

Introduction to CS 106AJ

Jerry Cain

CS 106AJ

September 24, 2018

slides courtesy of Eric Roberts

Course Description

CS 106AJ: Programming Methodology in JavaScript

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Emphasis is on good programming style. This course covers the same material as CS 106A but does so using JavaScript, the most common language for implementing interactive web pages, instead of Java. No prior programming experience required.

Terms: Aut | Units: 3-5 | UG Reqs: WAY-FR | Grading: Letter or CR/NC

CS 106AJ covers the same material and meets the same WAYS requirements as any other CS 106A section.

Why JavaScript?

- When Stanford adopted Java a little over a decade ago, we expected—along with its designers—that it would become the "language of the web". That didn't happen.
- Today, the "language of the web" is JavaScript, which has become the most widely used language in industry.
- Along with JavaScript expert Douglas Crockford, we believe that, as long as you avoid some of its most commonly abused features, JavaScript is "a beautiful, elegant, highly expressive language" that is ideal for a first course in programming.
 - It is considerably easier to learn than Java.
 - There are far fewer details to memorize.
 - It offers cleaner implementations of modern language features.
 - It is universally supported on the web.

JavaScript is the Most Popular Language



Most Popular Technologies

Overview

Developer Profile

Technology

I. Most Popular Technologies

II. Most Loved, Dreaded, and Wanted

III. Development Environments and Tools

IV. Top Paying Technologies

V. Correlated Technologies

VI. Technology and Society

Work

Community

Methodology

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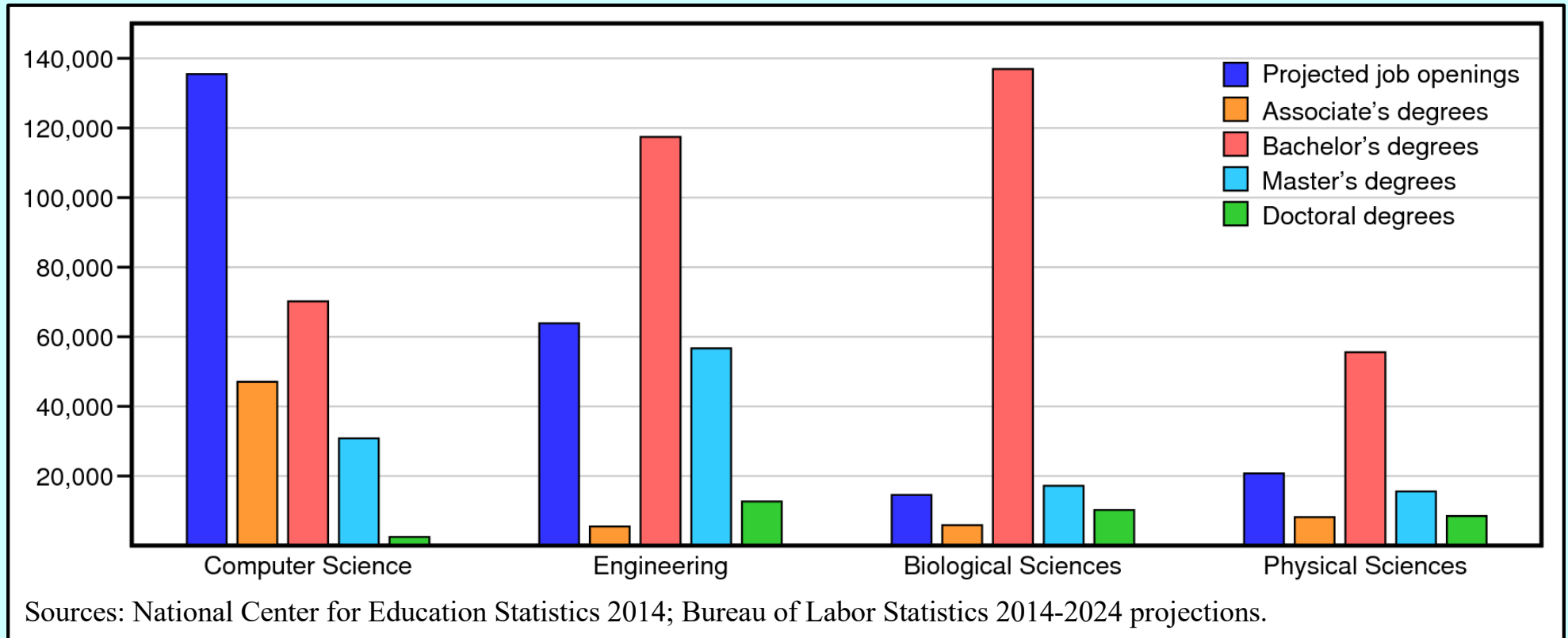
Programming, Scripting, and Markup Languages

All Respondents

Professional Developers



Why Study Computer Science?

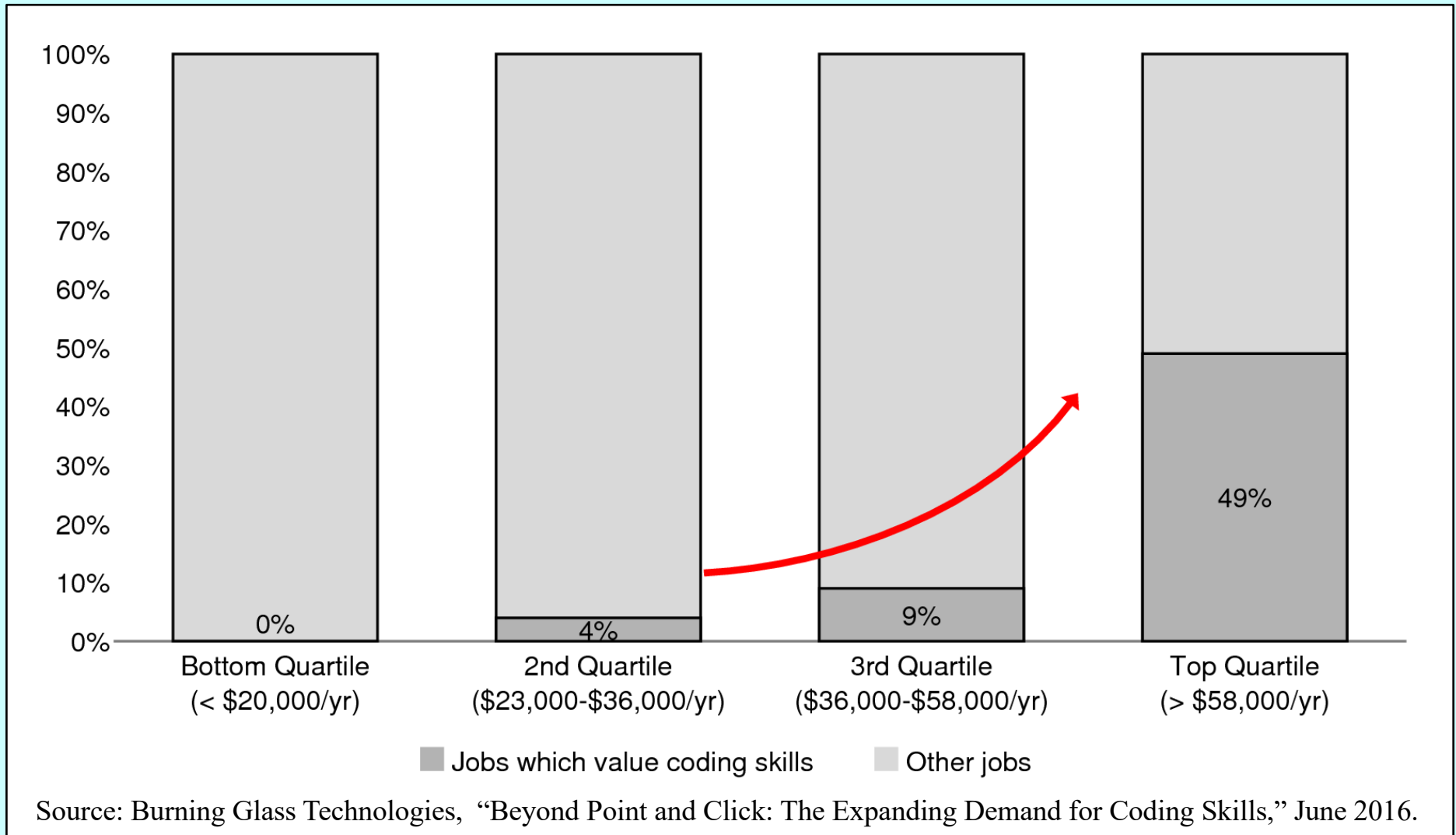


We are very happy with the students that we get from this university. . . . We just wish we could hire two to three times as many of them.

— Bill Gates at Stanford, February 19, 2008

Everyone Needs Some Programming

Half of all jobs in the top income quartile value coding skills.



CS 106AJ Course Staff



Jerry Cain

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Office Hours (Gates 192):

Wednesdays: 3:45 – 5:45 P.M.

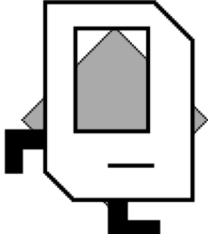


Ryan Eberhardt

`rebs@stanford.edu`

Office Hours: TBD

Syllabus—Week 1

<p>September 24</p> <p>Administration Course overview Meet Karel the Robot</p> 	<p>26</p> <p>Simple Karel programs Control structures in Karel</p> <p>Read: Sections 1.1-1.3</p>	<p>28</p> <p>Program decomposition The idea of an algorithm</p> <p>Read: Sections 1.4-1.5</p>
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Syllabus—Week 2

October 1	3	5
Variables and values Arithmetic expressions Functions Strings and concatenation	Programs in JavaScript JavaScript and the web Simple graphics	Control statements Boolean data
Read: Sections 2.1-2.5	Read: Sections 2.6, 3.1-3.5	Read: Sections 4.1-4.5

Syllabus—Week 3

<p>October 8</p> <p>Arguments and parameters Libraries Random numbers</p> <p><i>Due: HW #1 (Karel)</i> Read: Sections 5.1-5.3</p>	<p>10</p> <p>The mechanics of functions Decomposition</p> <p><i>Due: Karel contest</i> Read: Sections 5.4-5.5</p>	<p>13</p> <p>First-class functions Event-driven programming Responding to mouse events</p> <p>Read: Sections 6.1-6.4</p>
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Syllabus—Week 4

<p>October 15</p> <p>Simple animation Timers</p> <p><i>Due: HW #2 (Simple JS)</i> Read: Section 6.5</p>	<p>17</p> <p>The GArc class The GPolygon class The GCompound class</p> <p>Read: Section 6.6</p>	<p>19</p> <p>Binary representation Representing characters</p> <p>Read: Section 7.1</p>
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Syllabus—Week 5

October 22 JavaScript's String class Common string patterns Read: Sections 7.2-7.4	24 Problem solving with strings String applications Read: Section 7.5	26 Cryptography <i>Due: HW #3 (Breakout)</i> Read: Section 7.6
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Syllabus—Week 6

October 29	31	November 2
Debugging strategies	Simple arrays	Using arrays for tabulation
Midterm Exam Tuesday, October 30 3:30 P.M. or 7:00 P.M		
<i>Due: Graphics contest</i>	Read: Sections 8.1-8.2	Read: Section 8.3

Syllabus—Week 7

<p>November 5</p> <p>Multidimensional arrays Pixel arrays The GImage class</p> <p><i>Due: HW #4 (HangKarel)</i> Read: Sections 8.4-8.6</p>	<p>7</p> <p>Objects as aggregates Objects as maps</p> <p>Read: Sections 9.1-9.2</p>	<p>9</p> <p>JavaScript and OOP Libraries and interfaces Defining classes and methods</p> <p>Read: Sections 9.3-9.5</p>
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Syllabus—Week 8

<p>November 12</p> <p>Designing data structures Token scanners Efficiency and Representation</p> <p>Read: Sections 10.1-10.4</p>	<p>14</p> <p>JavaScript and the Web Connecting HTML and JavaScript</p> <p>Read: Sections 12.1-12.4</p>	<p>16</p> <p>Data driven programs Storing data in HTML files</p> <p><i>Due: HW #5 (Enigma)</i> Read: Section 12.5</p>
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Syllabus—Week 9

November 26 Overview of Adventure! Read: Adventure Handout	28 Special topics Read: TBD	30 Special topics Read: TBD
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Dead Week and Beyond

December 3 Special topics Read: TBD	5 Special topics Read: TBD	7 Special topics <i>Due: HW #6 (Adventure)</i> <i>Due: Adventure contest</i>
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Review Session
Saturday, December 8
11:00 A.M.

Final Exam
Monday, December 10
8:30 A.M.

Assignments in CS 106AJ

- Assignments in CS 106AJ are due at 5:00P.M. Assignments that come in after 5:00 will be considered late.
- Everyone in CS 106AJ starts the quarter with two “late days” that you can use at any point you need some extra time. In my courses, late days correspond to class meetings, so that, if an assignment is due on Wednesday and you turn it in on Friday, that counts as *one* late day.
- Extensions can be approved only by the TA, Ryan Eberhardt.
- Assignments are graded by your section leader, who discusses your work in an interactive, one-on-one grading session.
- Each assignment is given two grades: one on functionality and one on programming style. Style matters. Companies in Silicon Valley expect Stanford graduates to understand how to write code that other programmers can maintain.

The CS 106AJ 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.
✓-	Some more serious problems.
-	Even worse than that.
--	Why did you turn this in?

Contests

- CS 106AJ will have three contests as follows:
 - The Karel Contest associated with Assignment #1
 - The Graphics Contest associated with Assignment #3
 - The Adventure Contest associated with Assignment #6
- The grand prize in the contest is a score of 100% on one of the graded components of the course, typically the final exam.
- As an additional incentive, entering any of the contests gives you a virtual ticket to win an additional grand prize in a random drawing at the end of the quarter. So does receiving a runner-up or honorable mention on a contest and finding errors in the text.

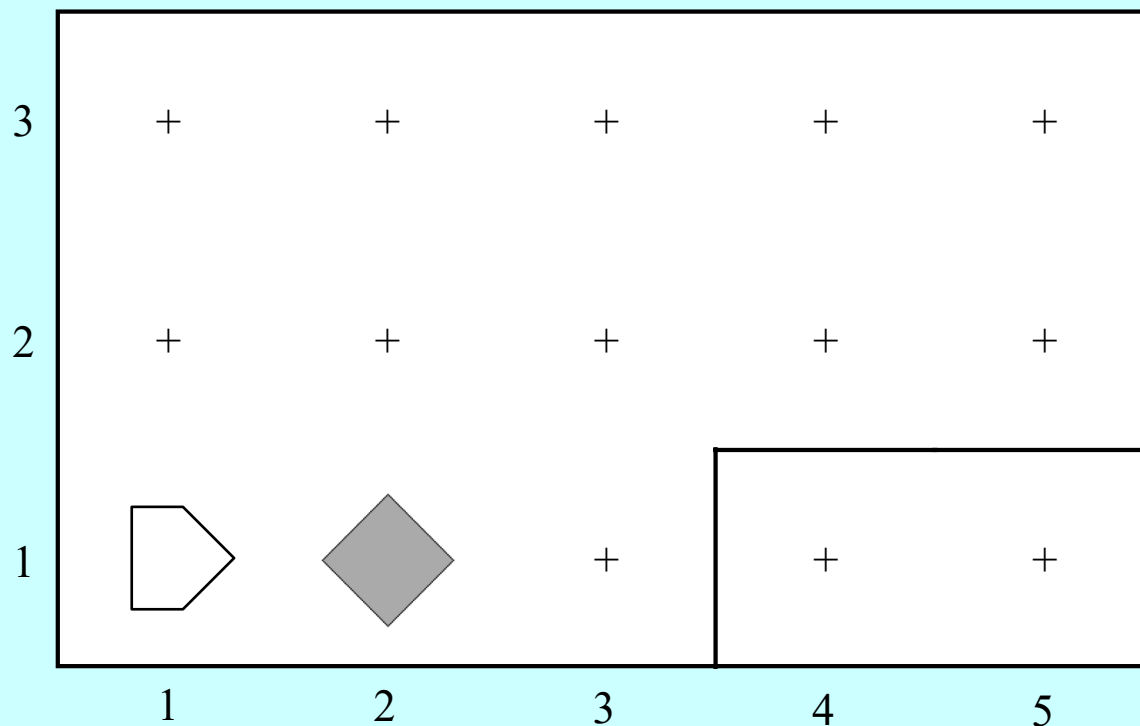
Honor Code Rules

- Rule 1: You must not look at solutions or program code that is not your own.
- Rule 2: You must not share your solution code with other students.
- Rule 3: You must indicate on your submission any assistance you received.

Meet Karel the Robot

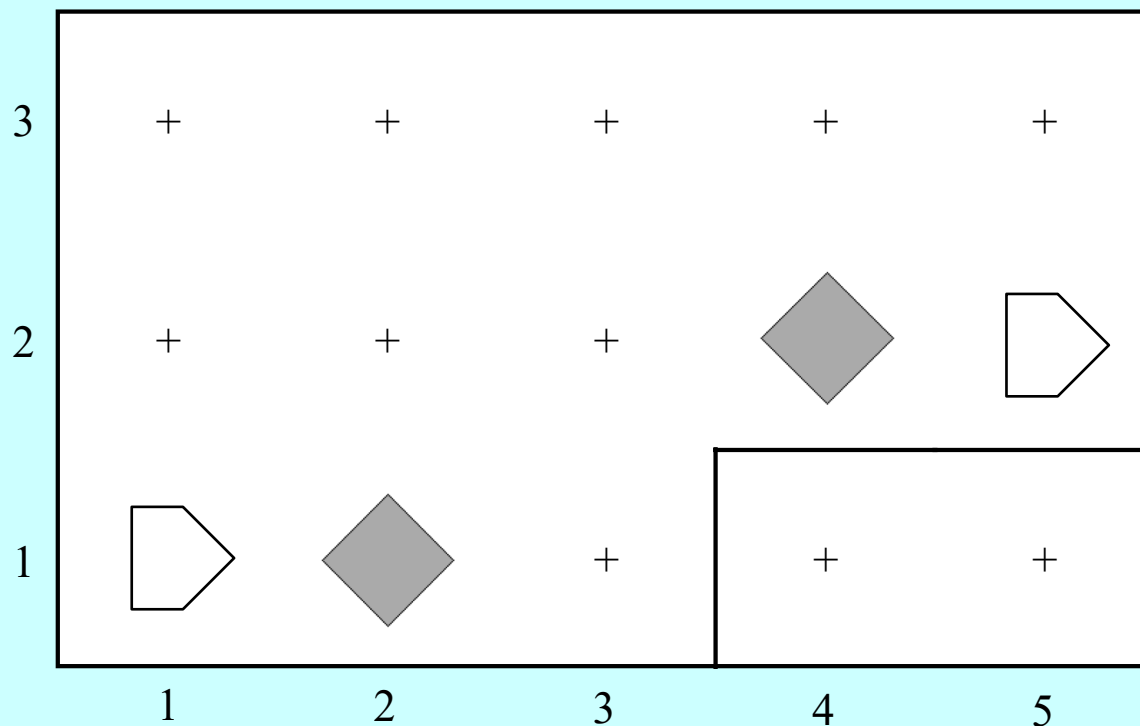
- Initially, Karel understands only four primitive commands:

<code>move()</code>	Move forward one square
<code>turnLeft()</code>	Turn 90 degrees to the left
<code>pickBeeper()</code>	Pick up a beeper from the current square
<code>putBeeper()</code>	Put down a beeper on the current square



Your First Challenge

- How would you program Karel to pick up the beeper and transport it to the top of the ledge? Karel should drop the beeper at the corner of 2nd Street and 4th Avenue and then continue one more corner to the east, ending up on 5th Avenue.



The End