

About this course

Code in Place

Learn the first few steps of
coding

Volunteer Section Leaders



* Actually a stock photo – but you know

Piech and Sahami, Code in Place



This class is just for fun

We are doing this as volunteer
work. You get a class for free!

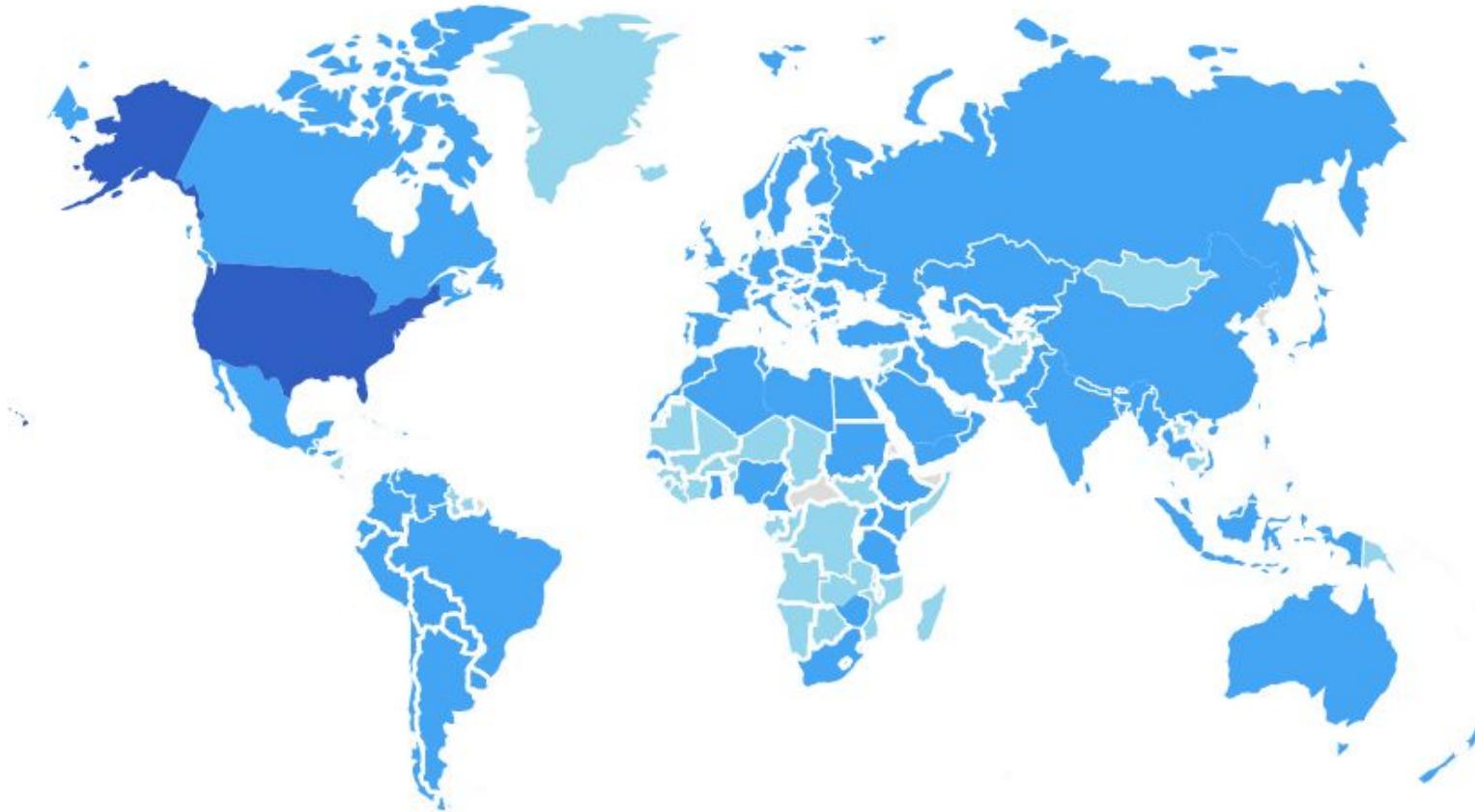
Many things are different in the
time of covid-19

Some of our staff have already
gotten sick.

The class is 100% opt in

Let's have a fun adventure
together

Who are you?



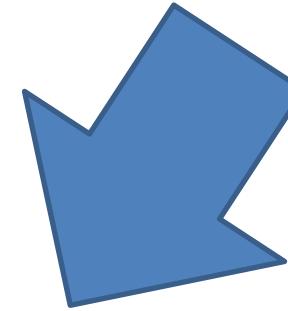
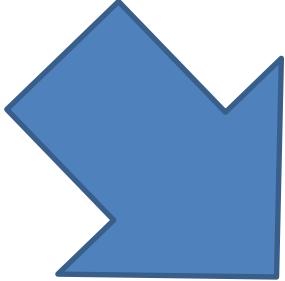
Prerequisite Test



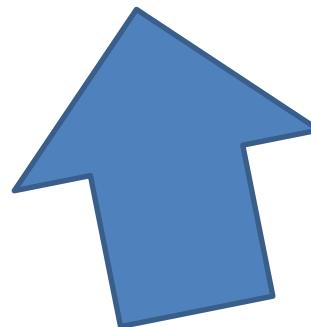
Piech and Sahami, CS106A, Stanford University



Course Website

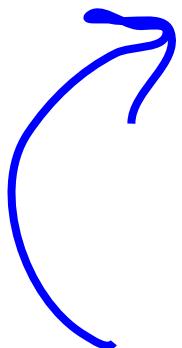


<https://compedu.stanford.edu/codeinplace/v1/#/course>



Learning Goal

**Learn how to solve
problems with
python**



**Find the joy
of a new skill**



In this class:

Section 40 mins



Build a community



If you miss section, there is a recorded one.

Lectures



Piech and Sahami, Code in Place



Ed Discussion Forum

The screenshot shows a web browser window for the 'ed' platform, specifically the 'Teaching Team - Discussion' section. The URL is us.edstem.org/courses/521/discussion/26780. The left sidebar lists 'COURSES' and 'CATEGORIES'. The 'Teaching Team' course is highlighted with a blue circle. The main area displays a list of pinned threads:

- Code in Place Section Leader Welcome Me... (General, Mehran S, INSTRUCTOR, 5h, 10 likes)
- Points of contact (General, Chris P, INSTRUCTOR, 8h, 17 likes)
- Playing with Karel (General, Brahm Kapoor, CA, 1d, 11 likes, 24 comments)
- Karel on Pycharm (General, Nathaniel G, 5h, 1 like)

Below the pinned threads, there is a link to 'Show 5 more' and a section titled 'This Week'.

Piech and Sahami, Code in Place



Course Communication

For almost all
questions, Ed is the
right place.

There are 10k
students.

Private posts go to
just the section
leaders



We are all learners, teachers



This is a collective
community service project.
You are part of our
community.

Help us make this work.

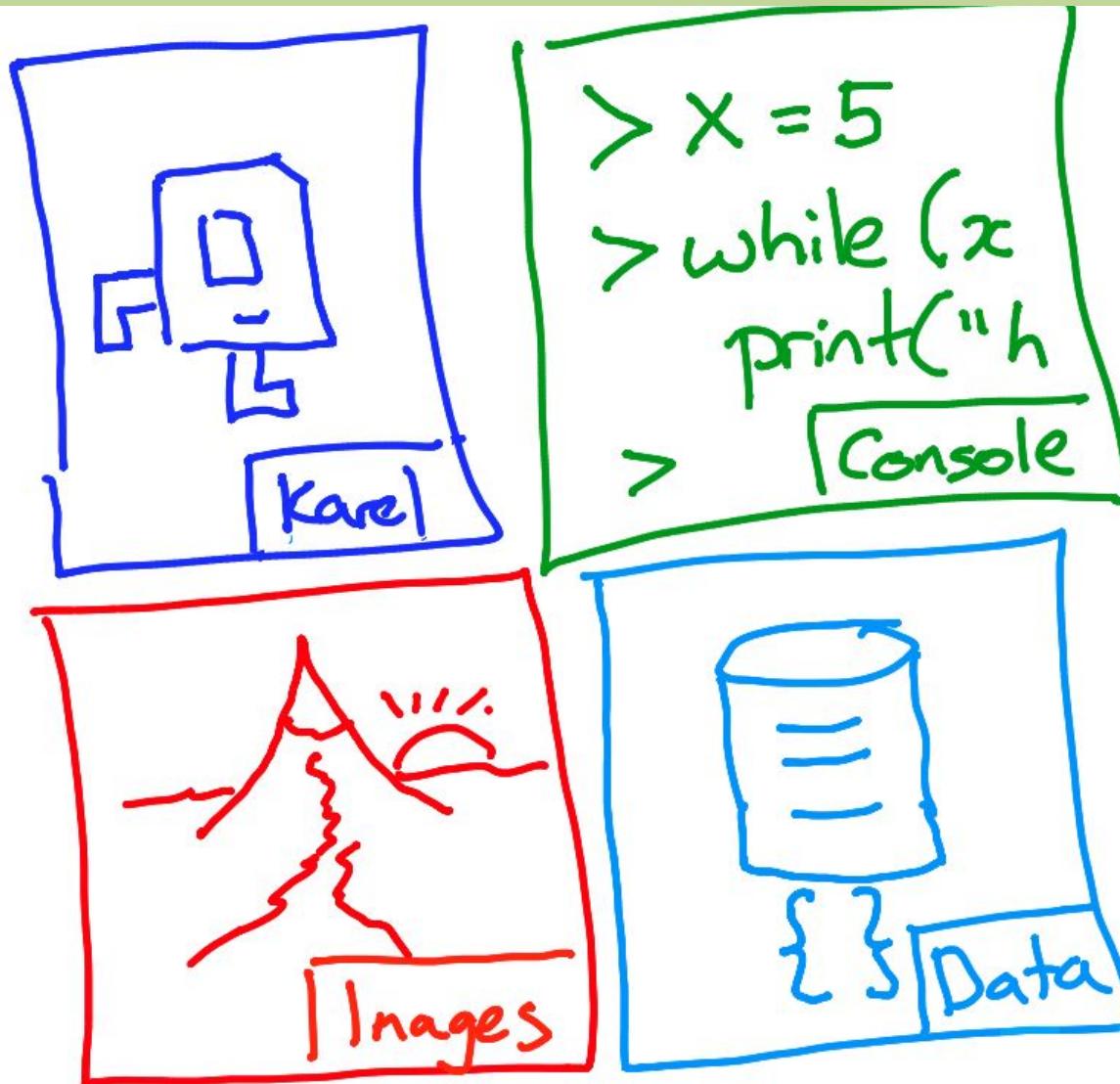


Online Readings

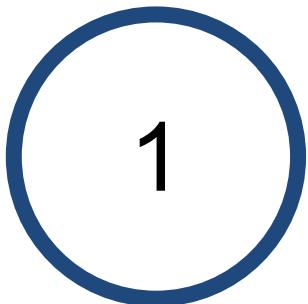
A screenshot of a web browser window titled "Karel Reader". The URL in the address bar is compedu.stanford.edu/karel-reader/docs/python/en/intro.html. The main content area features a large title "Karel the Robot" above a logo of a robot head with a Python icon. Below the logo, the text "Learns Python" is displayed. Author information is present: "Chris Piech and Eric Roberts" from the "Department of Computer Science, Stanford University, January 2019". A blue "Get Started" button is visible. On the left side, there is a sidebar with a "Karel" icon and a list of 11 chapters: 1 - Meet Karel, 2 - Programming, 3 - New Functions, 4 - Decomposition, 5 - For Loops, 6 - While Loops, 7 - Conditionals, 8 - Refinement, 9 - SuperKarel, 10 - Reference, and 11 - Code.



Course Plan



Karel Speaks Python



Khansole Academy

2



Piech and Sahami, Code in Place

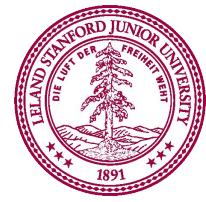


Image Transformation



Piech and Sahami, Code in Place



The Challenge

4



Piech and Sahami, Code in Place



The Course Rhythm

Next week

Mon	Tue	Wed	Thurs	Friday
			Karel Section	
			Console Section	

Week after

<https://compedu.stanford.edu/codeinplace/v1/#/course/schedule>



What is a successful
experience?

If you learn something, you
have been successful.

What if I fall behind?

Not a worry, we will leave material up for you to finish at your own pace.

Can my friends follow along
with me?

We want everyone to have this
material. We are starting
“small” so that we can focus.

Course Values

Art of Computer Science



Learn by Doing



Humane in Trying Times



Gratitude



Being Welcoming



There are a lot of cool
programs you may one day
write

Computer Graphics

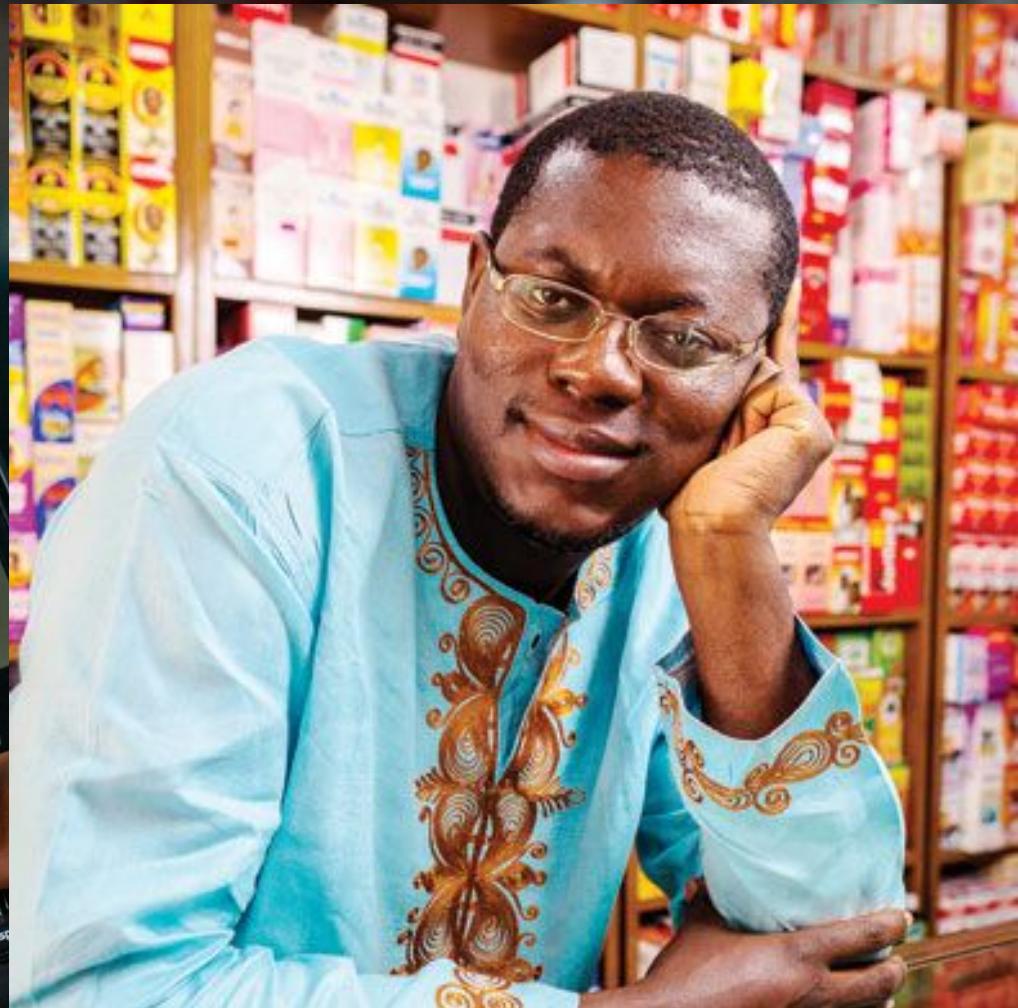


Pat Hanrahan, a founding employee at Pixar, is a professor at Stanford. He just won the Turing Award – the Nobel Prize of Computer Science

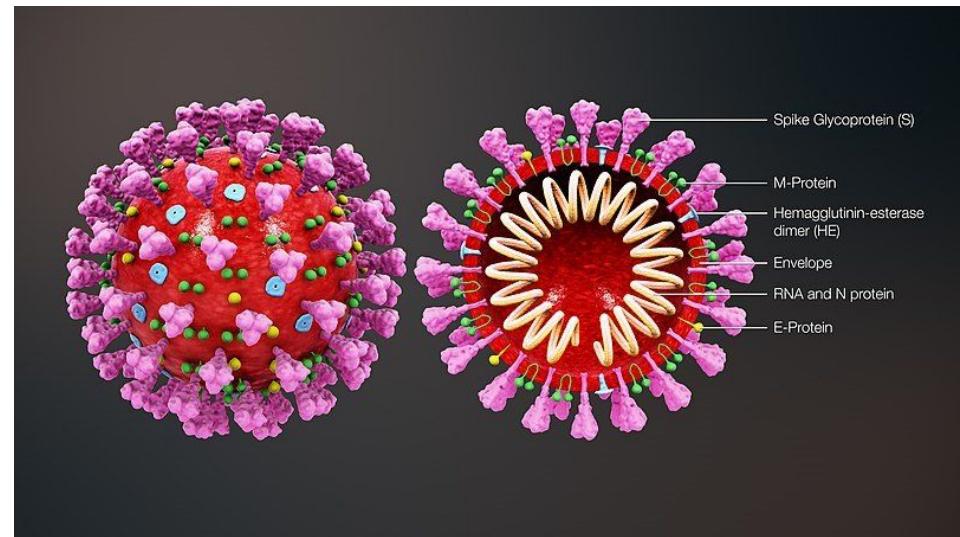
Piech and Sahami, CS106A, Stanford University



Consumer Applications



Medical Innovation



(c) 2012 Intuitive Surgical, Inc.



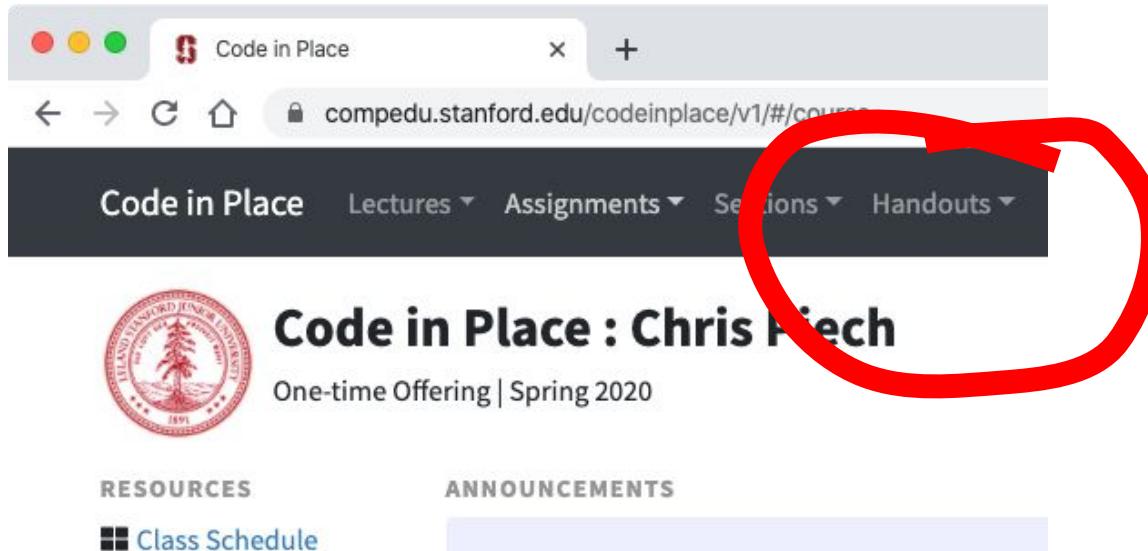
Self-Driving Car



Piech and Sahami, CS106A, Stanford University



General Information



A screenshot of a web browser window titled "Code in Place". The URL in the address bar is "compedu.stanford.edu/codeinplace/v1/#/course". The page itself shows the title "Code in Place : Chris Piech" and "One-time Offering | Spring 2020". The top navigation bar includes links for "Code in Place", "Lectures", "Assignments", "Sessions", and "Handouts". A large red circle highlights the "Code in Place" link in the navigation bar.

Code in Place Lectures Assignments Sessions Handouts

Code in Place : Chris Piech

One-time Offering | Spring 2020

RESOURCES ANNOUNCEMENTS

Class Schedule



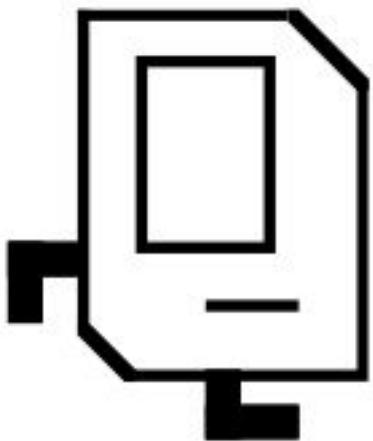
This is the start
of your journey

We have seen many people
learn to code

It is hard!

That is why we start with a
gentle introduction

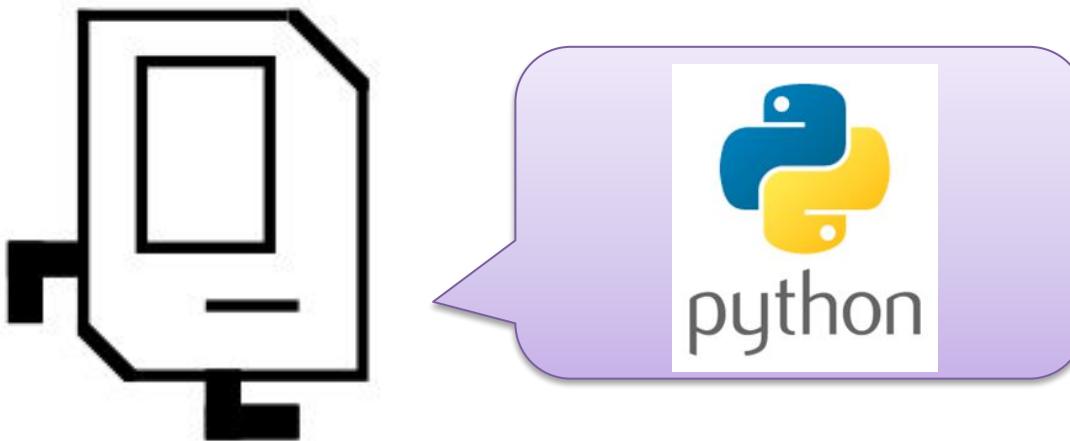
Meet Karel the Robot



Good morning

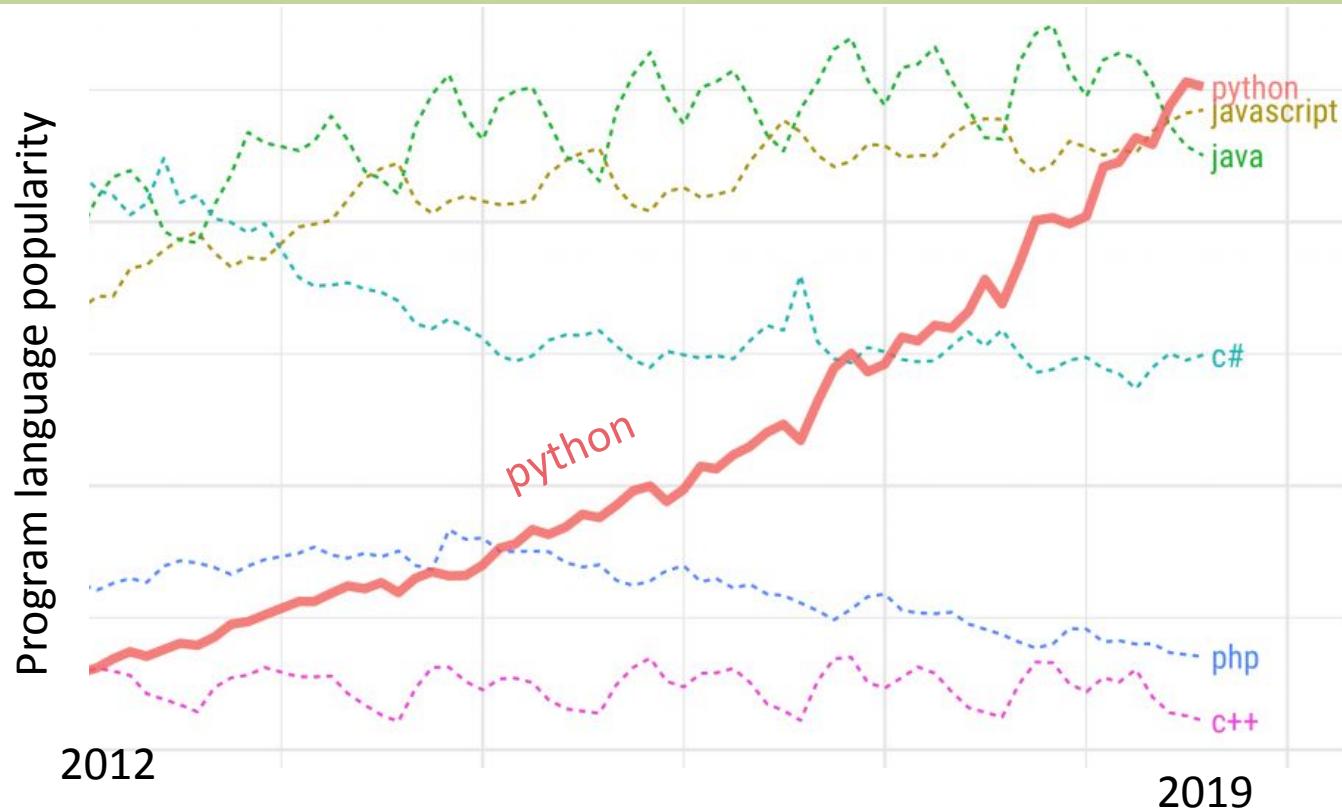


Karel Speaks Python



Why Python?

1



2



<https://stackoverflow.blog/2017/09/06/incredible-growth-python/>



Guido van Rossum

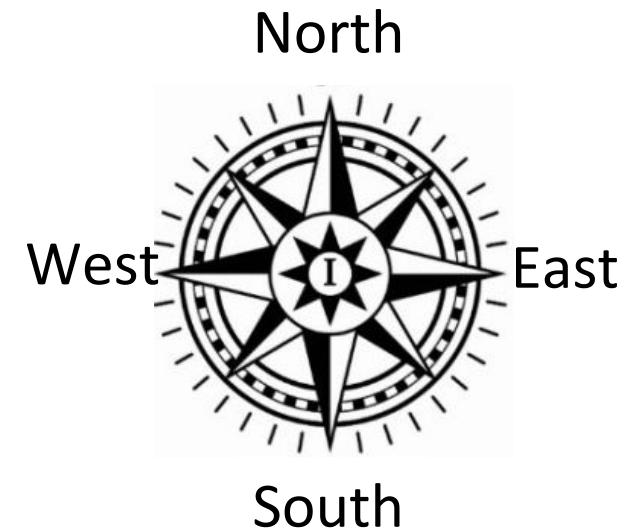


Monty Python's Flying Circus

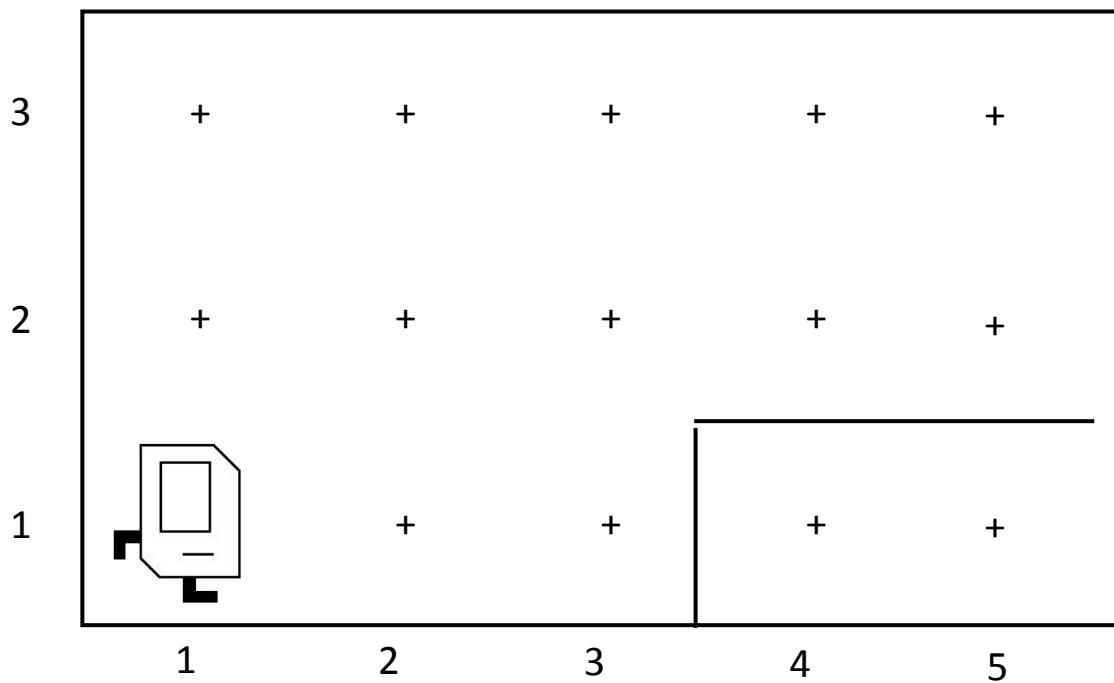


Karel's World

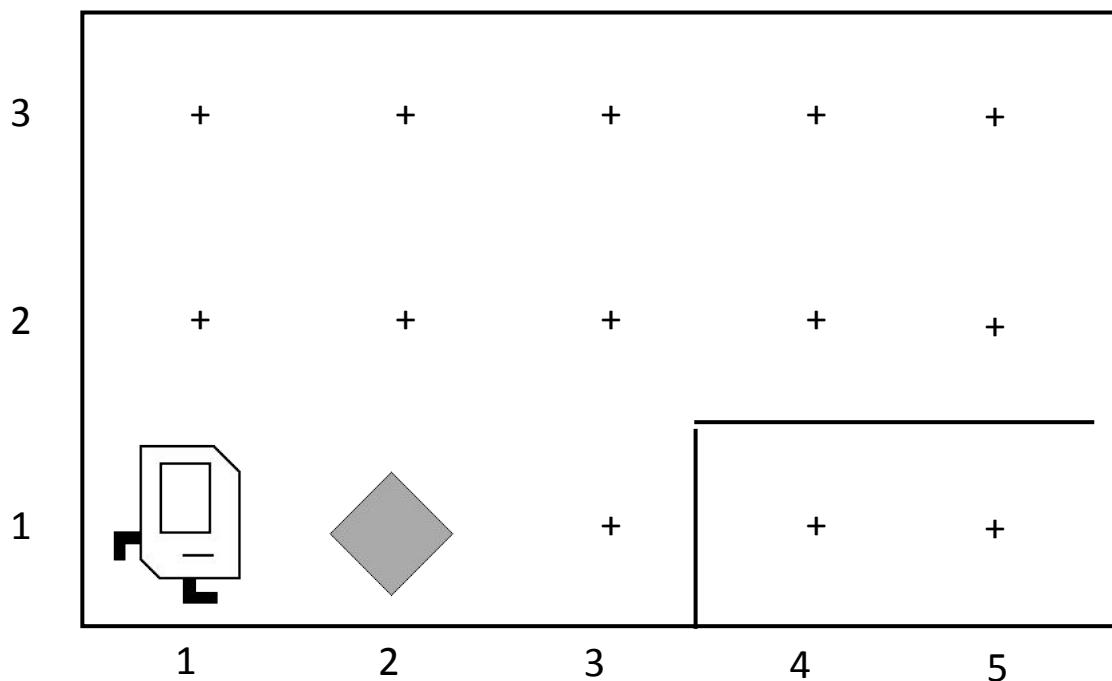
3	+	+	+	+	
2	+	+	+	+	
1		+	+	+	
	1	2	3	4	5



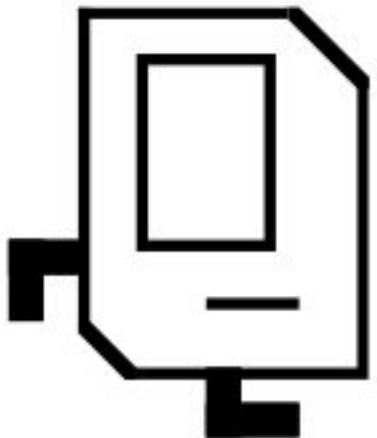
Walls



Beepers



Knows Four Commands



move()

turn_left()

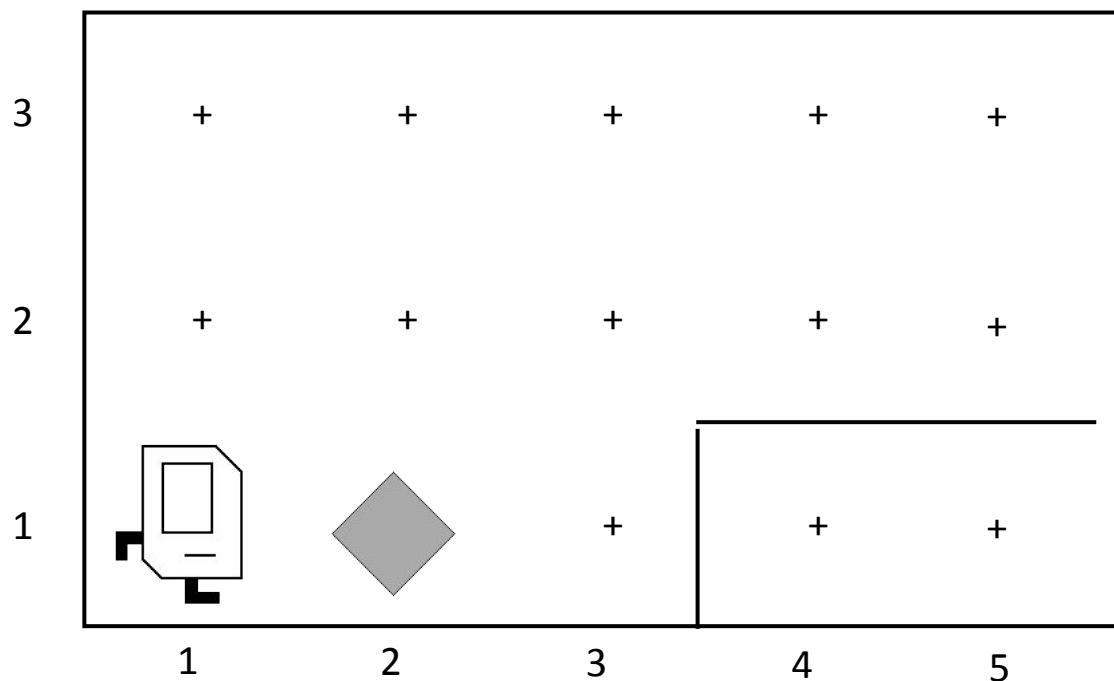
put_beeper()

pick_beeper()

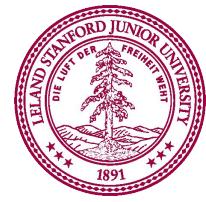
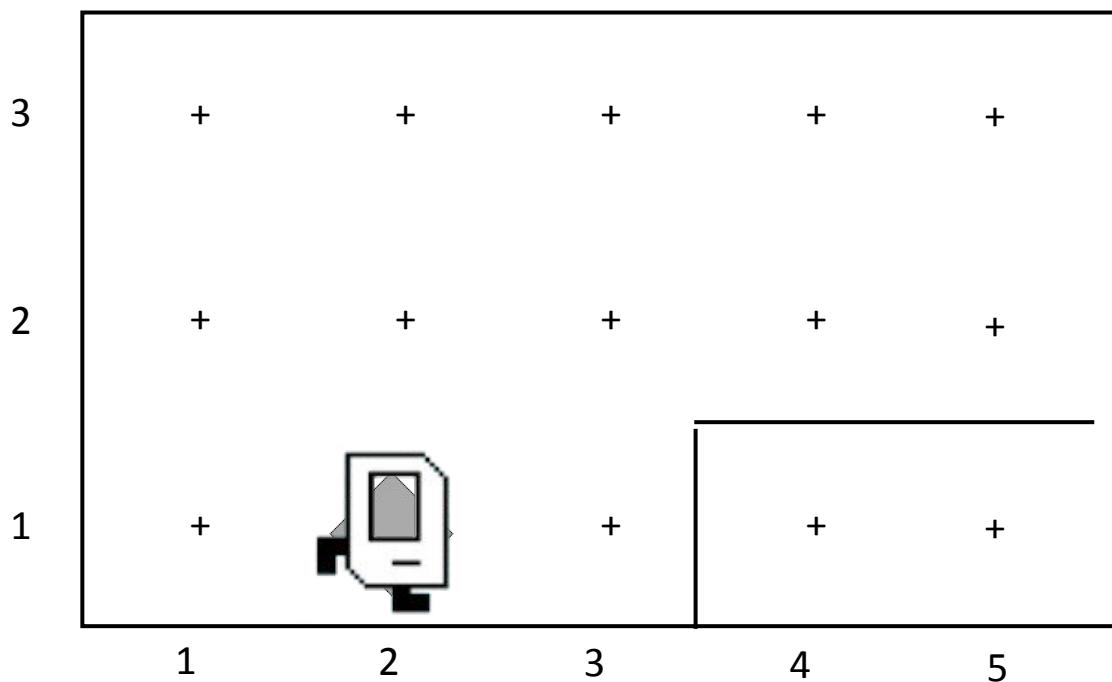


move ()

move()

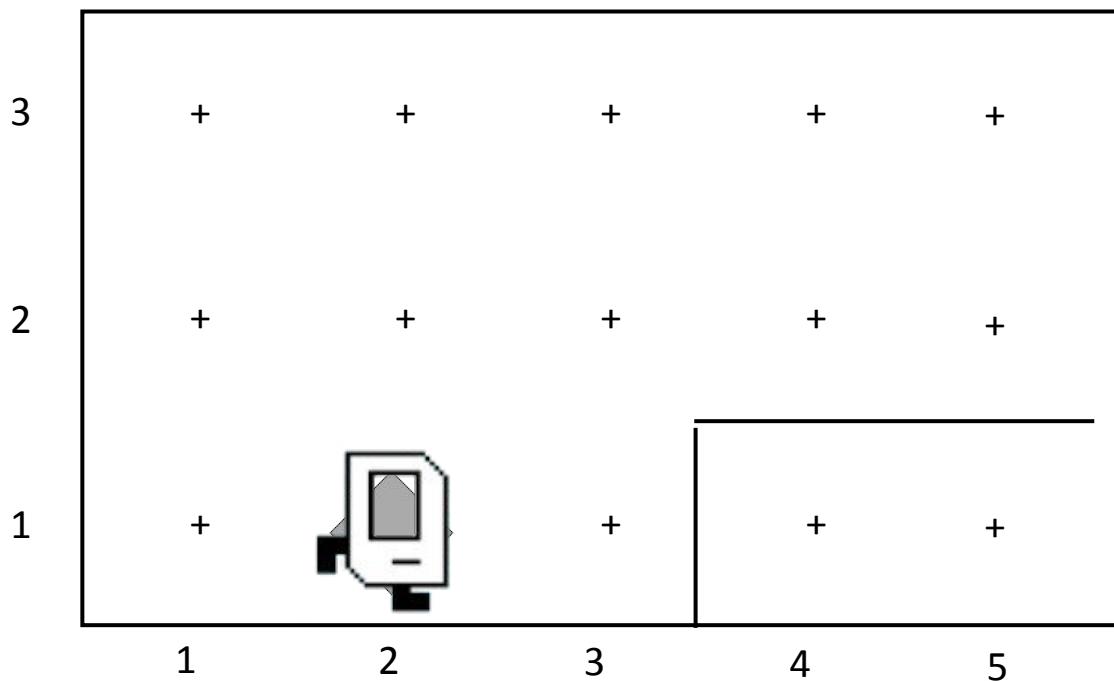


move()

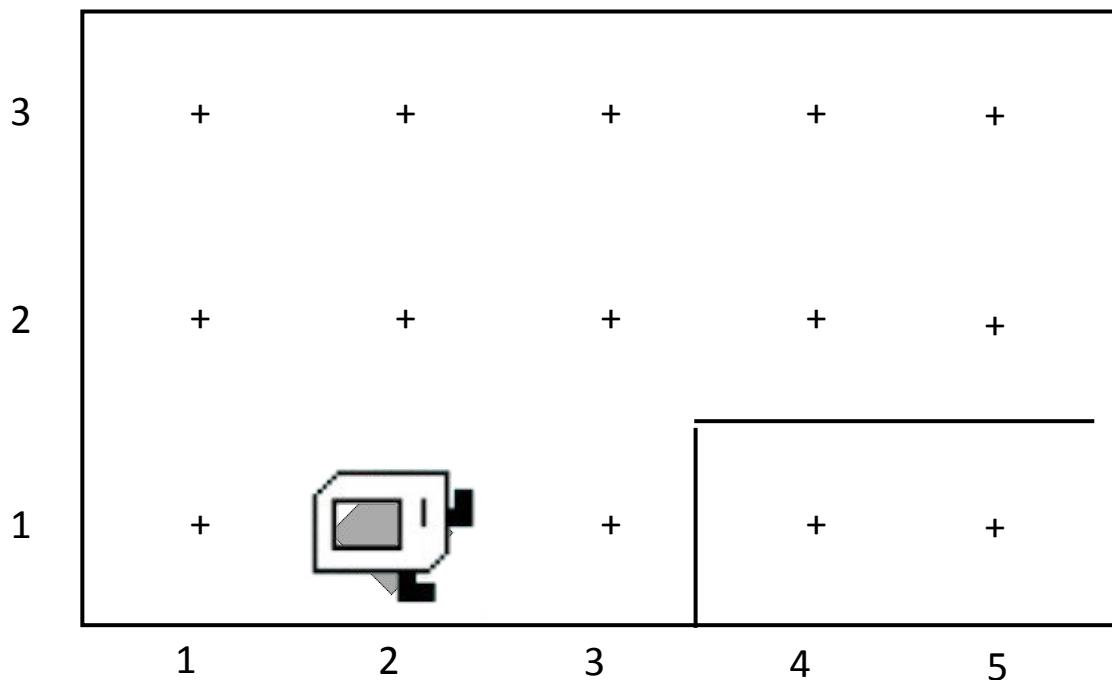


turn_left()

turn_left()

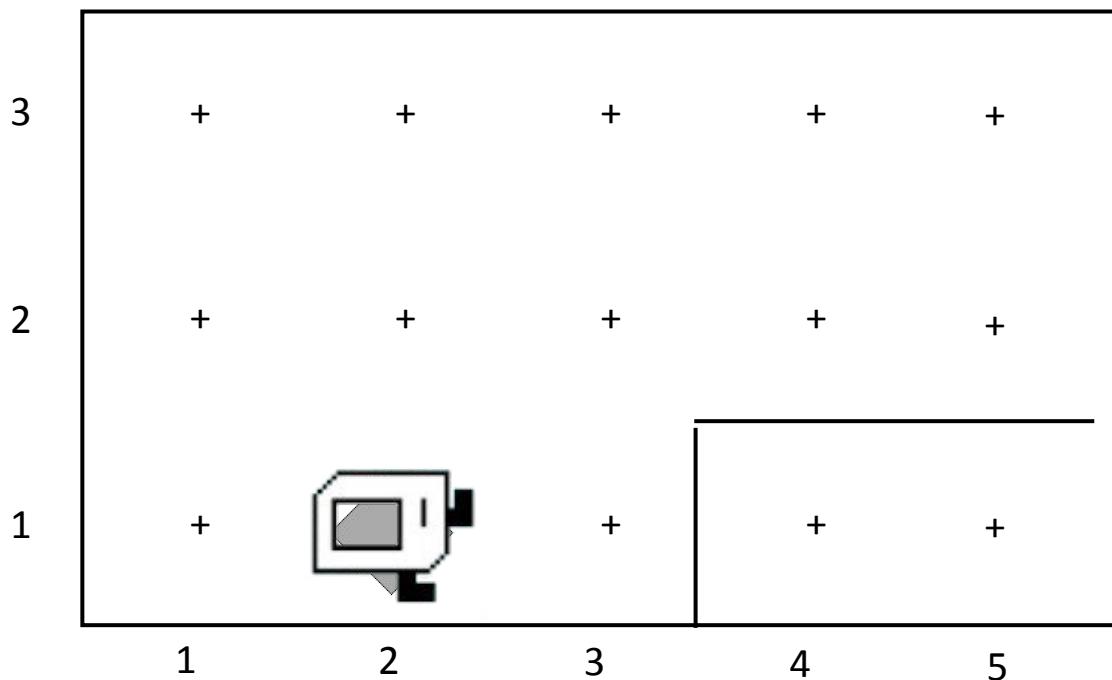


turn_left()

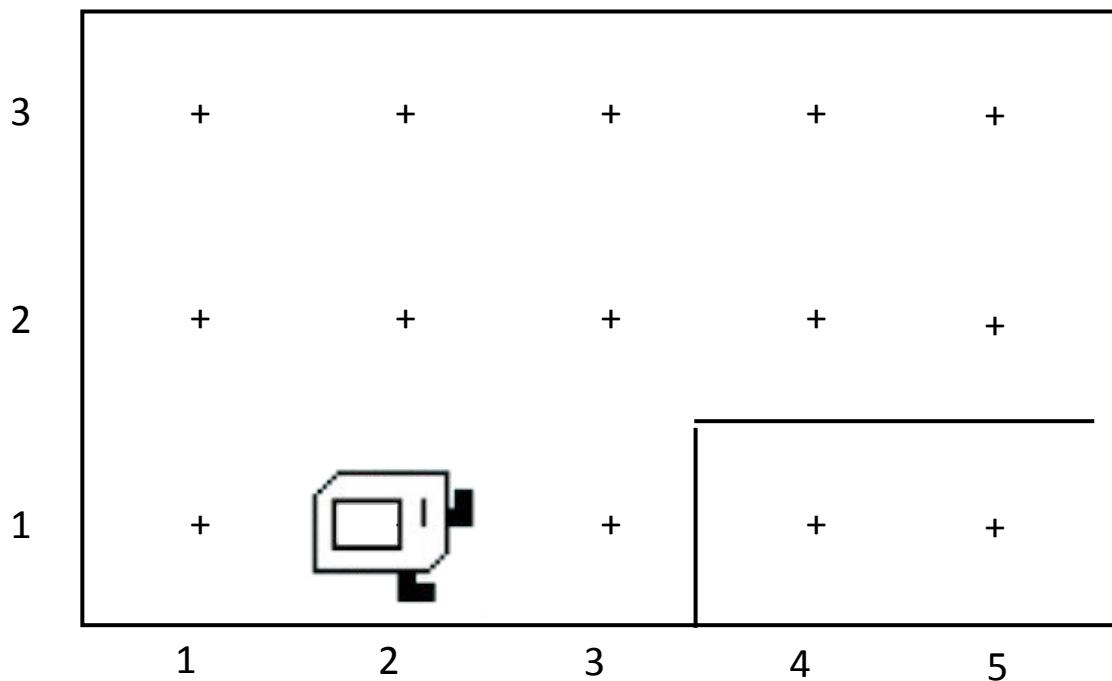


pick_beeper()

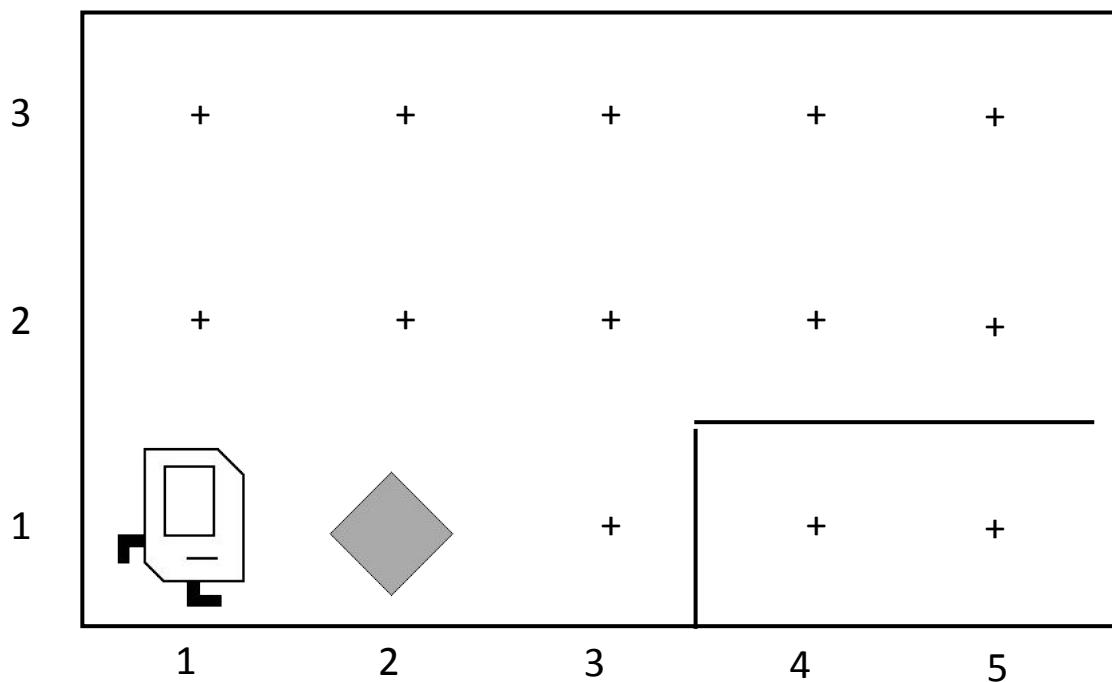
turn_left()



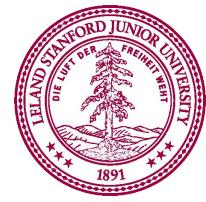
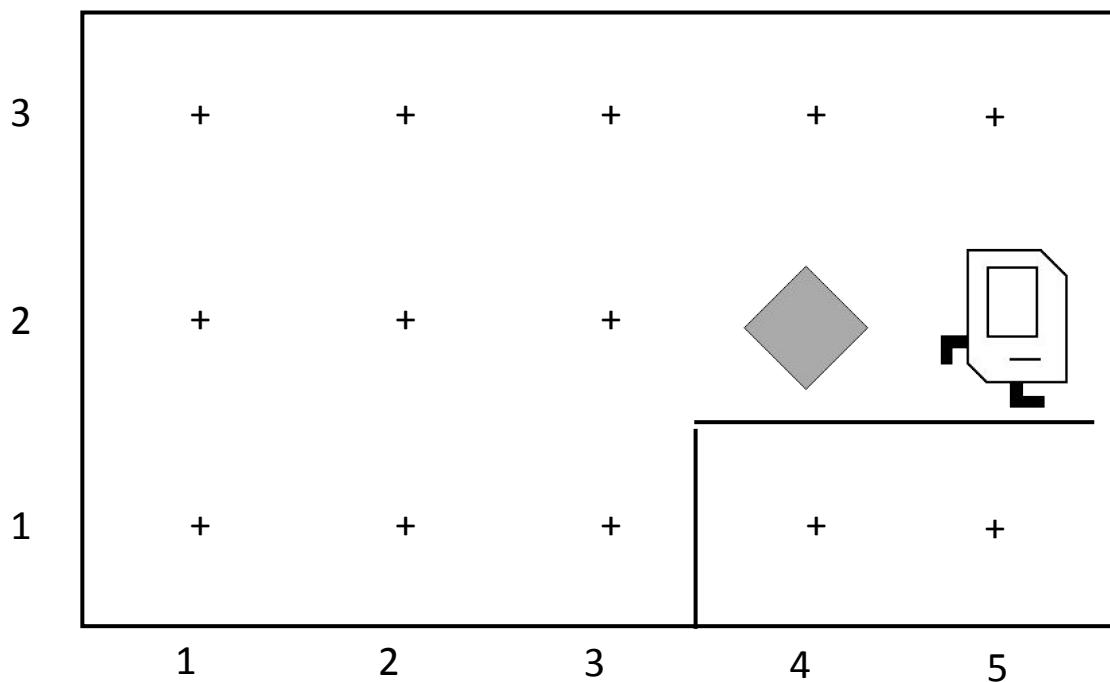
turn_left()



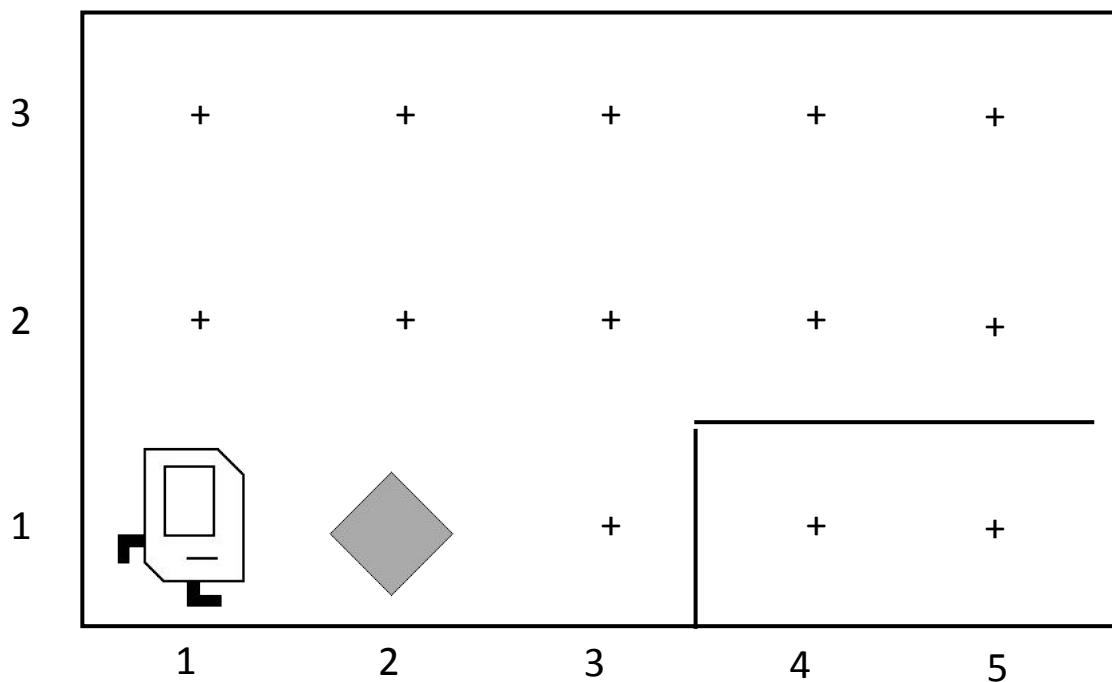
First Challenge



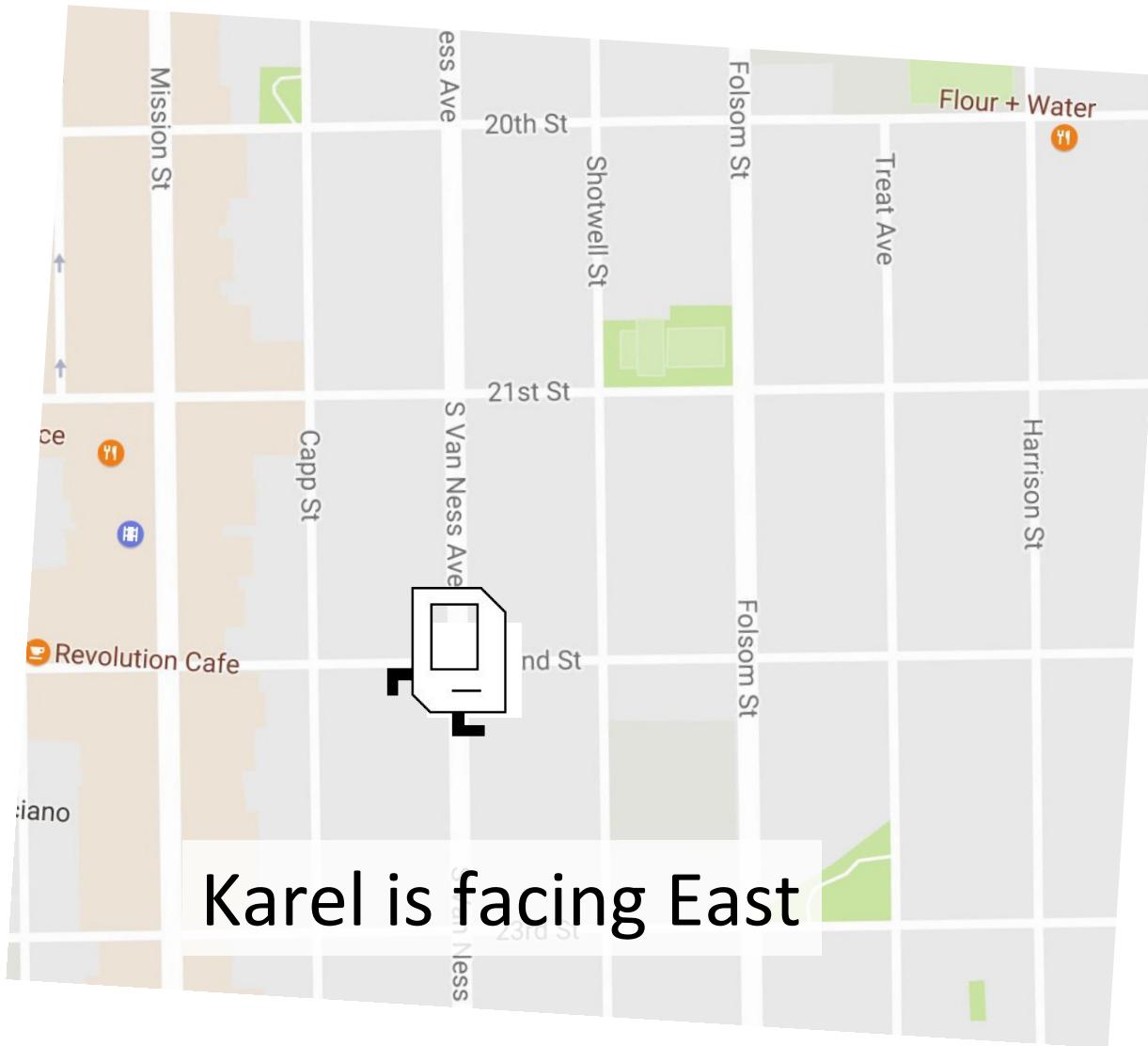
First Challenge



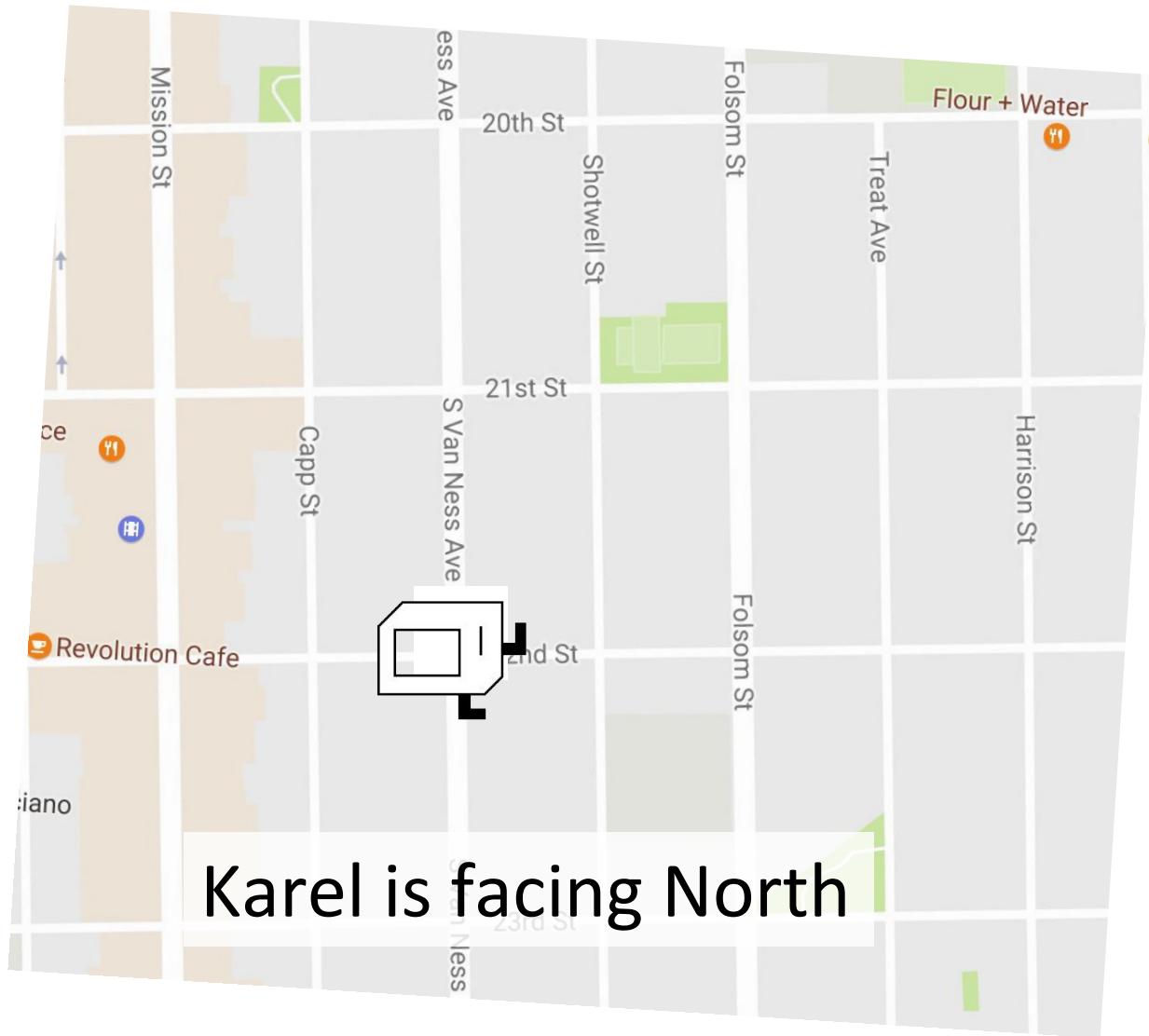
Bird's Eye View



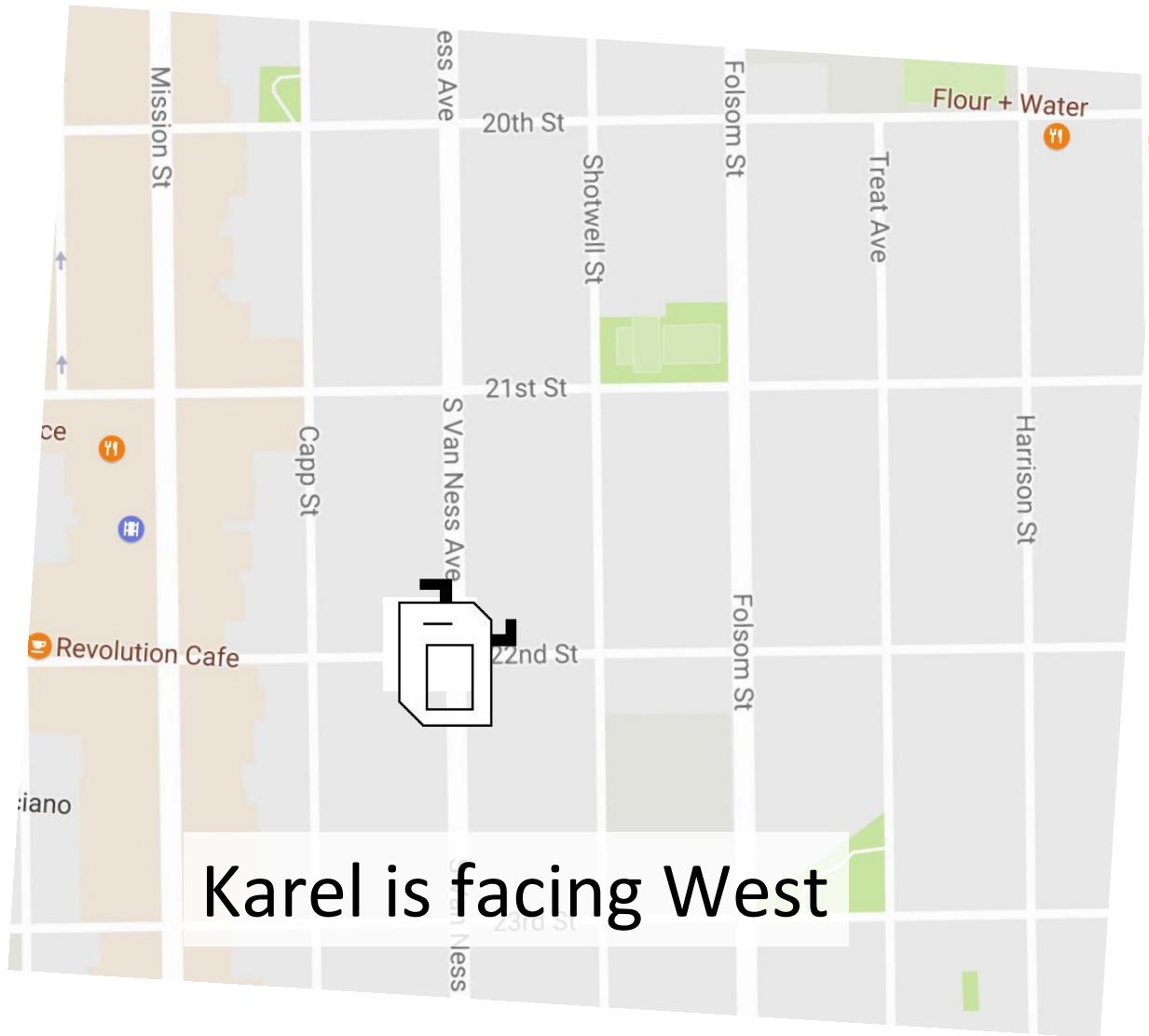
Bird's Eye View



Turn Left



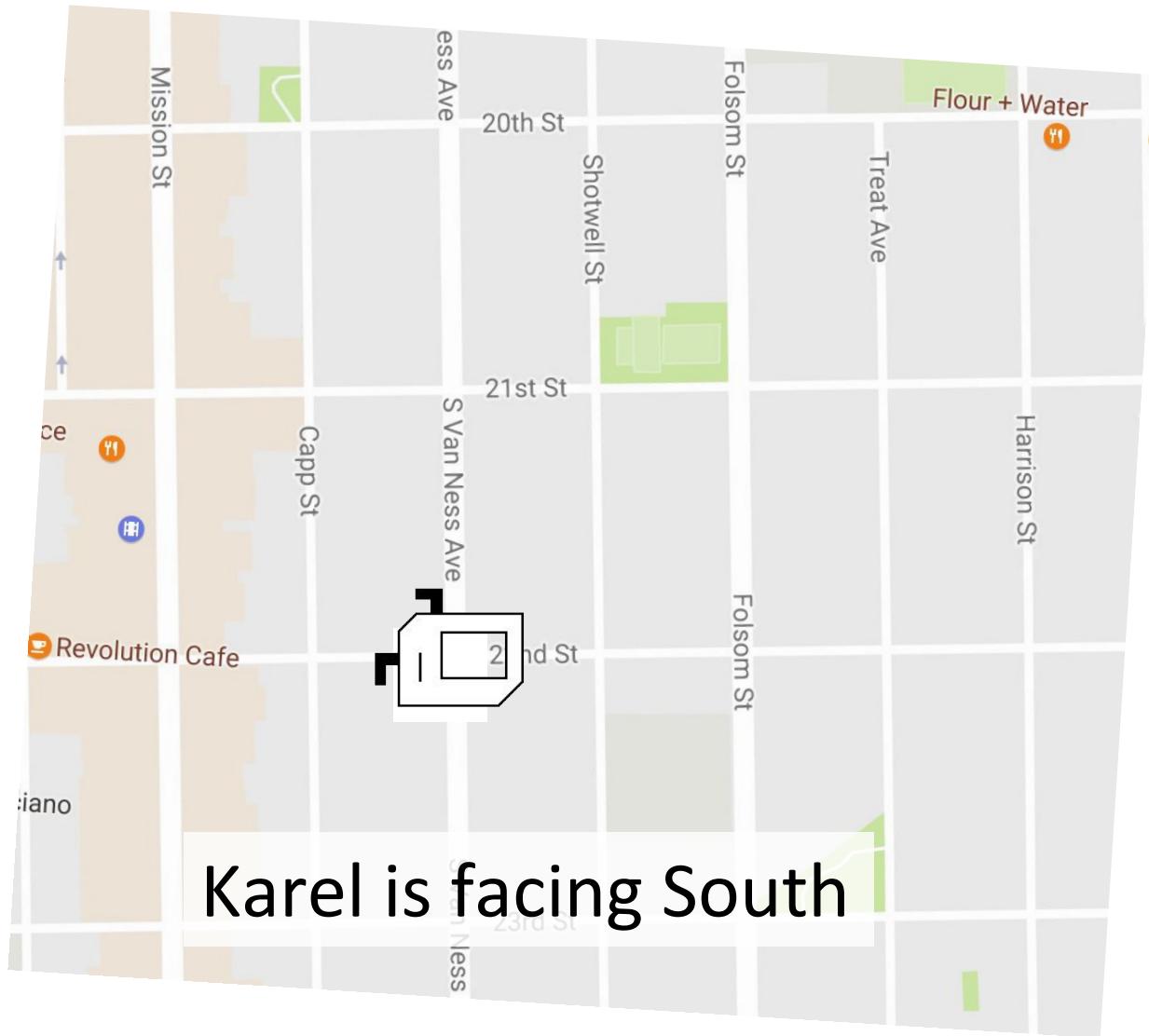
Turn Left



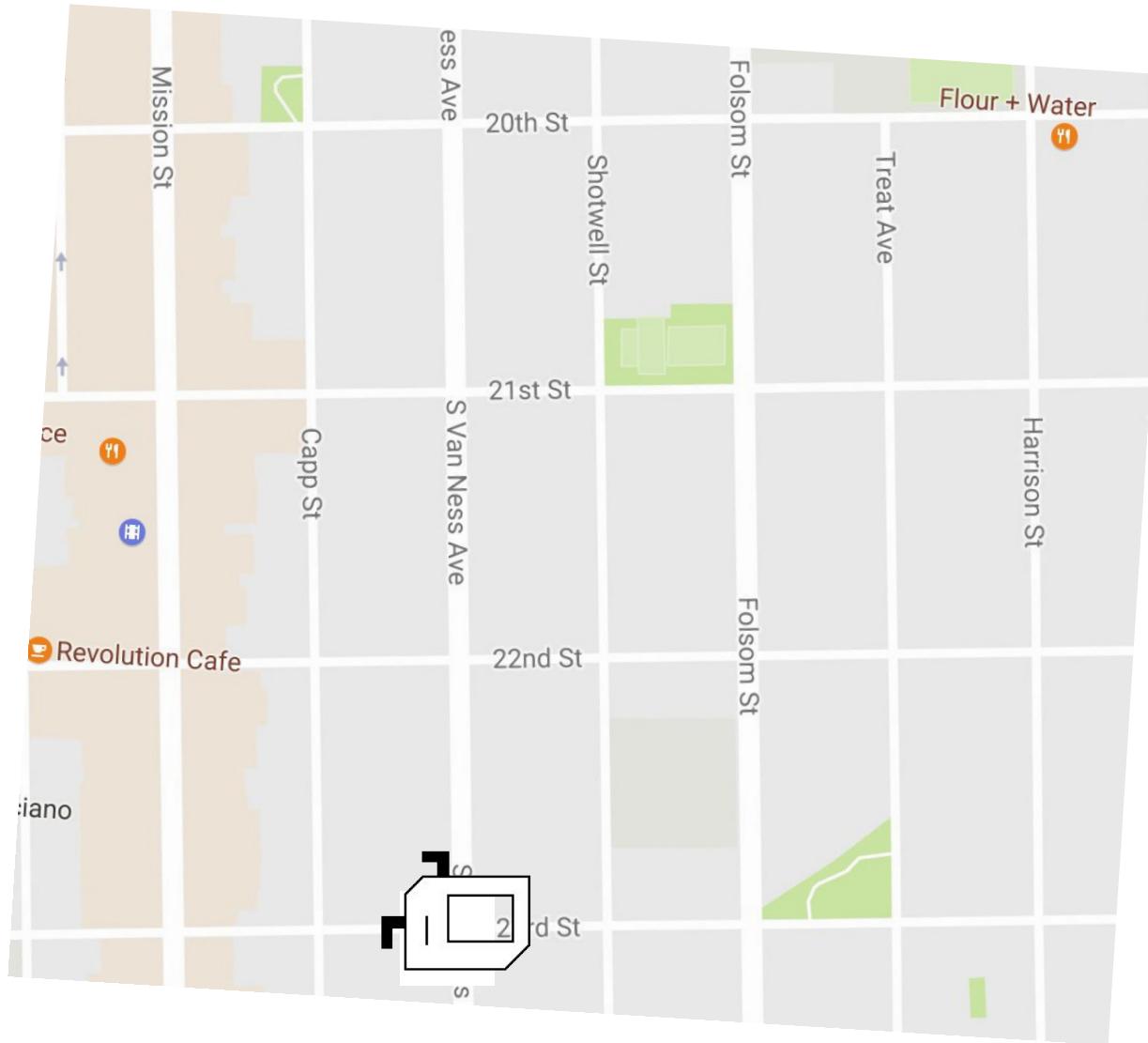
Karel is facing West



Turn Left



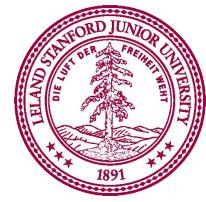
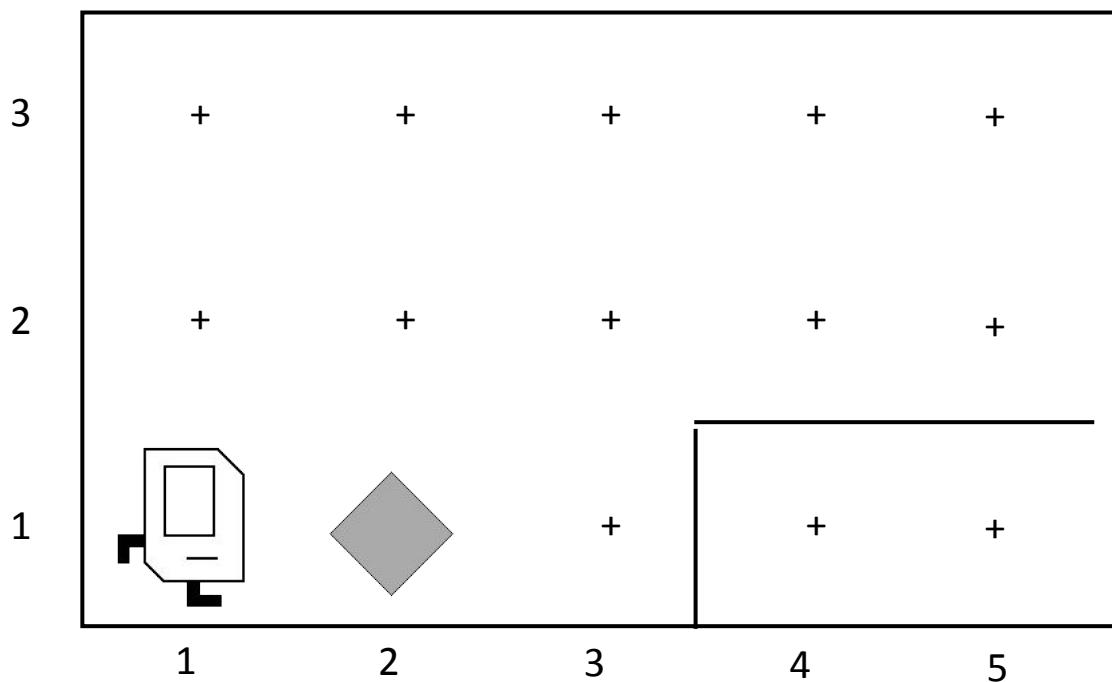
Move



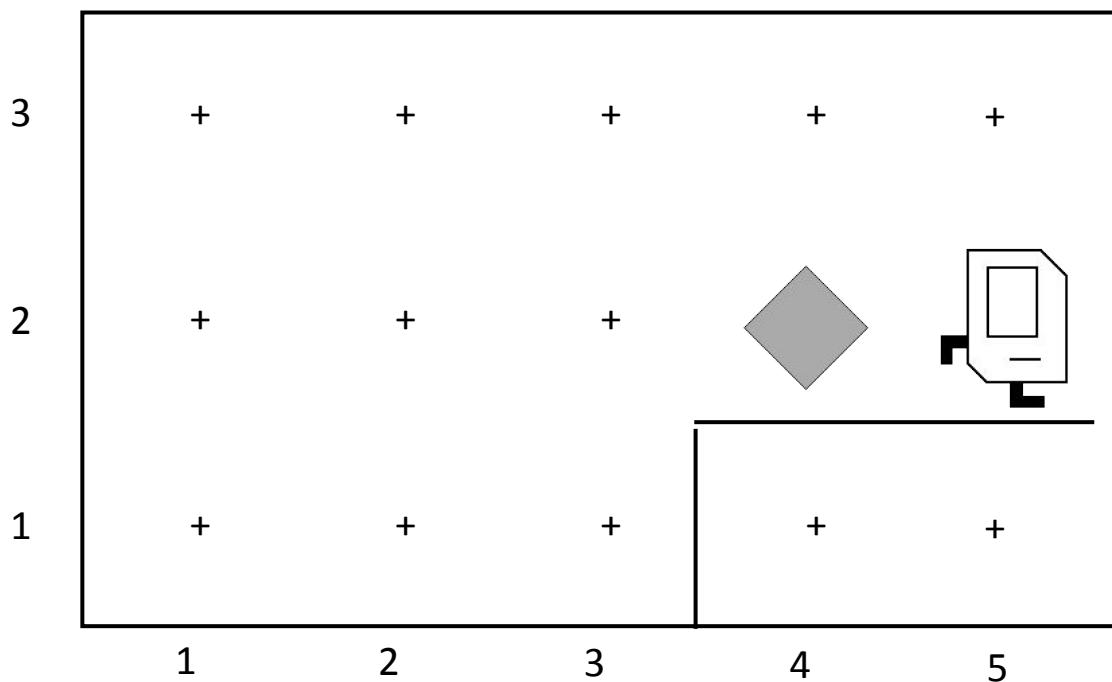
Piech and Sahami, CS106A, Stanford University



First Challenge



First Challenge





Piech and Sahami, CS106A, Stanford University

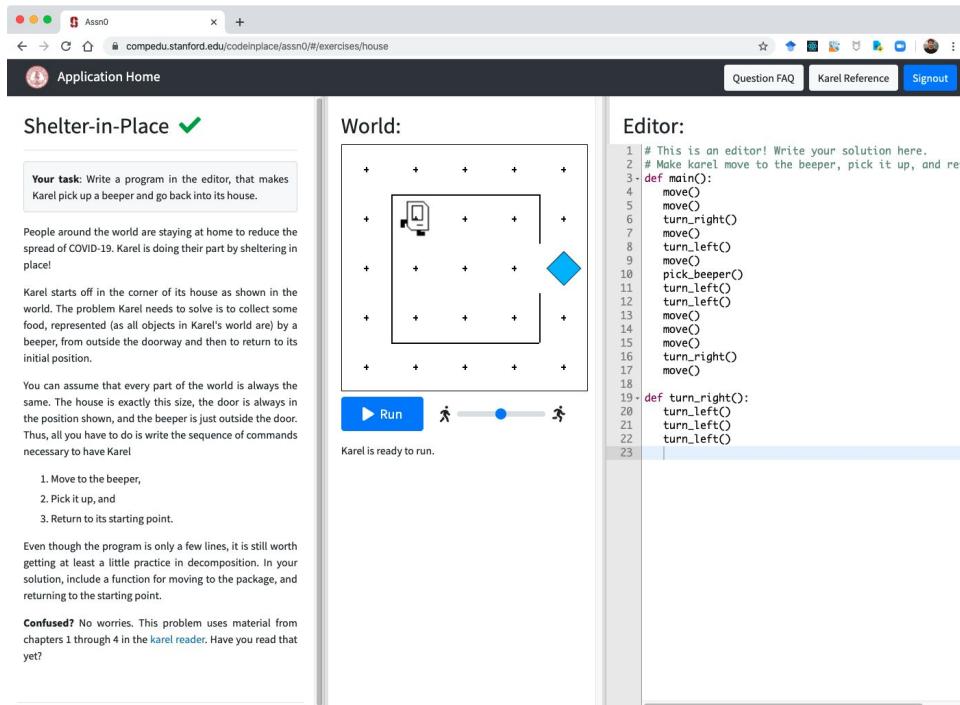


Learn By Doing



Program in an IDE

This is an IDE



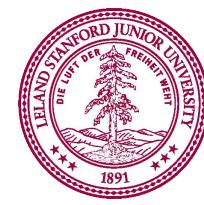
The screenshot shows the Karel IDE interface. On the left, the "World:" section displays a 5x5 grid with a Karel robot at the top-left corner facing right. There is a beeper at the door of a house-shaped room on the right side of the grid. The "Editor:" section contains the following Python code:

```
1 # This is an editor! Write your solution here.
2 # Make karel move to the beeper, pick it up, and return.
3 def main():
4     move()
5     move()
6     turn_right()
7     move()
8     turn_left()
9     move()
10    pick_beeper()
11    turn_left()
12    turn_left()
13    move()
14    move()
15    move()
16    turn_right()
17    move()
18
19    def turn_right():
20        turn_left()
21        turn_left()
22        turn_left()
23
```

Below the code editor, a message says "Karel is ready to run." At the bottom left, there is a "Run" button and a slider.



This is too!



Function Definition

```
def name():  
    function statements
```

This adds a new
command to Karel's
vocabulary



Anatomy of a Program

Import Packages

Program



Anatomy of a Program

Import Packages



Anatomy of a Program

Import Packages

main function

helper functions

start program



Anatomy of a Program

Import Packages

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

helper functions

start program



Anatomy of a Program

Import Packages

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

start program



Anatomy of a Program

Import Packages

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()

def turn_right():
    turn_left()
    turn_left()
    turn_left()

if __name__ == "__main__":
    run_karel_program()
```



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

```
if __name__ == "__main__":
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Anatomy of a Program

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from karel.stanfordkarel import *

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Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

}

This piece of the program's **source code** is called a **function**.

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

```
if __name__ == "__main__":
    run_karel_program()
```



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

This line of code gives the
name of the function
(here, run)

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

```
if __name__ == "__main__":
    run_karel_program()
```



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()

if __name__ == "__main__":
    run_karel_program()
```

This line of code gives the
name of the function
(here, `turn_right`)



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()

if __name__ == "__main__":
    run_karel_program()
```

This is called a
code block



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

This is called a
code block

```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

```
if __name__ == "__main__":
    run_karel_program()
```



Anatomy of a Program

```
from karel.stanfordkarel import *
```

```
def main():
    move()
    pick_beeper()
    move()
    turn_left()
    move()
    turn_right()
    move()
    put_beeper()
    move()
```

This is called a
code block

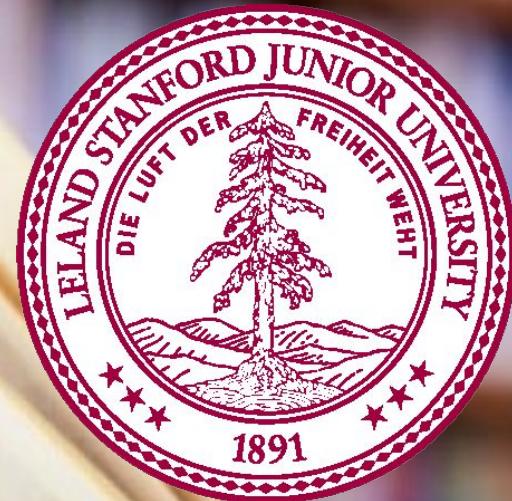
```
def turn_right():
    turn_left()
    turn_left()
    turn_left()
```

```
if __name__ == "__main__":
    run_karel_program()
```



The End,
but really just the start.

Be well and be kind.



Code in Place Welcome Meeting

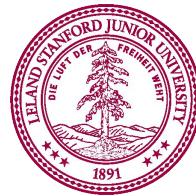
Chris Piech + Mehran Sahami

Welcome to code in place

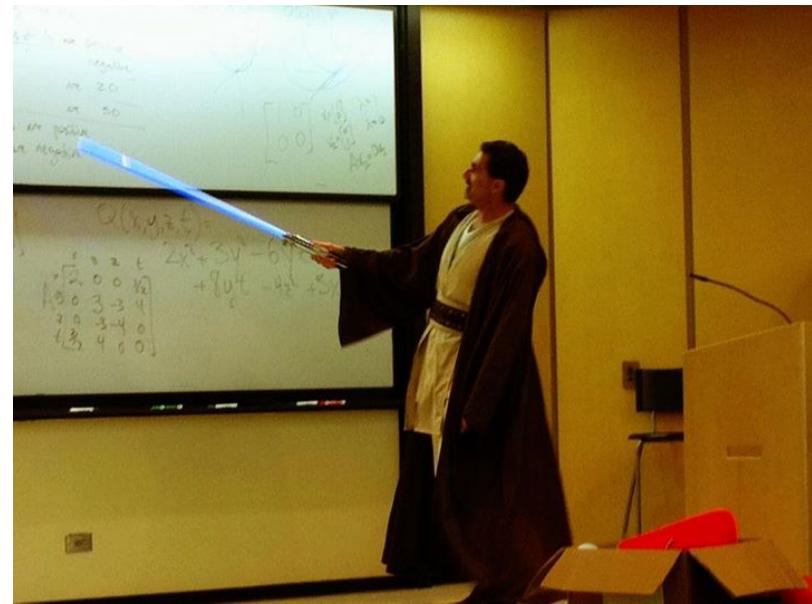
Mehran Sahami



- Childhood: Iran
- High School: San Diego
- Stanford University Ph.D. in Machine Learning
(Before Machine Learning was cool)
- Spent a decade in tech industry before coming back as professor
 - Love of teaching is why I came back



Mehran Sahami



Piech and Sahami, Code in Place



Chris Piech

Teaching at Stanford

CS106A

Programming
Methodologies

CURRENT

CS106B

Programming
Abstractions

LAST: FALL 2016

8,000+ students over 10 years

CS109

Probability for Computer
Scientists

LAST: FALL 2018

CS221

Intro to Artificial
Intelligence

LAST: SUM 2013



Created the research lab in
Computational Education?



How people learn is a
terribly interesting
domain

Piech and Sahami, Code in Place



Chris Piech



Piech and Sahami, Code in Place



What we will do today:

What is Code in Place?
Learn!

Start something beautiful