

Lecture 9: Application Programming Interfaces I

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QUESTIONS?

Plan

- ▶ Last time

- 1. packages

- 2. modifiers

- ▶ Today's Plan:

- 1. Robot APIs

Objectives

Object-oriented programming is not at its best in small-scale programming (what we called “algorithm design” in Lecture 5).

To practice OOP we need to have a system of at least modest size.

B.W. Becker’s book *Java: Learning to Program with Robots* provides an excellent such system.

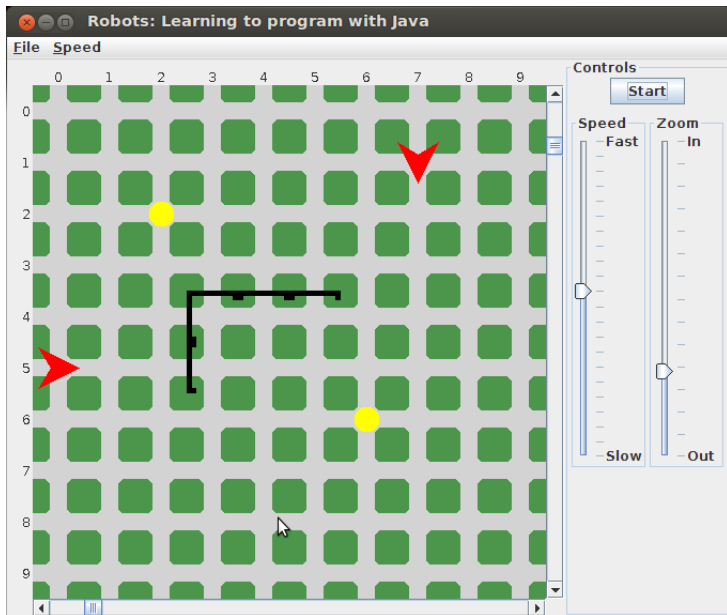
Objectives

Working with this system will enable us to










- ▶ experiment with OOP design;
- ▶ learn how to read documentation;
- ▶ learn how to work with an existing codebase.

All of these are vital in your future studies and career.

The Robot World



The Robot class

Robot
 int street
 int avenue
 int numThings
 Direction direction
 Robot(City city, int street, int avenue, Direction direction):Robot
 move():void
 pickThing():void
 turnLeft():void
 ...

Documentation

The City class

All Robot constructors require a City.

The City class does not seem very interesting.

City
<ul style="list-style-type: none">City(int numVisibleStreets, int numVisibleAvenues):CityshowFrame(boolean b):void

Documentation

We need to experiment a bit with City.

Initial code

Putting Things in a City

A city can contain

- ▶ generic Things
- ▶ Walls
- ▶ and, of course, Robots.

A first example

Creating a world

It's annoying to have to redo the creation every time.

It is better to package everything in a new kind of City!

A first world

Experimenting with Robot

- ▶ `move`, `turnLeft`, `pickThing`
- ▶ limited, explodes, not good

Initial code

Extending Robot

- ▶ New methods: `move(n)`, `turnRight`, `turnAround`
- ▶ doesn't explode

SmartRobot

Changing Things

The elements of the robot world can be customized: we can change the color, add labels, etc. Check the documentation!

RandomRobot

Having to write the move code for the robot is boring: we can add a “move about randomly” method.

RandomRobot

Homework

Read the first 3 chapters of Becker's book.