Chris Piech Section #7

CS 106A Feburary 28, 2018

Solution to Section #7

Portions of this handout by Eric Roberts and Nick Troccoli

**1. Word Cloud**

**/\*\***

**\* File: WordCloud.java**

**\* --------------------**

**\* This program allows the user to create a set of labels and then drag**

**\* them around in the window.**

**\*/**

**import acm.graphics.\*;**

**import acm.program.\*;**

**import java.util.\*;**

**import java.awt.event.\*;**

**import javax.swing.\*;**

**public class WordCloud extends GraphicsProgram {**

**public void init() {**

**contents = new HashMap<String,GLabel>();**

**createController();**

**addActionListeners();**

**addMouseListeners();**

**}**

**/\* Creates the control strip at the bottom of the window \*/**

**private void createController() {**

**nameField = new JTextField(MAX\_NAME);**

**nameField.addActionListener(this); // Detects ENTER key pressed**

**addButton = new JButton("Add");**

**removeButton = new JButton("Remove");**

**clearButton = new JButton("Clear");**

**add(new JLabel("Name"), SOUTH);**

**add(nameField, SOUTH);**

**add(addButton, SOUTH);**

**add(removeButton, SOUTH);**

**add(clearButton, SOUTH);**

**}**

**/\* Adds a label with the given name at the center of the window \*/**

**private void addLabel(String name) {**

**GLabel label = new GLabel(name);**

**double labelX = getWidth() / 2.0 - label.getWidth() / 2.0;**

**double labelY = getHeight() / 2 + label.getAscent() / 2.0;**

**add(label, labelX, labelY);**

**contents.put(name, label);**

**}**

**/\* Removes all labels in the contents table \*/**

**private void removeContents() {**

**for (String labelName : contents.keySet()) {**

**remove(contents.get(labelName));**

**}**

**contents.clear(); // Clear all entries in the hashmap**

**}**

**/\* Called in response to button actions \*/**

**public void actionPerformed(ActionEvent e) {**

**Object source = e.getSource();**

**// Detect both clicks and ENTER for adding a new label**

**if (source == addButton || source == nameField) {**

**addLabel(nameField.getText());**

**} else if (source == removeButton) {**

**String text = nameField.getText();**

**if (contents.containsKey(text)) {**

**remove(contents.get(text));**

**contents.remove(text);**

**}**

**} else if (source == clearButton) {**

**removeContents();**

**}**

**}**

**/\* Called on mouse press to record the coordinates of the click \*/**

**public void mousePressed(MouseEvent e) {**

**last = new GPoint(e.getPoint());**

**currentLabel = (GLabel)getElementAt(last);**

**}**

**/\* Called on mouse drag to reposition the object \*/**

**public void mouseDragged(MouseEvent e) {**

**if (currentLabel != null) {**

**currentLabel.move(e.getX() - last.getX(),**

**e.getY() - last.getY());**

**last = new GPoint(e.getPoint());**

**}**

**}**

**/\* Private constants \*/**

**private static final int MAX\_NAME = 25;**

**/\* Private instance variables \*/**

**private HashMap<String,GLabel> contents;**

**private JTextField nameField;**

**private JButton addButton;**

**private JButton removeButton;**

**private JButton clearButton;**

**private GLabel currentLabel;**

**private GPoint last;**

**}**

**2. Interactive Karel**

**/\***

**\* File: InteractiveKarel.java**

**\* --------------------**

**\* This program lets the user control Karel as it moves and turns**

**\* within the canvas window.**

**\*/**

**import acm.program.\*;**

**import acm.graphics.\*;**

**import java.awt.event.\*;**

**import javax.swing.\*;**

**/\* Simulates a simplified Karel the Robot through use of GUI interactors. \*/**

**public class InteractiveKarel extends GraphicsProgram {**

**/\* The number of pixels wide/tall for the Karel images \*/**

**private static final int KAREL\_SIZE = 64;**

**/\* The image of Karel currently displayed on the canvas. \*/**

**private GImage karel;**

**/\* The direction (NORTH, SOUTH, EAST, WEST) Karel is facing. \*/**

**private String direction;**

**/\* Sets up GUI components and Karel's initial image. \*/**

**public void init() {**

**add(new JButton("move"), SOUTH);**

**add(new JButton("turnLeft"), SOUTH);**

**addActionListeners();**

**}**

**/\* Add our graphics once the canvas is onscreen. \*/**

**public void run() {**

**karel = new GImage("KarelEast.jpg");**

**direction = EAST;**

**add(karel, 0, 0);**

**}**

**/\* When we get an interaction, update Karel accordingly. \*/**

**public void actionPerformed(ActionEvent event) {**

**String command = event.getActionCommand();**

**if (command.equals("move")) {**

**moveKarel();**

**} else if (command.equals("turnLeft")) {**

**turnLeftKarel();**

**}**

**}**

**/\* Moves Karel one step in the current direction. \*/**

**private void moveKarel() {**

**double newX = karel.getX();**

**double newY = karel.getY();**

**if (direction.equals(NORTH)) {**

**newY -= KAREL\_SIZE;**

**} else if (direction.equals(SOUTH)) {**

**newY += KAREL\_SIZE;**

**} else if (direction.equals(EAST)) {**

**newX += KAREL\_SIZE;**

**} else if (direction.equals(WEST)) {**

**newX -= KAREL\_SIZE;**

**}**

**if (isKarelOnScreen(newX, newY)) {**

**karel.setLocation(newX, newY);**

**}**

**}**

**/\* Causes Karel to turn 90 degrees to the left (counter-clockwise). \*/**

**private void turnLeftKarel() {**

**if (direction.equals(NORTH)) {**

**direction = EAST;**

**} else if (direction.equals(EAST)) {**

**direction = SOUTH;**

**} else if (direction.equals(SOUTH)) {**

**direction = WEST;**

**} else if (direction.equals(WEST)) {**

**direction = NORTH;**

**}**

**karel.setImage("Karel" + direction + ".jpg");**

**}**

**/\* Returns whether Karel would be on-screen at the given x/y position. \*/**

**private boolean isKarelOnScreen(double x, double y) {**

**return x >= 0 && y >= 0 && x + KAREL\_SIZE <= getWidth()**

**&& y + KAREL\_SIZE <= getHeight();**

**}**

**}**

**3. The Employee Class**

**/\***

**\* File: Employee.java**

**\* -------------------**

**\* Class which describes the Employee variable type.**

**\* An Employee has the following information:**

**\* - name**

**\* - title**

**\* - annual salary**

**\***

**\* They may be given a promotion, which adds the word "Senior"**

**\* to their job title and doubles their salary.**

**\*/**

**public class Employee {**

**public Employee(String newName, String newTitle) {**

**name = newName;**

**title = newTitle;**

**}**

**public String getTitle() {**

**return title;**

**}**

**public void setTitle(String title) {**

**this.title = title;**

**}**

**public int getSalary() {**

**return salary;**

**}**

**public void setSalary(int salary) {**

**this.salary = salary;**

**}**

**public String getName() {**

**return name;**

**}**

**// Adds "Senior" to the front of our job title, and doubles our salary**

**public void promote() {**

**title = "Senior " + title;**

**salary \*= 2;**

**}**

**/\* Employee instance variables \*/**

**private String name;**

**private String title;**

**private int salary;**

**}**

**4. Subclassing GCanvas**

**/\***

**\* File: RandomCirclesCanvas.java**

**\* ------------------------**

**\* This GCanvas subclass adds the ability to also draw random circles.**

**\* Each circle has a randomly chosen color, a randomly chosen**

**\* radius between 5 and 50 pixels, and a randomly chosen**

**\* position on the canvas, subject to the condition that**

**\* the entire circle must fit inside the canvas without**

**\* extending past the edge.**

**\*/**

**import acm.graphics.\*;**

**import acm.util.\*;**

**public class RandomCirclesCanvas extends GCanvas {**

**/\*\* Minimum radius \*/**

**private static final double MIN\_RADIUS = 5;**

**/\*\* Maximum radius \*/**

**private static final double MAX\_RADIUS = 50;**

**public void drawRandomCircle() {**

**double r = rgen.nextDouble(MIN\_RADIUS, MAX\_RADIUS);**

**double x = rgen.nextDouble(0, getWidth() - 2 \* r);**

**double y = rgen.nextDouble(0, getHeight() - 2 \* r);**

**GOval circle = new GOval(x, y, 2 \* r, 2 \* r);**

**circle.setFilled(true);**

**circle.setColor(rgen.nextColor());**

**add(circle); // adds it to ourself!**

**}**

**/\* Private instance variable \*/**

**private RandomGenerator rgen = RandomGenerator.getInstance();**

**}**