

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

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IDE

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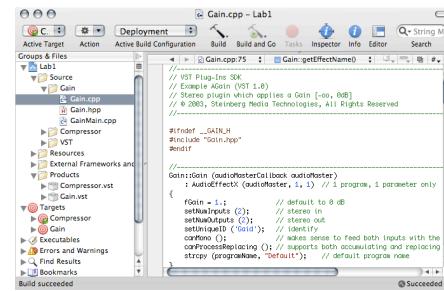
IDE

- Integrated Development Environment
- Software that assists programmer to develop software
- Contains
 - editor
 - compiler
 - debugger
 - **GUI designer**

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IDE on Mac: Xcode



A screenshot of the Xcode IDE on a Mac. The left sidebar shows a project structure with groups like 'Groups & Files', 'Localization', and 'Source'. Under 'Source', there are files like 'Gain.cpp', 'Gain.h', 'GainMain.cpp', 'Compressor.cpp', 'VST.h', 'Headers', and 'External Frameworks and Libraries'. The main editor window displays C++ code for a VST plugin. The code includes includes for 'GAIN_H' and 'Gain.h', defines for 'kProgramName', and function implementations for 'Gain::Gain(AudioMasterCallback audioMaster)' and 'void processReplacing(float** inputs, float** outputs, void* program, void* parameters)'. A copyright notice at the bottom reads: '© 2003, Steinberg Media Technologies, All Rights Reserved'.

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VST

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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

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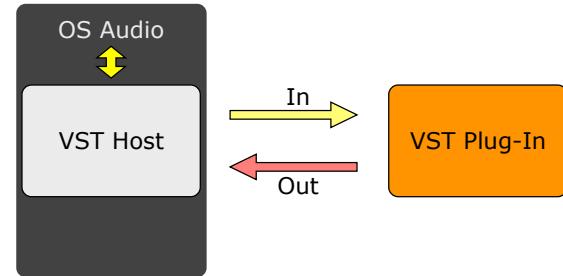
Plug-In Architecture

- 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

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Host & Plug-Ins



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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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VST Plug-In Programming

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Key Concepts

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

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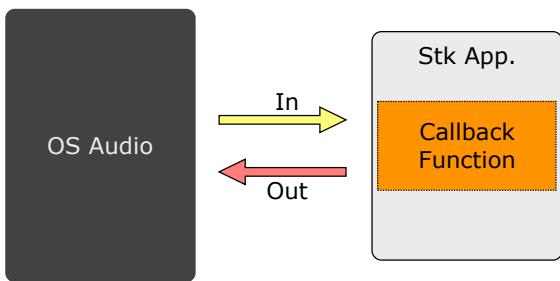
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Callback

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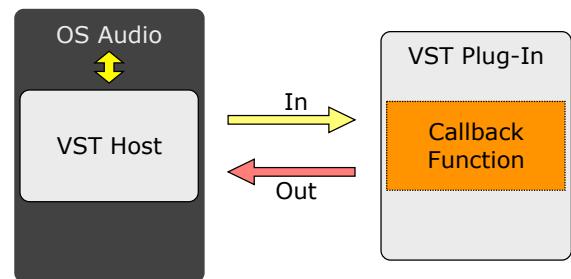
Stk Apps



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VST Plug-Ins



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