Karel J. Robot
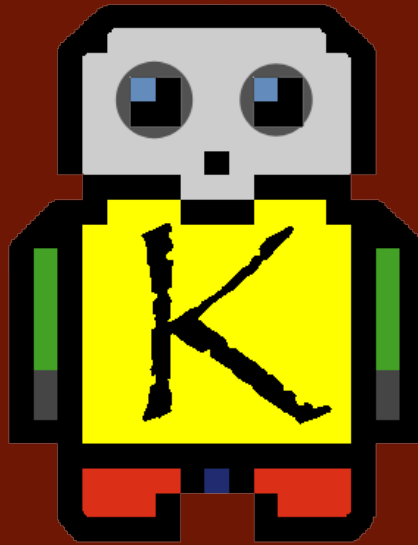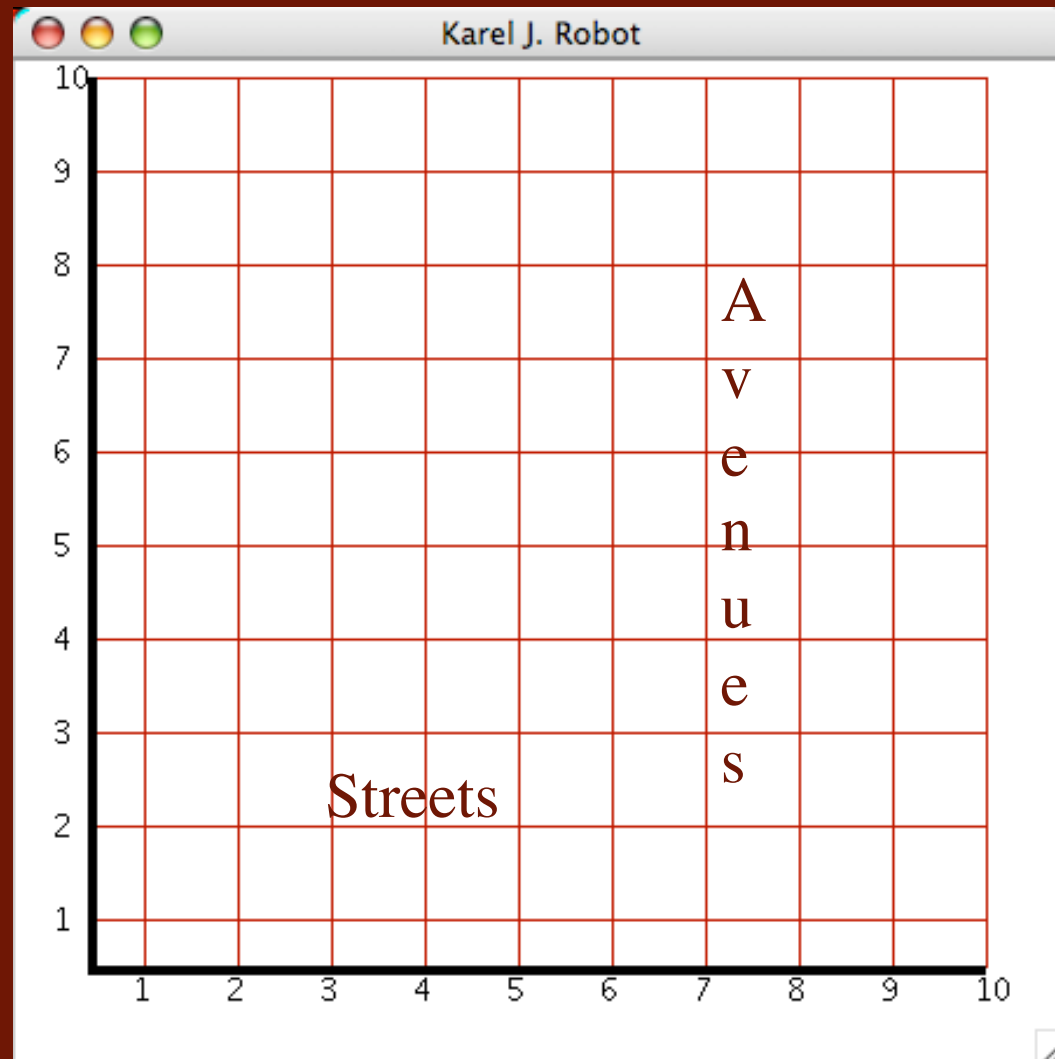
Tool for learning OOP
(Lecture covers Ch. 1 and 2)

Karel's World

- Imaginary 2D world

Streets (E,W)
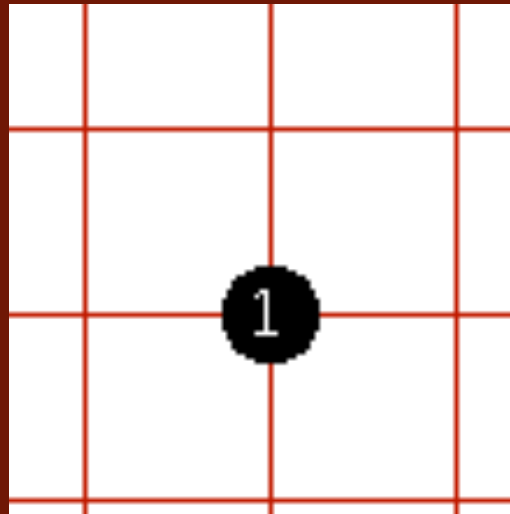
Streets

Avenues

Avenues

N S

Karel's World

■ (for right now) only two things can exist in the world:
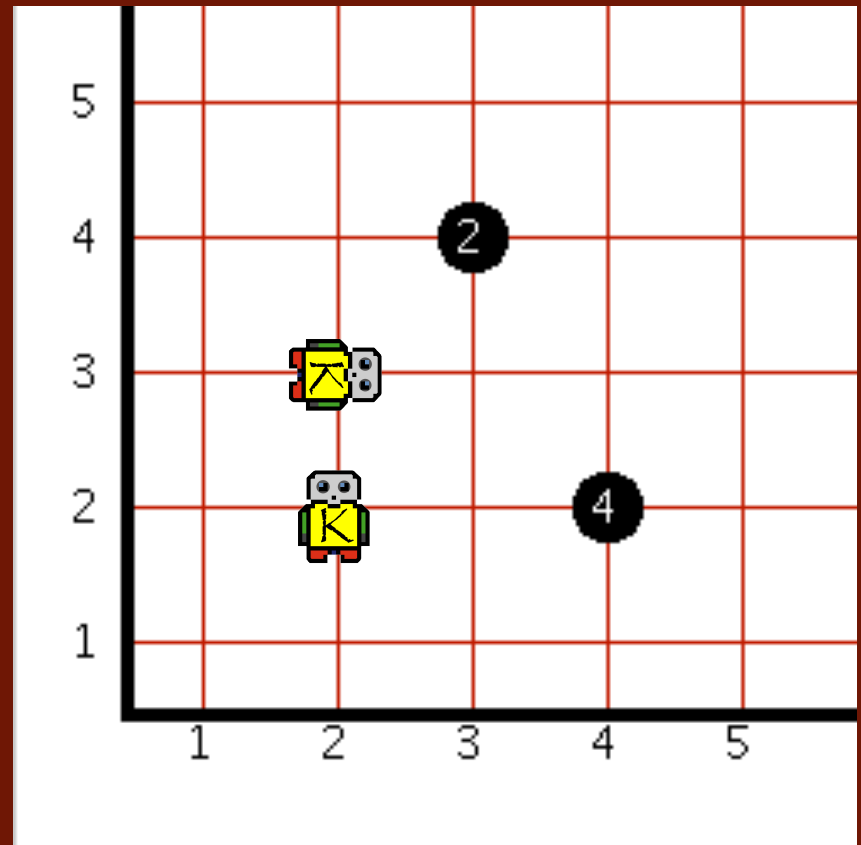
- Robots

- Beepers

Robots can pick up beepers and place them in their "beeper bag."

Robots can also put one or more beepers down as long as it has enough beepers in its bag.

Karel's World

- Robots and Beepers can only be placed on corners in the world.

- More than 1 beeper/robot per corner is possible

- Robot's can face N, E, S, or W

Karel's World

- Robots can only do 4 things in the world. There is a specific command (i.e. method) for each action:
  - move()
  - turnLeft()
  - pickBeeper()
  - putBeeper()
  - *turnOff()*

Karel's World

- For a Robot to enter the world, it must be <u>constructed</u> in the "Robot Factory."

- It is then magically flown to a location specified in its construction.

- When you construct a robot you must specify:
  - Starting <u>Street</u>
  - Starting <u>Avenue</u>
  - Starting <u>Direction</u>
  - Initial number of <u>Beepers</u> in "Bag"

Constructing a Robot

- We are going to construct a version of a robot called a UrRobot (historical reasons).
  - Example:

```
UrRobot bob = new UrRobot(2, 4, East, 4);
```

Constructs a new UrRobot at <u>street 2</u>, <u>avenue 4</u>, facing <u>East</u>, with <u>4 beepers</u> in his bag.

"bob" is the name we're giving this instance of a UrRobot. We can make as many UrRobots as we want, but they each must have names…

Making Robots do stuff

- Since we named our UrRobot "bob," if we want him to do something we have to explicitly tell "bob" to do it.

- Example:
`bob.move();`

  This will move bob one block in the direction he happens to be facing.

  `bob.turnLeft();`

  This will make bob turn 90 degrees to his left

  `bob.pickBeeper();`

  Bob will attempt to pick up beeper from corner he's standing on. ERROR if no beeper actually there.

See some real code in action

- ■ Baker: Go to BlueJ…

Problem

- A Robot *karel* starts at 1,1 facing North with a lot of beepers in his bag (let's say 20).

- Your task is to make karel draw the letter "H" by placing beepers into the world as shown in the diagram.

- Karel must end up back at 1,1 facing North

- This must be done as efficiently as possible.

- See Handout…