

Using Impro-Visor in the Jazz Laboratory

TI:ME 2012 Presentation

Robert M. Keller

Harvey Mudd College

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Motivation

- Having taught jazz improvisation as a “side line” for a few years, I desired a notation tool that would:
 - Help students produce clean homework of written-out solos.
 - Provide assistance of some kind to the students.
 - Act as a repository or notebook for improvisational ideas.
- **Impro-Visor** is the result.
- Non-improvisational uses are also possible.

About these Slides

- This talk is being given using Impro-Visor live.
- Not all material covered in the talk is represented in these slides.
- Consult the Impro-Visor web site for more information:

www.impro-visor.com

Please Ask Questions

- Questions are fine during the presentation.

Conventional Wisdom

for learning to improvise

- Choose a solo from some jazz master.
- Transcribe the solo from audio and memorize it.
- Repeat, until you “know how to improvise”.

Problems with Conventional Wisdom for learning to improvise

- Difficult enough to be a show-stopper.
- The learner does not *own* the result.
- You could end up sounding like (you are trying to be) a clone of the famous master.

Alternative Approach

for learning to improvise

- Pick a tune you like, or be assigned one.
- Construct your own solo over the chord progression of the tune. (Note: You own it.)
- Try to play your solo. Improvise as needed to make it sound good.
- Repeat, with different tunes.

Impro-Visor

- Impro-Visor = “Improvisation Advisor”
- Designed with the Alternative Approach in mind.
- Also usable with the Conventional Approach.
- Provides automated accompaniment and other features.

Free, Open-Source, Software



Impro-Visor

keller91711



sourceforge

@sourceforge Mountain View, CA

SourceForge.net is the biggest and best place to download and develop free open source software.

<http://sourceforge.net/community>

Leadsheet notation with auto-generated playback, improvisation advice

53 Recommendations

410 Downloads (This Week)

Platform(s) Available



Download

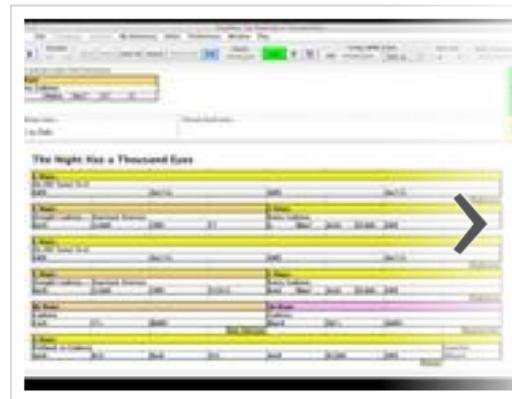
Impro-Visor_macos_5_08.dmg

Tweet 0

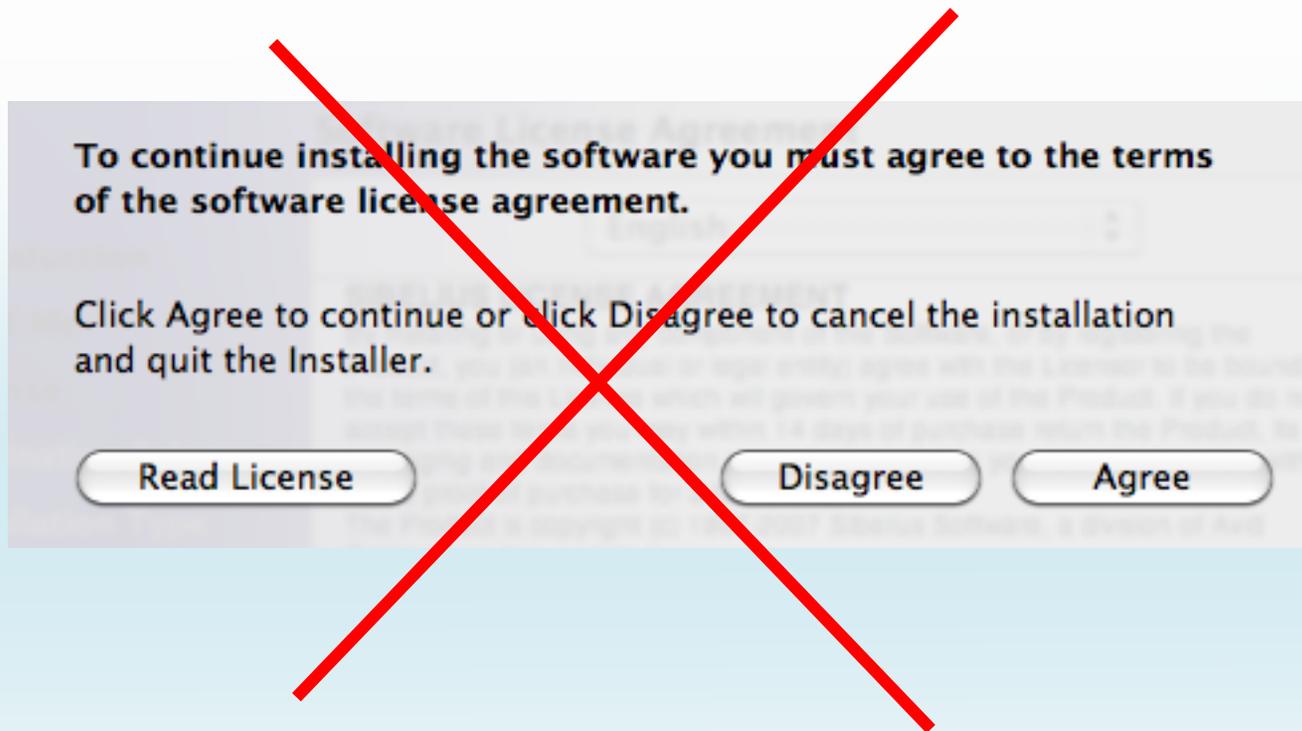
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impro-visor

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Management

- Groups Labs (Beta)
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Group Information

Members: 6873
Category: [Jazz](#)
Founded: Mar 29, 2006
Language: English



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Activity within 7 days: **23** New Members - **5** New Messages

Description [\(Edit\)](#)

Forum for [Impro-Visor: Jazz](#) Improvisation Advisor, free software for musicians, used to create improvised solos, tunes, transcriptions, or bass lines in the form of lead sheets (chord symbols with melody). Runs on Windows, MacOSX, Linux. Here are [example of a solo, tutorial, FAQ](#).

Generates styled accompaniment automatically from chord progressions. Provides a database for storing and retrieving licks. Creates new licks and full solos based on a user-modifiable grammar that can be learned from transcriptions. Music information is stored as open text files. Sound output is MIDI. Exports MIDI and MusicXML.

Impro-Visor is provided courtesy of Bob Keller. The official home page for documentation is <http://www.impro-visor.com/>.

Viewing and Playing Leadsheets

Open a file, such as `_tutorial.ls`

Click here
to play,
or press I

Press K
to stop

Press L
to pause
or resume

The screenshot shows the Impro-Visor software interface for a 12-Bar Blues piece. The window title is "Impro-Visor: 12-Bar Blues". The menu bar includes File, Edit, Transpose, View, Play, Utilities, Roadmap, Window, My grammar, Preferences, and Help. The toolbar contains various icons for file operations, playback, and editing. The main display area shows the musical score for "12-Bar Blues" in 4/4 time, with a style of "swing". The score is divided into three lines of four bars each. The first line contains measures 1-4 with chords F13_ (highlighted in red), Bb13, Bo7, F13_, Cm9, and F13b9. The second line contains measures 5-8 with chords Bb13, Bo7, F13_, and D7#5#9. The third line contains measures 9-12 with chords Gm9, C13b9, F13_, D7#5#9, Gm9, and C13b9. A yellow arrow points from the first instruction box to the play button in the toolbar. A "Textual Entry" field is visible above the score.

Got Sound?

- Impro-Visor sound is produced through MIDI.
- If you have a non-standard sound setup, you may need to make some adjustments to your system.
- You can use MIDI players, such as Kontakt or ARIA, to provide more realistic sounds than the built-ins.

Use: Playing Chords

Click here
to step from
one chord to the next

Click the arrow
before to go back.

The screenshot shows the Impro-Visor software interface for a 12-Bar Blues piece. The title bar reads "Impro-Visor: 12-Bar Blues". The menu bar includes "Edit", "Transpose", "View", "Play", "Utilities", "Roadmap", "Window", "My grammar", "Preferences", and "Help". The toolbar contains various icons for editing and playback, including a play button, a stop button, a refresh button, a lightbulb icon, and a "Generate" button. The "Program Status" section shows "Click in notes, or type in textual entry field". The playback controls include "Playback Location" (0:00 to 0:16), "Looping" (Loop 2), "Volume" (Mute), "Tempo (Beats per Minute)" (180), "Transpose" (0), "Bars" (12), "Delay" (0), "Early Scroll" (checked), and "Parallax" (0). The main display area shows the musical score for "12-Bar Blues" in 4/4 time, with a style of "swing". The score is divided into three lines of four bars each. The first line contains chords: F13_ (bar 1), Bb13 (bar 2), Bo7 (bar 3), F13_ (bar 4), Cm9 (bar 5), and F13b9 (bar 6). The second line contains chords: Bb13 (bar 7), Bo7 (bar 8), F13_ (bar 9), and D7#5#9 (bar 10). The third line contains chords: Gm9 (bar 11), C13b9 (bar 12), F13_ (bar 13), D7#5#9 (bar 14), Gm9 (bar 15), and C13b9 (bar 16). A yellow arrow points to the play button in the toolbar, and another yellow arrow points to the left arrow in the playback controls.

Various Chord Exercises

As each chord sounds, the students arpeggiate the chord on their instruments:

- Up from the root
- Down from the root
- Up/Down from the 3rd, 5th, 7th

Example

Cm9 (C minor ninth)

Cm9

The image displays the musical notation for a C minor ninth chord (Cm9) in 4/4 time. The notation is presented across four staves. The first staff is in treble clef and contains the notes C4 (quarter), Eb4 (quarter), F4 (quarter), G4 (quarter), and Ab4 (half). The second staff is in bass clef and contains the notes C3 (quarter), Eb3 (quarter), F3 (quarter), G3 (quarter), and Ab3 (half). The third staff is in treble clef and contains the notes C4 (quarter), Eb4 (quarter), F4 (quarter), G4 (quarter), and Ab4 (half). The fourth staff is in bass clef and contains the notes C3 (quarter), Eb3 (quarter), F3 (quarter), G3 (quarter), and Ab3 (half). The label 'Cm9' is positioned above the first staff.

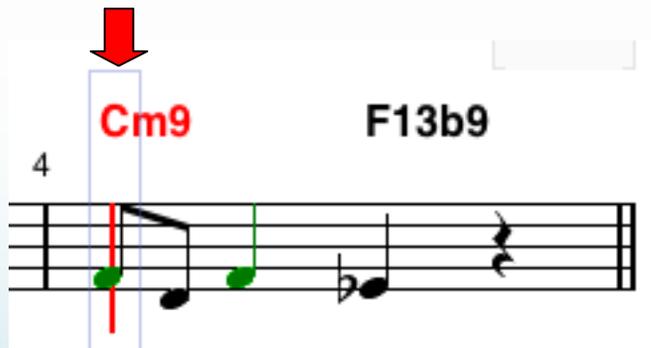
Getting Advice

If the student doesn't know the notes in the chord, **advice** can be consulted. (A chord must be in force.)

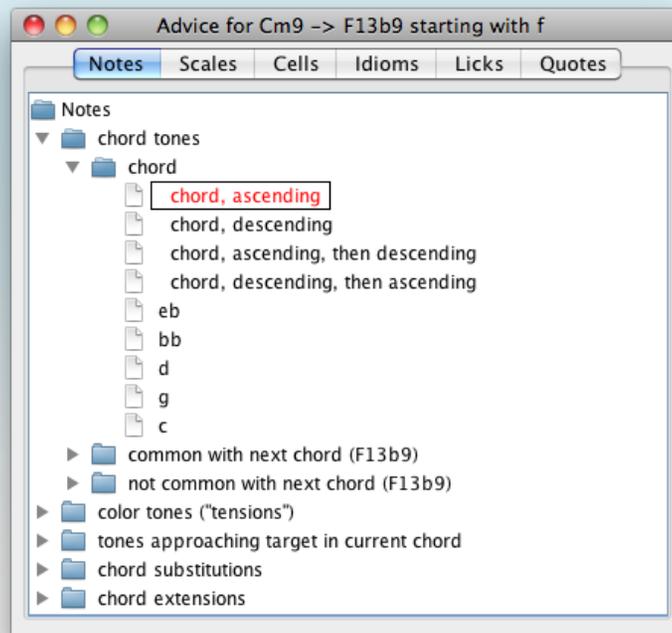
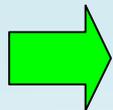
Click here
(left light bulb)

The screenshot shows the Impro-Visor software interface for a 12-Bar Blues progression. The title bar reads "Impro-Visor: 12-Bar Blues". The menu bar includes "File", "View", "Play", "Utilities", "Roadmap", "Window", "My grammar", "Preferences", and "Help". The toolbar contains buttons for "Generate", "Thaw", "B/W", "Simple", "No Beam", "Chord Font", and "Program Status". The playback location is set to 0:00, and the tempo is 180 BPM. The chord progression is displayed on a grand staff with the following chords: F13_ (bar 1), Bb13 (bar 2), Bo7 (bar 3), F13_ (bar 4), Cm9 (bar 5, highlighted in red), F13b9 (bar 6), Bb13 (bar 7), Bo7 (bar 8), F13_ (bar 9), D7#5#9 (bar 10), Gm9 (bar 11), C13b9 (bar 12), F13_ (bar 13), D7#5#9 (bar 14), Gm9 (bar 15), and C13b9 (bar 16). A yellow callout box with a white arrow points to the left light bulb icon in the toolbar, with the text "Click here (left light bulb)".

Advice is for the chord beneath the *red* (not green) cursor



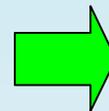
A musical staff showing two chords: Cm9 and F13b9. A red vertical cursor is positioned under the Cm9 chord, with a red arrow pointing down to it. A green vertical cursor is positioned under the F13b9 chord. A green lightbulb icon is shown to the right of the staff, indicating advice.



Advice for Cm9 -> F13b9 starting with f

- Notes
- Scales
- Cells
- Idioms
- Licks
- Quotes

- Notes
 - chord tones
 - chord
 - chord, ascending
 - chord, descending
 - chord, ascending, then descending
 - chord, descending, then ascending
 - eb
 - bb
 - d
 - g
 - c
 - common with next chord (F13b9)
 - not common with next chord (F13b9)
 - color tones ("tensions")
 - tones approaching target in current chord
 - chord substitutions
 - chord extensions



A musical staff showing two chords: Cm9 and F13b9. A green vertical cursor is positioned under the Cm9 chord, and another green vertical cursor is positioned under the F13b9 chord.

Moving the Red Cursor

- This is a little tricky, but there is a reason for it.
- Holding the **shift** key,
click the mouse over the slot you wish to select.
- **Then click again** (still holding the shift key).
- (The second click is only necessary if something was already selected.)

Example of Cursor Moving

Say we want to select the Cm9.

Before:

A musical staff with three measures. The first measure is labeled 'F13_' in red. The second measure is labeled 'Cm9'. The third measure is labeled 'F13b9'. A red vertical cursor is positioned at the beginning of the first measure, between the measure numbers '3' and '4'.

Click Here, holding shift key

Click:

The same musical staff as above. A blue selection box now encompasses the first two measures. The labels 'F13_' and 'Cm9' are now in red. Vertical lines of alternating red and yellow colors are placed at the beginning of each measure within the selection box. A red vertical cursor is now positioned at the beginning of the second measure, between the measure numbers '3' and '4'.

Click Again, still holding shift key

Click Again:

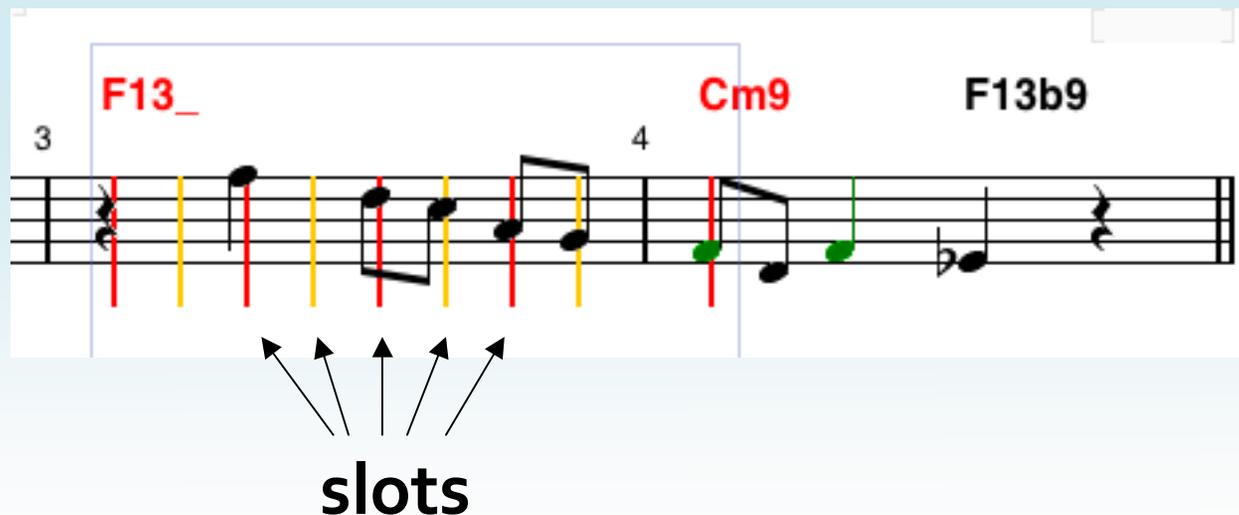
The same musical staff as above. The selection box has moved to encompass only the second measure. The label 'Cm9' is now in red. A red vertical cursor is now positioned at the beginning of the second measure, between the measure numbers '3' and '4'.

Let's Click Again ...

- ... like we did last summer.
- See if you can select the F_{13b9}

Without a click ...

- ... the day would never end.
- If the second click is not done, then several “slots” are left selected. This can be a **useful** option.



The diagram shows a musical staff with three measures. The first measure is labeled 'F13_' and contains a triplet of eighth notes. The second measure is labeled 'Cm9' and contains a quarter note followed by a dotted quarter note. The third measure is labeled 'F13b9' and contains a quarter note followed by a dotted quarter note. Vertical lines mark the boundaries of the measures. Below the staff, several vertical lines represent 'slots'. Arrows point from the word 'slots' to these lines. The first measure has three red slots and two yellow slots. The second measure has one red slot and one yellow slot. The third measure has one red slot and one yellow slot. The red slots are positioned at the beginning of each measure, while the yellow slots are positioned at the end of each measure.

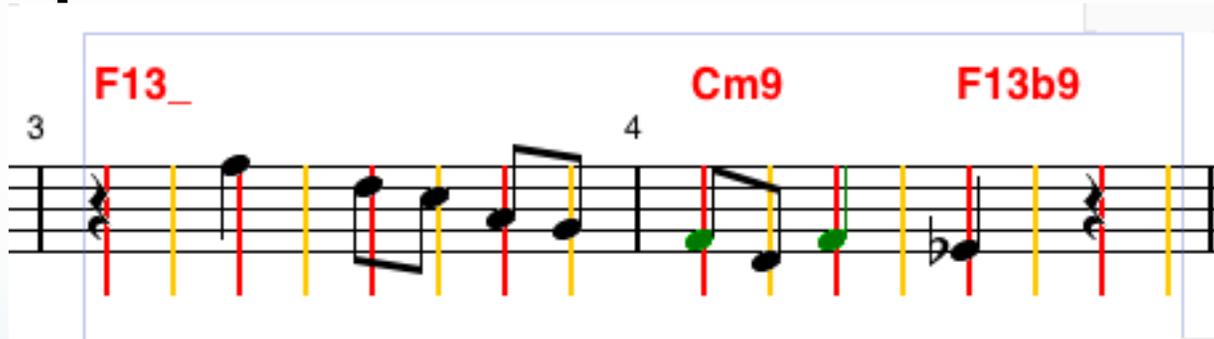
3 F13_ Cm9 F13b9

slots

What can be done with one or more slots selected:

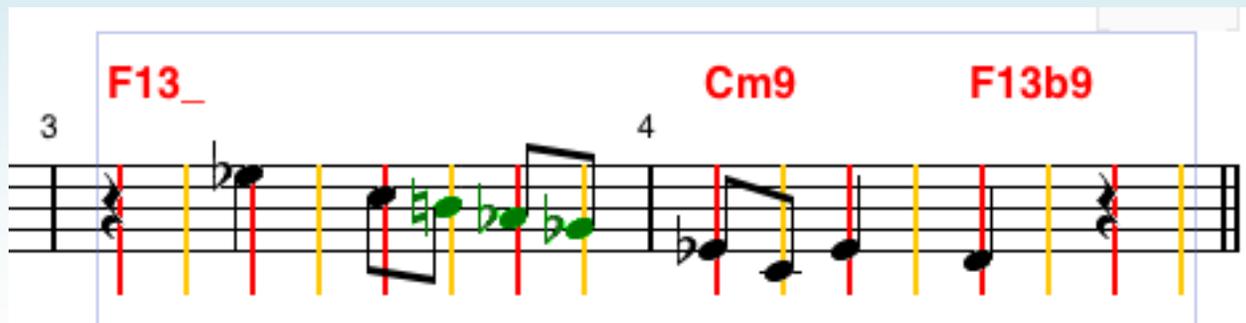
- Play the selection
- Transpose
- Move laterally
- Cut, Paste, Copy

Operations on Selections



A musical staff showing three chord selections: F13_ (measures 3-4), Cm9 (measures 4-5), and F13b9 (measures 5-6). The notes are color-coded: red for the root, yellow for the 3rd, and green for the 7th. The F13_ chord has notes F, A, C, E, G, Bb. The Cm9 chord has notes C, Eb, F, G, Bb, C. The F13b9 chord has notes F, Ab, C, Eb, G, Bb.

- To **play**, press Enter. For looped play:  Loop 0
- To **transpose** down or up, press **d** or **e**.
- To **transpose** “harmonically”, press **s** or **w**.

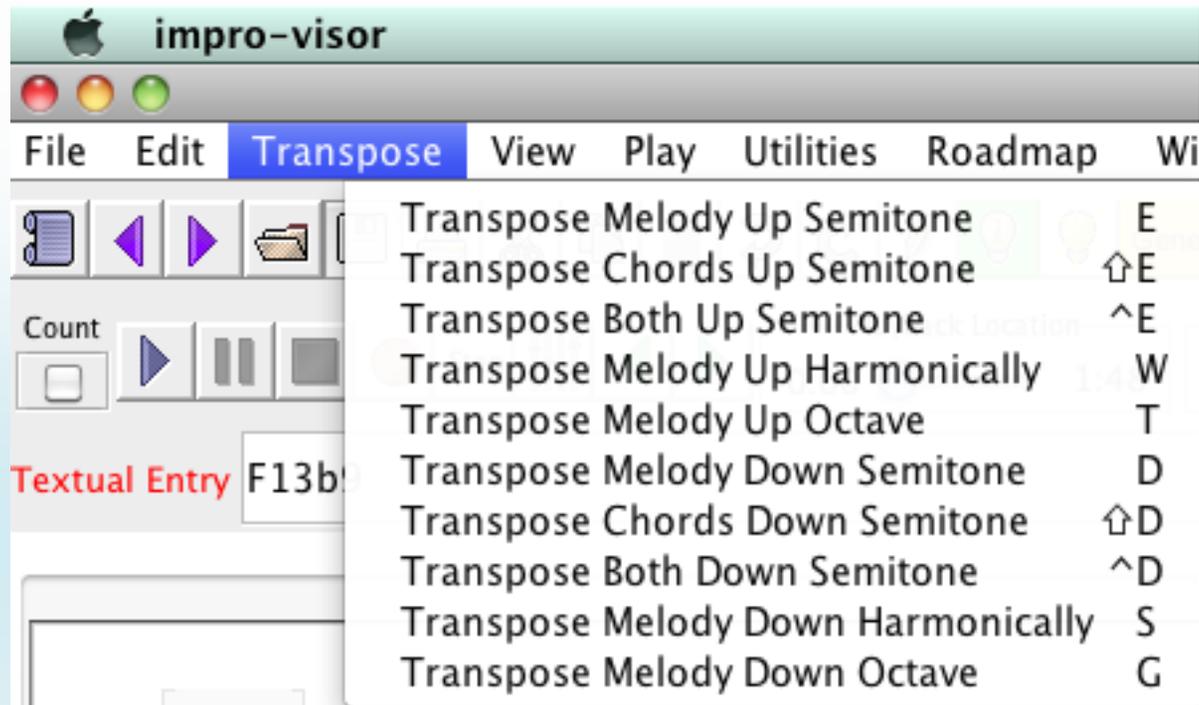


A musical staff showing the same three chord selections as above, but with transposition. The notes are color-coded: red for the root, yellow for the 3rd, and green for the 7th. The F13_ chord has notes F, Ab, C, Eb, G, Bb. The Cm9 chord has notes C, Eb, F, G, Bb, C. The F13b9 chord has notes F, Ab, C, Eb, G, Bb.

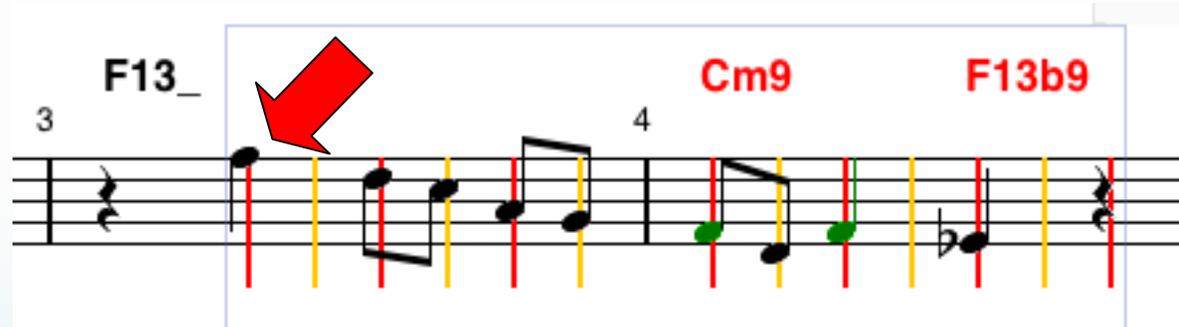
Octave Transpositions

- Press **t** to transpose notes up an octave.
- Press **g** to transpose notes down an octave.

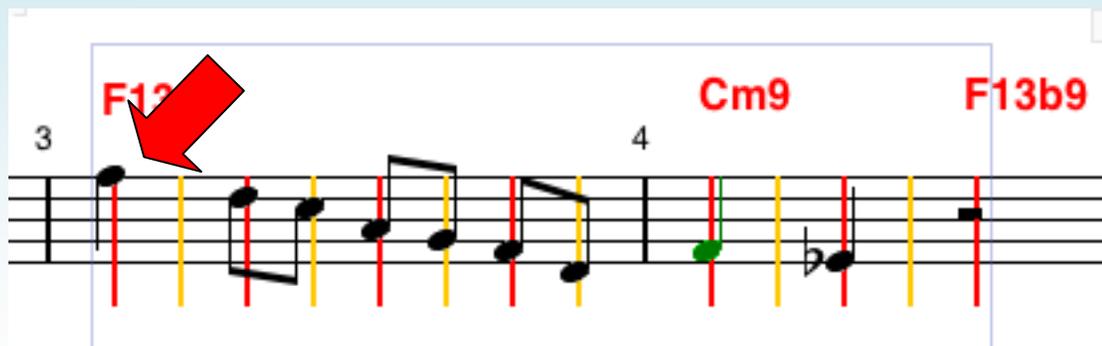
Use Menus to Help Remember



Operations on Selections



- To **move laterally**, grab a note and drag.
(Recent bug discovered: Do not include the rest on the left in the selection.)
- Drag left two slots:



More Operations on Selections

- Copy notes: Press **c**
- Cut notes: Press **x**
- Paste copied or cut notes:

Press **v** after selecting new starting slot.

The image shows three musical staves illustrating operations on selections:

- Staff 1:** Labeled with a large **C** on the left. It shows a sequence of notes with chord symbols **F13_**, **Cm9**, and **F13b9** above. A green vertical line is positioned at the start of the second measure.
- Staff 2:** Labeled with a large **C** on the left. It shows a sequence of notes with chord symbols **F13_** and **D7#5#9** above. A green vertical line is positioned at the start of the second measure.
- Staff 3:** Labeled with a large **V** on the left. It shows a sequence of notes with chord symbols **F13_**, **D7#5#9**, **Gm9**, and **C13b9** above. A blue vertical line is positioned at the start of the first measure, and a red vertical line is positioned at the start of the second measure.

Undo & Redo

- To undo cut, copy, paste type operations:
Press **z**.
- To redo what you just undid: Press **y**.
- **Any number** of steps can be undone.

Managing Chords

- Similar operations (cut, paste, etc.) work on chords.
- For **chord** operations, hold the **shift** key.
- For **both** chords and melody, hold the **control** key.
- The presentation will demonstrate.

Scale Exercises

As each chord is played, the students play an appropriate scale on their instruments.



(Eb major pentatonic)



(C bebop minor)

What do the colors mean?

Optional **color coding** for visual feedback:

black: chord tone

green: “color” tone (aka “tension”)

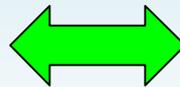
blue: chromatic approach tone to one of the above

red: none of the above (error or “outside”?)

Coloration can be toggled on or off:



Coloration is on



Coloration is off

Coloration Exercise

- Load a leadsheet of a solo with coloration *off*.
- Ask students to identify coloration for the notes, then check their answers.

The image shows a transcription of an eight-bar solo in B-flat major. The notation is presented in two staves. The first staff contains measures 25 through 28, and the second staff contains measures 29 through 32. Chord symbols are placed above the notes in each measure to indicate the harmonic context. Measure 25 has Em7 and A7. Measure 26 has Fm7 and Bb7. Measure 27 has EbM7. Measure 28 has Em7b5 and A7. Measure 29 has Dm7. Measure 30 has Cm7 and F7. Measure 31 has BbM7. Measure 32 has Eb9. The notes are primarily eighth and quarter notes, with some triplet markings in measures 28 and 32.

Eight bars from a transcription of John Coltrane's solo on "Moment's Notice".

Coloration Exercise

The image displays a musical score for a coloration exercise, consisting of two lines of music. The first line contains bars 25 through 28, and the second line contains bars 29 through 32. Each bar is labeled with a chord name above it. The notes in the music are color-coded: green, red, blue, and black. Bar 25 has a triplet of notes (G4, A4, B4) in bar 28. Bar 32 has a triplet of notes (Bb4, C5, D5) in bar 32.

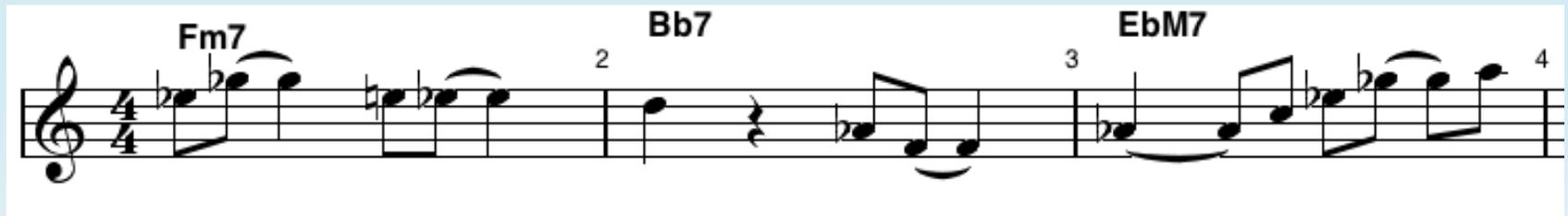
25 **Em7** **A7** 26 **Fm7** **Bb7** 27 **EbM7** 28 **Em7b5** **A7**

29 **Dm7** 30 **Cm7** **F7** 31 **BbM7** 32 **Eb9**

Eight bars from a transcription of John Coltrane's solo on "Moment's Notice".

Students' Use of Coloration

- Students (should) use coloration (+ their ears) to spot mistakes in their own solo compositions.



Students' Use of Coloration

- Students (should) use coloration (+ their ears) to spot mistakes in their own solo compositions.



Composing Simple Melodies

- The setup is similar to previous exercises, one chord at a time.
- The chord is played and the student improvises a simple melody over the chord on his/her instrument.
- Go around the room, sequencing through the chords in the piece under study.

Composing Solos

- This is the original intended use of Impro-Visor.
- For the tune under study, compose a solo of one or two choruses, or maybe just a fragment.
- Ideally, be able to play the solo.
- Don't make it too complex.

Impro-Visor Provides Help

- **Coloration**, as discussed
- **Harmonic** point-and-click entry:
Notes **gravitate** to chord and color tones.
- **Rectification** to clean up melodies.
- **Aural feedback** (note + chord)
- **Advice** (suggestions for scales, licks, etc.)

Tutorial Example

Compose something for the last 4 bars:

12-Bar Blues

Style: swing

Chord progression for the 12 bars:

- Bar 1: F13_ (Chord)
- Bar 2: Bb13 (Chord)
- Bar 3: Bo7 (Chord)
- Bar 4: F13_ (Chord)
- Bar 5: Bb13 (Chord)
- Bar 6: Bo7 (Chord)
- Bar 7: F13_ (Chord)
- Bar 8: D7#5#9 (Chord)
- Bar 9: Gm9 (Chord)
- Bar 10: C13b9 (Chord)
- Bar 11: F13_ (Chord)
- Bar 12: D7#5#9 (Chord)
- Bar 13: Gm9 (Chord)
- Bar 14: C13b9 (Chord)

Tutorial Example Sample Solution

12-Bar Blues

Style: swing

Chord progression: F13_ (1), Bb13 (2), Bo7 (3), F13_ (4), Cm9 (5), F13b9 (6), Bb13 (7), Bo7 (8), F13_ (9), D7#5#9 (10), Gm9 (11), C13b9 (12).

Bar numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Point-and-Click Features

- Only one note can stand in a given slot.
- If you make a mistake, **just click over it.**
- Click over tails of long notes to shorten.
- Use undo/redo, copy, paste, etc.

Entry Steps

Musical staff 1: Shows a transition from Gm9 (fret 9) to C13b9 (fret 10). The fretboard is marked with vertical lines: yellow for fret 9, red for fret 10, and black for fret 11. Chords F13_ (fret 11), D7#5#9 (fret 12), Gm9 (fret 12), and C13b9 (fret 12) are indicated above the staff.

Musical staff 2: Shows a transition from Gm9 (fret 9) to C13b9 (fret 10). The fretboard is marked with vertical lines: red for fret 9, black for fret 10, and black for fret 11. Chords F13_ (fret 11), D7#5#9 (fret 12), Gm9 (fret 12), and C13b9 (fret 12) are indicated above the staff.

Musical staff 3: Shows a transition from Gm9 (fret 9) to C13b9 (fret 10). The fretboard is marked with vertical lines: yellow for fret 9, black for fret 10, and black for fret 11. Chords F13_ (fret 11), D7#5#9 (fret 12), Gm9 (fret 12), and C13b9 (fret 12) are indicated above the staff.

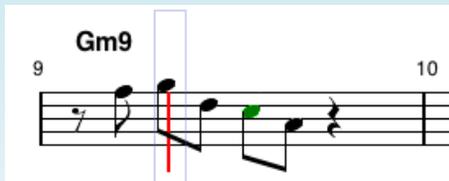
Musical staff 4: Shows a transition from Gm9 (fret 9) to C13b9 (fret 10). The fretboard is marked with vertical lines: black for fret 9, green for fret 10, and black for fret 11. Chords F13_ (fret 11), D7#5#9 (fret 12), Gm9 (fret 12), and C13b9 (fret 12) are indicated above the staff.

Musical staff 5: Shows a transition from Gm9 (fret 9) to C13b9 (fret 10). The fretboard is marked with vertical lines: black for fret 9, green for fret 10, and red for fret 11. Chords F13_ (fret 11), D7#5#9 (fret 12), Gm9 (fret 12), and C13b9 (fret 12) are indicated above the staff.

Press r
for rest

Deleting Notes

- Select note, then press **x**.
- The duration value of the note is added to the note preceding. Other notes do not move.
- Delete rests to elongate notes before them.



press **x**



press **x**



Other Ways to Enter Notes

- Impro-Visor provides a textual notation
- MIDI keyboard:
 - Step entry
 - Real-time entry (less developed)

Textual Notation

- This will be explained in the presentation.
- It is potentially faster than point-and-click.

9 Gm9 10 C13b9 11 F13_ 12 D7#5#9 Gm9 C13b9

Textual Entry r4 f+8 g+8 d+8 c+8 a8 r4 db+8 c+8 eb+8 db+8 c+8 bb8 a8 g8 f4 r8 eb8 d8 bb8 c+8 d+8 c+8 bb4 g8 e4+8

r4 f+8 g+8 d+8 c+8 a8 r4

db+8 c+8 eb+8 db+8 c+8 bb8 a8

g8 f4 r8 eb8 d8 bb8 c+8

d+8 c+8 bb4 g8 e4+8

Entering Chords, Very Briefly

- Chords are entered entirely by text.
- The starting bar must be selected.
- Separate measures by , (comma) or |.
- Chords within a measure are equally spaced out.
- Use / to repeat chord and control uneven spacing.
- Slash chords e.g. D7/C and polychords e.g. D\C7.
- Example: _tutorial.ls

F13_ | Bb13 B07 | F13_ | Cm9 F13b9 |

Bb13 | B07 | F13_ | D7#5#9 |

Gm9 | C13b9 | F13_ D7#5#9 | Gm9 C13b9 |

Class Assignment

- Assign the class the task of writing a solo for the tune of the week.
- They email their submissions to the instructor.
- The instructor creates a composite of the submissions.
- Each submission is one chorus of the composite.

Reviewing Class Assignment

- In class, the composite is played for the students.
- Watch on an LCD display while listening.
- Critique each others work.
- The instructor also provides critique.
- Examples:
 - <http://www.cs.hmc.edu/~keller/jazz/improvisor/classroom/MomentsNoticeSolos.htm>
 - <http://www.cs.hmc.edu/~keller/jazz/improvisor/classroom>

Advice for Writer's Block

- In addition to chords and scales, Impro-Visor provides a library of:
 - Cells
 - Idioms
 - Licks
 - Quotes
- The user can use these in solos, and add to them.

Licks, etc. Advice

Advice for Cm9 -> F13b9 starting with f

Notes Scales Cells Idioms **Licks** Quotes

```
\ \ [Cm7 -> F7] major 2-5 (f8 g8 f8 eb8 d8 c4)
\ \ [Cm7 -> F7] parker (f8 g16 f16 e8 eb4 c8 bb-8 g-8)
\ \ [Cm7 -> F7] 2-5 Parker (f8 g16 f16 e8 eb4 c8 bb-8 g-8)
\ / [Cm7 -> F7b9] 2-5 (f8 eb4 c8 gb-4 ab-8 a-8)
\ / [Cm7 -> F7] parker (f8 e8 eb8 g-8 d4 g4)
\ \ [Cm7 -> F7] parker (f8 eb4 e4 g4 e8)
\ \ [Cm7 -> F7] parker (f-8 e-8 eb-8 f-8 f8 eb8 d8 c8)
\ \ [Cm7 -> F7] parker (f8 e8 eb8 c8 bb-8 g-8 d8 c8)
\ \ [Cm7 -> F7] 2-5 Parker (f8 eb8 c8 g-8 d4 f8 c8)
\ \ [Cm7 -> F7] 2-5 Parker (f8 e8 eb8 c8 bb-8 g-8 d8 c8)
\ \ [Cm7 -> F7] 2-5 Bill Evans (f+8 d+8 r8/3 bb8/3 b8/3 d
\ \ [Cm7 -> F7] 2-5 Bill Evans (f+8 e+8 f+8 d+8 c+8 bb8 a
\ \ \ [Cm7 -> F7b9] 2-5 (f8 g4 c+8 gb8 ab8 eb8 a-8)
\ \ \ [Cm7 -> F7] 2-5 (f+8 e+8 eb+8 db+8 d+8 f8 g4)
\ [Cm7 -> F9] major 2-5 (f+8 eb+8 d+8 c+8 b8 a8 ab8 gb
\ \ [Cm7 -> F9] major 2-5 (f+8 eb+8 d+8 c+8 b8 c+8 eb+
\ \ [Cm7 -> F7] 2-5 (f8 eb8 d8 b-8 c8 eb8 g8 c+8 a8)
\ \ \ [Cm7 -> F7] major 2-5 (f8 bb-8 c8 f8 ab8 gb8 f8 eb8 f
\ \ \ [Cm7 -> F9] major 2-5 (f8 eb8 d8 c8 ab8 gb8 f8 eb8 f
\ \ \ \ [Cm7 -> F7] major 2-5 (f8 g8 eb8 b-8 d8 eb8 gb8 d8
\ \ \ \ [Cm7 -> F7] major 2-5 (f8 bb-8 eb8 d8 a-8 c8 gb8 al
\ \ \ \ [Cm7 -> F7] major 2-5 (f8 bb-8 eb8 d8 c8 a-8 eb8 gl
\ \ \ \ [Cm7 -> F7] major 2-5 (f8 bb-8 d8 eb8 c8 eb8 gb8 al
\ \ \ \ \ [Cm7 -> F7] major 2-5 (f8 gb8 eb8 b-8 d8 c8 gb8 at
\ \ \ \ \ [Cm7 -> F7] major 2-5 (f8 g8 eb8 f8 d8 eb8 gb8 d8
\ \ \ \ \ [Cm7 -> F7] major 2-5 (f8 g8 eb8 f8 d8 c8 gb8 d8 f
\ \ \ \ \ [Cm7 -> F7] major 2-5 (f8 g8 eb8 f8 d8 c8 db8 a-8
\ \ \ \ \ [Cm7 -> F7] 2-5 Coltrane (f+8 d+8 eb+8 f+8 g+8 et
\ \ \ \ \ [Cm7 -> F7] major 2-5 (f+8 eb+8 c+8 bb8 c+8 b8
\ \ [Cm7 -> F7] 2-5 Coltrane (f+16 e+16 f+16 g+16 a+16
```



Cm9 **F13b9**

Lick Generation

- Impro-Visor will also **generate** new melodic material on its own.
- Some of this material can be informed by solos absorbed from other players.
- There is a **grammatical** basis underlying this technology.

Examples of Generated Licks

Gm9 **C13b9**

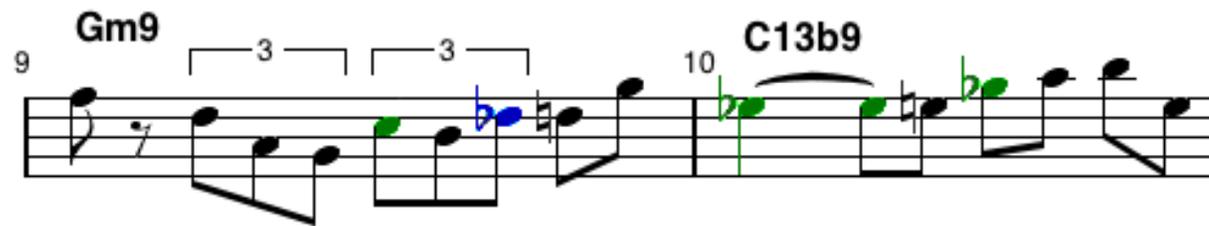
9 10



A musical staff showing a lick across two measures. The first measure is labeled 'Gm9' and contains notes G4, A4, Bb4, and C5, with a green highlight on G4. The second measure is labeled 'C13b9' and contains notes C5, Bb4, A4, and G4, with a green highlight on C5. A '9' is written above the first measure and a '10' above the second measure.

Gm9 **C13b9**

9 10



A musical staff showing a lick across two measures. The first measure is labeled 'Gm9' and contains notes G4, A4, Bb4, and C5, with a green highlight on G4. The second measure is labeled 'C13b9' and contains notes C5, Bb4, A4, and G4, with a green highlight on C5. There are blue highlights on Bb4 and A4 in the second measure. A '9' is written above the first measure and a '10' above the second measure. Triplet markings are present over the first two notes of each measure.

Gm9 **C13b9**

9 10



A musical staff showing a lick across two measures. The first measure is labeled 'Gm9' and contains notes G4, A4, Bb4, and C5, with a green highlight on G4. The second measure is labeled 'C13b9' and contains notes C5, Bb4, A4, and G4, with a green highlight on C5. A '9' is written above the first measure and a '10' above the second measure.

Avoiding Overuse

- Students should be warned not to overuse lick generation in composition assignments.
- Ideally, generated licks are a **source of ideas**, not a substitute for thinking and engagement with the material.
- The lick generator can do the entire assignment in real-time, but the hope is the students will be able to create a better sounding solo.

Play-Along Exercises

- These can be done in class or individually.
- Soloing with the program's accompaniment.
- Trading with the program.
- Comping the program as it generates a melody.
- Playing bass or drums while the program plays other parts.
- Sight-reading practice.

Fixed Trading with Impro-Visor

- Starting with an existing solo, delete every other group of four bars.
- Play the result and have the students trade fours with the fixed solo.
- Adjust tempo to suit the tune and abilities (30 to 300 beat-per-minute available).

Soloing with Impro-Visor

- Delete the melody entirely.
- Students solo over the generated background.

Dynamic Trading with Impro-Visor

- Instead of fixed trading, Impro-Visor generates fours dynamically.
- This requires a special grammar and settings.

Trading Fours: Details

- **The tune must be a multiple of 8 bars long.**
- Select the grammar MyFours.
- Unselect everything on the leadsheet (press Escape).
- Open the Lick Generator control panel.
- Click Recurrent and Rectify.
- You may need to adjust Gap, which is the number of beats lead-time to generate the next chorus (usually 1 to 4).
- Press Generate (do not use Loop).

Trading Fours: Example

Blue Bossa
Kenny Dorham

Style: latin 1963

Cm69 2 3 **Fm7** 4

5 **Dm7b5** 6 **G7alt** 7 **Cm69** 8

9 **Ebm7** 10 **Ab7** 11 **DbM7** 12

13 **Dm7b5** 14 **G7alt** 15 **Cm69** 16 **Dm7b5** **G7alt**

Detailed description: This image shows a musical score for the piece 'Blue Bossa' by Kenny Dorham. The score is presented in a 'Trading Fours' format, consisting of four systems of musical notation. Each system contains four measures, with measure numbers 1 through 16 indicated at the beginning of each measure. The first system (measures 1-4) starts with a treble clef, a key signature of two flats (Bb and Eb), and a 4/4 time signature. The notes in each measure are represented by small black squares on the staff lines. The second system (measures 5-8) continues the notation. The third system (measures 9-12) continues the notation. The fourth system (measures 13-16) continues the notation. Above each measure, the corresponding chord name is written in bold black text. The chords are: Cm69 (measures 1, 5, 7, 13), Fm7 (measure 3), Dm7b5 (measures 2, 6, 14, 16), G7alt (measures 4, 8, 10, 15), Ebm7 (measure 9), Ab7 (measure 10), and DbM7 (measure 11). The style is noted as 'latin' and the year '1963' is shown in the top right corner.

Trading Fours: Grammar Selection

The screenshot displays the Impro-Visor software interface for the song "Blue Bossa". The menu bar includes File, Edit, Transpose, View, Play, Utilities, Roadmap, Window, My grammar, Preferences, and Help. The "My grammar" menu is open, showing a list of jazz grammar options. The option "MyFours" is highlighted in blue. A yellow arrow points to this option with the word "Select" written inside it. The main window shows a musical score with a treble clef, a key signature of two flats, and a 4/4 time signature. The score is divided into measures, with bar numbers 2, 4, 5, 6, and 8 visible. The first measure is labeled "Cm69" and the second measure is labeled "G7alt". The style is set to "latin". The playback location is shown as 0:00 to 0:24. The tempo is set to 160 beats per minute. The program status is "Click in notes, or type in textual entry field".

File Edit Transpose View Play Utilities Roadmap Window **My grammar** Preferences Help

Backup
Bare
BillEvans
CharlieParker
CliffordBrown
ColemanHawkins-Ballads
DaveLiebman
DexterGordon
DizzyGillespie
FreddieHubbard
JimmyHeath
JJJohnson
JohnColtrane m7
KeithJarrett
LeeMorgan
MilesDavis
My
MyFours
Outside
RedGarland
TomHarrell-Waltzes
TomHarrell
Zoo

Program Status
Click in notes, or type in textual entry field

Count Playback Location 0:00 0:24 Loop

Style: latin Cm69 2 4 5 6 8

Dm7b5 G7alt

Tempo (beats per Minute) 160 Transpose 0 Bars 16 Delay 0 Parallax 0

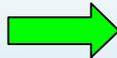
Early Scroll Clear

1963

Select

Trading Fours: Example

Open with
right-hand
light bulb



Lick Generator Controls

Grammar Options Window

Lick Generator Grammar Learning Solo Generator

Abstract Melody
(C8 S4 C8 C8 L8 C8 C8 C8 S8 L8 C8 R8 S8 S8)

Lick Generation and Extraction

Generate Melody

Fill Abstract Melody

Generate Abstract Melody Only

Extract Abstract Melody

Extract Rhythm

Play Stop Save

Generation Parameters

Avoid repeat pitches Recurrent gap (beats): 2.0

Rectify Use Soloist Use Head

Regenerate Head Data

Leap Probability

Pitch Interval Duration

Max 82 6 8

Min 60 0 8

Lick Saving and Grading

Save Lick with Grade: 1 2 3 4 5 6 7 8 9 10

Save Lick with Label: <Generated Lick>

Pitch Probabilities Fill and Clear

Clear All Probabilities Fill Auto-Fill

Scale Tone Type

Scale: Type: Use First Scale

Root: C

Pitch Category Weights

Chord Tone	Scale Tone	Color Tone	Chord Tone Decay Rate
0.7	0.05	0.15	0.0

Pitch Probabilities by Chord

Trading Fours: Launching

Press

The screenshot displays the MuseScore software interface for the piece 'Blue Bossa' by Kenny Dorham. A yellow callout box with the word 'Press' points to the 'Generate' button in the toolbar. The interface includes a menu bar (File, Edit, Transpose, View, Play, Utilities, Roadmap, Show, My grammar, Preferences, Help), a toolbar with various editing tools, and playback controls. The score is in 4/4 time, featuring a treble clef and a key signature of two flats. The first four measures are shown, with chord symbols Cm6/9 and Fm7 above them. The interface also includes a 'Textual Entry' field, a 'Clear' button, and a 'Chorus 1' label.

Chorus of Fours, Dynamically Generated

Blue Bossa

Kenny Dorham

Style: latin

1963

Cm69 **Fm7**

Dm7b5 **G7alt** **Cm69**

Ebm7 **Ab7** **DbM7**

Dm7b5 **G7alt** **Cm69** **Dm7b5** **G7alt**

Forthcoming Improvements

- Fours, Eights, etc. over artist grammars
- Removal of occasional hiccup between choruses.

Postmortem of Generated Melodies

- Melodies are saved in memory.
- You can access them by pressing undo (z).
- Each undo will go back one chorus.

- See example of 66 generated choruses:

<http://www.cs.hmc.edu/~keller/jazz/improvisor/Solos/12BarBlues66Choruses.htm>

- Eventually memory will run out, indicated by the program slowing down or stuttering.

In this case, it is best to **restart**.

Road Maps

- Road maps are Impro-Visor's newest feature.
- Tunes can be automatically analyzed into keys and bricks.
- Bricks are idiomatic chord progressions, such as cadences and turnarounds.
- These help the beginner to intermediate player understand the tune.
- The idea of bricks is from Conrad Cork in the U.K.

A Tune for Analysis

Blue Bossa
Kenny Dorham

Style: swing

1963

Cm69 **Fm7**

2 3 4

Dm7b5 **G7alt** **Cm69**

5 6 7 8

Ebm7 **Ab7** **DbM7**

9 10 11 12

Dm7b5 **G7alt** **Cm69** **Dm7b5** **G7alt**

13 14 15 16

Generated Road Map for "Blue Bossa"

Blue Bossa

Join Names
(yellow tags)

Input
Chords

Inferred
Key

Brick
Name

C Minor			
On Off Minor IV			
Cm69		Fm7	
			Backslider
C Minor			
Sad Cadence			
Dm7b5	G7alt	Cm69	
			Cherokee
Db Major			
Straight Cadence			
Ebm7	Ab7	DbM7	
			Downwinder
C Minor			C Minor
Sad Cadence			Sad Launcher
Dm7b5	G7alt	Cm69	Dm7b5 G7alt
			Homer

Using Road Maps for Play-Along

- Because roadmaps nicely decompose a tune, each brick can be practiced separately, allowing concentration on specific progressions.
- Impro-Visor allows one to **play** individual bricks or contiguous sequences of them.

Licks over Bricks

- See: <http://www.cs.hmc.edu/~keller/jazz/improvisor/licks/>

Name	Chord Progression			
Cadence + Dropback	IIIm ⁷	V ⁷	I	VI ⁷
Sad Cadence + Dropback	IIIm ⁷ b5	V ⁷	Im	VIIm ⁷ b5
POT (Plain Old Turnaround)	I	VI ⁷	IIIm ⁷	V ⁷
Minor POT (Minor Plain Old Turnaround)	Im	VI ⁷	IIIm ⁷ b5	V ⁷
Pullback	IIIm ⁷	V ⁷	IIIIm ⁷	VI ⁷
Ladybird Turnaround	I	bIII ⁷	bVI	bII ⁷
Turnaround to II + Straight Approach	I IV ⁷	IIIIm ⁷ VI ⁷	IIIm ⁷	V ⁷
Rainy Approach Turnaround	IIIIm ⁷	bIIIo ⁷	IIIm ⁷	V ⁷
Red Clay Turnaround	Im	bVIIIm ⁷ bIII ⁷ (IIIm ⁷ V ⁷ of bVI)	bVI	IIIm ⁷ b5 V ⁷

Ladybird Turnaround Licks

Bob Keller

Style: swing

CM9 Eb13 AbM9 Db9#11

Bricks for Composition

- I have found that thinking in terms of bricks and joins helps me in tune composition.
- For example, the bridge of “Benny’s Dream” starts with three **cadences**, separated by **downwinders**.
- [Video of “Benny’s Dream”](#)

End of Talk Slides