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HOWTO: Csound5 for OS X  
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This document contains instructions for building and installing Csound5 for OS X (with realtime audio and FLTK) and the other software packages it needs to run. Please review the entire document before beginning the install process. If you are uncomfortable with using OS X's Terminal.app to enter commands at the command line, this process might not be for you. Be aware that Csound5 is still in development - parts of it may be buggy or may not work at all.

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Section 1: Preparation  
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First, you will need to install Apple's Developer Tools, which can be found on your OS X install disc or downloaded from <http://www.apple.com/macosx/developertools>. The Developer Tools package includes the compiler (GCC 3) that will build the necessary software packages for your particular hardware architecture and version of OS X. For more information on compiling software from source code, please visit this link at wikipedia.org: <http://en.wikipedia.org/wiki/Compiler>.

Five archives should be included with this document:

- libpng-1.2.8-config.tar.gz
- libsndfile-1.0.11.tar.gz
- Python-2.3.5.tgz
- scons-0.96.1.tar.gz
- fltk-1.1.4-source.tar.gz

If any are missing, you can find them online at these locations:

- <http://download.sourceforge.net/libpng/libpng-1.2.8-config.tar.gz>
- <http://www.mega-nerd.com/libsndfile/libsndfile-1.0.11.tar.gz>
- <http://python.org/ftp/python/2.3.5/Python-2.3.5.tgz>
- <http://prdownloads.sourceforge.net/scons/scons-0.96.1.tar.gz>
- <http://fltk.org/software.php?VERSION=1.1.6&FILE=fltk/1.1.4/fltk-1.1.4-source.tar.gz>

Try to get the same versions as listed above, especially Python 2.3.5, scons 0.96.1, and FLTK 1.1.4.

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## Section 2: Building & Installing Required Software

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Extract the contents of the archives using Stuffit Expander (<http://www.stuffit.com/mac/expander/download3.html>). Optionally, you can extract the contents from the command line using the following command (this will work for both .tar.gz and .tgz files):

```
tar -zxvf /path/to/file.tgz -C /path/to/destination
```

It will be helpful if all the extracted folders are in the same directory (a good place would be your desktop). Now we can begin to build and install each software package one at a time. It will be necessary to use the command line provided by Terminal.app, which is located by default in your /Applications/Utilities folder.

We will assume that the folders you extracted in the previous section are all located on your desktop. If they're not, change the paths in the commands accordingly. Each line is a new command - type it in or copy it to the command line, then press return. Be sure to substitute your OS X username where "username" occurs within the commands. The sudo command allows you to execute commands with root user privileges. When prompted to enter a password, type your OS X administrative password and press return.

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libpng 1.2.8:

```
cd /Users/username/Desktop/libpng-1.2.8-config
./configure
make
sudo make install
```

---

libsndfile 1.0.11:

```
cd /Users/username/Desktop/libsndfile-1.0.11
./configure
make
sudo make install
```

---

Python 2.3.5:

```
cd /Users/username/Desktop/Python-2.3.5
./configure
make
sudo make install
```

---

scons 0.96.1:

```
cd /Users/username/Desktop/scons-0.96.1
python setup.py install
```

\*If scons doesn't install correctly, use the following command to install it manually:

```
sudo cp ./script/scons /usr/local/bin/scons
```

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## FLTK 1.1.4:

```
cd /Users/username/Desktop/fltk-1.1.4
./configure --enable-threads --enable-shared
make
sudo make install
```

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### Section 3: Downloading, Building, & Installing Csound5

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The most recent version of Csound5 can be downloaded from the concurrent versioning system (CVS) at [sourceforge.net](http://sourceforge.net). First, create a folder into which the Csound software will be downloaded and make it the current working directory. For simplicity, we'll call the folder CsoundCVS, but you can name it whatever you like. Use these commands to do so:

```
mkdir /path/to/CsoundCVS
cd /path/to/CsoundCVS
```

The following command will allow you to authenticate and connect to the CVS server:

```
cvs -d:pserver:anonymous@cvs.sourceforge.net:/cvsroot/csound login
```

When prompted for a password, just press return. To initiate the download, use this command:

```
cvs -d:pserver:anonymous@cvs.sourceforge.net:/cvsroot/csound co -P csound5
```

After the download has completed, the command prompt will appear again. Change the working directory to /CsoundCVS/csound5, then use `scons` to build the Csound5 binaries.

```
cd /path/to/CsoundCVS/csound5
scons useALSA=0 useJack=0
```

The build process will take a few minutes. When it is finished, a current Csound5 installation will reside in the /csound5 directory. The source code for Csound5 is updated regularly by developers all over the world. The process described in this section can be repeated as necessary to install updated versions of the software.

It may be necessary to inform Csound5 of the directory in which its opcodes reside. To do this, create a `.profile` file in your home directory. Enter the following commands.

```
cd ~/
pico ./profile
```

Within the text editor, type this line into the file:

```
export OPCODEDIR=/path/to/CsoundCVS/csound5
```

Press `ctrl-O`, then press return to write the file. At the command line, entering the following command should return the path included in `.profile`.

```
echo $OPCODEDIR
```

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Section 4: Rendering a Test File with Csound5  
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A number of .csd files for testing the features and functions of Csound5 is included in the /csound5/examples directory. To render these files, first change the working directory to /csound5.

```
cd /path/to/csound5
```

To view version information and a list of legal flags, type the following command and press return:

```
./csound
```

Most users of Csound4 (or earlier versions) will recognize many of the flags in Csound5. However, there are a few new methods for specifying certain settings with command line flags - selecting a realtime audio driver, for instance.

Use the following command to test Csound5 and render fL.csd:

```
./csound -b1024 -d -odac:0 -iadc:0 -+rtaudio=coreaudio -+buffnos=16 examples/fL.csd
```

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Section 5: Resources  
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The central collection of Csound news and information on the internet can be found at <http://www.csounds.com>. The site is regularly updated as important advancements in Csound and related applications are made. It contains tutorials, links, software downloads, support forums for the most popular Csound front-end applications, and a new streaming radio station featuring computer music composers from around the world.

The Csound mailing list facilitates discussion on all Csound topics by e-mail. Many contributors to the development of Csound5 regularly respond to questions and conversations about everything from Stockhausen to sound cards. For instructions on how to join the mailing list, please visit <http://www.csounds.com/list/index.html>. A searchable archive of messages from the mailing list can be found here: [http://agentcities.cs.bath.ac.uk/%7ebwillkie/list\\_arch.php](http://agentcities.cs.bath.ac.uk/%7ebwillkie/list_arch.php).

This HOWTO document originated on the Csound mailing list. It was created by Patrick Pagano (University of Florida) and revised by Richard M. Otero (Berklee College of Music). It is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike license (<http://creativecommons.org/licenses/by-nc-sa/2.0>).

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