Mixing and blending Music with *Audacity*
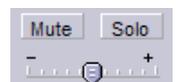
Launch *Audacity*. **(Start => All Programs => Audacity).** **Note:** If *Audacity* is not already on your computer, refer to the handout "How to Install Software..." for installation instructions.

A. Combining songs into a continuous medley

1. A *medley* is a series of songs or portions of songs that flow one into the other.
2. Pull down **Project** => **Import Audio...** , click in the **Look in** menu at the top, navigate to "Royalty-free Music" on the **D:** drive, and click on any one of the songs.
3. Repeat step 2 and select another song. Each song will be loaded into a separate track. You can cut out any parts of a song that you don't want: look at the upper left corner of the *Audacity* screen and click on the **selection tool** I , select the region that you want to delete, and press the **delete** key on the keyboard.
4. Look at the upper left corner of the *Audacity* screen and click on the **time shift tool** ↔ .
5. Use this tool to drag the second song to the right, overlapping with the first song so that the second song starts as the first one fades out. To hear what the transition sounds like, switch back to the **selection tool** I , select the desired region, and click the play button
6. You can also "fade-out" the end of the first song and "fade in" the beginning of the next song: select the desired region, then pull down **Effect** => **Fade In** or **Fade Out**.
7. To save the entire medley as one MP3 file, select **File** => **Export as MP3...** , navigate to the desired save location, type in a file name into the **File name** box, and click **Save**.

B. Adding a vocal track (singing or spoken commentary) to a music file

1. Use this procedure to add voice narration to a music background, or to build up a multi-layer performance where you sing a duet with yourself, or play all the parts of an instrumental work, or to sing along with a karaoke accompaniment, etc. (See handout **B1**, "Recording sound with a microphone", for microphone set-up instructions).

2. Select **Edit** => **Preferences**. Click "Play other tracks while recording new one".

3. Under Recording/Channels, select "**1 (Mono)**". If you were using a stereo microphone, you could use "**2 (Stereo)**". Then click the **Quality** tab and select Default sample rate **44100 Hz**, default Sample format 32-bit float and click **OK**.

4. Pull down **Project** => **Import Audio...**, click in the **Look in** menu at the top, navigate to the folder containing the music, and select the music that you want to use.

5. Press the green **Play** button to play the music and click the **Stop** button to stop.

6. Click on the place in the music where you want to begin recording and click the **Record** button to begin recording from the microphone. Click the **Stop** button to stop. Each separate recording is added to a separate track. To play back the recording, press the **Play** button All the tracks are played back simultaneously, but you can use the **Mute** and **Solo** buttons on the left to mute (quiet) a track or to play it solo (by itself).

7. **Adjusting the volume of tracks**. Adjust the volume of any track by dragging the slider at the left-hand end of that track to make it softer or louder.

8. If you don't like a track that you have recorded, you can delete it by clicking on the close box ☒ in the *upper left corner* of the waveform window, then record again.

9. To delete sections of any audio track that you don't want, drag the mouse pointer over that section of the waveform and press the **Delete** key. To hear one section of the sound file, drag the mouse pointer over that portion of the waveform and click the **Play** button or press the space bar. You can also **Cut**, **Copy**, and **Paste** sections of a sound file.

10. **Aligning the tracks.** Click on the **time shift tool** ↔ in the upper left corner of the *Audacity* screen. Use this tool to shift each track into its proper place. To hear what that section sounds like, switch back to the **selection tool** Ⅰ, select the desired section of the waveform, and press the **space bar** to start and stop.

11. **Adding other sound tracks**. While the other tracks are still showing on the screen, you can pull down **Project** => **Import Audio...** to add another audio file (in WAV or MP3 format) to the project. Use the **time shift tool** ↔ to shift each track into its proper place. Adjust the overall volume of a track by dragging the slider at the left-hand end of that track so that it is not too loud. Note: You can also **Cut**, **Copy**, and **Paste** sections of a sound file within a track and between tracks.

12. **(Optional) Fading the music up and down.** If you want to fade the music up in the pauses between narrative comments, then fade it back down when the narration continues, click on the **Envelope Tool** ⬍ in the upper left corner. Use this tool to click on the waveform to create drag points (little dots) and then use them to drag the envelope up and down to fade the music up and down as needed. (This takes some practice).

13. **(Optional) Special Effects.** You can add various special effects to any track. It's best to add effect to a *copy* of the audio track. First, select the track by clicking on the white area to the left of the waveform, below the L/R slider. Select **Edit** => **Copy**. Then pull down **Project** and select **New Stereo Track**. Select **Edit** => **Paste.** Then pull down **Effect** and select the desired effect. For example, to add richness to a solo instrumental or singing performance, try adding reverberation (**GVerb**) and **Phaser** effects. When you click the Play button, both the original and effect-processed sound will play simultaneously. You can conveniently control the blend of original and effect-processed sound by adjusting the slider at the left-hand end of that track to make that track softer or louder. (For information about the various effects available, click **Help** => **Contents...,** then double-click **Audacity Help, Menu Bar,** and **Effect Menu.)**

14. **Saving**. To save the sound file, select **File** => **Export as MP3...** , navigate to the desired location (e.g. the "Sounds" folder on the desktop), type in a file name into the File name box, and click **Save**. The resulting MP3 file can be used just like any other MP3 file.

15. To save the entire *Audacity* screen with all the separate tracks, select **File** => **Save Project**. You can open the project file later in *Audacity* and continue working on the project. Close *Audacity* when you are finished.

Converting Vinyl Records and Tapes into Audio CDs

Connecting and adjusting the sound settings for recording

1. Connect the output of your record player, tape player, or stereo system to the "line in" input of the computer with a suitable patch cord. (The "line in" input is usually on the back of your computer; it's a 1/8" round hole, often with a symbol of an arrow pointing into the hole. Some sound cards have a *single physical input jack* that is used for both the microphone *and* line-in input. If in doubt, refer to the manual that came with your computer, or simply try each of the holes back there until you find the one that works). You can find the patch cord you need at Radio Shack; you'll need one with a 1/8" stereo mini-plug at one end to connect to the "line in" input and a plug at the other end that matches your turntable, stereo system aux output, or tape recorder's output. Note: if you don't have a suitable turntable, or if your stereo system is not near enough to your computer, consider buying a portable turntable with line outputs, such as the *Vestax Handy Trax* (http://www.vestax.com/products/HandyTrax.htm), about $150.

2. Double-click on the volume control in the taskbar on the lower right corner of the screen. Make sure that the Mute box under "Mic" is checked and that the one under "Line in" is *not* checked and that the "line-in" volume is turned up.

3. Select **Options** => **Properties**

4. Click once on **Recording.**

5. Click **OK**. This opens the Recording Control Box.

6. **Important**! *Make sure that the **Select** checkbox is checked under "Line-in"*. **Note:** Some sound cards have a *single physical input jack* that is used for both the microphone *and* line-in input, depending upon which input is selected in the Recording Control Box. You can now close the box.

Selecting a Recording Method

There are two different methods detailed here, using different software and having certain pros and cons. Except for the noise reduction features, both methods can give identical final results on the audio CD. **Method 1** uses the freeware *Audacity* to record. It has the advantage of a built-in noise reduction function. Also, you can actually see the recorded waveform, making it easy to delete undesired portions or to use Copy and Paste for special effects. However, it does not automatically recognize and separate the tracks on a record; you have to do that manually. This is probably the best method for very old records that have lots of scratches and clicks. **Method 2,** which uses the full version of *MusicMatch* (which you must purchase for $20), has the advantage that it can automatically recognize and separate the tracks on a record. However, there is no easy way to tell that the recording level is adequate until you make a test recording, and there is no built-in noise reduction function. Still, this method is convenient and would work well for records and tapes in good condition.

Method 1: Using *Audacity* to record and *MusicMatch* to burn

1. Launch *Audacity*. (**Start** => **All Programs** => **Audacity**). If *Audacity* is not already installed on your computer, refer to handout **A5**: "Installing Software used in the Digital Sound and Music Workshop" for instructions.

2. Select **Edit** => **Preferences**. Under Recording/Channels, select "**2 (Stereo)**". Click the **Quality** tab and select Default sample rate **44100 Hz**, default Sample format 32-bit float and click **OK**.

3. Click the little triangle to the right of the microphone icon near the top center of the *Audacity* screen.

4. Start up the record or tape player and play a loud portion of the music. Adjust the volume control on the tape or record player (and on volume slider near the microphone icon at the top right of the

Audacity screen) so that the two red bars get near but do not reach the right-hand limit on the loudest parts of the music; this will insure that the sound is loud enough but does not overload or distort. (If you get no response at all, you probably didn't do the set-up correctly - repeat the steps under "Connecting and adjusting the sound settings" at the top of this document).

5. Click the **round red** button to begin recording and start the tape or record player.

6. *Audacity* will record the music until you click on the **square (Stop)** button.

7**.** When the recording is complete, click once on the **square stop button** to stop the recording and then click the **green triangle** to play what you have recorded. If you don't like what you have recorded, you can delete it by clicking on the close box [x] in the *upper left corner* of the waveform window, then repeat steps 4 - 7. (If the volume is too soft, even if you turn the playback volume all the way up, turn *up* the volume control on the tape or record player and on volume slider near the microphone icon at the top right of the *Audacity* screen. If the volume is too loud and distorted, even if you turn down the playback volume, turn *down* the volume control on the tape or record player and on volume slider near the microphone icon at the top right of the *Audacity* screen).

Note: If the record or tape consists of several separate songs, you can either stop the recording after each song, and save the resulting file as the name of that song, or you can record the whole tape or record side and then separate the digital recording into separate tracks later (see step 10).

8. You can clean up your recording by deleting silences and removing large pops and clicks that are visible in the recorded waveform. To listen to any section of the music, just drag the mouse over that section and click once on the **Play** button (green triangle). To delete a section, drag the mouse over the undesired section and press the **delete** key. Use the **Zoom**, **In**, and **Out** buttons (they look like magnifying glasses) to zoom in and out on the waveform so you can see smaller sections clearly. Note: it's best to leave 1-2 seconds of "silence" at the beginning and end of the sound to act as a separator between songs.

9. You can reduce the background noise of your recording by using the noise reduction effect. First, zoom in on the beginning of the song and select (drag the mouse over) a section of "silence" that has only the background noise, e.g. the lead-in right before the music starts. Then click **Effect** => **Noise Removal...** and click once on **Get noise Profile**. Then pull down the **Edit** menu and select **Select All**. Finally, click **Effect** => **Noise Removal...** again and click **Remove Noise**. The noise reduction process will take about 30 seconds to 1 minute for a single song.

10. To save the entire recording as one song, select **File => Export as MP3...** , type in a file name into the File name box, click in the "Save in" pop up menu and select "**My Documents**" => "**My Music**", and click **Save**. Alternatively, if you recorded several songs together into one long waveform, then drag the mouse over each song in turn and pull down **File => Export Selection as MP3...** Repeat for each song. Once you've saved all the separate songs, you can delete the combined recording (click on the close box [x] in the *upper left corner* of the waveform window).

11. In order to make and audio CD of the tracks you have recorded, open the folder contain the tracks and click once on "Copy all items to audio CD" in the left-hand Music Tasks panel. (Or, select the desired tracks, right-click on the tracks, and select "Copy to CD or device"). This brings up the *Windows Media Player* window.

12. Insert a blank CD-R into the CD burner drive and click the red **Copy** button in the *Windows Media Player* window to start burning the disk.

13. The disk will be ejected when the operation is complete (takes several minutes).

14. To print a jewel case label for the CD, complete with a list of tracks,. select **File** => **Print label....** and follow the on-screen directions. Cut out and insert into the jewel case. Remove your CD and label it. Repeat steps 12 - 14 for each audio CD you want to make.

Method 2: Using *MusicMatch* to record (requires the full $20 version of *MusicMatch*).

1. Run *MusicMatch*. (**Start** => **Programs** => **MusicMatch Jukebox**.
2. Pull down MusicMatch's **Options** menu and select **Recorder** => **Source** => **Line in**.
3. Pull down MusicMatch's **Options** menu and select **Recorder** => **Settings**.
4. Click once on the **Advanced** button.
5. Under **Auto song detect**, click once on **Active** so that it is checked. Click **OK** twice to return to the *MusicMatch* main panel.
6. If the RECORDER panel is not showing below the main *MusicMatch* window, click once on the *red round button*.
5. The Recorder window will display the words "artist" and "album" on the left side of the Recorder panel. Click once on these words and type in the actual names of the artist and album that you are going to record. *MusicMatch* uses these names to create folders to save the recorded music files in, so remember these names so you can easily find the recorded files later.
6. Click once on the red round button on the recorder panel to begin recording. Start the tape playing or place the needle in the desired groove of the record.
7. *MusicMatch* automatically recognizes the silences between the tracks and records each track in turn, labeling it "line in track 1", "line in track 2", etc. If the record or tape has another side that you want to record, click once on the **Stop** (square blue) button on *MusicMatch*, flip the record or tape over, and click once on the red round button **Record** button to continue recording. At the end of the tape or record, click the **Cancel** (x) button to stop recording.
8. Once the recording is complete, each track will have been saved (in MP3 format) into a folder in "**My Documents**" => "**My Music**". The files will be in a folder that *MusicMatch* automatically creates and names according to the names you typed into the recorder panel before you started. (If you forgot to do this, the folder will be named simply "artist". You may re-name the folder if you like after the fact). Note: If all you get is silence, you probably didn't do the set-up correctly - repeat the steps under "Connecting and adjusting the sound settings" at the top of this document. If the sound is too loud and distorted, reduce the volume control on the tape or record player and try again.
9. *Optional*. If you like, you may rename the tracks with the actual song names. Open "**My Documents**" => "**My Music**" and look for the folder named for the album you just recorded. Open the folder, right-click on each track and select **Rename**. Type in the name of the song on that track and press the **Enter** key.
10. Click *once* on the **Burn** button at the bottom of the playlist window (brings up **Burner** window).
11. Click once on the square button that has a musical note on it (this means to burn an audio CD).
12. Click once on the **Explorer** button at the top of the **Burner** window. Click once on the + sign to the left of the "My Music" folder to display all the albums that have been recorded. Click once on any album to display its music tracks.
13. Drag the desired music tracks onto the **Burner** window. If the dragged files to not accepted and listed in the Burner window, they are the wrong format for that type of disk.
14. To rearrange the order of the tracks, just drag and drop the titles within the **Burner** window.
15. The green bar at the bottom of the window tells you how much room you have left on the disk. If it's red it means that you have too many files; right-click on a track and select **Remove file** to remove it from the burner list.
16. Insert a blank CD-R disk into the CD-R drive and click once on the **Burn** button to begin burning. This may take several minutes. When it is finished, the CD will be ejected.

17. To print a label for the CD case, complete with a list of tracks, click once on the **Print** button in the Burner window. Click "Back cover settings" under Layout Settings, type in an overall label for the album, and click **Print**. Cut out the track list and insert into the jewel case.

18. Remove your CD and label it. Repeat steps 12 - 18 for each audio CD you want to make.

19. Close the **Burner** window when you are finished. (To return *MusicMatch* to the normal mode for recording audio CDs, pull down the **Options** menu and select **Recorder** => **Source** and select the desired CD drive).

Reducing Noise in Digitized Analog Recordings using *Audacity*

Opening up a prerecorded file in Audacity

1. Launch *Audacity*. (**Start** => **All Programs** => **Audacity**). If *Audacity* is not already installed on your computer, refer to handout **B5**: "Installing Software used in the Digital Sound and Music Workshop" for instructions.
2. Put the *Digital Sound and Music* CD-ROM into the computer's CD-ROM drive.
3. Select **Project** => **Import Audio...**. Click in the "Look in" menu at the top and select the CD drive (the icon looks like a round CD disk).
4. Look in the list for the folder named "Old Records". Double-click on that folder or click on it once and click **Open**.
5. Open (double-click on) "Original".
6. The waveform will be displayed. To play it, press the **space bar**, or click the green triangle ▶ Listen on your headphones so you can hear clearly. As the song plays, the cursor line moves through the waveform.
7. *While the song is playing*, click the 🔍 button (looks like a magnifying glass with a plus on it). Zooming in will allow you to see details of the waveform more clearly. You will be able to see the individual notes as they slide by. You will also be able to see some pops and clicks as sharp spikes that stick out from the smoother music waveform. These are caused by tiny scratches on the surface of the record.

Removing pops and clicks

1. Click the 🔍 button to display the entire waveform, then click the green triangle **Play** button. ▶ As the song starts to play, click the 🔍 button two or three times until you can see the individual notes scrolling by as the music plays.
2. When you hear a click that you want to remove, press the **spacebar** immediately to stop the song at that point. The portion of the waveform that was playing at that point is displayed in the center of the screen.
3. If you can see the click as a spike near the center of the screen, drag the mouse over two or three notes around that region and click the 🔍 button to zoom in on that region. Click the **Play** button to play just that region.
4. Carefully drag the mouse over the spike, so that only it is highlighted, and press the **delete** key on the keyboard. Click the mouse at the beginning of that region and press the **spacebar** (or click **Play**) to see if the click is removed.
5. Click 🔍 a times few to zoom out and press the **spacebar** (or click **Play**) to continue playing.
6. Select **File** => **Close** and click **No** when it asks you if you want to "Save Changes...".

Automatic Noise Reduction

1. Select **Project** => **Import Audio...** and double-click on "Original"
2. Drag the mouse over the first 10 seconds of the song and click the ⟋🔍 button. You should see section of "silence" that has only the background noise, e.g. the lead-in right before the music starts, followed by the first few notes of the song.
3. Select (drag the mouse over) the lead-in ("silence") before the music starts.
4. Click **Effect** => **Noise Removal...** and click once on **Get noise Profile**.
5. Pull down the **Edit** menu and click **Select => All**.
6. Click **Effect** => **Noise Removal...** again and click **Remove Noise**. The noise reduction process will take about 30 seconds to 1 minute for a single song, more for several songs strung together.
7. To save the entire recording as one song, select **File => Export as MP3...** , type in a file name into the File name box, click in the "Save in" pop up menu and select the desired save location, and click **Save**.

Comparing other methods of recording

1. Click **Start** => **Programs** => **Accessories** => **Entertainment** => **Windows Media Player**. This is a general-purpose player application that is supplied with all Windows machines. It can play most types of music, sound, and video files.
2. Click on the **Now Playing** tab on the upper left corner of the Windows Media Player window. (If that's not showing, click on the little skinny "Show Taskbar" button on the left edge of the window)
3. Select **File** => **Open**. If the File menu is not showing, click the tiny round button in the upper left.
4. Click in the "Look in" menu at the top and select the CD drive (icon looks like a round CD disk).
5. Look in the list for the "Old Records" folder. Double-click on that folder or click on it once and click **Open**.
6. Several files are listed. The following three files are original (unfiltered) recordings of Nat King Cole's "Honeysuckle Rose" from his "Trio Days" album, using three different recording programs and saved in three different sound file formats:

"MusicMatch"	Recorded using *MusicMatch*	MP3 format
"Cool Edit"	Recorded using *Cool Edit*	WAV format
"Plus Analog Recorder"	Recorded using *Analog Recorder*	WMA format

To listen to one of these, click on it and click **Open**. To listen to another, select **File => Open**. and repeat this procedure. Compare the three files listed above and see if you can hear any difference caused by the recording program or by the different formats they are recording in. (Most people can hear little or no difference). Now open the file "Plus Analog Recorder reduced pops and hiss" and compare to "Plus Analog Recorder original". This demonstrates *Plus Analog Recorder's* pop and hiss filter.

7. If you have time, try opening and listening to some of the sound files in "Sound file examples" on the CD-ROM. Put your Sound and Music CD-ROM into the CD drive, select **File** => **Open**, click in the "Look in" menu at the top and double-click the CD-ROM icon, then double-click "Sound file examples".