

CS 106A, Lecture 2

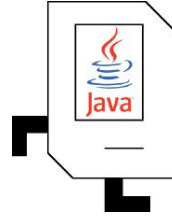
Programming with Karel

suggested reading:

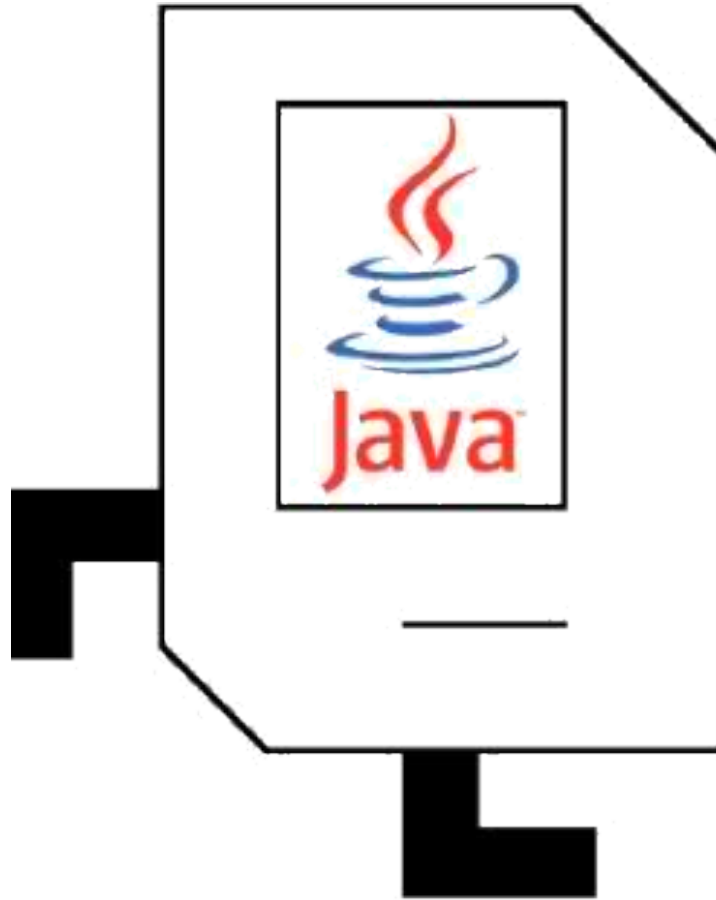
Karel, Ch. 3-4

Plan For Today

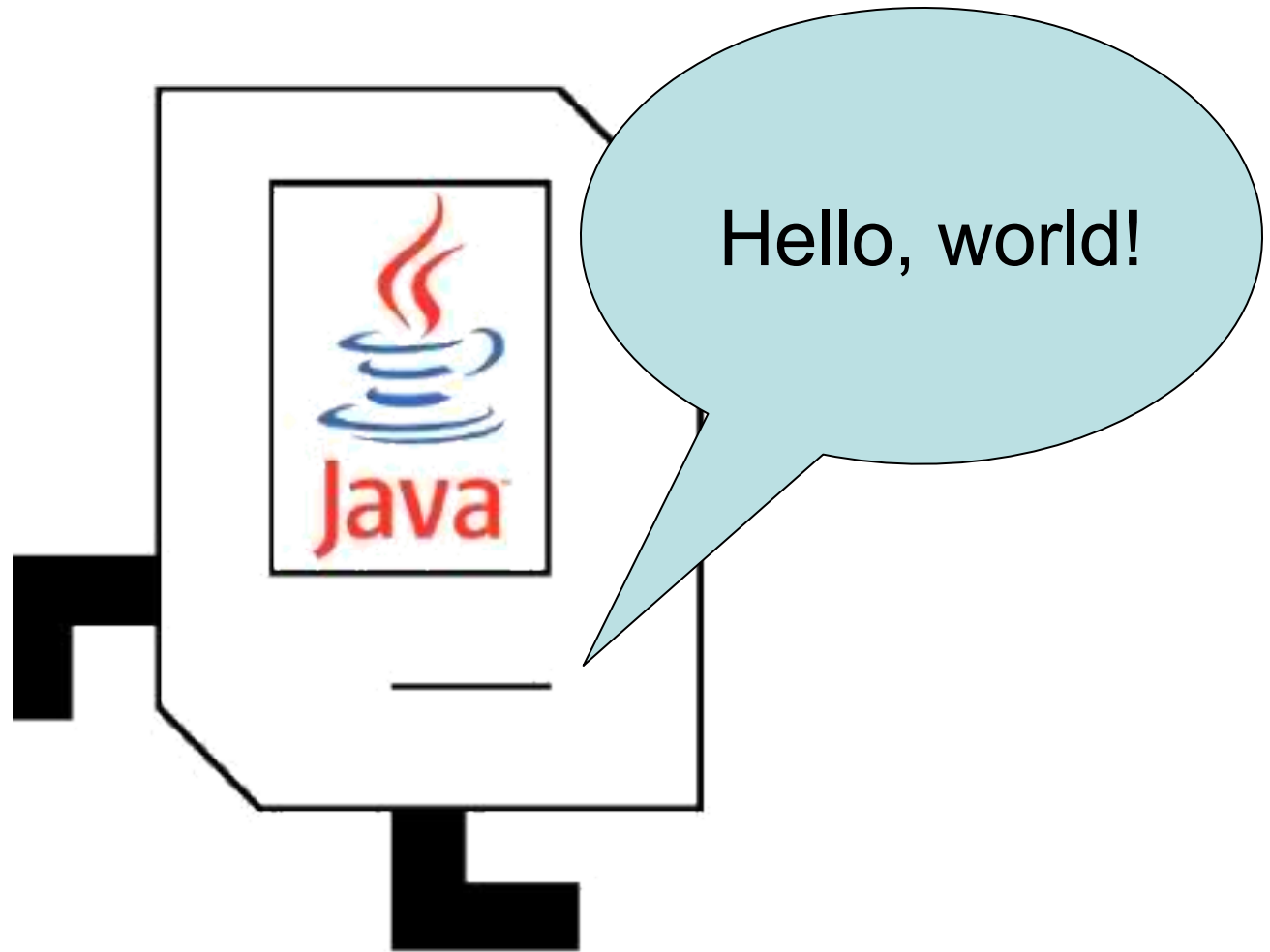
- Meet Karel the Robot
- Control Flow
- Karel Practice



Meet Karel the Robot!

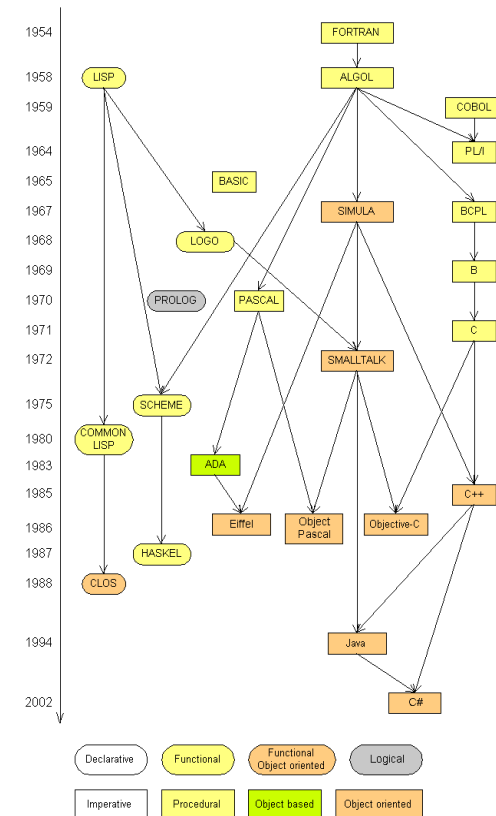


Meet Karel the Robot!

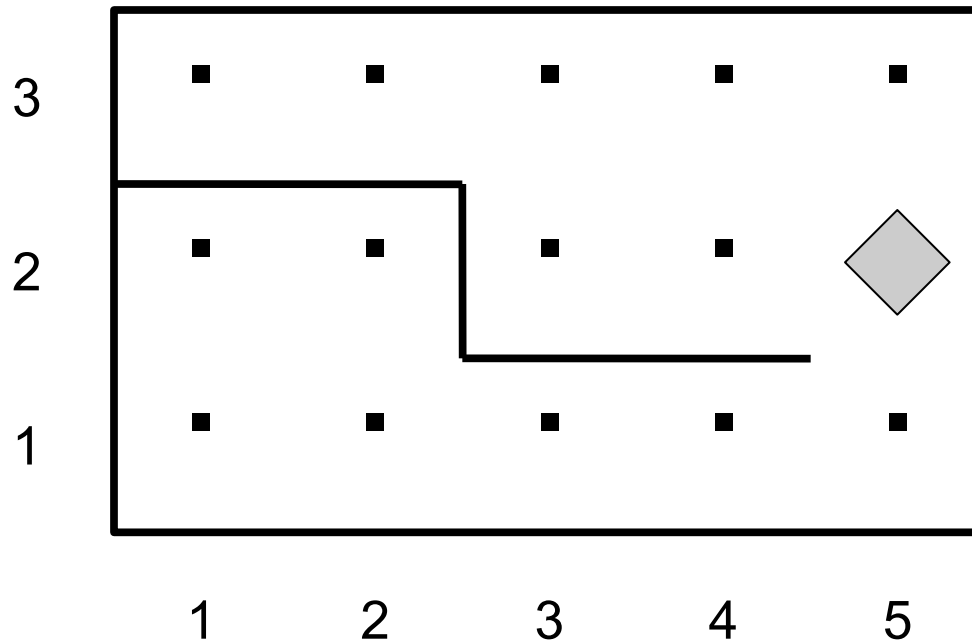


Programming languages

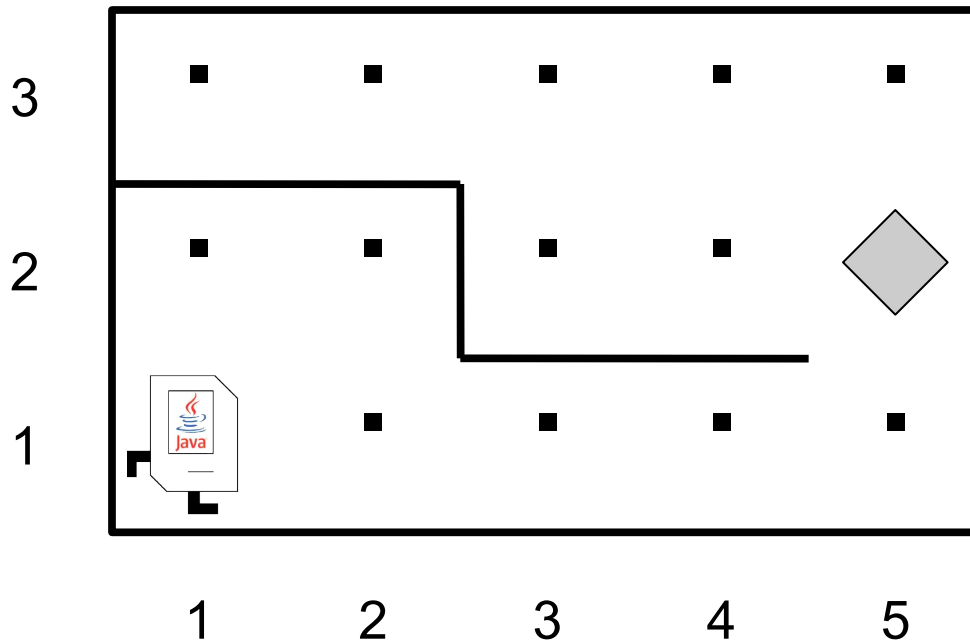
- *procedural languages*: programs are a series of commands
 - **Pascal** (1970): designed for education
 - **C** (1972): low-level operating systems and devices
- *functional programming*: functions map inputs to outputs
 - **Lisp** (1958) / **Scheme** (1975), **ML** (1973), **Haskell** (1990)
- *object-oriented languages*: programs use interacting "objects"
 - **Smalltalk** (1980): first major object-oriented language
 - **C++** (1985): "object-oriented" improvements to C
 - successful in industry; used to build OSES such as Windows
 - **Java** (1995): designed for embedded systems, web apps
 - Runs on many platforms (Windows, Mac, Linux, cell phones...)
 - The language taught in this course and our textbook



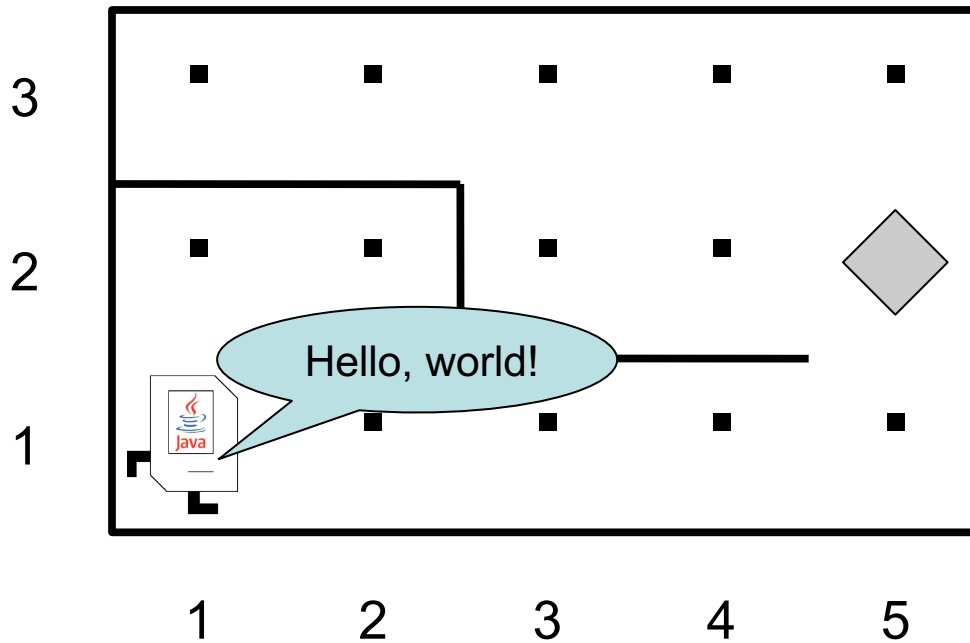
Karel's World



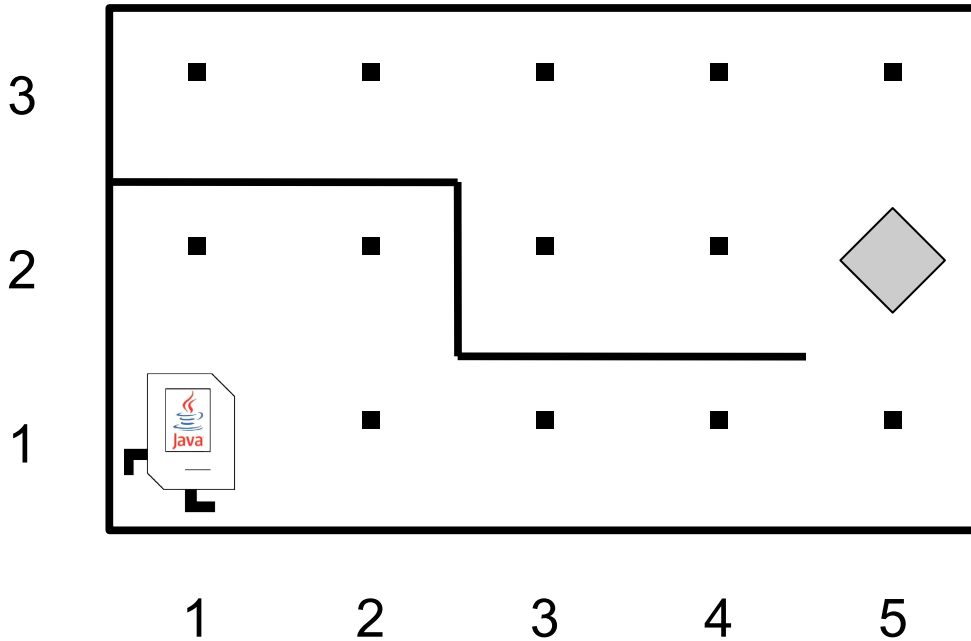
Karel's World



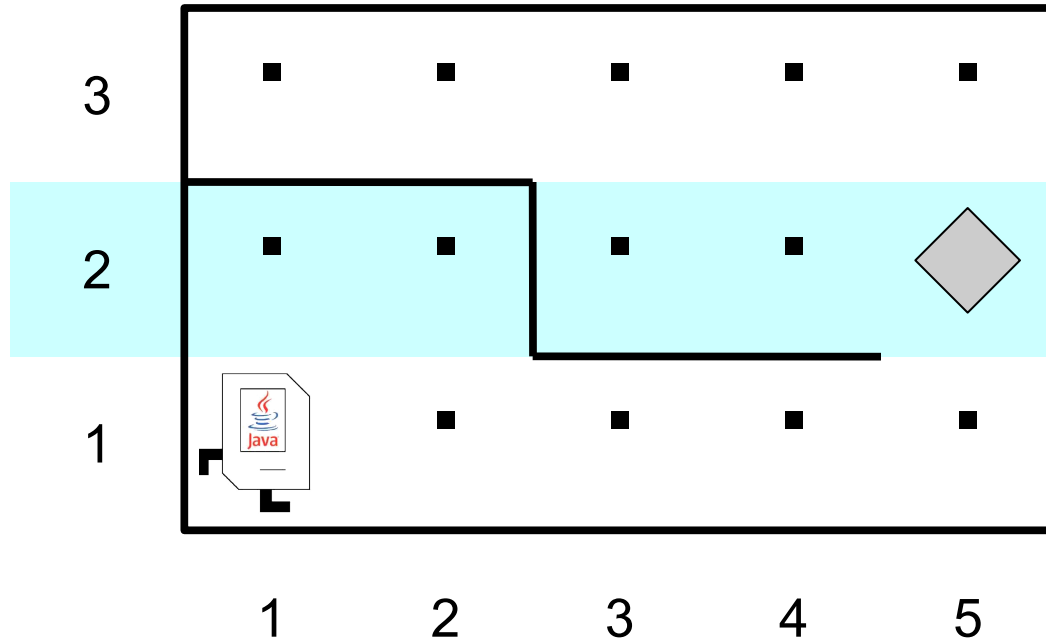
Karel's World



Karel's World

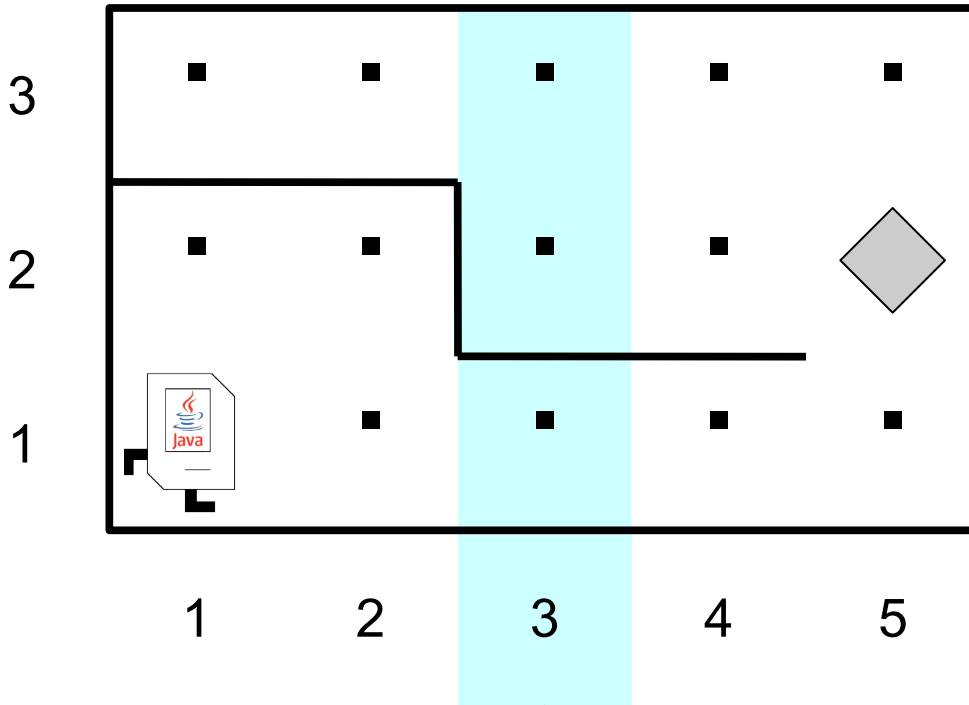


Streets (rows)



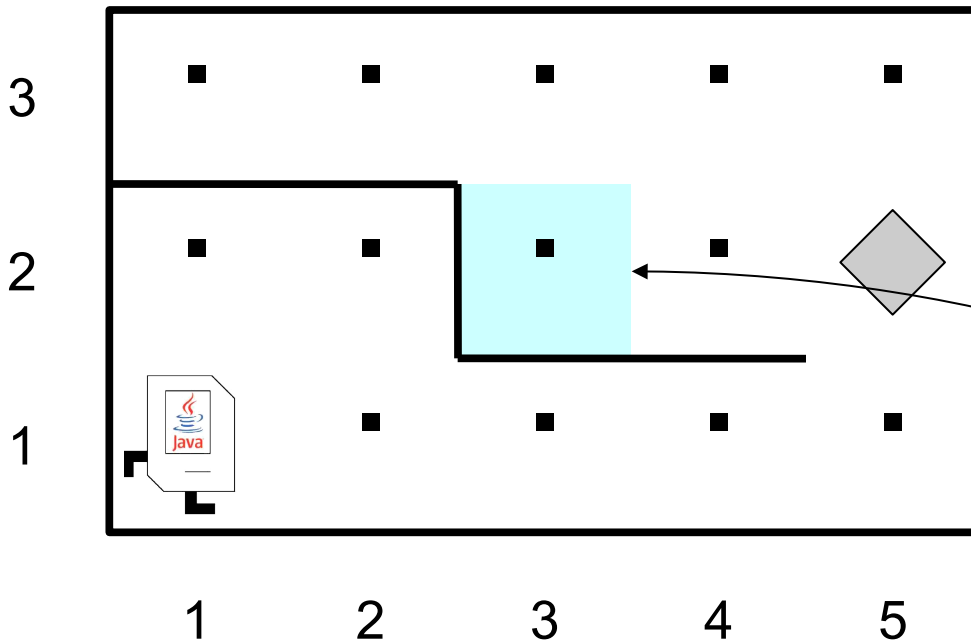
Each row is called a street.

Avenues (columns)



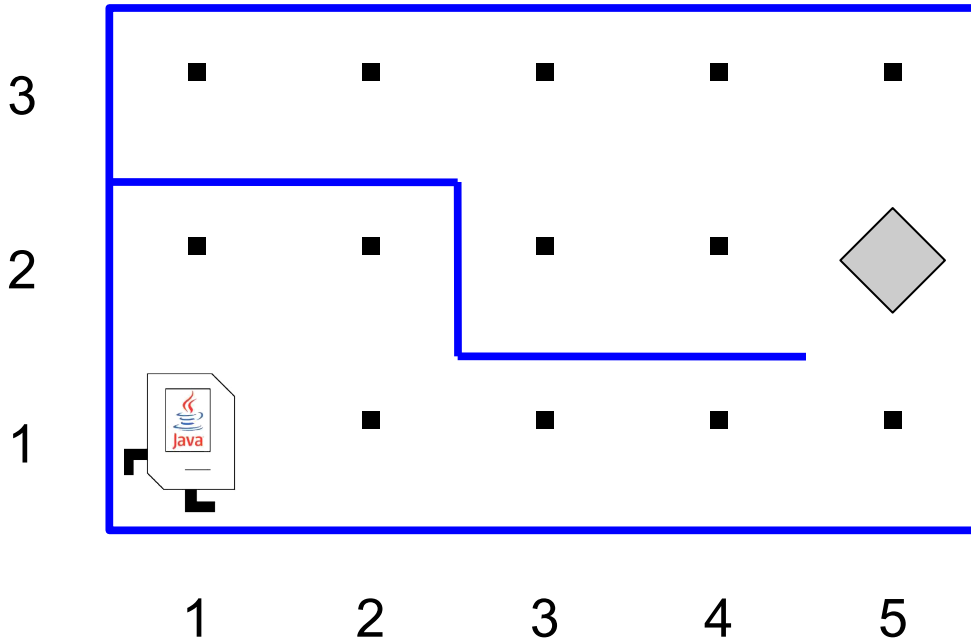
Each column is called
an avenue.

Corners (locations)



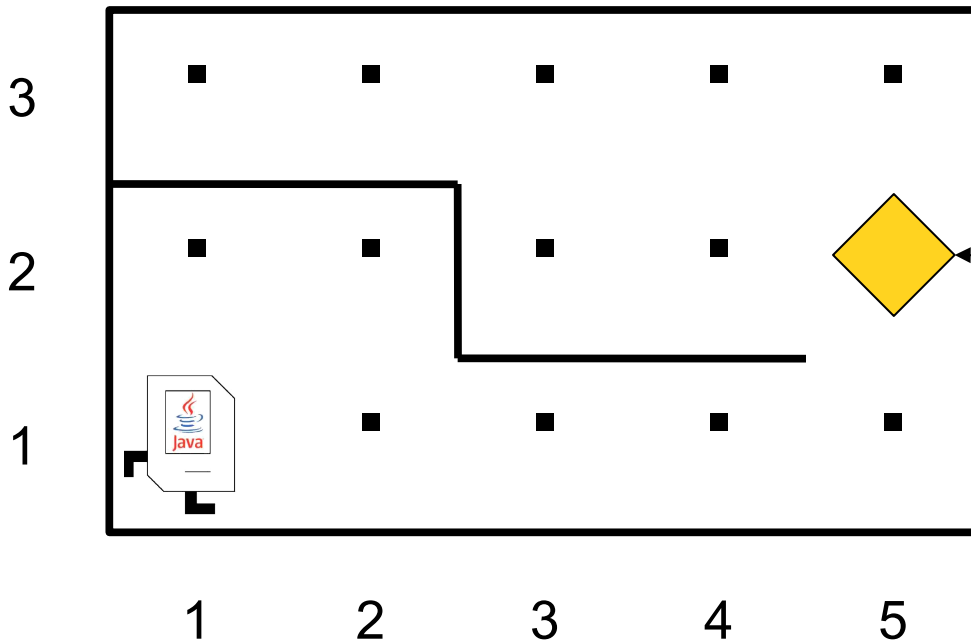
The intersection of a street and an avenue is a corner.

Walls



Karel cannot
move through
walls.

Beepers



Beepers mark locations in Karel's world. Karel can pick them up and put them down.

Karel Knows 4 Commands



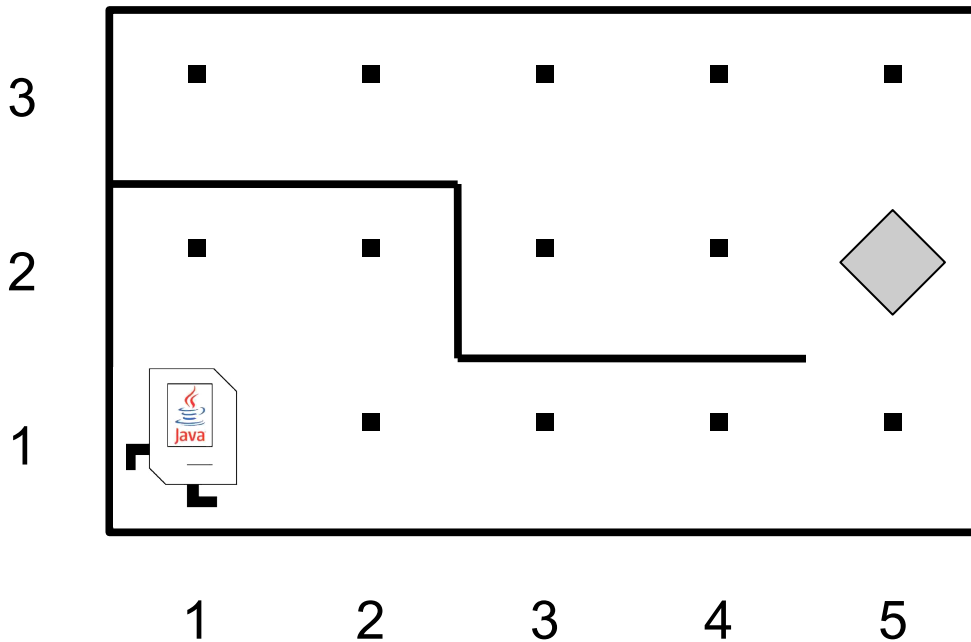
`move`

`turnLeft`

`putBeeper`

`pickBeeper`

Karel commands: move



Karel Commands

move

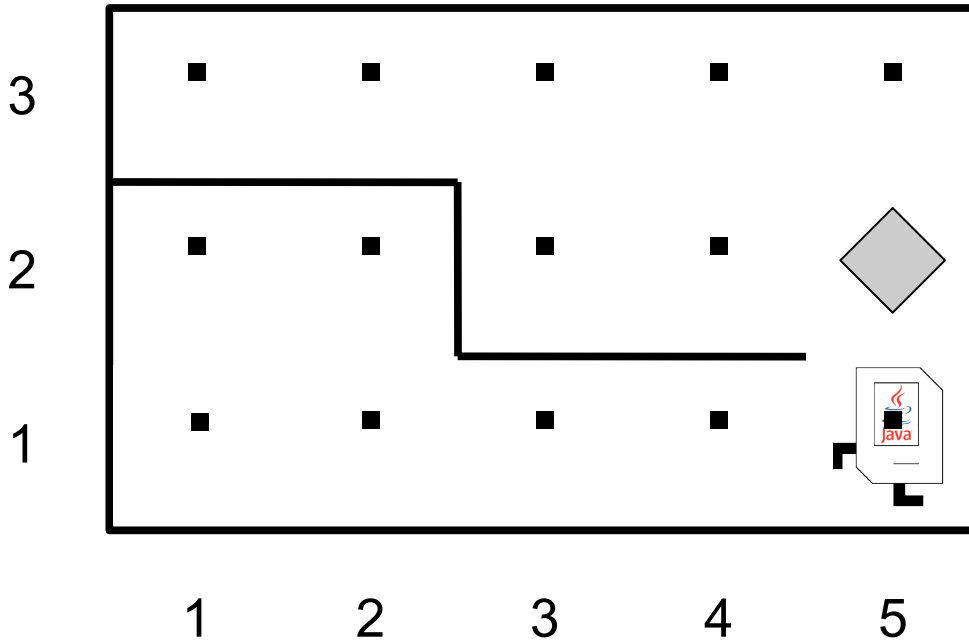
turnLeft

pickBeeper

putBeeper

- move makes Karel move forward one square in the direction it is facing.

Commands: turnLeft

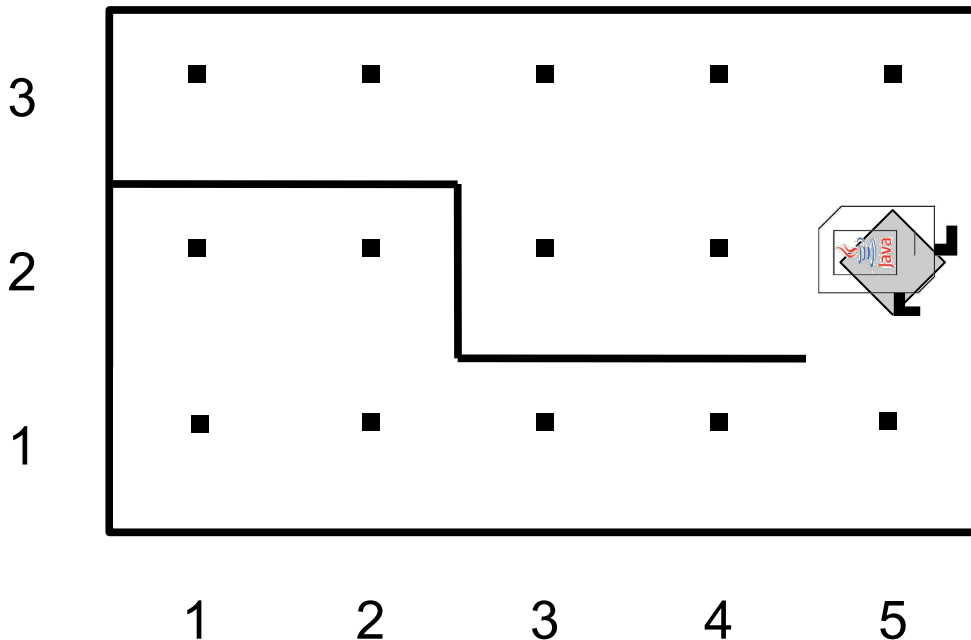


Karel Commands

`move`
`turnLeft`
`pickBeeper`
`putBeeper`

- `turnLeft` makes Karel rotate 90° counter-clockwise.
- There is no `turnRight` command. (Why not?)

Commands: pickBeeper

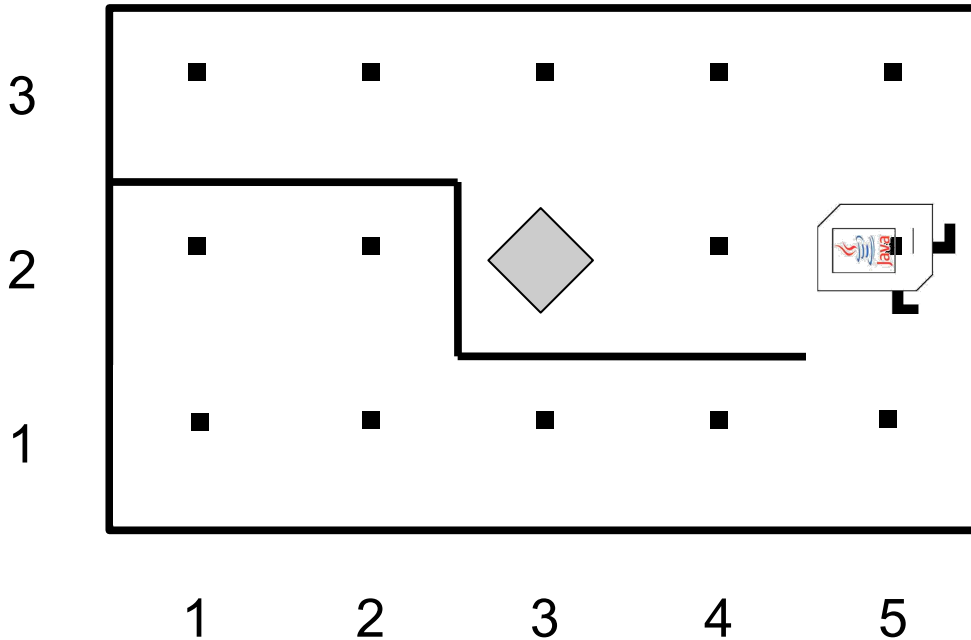


Karel Commands

`move`
`turnLeft`
`pickBeeper`
`putBeeper`

- `pickBeeper` makes Karel pick up the beeper at the current corner. Karel can hold multiple beepers at a time in its "beeper bag".

Commands: putBeeper



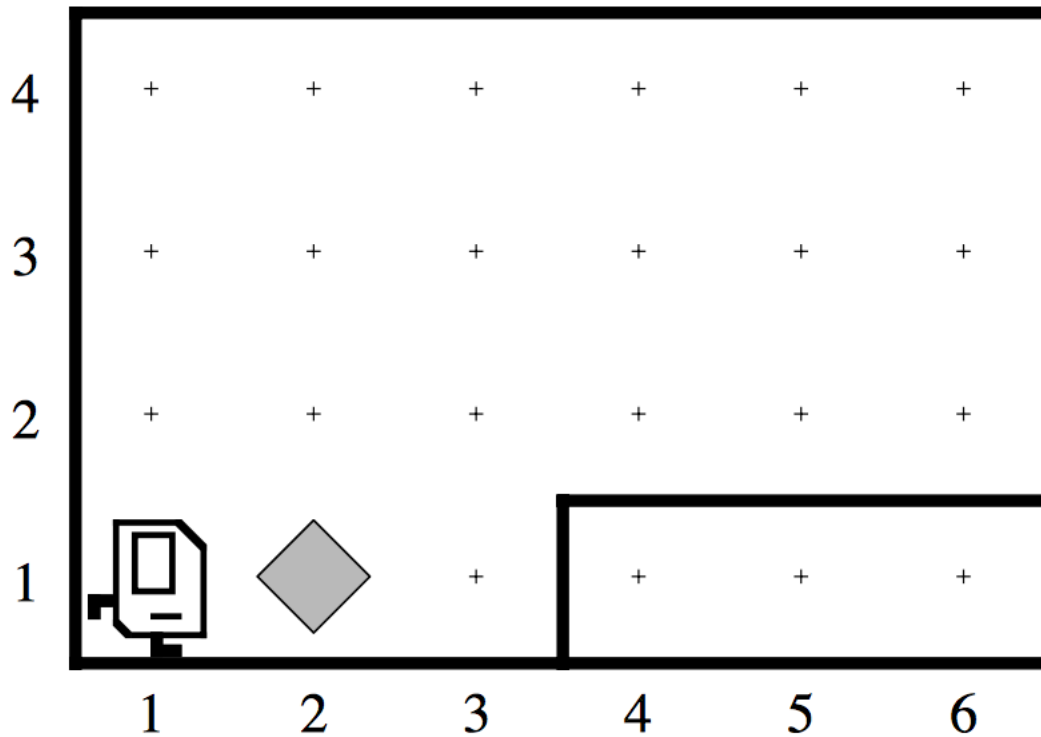
Karel Commands

`move`
`turnLeft`
`pickBeeper`
`putBeeper`

- `putBeeper` makes Karel put a beeper down at its current location.
 - `pickBeeper` and `putBeeper` are used to move beepers around.

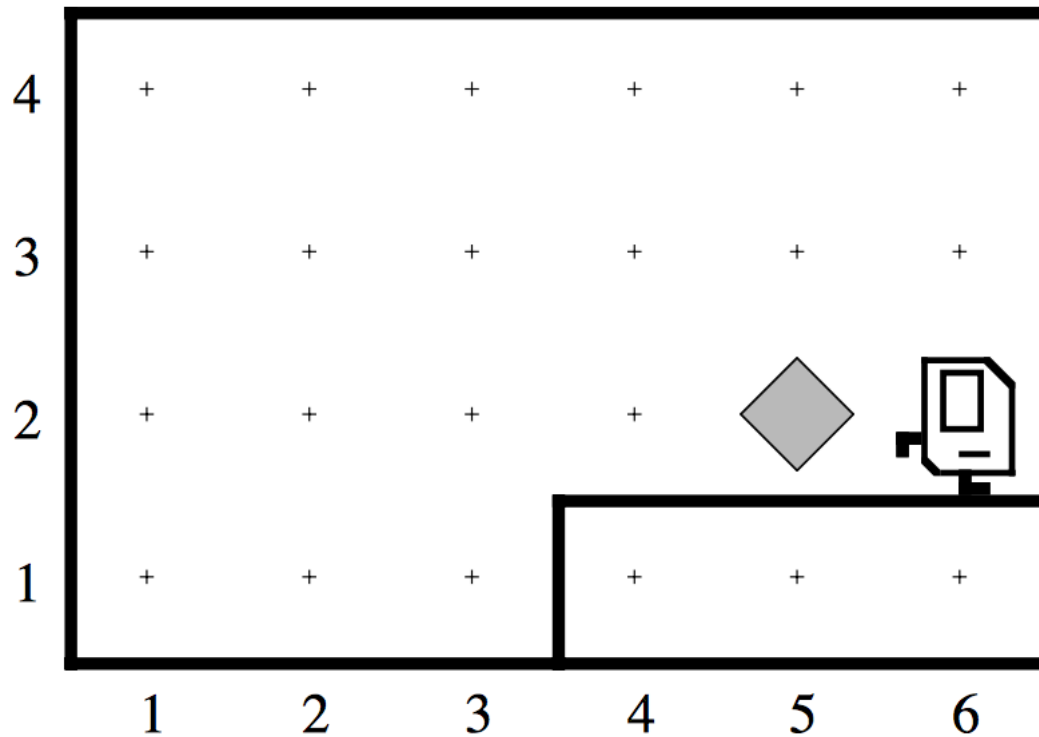
Our First Karel Program

Before



Our First Karel Program

After



Karel Summary

- Karel lives in a grid world with walls and beepers.
- 4 commands: **move**, **turnLeft**, **pickBeeper** and **putBeeper**.
- Seems simple; but you can do amazing things with Karel!

