Music 3SI: Introduction to Audio/Multimedia App. Programming

Week #4 - 4/28/2006
CCRMA, Department of Music
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Last Week...
• Callback function
• Stk instruments / effects
• Error handling
• Assignment #1

Today...
• Assignment #1 Hints
  › Week #3 online tutorial
• IDE: Xcode
• VST Plug-in

Assignment #1

A1 Tips
• Stereo: ex13
• Multiple effects: ex14
• Again: don’t panic!
  › minimum requirement: ex9 or 10 w/ comments
  › ask me any questions you have!
  › prove that you understand what’s going on!
• Office hours
  › Tue 11 am - 1 pm, or by appointment

IDE
IDE
• Integrated Development Environment
• Software that assists programmer to develop software
• Contains
  ‣ editor
  ‣ compiler
  ‣ debugger
  ‣ GUI designer

IDE on Mac: Xcode

VST
• Virtual Studio Technology
• Debuted in 1996 (VST 1.0)
  ‣ audio processing units (a.k.a. effects)
• Current: VST 2.3
  ‣ virtual synths (VSTi) since 2.0
• Based on plug-in architecture
• VST SDK

Plug-In Architecture
• Plug-in
  ‣ a small child program to alter/enhance/extend the operation of a parent program (host)
  ‣ seen as a black box from its host
• VST Plug-in & host
  ‣ plug-ins: effects and/or synthesizers
  ‣ host: interface & services

Host & Plug-Ins

OS Audio
VST Host
VST Plug-In
In
Out
**Why Plug-In?**

- DSP-only (well, almost...) programming
  - can concentrate on the core algorithm
  - NO system-level audio handling, GUI design, etc.
- Same code for both Windows & Mac
- Dynamic library
  - multiple instances simultaneously
  - usable with multiple VST hosts

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**Key Concepts**

- Callback (again!)
  - same as in Stk
- Polymorphism
  - inherit & override

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**Stk Apps**

- OS Audio

  ![Stk App. Callback Function](image)

- In

  ![Callback Function](image)

  ![Out](image)

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**VST Plug-Ins**

- OS Audio

  ![VST Host Callback Function](image)

- In

  ![Callback Function](image)

  ![Out](image)

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A VST PI

Inside VST PI
- Parameters
  - name
  - display
  - label
- Program (or preset)
  - name
- Misc. info.
- Audio Callback

Coding
- VST SDK
- Plug-in programming
  - gain controller
  - distortion
  - compressor

More VST Stuffs
- VST GUI
- VSTi

Next Week On Music 3SI
- Cocoa
  - guest lecturer from Apple