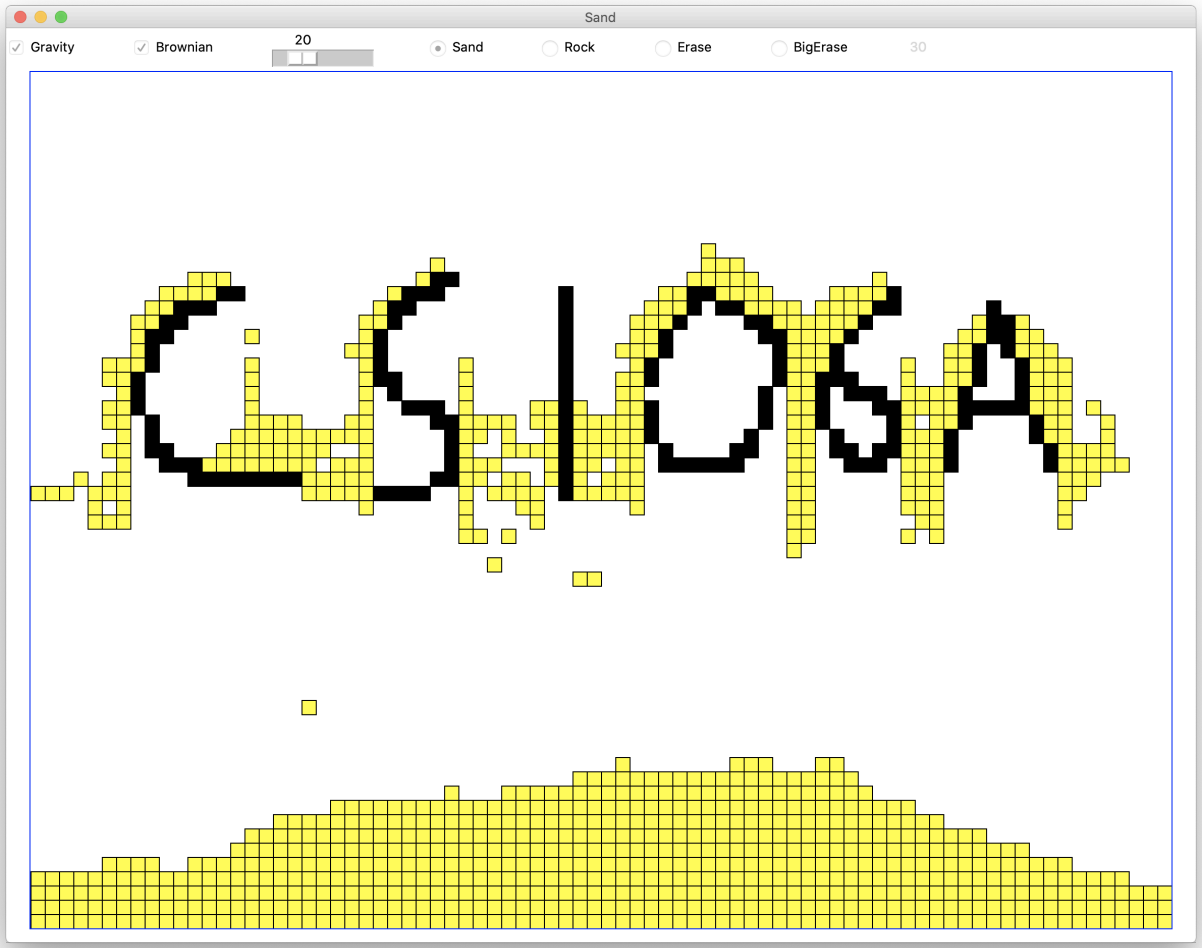

Chess Board

```
def main():
    canvas = make_canvas(…)
    draw_square(canvas)

def draw_square(canvas):
    canvas.create_rectangle(20, 20, 100, 100)
```




BouncingBallSoln

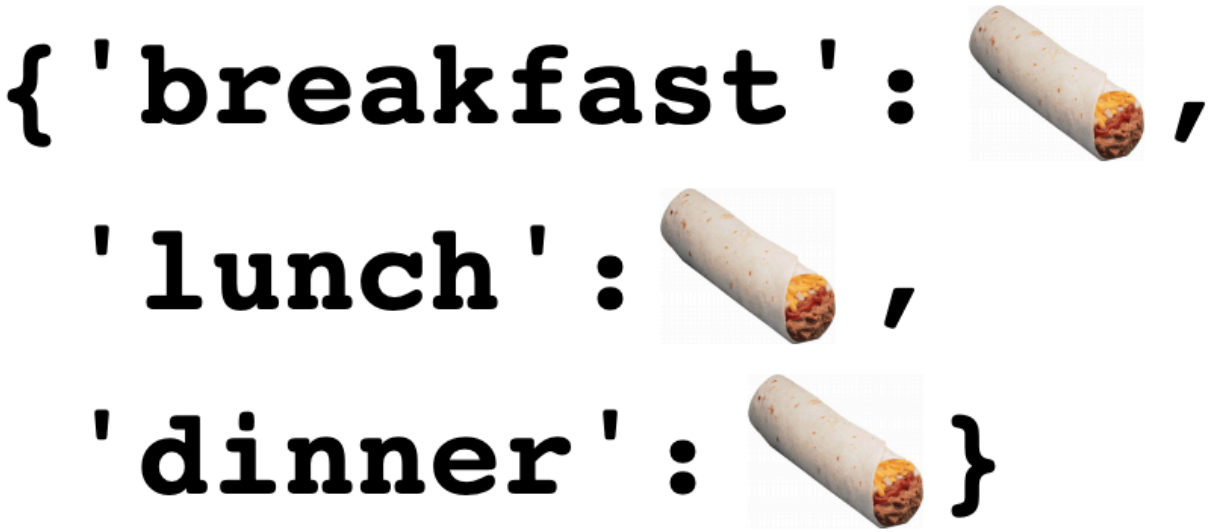

Sand
Gravity
Brownian
20
Sand
Rock
Erase
BigErase
30


Valor

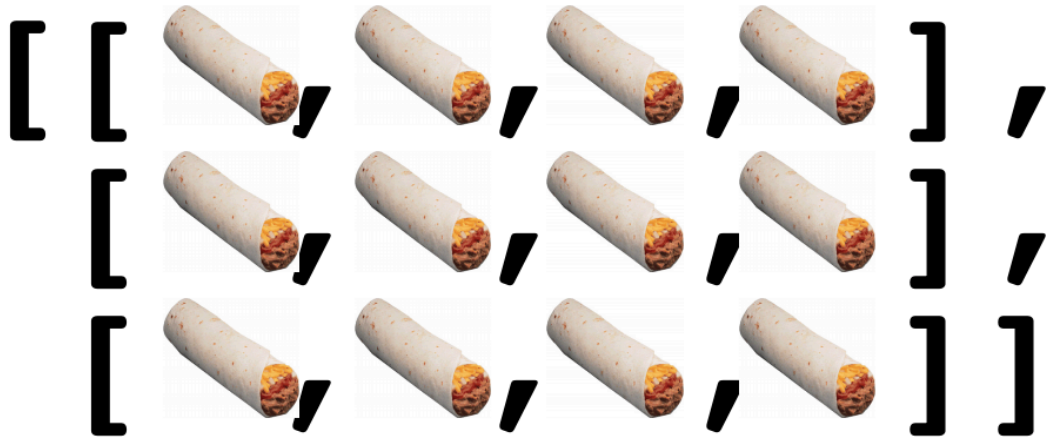

```
Type a single letter here, then press enter: a
That guess is correct.
The word now looks like this: -A---
You have 8 guesses left
Type a single letter here, then press enter: q
There are no Q's in the word
The word now looks like this: -A---
You have 7 guesses left
Type a single letter here, then press enter: p
That guess is correct.
The word now looks like this: -APP-
You have 7 guesses left
Type a single letter here, then press enter: C
There are no C's in the word
The word now looks like this: -APP-
You have 6 guesses left
Type a single letter here, then press enter: H
That guess is correct.
The word now looks like this: HAPP-
You have 6 guesses left
```

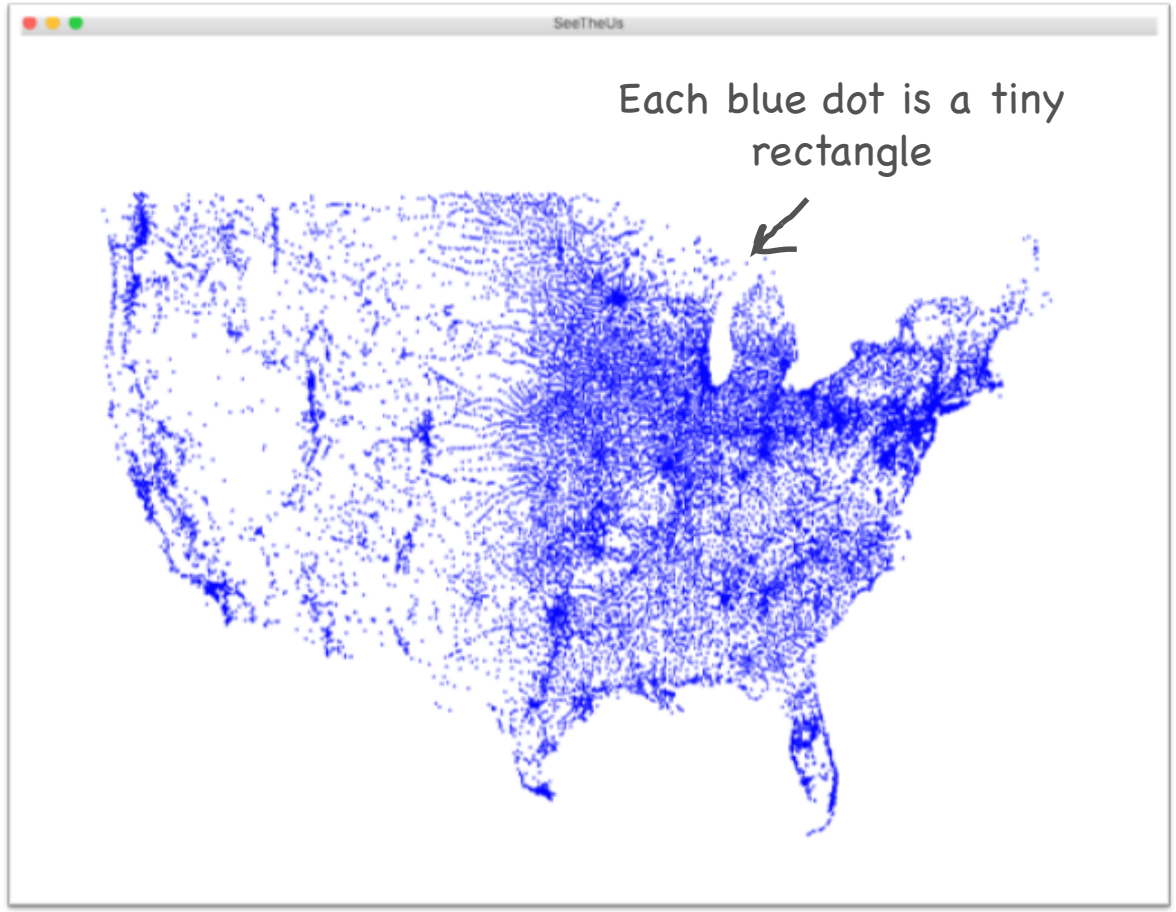
Lists

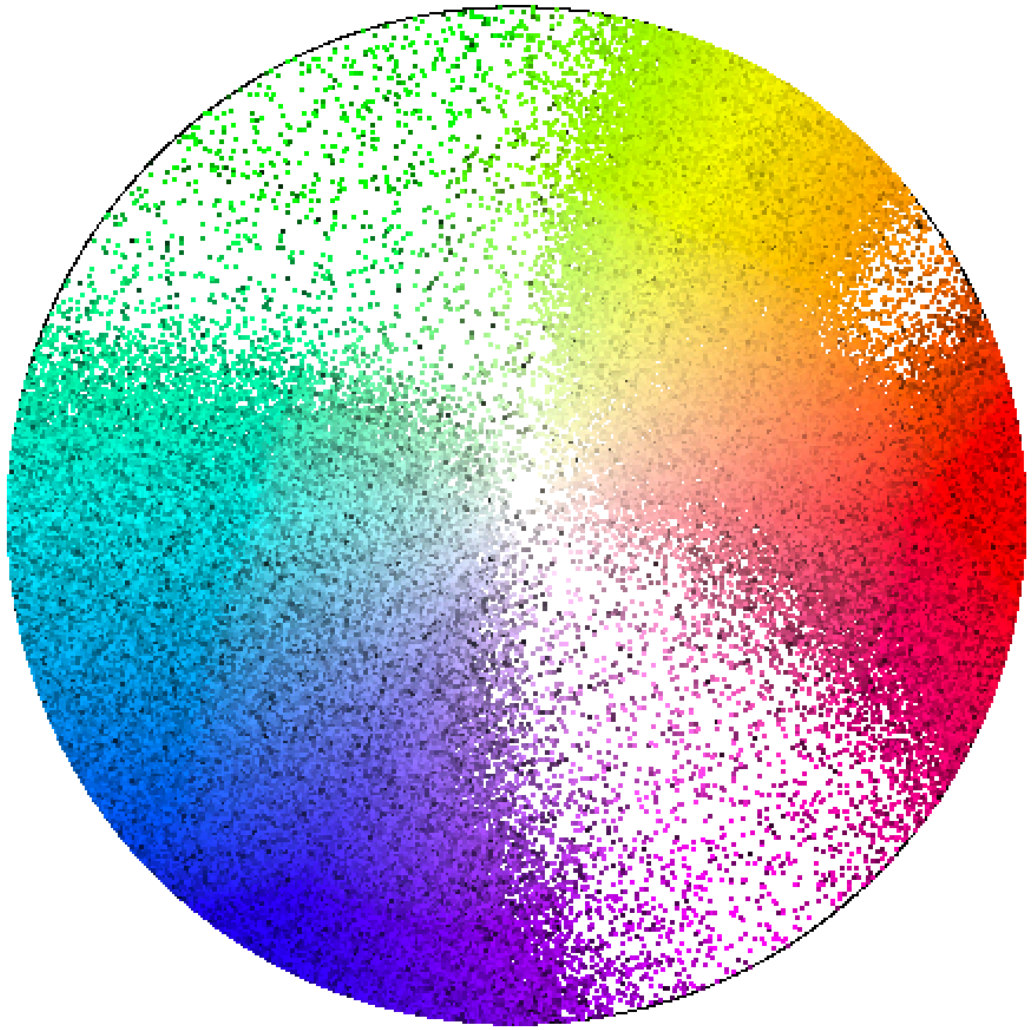
Dictionaries

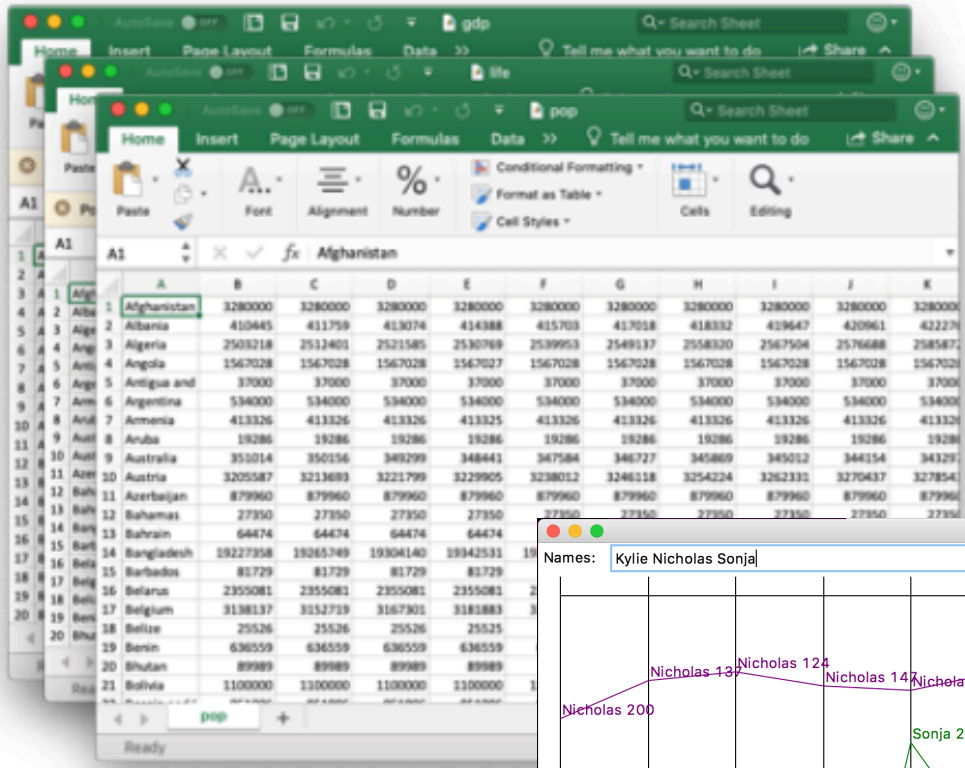


2D Lists

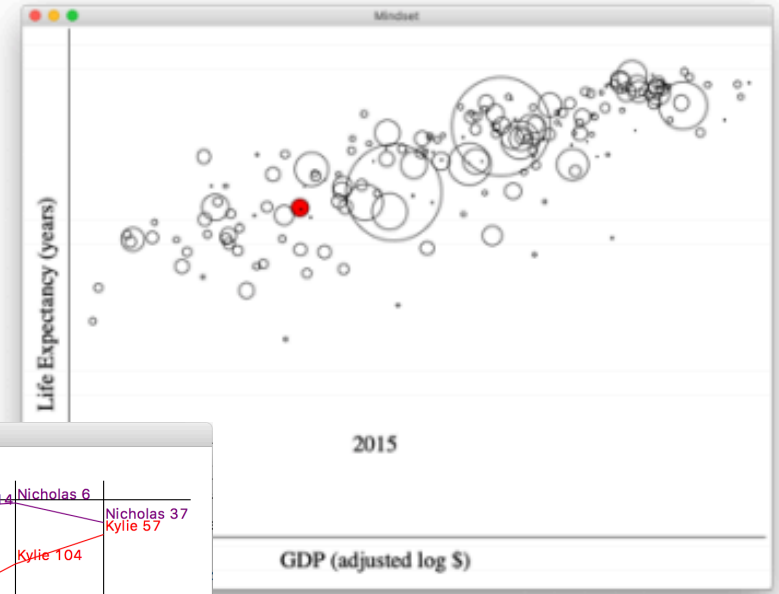


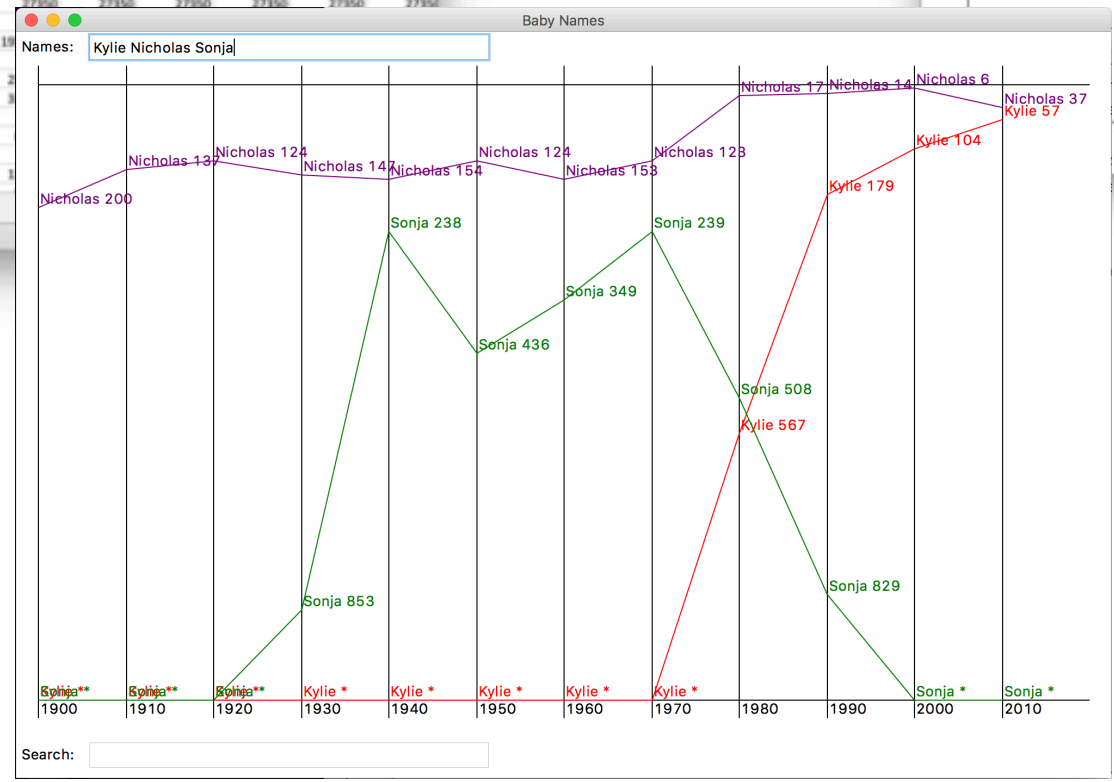

SeeTheUs
Each blue dot is a tiny rectangle




gdp
life
pop
Home
Insert
Page Layout
Formulas
Data
Paste
Font
Alignment
Number
Conditional Formatting
Format as Table
Cell Styles
Cells
Editing
A1
Afghanistan
Ready


Python
Variable


Mindset
Life Expectancy (years)
2015
GDP (adjusted log $)


Baby Names
Names:
Kylie Nicholas Sonja
Nicholas 200
Nicholas 137
Nicholas 124
Nicholas 147
Nicholas 154
Nicholas 124
Nicholas 153
Nicholas 123
Nicholas 17
Nicholas 14
Nicholas 6
Nicholas 37
Kylie 57
Kylie 104
Kylie 179
Kylie 567
Sonja 238
Sonja 239
Sonja 349
Sonja 436
Sonja 508
Sonja 829
Sonja 853
Kylie *
Sonja *
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Search:


LELAND STANFORD JUNIOR UNIVERSITY
1891

Chat Client

Send | The internet is a wild place...

Messages

Refresh

> [Chris] Hello world?

> [Laura] Here I am!!

> [Laura] This is fun!

> [Chris] Wahooooo :-)

```
Server running...
{'command': 'getMsgs', 'params': {'index': '0'}}
{'command': 'newMsg', 'params': {'msg': 'Hello world?', 'user': 'Chris'}}
{'command': 'getMsgs', 'params': {'index': '0'}}
{'command': 'getMsgs', 'params': {'index': '0'}}
{'command': 'newMsg', 'params': {'msg': 'Here I am!!', 'user': 'Laura'}}
{'command': 'getMsgs', 'params': {'index': '1'}}
{'command': 'newMsg', 'params': {'msg': 'This is fun!', 'user': 'Laura'}}
{'command': 'getMsgs', 'params': {'index': '2'}}
{'command': 'getMsgs', 'params': {'index': '1'}}
{'command': 'newMsg', 'params': {'msg': 'Wahooooo :-)', 'user': 'Chris'}}
{'command': 'getMsgs', 'params': {'index': '3'}}
{'command': 'newMsg', 'params': {'msg': 'We are on the internet...', 'user': 'Chris'}}
{'command': 'getMsgs', 'params': {'index': '4'}}
{'command': 'newMsg', 'params': {'msg': 'This is like low-budget WhatsApp', 'user': 'Chris'}}
ams': {'index': '5'}}
ams': {'index': '3'}}
```

Search

localhost:8000

Bajillion

World wide web

Can Yahoo dominate next decade?

...But for others there is another, newer net icon threatening to overshadow Yahoo in the post dot-com world - Google. The veteran and the upstart hav plenty in common - Yahoo was the first internet fi...

Yahoo celebrates a decade online

...f people and the two saw business potential in their idea. Originally dubbe "Jerry's Guide to the World Wide Web" the firm adopted the moniker Yahoo because the founders liked the dictionary definit...

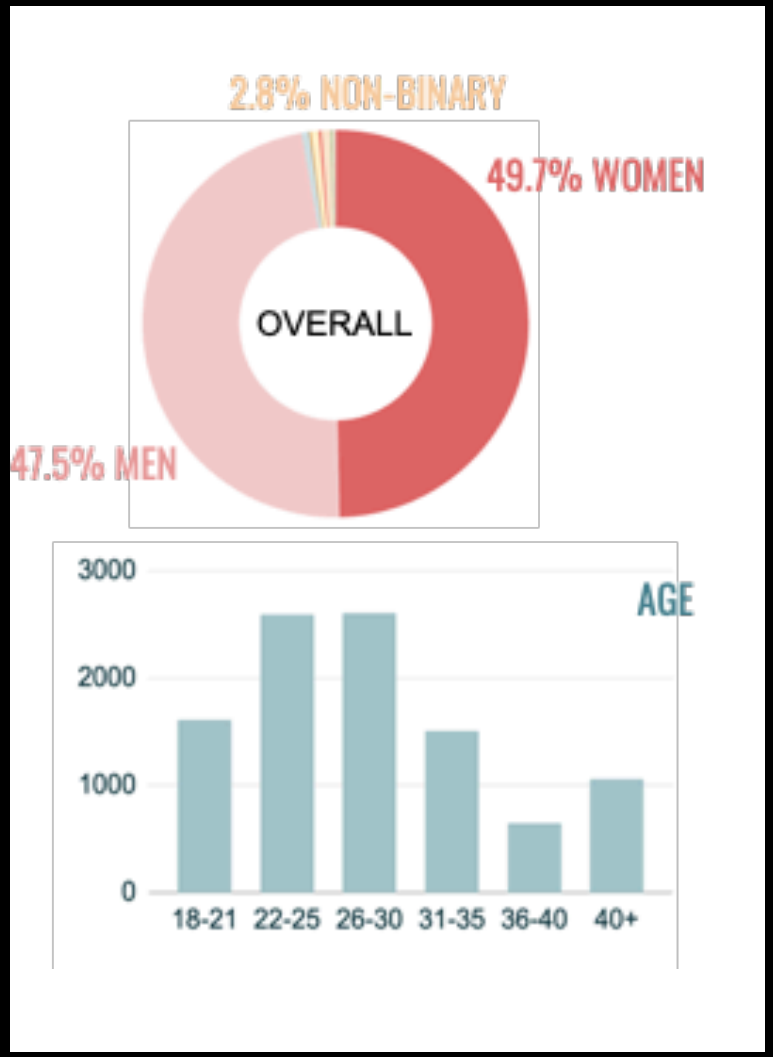
Musical future for phones

...re's never anything worth watching on TV', is hardly going to embrace these phones. But just as the World Wide Web was the "killer application" that drove internet adoption, music videos are going to ...

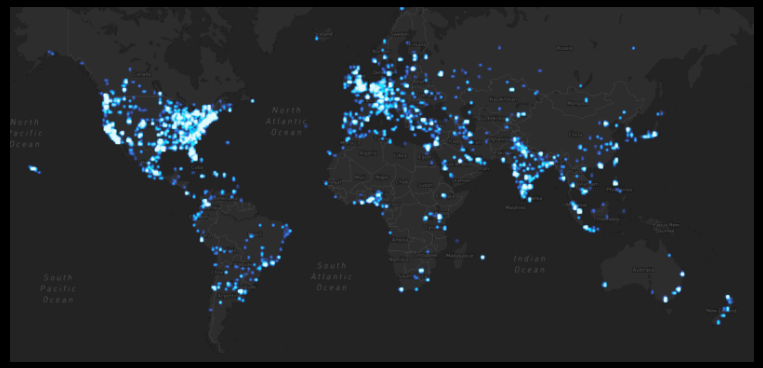
Rolling out next generation's net

...e web. At Cern, Dr Carpenter helped pioneer advanced net applications

Code in Place : Course with the most section leaders?



905 section leaders teach
10,000 students
First half of Stanford CS106A



20% experienced job loss or home loss
10x retention vs baseline MOOC
99% wanted more (after first section)
6k hours of live teaching
60k hours of lecture watched
Better CS106A for **Stanford** students

Draw your number here

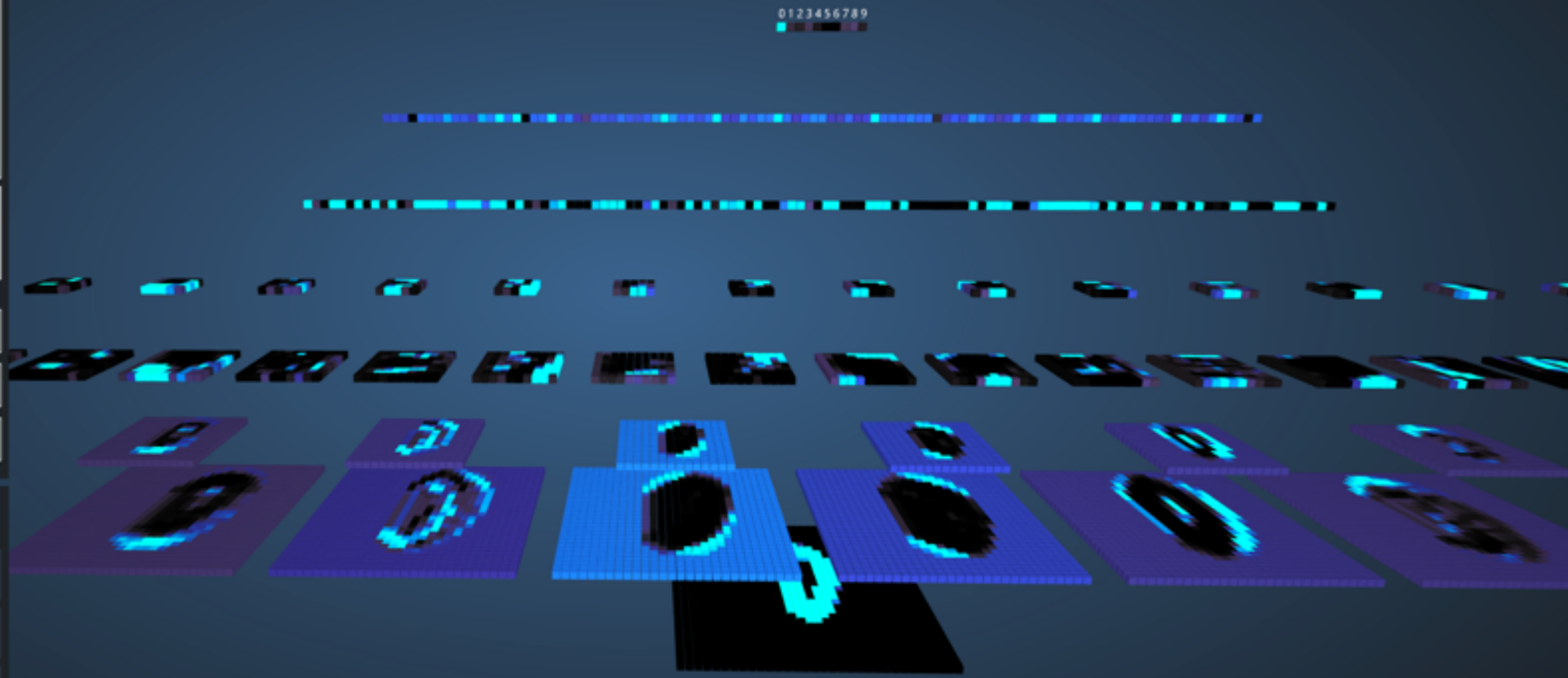
Downsampled drawing: 0

First guess: 0

Second guess: 8

Layer visibility

Input layer	Show
Convolution layer 1	Show
Downsampling layer 1	Show
Convolution layer 2	Show
Downsampling layer 2	Show



By the numbers

10 weeks

7 hard assignments

27 lectures

50+ major keys

60,000+ person hours programming

1 class ☺

You have our respect.

Why Study CS?

Joy of Building

Interdisciplinary

Closest Thing To Magic

Now is the Time

Everyone is Welcome

The End