



CS106A: Programming Methodologies

Chris Piech

My parents are interesting folks

I originally concentrated in graphics and worked at Pixar

- Childhood: Nairobi, Kenya
- High School: Kuala Lumpur, Malaysia
- Stanford University Ph.D. in Neural Networks
- Research lab on AI for Social Good
- Researcher in the MSR cognitive science lab

The problem I really want to solve is to make high quality more education accessible



Chris Piech



10 years ago to this day, I was sitting in your seats

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Head TA: Nick Troccoli



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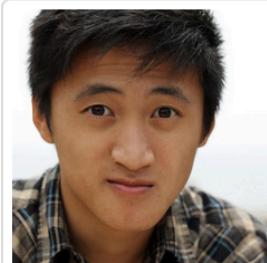
Section Leaders



Alisha



Amy



Brian



Bryce



Çağatay



Dilara



Göktuğ



Julia



Kerem



Kevin



Pınar Ö



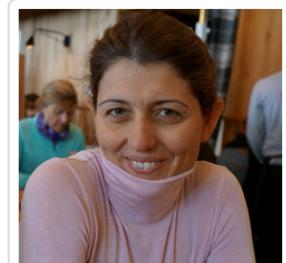
Şahin



Pınar Y



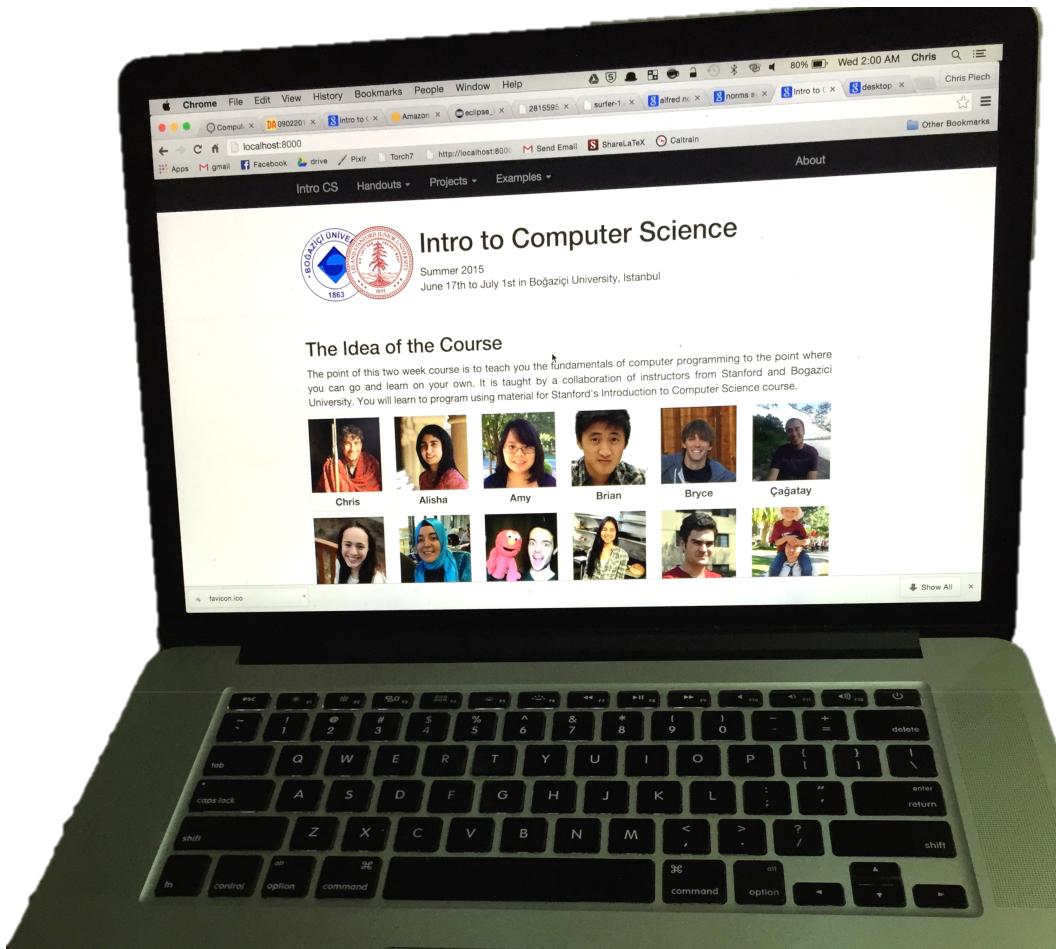
Nick



Asena

Who are you?

Prerequisite Test



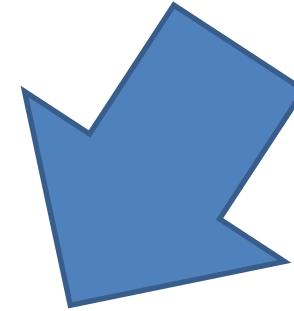
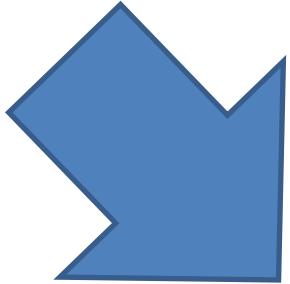
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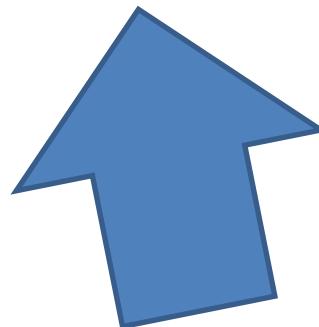
Are you in the right place?

Course mechanics
(this is a light version. Please read the handout
for details).

Course Website



<http://cs106a.stanford.edu>



Lectures and Sections

- Weekly 50-min section led by awesome section leaders (the backbone of the class!)
- Signups begin on Thursday at 5:00pm and close Sunday at 5:00pm
- Pair programming with others in your section.



Office Hours



LaiR: 6pm until midnight Sunday through Thursday (starting next Sunday)

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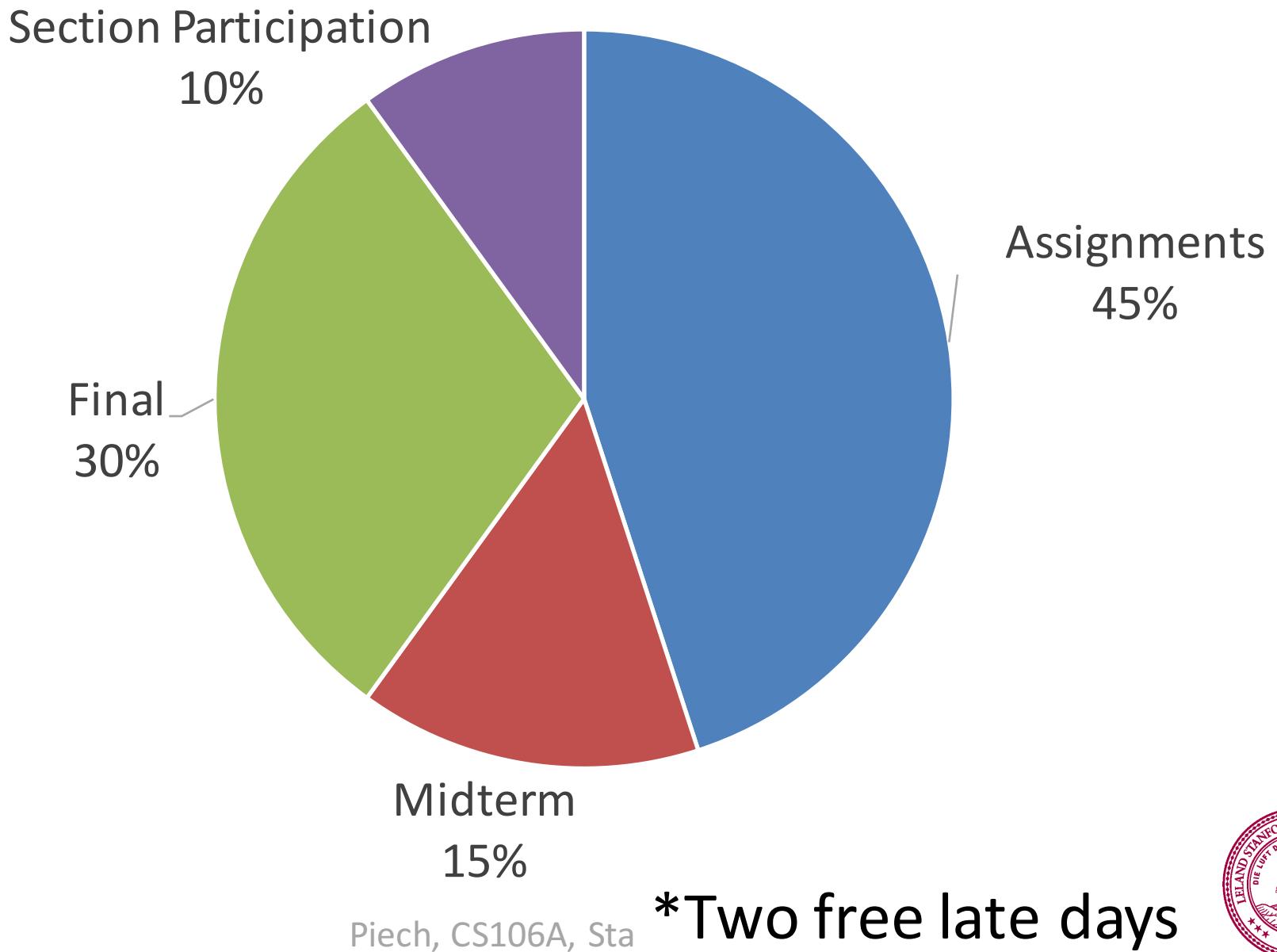
Grading Scale

Functionality and style grades for the assignments use the following scale:

- ++** A submission so good it “makes you weep.”
- +** Exceeds requirements.
- ✓ +** Satisfies all requirements of the assignment.
- ✓** Meets most requirements, but with some problems.
- ✓ -** Has more serious problems.
- Is even worse than that.
- Better than nothing.



What we will ask you to do



Optional Contest



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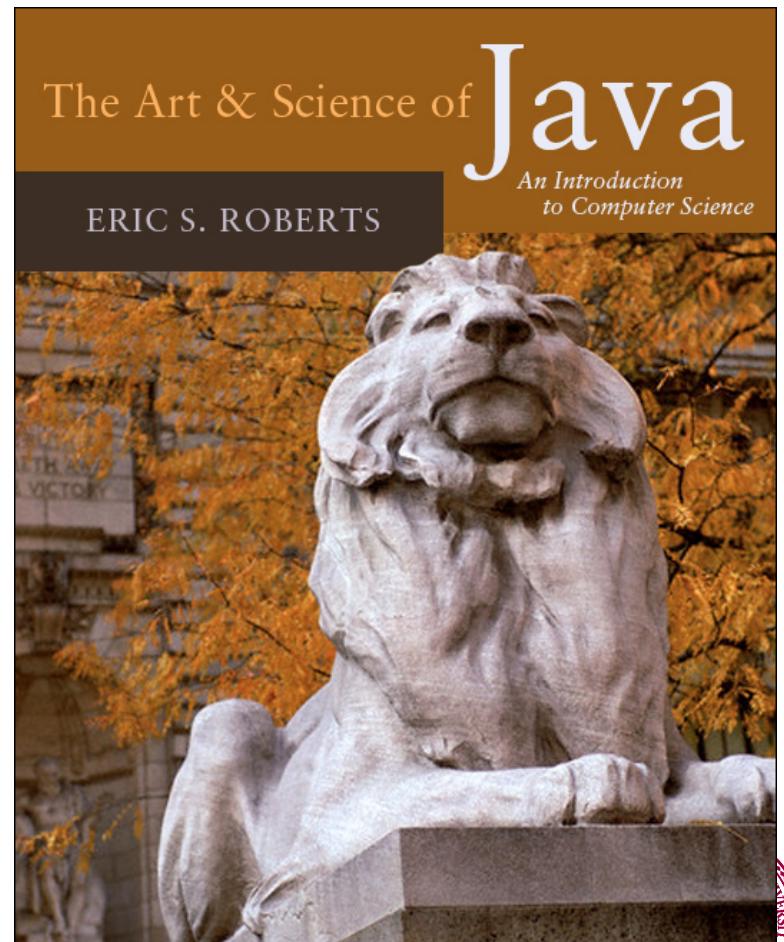
Textbook

The Art & Science of Java by Eric Roberts

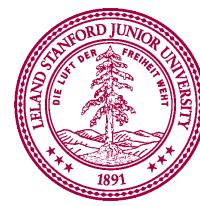
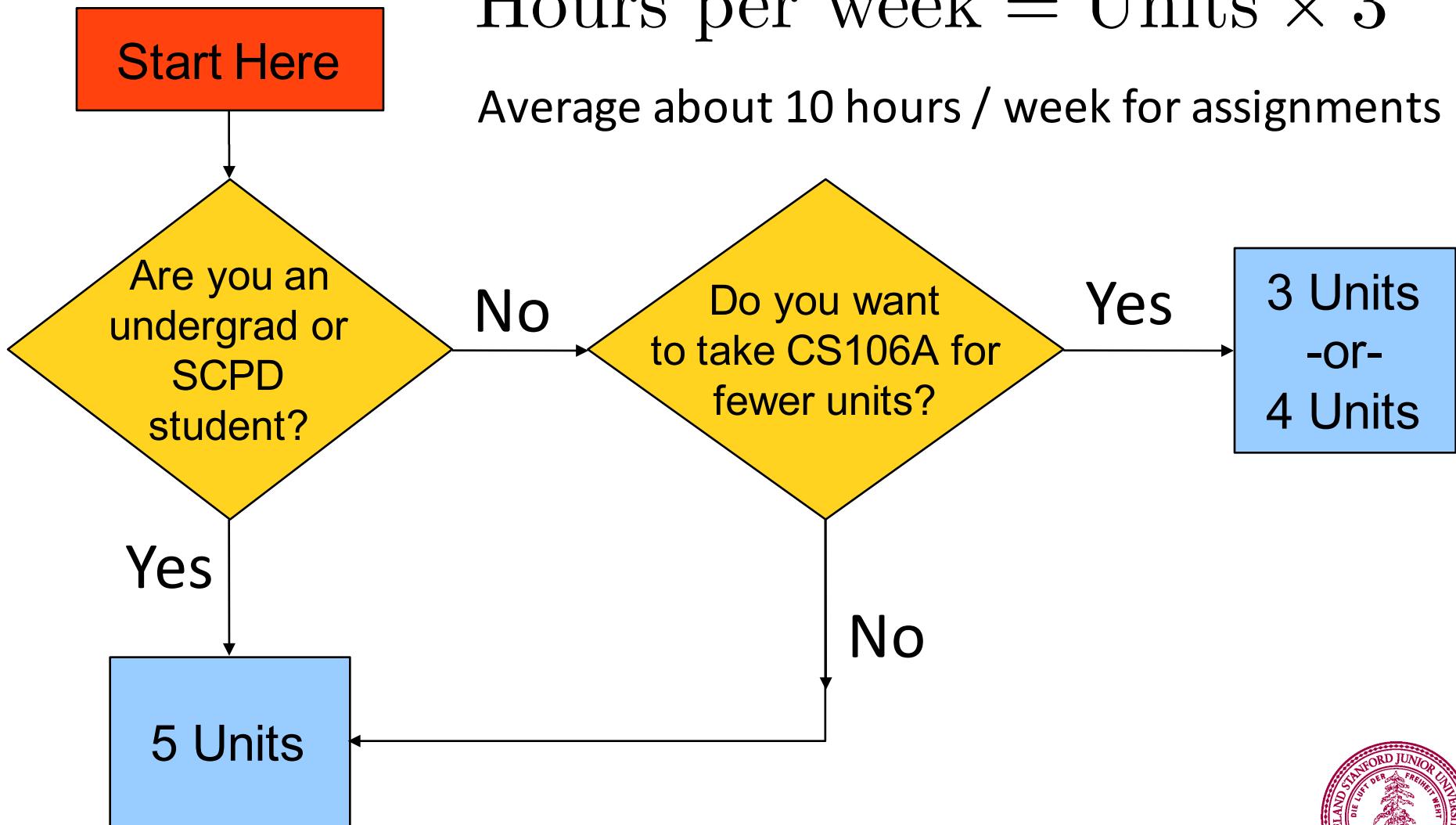
- written here at Stanford
- tailored to this course
- a valuable reference
- usable on open-book exams

Karel the Robot Learns Java

- First week of material



CS106A Units



Lectures are Online

Stanford Center for Professional Development

Chris Piech

https://mvideox.stanford.edu/Course/825

Stanford University

Chris James Piech (cpiech) | Log Out

Stanford | Center for Professional Development

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Seminars

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ClassX engineered for engineers

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Programming Methodology

CS106A

Watch Now: Wednesday, December 7, 2016

Course Sessions (29): Show All

Week 11

Day/Date:	Watch Online:	Duration:
Wednesday December 7, 2016	▶ WATCH NOW	00:48:08
Monday December 5, 2016	▶ WATCH NOW	00:48:19

Week 10 +

Week 9 +

Week 8 +

Course Details

Course Description

This introduction to the engineering of computer applications emphasizes modern software “D’s” of development: Design,

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classx.stanford.edu/Home?Graduate=1

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What is CS106A?

Computer Science

Computer science is no more about computers than astronomy is about telescopes, biology is about microscopes or chemistry is about beakers and test tubes. Science is not about tools, it is about how we use them and what we find out when we do.

- Michael Fellows and Ian Parberry



Learning Goals

- *Learn how to harness computing power to solve problems.*
- To that end:
 - Explore fundamental techniques in computer programming.
 - Develop good software engineering techniques.
 - Gain familiarity with the Java programming language.



Art of Computer Science



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

Computer Graphics



Pat Hanrahan, one of the founders of Pixar is a professor here

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Consumer Applications



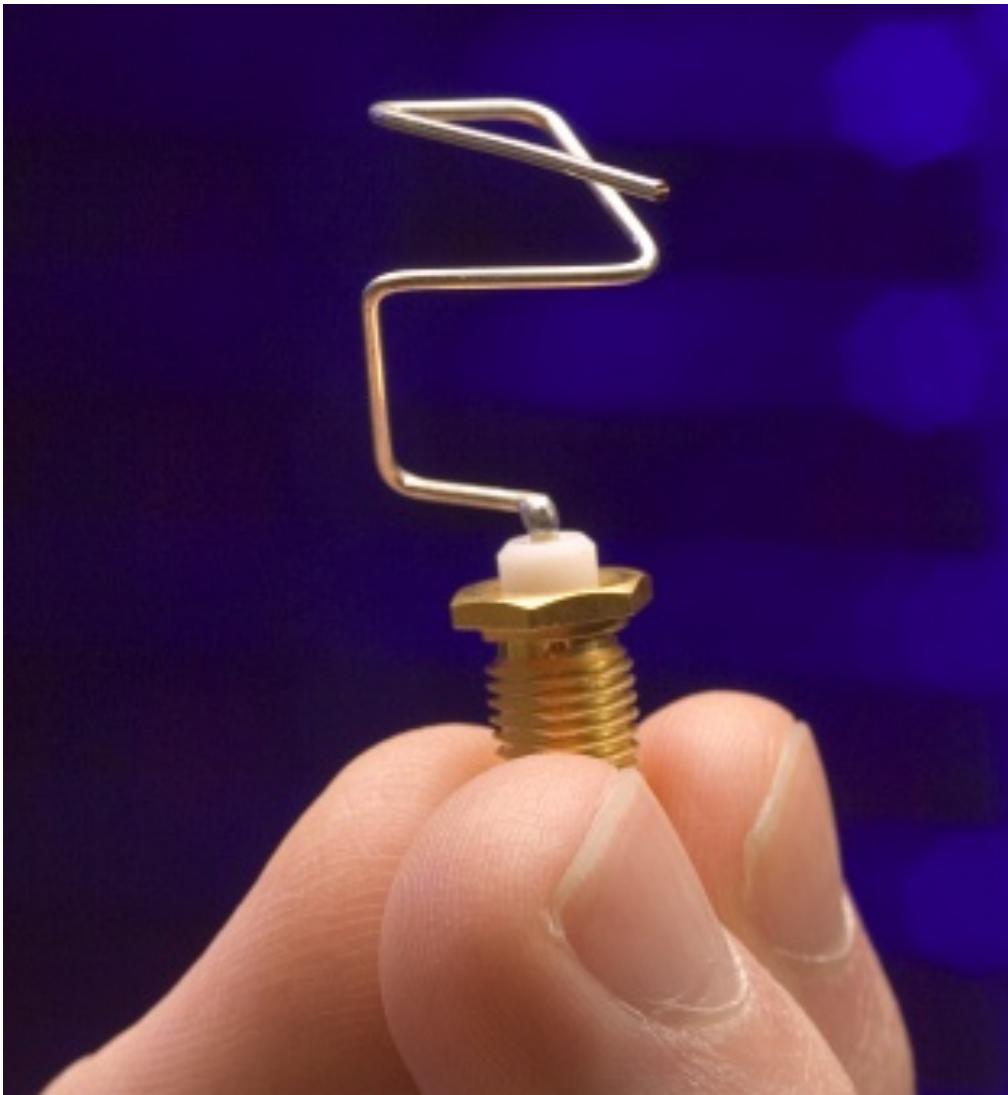
Autonomous Surgery



Self Driving Car

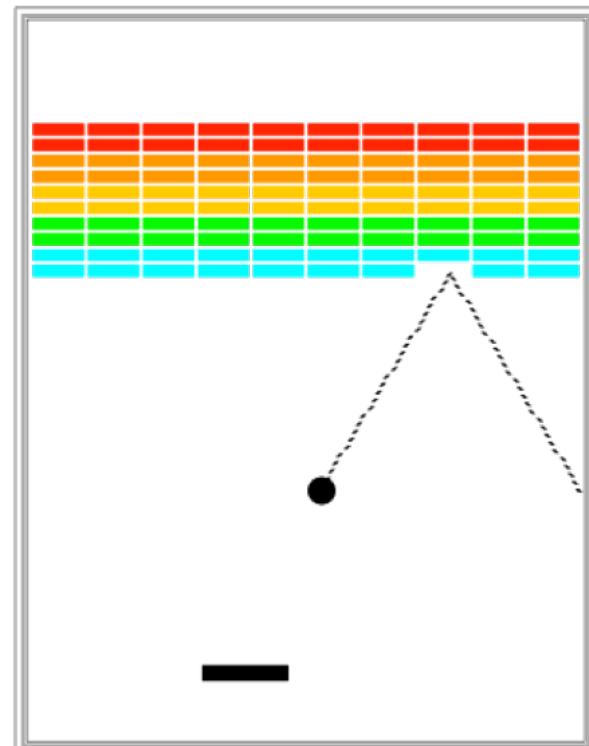
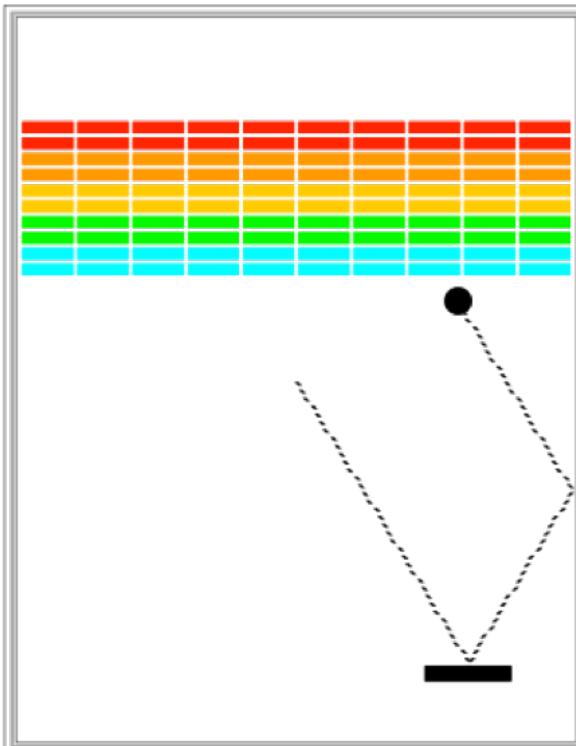
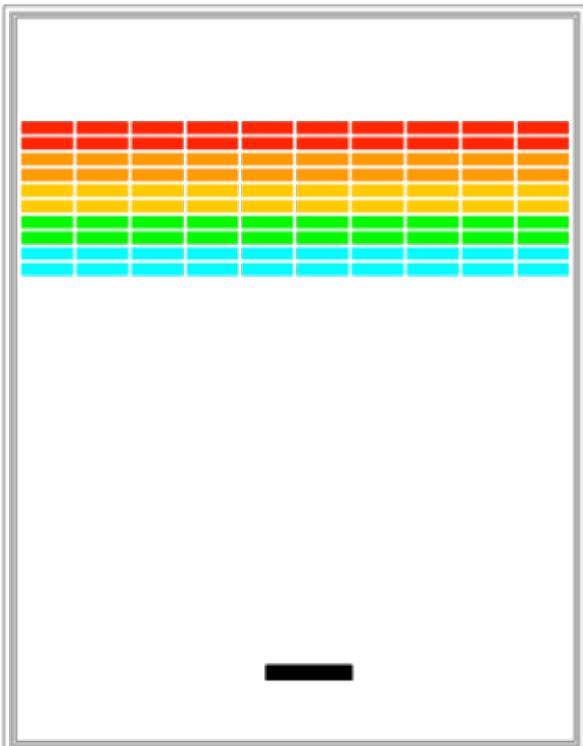


Genetic Algorithms

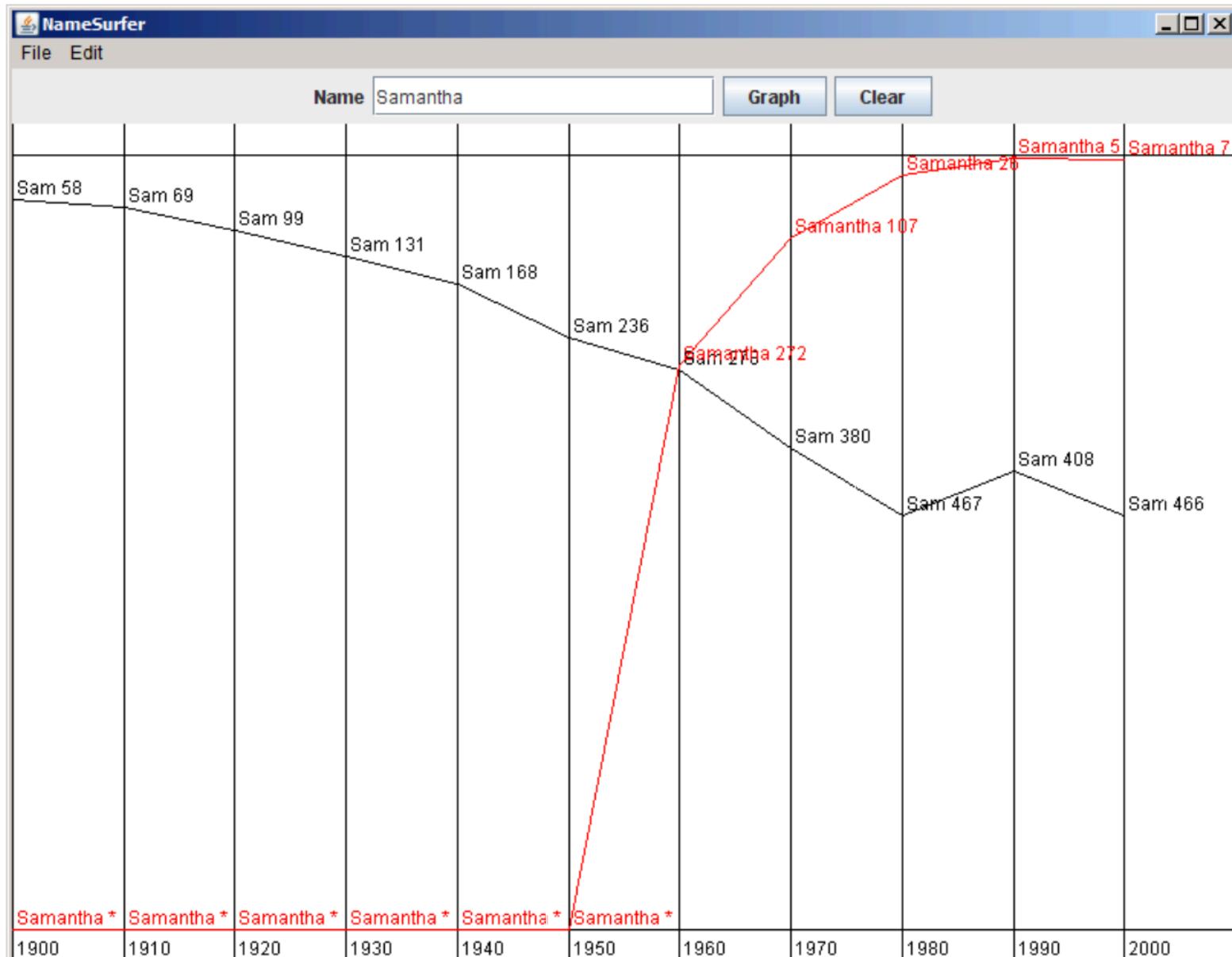


If only we could program self
driving cars...

Graphical Games



Data Visualization



Mini Facebook

FacePamphlet

File Edit

Name

Add Delete Lookup

Mehran Sahami

Friends:



coding like a fiend

Change Status

MehranS.jpg

Change Picture

Mehran Sahami

Add Friend

Mehran Sahami is coding like a fiend

Displaying Mehran Sahami



Strive for Everyone to Succeed



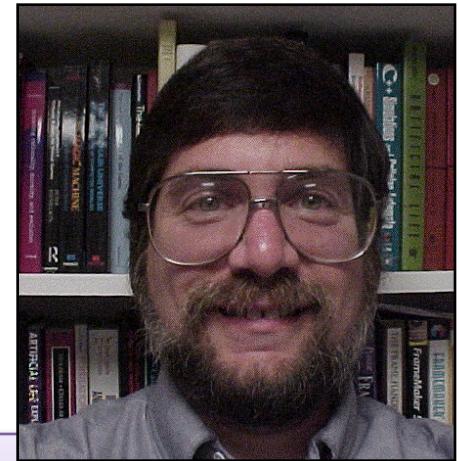
Lets Get Started



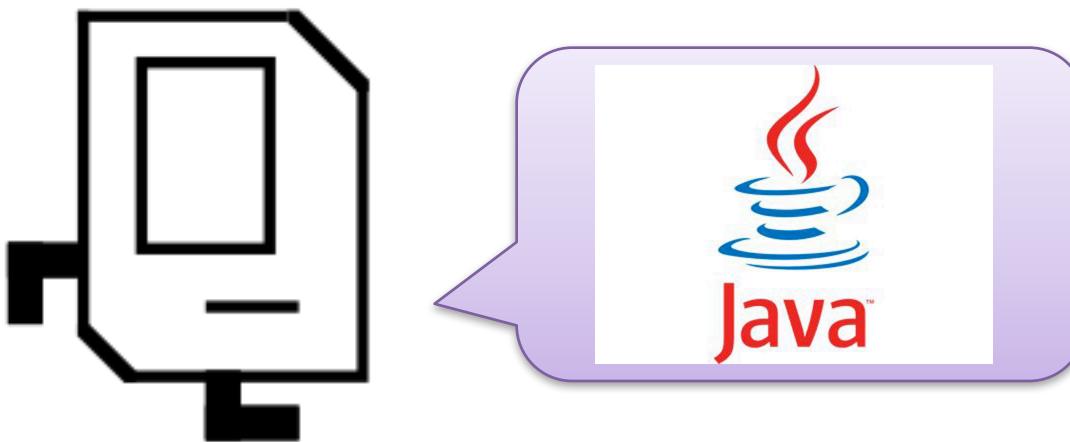
Meet Karel the Robot



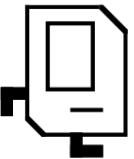
Good morning

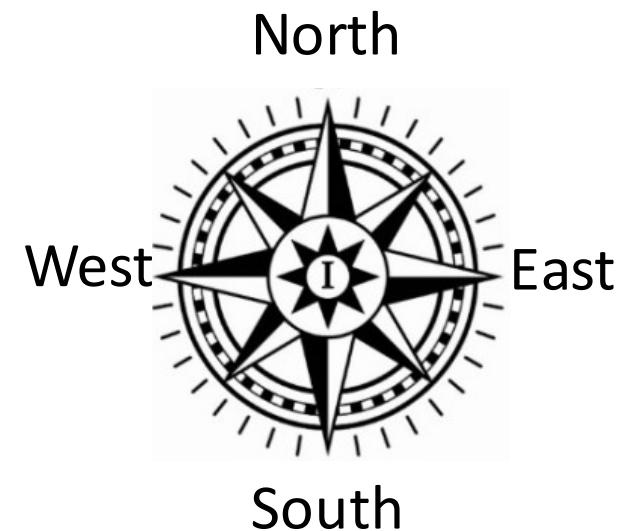


Karel Speaks Java

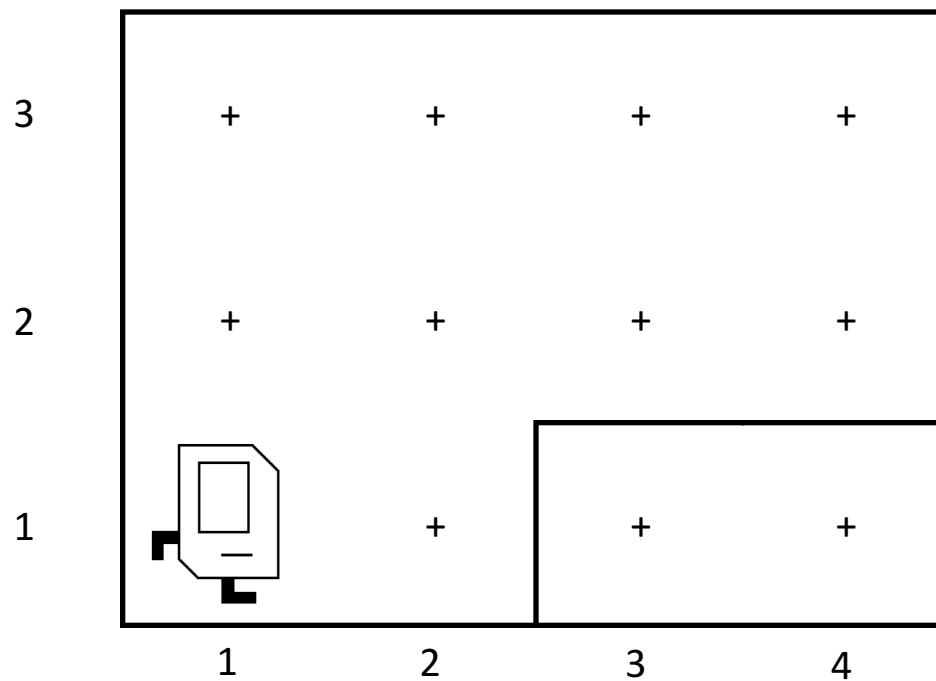


Karel's World

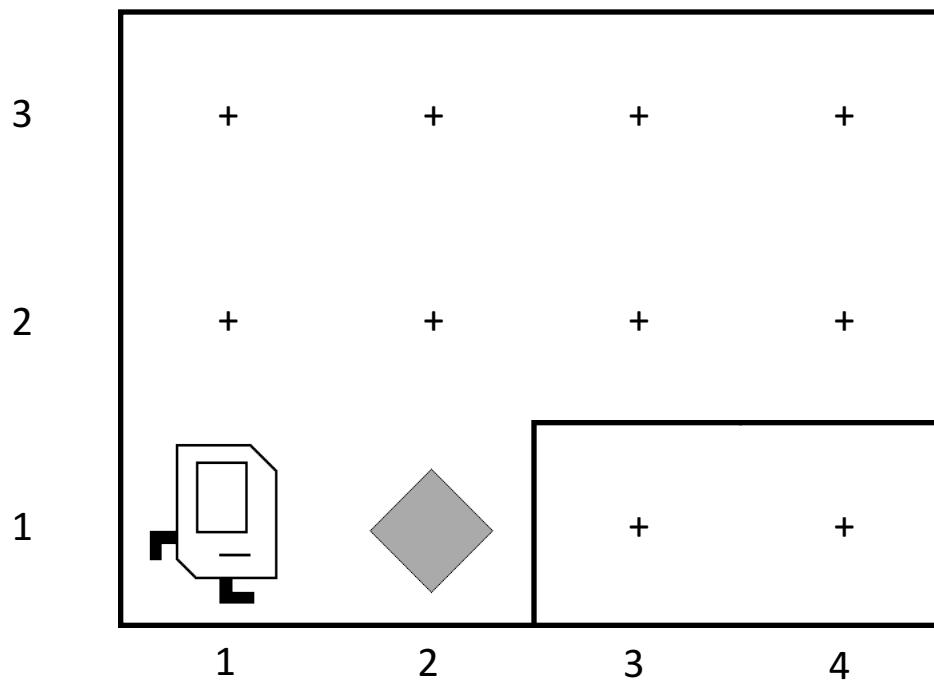
3	+	+	+	+	
2	+	+	+	+	
1		+	+	+	
	1	2	3	4	5



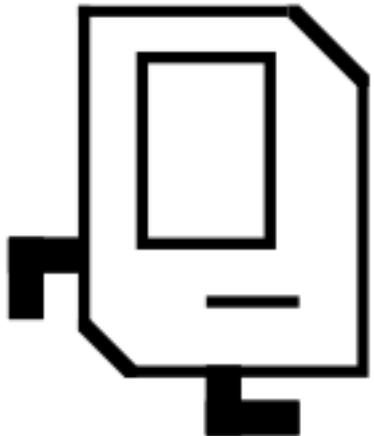
Walls



Beepers



Knows Four Commands



`move();`

`turnLeft();`

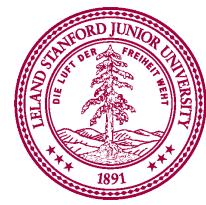
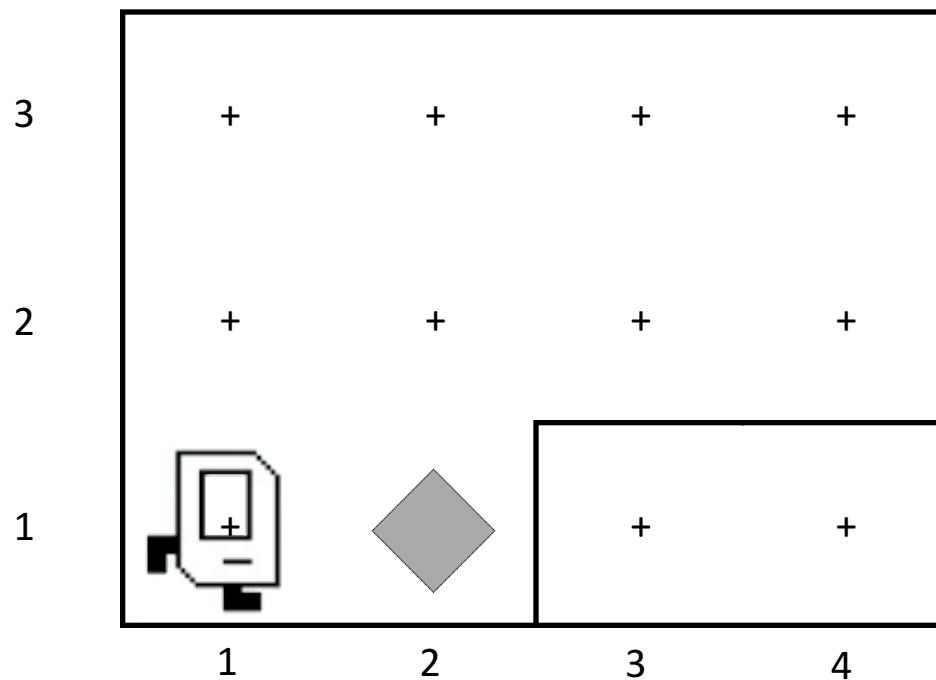
`putBeeper();`

`pickBeeper();`

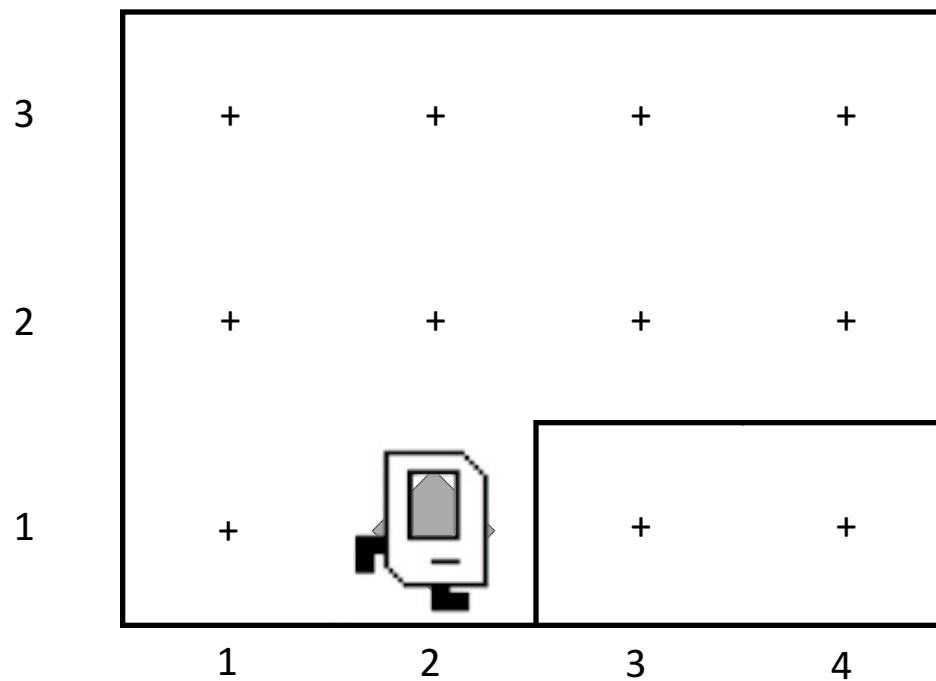


move();

move();

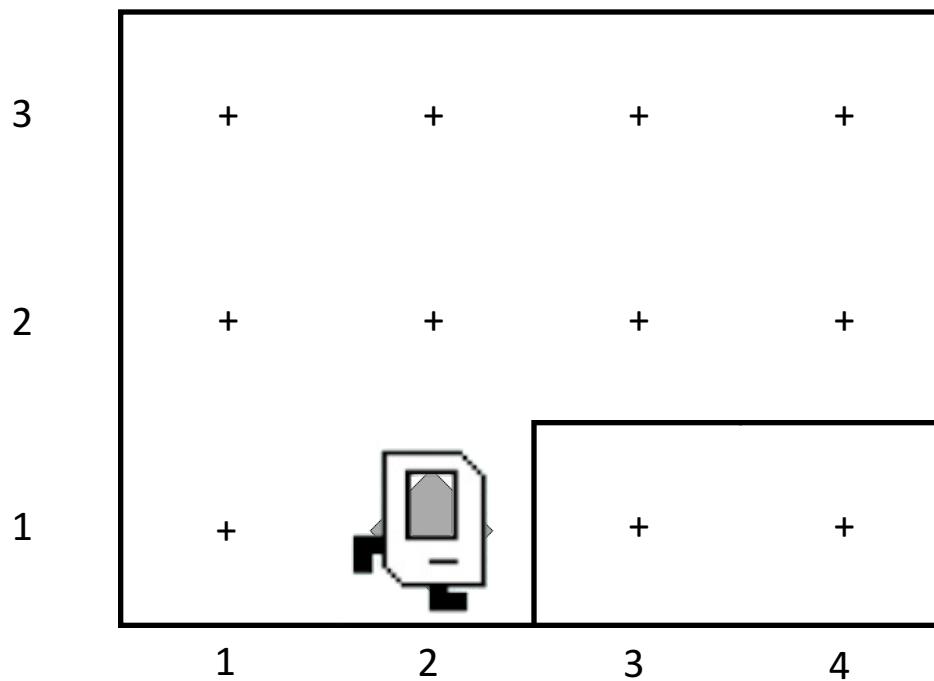


move();

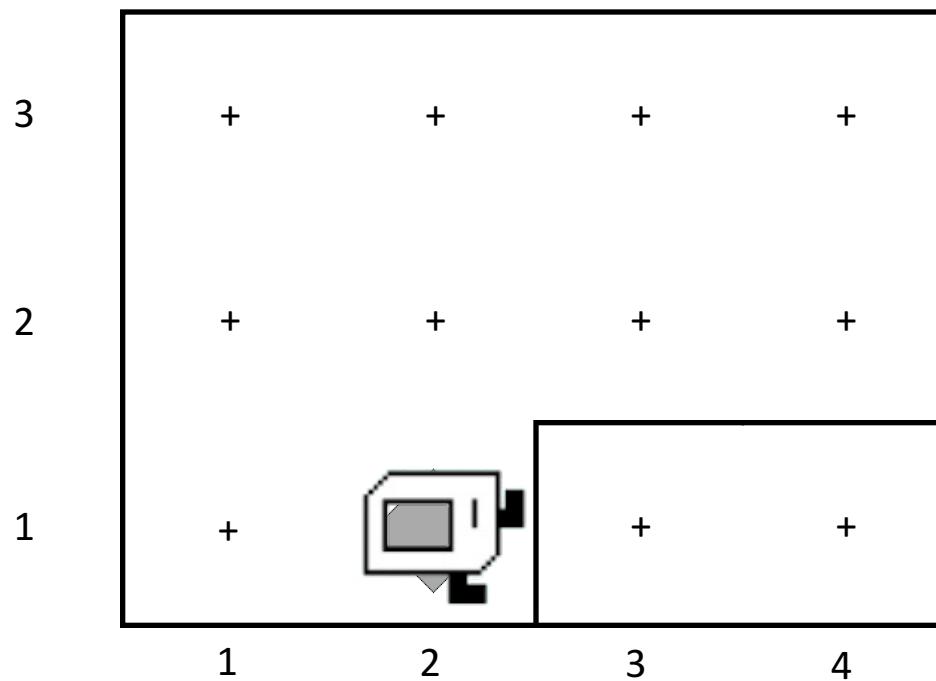


turnLeft();

turnLeft();

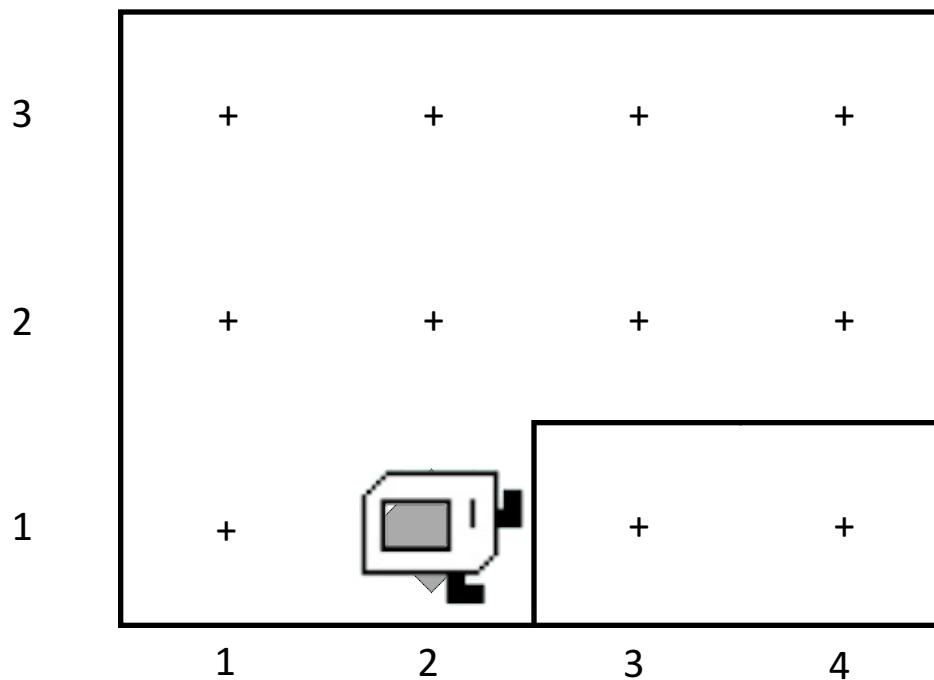


turnLeft();

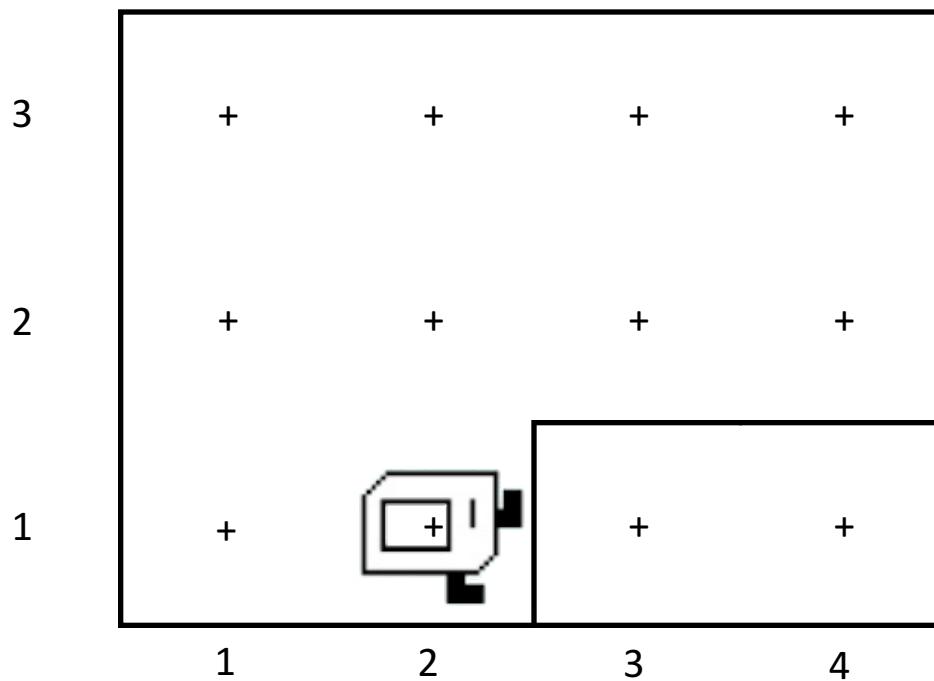


pickBeeper();

pickBeeper();

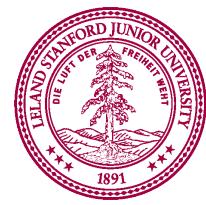
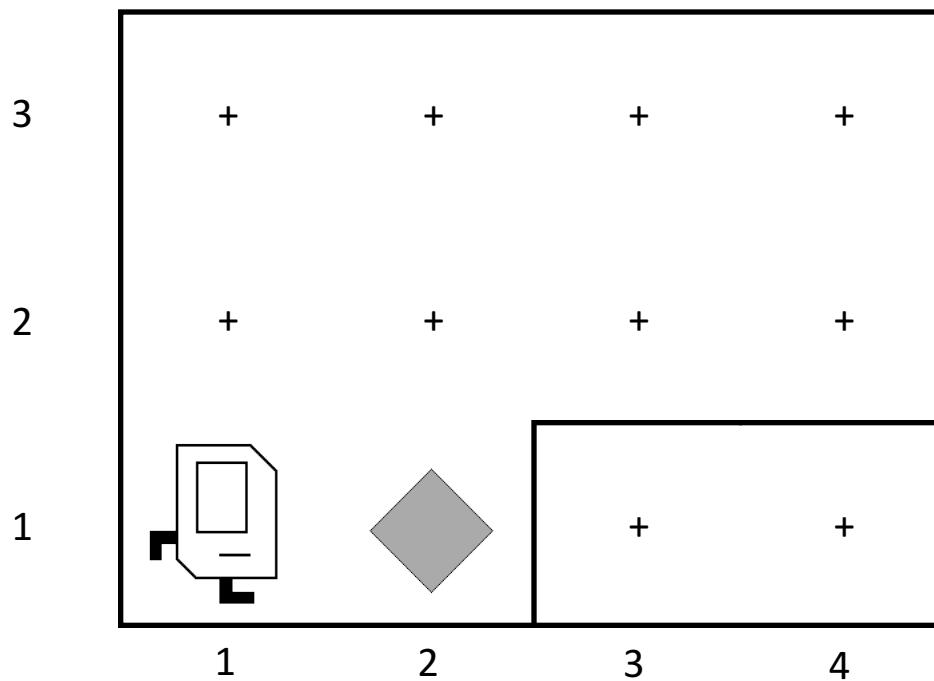


pickBeeper();

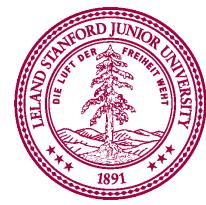
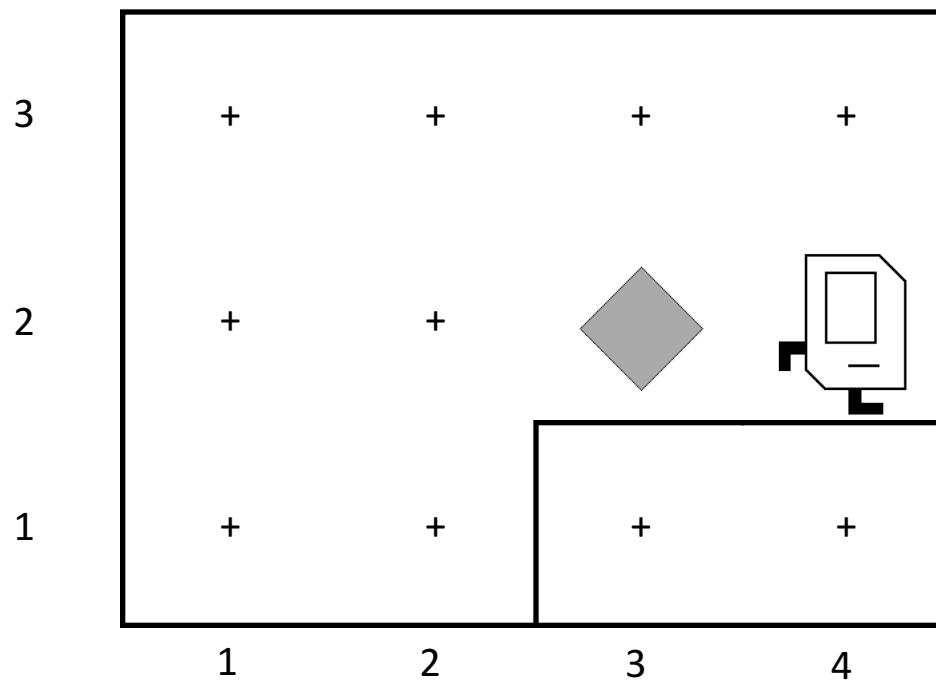


Make Sense?

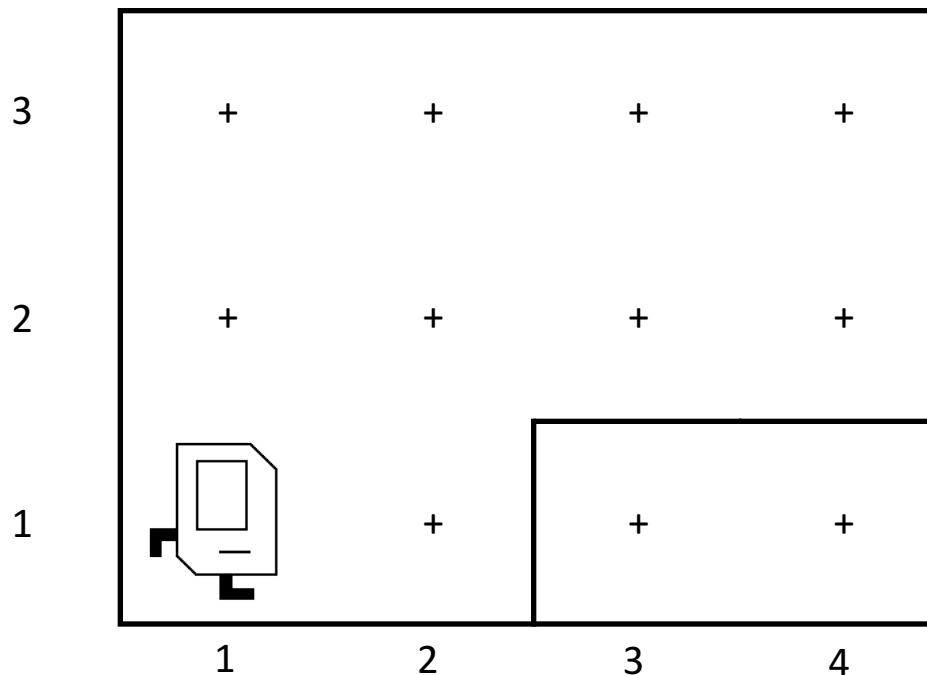
First Challenge



First Challenge



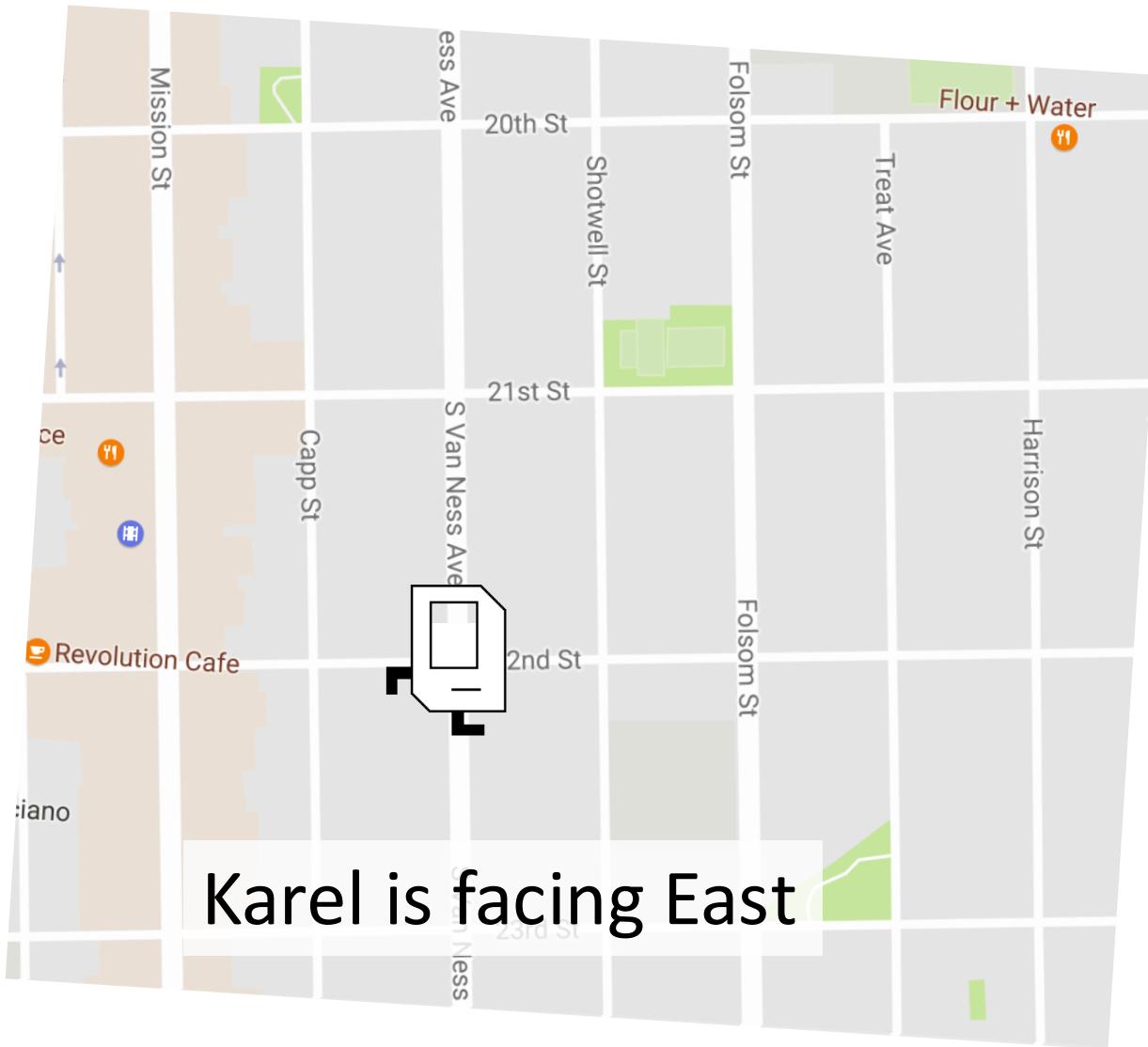
Bird's Eye View



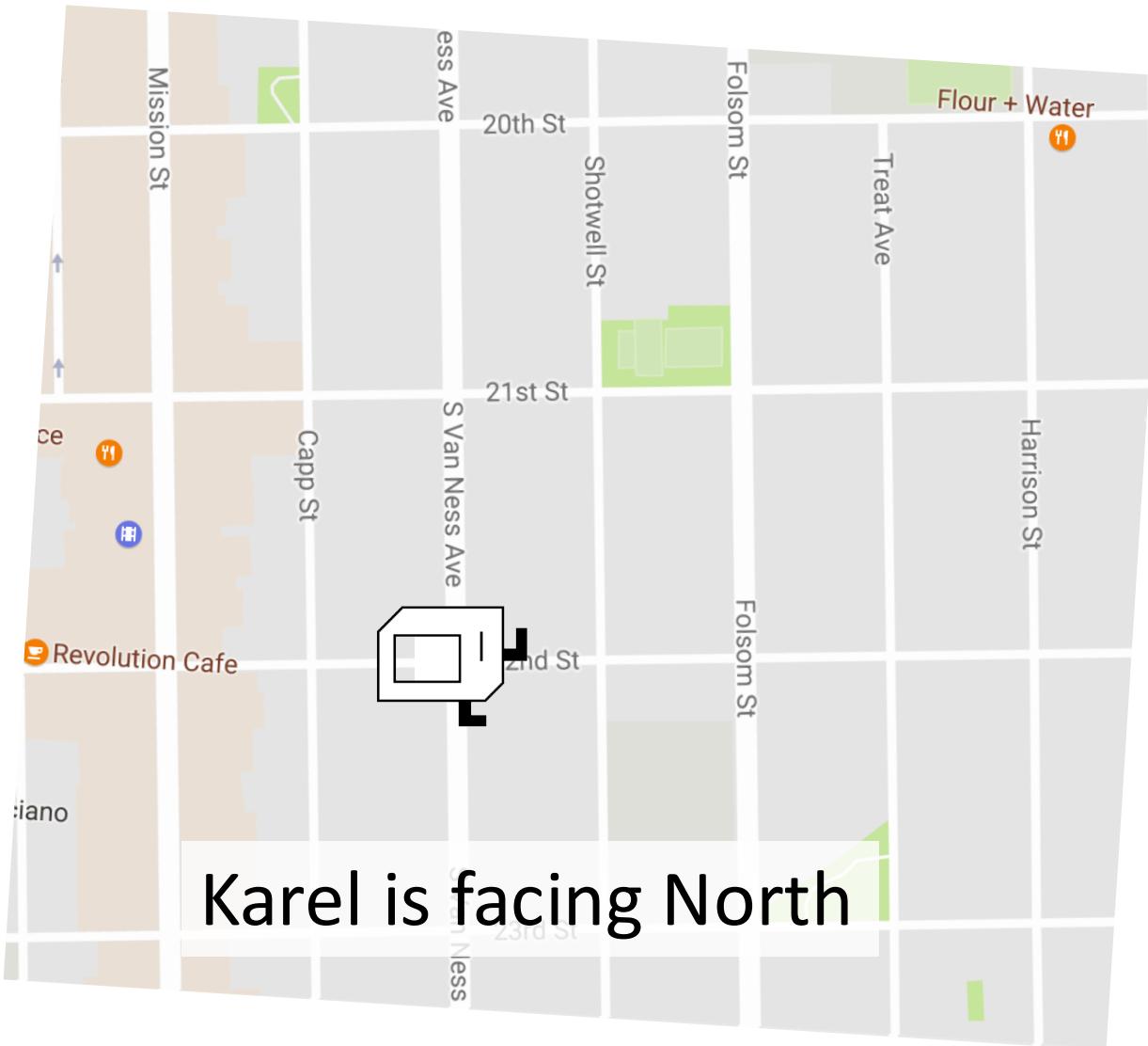
Karel is facing East



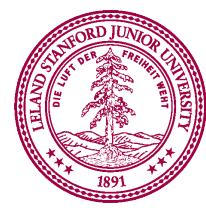
Bird's Eye View



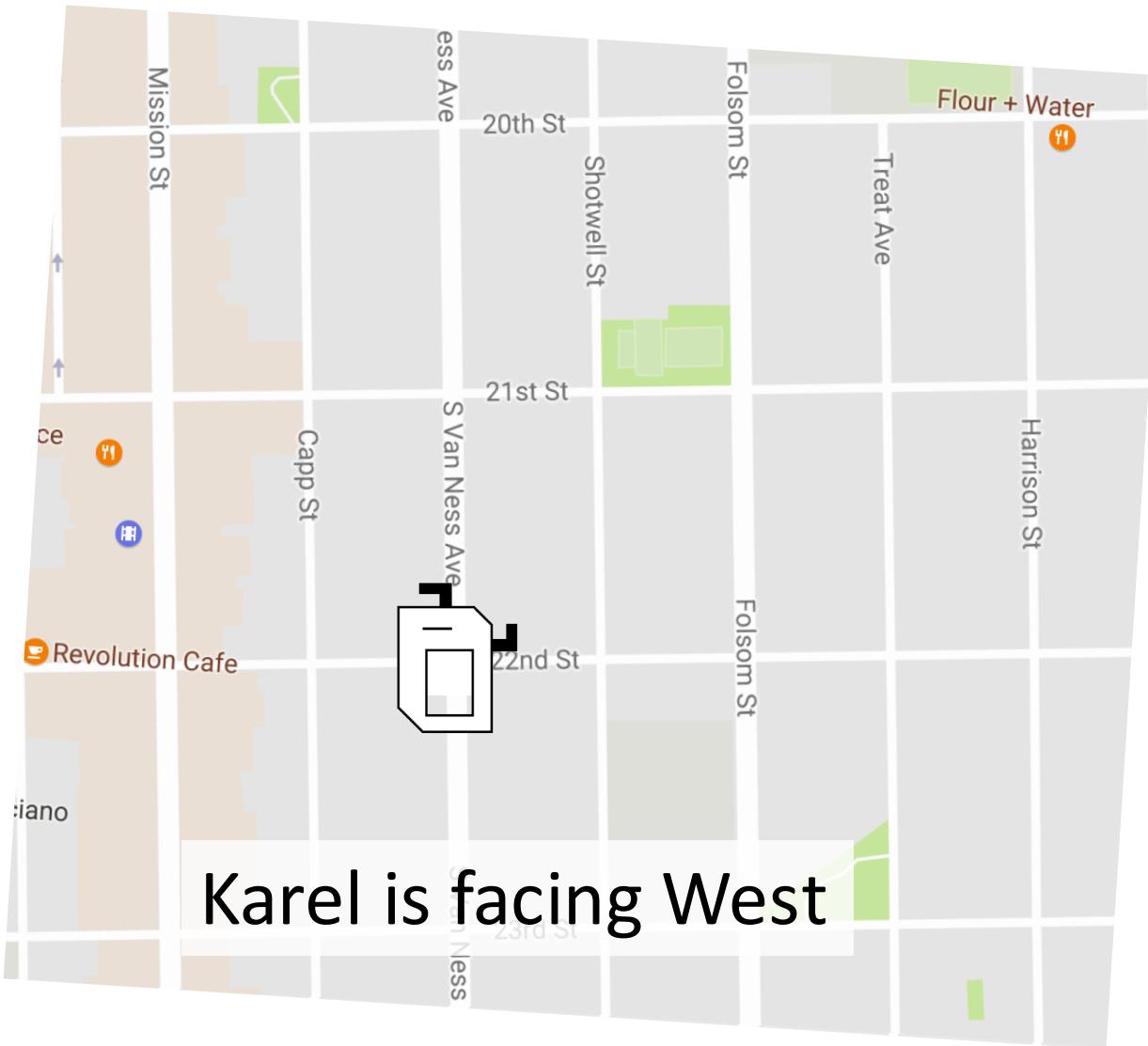
Turn Left



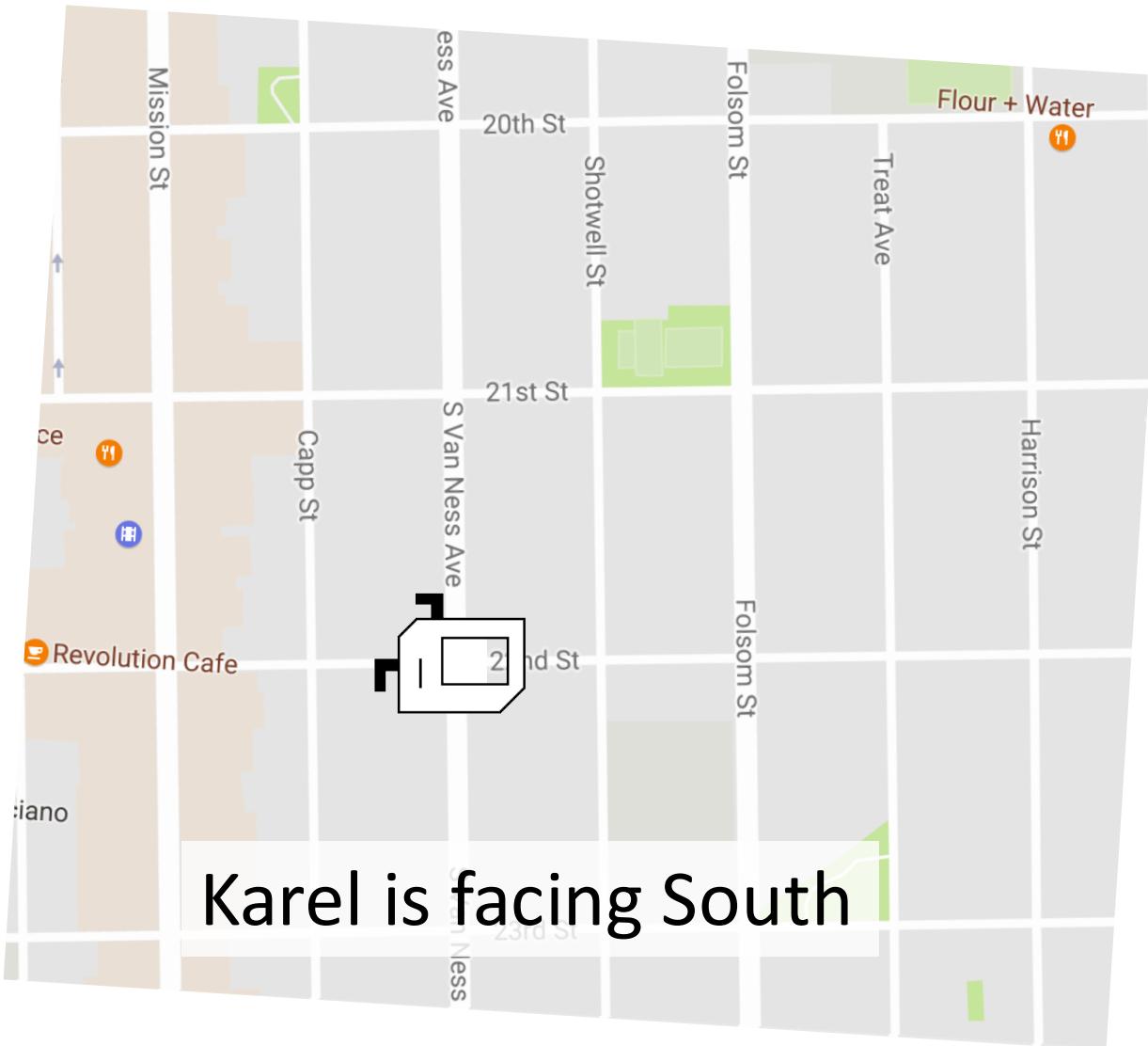
Karel is facing North



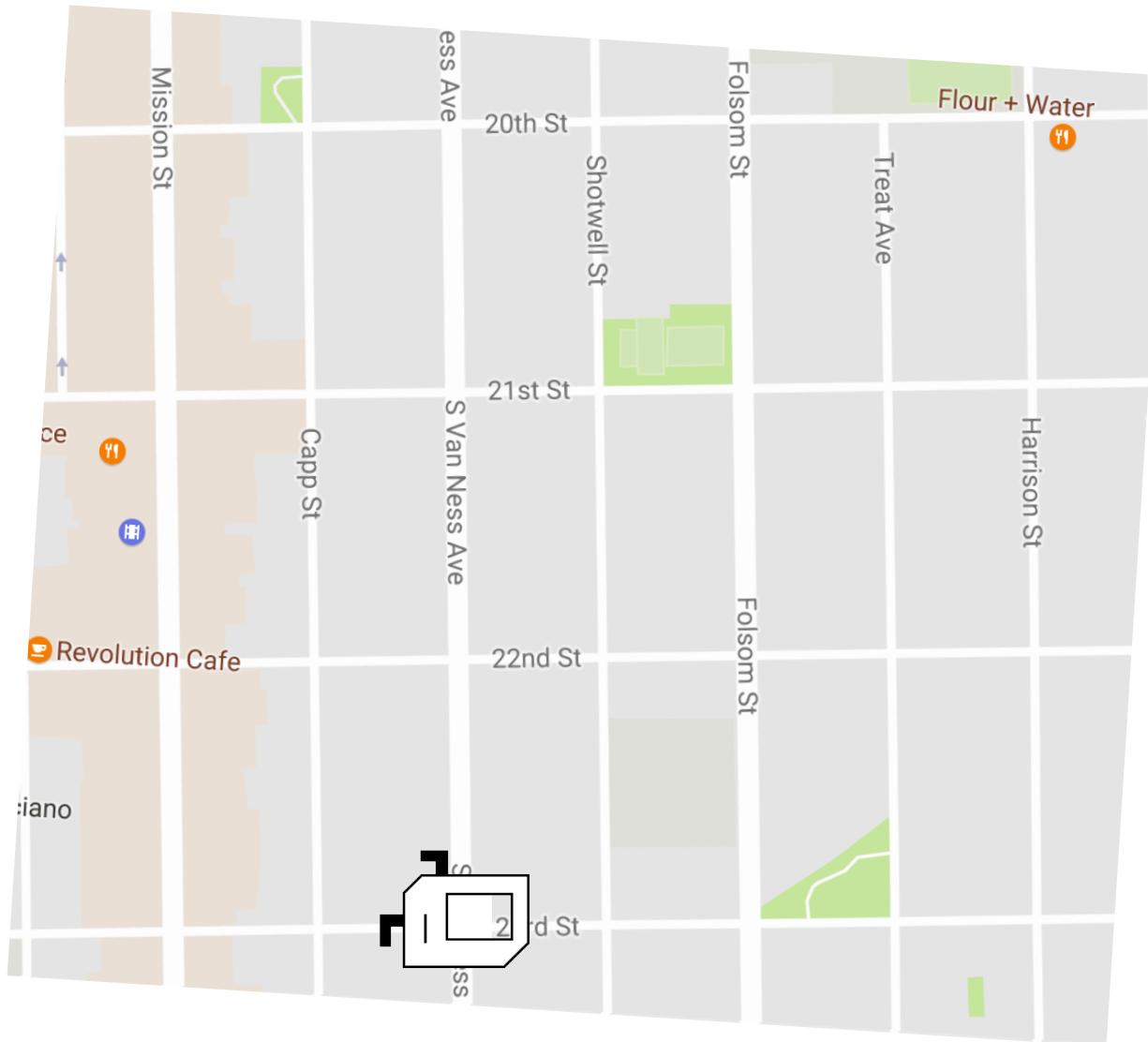
Turn Left



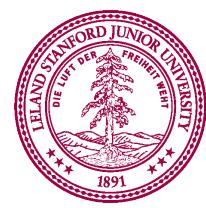
Turn Left



Move



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Method Definition

```
private void name( ) {  
    method statements  
}
```

This adds a new
command to Karel's
vocabulary



Learn By Doing



Why Study CS?

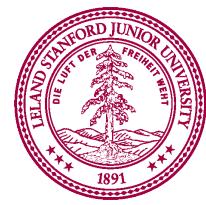
Joy of Building



Interdisciplinary



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Closest Thing To Magic

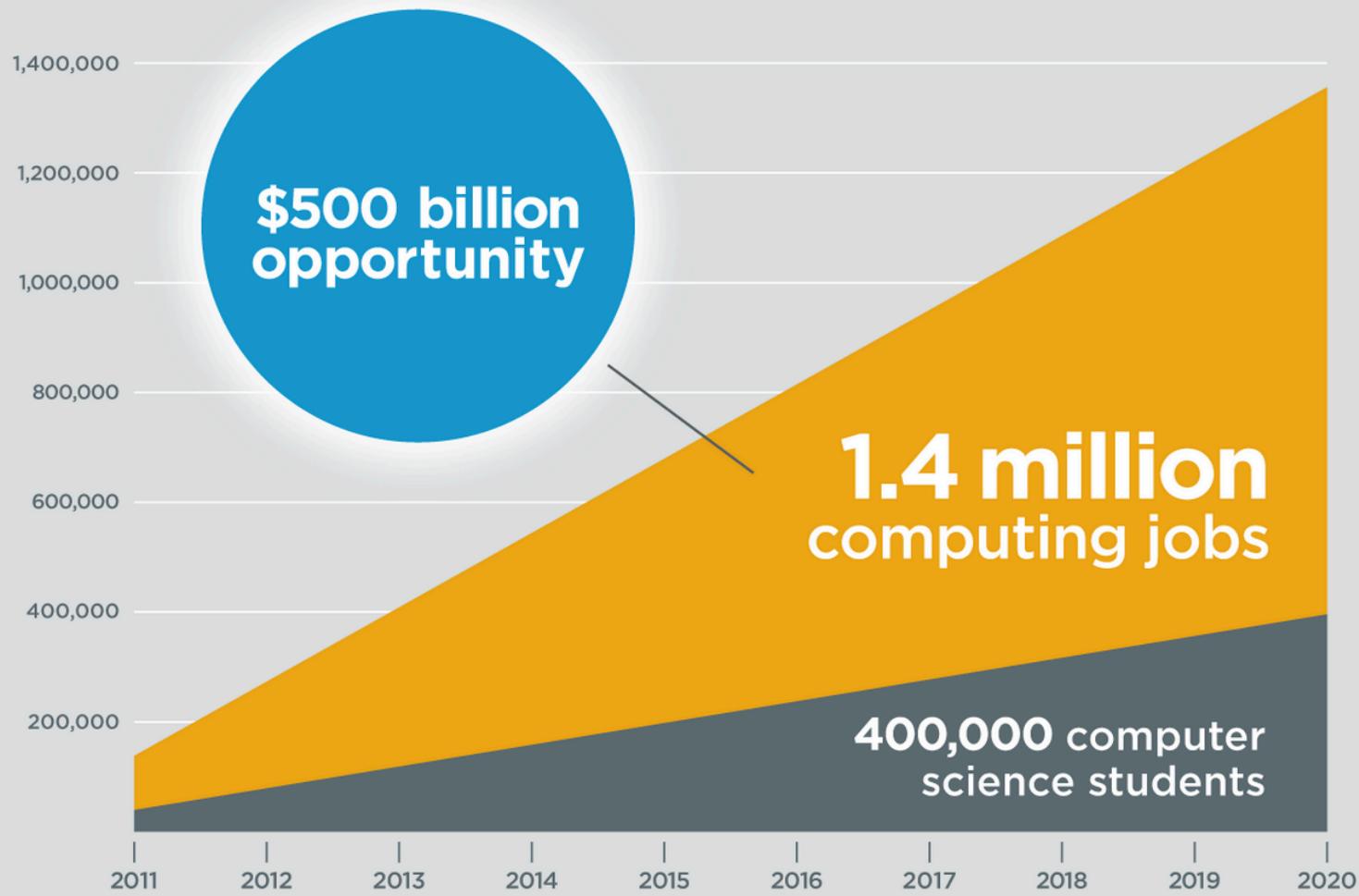


Now is the Time



Oh and Its Useful

1,000,000 more jobs than students by 2020



Everyone is Welcome



The End



The End?