

Projects on the Move



Linux is a wonderful and underrated audio production platform, with great applications for every audio task. MuseScore and LilyPond bring elegance and sophistication to score writing, and Chordii is a wonderfully simple guitar sheet-music maker. *By Carla Schroder*

MuseScore is a sophisticated WYSIWYG music notation editor for writing and printing scores. It has a nice integrated mixer and synthesizer for instant previews of your work, supports the creation of large complex scores, and allows fast note input. You'll find MuseScore in Debian, Ubuntu, PCLinuxOS, openSUSE, and sources and binaries on the MuseScore website [1].

You've Got the Beat

Install and start it up for instant gratification: It opens to the Promenade of Modeste Mussorgsky's "Bilder einer Ausstellung." Hit the *Play* button and enjoy. A blue line follows the music, and in the bottom-right corner, you'll see the location of each note or chord as it plays by measure and beat.

To see what else MuseScore can do, stop the playback and click on the notes – they play when you click them. Zoom out with `Ctrl + -` and in with `Ctrl + =`. To move the page around, position the cursor on any blank spot and just click and drag. If the keyboard shortcuts don't work, or if you want to change them, go to *Edit | Preferences | Shortcuts* and fix them any way you like. MuseScore is equally friendly to the keyboard and the mouse.

Now, you can unleash your creativity and write your own song. I have no songwriting talent, so I am going to write "Frère Jacques."

You can begin by clicking *Create New Score | Create new score from scratch* and following the wizards. The instrument selection dialog might tempt you into all manner of unlikely combinations; I chose sitar and alto guitar. The next dialog is key selection; it's not labeled, but mousing over it will display the names. Next, select your time signature and number of measures and click *Finish*; your new blank score awaits your creative genius!

To enter notes in your new score, you must be in Note Entry mode. Click the *N* button on the *Note Entry* toolbar – or *n* on the keyboard. (Press the Escape key to leave Note Entry mode.) When you are in Note Entry mode, you'll see a blue line at the beginning of the first measure. To enter notes with the mouse, go to the Note Entry toolbar and click on the note with the appropriate duration (quarter note, half note, etc.). Then, go back down to your score and click on the staff to select the correct pitch. Yep, it's that easy. To delete a note, you simply press the Backspace key.

When I was a wee Girl Scout, we sang "Frère Jacques" as a round and kept it going until our troop leader threatened to feed us to bears. A round consists of exactly the

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same notes for the second voice; the only difference is the starting point. So, instead of re-entering all those notes manually on the second staff, you can save precious effort with copy and paste.

To begin, exit Note Entry mode, then click the start of the section to be copied, hold down the Shift key and click the end of the section. A blue box will appear to mark the selection. To copy, press Ctrl + C, click at the beginning of where you want to paste it, and press Ctrl + V. Figure 1 shows my new score.

When you're finished with your creation, you can save it in a number of formats. The default is the native MuseScore format (.mscx). This format uses plain text, so it's easily recoverable and editable. You can import and export MusicXML (.xml) files, which means you can share scores with virtually all music score editors.

Experimental support exists for LilyPond format (.ly) [2], but you're better off using MusicXML and the musicxml2ly converter included in LilyPond to convert .xml files to .ly. You can export your scores to a number of popular audio file formats: WAV, FLAC, and Ogg Vorbis. MIDI import and export also are supported. For printing, you can choose from Portable Document Format (.pdf), Scalable Vector Graphics (.svg), PostScript (.ps), and Portable Network Graphics (.png).

The documentation for MuseScore is first-rate – well-written and thorough – so do please read the fine manual. Note that MuseScore requires a fair bit of horsepower. My single-core CPU consistently pegged at 95% and higher. The program is happier on multicore machines.

MuseScore is a grass-roots success, created by musician and developer Werner Schweer, who is the author of the popular Linux MIDI sequencer MusE. In 2002, Schweer spun off the music notation component of MusE as a separate program when he decided it didn't really make sense as part of a MIDI sequencer. MusE is still going strong. Music education teachers have discovered MuseScore, and it is downloaded more than 1,200 times per day. A map of schools that use MuseScore is available online [3], so you can put your school on the map! MuseScore is licensed under the GPL; runs on Linux, Mac OS X, and

Windows; and supports 35 languages.

LilyPond

LilyPond is a music score engraving program [4]. Engraving here doesn't refer to literal engraving; the output is printed like any other computer document. Rather, it refers to the days when music scores were beautifully engraved by hand – a skill that took years to master. Music scores were cut or stamped onto pewter or zinc plates, which were then inked to print paper scores. (Read the Engraving chapter of the LilyPond manual to learn about the subtleties of music typography and the differences between engraving and ordinary computer-generated scores [5].)

LilyPond is driven from the command line, but don't let the lack of a GUI scare you away; LilyPond is user-friendly and easy to learn. Again, I'll show how to write a simple score for "Frère Jacques." To begin, you'll need to create a plain-text input file. Here are the first four bars of "Frère Jacques":

```
\version "2.12.3"
\relative a' {\time 4/4
  \clef treble
  a4 b c a a b c a c d e2 c4 d e2
}
```

Name this file test.ly, then compile and create a PDF by running `lilypond test.ly`. Eureka! You have Figure 2. That's pretty plain, so you can add a title, composer, and lyrics as shown in Listing 1.

The results are shown in Figure 3. Isn't that a fine-looking score? Next, I'll explain what everything means.

The `\version "2.12.3"` at the beginning tells the LilyPond compiler the version number. You don't have to include the version number in the header, but the compiler will complain if it isn't there. How do you know the version number? Just type `lilypond -v`.

Every block is delimited with curly braces, so the header block gets its own pair. Headers are special commands that are not part of the music blocks. They are used for multiple purposes, such as title and composer and other metadata, and to mark sections in the conductor's



Figure 1: A simple score created in MuseScore.

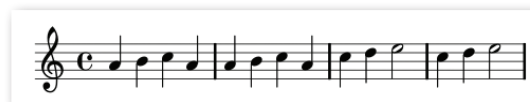


Figure 2: A very simple score created with just a few lines of LilyPond code.

LISTING 1: Adding Lyrics

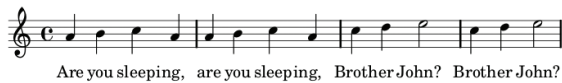
```
01 \version "2.12.3"
02 \header {
03   title = "Frere Jacques"
04   composer = "Carla, poached from
    elsewhere"
05 }
06 <<
07
08 \relative a' {\time 4/4
09   \clef treble
10   \key c \major
11   a4 b c a a b c a c d e2 c4 d e2
12 }
13
14 \addlyrics {
15   Are you sleep -- ing, __ are
    you sleep -- ing, __ Broth -- er
    John? __ Broth -- er John?
16 }
17 >>
```

LISTING 2: Chordii Sheet Music

```
01 {title:Strummin' and Hummin'}
02 {st:the life is pretty darn good song}
03 {comment: sounds best at a medium tempo with good
    energy, don't drag and don't go too fast}
04
05 {start_of_chorus}
06 The end [E]of another grand day
07 There's [D7]no place that I'd rather be
08 Sitting [E]here playing the sun away
09 Chomping [A7]on olives and Brie
10
11 Life in the sticks is feeling pretty fine
12 Squatting on these acres they are mine, all mine
13 I don't have to share, don't have a care
14 Just me and the cows and swine
15
16 The air smells sweet and the land is pretty
17 Can't pay me enough to live in a city
18 This is my home, plenty room to roam
19 Just me and the dogs and the fierce little kitty
20
21 {c:Chorus}
```

Frère Jacques

Carla, poached from elsewhere



Are you sleeping, are you sleeping, Brother John? Brother John?

Figure 3: A simple LilyPond score with title, composer, and lyrics added.

score. Angle brackets surround the sections where lyrics accompany the music.

The `\relative a'` command determines the starting octave. If you don't use the `\relative` command, your music might start in the wrong octave, so `\relative a'` means relative to middle A. This approach is a bit unusual, but it's a timesaver.

LilyPond calculates pitch relative to each note by staff position. Suppose you're at D, which is on the second staff line from the top. When D is followed by E, F, or G, LilyPond assumes they are in the same octave, so these notes go on the staff immediately above D. When D is followed by A, B, or C, LilyPond calculates they go on the staff below D.

LilyPond uses commas to indicate movement to one octave lower, and apostrophes for one octave higher.

So, you would indicate an octave higher than middle A with `\relative a''`, and one octave below middle A with `\relative a,`. You can also do this with individual notes. If you want to follow middle A with A an octave higher, do `a a'`. For lower, do `a a,`. Remember that all this is relative to the previous note, so you don't need any octave marks until you change octaves. Also, `\clef` can be treble, bass, alto, or tenor. The `\key` command is followed by the pitch, and then `\major` or `\minor`.

Now, you can type some notes. LilyPond's syntax is simple and fast to use. Pitch is the usual `a` through `g`, all lowercase. Duration is indicated by numbers: 1 for a whole note, 2 a half note, 4 a quarter note, 8 an eighth note, 16 a sixteenth note, and 32 a thirty-second note.

The `\addlyrics` block gets its own set of curly braces, and this is where you type lyrics. Matching the spacing to the music can get a little tricky. The double hyphen surrounded by spaces, as in `sleep -- ing`, means each syllable gets its own note. The double underscore creates a space.

LilyPond has extensive documentation, command references, and a glossary of music terminology. The program is ancient by modern standards, as it was created in 1996, and the 1.0 release was in 1998.

Like MuseScore, it was invented by musicians Han-Wen Nienhuys and Jan Nieuwenhuizen, and it now has a large team of developers. It is free software, licensed under the GPL, and runs on Linux, Mac OS X, Windows, and whatever else you can get it to compile on.

Chordii

The final entry in this Linux score editor roundup is the wonderful Chordii [6]. Think of Chordii (pronounced Chord-ee-ee – really) as a quick-and-easy guitar sheet-music maker. You start with a plain text file and type your lyrics and chords, and Chordii converts them to printable sheet music with tablature. The format is simple and uses standard guitar chord notation, as shown in Listing 2:

Save your file with the `.cho` extension, for example `strumming.cho`, then run Chordii to convert it to PostScript (`.ps`) format:

```
$ chordii -o strumming.ps strumming.cho
```

The `-o` option means output file, so you should name your output file first and then your source file. You should be able to click on your new `.ps` file in a graphical file manager and view it in all of its glory. Use the `ps2pdf` command if you want to convert it to a PDF.

The chords in my example are totally random, so if you play them don't be surprised if they make no sense. The following example selects US letter paper size and a size of 65 for the chord grids. I have no idea what 65 refers to, but this setting lines up four grids nicely in one row, and they are larger than the tiny default:

```
$ chordii -P letter -s 65 \
-o strumming.ps strumming.cho
```

Run `$ chordii -D > chords.ps` to create a chart of all the chords known to Chordii. You can add your own custom chords to your preferences file in `$HOME/.chordrc`, as well as other preferences like paper size, font size, and so on. Chordii is maintained by Johan Vromans and is licensed under the GPL. ■■■

INFO

- [1] MuseScore: <http://musescore.org/en/download>
- [2] LilyPond: <http://lilypond.org/>
- [3] MuseScore school map: <http://musescore.org/en/about/references>
- [4] "Obsessed with putting ink on paper": <http://lilypond.org/web/about/automated-engraving/>
- [5] Engraving chapter of the LilyPond manual: <http://lilypond.org/doc/v2.12/Documentation/user/lilypond-learning-big-page.html#Engraving>
- [6] Chordii – Printing Lyrics with Chords: <http://www.vromans.org/johan/projects/Chordii/index.html>