Maze Program

TOPICS

• Graphical Programming
• Using Classes (Objects)
• Multiple Files (Eclipse)
• Maze Logistics

Graphical Programming (1)

½ No, we’re not going to show the code for the Puzzle program! (yet)
½ 150 lines of Java Swing code
½ What kinds of things does it do?
  ▪ Set window size, title, and location
  ▪ Setup a frame and panel, add buttons
  ▪ Read a photo and extract parts of it
  ▪ Listen for mouse and keyboard events

Graphical Programming (2)

½ But, why not have you write code that controls a graphical program?
½ Maze program:
  ▪ Move student around a maze
  ▪ ~300 lines of graphical programming
  ▪ You write the main method
  ▪ You instantiate the Maze
  ▪ You control the movement
Maze Program: Objectives

- Use objects (classes) developed by someone else
- Create an instance of a class
- Call methods on the object
- For example: graphical programming!
- Multiple source files
- Resource and data files

Maze Program: Initial Code

```java
// Create maze
String fileName = args[0];
Maze maze = new Maze(fileName);
System.out.println("Maze name: " + fileName);

// Get dimensions
int mazeWidth = maze.getWidth();
int mazeHeight = maze.getHeight();
System.out.println("Maze width: " + mazeWidth);
System.out.println("Maze height: " + mazeHeight);
```

Maze Program: Moving

```java
// Check for obstructions
boolean okay;
okay = maze.checkRight(); // true if clear, false if blocked
// Move commands
if (okay)
    maze.moveRight(); // move right, no return value
// Check for done
boolean done = maze.isDone(); // true if done, else false
Hint 1: Must call checkRight before moveRight, etc.
Hint 2: Must call maze.isDone after every move!
```

Maze Program: Output

```java
Maze name: Maze5.txt
Maze width: 10
Maze height: 5
Moved to row 0, column 1
Moved to row 1, column 1
...
You found the Java logo, congratulations!
Error Messages
Exited maze left, goodbye!
Ran into obstacle, goodbye!
```
Maze Program: User Interface

Maze Program: Algorithm

- Rules for moving student around maze:
  - Student always starts top left corner
  - Traverse all rows top to bottom in order
  - Left to right on even rows
  - Right to left on odd rows
  - If wrong way, go down, around, up
  - To cover a row or column, how many moves?
  - Must follow algorithm exactly!
  - Try to make your code simple and efficient

Maze Program: Setup

- ~/workspace/P6
- DoNotPass.jpg
- Java.jpg
- Success.jpg
- Student.jpg (replace this!)
- Maze*.txt
- ~/workspace/P6/src
- Maze.java
- P6.java (write this!)

Associated Exercises

- Recitation R8:
  - Setup files, create maze, move student
  - Put your own photo in Student.jpg
- Assignment P6:
  - Implement algorithm as described
  - Automated testing for several mazes
  - You can make your own maze
  - Not all mazes can be solved by algorithm