

Simple DISSCO Project with LASSIE: Sound Synthesis

<https://cmp.ischool.illinois.edu/software/dissco/index.php>

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0. If you do not have DISSCO, check it out in Terminal using the command:

```
git clone https://github.com/tipei/DISSCO-2.1.0.git
```

(be patient, it might take a while - there are many files)

1. Enter the following, pressing Enter after each line:

```
cd DISSCO-2.1.0
```

```
premake4 clean
```

```
premake4 make
```

```
make
```

(again, be patient, it will take a while to compile the program)

2. Create a new project in LASSIE **(if you already downloaded and compiled DISSCO start here)**

- Type `./lassie`
- Click the **Create a new project** button in the toolbar
- Choose a folder, name your project *tutorial*, and click Open

(NOTE: Once you choose a folder for your project, do not change it later - DISSCO will not be able to find it at the changed location)

- A new window, **Project Properties**, will appear
 - only check the boxes **Sound Synthesis** and **Output Particel**
 - set **Piece Duration** to **30** and click OK

Project Properties

Project Title: tutorial

File Flag: THMLBsnv

Number Of Channels: 2

Sample Rate: 44100

Sample Size: 16

Number Of Threads: 1

Sound Synthesis

Score Printing

Grand staff

Number Of Staff: 1

Output Particel

Top Event: T/0

Piece Duration: 30

(the default name of the newly created Top object is 0)

3. Build a Top event - this is your piece and the root node of the structure

- Click the wedge next to **Folder Top** then double click **Top 0**
- Set **Number of Children to Create** to 1
- Set **Child Start Time** to 0
- Set **Child Type** to 0
- Set **Child Duration** and **Max Child Duration** to 30

The screenshot shows a software interface with a toolbar at the top containing icons for 'Create a new project', 'Open an existing project', 'Save the project', 'Save As', 'Create a new Object', and 'Contents'. Below the toolbar is a panel with two sections: 'Objects List' and 'Attributes'.

The 'Objects List' section has a table with two columns: 'Type' and 'Name'. It shows a hierarchy of folders: 'Folder Top' (expanded) containing 'Top 0', and several other folders like 'High', 'Mid', 'Low', 'Bottom', 'Spectrum', 'Note', 'Envelope', 'Sieve', 'Spatialization', 'Pattern', 'Reverb', and 'Filter'.

The 'Attributes' section is for configuring the selected 'Top 0' object. It includes the following fields and options:

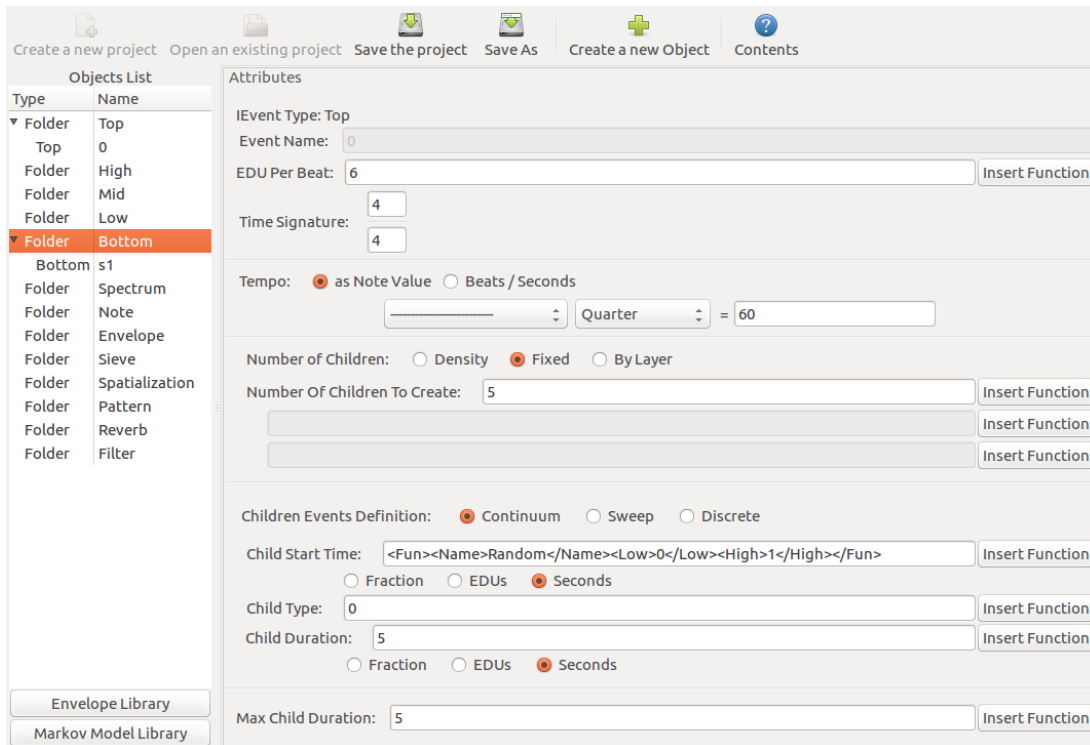
- Event Type:** Top
- Event Name:** 0
- EDU Per Beat:** 6 (with an 'Insert Function' button)
- Time Signature:** 4 (numerator) over 4 (denominator)
- Tempo:** as Note Value, Beats / Seconds. A dropdown menu shows 'Quarter' and a field shows '= 60'.
- Number of Children:** Density, Fixed, By Layer. Below this is a field for 'Number Of Children To Create' set to 1, with an 'Insert Function' button.
- Children Events Definition:** Continuum, Sweep, Discrete.
- Child Start Time:** 0 (with an 'Insert Function' button). Below it are radio buttons for Fraction, EDUs, and Seconds.
- Child Type:** 0 (with an 'Insert Function' button').
- Child Duration:** 30 (with an 'Insert Function' button'). Below it are radio buttons for Fraction, EDUs, and Seconds.
- Max Child Duration:** 30 (with an 'Insert Function' button').

At the bottom of the interface, there are two buttons: 'Envelope Library' and 'Markov Model Library'.

4. Create a Bottom event - this event creates start times, durations, pitches, and dynamics of sounds

- Click **Folder Bottom**
- Click the **Create a new Object** button in the toolbar
- Name it *s1* and click OK (NOTE: Bottom names must begin with a lower-case s !)
- Click the wedge next to the **Folder Bottom** and double-click **Bottom s1**
- Set **Number of Children to Create** to 5 - these will be your sounds
- Click **Insert Function** next to **Child Start Time** and choose **Random**
 - we are randomizing the starting times for our 5 children (sounds)
 - keep **Lower Bound** at 0

- set **Higher Bound** to 1, hit OK
- Set **Child Type** to 0
- Set **Child Duration** and **Max Child Duration** to 5 - each sound will be 5 seconds long

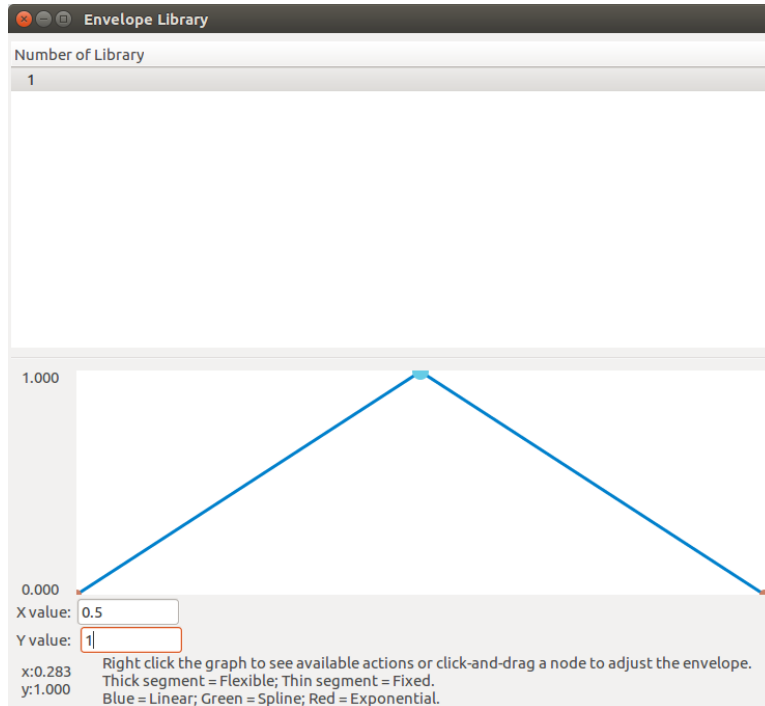


(we will come back to complete the bottom event in step 7)

5. Create a simple Envelope

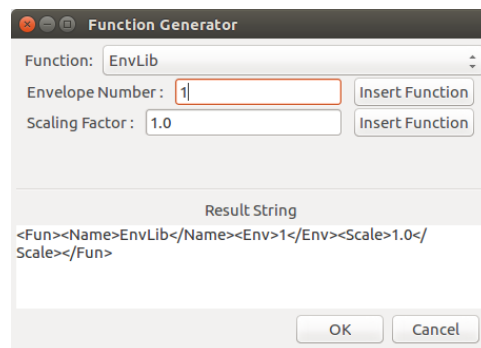
- Click **Envelope Library** button at bottom of the window
- Right-click in the top blank rectangle and select **Create New Envelope** to create a new envelope item
- Select the envelope item labeled 1 in the upper blank rectangle
- Right-click the lower rectangle (graph) and select **Insert Node**
- Moving around the node, you should notice the X and Y values below the graph changing accordingly. Drag the node to the top center or input the X and Y values to be **X value: 0.500** and **Y value: 1.000**
- In the bottom left and right corners of the graph, there are 2 nodes. Be sure their values are **X value: 0.000** and **Y value: 0.000**, **X value: 1.000** and **Y value: 0.000** to avoid clipping in your piece

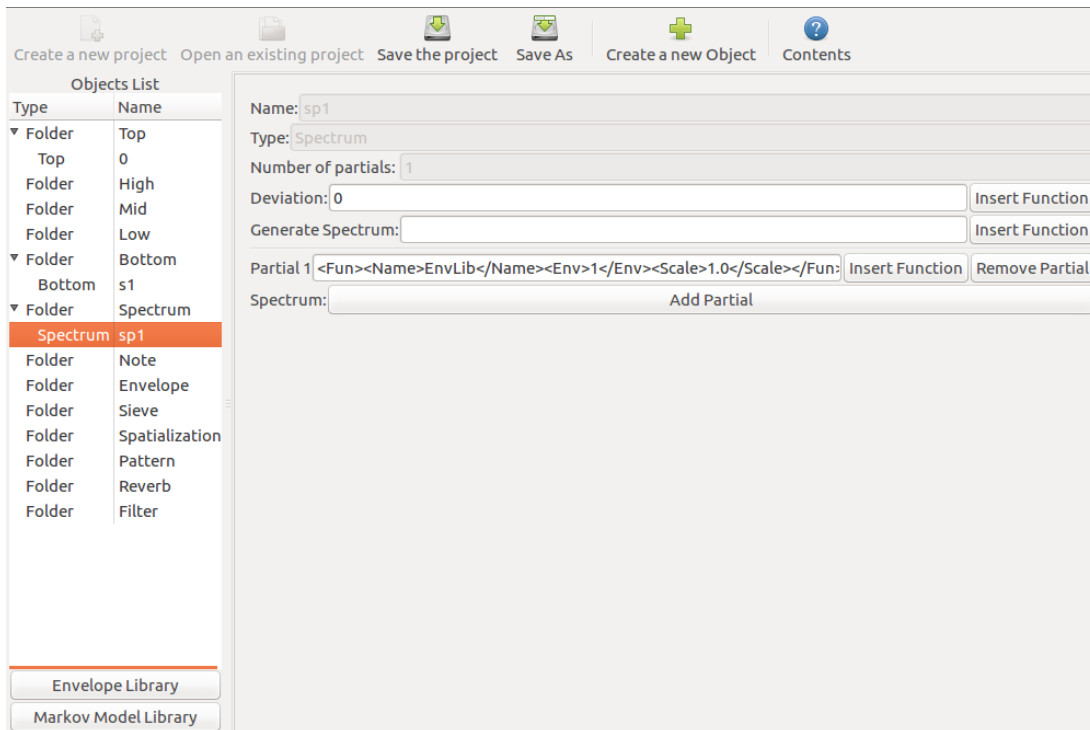
(NOTE: Refer to the manual for more information about envelopes)



6. Create a Spectrum - this will determine the internal structure of your sound(s)

- Click **Folder Spectrum**
- Click the **Create a new Object** button in the toolbar
- Name it *sp1* and click OK
- Click the wedge next to the **Folder Spectrum** and double-click **Spectrum sp1**
- Set **Deviation** to 0
- Click **Insert Function** next to **Partial 1** and select the **EnvLib** function
 - Set **Envelope Number** to 1 (the envelope you created), hit OK

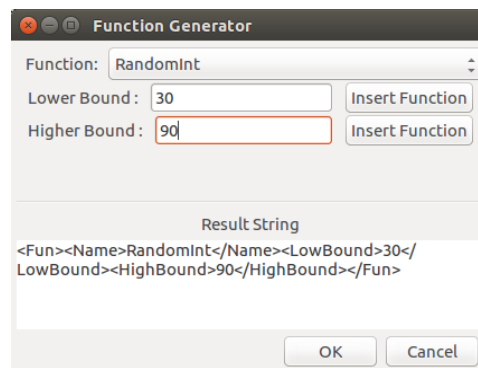




7. Complete the Bottom event

- Double click on the **Bottom s1** event to bring it back
- Scrolling down, drag your **Spectrum sp1** into the white box underneath where it says **Child Type | Class | Name**
- Click **Insert Function** in the **Value** field below **Frequency** and choose **RandomInt**
 - Set **Lower Bound** to **30**
 - Set **Higher Bound** to **90**, hit OK

(Note: as reference, 48 = C4) - this randomly assigns pitch values to each child between MIDI 27 - 78 (F#2 - F#7)

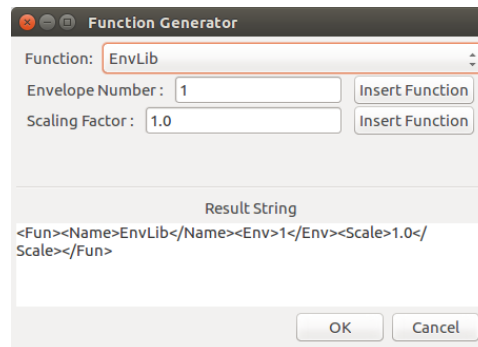


- Set Loudness to 100

DISSCO Loudness Key (if x is loudness value):

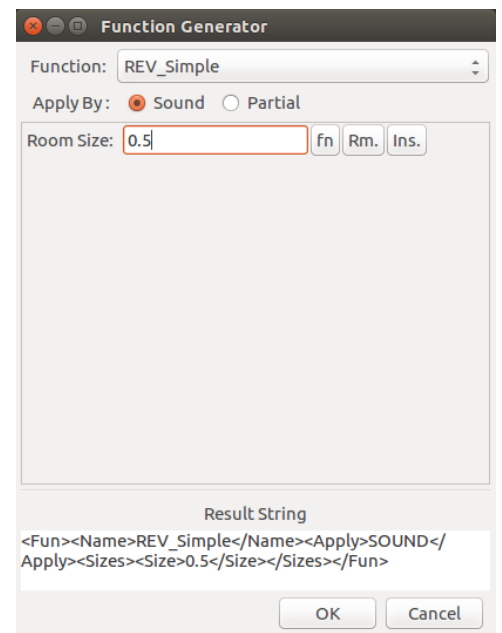
ppp (x <= 4)
 pp (x <= 8)
 p (x <= 16)
 mp (x <= 32)
 mf (x <= 45)
 f (x <= 64)
 ff (x <= 128)
 fff (x <= 256)

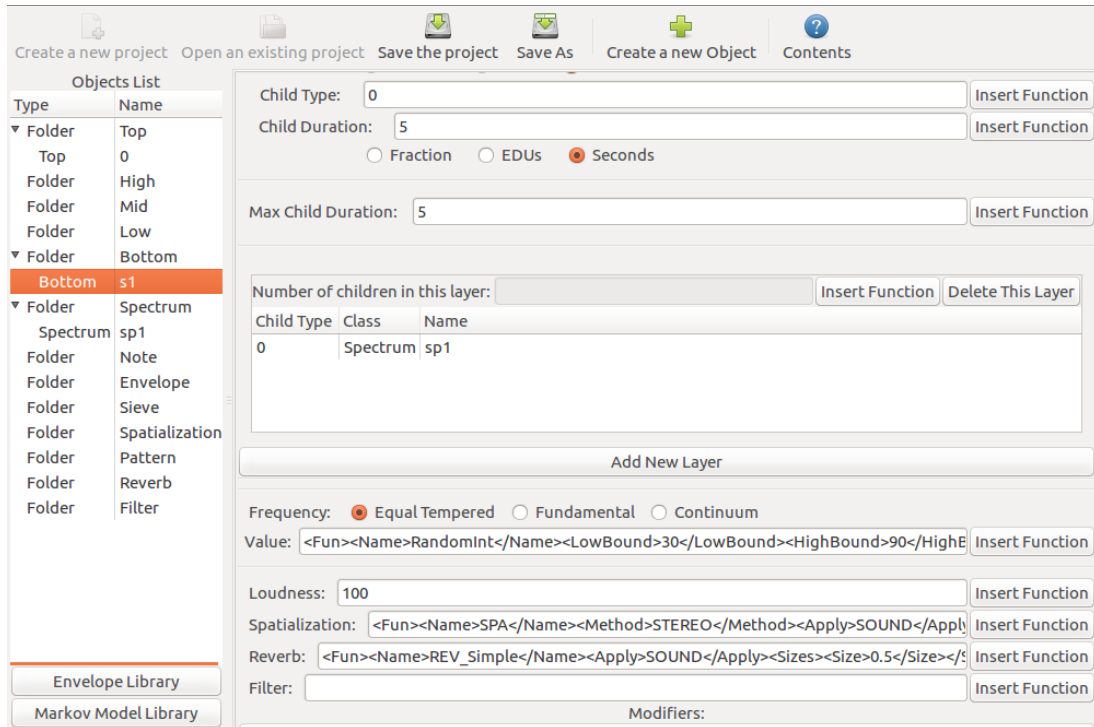
- Click **Insert Function** next to **Spatialization** and choose **SPA** - determines the locations of sounds in space
 - Click the **fn** (function) button
 - Select the **EnvLib** function
 - Set **Envelope Number** to **1** (the envelope you created), hit OK (on both



Function Generator and SPA windows)

- Click **Insert Function** next to **Reverb** and choose **REV_Simple** - this sets the reverberation quality of the room
 - Set **Room Size** to **0.5**, hit OK



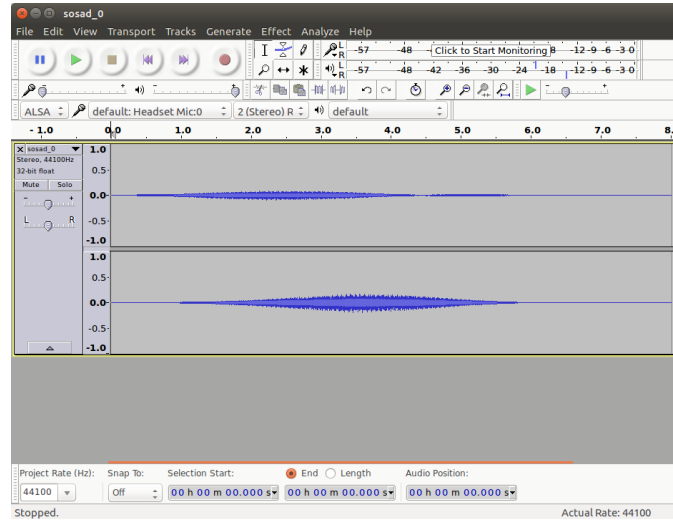


8. Return to the Top event and add Bottom as child of Top

- Double click on the **Top 0** event
- Drag **Bottom s1** into the white box underneath where it says **Child Type | Class | Name**

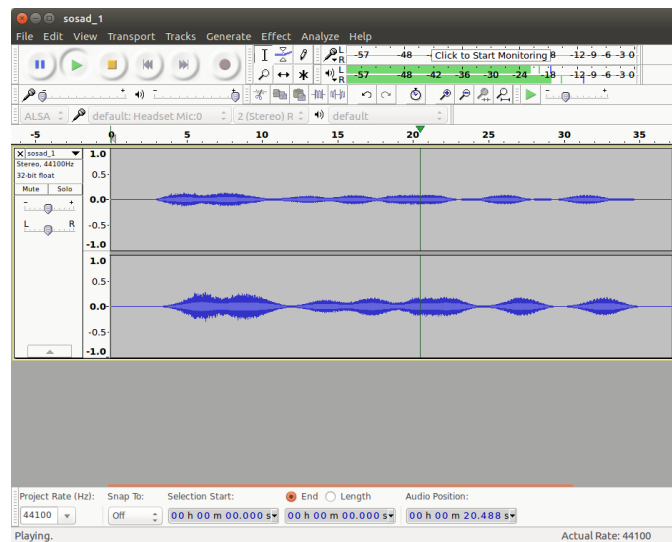
9. Save Project and Synthesize

- Click the **Save the project** button in the toolbar
- From the **Project** menu in the toolbar, select **run**
- Type *apple* (or any sequence of letters and/or numbers) into the **Random Seed** window and click OK
- The .aiff output is in the folder **SoundFiles**, in the same folder as the project (ex. *Tutorial/SoundFiles/Tutorial.aiff*)
 - To listen to the file, it can be opened in a Audacity (or any sound editor/media player/digital audio workstation)
 - How can we make a more interesting piece..?



10. Increasing piece complexity

- Click **Project** in the toolbar and select **Properties**
- Change the Piece Duration from 30 to 60
- Select Top 0 and change **Number of Children to Create** from 1 to 10
- Click **Insert Function** next to **Child Start Time** and choose *Random*
 - Keep **Lower Bound** at 0
 - Set **Higher Bound** to 30, hit OK
- Save Project and Synthesize (Step 9)



50 sounds will now be generated and now likely more interesting. Congratulations on creating your first DISSCO piece!