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

Week #4 - 4/28/2006
CCRMA, Department of Music
Stanford University

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Last Week...

- Callback function
- Stk instruments / effects
- Error handling
- Assignment #1

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Today...

- Assignment #1 Hints
  - Week #3 online tutorial
- IDE: Xcode
- VST Plug-in

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Assignment #1

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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
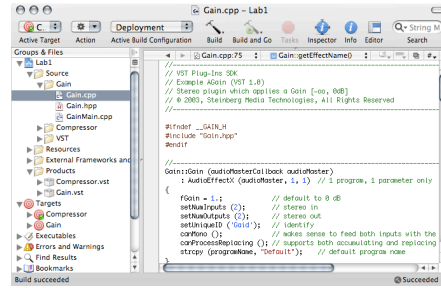 - Tue 11 am - 1 pm, or by appointment

5

IDE

6

IDE

- Integrated Development Environment

- Software that assists programmer to develop software

- Contains
  - ‣ editor
  - ‣ compiler
  - ‣ debugger
  - ‣ GUI designer

IDE on Mac: Xcode

VST

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
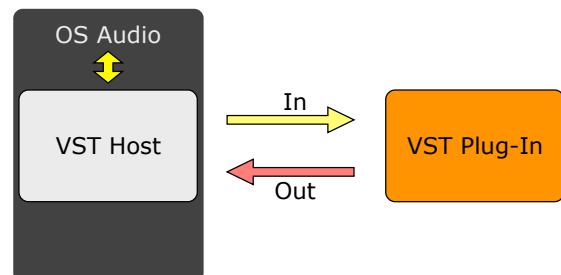
- VST SDK

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

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

VST Plug-In Programming

Key Concepts

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

Callback

Stk Apps

OS Audio — In → Stk App. Callback Function — Out ←

VST Plug-Ins

OS Audio — VST Host — In → VST Plug-In Callback Function — Out ←
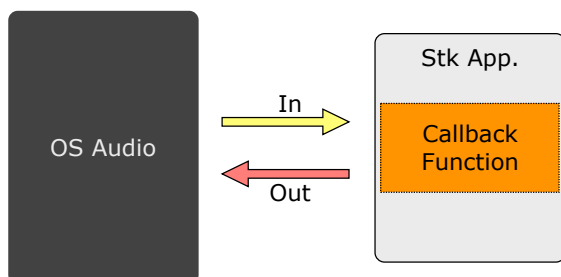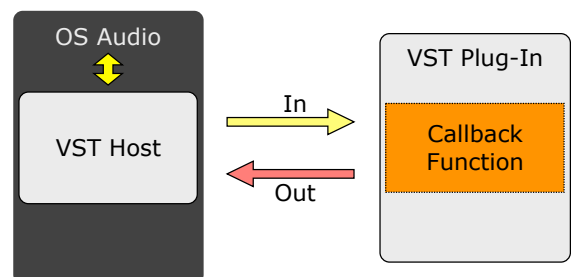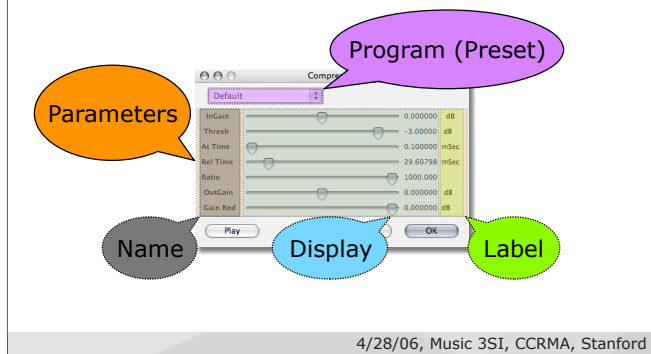
A VST PI

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