FLOSS
MANUALS

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Audacity

Audacity is the kind of software called an 'audio editor'. That means that it can record and edit audio. Typically you might use Audacity for recording sounds, like interviews or instruments. You can then use Audacity to combine these sounds and edit them to make documentaries, music, podcasts etc.

In the old days audio editing was done with huge machines that recorded sound to tape (similar to the tape in tape cassettes).
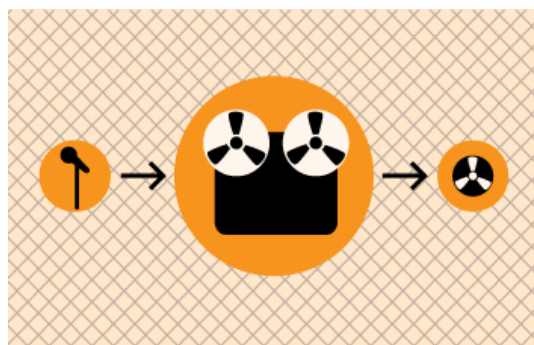
These tapes would then be edited using razor blades and sticky tape. Much of the jargon used in audio editing today comes from this process. Making a "cut" mean literally cutting the audio tape at a certain point. 'Multitrack' referred to recording many separate sounds onto the same tape using extra wide to tape to fit more 'tracks'. These terms, and more, are still used today and many of the fundamental techniques which form good audio recording and editing practice still form the basis of this craft.

While many of the terms and techniques remain the same today, tape machines are now replaced by computers, and tapes by digital files. Hence you record audio and edit with a computer (using software like Audacity), and you store these sounds in files on your computer. This is a faster process and requires a lot less physical storage space!
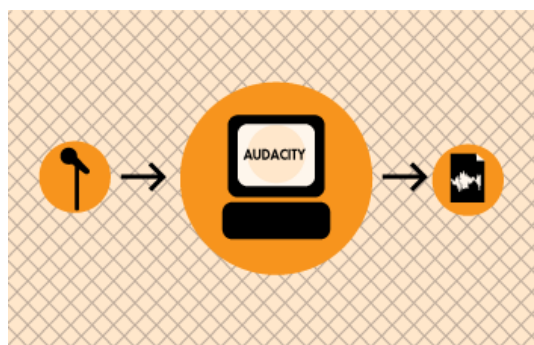
Audacity is one of the tools you will need to record and edit audio on your computer. Its is a very sophisticated program and can do everything you would expect with a modern audio editor. Audacity perhaps falls short of meeting the needs of professional recording studios, but not by much.

You can install and run Audacity on **Linux**, **Mac OS X** and **Windows**.

What is sound?

Sounds are waves of air. We hear sounds because our ears are sensitive to these waves. One of the easiest types of sound wave 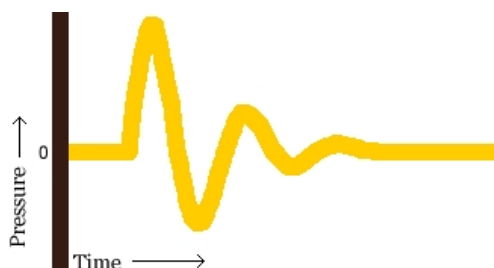to understand is a short, sudden sound like a hand clap. When you clap your hands you create a *pressurised* wave of air which moves at about 340 meters per second ("the speed of sound"). When this wave reaÃ Â−ches your ear, it pushes on your eardrum slightly, causing your ear drum to vibrate and you hear the clap.

A hand clap is a short event that causes a single wave of air that quickly dies out. The image above shows the shape of the wave ("waveform") for a typical hand clap.

Other sound waves are longer events and can be illustrated with the example of a ringing bell. When you ring a bell, after the initial strike, the sound comes from the ongoing "ringing" of the bell. While the bell is still ringing, it vibrates at a particular speed ("frequency") and this causes the nearby air to vibrate at the same speed. This causes waves of air to travel from the bell, again at the speed of sound. Pressure waves from continuous vibration look more like this:
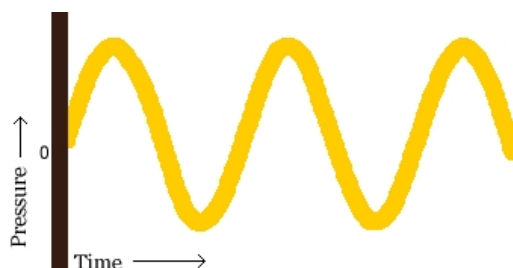
Both of these types of waves are called **sound waves** or **acoustic waves**.

Digital recording and playback

A **microphone** consists of a small membrane which vibrates when it meets these acoustic waves. The microphone translates movements of the membrane into electrical signals. Acoustic waves are translated into electrical waves by the microphone.

If you were to look at the shape of this electrical wave you would see that it looks very similar to the shape of the original sound wave. The following is the sound wave we saw in the above explanation :
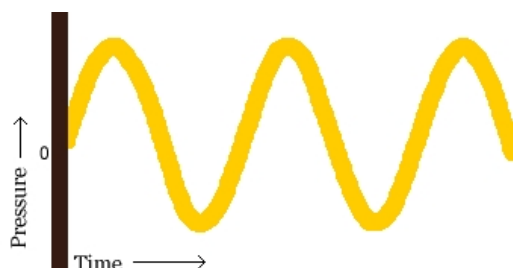
The following is the electrical wave created by the microphone (notice the measurement for "Current") :
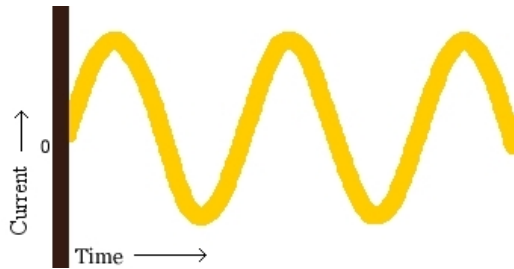
You could say that the shape of the electrical wave is *analogous to* ("similar to") the shape of the original sound wave. This is why these electrical waves that represent sound waves are called **analog waves**.

The main device used in digital *recording* is a **Analog-to-Digital Converter** (**ADC**). The ADC measures the voltage of an electrical wave thousands of times per second. These measurements are used to create a map of an electrical wave :

Each dot in the figure above represents one audio *sample*. The more samples per second the more accurate the mapping of the electrical wave.

Playback of digital audio uses a **Digital-to-Analog Converter** (**DAC**). This takes the samples and converts them back into an electrical wave. This electrical wave is output to the sound cards headphone or speakers sockets and is used by speakers to once again recreate the original sound wave.

Your computers soundcard comes with an Analog-to-Digital Converter (ADC) for recording, and a Digital-to-Analog Converter (DAC) for playing audio. Your operating system (Windows, Mac OS X, Linux, etc.) talks to the sound card to actually handle the recording and playback, and audio applications talk to your operating system so that you can play sound files, capture sounds to a file, edit them, and mix multiple tracks while playing etc.

Quality

There are two factors that determine the quality of a digital recording:

- **Sample rate**: this is the rate at which the samples are recorded or played back. Sample Rate is measured in Hertz (Hz), or samples per second. An audio CD has a sample rate of 44,100 Hz (often written as "44 KHz" for short).
- **Sample format** or **sample size**: Essentially this is the number of digits in the digital representation of each sample. Think of the sample rate as the horizontal precision, and the sample format as the vertical precision. An audio CD has a precision of 16 bits.

Higher sampling rates allow a digital recording to accurately record higher frequencies.

Higher sample sizes allow for more dynamic range - better reproduction of loud and soft sounds.

Audio file formats

There are two main types of audio files on a computer:

- **PCM** stands for **Pulse Code Modulation**. This is just a fancy name for the technique where each number in the digital audio file represents exactly one sample in the waveform. Common examples of PCM files are **WAV** files, **AIFF** files, and **Sound Designer II** files.
- The other type is of audio file are those that are compressed. Modern compressed audio files use sophisticated *psychoacoustic algorithms* to represent the essential frequencies of the audio signal in far less space. Examples include **MP3** (MPEG I, layer 3), **Ogg Vorbis**, and **WMA** (Windows Media Audio). When you create an these types of file, you are deliberately losing some quality in order to use less disk space.

Installing Audacity on Ubuntu

Software name : Audacity Â–
Homepage : http://audacity.sourceforge.net
Software version used for this installation : 1.2.6
Operating System use for this installation : Ubuntu 7.04
Recommended Hardware : 200 Mhz processor (CPU) minimum, internet connection

If you are used to an Operating System like **Windows** or **MacOSX** you may have installed software by downloading it from a website and double clicking on the downloaded file, and clicking through all the licence agreements, configuration options etc. This is the 'old' way of installing software. The 'new' way is much smarter - you choose what you want to install from a list and press 'go'. The rest - finding the files, downloading the files, installing software, is taken care of by Ubuntu itself while you go and get a cup of tea or work on something else. It can't get much easier.

However, new ways take a little getting used to, and so we will first look at the basic tool needed to install software this way, and then how to use it to install VLC.

Synaptic Package Manager

The Synaptic Package Manager (SPM) is used for more than just installing software. It can also upgrade your entire operating system, and manage all software installed on your computer. However most people use SPM for just installing new software. Before you embark on this process there are a few concepts that you may wish to get familiar with. Its not crucial you understand them throughly, so just read the explanations and then let it soak in over time. The ideas behind SPM will become clearer with use.

What is a repository?

SPM can automate the installation of software on your computer because it has a direct connection to one or more online software repositories. These repositories are vast archives of softwares that have been pre-configured for installation on your operating system . When your computer is online SPM can connect to these archives, check what software is available for installation, and present you with a list of installable software. All you have to do is select the software from the list that you want. SPM then downloads the software from the repository and takes care of the installation process.

So SPM is actually a repository manager, it manages which repositories (there are many) you wish to access, and which softwares to download and install from those repositories.

SPM allows you to choose which repositories it accesses through its settings. The default repositories used by Ubuntu can be extended through the SPM settings so you can access a wider range of softwares. Ubuntu calls each repository by a simple name. They are : **Main**, **Universe**, **Multiverse**, **Restricted**. By default Ubuntu only uses the **Main** online repository. If you wish to access you the other repositories you must do this by changing repository settings of SPM.

What is a package?

When SPM downloads a software for installation it is in the form known as a 'package'. This means that it is a compressed archive of the software, pre-configured so that it will install nicely on your computer. If the package has been configured nicely, and Ubuntu spends a lot of time making sure this is the case, then many of the headaches that installing software can bring are taken away - its the panadol of software installation. One of the biggest issues with

installing software on any form of Linux (Ubuntu is one of many types of Linux), are **dependencies**. Dependencies are all the other softwares required by a particular software. If, for example, I want to install a audio editor, that audio editor software may use some functionality of other softwares to do its job.

SPM takes the (often) dark art of dependencies away from you, and manages this itself. So if you wish to install a software and it has dependencies (and the list can be long), you don't have to work this out yourself, SPM knows already what is needed, finds it, and installs it along with the software you have chosen.

So, SPM, as well as managing which repositories you access, is also a package management software. Hence the name - Synaptic *Package Manager*.

apt

You don't really need to know about apt, so if you are on the verge of being confused then don't read this short section. If you are a geek wannabe then read on.

Ubuntu is a form of Linux that has derived from another form of Linux - Debian. This family of Linux has in common (amongst other things) the package/repository management system. Both Ubuntu and Debian use the **apt** system for managing packages. APT is actually an acronym short for **Advanced Package Tool**.

SPM is actually a 'front end' (graphical interface) for controlling apt. So SPM is the nice user interface that you see, but the real work is done by apt. There are other ways of managing apt also, such as the command line interface known as **apt-get**. In the world of Linux there are many varieties of Linux users and they have their own ways of doing things. In general its safe to say most Debian users use apt-get, and most Ubuntu users are happier using SPM.

Configuring Synaptic Package Manager for installing Audacity

To install Audacity on Ubuntu you will need to change the default repository settings of SPM as Audacity is not contained in the default repository. To do this you will need to open the Synaptic Package Manager and you can do this via the **System** menu. If you haven't changed the default Desktop of Ubuntu then the System menu can be accessed at the top left of your screen:
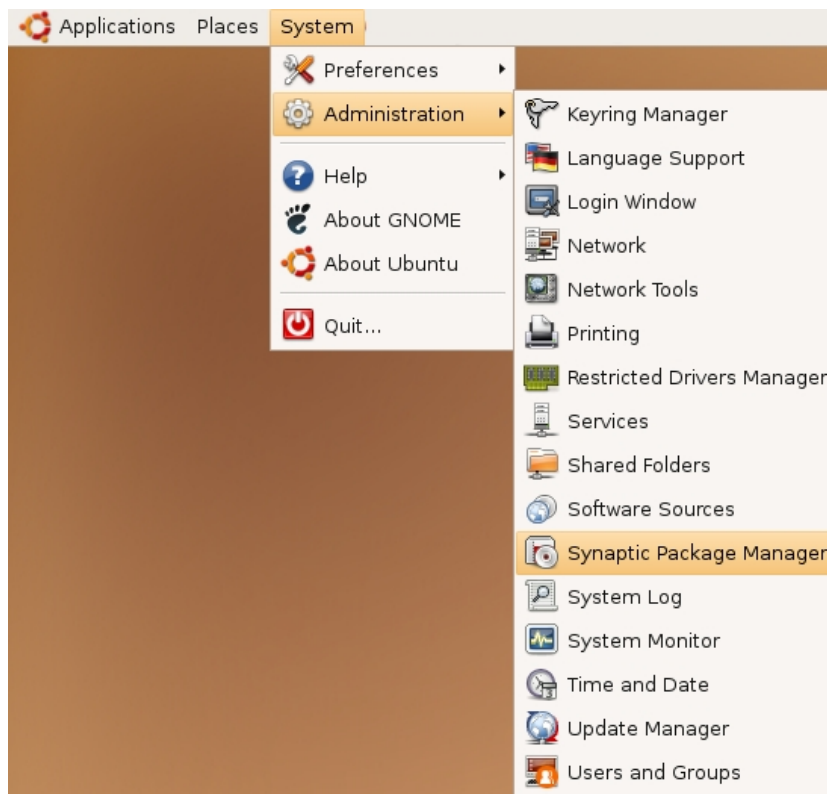
If all is good you will be prompted for a **password**.
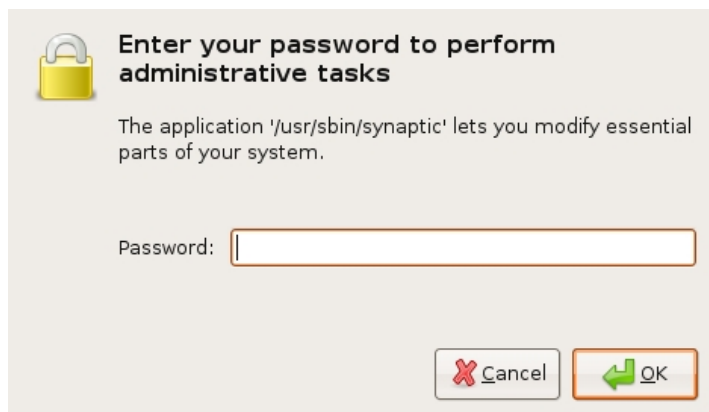
Here you must enter your password (the same one you use to log into the system). If you don't know the password then you have a problem and its probably caused by the fact that the computer you are using is not yours. In this case you have to find the computers owner and ask them for the password (which is usually not polite unless you know them well) or ask them to input the password while you look casually in the other direction.

Assuming the password entered is correct - you will now see the SPM open infront of you. It may be that you first see the following 'Quick Introduction' (this appears if you haven't used SPM before).
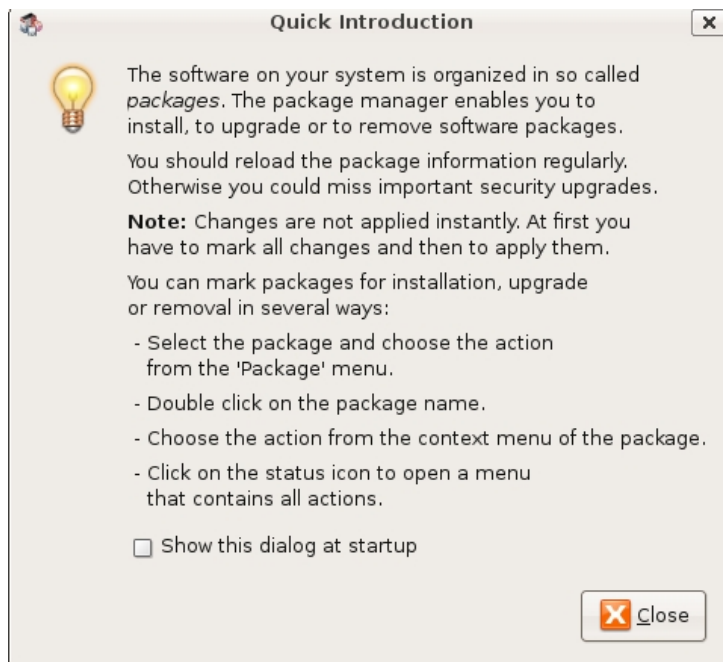
Just click **Close** and move on. Lets look at the Synaptic Package Manager interface...

Lets not worry about the details of the interface for now. All we want to do is change the repository settings. To do this click on the **Settings** and choose **Repositories**
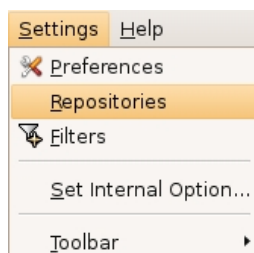
Now we get to where we can do some business. Make sure that **Community-maintained Open Source software (universe)** is checked :
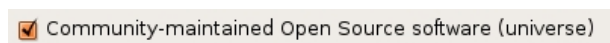
Now close that window by pressing the big close button at the bottom right.
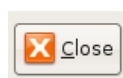
Next, you will see a warning telling you the repository has changed :

Click the **Close** button and move on to SPM so you can refresh the repositories as the warning suggests. To do this, do as the warning says - click on **Reload** :
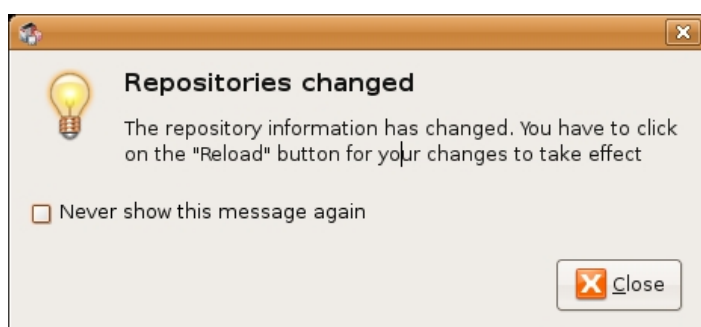

You should then get some feedback saying the repositories are being updated and showing the progress.
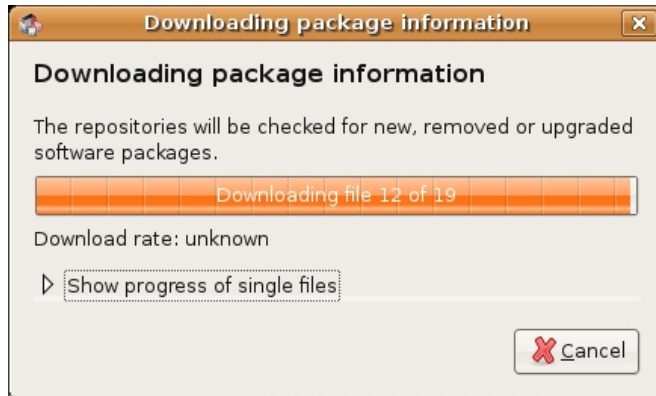
Installing Audacity with Synaptic Package Manager

Now the real business. Its pretty easy. Click on the nice big **Search** button:
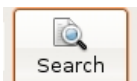
The search window will open and now enter 'audacity' in the field:
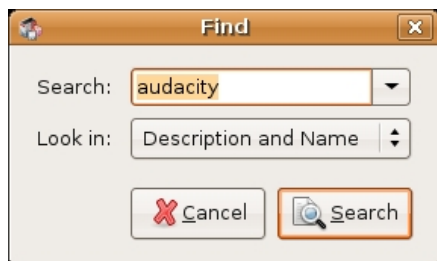
Great. Now press **Search** at the bottom right of the above window. The search should not take very long and when it is complete you will see Audacity listed :

If you highlight audacity (by clicking once on the name) you will see some information about Audacity displayed :

S	Package	Installed Version	Latest Version
	audacity		1.2.6-0ubuntu1

A fast, cross-platform audio editor

Audacity is a multi-track audio editor for Linux/Unix, MacOS and Windows. It is designed for easy recording, playing and editing of digital audio. Audacity features digital effects and spectrum analysis tools. Editing is very fast and provides unlimited undo/redo.

Supported file formats include Ogg Vorbis, MP3, WAV, AIFF, and AU.

For more information, see http://audacity.sourceforge.net/

Now you can read the information if you wish but there is nothing critical there. Best thing to do is just to double-click on **audacity**. By doing this you are 'marking' (choosing) the software for installation. If you do so then an additional window appears:
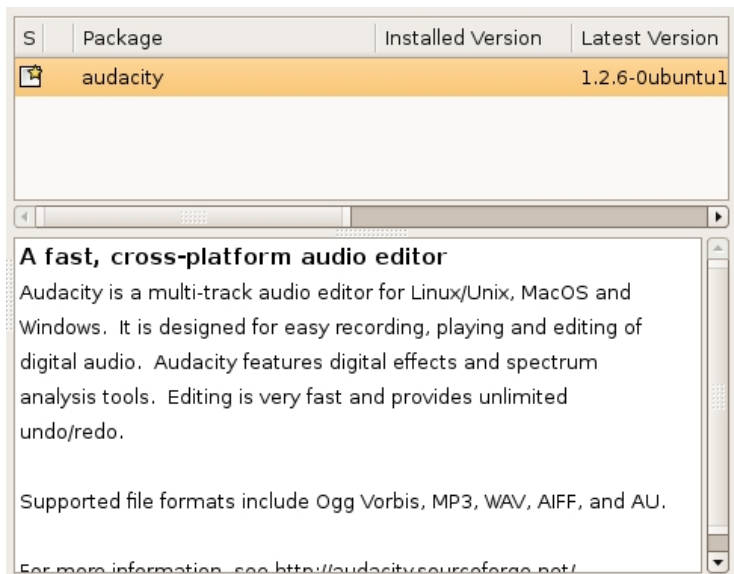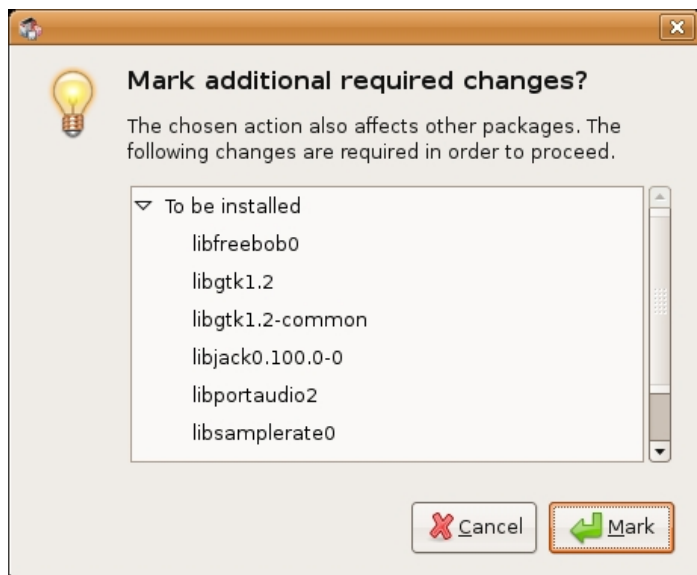

Now click **Mark**:

You have now told Synaptic Package Manager that you want to install Audacity. If all is well then the package will be highlighted:

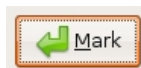| S	Package	Installed Version	Latest Version
	audacity		1.2.6-0ubuntu1
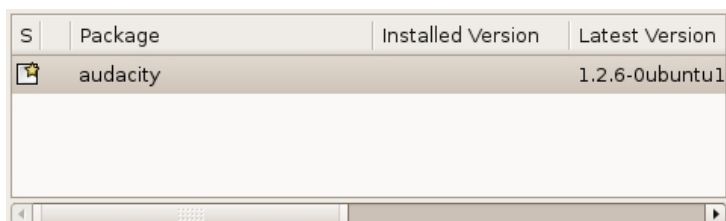
Now press the **Apply** button with the nice big tick next to it :

Apply

Next SPM informs you of how much space will be taken by the installation :
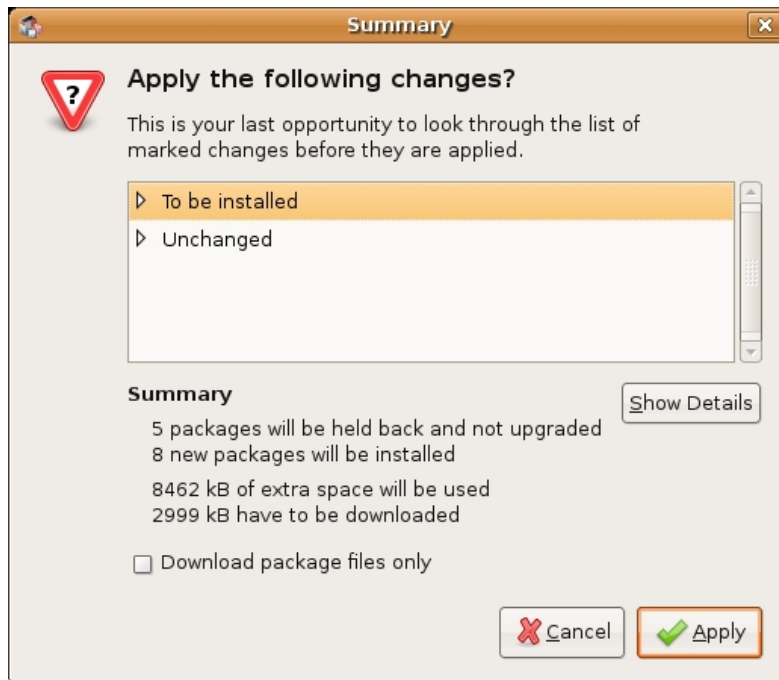
Now you can just click **Apply** at the bottom right of the screen and the installation will start. A progress bar will be shown:

When it is completed (downloading and installing) you will have this screen :
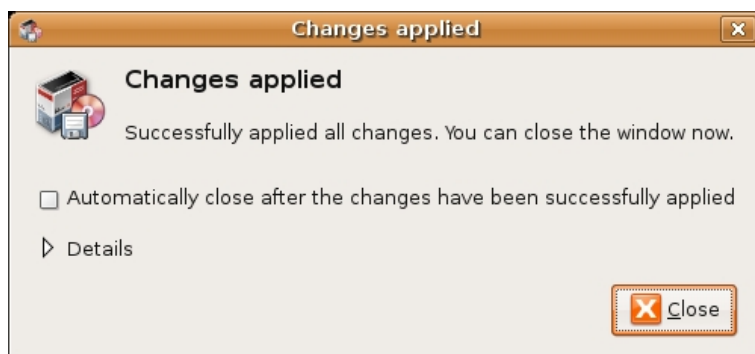
That means all is well. Pat yourself on the back and press **Close**. Synaptic Package Manager will then return to its original state. Close it :
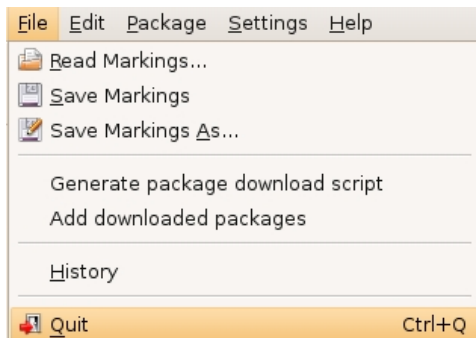
Now you can open audacity...just browse to the **Applications** menu, choose **Sound & Video**, select **Audacity** and release the mouse :
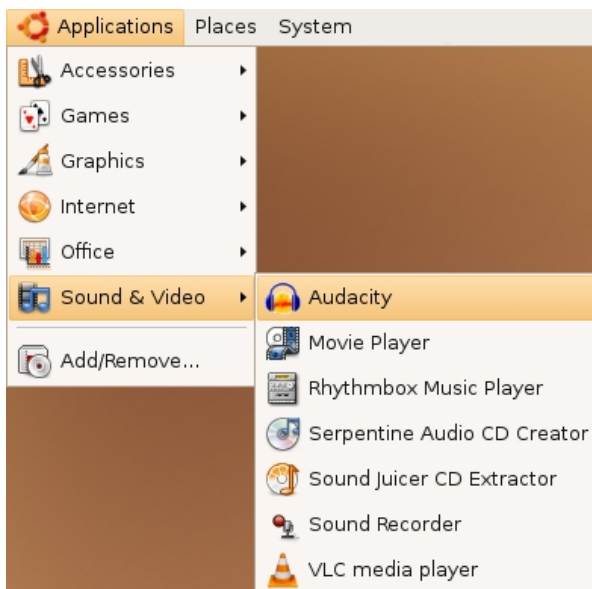
If all is well you will see Audacity:
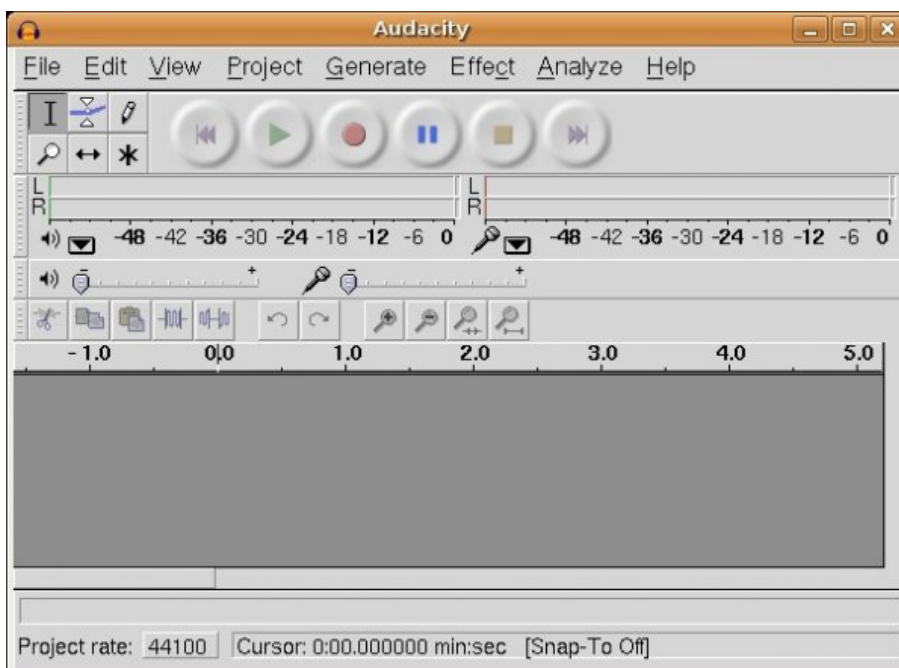
Congrats!

Installing Audacity on OS X

Software name : Audacity
Homepage : http://audacity.sourceforge.net
Software version used for this installation : 1.2.4b
Operating System use for this installation : OSX (10.3)
Recommended Hardware : G3 minimum

Downloading Audacity

The latest stable version of **Audacity** for **OS X** can be downloaded from
http://audacity.sourceforge.net/download/mac. The latest version at the time of writing this document is
Audacity 1.2.4b.
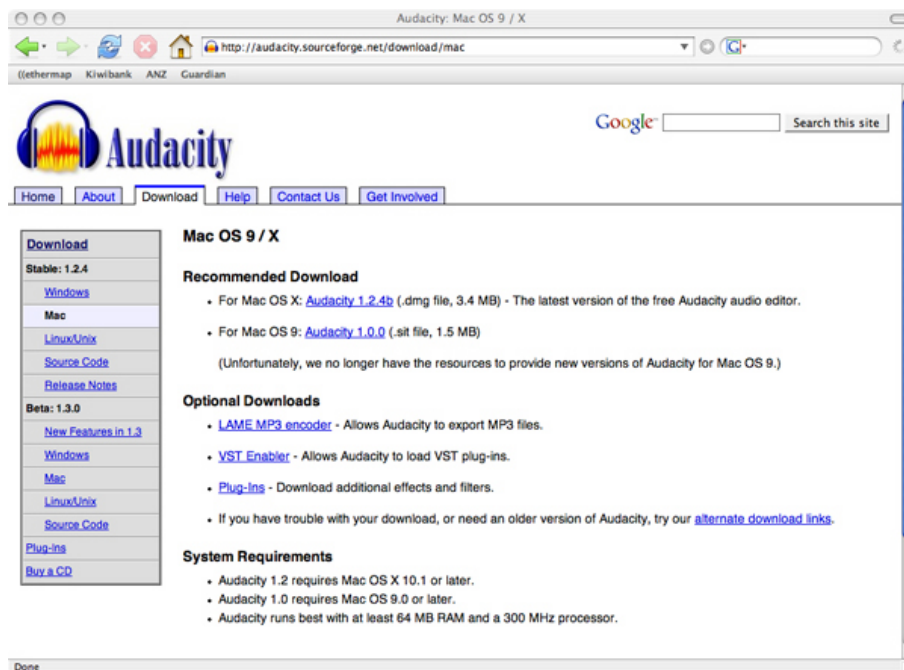
Click on the link labelled "For Mac OS X : Audacity 1.2.4b". This will take you to a download page. The
page lists many locations around the world where the software can be downloaded. The idea is that the
downloads can be faster and more efficient if you choose a location near to you. To begin downloading, click
on the download link of the location nearest you.

Once the download is complete, you should see something like this on your desktop or in the folder that your
web browser is set to download into:
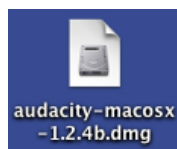
Double click on it to begin installing the software.

You should now see a **finder window** with a **disk image** named "Audacity 1.2.4b" open (the name of the disk
image may be different if you are installing a different version than shown here):
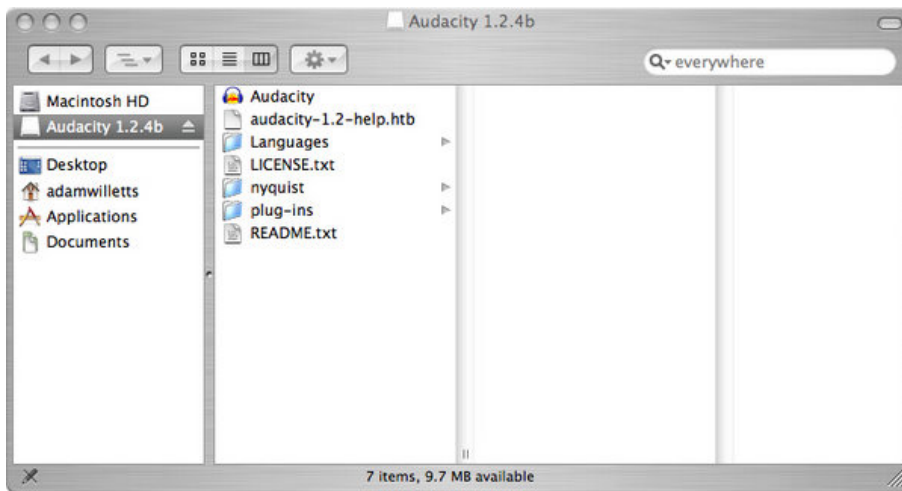
All you need to do now to complete the installation is copy the disk image into your "Applications" folder. To do this, click on the disk image to select it then press the *Apple* and *C* keys together to copy it. Now select your Applications folder and press the *Apple* and *V* keys together. This will paste an Audacity folder containing all of the contents of the disk image into your applications folder.

The installation is now complete, so you can eject the installer folder (by dragging it to the eject icon) and start using Audacity.

To open Audacity double click on the following icon in the Audacity folder:
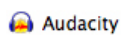
 Audacity

The first time you launch Audacity you will be prompted to select which language you want it to use.
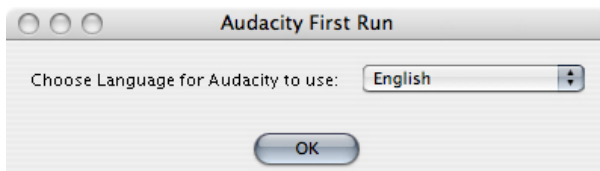
Click on the dropdown menu to select the language you want.
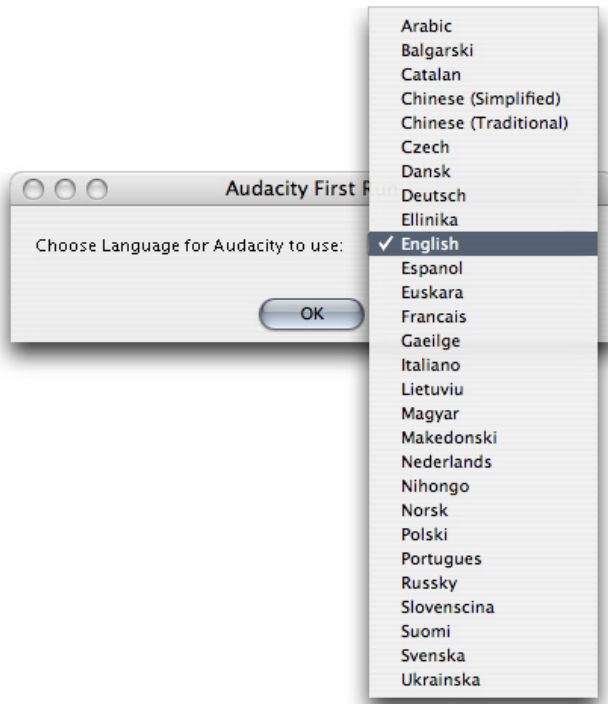
Once you have chosen the language you want click on OK to finish launching Audacity.

You should be able to see the Audacity interface which looks like this:
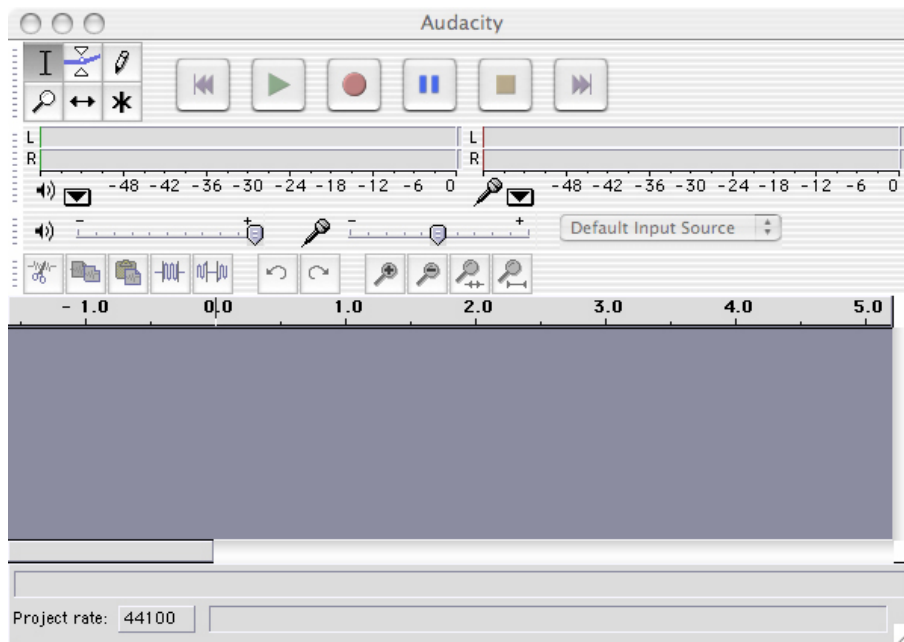
That's it! You now have Audacity up and running and can begin making and editing recordings.

Installing Audacity on Windows

Software name : Audacity Â−
Homepage : http://audacity.sourceforge.net
Software version used for this installation : 1.2.4b
Operating System use for this installation : Microsoft Windows (2000)
Recommended Hardware : 200 Mhz processor (CPU) minimum

Downloading Audacity

The latest stable version of Audacity for **Microsoft Windows** can be downloaded from
http://audacity.sourceforge.net/download/windows. The latest version at the time of writing this document is
Audacity 1.2.4b.
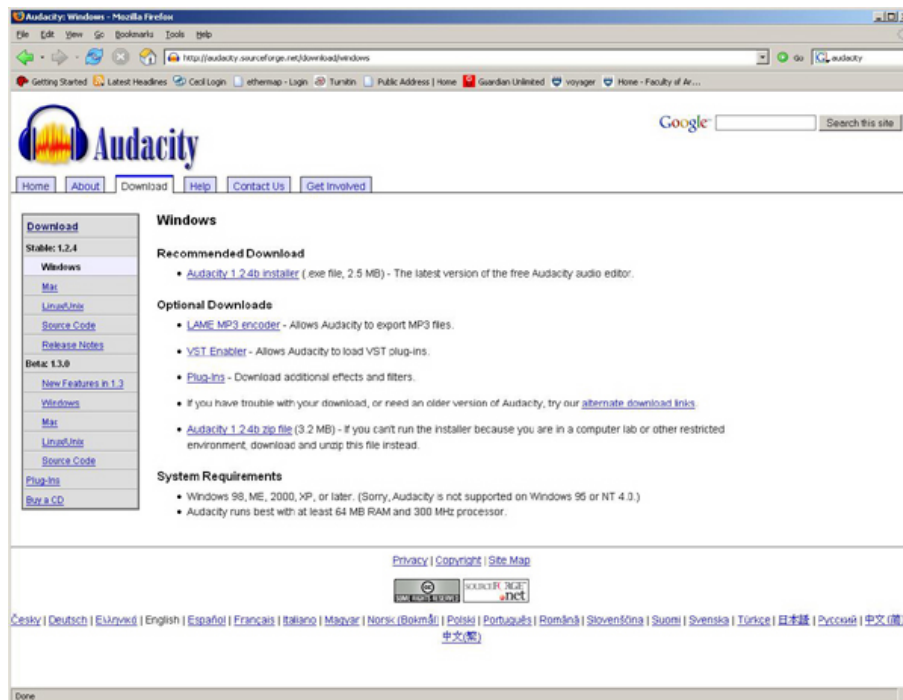
Click on the "Audacity 1.2.4b installer" link. This will take you to a download page. This page lists locations
around the world where the software can be downloaded. The idea is that downloads can be faster if they
come from a place near you. To begin downloading, click on the download link of the location nearest you.

Once the download is complete you should see a downloads window like this:
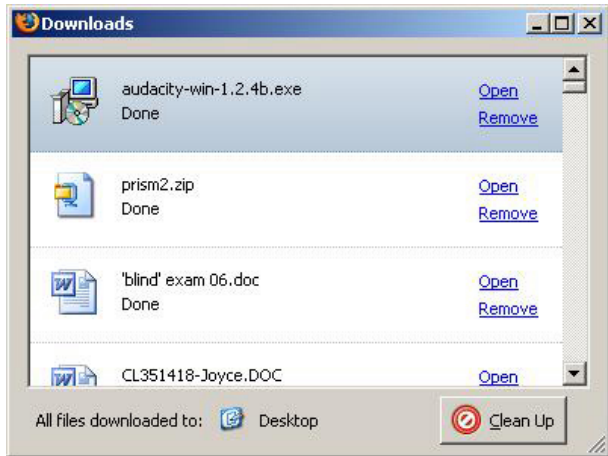
or something like this on your desktop:
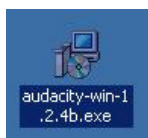
Open this file to begin installing Audacity by double clicking on the icon or clicking on "Open" on the downloads window.

You should now see a **Setup Wizard** like this:

Click "Next" to proceed.

The next step asks you to read and accept the **License Agreement**.
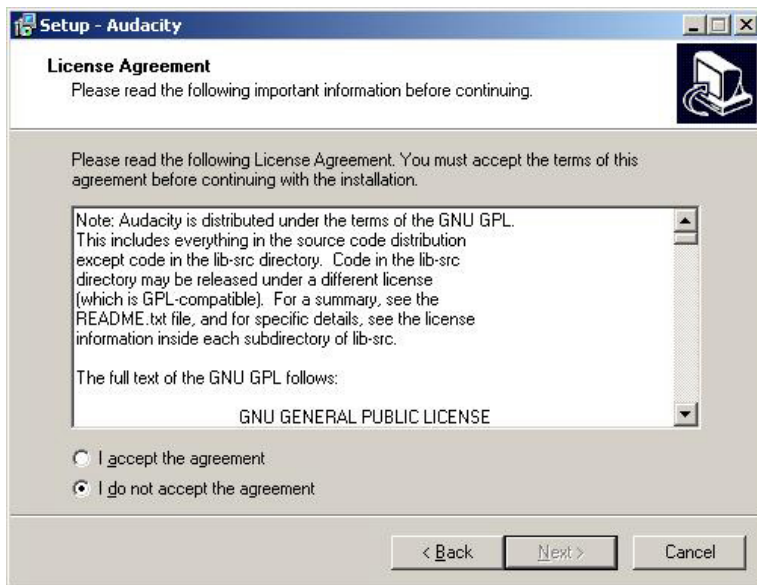
You cannot continue with the installation until you have accepted the agreement, so click on the **radio button** labelled "I accept the agreement" and then click "Next" to continue.

You should now see an **Information** window like this:

This window contains information such as credits and a changelog that you may find useful to read. Click "Next" continue.

You will now be prompted to select the folder Audacity will be installed into.
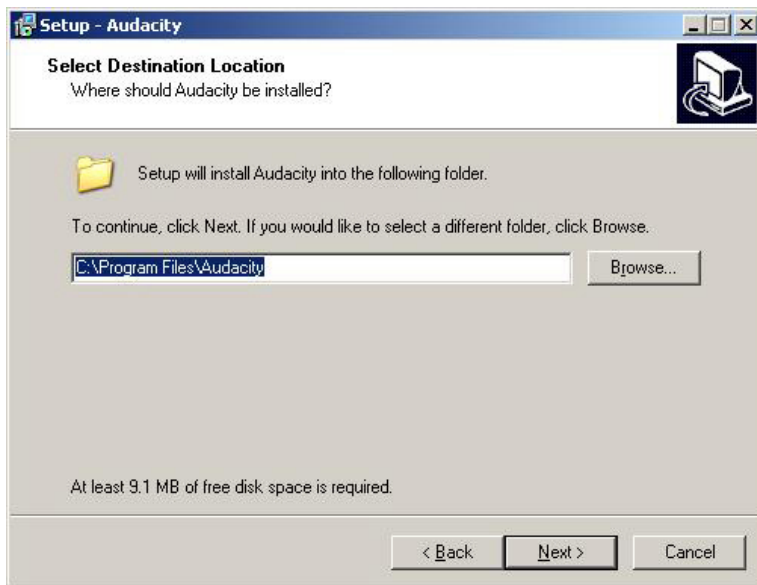
The **Setup Wizard** will automatically create a folder called "Audacity" in your "Program Files" folder so unless you want to install it somewhere else you can simply click "Next" to continue. If you wish to install Audacity somewhere else click "Browse".

You will now be asked to select which additional tasks you would like Setup to perform during the installation.
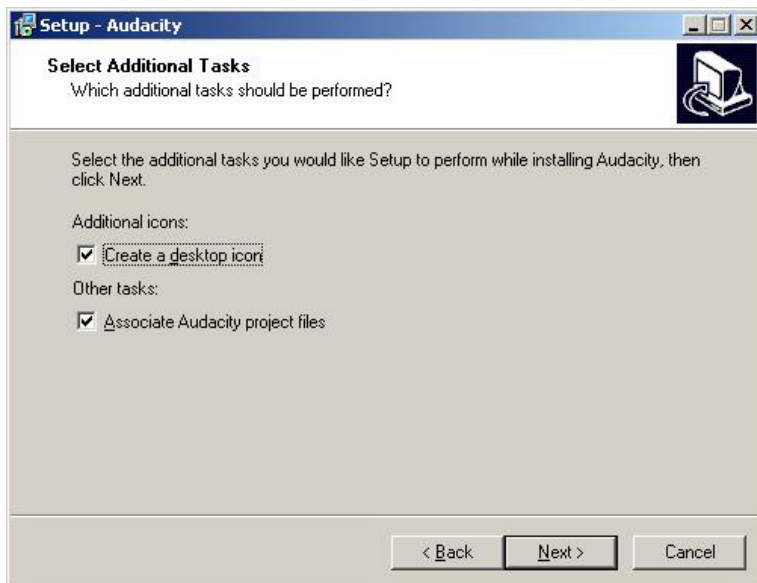
Click the check boxes to select or deselect the additional tasks then click "Next" to continue.

You will now see a window displaying the destination location and additional tasks.
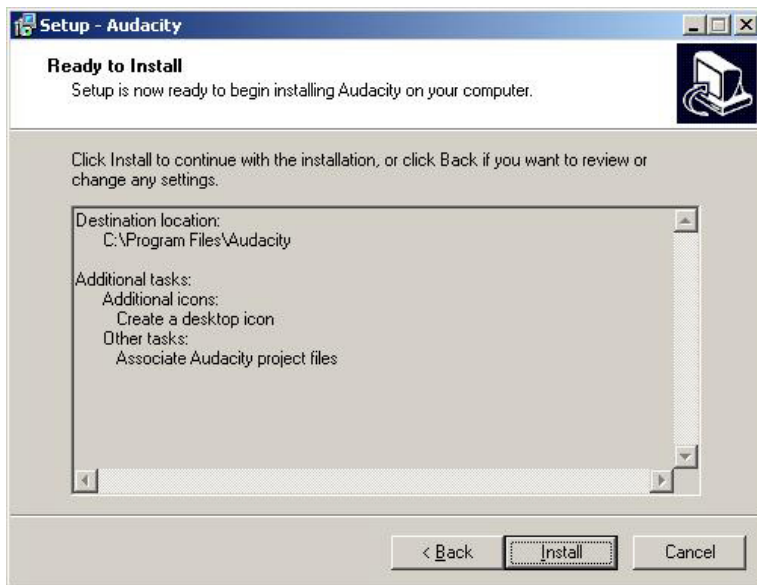
Check that this information all correct and if it is click "Install" to continue. Click "Back" if you wish to change any of the installation settings.

You should now see a window like this:

Click "Finish" to complete the installation. If the check box labelled "Launch Audacity" is ticked Audacity will open straight away.

Installation is now complete. If you didn't choose "Launch Audacity" in the options above then you can launch Audacity by double clicking the following icon in the Audacity folder:

The first time you launch Audacity you will be prompted to select which language you want it to use.
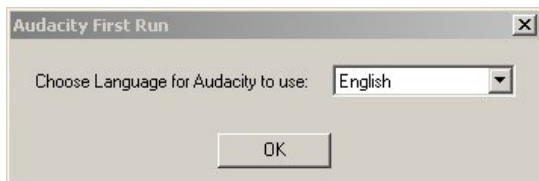
Click on the dropdown menu to select the language you want.
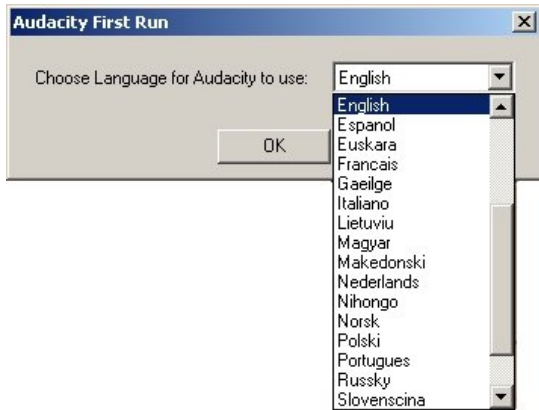
Once you have chosen the language you want, click on "OK" to finish launching Audacity.

The Audacity interface should look like this:
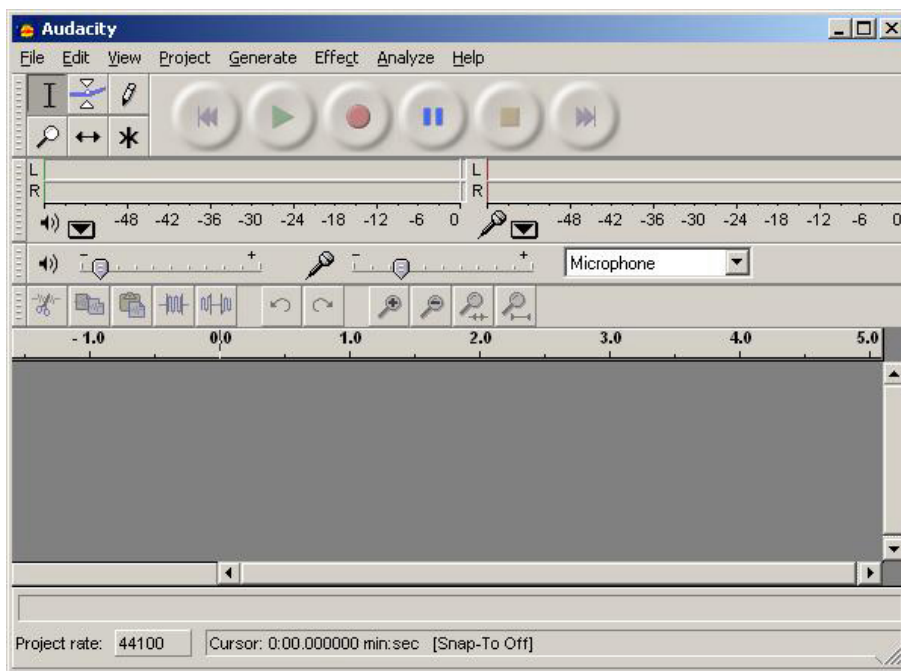
That's it! You now have Audacity up and running and can begin making and editing recordings.

Track Area

Software name : Audacity
Software version : 1.2

In Audacity, a channel of sound is represented by one mono audio track, a two channel sound by one stereo audio track. The example below is a stereo track :
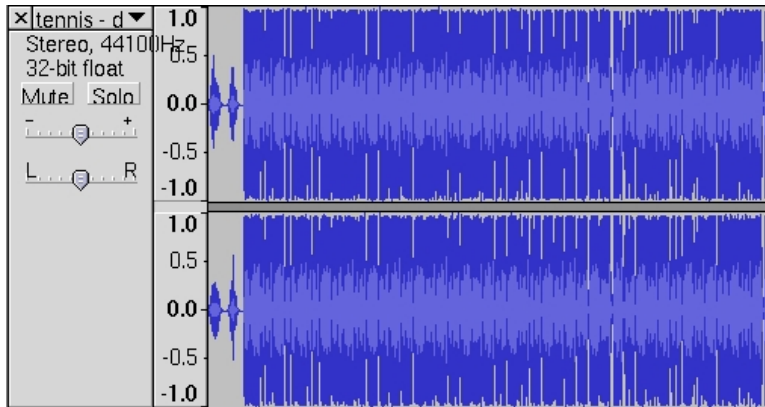
Lets look at some of the controls available to you from this interface :
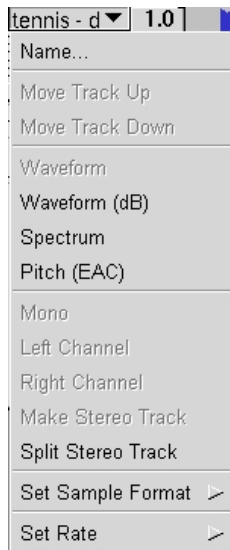
option	action
Name	edit the name of the track
Move Track Up/Down	move Track Up or Down in the display
Waveform	traditional display of audio material.
Waveform (dB)	like Waveform, but logarithmic instead of linear vertical units .
Spectrum	displays the frequency spectrum of the audio over time.
Pitch (EAC)	tries to detect the pitch of the current audio and displays that information over time.
Mono	set playback of this single channel track on the left and right channels.
Left Channel	set playback of this single channel track on the left channel.
Right Channel	set playback of single channel track on the right channel.

Make Stereo Track	the selected track and that beneath it is turned in to one stereo track.
Split Stereo Track	turn one stereo track in to two single channel tracks.
Set Sample Format	pick the sample format for this track.
Set Rate	set the sample rate of this track.

Solo and Mute Mode

Solo

In solo mode, only tracks that have the solo button activated.

Mute

With mute a track is switched off without deleting it.

Gain and Pan Controls

L . . . ⊖ . . . R

This slider set the panning position of the track in the stereo field.

− . . . ⊖ . . . +

This slider controls the track volume, or rather the overall gain of that particular track.

Menu Bar

Software name : Audacity
Software version : 1.2

Lets look at the basic elements of the Audacity Menu Bar :

File   Edit   View   Project   Generate   Effect   Analyze   Help
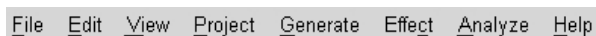
The **Menu Bar** is a typical element in many applications. It will look slightly different to this if you are not using **Linux**, most notably in **Mac OSX** this Menu Bar is not located on the application window itself but at the top of the screen in the "Apple Menu". Lets go through the Menu Bar one item at a time.

File

By clicking on "File" in the Menu Bar you get a drop down menu with several options to choose from. Some options maybe "greyed out" meaning you can't select them, you will only be able to choose the options that appear in solid black. The options available depend on the state of Audacity at the time. For example the following image was taken from Audacity with when the program had just been opened and no recording or editing had been started:

File	Edit	View	Project	Generate	Et
New				Ctl+N	
Open...				Ctl+O	
Close				Ctl+W	
Save Project				Ctl+S	
Save Project As...					
Recent Files...				>	
Export As WAV...					
Export Selection As WAV...					
Export As MP3...					
Export Selection As MP3...					
Export As Ogg Vorbis...					
Export Selection As Ogg Vorbis...					
Export Labels...					
Export Multiple...					
Page Setup...					
Print...					
Exit					

The File Menu is where you can process all the things related to the audio and project (.aup) files.

option	action
New	creates a new empty project window.
Open...	selecting "Open" presents you with a dialog where you can choose a file to open.
Close	closes the current project window.
Save Project	saves the current Audacity project (AUP) file.
Save Project As...	

	allows you to save the current Audacity project (AUP) file with a different name or in a new location.
Recent Files...	gives a list of recent files you ahve been working on.
Export As WAV...	exports the current Audacity project as a standard audio file format such as WAV or AIFF.
Export Selection As WAV...	this is the same as Export, but it only exports the part of the project that is selected.
Export As MP3...	exports the current Audacity project as an MP3 file.
Export Selection As MP3...	this is the same as Export MP3, but it only exports the part of the project that is selected.
Export As OGG...	exports the current Audacity project as an Ogg Vorbis file.
Export Selection As OGG...	this is the same as Export As OGG, but it only exports the part of the project that is selected.
Export Labels...	if you have any Label Tracks, this command will export them as a text file. This feature is commonly used in Speech Recognition.
Export Multiple...	this allows you to do multiple exports from Audacity.
Exit/Quit	closes all project windows and exits Audacity. It will ask you if you want to save changes.

Edit Menu

The **Edit Menu** is only accessible when you are editing an audio file.

| option	*action*
Undo	this will undo the last editing operation you performed to your project.
Redo	this will redo any editing operations that were just undone.
Cut	removes the selected audio data and places it on the clipboard.

Copy	copies the selected audio data to the clipboard without removing it from the project.
Paste	inserts whatever is on the clipboard at the position of the selection cursor in the project.
Trim	deletes everything but the selection.
Delete	removes the audio data that is currently selected without copying it to the clipboard.
Silence	erases the audio data currently selected, replacing it with silence.
Split	moves the selected region into its own track or tracks.
Duplicate	makes a copy of all or part of a track or set of tracks into new tracks.
Select...	selects part of the audio depending on the option chosen.
Find Zero Crossings	moves the cursor or the edges of the selection to the nearest point where the audio waveform passes though zero.
Selection Save	saves the current selection and position.
Selection Restore	restores the selection to the project.
Move Cursor...	these commands provide quick and accurate ways to manoeuvre the cursor around the project to the start and end of tracks and selections.
Snap-To...	turns snapping of the cursor to a grid of time values on or off.
Preferences	opens a dialog window that lets you configure Audacity.

View

The **View Menu** is used to manage the display of the tracks ("channels") and various options to show and hide some interface elements :
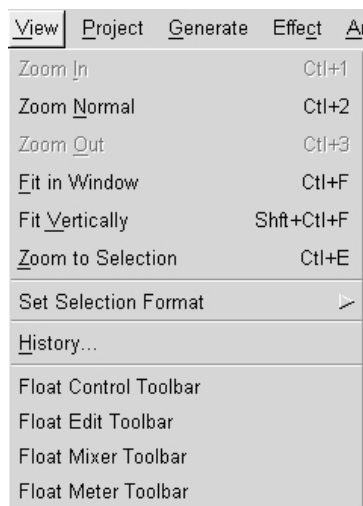
name	action
Zoom In	zooms in on the horizontal axis of the audio displaying less time.
Zoom Normal	zooms to the default view, which displays about one inch per second.
Zoom Out	zooms out displaying more time.
Fit in Window	Zooms out until the entire project just fits in the window.
Fit Vertically	adjusts the height of all the tracks until they fit in the project window.

Zoom to Selection	zooms in until the selected audio fills the width of the screen to show the selection in more detail.
Set Selection Format	sets the format in which selections are measured in at the bottom of the application window.
History	brings up the history window. It shows all the actions you have performed during the current session.
Float or Dock Control Toolbar	toggles between displaying the Tool Bar docked at the top of each project window, or in a separate floating window.
Float or Dock EditToolbar	toggles between displaying the Edit Tool Bar docked at the top of each project window, or in a separate floating window.
Float or Dock Mixer Toolbar	toggles between displaying the Mixer Tool Bar docked at the top of each project window, or in a separate floating window.
Float or Dock Meter Toolbar	toggles between displaying the Dock Meter Bar docked at the top of each project window, or in a separate floating window.

Project

The **Project Menu** is used to add / remove / align tracks in the existing project :

```
Project | Generate  Effect  Analyze  H
Import Audio...                 Ctl+I
Import Labels...
Import MIDI...
Import Raw Data...

Edit ID3 Tags...

Quick Mix

New Audio Track
New Stereo Track
New Label Track
New Time Track

Remove Tracks

Align Tracks...                     ▷
Align and move cursor...            ▷
Add Label At Selection          Ctl+B
Add Label At Playback Position  Ctl+M
```

name	*action*
Import Audio...	imports audio into your project.
Import Labels...	import Label Tracks (text files).
Import MIDI...	imports MIDI files.
Import Raw Data...	tries to open a file in virtually any format, as long as it is not compressed.
Edit ID3 Tags...	opens a dialog allowing you to edit the ID3 tags associated with a project, for MP3 exporting.
Quick Mix	this command mixes all of the selected tracks down to one or two tracks.
New Audio Track	this creates a new empty audio track.

New Stereo Track	creates a stereo version of the new audio track above.
New Label Track	creates a new Label track.
New Time Track	creates a special track that can be used to speed up and slow down playback over the course of the project.
Remove Track(s)	this command removes the selected track or tracks from the project.
Align Tracks	aligns tracks according to the options chosen.
Align and move cursor	same as "Align Tracks" but it also followed by the "Move Cursor" command (from the Edit Menu).
Add Label at Selection	this menu item lets you create a new label at the current selection.
Add Label at Playback Position	like "Add Label at Selection" but the label is added at the current position during playback.

Generate

The **Generate Menu** allows you to insert various generated audio elements into a track :
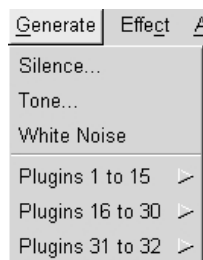
The length of the generated audio is determined by the length of your selection and the position by the left boundary of your selection. If no selection is made, the default length inserted at the cursor position is 30 seconds.

name	*action*
Silence	inserts silence.
Tone	inserts a wave of chosen type, frequency and amplitude.
White Noise	inserts white noise.
Plugins	there are too many plugins to describe here, experiment!

Effect

The **Effect Menu** allows you to apply effects to audio. Note : this menu cannot be accessed while any tracks are in Playback or Record mode.

```
Effect    Analyze    Help
Repeat Last Effect        Ctl+R
Amplify...
Bass Boost...
Change Pitch...
Change Speed...
Change Tempo...
Click Removal...
Compressor...
Echo...
Equalization...
Fade In
Fade Out
FFT Filter...
Invert
Noise Removal...
Normalize...
Nyquist Prompt...
Phaser...
Repeat...
Reverse
Wahwah...
Plugins 1 to 15          ▷
Plugins 16 to 30         ▷
Plugins 31 to 45         ▷
Plugins 46 to 60         ▷
Plugins 61 to 75         ▷
Plugins 76 to 90         ▷
Plugins 91 to 105        ▷
Plugins 106 to 120       ▷
Plugins 121 to 135       ▷
Plugins 136 to 150       ▷
Plugins 151 to 165       ▷
Plugins 166 to 180       ▷
Plugins 181 to 195       ▷
Plugins 196 to 201       ▷
```

name	action
Amplify	this effect increases or decreases the volume of a track or set of tracks.
Bass Boost	this is a smooth filter which can amplify the lower frequencies while leaving most of the other frequencies alone.
Change Pitch	changes the pitch/frequency of the selected audio without changing the tempo.
Change Speed	changes the speed of the audio by resampling. Making the speed higher will also increase the pitch.
Change Tempo	changes the tempo (speed) of the audio without changing the pitch.
Click Removal	this effect is designed to remove the annoying clicks on recordings from vinyl records without damaging the rest of the audio.
Compressor	compresses the dynamic range of the selection so that the loud parts are softer while keeping the volume of the soft parts the same.

Echo	this effect repeats the audio you have selected again and again, softer each time. There is a fixed time delay between each repeat.
Equalization	boost or reduce frequencies.
Fade In	applies a linear fade-in to the selected audio.
Fade Out	applies a linear fade-out to the selected audio.
FFT Filter	you define a curve that shows how much louder or quieter each frequency in the signal should be made.
Invert	this effect flips the audio samples upside-down. This normally does not affect the sound of the audio at all.
Noise Removal	this effect is ideal for removing constant background noise such as fans, tape noise, or hums. It will not work very well for removing talking or music in the background.
Normalize	allows you to amplify such that the maximum amplitude is a fixed amount, -3 dB.
Nyquist Prompt	allows you to express arbitrary transormations using a powerful functional programming language (for advanced users).
Phaser	the name "Phaser" comes from "Phase Shifter", because it works by combining phase-shifted signals with the original signal.
Repeat	repeats the selection a certain number of times.
Reverse	this effect reverses the selected audio.
Wahwah	just like that guitar sound so popular in the 1970's.
Plugins	there are too many plugins to describe here. Experiment!

Analyze

The Analyze Menu gives you many options for measuring your audio :
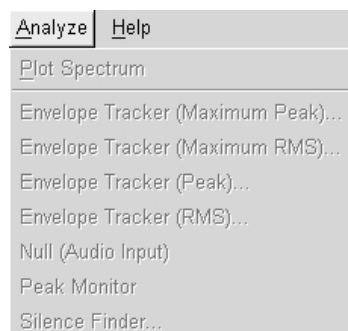
name	action
Plot Spectrum	displays the Power Spectrum of the audio over a selected region.
Envelope Tracker (Maximum Peak)	
Envelope Tracker (Maximum RMS)	
Envelope Tracker (Peak)	
Envelope Tracker (RMS)	
Null	
Peak Monitor	

| Silence Finder | Marks periods of silence within a selection. |

Tool Bar

Software name : Audacity
Software version : 1.2

The **Tool Bars** are where you choose tools to directly work on the tracks. There are three main Tool Bars in Audacity :

- Main Tool Bar
- Mixer Tool Bar
- Edit Tool Bar

Main Tool Bar

Lets look at each button:

button	action
I	this is the main tool you use to select audio.
	the envelope tool gives you detailed control over how tracks fade in and out.
	this tool allows you to change the relative positioning of tracks relative to one another in time.
	this tool allows you to zoom in or out of a specific part of the audio.
	enables the user to draw in to the actual waveforms.
	places the cursor at the start of the project.
	press the play button to listen to the audio in your project.
	press the record button to record a new track from your computer's sound input device.
	will pause during playback, or during recording. Press again to unpause.
	press the stop button or hit the spacebar to stop playback immediately.
	places the cursor at the end of the project.

Mixer Tool Bar

These sliders control the mixer settings of the soundcard in your system. The selector on the right controls what audio input you wish to use.

Input Selector

Line In

Pick the input source you wish to record from. All these items are exposed by the soundcard driver, so the this of options will vary with different soundcards.

Output Slider

This is the left hand slider that lets you control the output level of your soundcard. It actually controls the output setting of the soundcard driver.

Input Slider

This is the right hand slider that lets you control the level of the input selected in the Input Selector. It actually controls the recording level setting of the soundcard driver.

Edit Tool Bar

All these tools perform the exact same function, as those accessible through the "Edit" menu, "View" menu. Lets look at each button individually :

button	action
✂	removes the selected audio data and places it on the clipboard.
📋	copies the selected audio data to the clipboard without removing it from the project.
📋	inserts whatever is on the clipboard at the position of the selection cursor in the project.
📊	deletes everything but the selection.
📊	erases the audio data currently selected, replacing it with silence instead of removing it completely.
↶	this will undo the last editing operation you performed to your project.
↷	this will redo any editing operations that were just undone.
🔍	zooms in on the horizontal axis of the audio displaying less time.
🔍	zooms out displaying more time.
🔍	zooms in until the selected audio fills the width of the screen to show the selection in more detail.
🔍	shows entire project

Open a Sound File

You will need to have an audio file available to edit. If you don't have one and you are online then download an MP3 from somewhere. Make sure its not too big, a 1 minute file is fine. Choose the 'Open' option from the **File** menu :
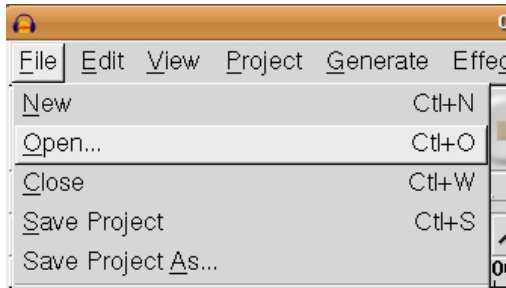
You will then be presented with a window where you can browse to the location of the audio file on your computer :
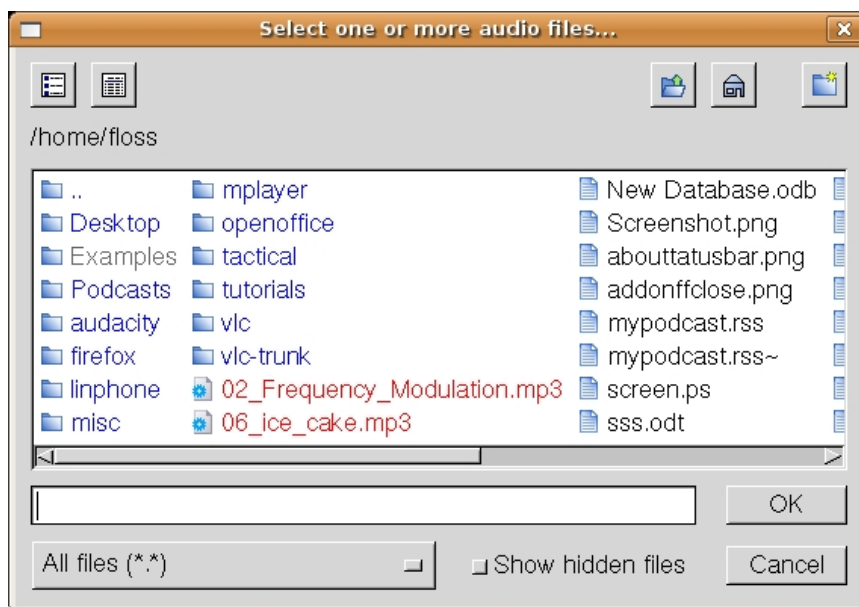
You can see in the above example there are a couple of audio files. I will click on one (06_ice_cake.mp3) :
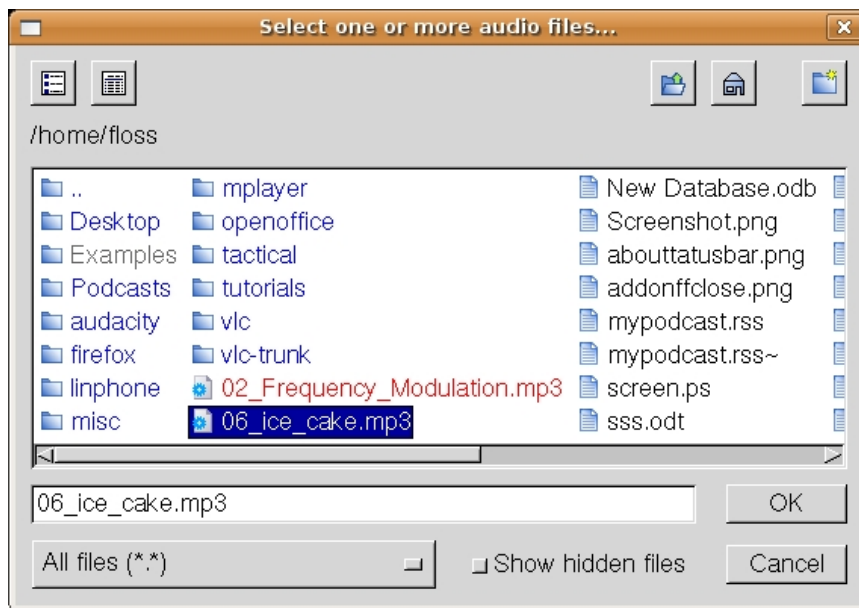
If I now press OK the file will be imported into Audacity.
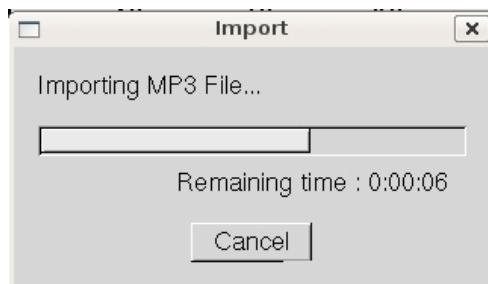
Now its worth noting that Audacity has its own way of storing audio files. These are known as 'Audacity project files'. So when audio is imported into Audacity it is stored in the Audacity format. You cannot then go and edit these files with another audio editor unless you first export the file to another format (for example, to MP3).

Once the import has finished you will see the audio file displayed in the Audacity window :
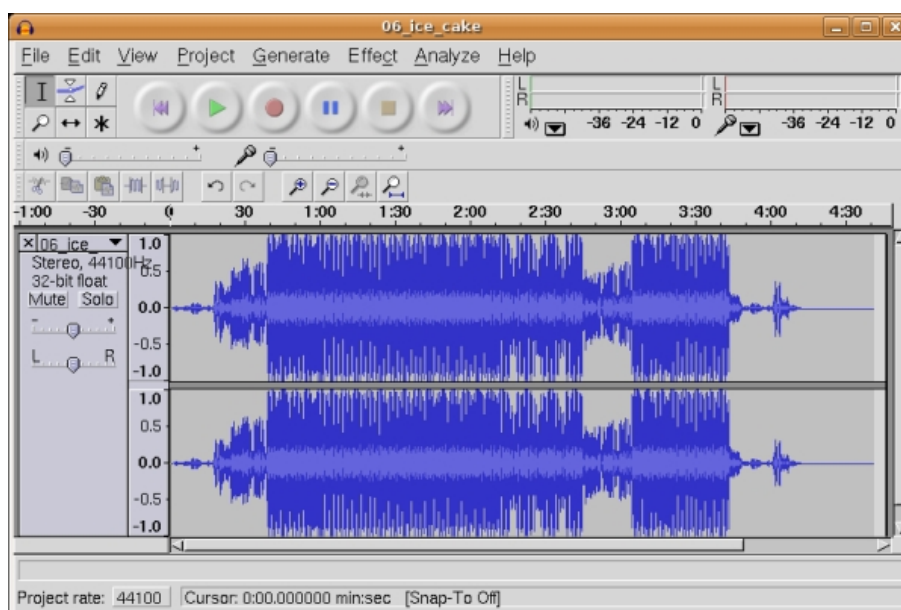
Recording a sound

Software name : Audacity
Software version : 1.2

Recording sound with Audacity is very straightforward you just need to have a computer that has a sound card with at least a **microphone** (**mic**) or **line** input.

Getting started

Before making a recording you need to make sure that what you want to record from (the "sound source") connected to the **audio input** of your computer's sound card. Once you have done that you can launch Audacity.

MacOSX

OS X has a unique way to configure the audio hardware, which is not shared by other operating systems (Windows, and Linux). So if you use OSX you will need to make sure that it is set up appropriately. To do this first open the "Preferences" window by clicking on "Preferences" under "Audacity" in the Menu Bar :
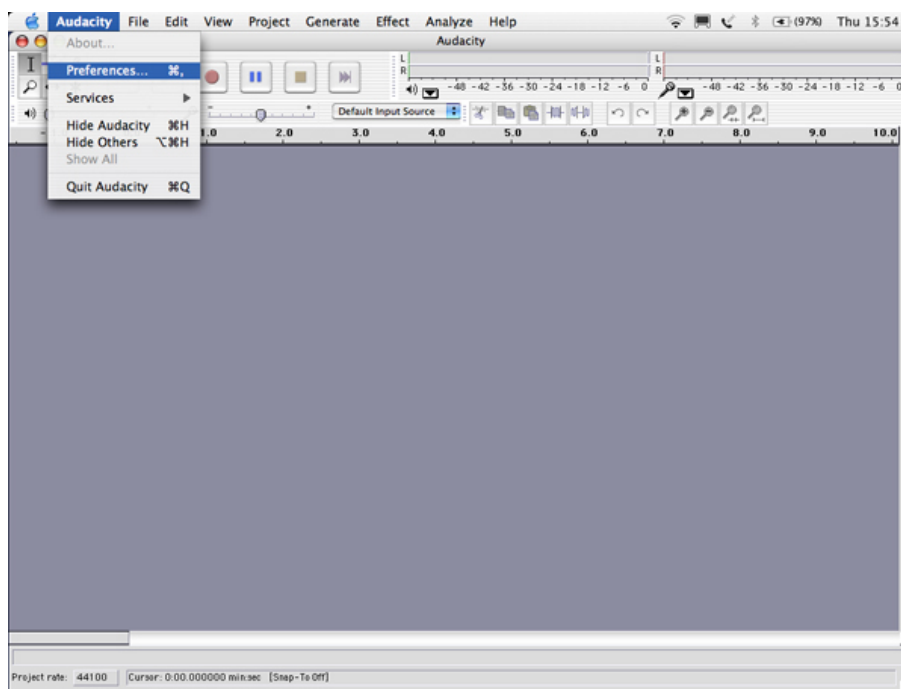
The Preferences window open and look something like this:
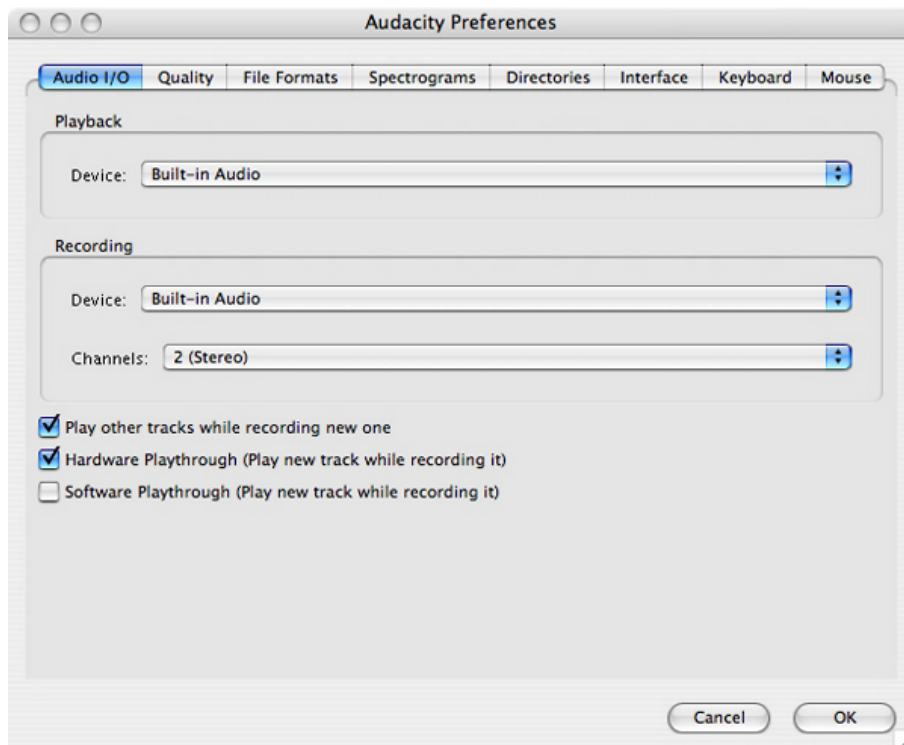
Click on "Audio I/O". The use of "I/O" means "Input or Output", so "Audio I/O" means "Audio Input or Output". The Audio I/O preferences page is where you can choose the sound source (audio *input*) and how you play back the sounds so you can hear them (the *output* settings). This can turn into a jungle of terms but essentially these things are the same:

- *input*
- sound source
- audio input
- input device
- recording device

and these are the same :

- *output*
- playback device
- output device
- sound output

The way you configure the *input* effects how you will record sounds. The configuration of the *output* effects how you will play back sounds so you can hear them.

Lets start with the output settings, these are refered to within the "Playback" section. In the "Playback" section use the "Device:" dropdown menu to select the audio *output* you wish to use. Unless you have another sound card installed "Built-in Audio" will be the only option available.
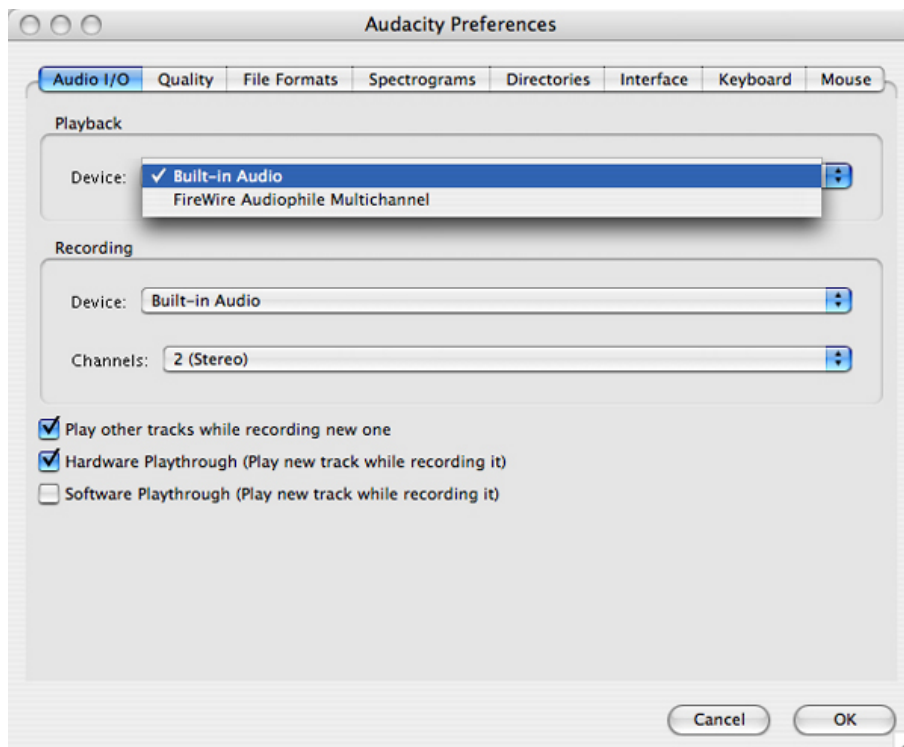
The *input* settings are chosen from the "Recording" section. In the "Recording" section use the "Device:" dropdown menu to select the audio *input* device you wish to use. Unless you have another sound card installed "Built-in Audio" will be the only option available.
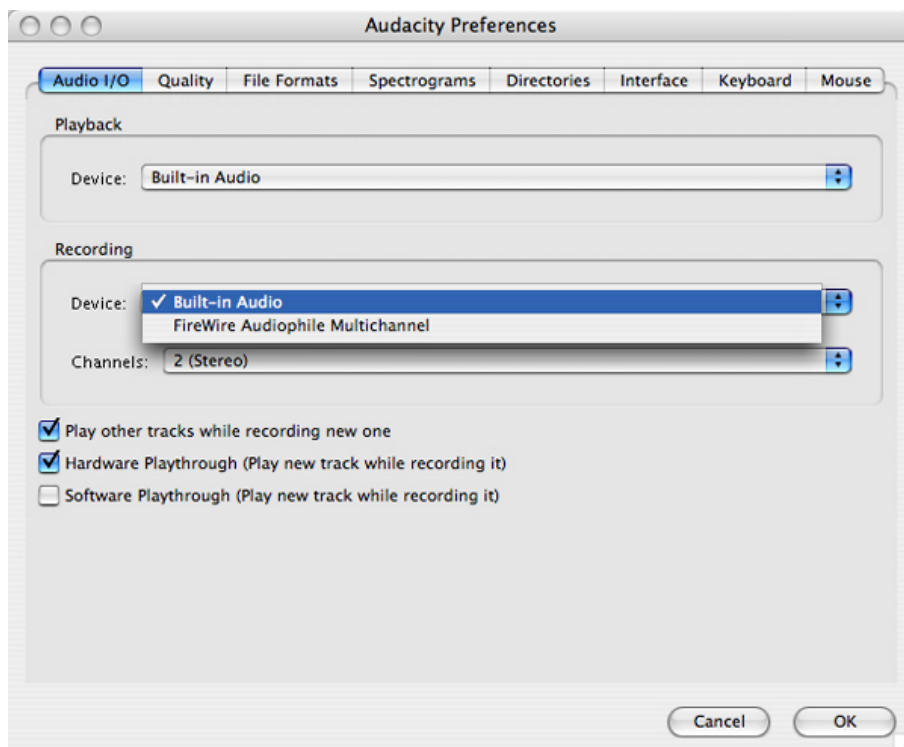
In the "Recording" section use the "Channels" dropdown menu to select the number of channels you wish to use. A "Channel" (also known as a "track") refers to the number of **audio signals** you wish to use to record or playback. A **mono** recording uses one audio signal (1 channel), and a **stereo** recording records two audio signals (2 channels).

Audacity defaults to "1 (mono)" so you can leave it at this if you are recording from a mono audio input. Most

microphones are only capable of producing a mono signal. Select "2 (stereo)" if you are recording from a stereo audio input such as a cassette or mini disc player (or a stereo microphone). It is possible to select up to 16 channels but do not select more than 2 unless you have something other than a 'normal' sound card.

Below the "Playback" and "Recording" sections are three check boxes.
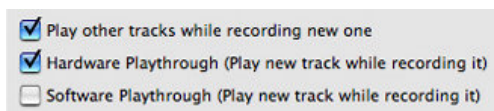
The first check box is not important for this exercise because we are only recording one channel. If you want to listen to the sound as you are recording it you will need to have either "Hardware Playthough" or "Software Playthrough" ticked. "Hardware Playthrough" lets you hear the sound directly from the input source while "Software Playthrough" lets you hear the sound as it will be when the recording is played back.

Now click on "Quality" to bring up this page of preferences:
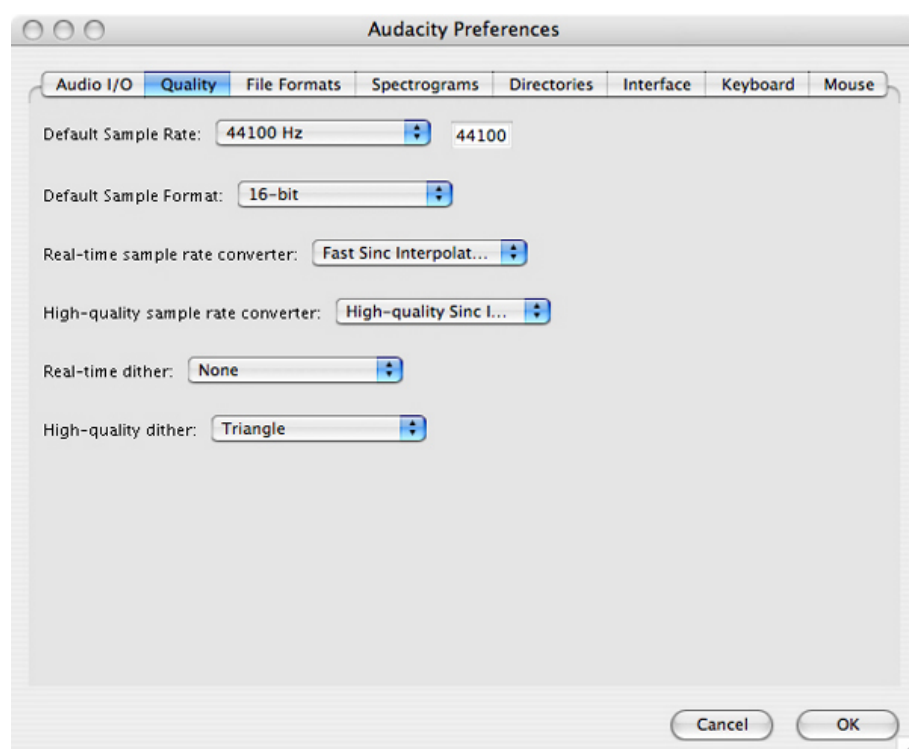
For this exercise you only need to worry about the first two settings; **Default Sample Rate** and **Default Sample Format**. Unless you really know what you are doing, use the dropdown menus to set **Default Sample Rate** to "44100 Hz" and **Default Sample Format** to "16-bit". This will give you CD quality recording.

Those are the only preferences you need to adjust before beginning to record so click "OK" to save the changes and close the Preferences Window. Audacity remembers these preferences so the next time you go to make a recording you will not have to repeat the steps above unless you wish to make changes.

Windows and Linux

Windows and Linux use the same kind of controls. First you need to choose the input device. The Mixer Toolbar has three controls, used to set the volume levels of your audio device and choose the input source.
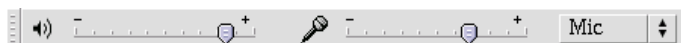
The leftmost slider controls the output volume, the other slider controls the recording volume, and the control on the right lets you choose the input source (such as "Microphone", "Line In", "Audio CD", etc.). You will need to choose "Mic" or "Line In" as one of the inputs. If you are using a microphone choose "Mic". If you are using another audio device (CD Player, Mini disc etc), choose "Line In".

Testing Audio Levels

Now that you have everything set up and ready to go you can begin the recording process.

Before making the recording it is important to preview the loudest section of the source audio so that you do not end up with a distorted recording.

First you need to switch the **input meter** on. This can be set in the main interface :
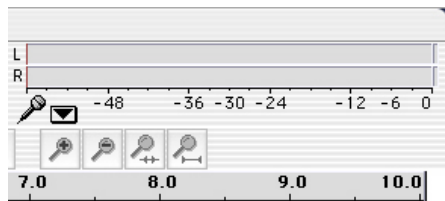
Simply click on the bars above the microphone symbol or click on the arrow next to the microphone symbol and select "Monitor input" like so :
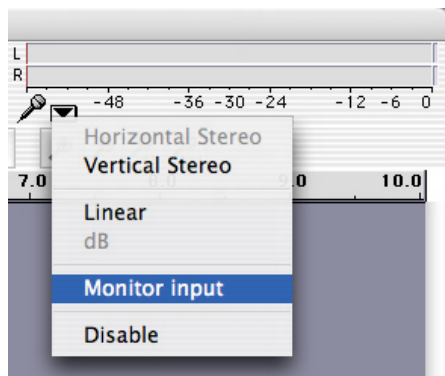
Now play the *loudest* passage of the audio you are recording and, while doing so, look at the input level meter.
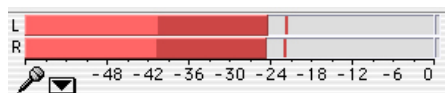
At the *loudest* point the red bars should be at about *-12*. You can adjust the input level by moving the slider next to the microphone symbol.

Keep playing back the loudest passage while adjust the input level until it peaks at about -12. Once you have done that click the "Stop" button :

Recording

Now you are ready to make your proper recording.

Click the "Record" button,

then play the audio you wish to record. Once the sound source has finished click the "Stop" button.

Your recording is now complete so save it immediately by selecting "Save Project" from the "File" menu.
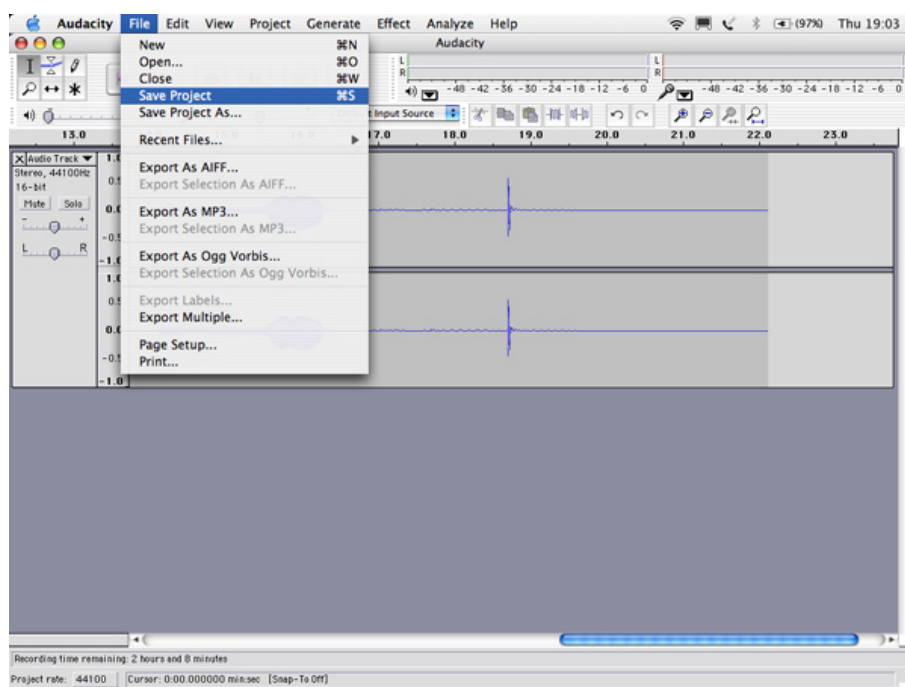
That's it! Your recording is completed and saved. You can play it back by clicking the "Play" button.

Troubleshooting - Linux

Linux :: Host Error?

If you are a Linux user and you see a message similar to this "Error Initializing Audio: There was an error initializing the audio i/o layer. You will not be able to play or record audio. Error: Host error." then you may have to try one of the following :

Kill esd

It maybe that the **esd** sound server is running which is not permitting Audacity to access the sound card. You can try running this in a terminal:

```
ps ax | grep esd
```

If you see an output similar to this :

```
5164 ?        Ss     0:00 /usr/bin/esd –terminate –nobeeps –as 1 –spawnfd 18
10352 pts/1    R+     0:00 grep esd
```

Then you can see from the first line that esd is running ("/usr/bin/esd"). To kill the esd sound server you need to type this in a terminal (you need to have the permissions to run the *sudo* command) :

```
sudo killall esd
```

You will then be prompted for a password, enter *your* password *not* the superuser password (also known as the "root" or "admin" password). Then try and start Audacity again, hopefully you won't get this error.

Start with aRts

You could also try running Audacity through the **aRts** sound server ("**a**nalog **R**eal **t**ime **s**ynthesizer"). To do this quit Audacity if you already have it opened and restart it with this command in a terminal:

```
artsdsp audacity
```

Kill aRts

Lastly, you may wish to try starting Audacity after killing the aRts sound server. You can try this:

```
sudo killall artsd
```

Then try starting Audacity again.

Add Another Sound File

Software name : Â−AudacityÂ−
Software version : 1.2

Audacity enables you to mix multiple sounds together. You will need Audacity open and an audio file already loaded, and then you can add as many new files as you like.

Adding your new track

Ok, so Audacity should be open in front of you and you will have some audio already loaded. In this example we will be working with a sound file I have opened from my computer, and so my Audacity window looks like this :

Now, we wish to add another sound file. To do this you will need to have another sound piece on your computer ready to go, and you will need to know where this file is located on your computer. Then click on **Project** and choose 'Import Audio...' :
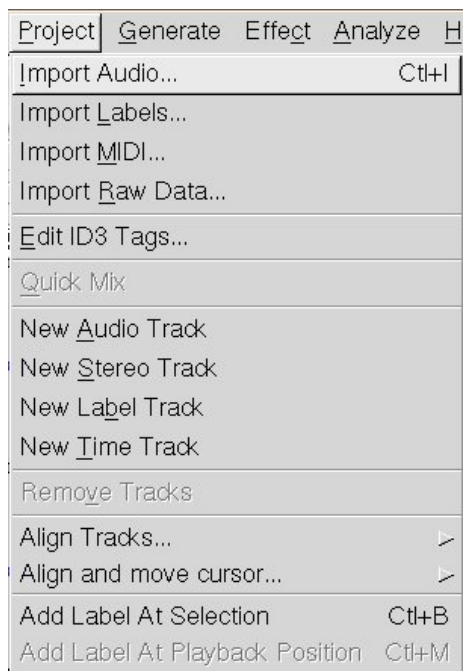
When you have done this a file browser will open :
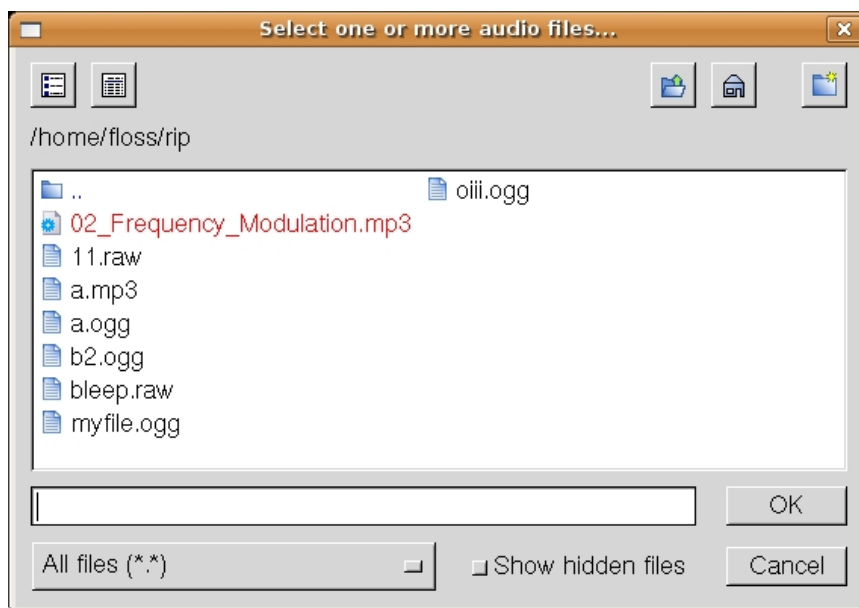
In the above example I am very lucky as the file I wish to load is in the directory shown. If the file was not here I would have to use the file browser to locate the file on my computer. To do this you would open directories by double-clicking on the directory icons, or you can go 'up a directory' by clicking on the button with the directory icon and green arrow :

In my case I will click on the 'myfile.ogg' :
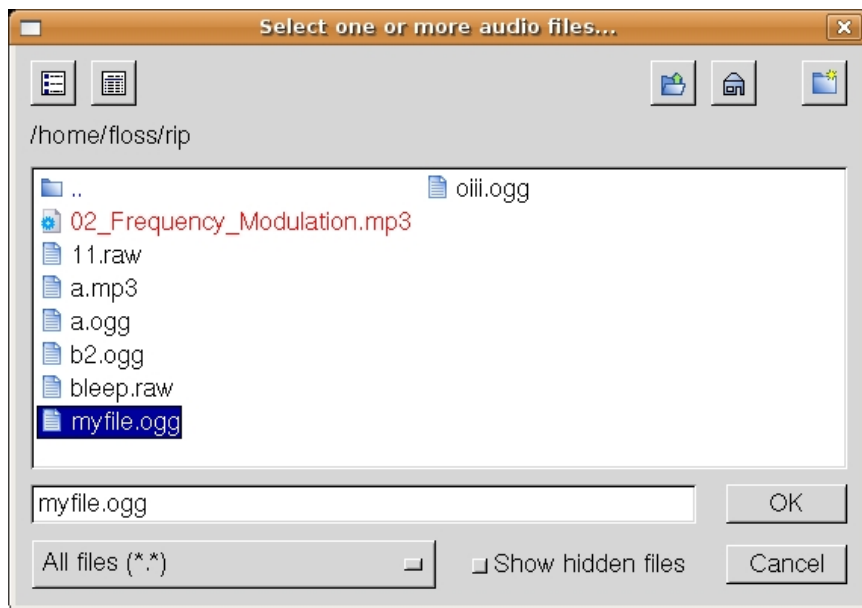
I know press **OK** and the file will be imported. 'Importing' means that the file will be converted into a format that Audacity understands and appear in the Audacity window as a new track. So you when you press 'OK' the importing process begins :

When it is complete the new track can be seen in the Audacity window :
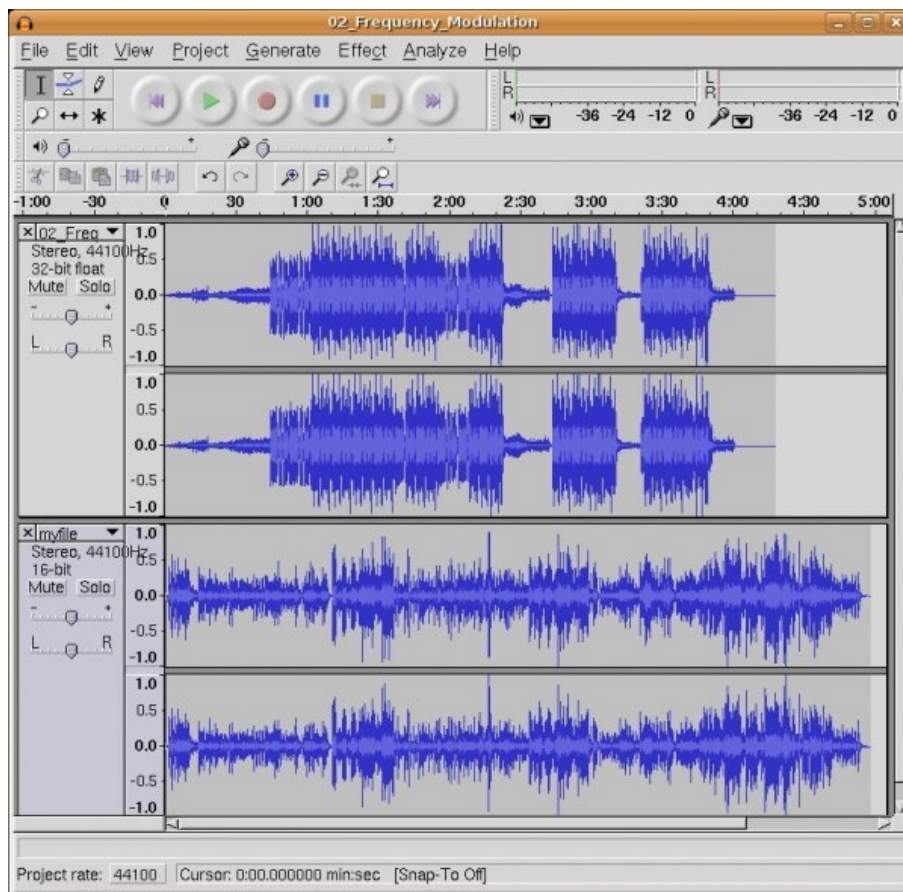
You will notice that in the above example there is a new stereo track added at the bottom of the window. If you don't see this then you might need to scroll down on your Audacity window.

Note on Playback and Exporting

If you now press the 'Play' Button :

you will hear *both* tracks playing back at once. If you were now to export this file the tracks would be combined together into one sound file.

Envelope Tool

The envelope tool is probably the most important tool for Audacity users. It allows you to alter the volume of the sounds in Audacity which is especially important when you are combining ('mixing') several tracks together.

Â−Open Audacity

You will first have to have Audacity open with more than one track. We will use two stereo music files to mix together using the Envleope Tool. So my Audacity initially looks like this :
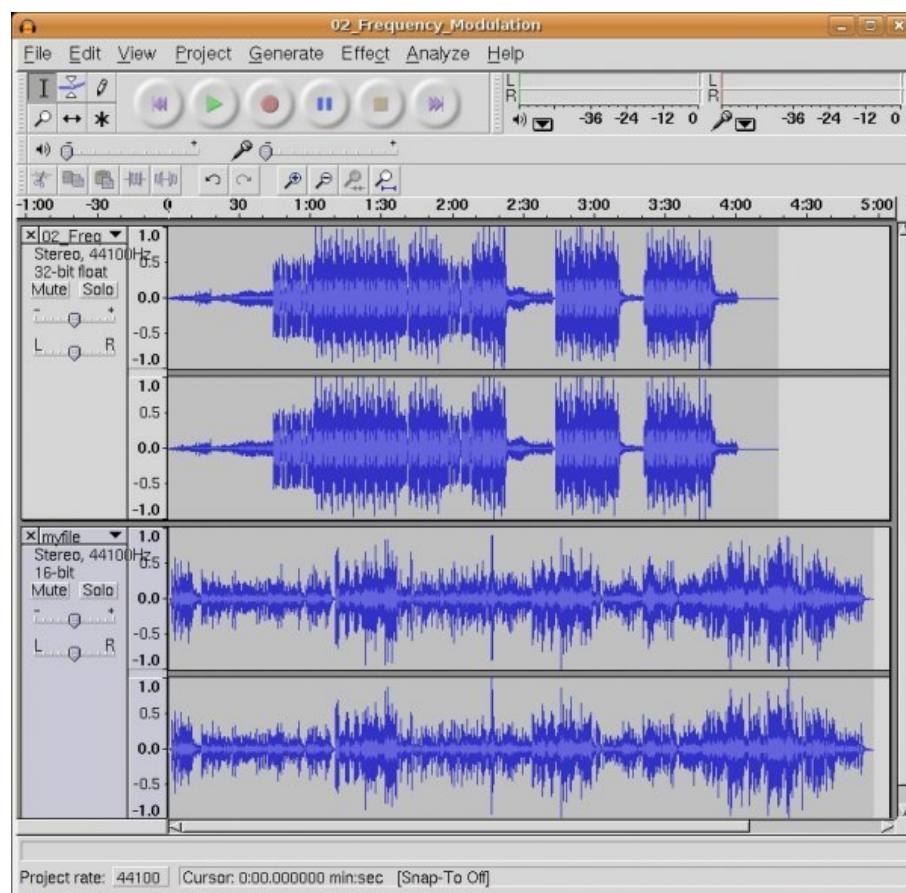
Activating the Envelope Tool

The Envelope Tool has an icon in the Audacity Tool Bar, it loos like this :

When you click on it there are two parts of the Audacity interface that change, the first id that the Envelope Tool button looke like it has been pressed :
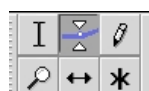
The second is that the tracks are surrounded by a think blue line. Before pressing the Envelope Tool a track looks like this :

After pressing it looks like this:

You can see the blue line around the track in the above image. This means the Envelope Tool is activated.

Alter the volume

The thin blue line actually represents the volume of the track. You can now lower the volume on chosen sections of the track by changing the shape of this blue line. To do this click on the blue line, you will see small white squares appear where you clicked :
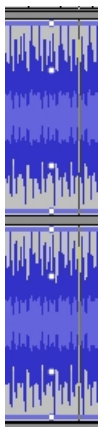
Now you can 'grab' the blue line at the point where these squares appear. To show you how this can change the volume of just one part of the audio click on the blue line close to where you first clicked :
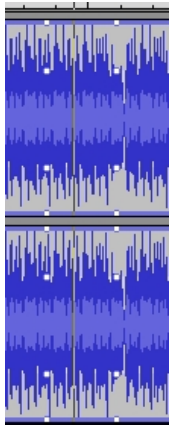
Now point your mouse cursor on the top white square on the left side, and while your mouse finger is still down, drag the square downwards :
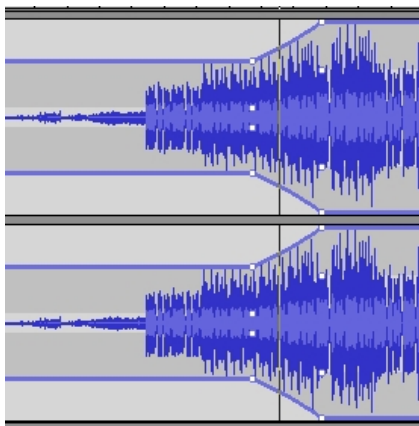
You will notice the area to the left gets smaller (the volume is lowered), and the area to the right gets bigger until it reaches the second set of squares. If you now play back the track you will hear the volume levels follow the lines you have made.

Mixing 2 tracks together

Using the Envelope Tool is the secret to mixing two or more tracks together into one sound piece. You can now experiment using the Envelope Tool and playing back the audio so you can hear how the tracks blend together. At the end you might have a lot of sections effected to create a single sound piece :
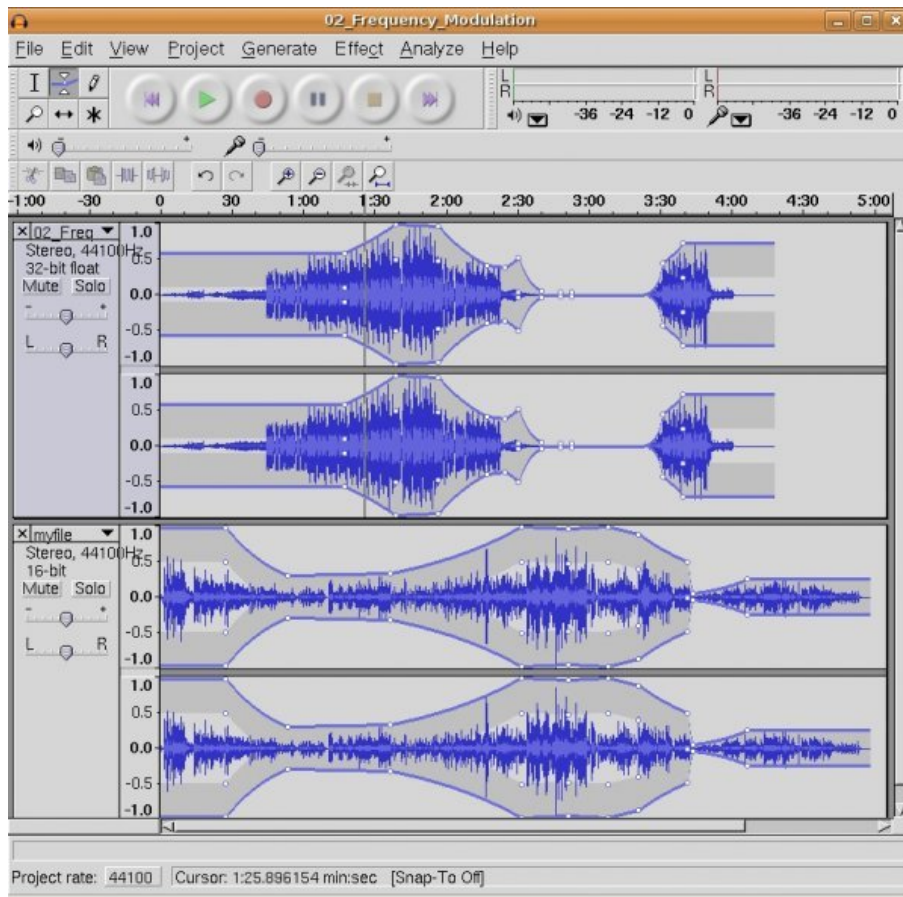
Basic Editing with Audacity

Software name : Audacity
Software version : 1.2

As far as audio editing software goes, Audacity is about as easy as it gets. Thats not to sayÃ Â– its easy, if you haven't edited audio before then the whole concept can get a little bewildering. However with a minimal of practice you should be able to make fast work of editing.

Firstly, you will have to have some audio to edit. You can either record some using Audacity, or open an audio file from your computer.

There are some simple methods that form the basis of editing with Audacity. We will look at deleting sections of audio ('cutting') and shifting audio. With these two methods you can already do quite a lot.

Cutting

You will of course have Audacity open in front of you with an audio file ready to edit. The process of editing requires that you first know your source file (the file you will edit). You need to know where a cut needs to be made so play the audio file and listen for where you want to make your first edit.

Lets assume you have chosen the area to be cut. You need to know select the area by clicking on where the cut should start, holding down the mouse button, and dragging the mouse to the end of the area to be cut. If you do this correctly the area to be deleted will be highlighted in grey :
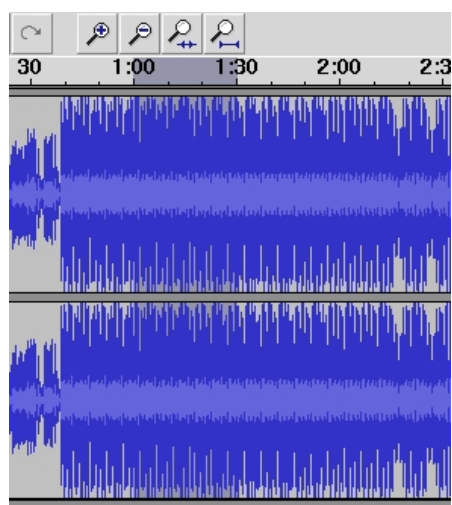
In the above example you can see that I have highlighted the area from 1 minute (**1:00**) to one and a half minutes (**1:30**). A selection of thirty seconds. To delete the file I can now click on the **Edit** menu and choose 'cut' :

When you release the mouse button you will see that the selected area has disappeared and the length of your file will have been reduced.

Focusing on the area to be cut

If you have just opened an audio file just press the green play button to listen to the entire file :

Once you have listened to it you may wish to take some notes to help you decide which area you wish to delete ('cut'). It is also a good idea to replay the area that you will cut to make sure you are selecting the right area. To do this you can select the area, as described above, and then press the play button and Audacity will only playback the selected area. This will help you decide if the selected area is actually the audio you wish to delete. If its not the right area then start again by selecting another area.

If you need to focus closer to the audio to make a 'finer' cut, then press on the magnifying glass icon :

This will enlarge the time scale shown and give you a 'closer' view of the audio. You can 'zoom out' of the audio again by pressing the magnifying glass with the minus sign in it:

Pasting

If you wish to shift audio from one place to another then you can easily do so with Audacity. First select the area you wish to shift. I will use the same area I used in the cutting example :
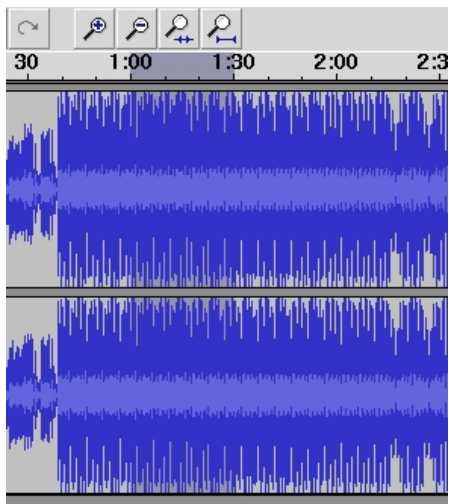
Now choose cut like you did in the above example.
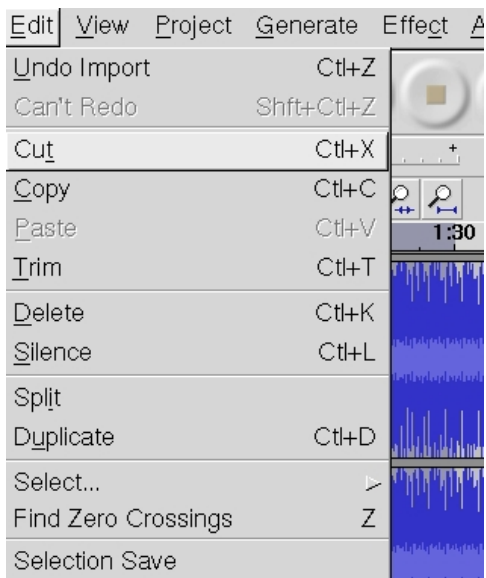
The audio will now be cut from the track. Now click on the audio that is left at the point you where you want this audio to be shifted to.

In the above example you can can see that I ahve decided to insert the audio at the 4 minute mark. Now choose the **Edit** menu and select **Paste**:
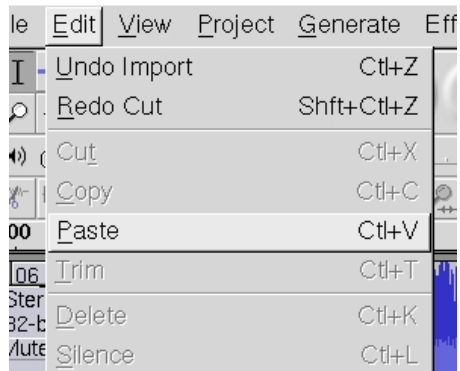
The audio will now be inserted and you if you look at the Audacity window you should see the selected audio in its new place :

The audio will now be inserted and you if you look at the Audacity window you should see the selected audio in its new place :
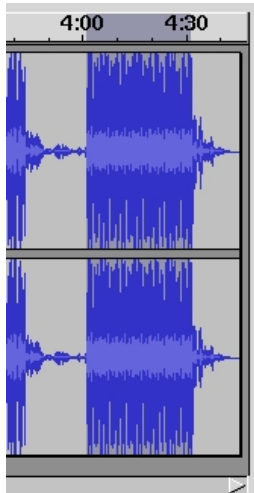
Now experiment with cutting and pasting audio!

Exporting A File

Software name : Â−Audacity
Software version : 1.2

Projects created in **Audacity** are always saved in Audacity's own unique file format that cannot be opened by most other software. It is therefore necessary to export projects to more common file formats in order to use them with other audio software or media players.

Audacity can export the following formats: AIFF, MP3 and Ogg Vorbis.

AIFF files provide uncompressed CD quality audio so this format should be used if you want to open your Audacity project with other music production software or CD authoring software.

MP3 and **Ogg Vorbis** are both compressed audio formats so they have lower sound quality but much smaller file sizes making them ideal for use in media players. The most important difference between these two formats is that **Ogg Vorbis** is completely open while **MP3** is not. For this reason you will need to download and install the LAME MP3 encoder before you can export in MP3 format.

To export a file from Audacity you need to have an Audacity file open. If you do not already have a file open from a recording or editing session then you can open one by pressing the *Apple* and *O* keys together or by clicking on "Open" in the Audacity File menu.
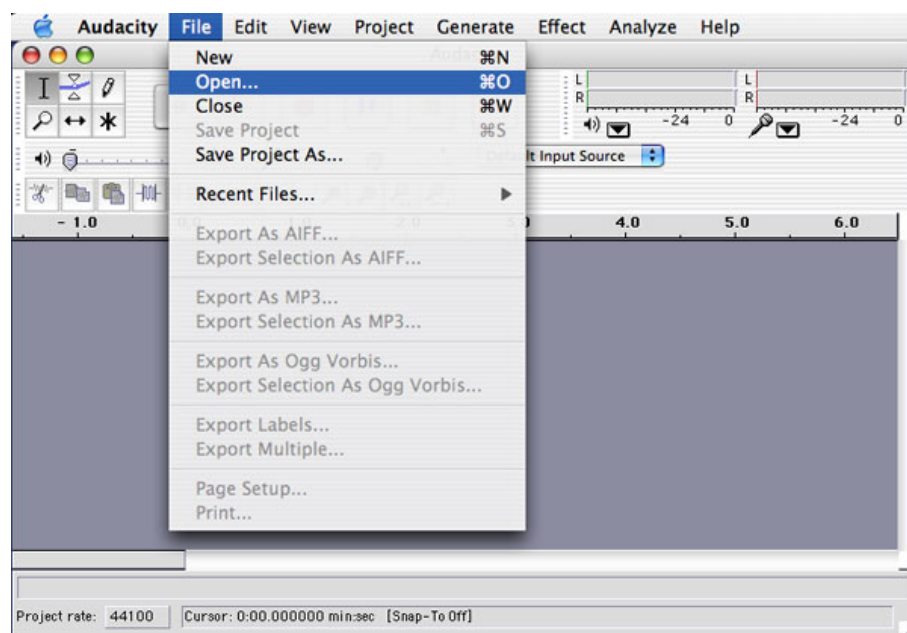
You should now see a window like this:
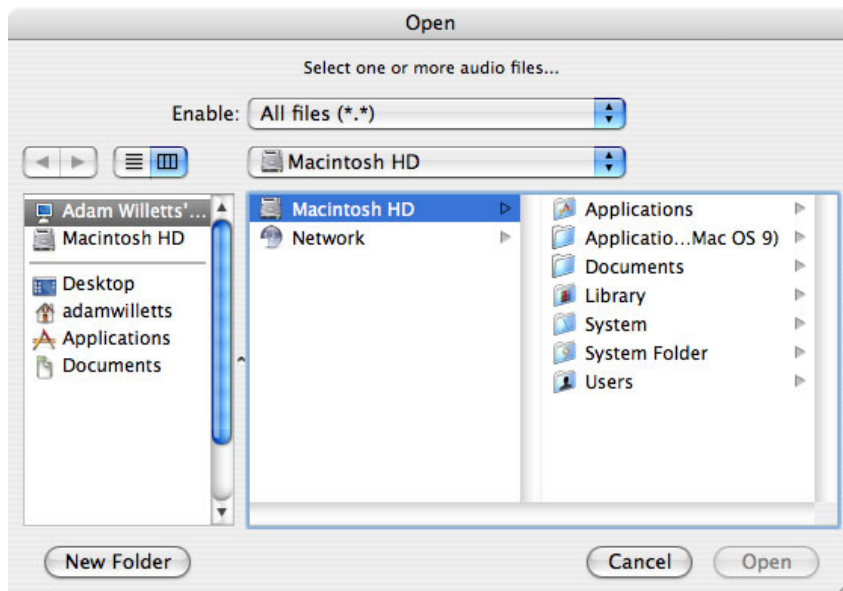
Use this window to browse to the file that you wish to open. Once you have selected the file simply click "Open" to open it. You should now see something a bit like this:
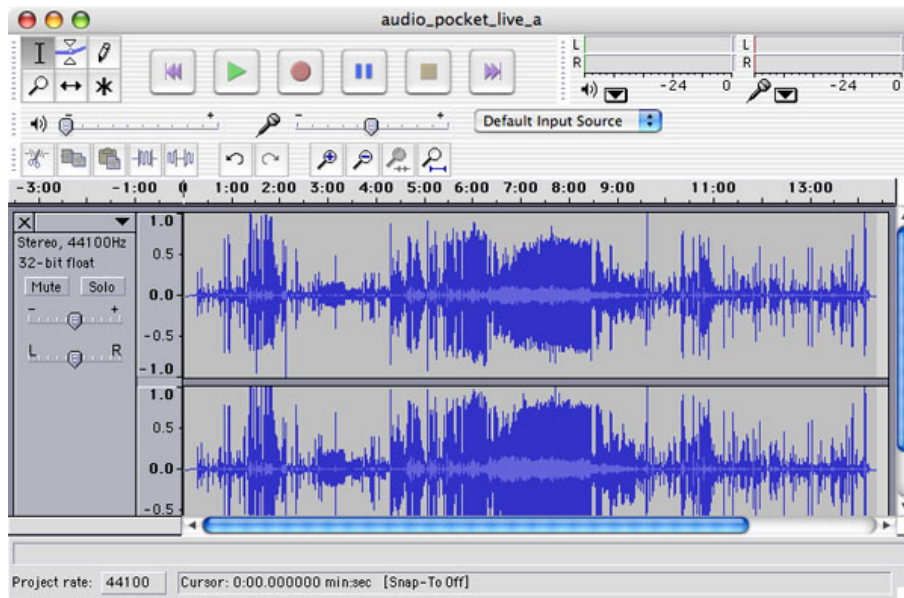
To export the file click "File" then click on the format that you want to export as.
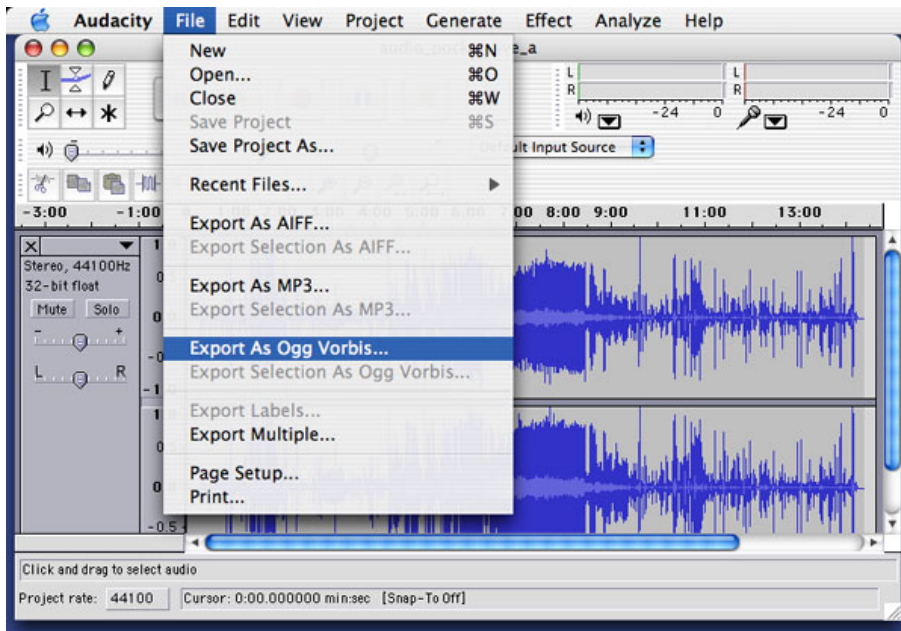
You should now see a window like this:
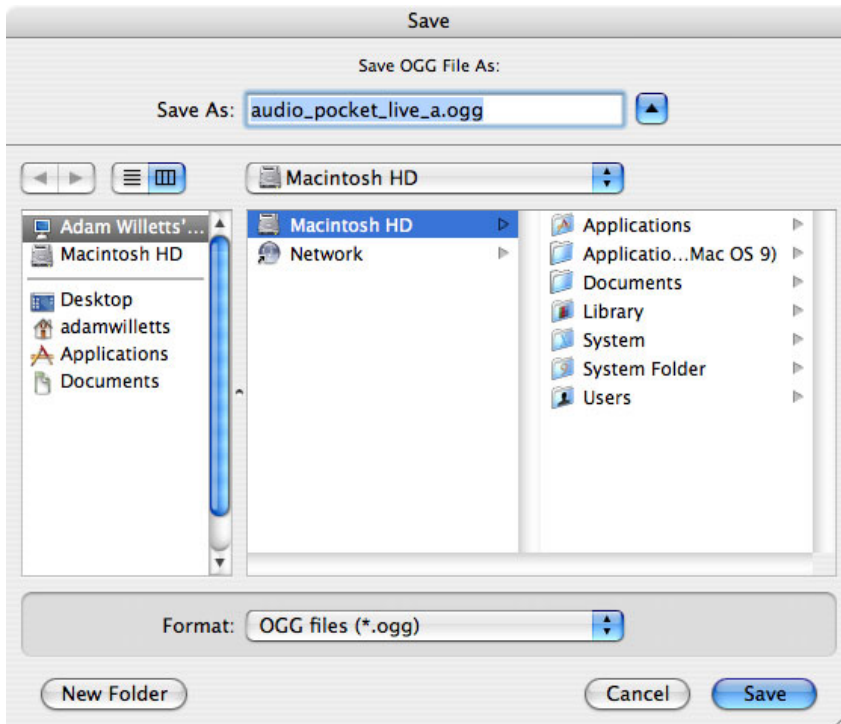
Use this window to edit the file name and select or create an appropriate folder into which to save the new file. Once you are happy with that simply click on "Save" to begin exporting.

You should now see a window like this:

The time it takes to export the project will depend on the length of the **recording and t**he speed of your computer.

When exporting is complete the above window will disappear. You should now be able to see the file in the folder that you chose to save it into looking something like this:

audio_pocket_live_a.ogg

That's it. You can now enjoy listening to the results of your Audacity project through other audio software or transfer it on to your portable media player.

More Help

For more help with **Audacity** you can try these avenues:

Audacity Documentation

You should first look at the very good documentation at the developers site - http://audacity.sourceforge.net

Also try the Audacity FAQ (Frequenctly Asked Questions) - http://audacity.sourceforge.net/help/faq

Online Forums

You can also try searching through the forums for information.

http://audacityteam.org/forum/

The forums contain a lot of postings from users on many topics. You can use the search system to locate topics or just browse the categories. If you don't find what you want then try subscribing to the forums and posting your question to the relevant category.

There are a few things to keep in mind when asking a question in a forum or to a mailing list. First, be as clear as you can with your question and provide any infromation that you might think would help some to try to help you. You might, for example, include information about the operating system you are using, or various specifics that relate to what you are trying to achieve. Additionally, it is always good practice to also post back to any forum or mailing list if you manage to solve your query and include clear information on how you solved the puzzle. This is so that someone else that may have the same issue can resolve it using what you have found out. If possible post back to the same thread (discussion topic) so that anyone searching through the forum can follow the discussion including the solution.

Mailing Lists

Mailing lists are good places to look through for answers to questions. The subscription (also the archives are listed on each info page) information is located here :

http://audacity.sourceforge.net/contact/lists

You can also subscribe to the mailing lists and ask a question. Please note the suggestions about posting to forums and mailing lists in the above section.

IRC

IRC is a type of online chat. it is not the easiest to use if you are not familair with it but it is a very good system. There are a variety of softwares for all operating systems that enable you to use **IRC**. The **IRC** channel for Audacity is where a number of the developers are online and some 'superusers'. So logging into this channel can be useful but it is very important that you know exactly what you are trying to find out before trying this route. The protocol for using the channel is just to log in, and ask the question immediately. Don't try and be too chatty as you are probably going to be ignored. It is also preferable if you have done some research using the other methods above before trying the channel. The details for the **IRC** channel are:

- IRC network: freenode
- Channel: #audacity

Web Search

Searching the web is always useful. If you are looking for problems arising from errors reported by the software then try entering the error text into the search engine. Be sure to edit out any information that doesn't look generic when doing this. Some search engines also enable you to try searches of mailing lists, online groups etc, this can also provide good results.

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