CS 683 Emerging Technologies: Embracing Change
Spring Semester, 2001
Doc 20 Morphic Intro
Contents

Reference

Squeak: Object-Oriented Design with Multimedia Applications, Guzdial, Chapter 5

Morphic

New interface experiment from Self

Goals were:

- Concreteness

  Language supports
    Direct, copy & modify style of programming

  Interface supports
    Immediate & direct access to all parts of application even when running

- Uniformity

  Language
    Merges state and behavior
    Uses objects & messages for everything

  Interface
    Uses graphical objects down to the lowest level

    Removes the distinction between run and edit

- Flexibility

Morphs

Live an a world

Can interact with
- Its world
- Other morphs in the world

Can be programmed with:
- Smalltalk code
- Tiles and scripts
- Graphical wired together (Fabrik)

Basic Interaction

Simple Events

Keyboard
Mouse
Drag & Drop

Keyboard Events

Three types in order sent

- Key down
- Key stroke
  Contains key pressed
- Key up

To handle keyboard events Morph subclass must implement:

handlesKeyboard: anKeyboardEvent

The method must return true for the types of events of interest

Important KeyboardEvent Methods

isKeyDown	anyModifierKeyPressed
isKeyUp	commandKeyPressed
isKeyboard	controlKeyPressed
isKeystroke	macOptionKeyPressed
keyCharacter	shiftPressed
keyValue	

To Actually handle Keyboard Events

Morph subclass must implement

keyDown: anEvent
keyStroke: anEvent
keyUp: anEvent

Handling Mouse Events

A Morph subclass must override one or more of the following methods to be notified of the event

Return true to handle the event

handlesKeyboard: aMouseButtonEvent
handlesMouseDown: aMouseButtonEvent
handlesMouseOver: aMouseButtonEvent
handlesMouseOverDragging: aMouseButtonEvent
handlesMouseStillDown: aMouseButtonEvent

To handle the event implement one of:

mouseDown: aMouseButtonEvent
mouseEnter: aMouseButtonEvent
mouseEnterDragging: aMouseButtonEvent
mouseLeave: aMouseButtonEvent
mouseLeaveDragging: aMouseButtonEvent
mouseMove: aMouseButtonEvent
mouseStillDown: aMouseButtonEvent
mouseStillDownThreshold aMouseButtonEvent
mouseUp: aMouseButtonEvent

Important MouseButtonEvent Methods

isDraggingEvent	anyButtonPressed
isMouse	blueButtonPressed
isMouseDown	cursorPoint
isMouseEnter	redButtonPressed
isMouseLeave	targetPoint
isMouseMove	yellowButtonPressed
isMouseUp	
isMove	

Drawing

To change the image of the Morph subClass

Override the method

drawOn: aCanvas

Stepping

Morphs are active

Periodically they are sent the message step

This method can perform animation etc.

The time between sending step is determined by the method

    stepTime

This method returns time in milliseconds

To start stepping send:

    startStepping

To send stepping send:

    endStepping

Example

```
Morph subclass: #TestMorphic
   instanceVariableNames: ''
   classVariableNames: ''
   poolDictionaries: ''
   category: 'Whitney-Morphic'!

step
   self world bounds bottom > self bottom
      ifTrue:[self bottom: (self bottom + 3)

stepTime
   ^500

handlesKeyboard: aKeyBoardEvent
   ^aKeyBoardEvent isKeystroke

keyStroke: anEvent
   Transcript
      show: 'You pressed key ';
      show: anEvent keyCharacter;
      cr.

drawOn: aCanvas
   aCanvas
      fillOval: self bounds
      color: Color red
```