Music 120: Introduction to Audio/Multimedia App. Programming

Lecture #7 - 11/3/2006
CCRMA, Department of Music
Stanford University

Last Week...
- HW1 review
- Cocoa BeeThree review
- GUI programming with Qt
- Demo: GUI-based Stk app.
  - Qt BeeThree
  - Qt Designer / Stk

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Today...
- Event Handling
- View Programming
  - example: Theremin
- GUI programming & MVC
  - MVC (model, view, & controller)
  - example: ColorProbe

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Event...
- An input action
  - mouse click / drag
  - key down
- Cocoa: NSEvent
  - contains information about user input
  - stored into a buffer (event queue)
  - ... then processed when the app. is ready

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Examples of Events
- Mouse
  - NSLeftMouseDown NSLeftMouseUp
  - NSRightMouseDown NSRightMouseUp
  - NSOtherMouseDown NSOtherMouseUp
  - NSMouseMoved NSMouseExited
  - NSLeftMouseDown NSRightMouseDown
  - NSOtherMouseDown NSOtherMouseDragged
  - NSMouseDragged NSMouseEntered
  - NSScrollWheel
- Keyboard
  - NSKeyDown NSKeyUp
- Etc.
To Handle Events...

- **NSResponder**
  - an abstract class
  - basis for event and command processing
  - Parent of
    - NSApplication
    - NSWindow
    - NSView
- Today: NSView

View...

- A rectangular region contained in a window
- Responsible for
  - drawing
  - responding to user actions (a.k.a. events)
- Cocoa: NSView
  - an abstract basis for many subclasses
  - implements fundamental view behavior
  - always subclassed!

Inherited From NSView...

- NSImageView
- NSOpenGLView
- NSMovieView
- QCView
- WebView
- NSText / NSTextView
- Custom views...

Demo: Theremin

Comparison
**BeeThree**

**IBOutlet:** _pitchValueField

**IBAction:** pitchSliderMoved

**IBAction:** pitchValueEntered

**IBAction:** startSound

**IBAction:** stopSound

**IBAction:** alloc

**IBAction:** dealloc

**IBAction:** Callback

**IBAction:** MainMenu.nib

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**Theremin**

**IBOutlet:** _thereminView

**IBAction:** mouseDown

**IBAction:** mouseDragged

**IBAction:** alloc

**IBAction:** dealloc

**IBAction:** setInstrument

**IBAction:** MainMenu.nib

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**Model, View, & Controller**

- Breaks an application into 3 categories
  - **Model**
    - Manages the app data and state
    - Not concerned with UI or presentation
  - **View**
    - Displays the model objects to the user

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**Model, View, & Controller**

- Controller
  - Coordinates the model and the view
  - Keeps the view updated when model changes
  - Typically where app “logic” is

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**Model, View, & Controller**

- Coordinates between Model & View
Model, View, Controller

Example: ColorProbe

For More Info...
- Cocoa event handling guide
- Cocoa view programming guide
- MVC Paradigm

A2 & FPP: Due 11/24/06