Maze Program

TOPICS

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

Graphical Programming (1)

§• No, we’re not going to show the code for the Puzzle program! (yet)
§• 150 lines of Java Swing code
§• 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)

Graphical Programming (3)

§• But, why not have you write code that controls a graphical program?
§• Maze program:
  §• Move student around a maze
  §• ~280 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
// Move commands
boolean success;
success = maze.moveRight(); // move right
success = maze.moveLeft(); // move left
success = maze.moveUp(); // move up
success = maze.moveDown(); // move down
boolean done;
done = maze.isDone(); // true if done, else false

HINT: Must call maze.isDone after every move!
```

Maze Program: Output

```
Maze name: Maze5.txt
Maze width: 10
Maze height: 5
Moved to row 0, column 1
Moved to row 1, column 1
Moved to row 1, column 2
```
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/P4
  - DoNotPass.jpg
  - Java.jpg
  - Success.jpg
  - Student.jpg (replace!)
  - Maze*.txt
- ~/workspace/P4/src
  - Maze.java
  - P4.java

Associated Exercises

- Recitation R5:
  - Setup files, create maze, move student
  - Put your own photo in Student.jpg
- Assignment P4:
  - Implement algorithm as described
  - Automated testing for several mazes
  - You can make your own maze
  - Not all mazes can be solved by algorithm