## Simple DISSCO Project with LASSIE: Sound Synthesis

https://cmp.ischool.illinois.edu/software/dissco/index.php By Aleksandra Grigortsuk

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 **Ouput 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
S Output Particel
Top Event: T/0
Piece Duration: 30 Insert Function
Cancel OK

(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

Create a r	new project Open	an existing project Save the project Save As Create a new Object Contents	
C	Objects List	Attributes	
Туре	Name		
▼ Folder	Тор	IEvent Type: Top	
Тор	0	Event Name: 0	
Folder	High	EDU Per Beat: 6	Insert Function
Folder	Mid	4	
Folder	Low	Time Signature:	
Folder	Bottom	4	
Folder	Spectrum	Tempo: 🕡 as Note Value 🔿 Beats / Seconds	
Folder	Note		
Folder	Envelope		
Folder	Sieve	Number of Children: O Deprity 🔗 Fixed O By Layor	
Folder	Pattern	Number of children. O bensity S rived O by Layer	
Folder	Reverb	Number Of Children To Create: 1	Insert Function
Folder	Filter		Insert Function
			Insert Function
		Children Events Definition:  Child Start Time: Child Start Time: Fraction EDUs Seconds Child Type: Child Duration: 30	Insert Function
		<ul> <li>Fraction</li> <li>EDUs</li> <li>Seconds</li> </ul>	
Env	elope Library	Max Child Duration: 30	
Marko	ov Model Library		Insert Function

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

Create a ne	ew project Open	an existing project Save the project Save As Create a new Object Contents	
ot	ojects List	Attributes	
Туре	Name		
▼ Folder	Тор	IEvent Type: Top	
Тор	0	Event Name: 0	
Folder	High	EDU Per Beat: 6	Insert Function
Folder	Mid	4	
Folder	Low	Time Signature:	
Folder	Bottom	4	
Bottom	n s1	Temper A schlete Value O Beste / Seconds	
Folder	Spectrum	Tempo: 🕘 as Note Value () Beats / Seconds	
Folder	Note		
Folder	Envelope		
Folder	Sieve	Number of Children: O Density 🖲 Fixed O By Layer	
Folder	Spatialization	Number Of Children To Create: 5	Insert Function
Folder	Pattern		Insert Function
Folder	Reverb		
Folder	Filter		Insert Function
		Children Events Definition:  Continuum Sweep Discrete Child Start Time: <pre></pre>	Insert Function
		Child Duration: 5	Insert Function
		<ul> <li>Fraction</li> <li>EDUs</li> <li>Seconds</li> </ul>	
Enve	lope Library	Max Child Duration:	
Markov	Model Library	Max child bulación.	msert Function

(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 <u>- this will determine the internal structure of your sound(s)</u>

- 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

😣 🖨 💷 Function Generator	
Function: EnvLib	÷
Envelope Number : 1	Insert Function
Scaling Factor : 1.0	Insert Function
Result String <fun><name>EnvLib</name><env>1</env>&lt; Scale&gt;</fun>	Scale>1.0 </td
0	K Cancel

Create a new	project Open a	an existing project Save the project Save As Create a new Object Contents	
Obje	ts List		
Туре	Name	Name: sp1	
Folder	Тор	Type: Spectrum	
Тор	0	Number of partials: 1	
Folder	High Mid	Deviation: 0	Insert Function
Folder	Low	Generate Spectrum:	Insert Function
▼ Folder	Bottom	Partial 1 <- Fun> <name>EnvLib</name> <env>1</env> <scale>1.0</scale> Insert Function	Remove Partial
▼ Folder	Spectrum	Spectrum: Add Partial	
Spectrum Folder Folder Folder Folder Folder Folder	sp1 Note Envelope Sieve Spatialization Pattern Reverb Filter		
Envelop Markov M	oe Library odel Library		

- 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 childbetween MIDI 27 - 78 (F#2 - F#7)

😣 🗢 🗉 Function Generator	
Function: RandomInt	÷
Lower Bound : 30	Insert Function
Higher Bound : 90	Insert Function
Result String <fun><name>Randomint</name><lowb LowBound&gt;<highbound>90<th>ound&gt;30<!--<br--> &gt;</th></highbound></lowb </fun>	ound>30  
OI	Cancel

• Set Loudness to 100

DISSCO Loundess Key (if x is loudness value): (x <= 4)ppp (x <= 8)рр (x <= 16) р (x <= 32) mp mf (x <= 45) f (x <= 64) ff (x <= 128) fff (x <= 256)

- Click Insert Function next to Spatialization and choose SPA <u>determines the locations</u> 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	
Function: EnvLib	*
Envelope Number : 1	Insert Function
Scaling Factor : 1.0	Insert Function
Result String <fun><name>EnvLib</name><env>1</env>&lt; Scale&gt;</fun>	-Scale>1.0 </td
0	K Cancel

Function Generator and SPA windows)

- Click Insert Function next to Reverb and choose *REV\_Simple* - <u>this sets the reverberation quality of the</u> <u>room</u>
  - Set Room Size to 0.5, hit OK

😣 🖨 🗊 🛛 Fu	nction Generator
Function:	REV_Simple
Apply By :	● Sound ○ Partial
Room Size:	0.5 fn Rm. Ins.
	Result String

<Fun><Name>REV\_Simple</Name><Apply>SOUND</ Apply><Sizes></Size>0.5</Size></Sizes></Fun>

ОК	Cancel
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Create a new	project Open a	n existing pro	oject <b>Save</b>	the project	t Save As	Create a	new Object	? Contents	
Objec	ts List	Child Type	e: 0		-				Insert Function
Type ▼ Folder	Top	Child Dura	ation: 5						Insert Function
Тор	0			ction ()	EDUs 🧕	Seconds			
Folder	High								
Folder	Mid	Max Child F	uration:	5					Insert Function
Folder	Low	indx critto c		-					
Folder	Bottom								
Bottom	s1	Number of	children in	this laver:				Insert Function	Delete This Laver
Folder	Spectrum	Child Type	Class	Name					
Spectrum	sp1	0	Spectrum	so1					
Folder	Note	Ū	speccium	, sp i					
Folder	Envelope								
Folder	Sieve								
Folder	Spatialization								
Folder	Pattern					Add Nev	w Layer		
Folder	Reverb		_						
Folder	Filler	Frequency:	🖲 Equal	l Tempered	🗌 🔘 Funda	imental 🔘	Continuum		
		Value: <fu< td=""><td>n&gt;<name>F</name></td><td>RandomInt</td><td><l< td=""><td>owBound&gt;3</td><td>0<td>d&gt;<highbound>90<td>hE Insert Function</td></highbound></td></td></l<></td></fu<>	n> <name>F</name>	RandomInt	<l< td=""><td>owBound&gt;3</td><td>0<td>d&gt;<highbound>90<td>hE Insert Function</td></highbound></td></td></l<>	owBound>3	0 <td>d&gt;<highbound>90<td>hE Insert Function</td></highbound></td>	d> <highbound>90<td>hE Insert Function</td></highbound>	hE Insert Function
		Loudness:	100						Insert Function
		Spatializati	on: <fun></fun>	> <name>SF</name>	PA<	<method>ST</method>	EREO <td>od&gt;<apply>SOUND<td>oply Insert Function</td></apply></td>	od> <apply>SOUND<td>oply Insert Function</td></apply>	oply Insert Function
		Reverb: <	Fun> <name< td=""><td>e&gt;REV_Sim</td><td>ple</td></name<> <td>&gt;<apply>SO</apply></td> <td>UND</td> <td><sizes><size>0.5</size></sizes></td> <td></td>	e>REV_Sim	ple	> <apply>SO</apply>	UND	<sizes><size>0.5</size></sizes>	
Envelop	e Library	Filter:							Insert Function
Markov Mo	odel Library					Modif	fiers:		

- 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..?

<mark>⊗</mark>	ad_0 iew	Transport	Tracks Ge	enerate Effe	ct Analyze	Help -57 -	48 Click to	Start Monitorin	n 8 - 12 - 9 - 6 - 3	o
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x sosad_0 Stereo, 44100Hz 32-bit float	<b>1.0</b>									
Mute Solo	0.0									
LR	-0.5									
	-1.0									
	0.5									
	0.0									
	-0.5									
	-1.0									
Project Rate (H	iz):	Snap To:	Selection S	tart:	🖲 End 🔿 Le	ngth	Audio Position:			
44100 v		Off ‡	00 h 00 r	n 00.000 s <del>•</del>	00 h 00 m 0	0.000 s×	00 h 00 m 0	0.000 s <del>*</del>		
Stopped.									Actual Rate: 4	14100

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!