Modi Documentation

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Understanding Modi - A Musical Score Collaborator

- Score Builder
  - Modi is designed as a sophisticated score builder tool, enabling users to output the composed scores as MIDI information.
- User Input for Improvisation
  - Moid supports live input from an external MIDI device.
- Harmonic Integration of Improvisations
  - Modi ensures that live improvisations input through an external MIDI device harmonize with the underlying score.

The Chord: Modi’s Fundamental Unit

- At Modi’s core lies the chord, a versatile building block.
- Each chord can be reduced to the minimal aspects of its root, associated pattern, and timing.
  - The root is any single musical note like C3 or A4, it serves as the primary classifier for a chord.
  - The pattern is a stored structure of associated note intervals with respect to the root, this could be like a major scale , a minor seventh arpeggio, or a series of perfect fifths.
  - The timing consists of a set of beats similar to a metronome in beats per minute.
- Understanding these chords is essential to harnessing Modi’s full potential.

Creating Repetitive Perfection with Loops

- Loops in Modi are created by arranging chords in a sequence.
- Loops form the repetitive backbone of a piece, providing structure and rhythm.
- The ability to loop allows for a sustained musical theme, vital for coherence in composition.

The Art of Arrangement in Modi

- An arrangement in Modi is a series of meticulously crafted loops.
- These loops can repeat or evolve, offering dynamic composition structures.
- Transitions between loops enable sophisticated musical narratives.

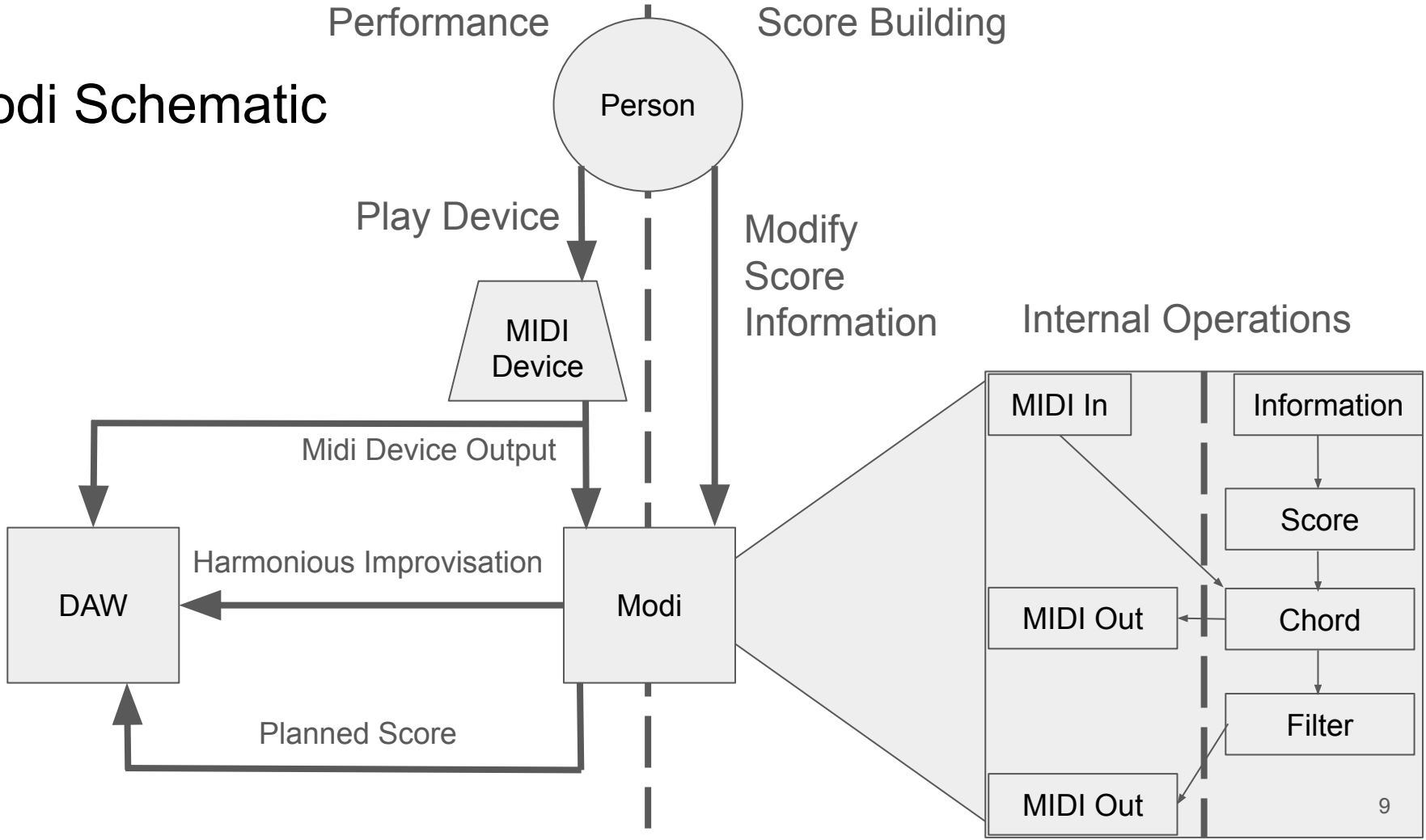
Dynamic Accompaniment with Modi

- Modi’s global parameters (such as beats per minute, number of beats in a bar, etc.) act as conductors, guiding the creation process through a framework.
- Filters can be applied to modify the accompaniment score in real-time.
- This dynamic control allows for a trustworthy musical accompaniment that a user can perform with.

Harmonious Improvisation with Modi

- Modi can overlay chord patterns on live MIDI inputs
- This empowers performers to integrate harmonious elements into loops during live arrangements.
- The feature is beneficial for drummers using electric kits or performers using grid-based MIDI devices.

Modi Schematic



Hierarchy Overview

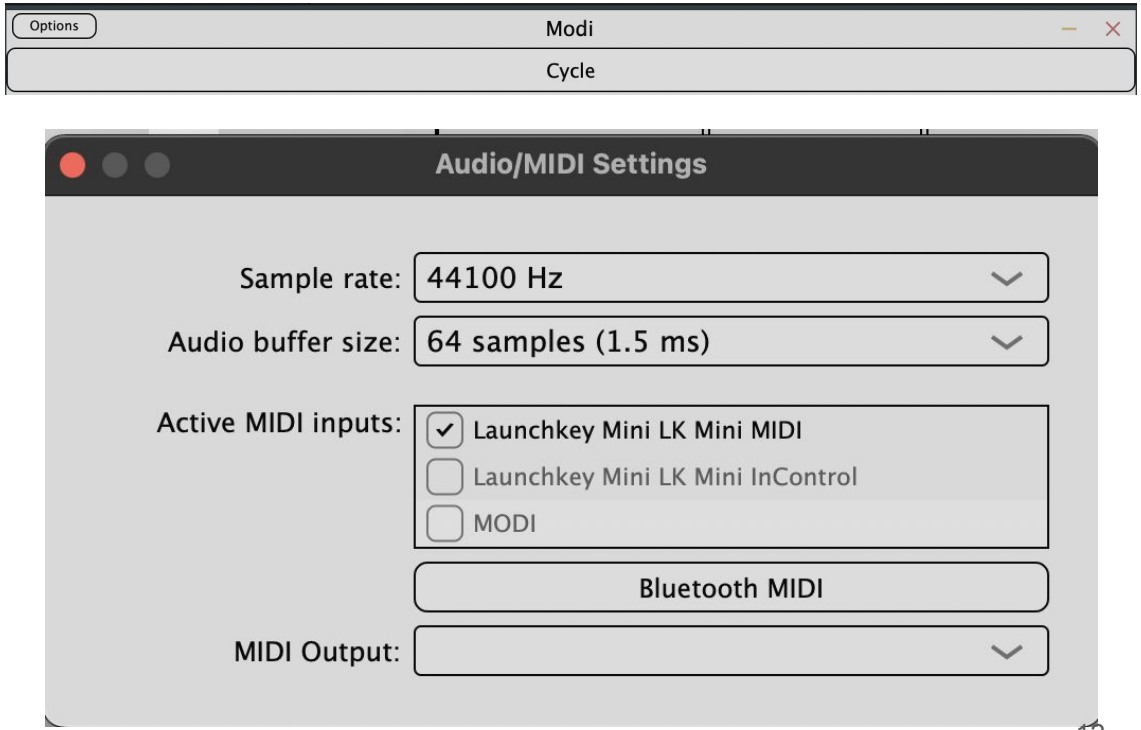
- Cycle and Options
  - Turn on score and set up MIDI inputs
- Global Parameters
  - Initial conditions for a song
- Prototyping Interface
  - Gives information and lets users experiment with new chords
- Loops
  - Create chord progressions
- Arrangement
  - Vertically organize loops
- Filters
  - Customize MIDI output of score
- Everything else

Cycle Button

- The cycle button, located at the top of the application window, enables or disables the output MIDI sequence of the score

Options

- The options button, at the top of the application window, allows the user to select Audio/MIDI Settings
- External MIDI devices for input can be selected here



.modi File

- Modi accepts a text-based file (.modi) for loading and saving information regarding song structures and performing
- The text to the right shows the main architecture of the file, where each word starting with # signifies a section header
- We'll go step-by-step through the file format and show how it applies to the rest of the application and with song creation

#PARAMS

…

#LOOPS

…

#ARR

…

#FILT

…

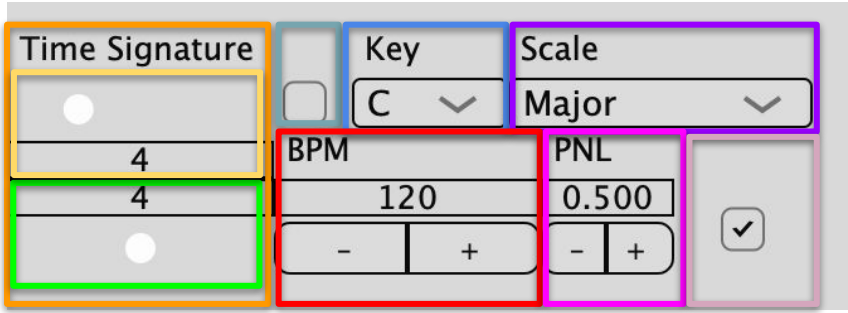
#END

Global Parameters

- Shown here are the default parameters of the initial .modi file
- In order, they control
  - Beats per minute
  - Time Signature
  - Scale Toggle
  - Tonic of Key
  - Scale pattern
  - Pad Note Length
- Most are self explanatory or possibly infuriating based on one's musical background
- Names and labels will likely be adjusted for more accurate descriptions based on constructive user feedback

```
#PARAMS
BPM,    120
TS,  4/4
ST,  0
KEY,    C
SCALE,  Major
PNL,    0.5
```

Global Parameters



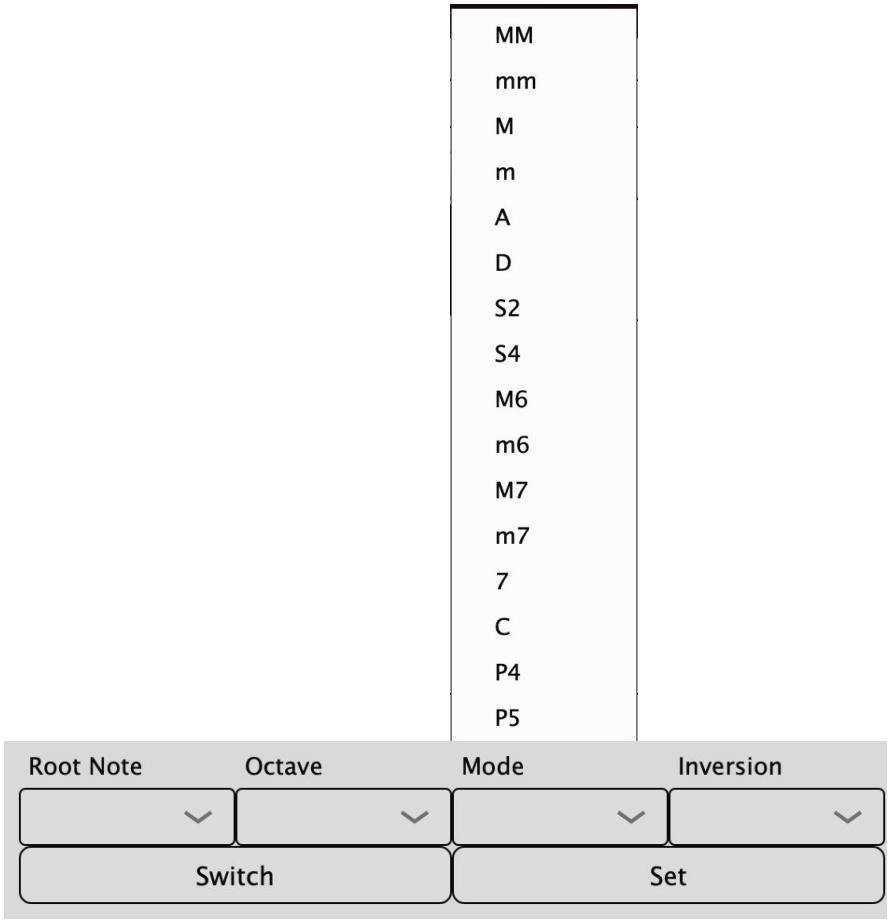
LIMITS

- BPM: [1 -> 360]
- TS: [1 -> 16] / [1, 2, 4, 8, 16]
- ST: [0,1] (false, true)
- KEY: [C, Db, … , Ab, B] (flats only)
- SCALE: [Major, Dorian, Phrygian, Lydian, Mixolydian, Minor, Locrian]
- PNL [0.125 -> 16] (units: beats)
- Pad Note Length Toggle: [0, 1] (currently not included in .modi file, default is on)

#PARAMS
BPM, 120
TS, 4/4
ST, 0
KEY, C
SCALE, Major
PNL, 0.5

Prototyping Interface

- Before learning about the Loops section of the .modi file, we need to understand the types of chords that can construct individual loops
- Each of these combo boxes allows a user to create a single chord to try out through the external MIDI device
- The root note has the same options as Key in the global parameters
- Octave goes from [1 -> 7]
- The list of varying “Modes” is shown in the image to the right, the label will likely change soon based on constructive user feedback
- The “Inversion” label is also not quite, this instance is an offset of the root note to the right pad element (explained in the Pads section), adding the next lowest note to the first pad position, right now the limits are [0 -> 3]



Prototyping Interface

Below are the (non-obvious) “modes” explained:

MM: Major scale

mm: minor scale

S2: sus2 chord

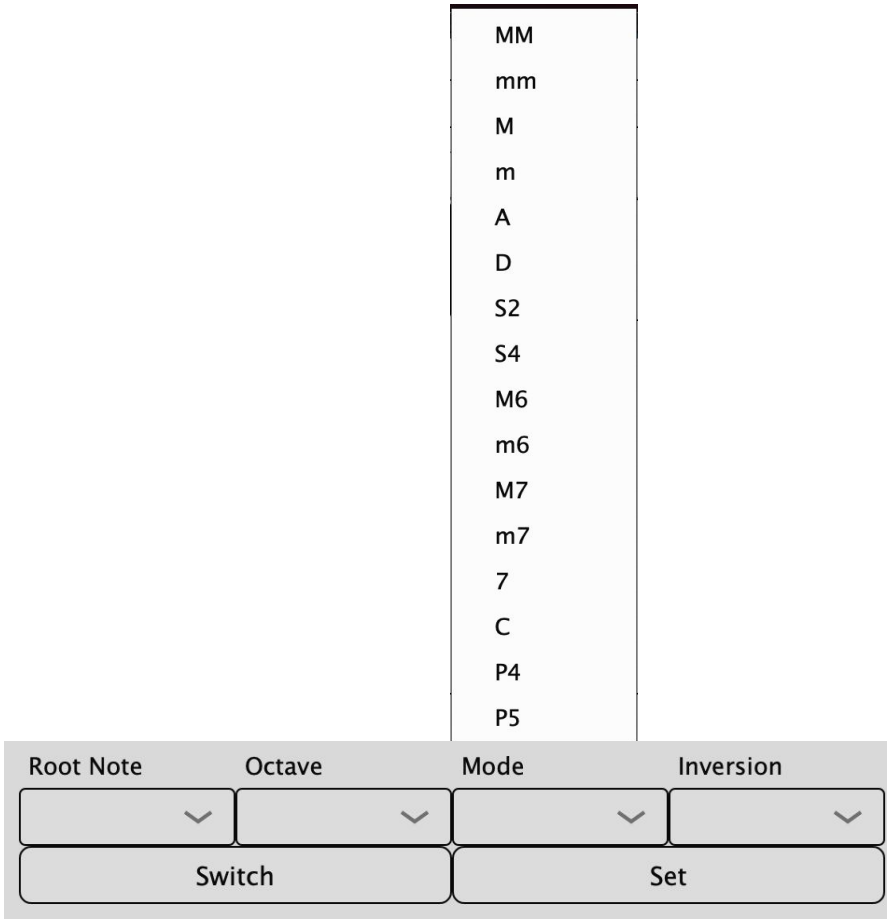
S4: sus4 chord

C: Chromatic

P4: Perfect 4th intervals

P5: Perfect 5th intervals

At some point I will include all the real Modes too: [Major, Dorian, Phrygian, Lydian, Mixolydian, Minor, Locrian]



Loops

- Shown in the left box is the default loop of the initial .modi file
- In order, they signify
  - C3 Major
  - E3 minor
  - G3 Major
  - A3 minor
- If the scale toggle is on, then a new chord format can be used with scale degrees for any set scale, thee example in the middle box shows the same chord progression in the C Major scale
- Optional variables can be listed to modify a chord, otherwise the default values are used. The example to the right shows the default optional variables explicitly listed

```
#LOOPS
L1
C3,  M
E3,  m
G3,  M
A3,  m
```

```
#LOOPS
L1
1'3
3'3
5'3
6'3
```

```
#LOOPS
L1
C3,  M, f1, b4, i0
E3,  m, f1, b4, i0
G3,  M, f1, b4, i0
A3,  m, f1, b4, i0
```

Loops

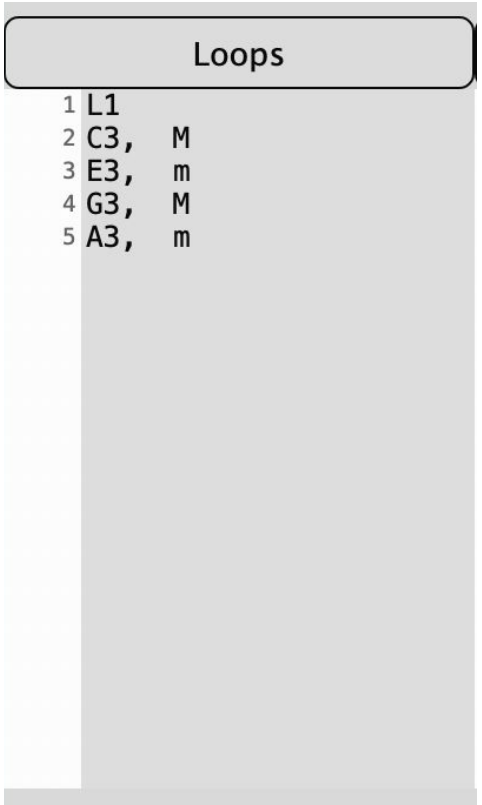
Optionals

- Filters: Filters alter the midi sequence of an individual chord in a loop
  - There are currently sixteen filters available and can be referenced in the chord line as f[1 -> 16]
  - The default filter for a chord is f1
- Beats: Beats are the number of beats associated with a chord in a loop
  - The default is the top number of the time signature (4 in this case)
  - The upper bounds of how many beats can be used for a chord is unknown, but can potentially be large. Can be referenced as b[1 -> 99]
- Inversions: The number determines the offset of the root note in the positive octave direction
  - They can be referenced with i[0 -> 3] in the chord line.
- Modes: sets the pattern of notes based on the root note and octave
  - Modes need to be explicitly listed when Scale Toggle is off
  - Otherwise, modes are optional

```
#LOOPS
L1
C3,  M, f1, b4, i0
E3,  m, f1, b4, i0
G3,  M, f1, b4, i0
A3,  m, f1, b4, i0
```

Loops

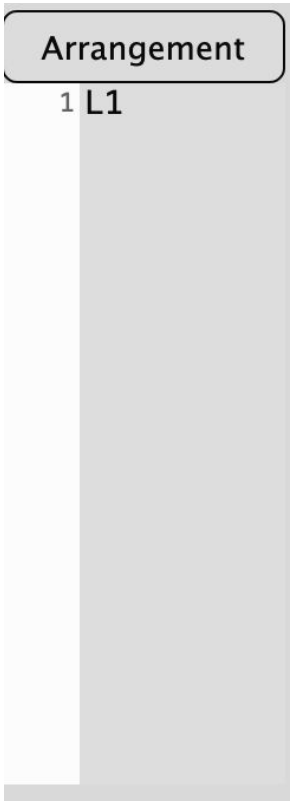
- Pressing the Loops button at the top will update the any alteration in the Loops editor
- The loop button also serves as a way to reset the entire arrangement back to the beginning of the arrangement
- New loops can be created by typing the L in one line and then typing in a chord in each successive line
- The numbers for each loop populate according the vertical placement of the loop, increasing in the positive direction from 1



Arrangement

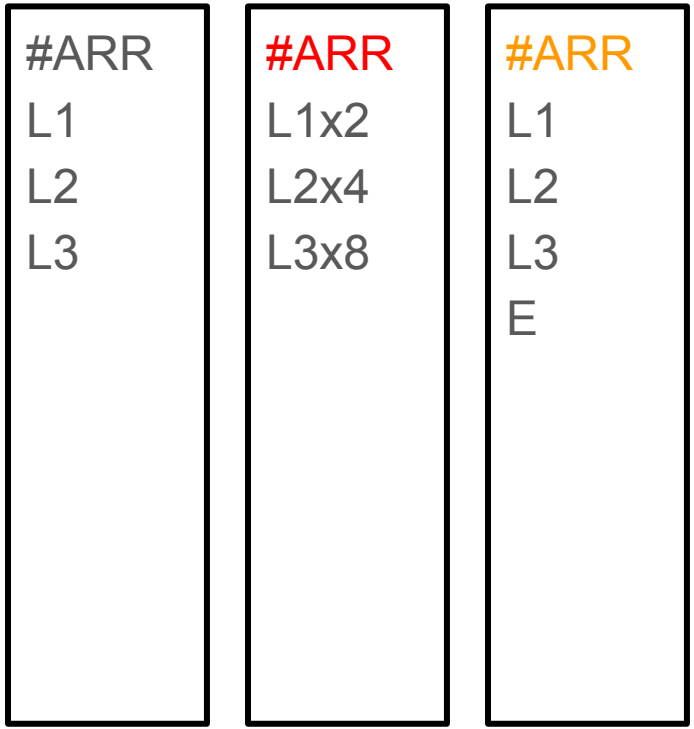
- The arrangement is a vertical organization of loops to form a song structure
- The default arrangement only shows L1 because there is one loop created
- It will loop continuously after pressing the cycle button and will stop with a successive press of the cycle button
- Always press the arrangement button after altering the arrangement

#ARR
L1



Arrangement

- If loops are added to the Loops Editor, then the Arrangement Editor will automatically populate the new loops at the end of the current arrangement
- Repeat loops by adding an “xN”, where N is any integer greater than zero
- Type E at the end of the arrangement to have the score end at that point



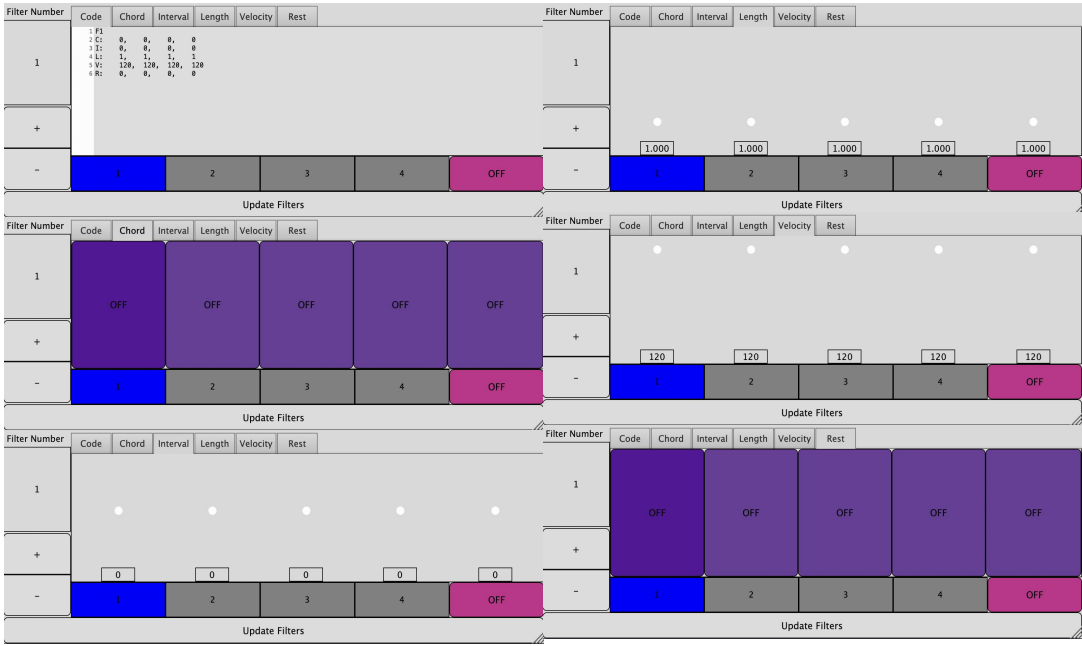
Filters

- Filters alter the MIDI score output during the course of any given chord
- The structure of a filter follows the CILVR protocol:
  - Chord: [0,1]
  - Interval: [-12 -> 12]
  - Length: [0.125 -> 8] (will end with 16 eventually)
  - Velocity: [0 -> 128]
  - Rest: [0,1]
- The default filter, shown to the right, plays the root note of any chord four times, where each beat has the length of a 1 beat and a velocity of 120
- There are sixteen different filters that can be altered
- The horizontal length of each filter depends on the top number of the time signature

```
#FILT
F1
C:   0,   0,   0,   0
I:   0,   0,   0,   0
L:   1,   1,   1,   1
V:   120, 120, 120, 120
R:   0,   0,   0,   0
```

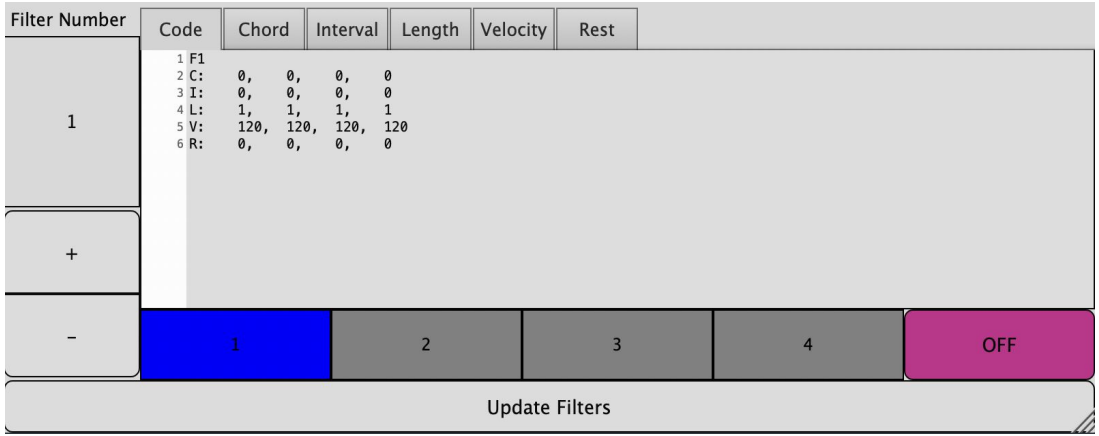
Filters

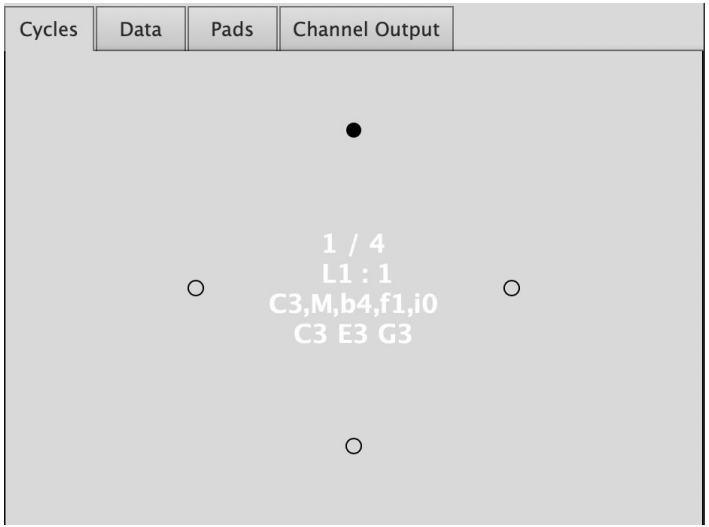
- There are six different tabs for each filter: one for the code and five for the CILVR variables
- Filter numbers are switched by the variable on the left
- The global Update Filters button is on the bottom
- The global variable toggle button is on the bottom-right
    - When turned “ON” any alteration of the variable above the button will alter every variable in the tab
- The global button does not work for the code tab and each filter has their own independent button



Real-Time Feedback

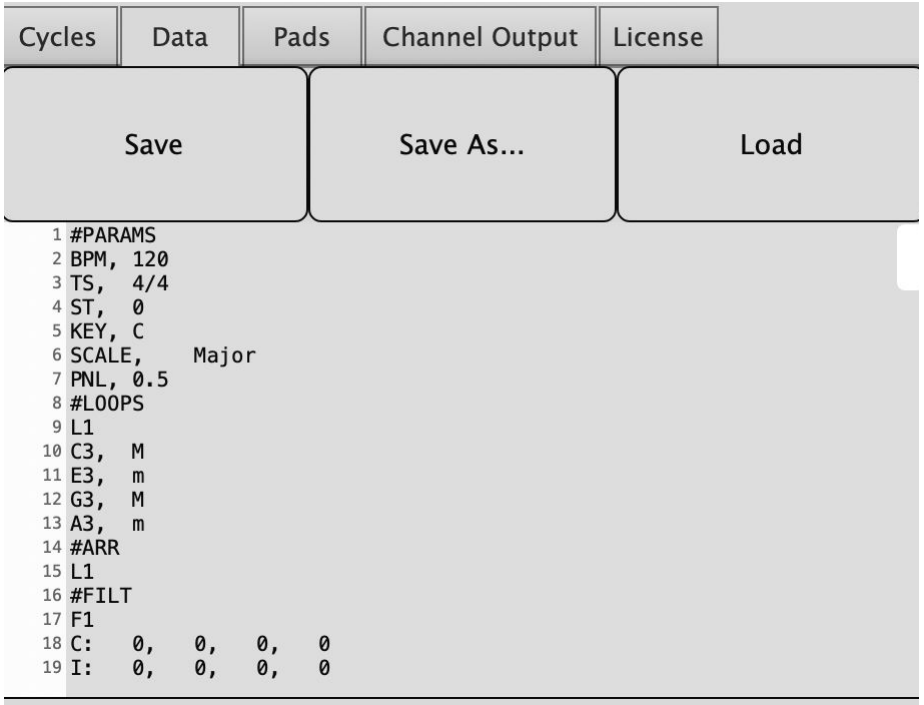
- There are two kinds of real-time feedback in Modi
  - The step sequencer at the bottom of each filter
  - The cycle tab on the right of the application window
- The step sequencer cycles through the filter and shows which of the steps is being played at the present time
- The cycles tab keeps track of each chord being played in the score with details showing
  - How many beats played so far / how many beats total
  - The Loop and chord number in the progression
  - The chord and it's optionals
  - The notes assigned to pads





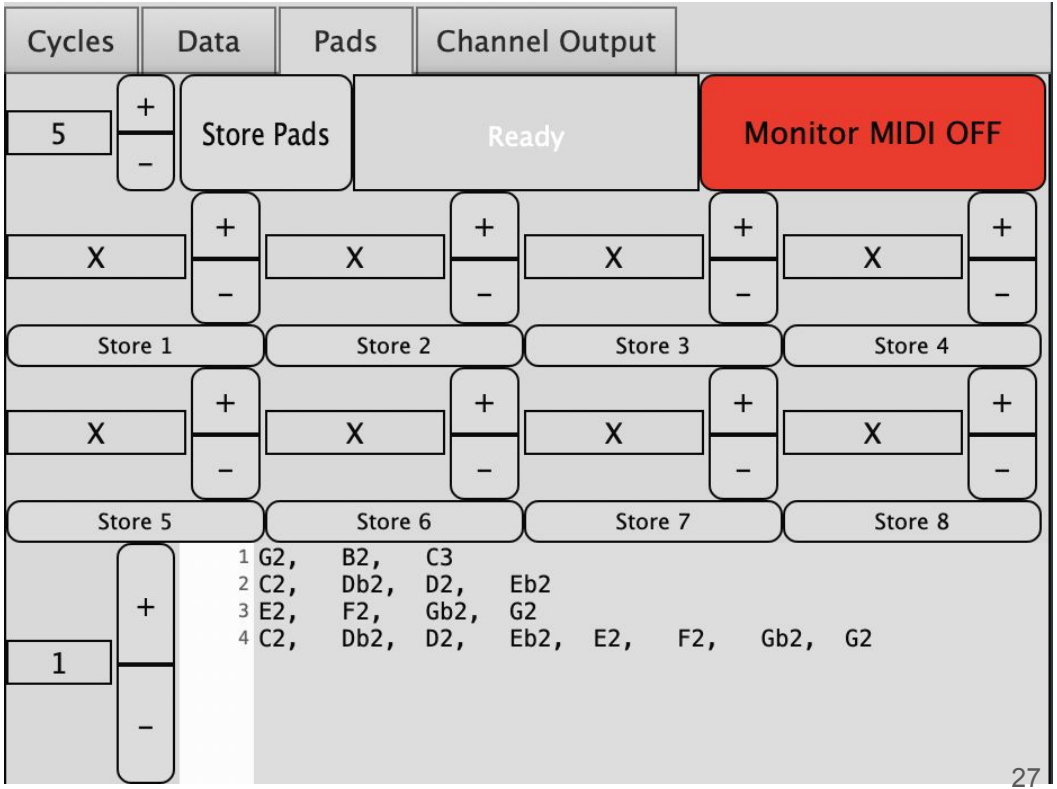
Data Save and Load

- The Data tab allows users to save and load .modi files
- The pads are not yet implemented in .modi
- Press Load at least twice, it loads the majority of information the first time, but still working on the logic here.



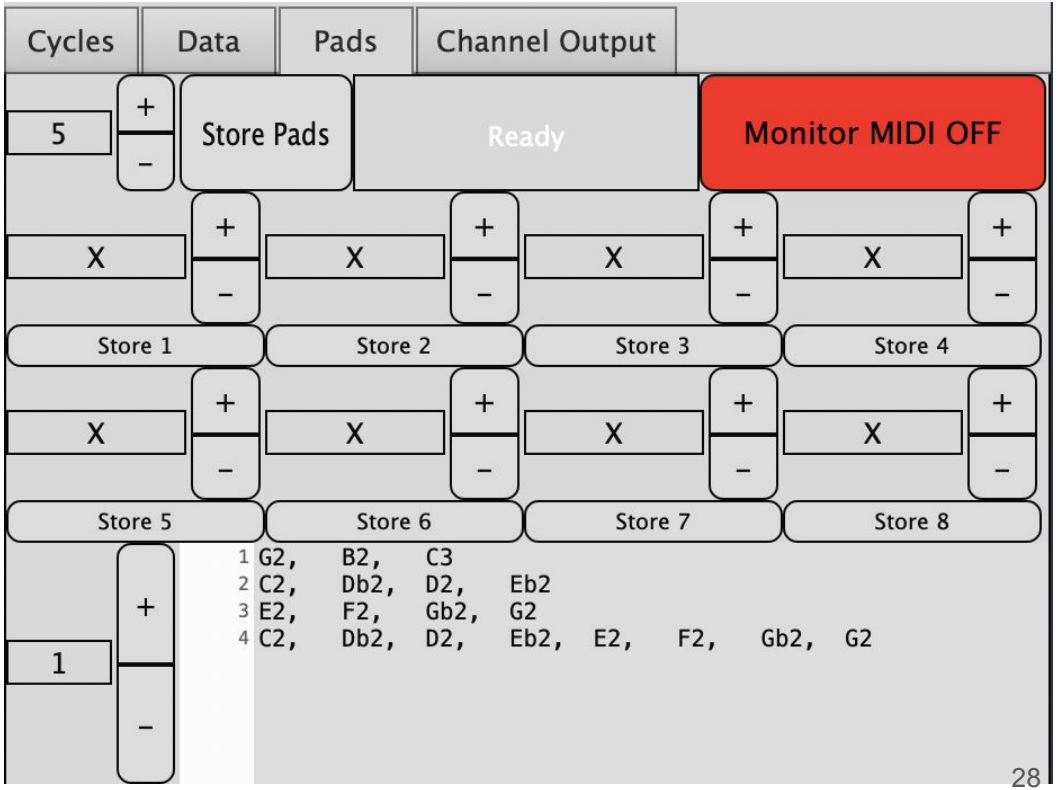
Pads

- Pads are part of the improvisational aspect of Modi
- This update is relatively new and will eventually be included in the .modi file
- It allows users to select unique midi notes to be intercepted and trigger improvisational notes that are associated with the present chord being played in the accompanying score
- There are eight pad elements available to choose from and each chord combination with certain optionals offers a unique pad combination



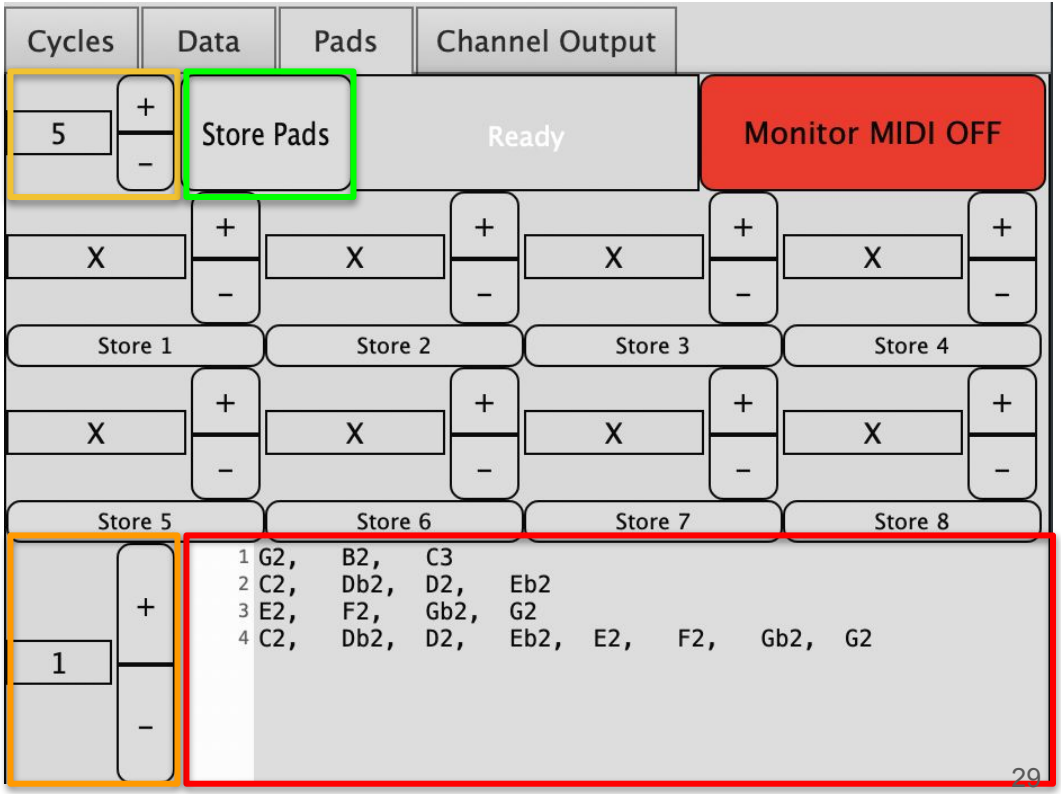
Pads

- For example the first default C3 Major chord: C3, M, b4, i0, f1
- This gives us eight pad elements [C3, E3, G3, C4, E4, G4, C5, G5]
- Another example is to create a C3 Major scale: C3, MM, b4, i1, f1
- This gives us eight pad elements [B2, C3, D3, E3, F3, G3, A3, B3], where the root note is offset by one element because of the inversion optional value



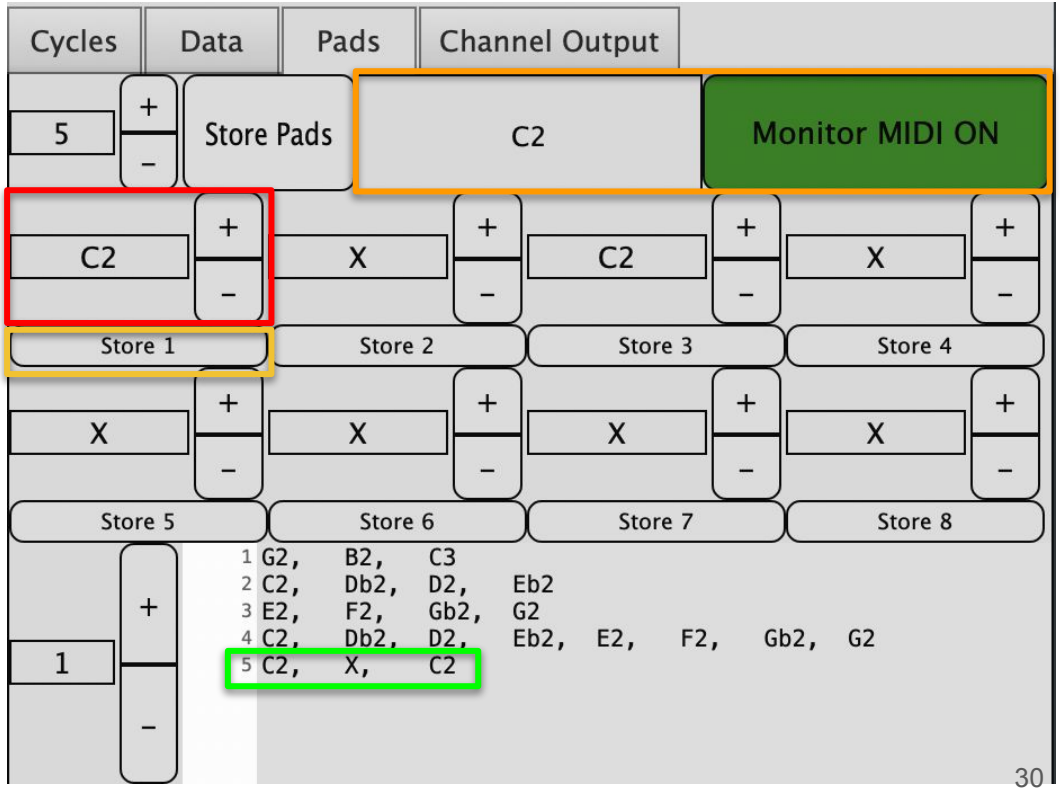
Pads

- Four pads are already populated with 1 being the default (drum toms)
- The current selected pad can be controlled by this variable
- Select this number to change or add a new set of pads
- Select Store Pads to store on the selected number line referenced in the text box below



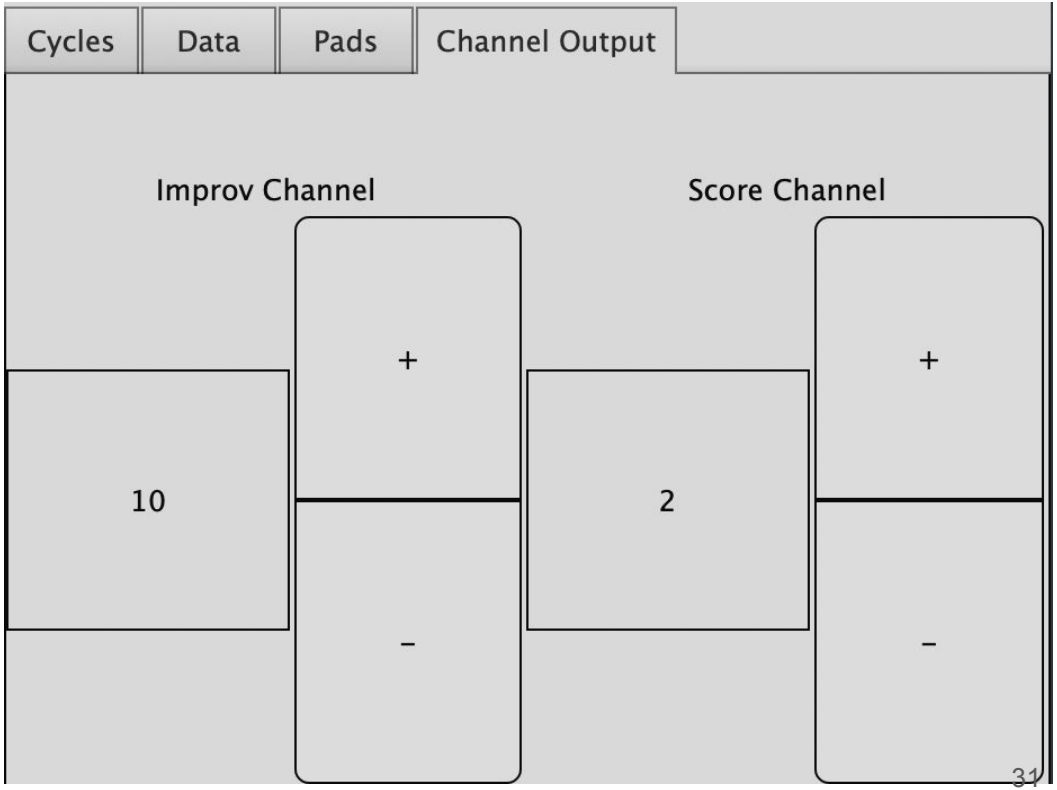
Pads

- A specific note can be entered into the text box
- The Monitor MIDI button can be pressed to read in the latest MIDI note pressed from an external MIDI device
- Store the note from the MIDI monitor by clicking a Store button
- Store the new pads, where the trailing X values are cut off, but the X values in between pad elements are retained for the sake of clarity



MIDI Channel Outputs

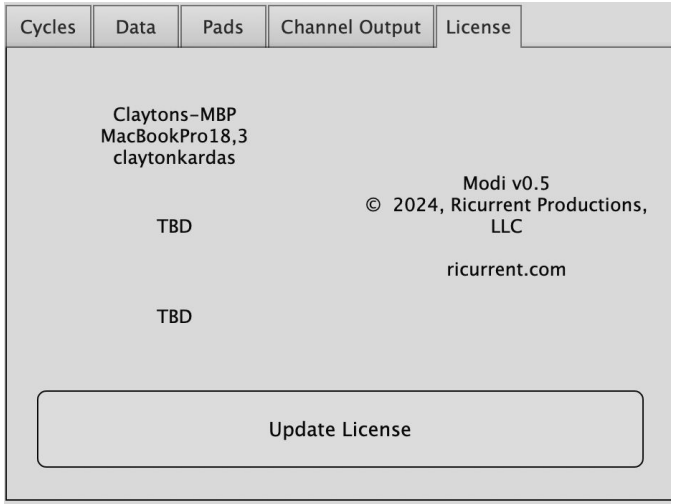
- Midi output channels can be selected here [1 -> 16]
- There are two main channels being used *for right now*
- Improv channel outputs the triggered pad elements from the present chord based on the pads selected
- Score channel outputs the arrangement of the chords



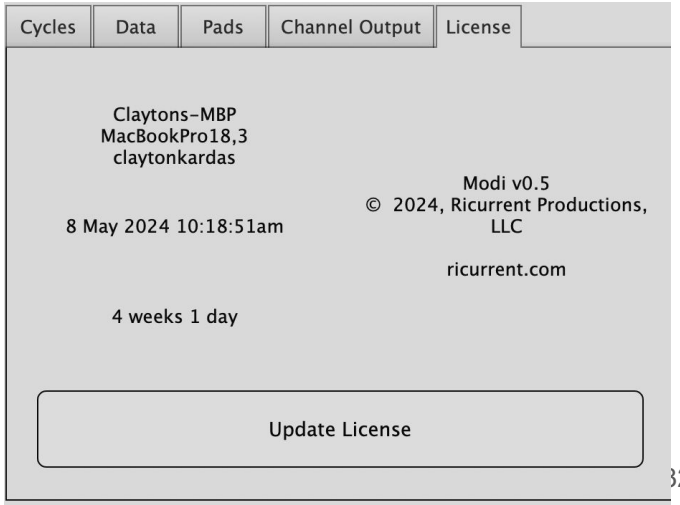
Licensing

- Beta version will have timed licenses in 30 and 90 day periods
- Free trials will be available based on events and promotions
- Custom time licenses will be available for special circumstances
- Perpetual licenses are planned for the alpha version
- NOTE: do not use a license multiple times, they do expire over time.

Before



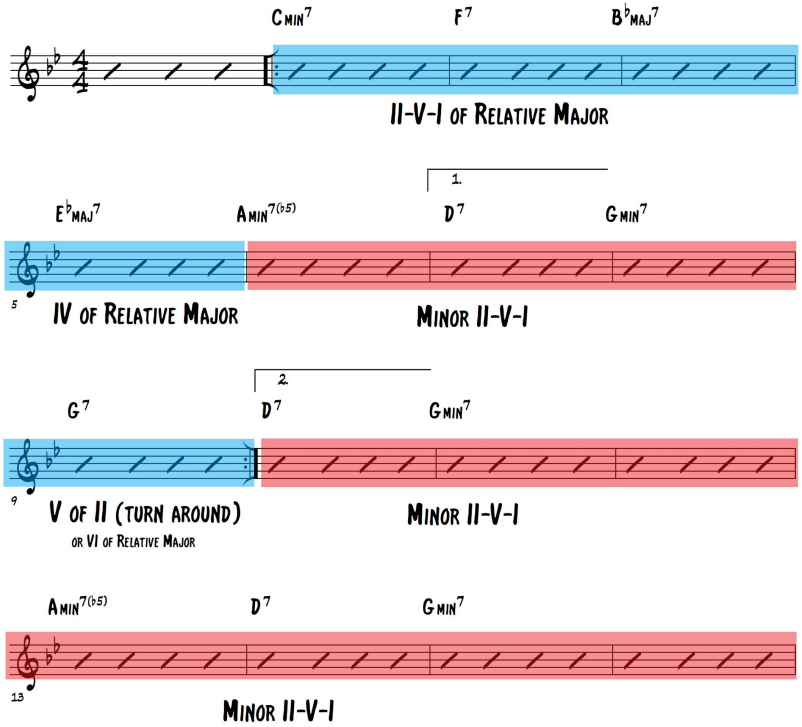
After

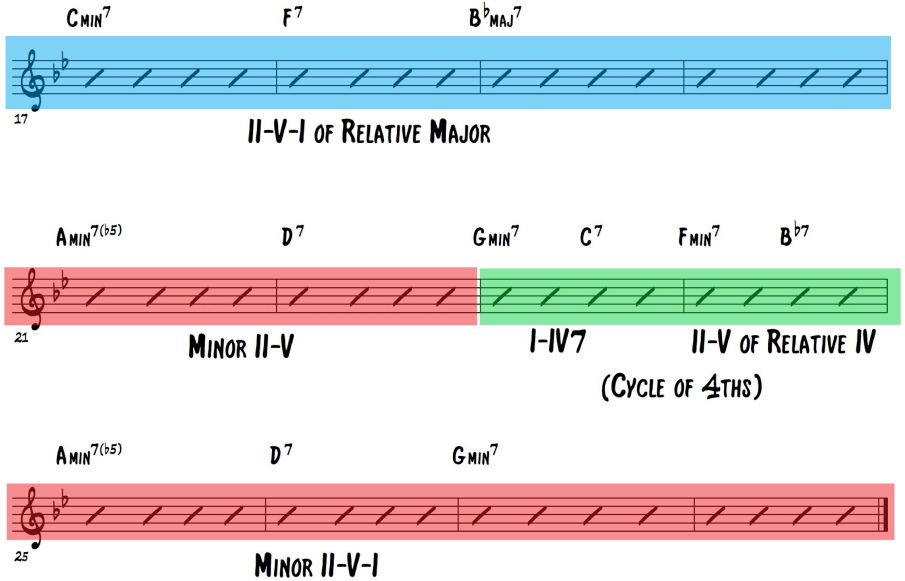


Example: Autumn Leaves

- Composed by Joseph Kosma
- A well renowned jazz standard covered by Coltrane, Davis, and Ellington among hundreds of others
- Known for its cyclical nature of chord progressions
- I'll show how to create this score in Modi in which a user could improvise over
- This was the first song my academic advisor asked if I could recreate with this software, so I figured I'd show how it's done

Autumn Leaves - Chord Analysis

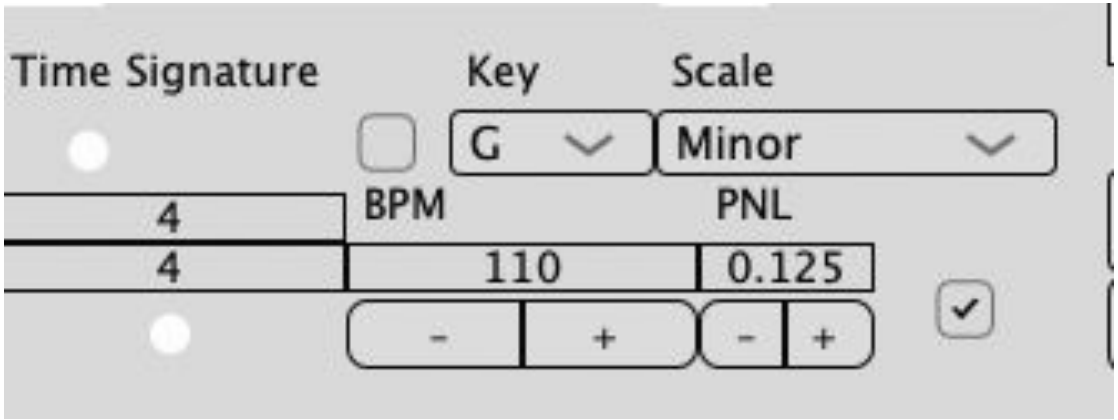




[HOW TO LEARN AUTUMN LEAVES CHORDS (AND MANY OTHER JAZZ STANDARDS)]

Autumn Leaves - Global Parameters

#PARAMS
BPM, 110
TS, 4/4
ST, 0
KEY, G
SCALE, Minor
PNL, 0.125

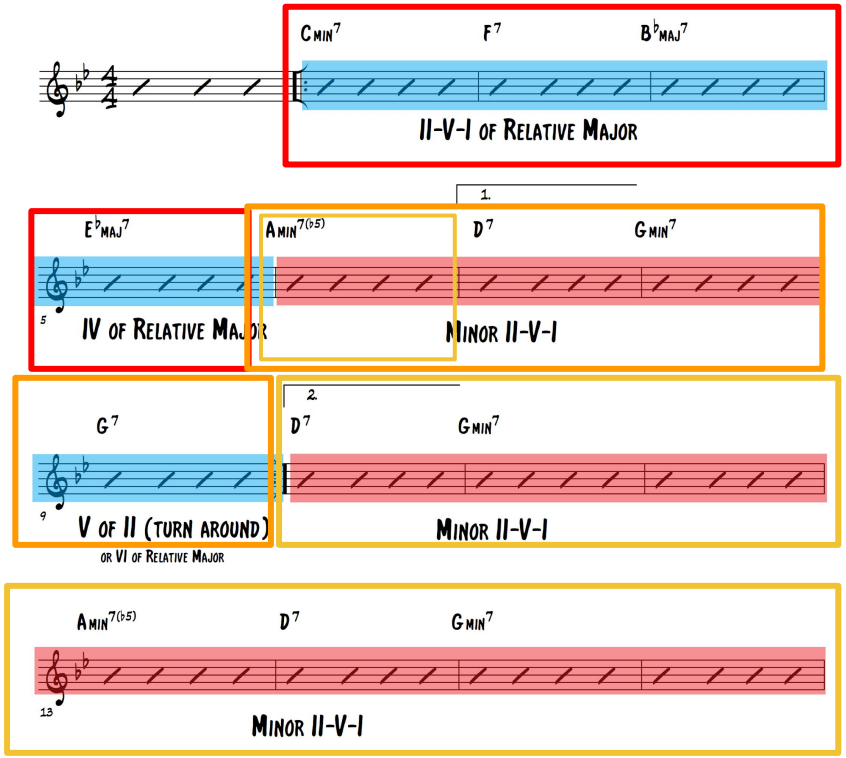


Autumn Leaves - Loops and Arrangement

#LOOPS
L1
C3, m7
F3, 7, f2
Bb3, M7
Eb3, M7
L2
A3, D, f3
D3, 7, f2
G3, m7
G3, 7, f2
L3
A3, D, f3
D3, 7
G3, m7, b8
L4
C3, m7
F3, 7, f2
Bb3, M7, b8
L5
A3, D, f3
D3, 7, f2
G3, m7, b2, f4
C3, 7, b2, f4
F3, m7, b2, f4
Bb3, 7, b2, f4

A3, D, f3
Because I don't have a choice for Amin7(b5), but will add the seventh interval in f3

#ARR
L1
L2
L1
L3x2
L4
L5
L3



Autumn Leaves - Loops and Arrangement

#LOOPS

L1
C3, m7
F3, 7, f2
Bb3, M7
Eb3, M7

L2
A3, D, f3
D3, 7, f2
G3, m7
G3, 7, f2

L3
A3, D, f3
D3, 7
G3, m7, b8

L4
C3, m7
F3, 7, f2
Bb3, M7, b8

L5
A3, D, f3
D3, 7, f2
G3, m7, b2, f4
C3, 7, b2, f4
F3, m7, b2, f4
Bb3, 7, b2, f4

#ARR

L1

L2

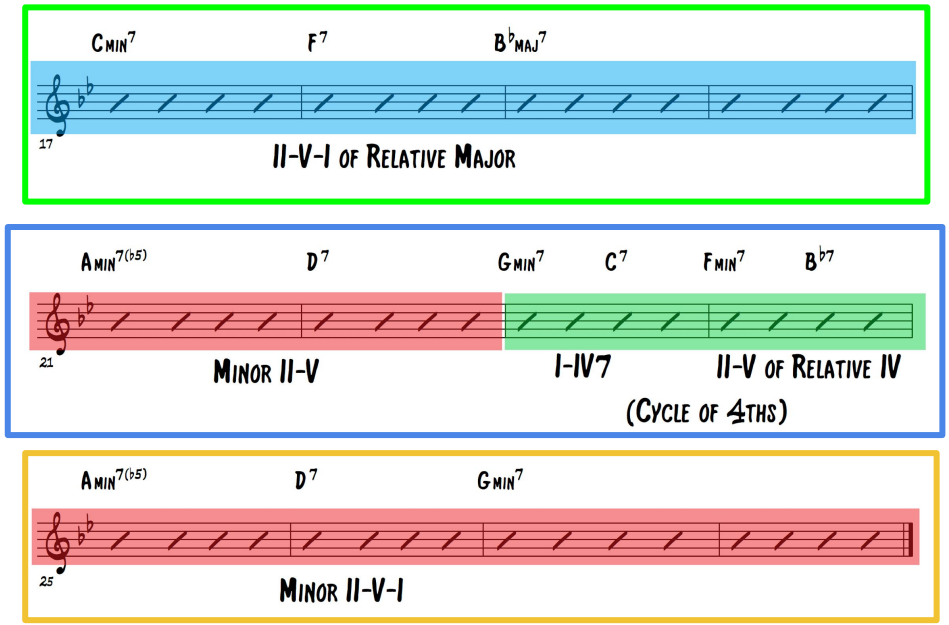
L1

L3x2

L4

L5

L3



Autumn Leaves - Filters and Output

```
#LOOPS
L1
C3,     m7
F3,     7,      f2
Bb3,    M7
Eb3,    M7
L2
A3,     D,      f3
D3,     7,      f2
G3,     m7
G3,     7,      f2
L3
A3,     D,      f3
D3,     7
G3,     m7,     b8
L4
C3,     m7
F3,     7,      f2
Bb3,    M7,     b8
L5
A3,     D,      f3
D3,     7,      f2
G3,     m7,     b2,     f4
C3,     7,      b2,     f4
F3,     m7,     b2,     f4
Bb3,    7,      b2,     f4
```

#ARR

L1

L2

L1

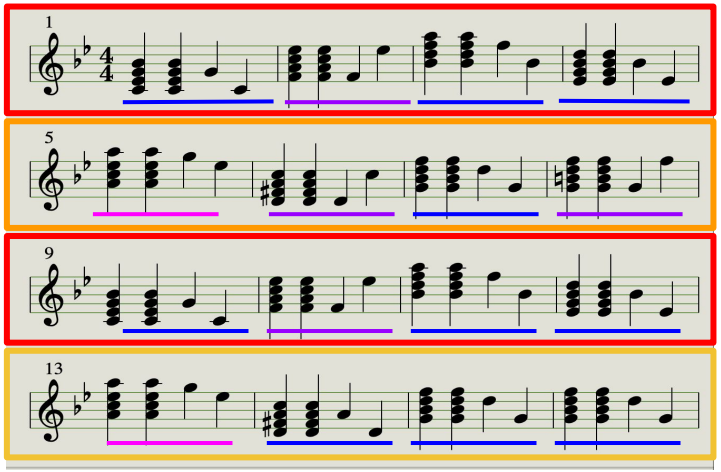
L3x2

L4

L5

L3

```
#FILT
F1
C:      1,      1,      0,      0
I:      0,      0,      7,      0
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F2
C:      1,      1,      0,      0
I:      0,      0,      0,      10
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F3
C:      1,      1,      0,      0
I:      0,      0,      10,     6
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F4
C:      1,      0,      0,      0
I:      0,      7,      0,      0
L:      4,      2,      1,      1
V:      72,     100,    120,    120
R:      0,      0,      0,      0
```



NOTES:

- Creating a Am7b5 chord by adding a 10 semitone interval in the filter F3
- Only two columns are played in F4
- Creating dynamism with the Length and Velocity values help personalize the score
- Score is from Logic Pro and not entirely accurate from the filters, it's more of a "cleaned up" version

Autumn Leaves - Filters and Output

```
#LOOPS
L1
C3,     m7
F3,     7,      f2
Bb3,    M7
Eb3,    M7
L2
A3,     D,      f3
D3,     7,      f2
G3,     m7
G3,     7,      f2
L3
A3,     D,      f3
D3,     7
G3,     m7,     b8
L4
C3,     m7
F3,     7,      f2
Bb3,    M7,     b8
L5
A3,     D,      f3
D3,     7,      f2
G3,     m7,     b2,     f4
C3,     7,      b2,     f4
F3,     m7,     b2,     f4
Bb3,    7,      b2,     f4
```

#ARR

L1

L2

L1

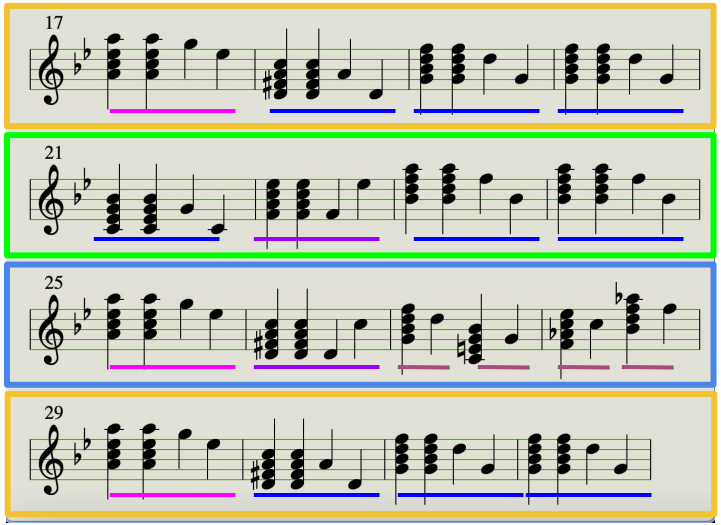
L3x2

L4

L5

L3

```
#FILT
F1
C:      1,      1,      0,      0
I:      0,      0,      7,      0
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F2
C:      1,      1,      0,      0
I:      0,      0,      0,      10
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F3
C:      1,      1,      0,      0
I:      0,      0,      10,     6
L:      4,      3,      4,      4
V:      66,     77,     94,     80
R:      0,      0,      0,      0
F4
C:      1,      0,      0,      0
I:      0,      7,      0,      0
L:      4,      2,      1,      1
V:      72,     100,    120,    120
R:      0,      0,      0,      0
```



NOTES:

- Creating a Am7b5 chord by adding a 10 semitone interval in the filter F3
- Only two columns are played in F4
- Creating dynamism with the Length and Velocity values help personalize the score
- Score is from Logic Pro and not entirely accurate from the filters, it's more of a "cleaned up" version

Autumn Leaves - Pads

- The pads can be either default or custom-made, depending on the external MIDI device utilized
- Regardless of the pads enabled, the pad elements remain consistent
- All the possible pad elements for this piece are located on the right side
- Chord inversions shift all the other notes to the right while adding the next lowest notes to the first elements

Chords \ pads	1	2	3	4	5	6	7	8
C3, m7	C3	Eb3	G3	Bb3	Eb4	G4	Bb4	C5
F3, 7	F3	A3	C4	Eb4	F4	A4	C5	Eb5
Bb3, M7	Bb3	D4	F4	A4	Bb4	D5	F5	A5
Eb3, M7	Eb3	G3	Bb3	D4	Eb4	G4	Bb4	D5
A3, D	A3	C4	Eb4	A4	C5	Eb5	A5	C6
D3, 7	D3	Gb3	A3	C4	D4	Gb4	A4	C5
G3, m7	G3	Bb3	D4	F4	G4	Bb4	D5	F5
G3, 7	G3	B3	D4	F4	G4	B4	D5	F5
C3, 7	C3	E3	G3	Bb3	E4	G4	Bb4	C5
F3, m7	F3	Ab3	C4	Eb4	F4	Ab4	C5	Eb5
Bb3, 7	Bb3	D4	F4	Ab4	Bb4	D5	F5	Ab5

- The pads can be either default or custom-made, depending on the external MIDI device utilized.
- Regardless of the pads enabled, the pad elements remain consistent.
- All the possible pad elements for this piece are located on the right side.
- Chord inversions shift all the other notes to the right while adding the next lowest notes to the first elements.

Autumn Leaves - Conclusion

- This is not the only way to compress this song into the format, which I think adds to the unique ways users may use Modi to create and interpret music

Autumn Leaves - Modi Documentation Example (youtube link)

Overall - Conclusion

- Looking forward to hearing feedback from any users, even if it's about this documentation or about how the experience is going
- Please do not hesitate to contact me for any help, I need YOU to help build a FAQ page

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