

HARMONY TUTOR

The intelligent harmony and voice-leading checker

USER MANUAL

Version 1.0.11 — May 2026
macOS · Windows



Table of Contents

1. Introduction

- 1.1 What is Harmony Tutor
- 1.2 Who is it for
- 1.3 Core principles
- 1.4 System requirements

2. Installation and first launch

- 2.1 macOS
- 2.2 Windows
- 2.3 First launch

3. The Interface

- 3.1 Overview
- 3.2 Display modes
- 3.3 Side menu
- 3.4 Voice colors
- 3.5 Voice-leading visual indicators
- 3.6 Chord symbols
- 3.7 Solo voice playback
- 3.8 Vocal ranges

4. Note entry

- 4.1 Voice and duration selection
- 4.2 Accidentals
- 4.3 Modifiers
- 4.4 Ghost note and entry
- 4.5 Selection and editing
- 4.6 Manual ornament marking

5. Measure edit panel (T)

- 5.1 Modulation / Tonicization
- 5.2 Measure
- 5.3 Harmony override
- 5.4 Move to staff

6. Key and meter

- 6.1 Key selection
- 6.2 Minor mode
- 6.3 Modulations
- 6.4 Meter and BPM

7. Harmonic analysis

- 7.1 How it works
- 7.2 The pipeline
- 7.3 Recognized chords

8. Non-chord tones

9. Rules and violations

- 9.1 Severity levels

- 9.2 Errors (red)
- 9.3 Warnings (orange)
- 9.4 Exceptions (green)
- 9.5 Recognized cadences
- 9.6 The analysis panel

10. Audio playback and MIDI

- 10.1 Internal playback
- 10.2 Controls
- 10.3 External MIDI

11. Import and export

- 11.1 Import
- 11.2 Export

12. Automatic choral realizer

- 12.1 Interface
- 12.2 Settings
- 12.3 Syntax
- 12.4 Corpus and learning

13. Preferences and settings

- 13.1 Editor tab
- 13.2 Analysis tab
- 13.3 Render / MIDI / Export / Debug tabs

14. Keyboard shortcuts

- 14.1 Global
- 14.2 Editor
- 14.3 Ornament marking (Option/Alt + letter)

15. Frequently asked questions

1. Introduction

1.1 What is Harmony Tutor

Harmony Tutor is an SATB (Soprano, Alto, Tenor, Bass) music editor with automatic real-time harmonic analysis. It is designed for harmony students and teachers, musicians, and composers who want to verify and improve their four-part writing exercises.

The application analyzes each chord as it is entered, identifies voice-leading errors, recognizes cadences and modulations, and provides educational explanations for every flagged issue. It is the only SATB editor with real-time harmonic analysis currently available.

1.2 Who is it for

Conservatory and music school students: immediate verification of exercises, error comprehension, self-study.

Harmony teachers: rapid correction tool, teaching support, time savings on repetitive errors.

Self-taught musicians: practice-driven learning guided by real-time feedback.

Composers and arrangers: voice-leading verification and harmonic analysis in a classical context.

1.3 Core principles

Spelling-First: the analysis is based on note names (spelling), not just MIDI numbers. This ensures correct enharmonic interval distinction and reliable recognition of augmented-sixth chords (It6, Fr6, Ger6).

Educational correction: every violation displays a rule code, an expandable description, and a practical correction tip.

International academic standard: nomenclature follows the academic standard, supporting both Roman numerals (functional analysis) and modern chord symbols (Cmaj7, Dm, G7/F, etc.).

1.4 System requirements

Operating System	Minimum Requirements
macOS	macOS 10.15 (Catalina) or later
Windows	Windows 10 (64-bit) or later

The application does not require an internet connection. Recommended resolution: 1280×800 pixels or higher.

2. Installation and first launch

2.1 macOS

Download the file Harmony Tutor-1.0.0-mac.dmg from the website.

Open the DMG and drag "Harmony Tutor" into the Applications folder.

2.2 Windows

Download the file Harmony Tutor-1.0.0.win.exe from the website.

Run the installer.

Windows SmartScreen may show the warning "Windows protected your PC":

Click on "More info".

Click on "Run anyway".

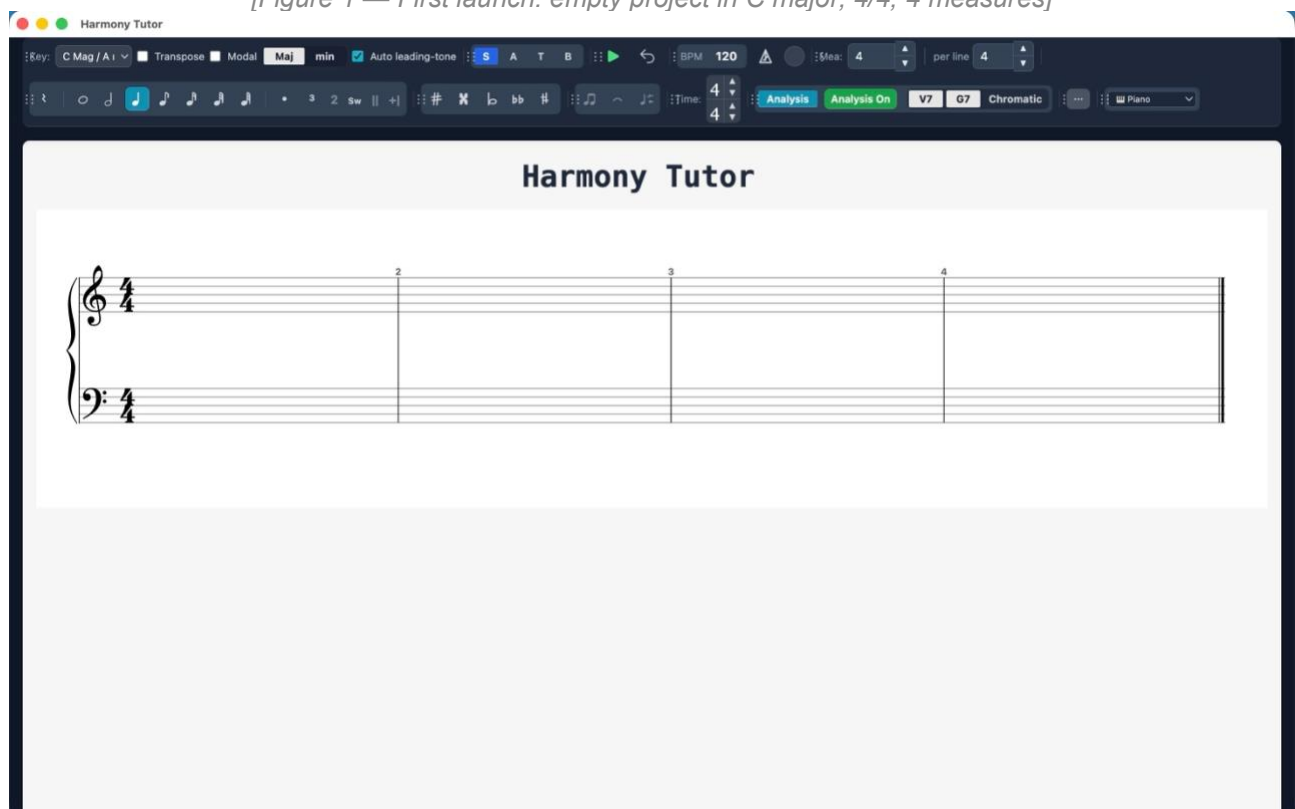
Follow the installation wizard.

The app will be available in the Start menu.

2.3 First launch

On opening, Harmony Tutor presents an empty project in C major, 4/4 time, with 4 measures. The interface is in dark mode.

[Figure 1 — First launch: empty project in C major, 4/4, 4 measures]



3. The Interface

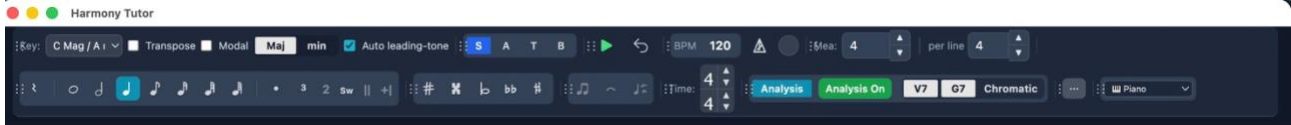
3.1 Overview

Toolbar (top): controls for voice, durations, accidentals, key, meter, playback, and instrument.

Central editor: staff with SATB voices, harmonic labels (Roman numerals) below the staff, and chord symbols above (toggleable).

Analysis panel (right): list of violations, severity filters, rule search, harmonic label explanations.

[Figure 2 —



The main toolbar]

3.2 Display modes

The editor supports several layouts, selectable from the Preferences panel (Editor tab) or the side menu:

Mode	Description	Staves
Grand Staff (default)	Treble clef + bass clef	2
Treble clef	Single staff	1
SATB ancient clefs	Four staves with historical clefs (S, A, T, B)	4
Close score	Grand Staff with reduced spacing	2
Open score	Separate staves with wider spacing	4

Switching between layouts is instant: you can write in Grand Staff and view in ancient clefs, or vice versa. Notes remain unchanged.

The screenshot shows the Harmony Tutor interface in SATB layout with ancient clefs. The score is displayed on four staves: Soprano (S), Alto (A), Tenor (T), and Bass (B). The key signature is two flats (B-flat and E-flat) and the meter is 4/4. The score includes augmented sixths and Neapolitan chords. The harmonic labels below the staves are: I³ i⁵, IV⁵ ₁, V⁷ ₅, V/vi⁶, v⁶ i⁵, vi⁵, v⁴ ₂, I⁶, v/III⁵ ₄, v⁷ ₅.

[Figure 3 — SATB layout with ancient clefs, colored voices, augmented sixths and Neapolitan]

3.3 Side menu

The "... " button on the toolbar opens the side menu, which groups layout, format, and MIDI controls.

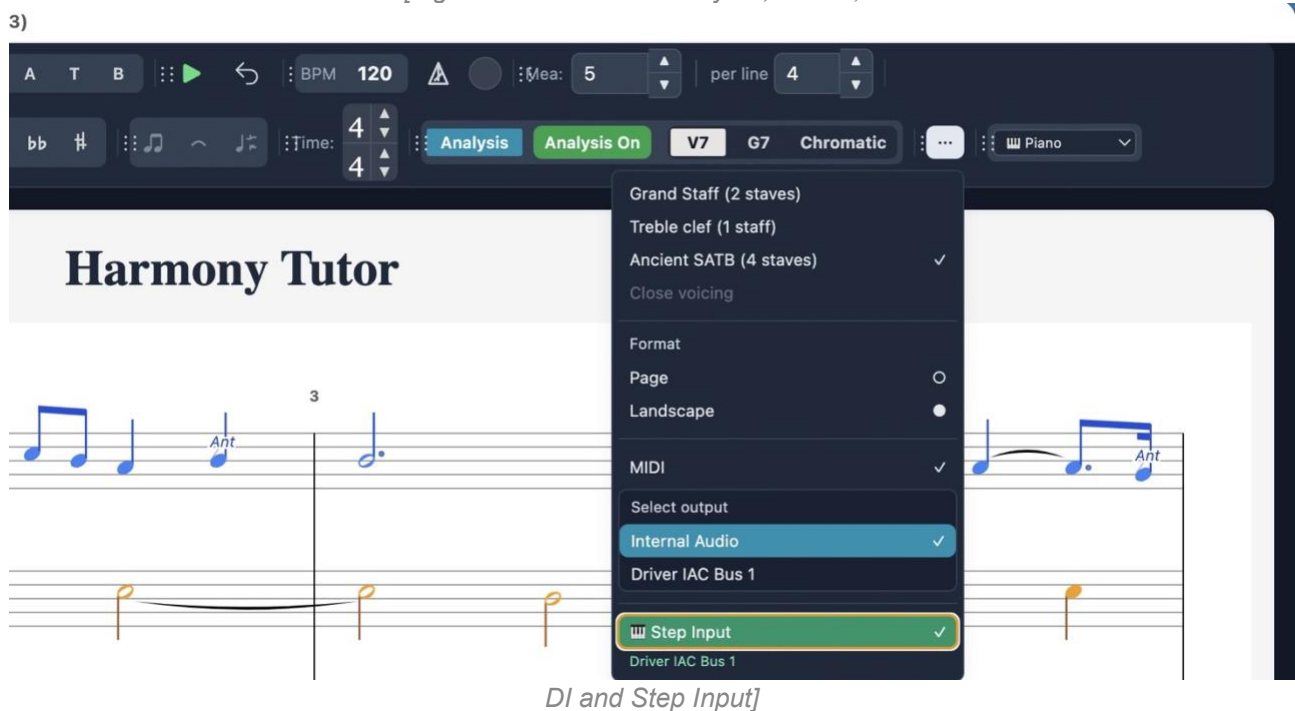
Layout: Grand Staff (2 staves), Treble clef (1 staff), SATB ancient clefs (4 staves), Close score. Selection changes display immediately without modifying notes.

Format: Page (portrait) or Landscape (horizontal). Affects staff layout on screen and in PDF export.

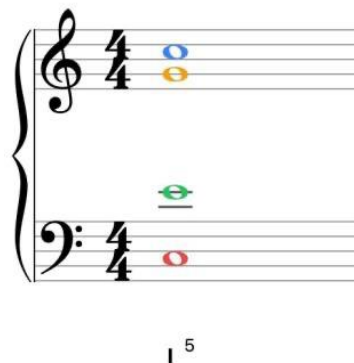
MIDI: enable/disable MIDI output and select the destination device (Internal Audio, IAC Driver Bus, Logic Pro Virtual In, or other connected devices).

Step Input: when active, allows entering notes one at a time from a connected MIDI keyboard. Each key press inserts the note in the current voice with the selected duration, and the position advances automatically to the next beat. Ideal for rapid transcription without using the mouse.

[Figure 4 — Side menu: layout, format, MI



3.4 Voice colors Activating "Voice colors (BTAS)" in Preferences → Editor gives each voice a distinct color: Soprano in blue, Alto in orange, Tenor in green, Bass in red.



[Figure 5 — Colored voices: S (blue), A (orange), T (green), B (red)]

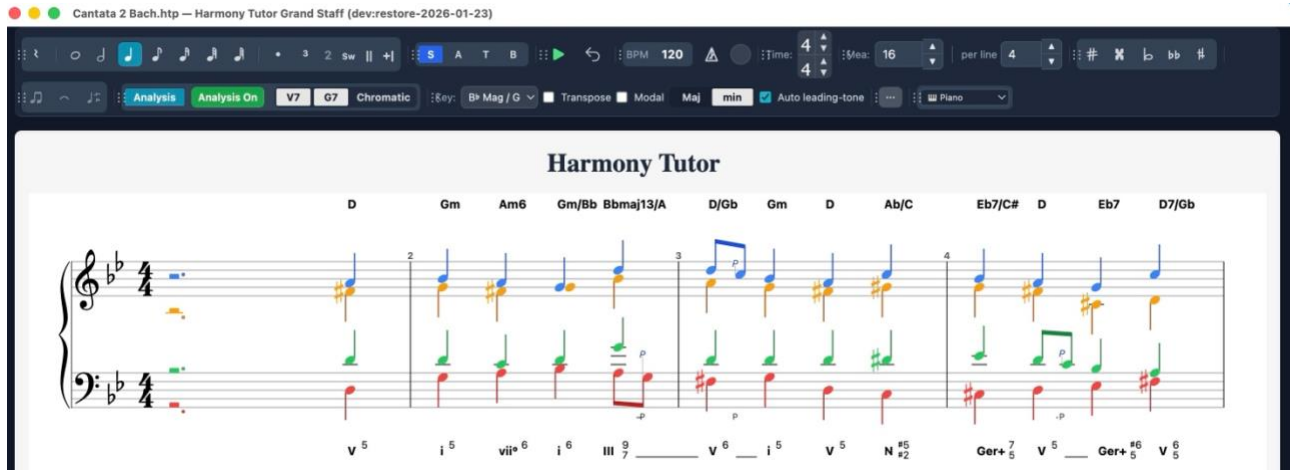
3.5 Voice-leading visual indicators

On the staff, colored dashed lines connect notes between one chord and the next:

Green lines: indicate permitted or tolerated movements, or recognized cadences (PAC, IAC, HC, plagal). They appear only where the engine recognizes a significant pattern.

Orange lines: flag a warning (situation to verify).

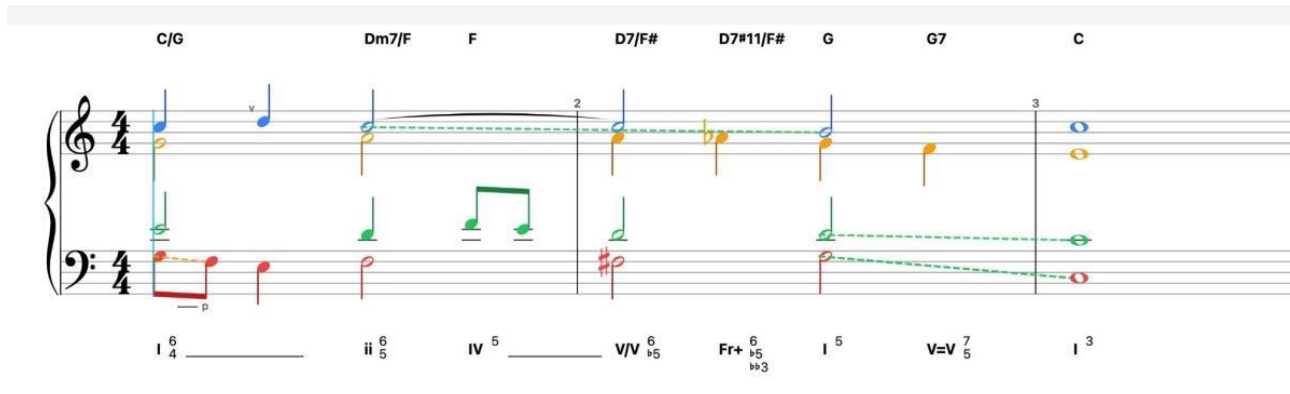
Red lines: highlight a serious error (parallel fifths, parallel octaves, crossing, etc.).



[Figure 6 — Voice-leading with green, orange and red lines, Ger+ and Neapolitan]

3.6 Chord symbols

In addition to Roman numerals, you can display modern chord symbols (C, Am, D7/F#, Dm7/F, G7, etc.) above the staff. Toggle from the toolbar selector or Preferences → Analysis → "Show chord symbols".



[Figure 7 — Dual display: symbols above + Roman numerals below, with French augmented sixth (Fr+)]

3.7 Solo voice playback

To listen to a single voice in isolation, double-click the voice button (S, A, T or B). Can be activated on multiple voices. Double-click again to deactivate.

3.8 Vocal ranges

Voice	Comfortable range	Extended range
Soprano	C4 – F5	B3 – A5
Alto	F3 – C5	E3 – D5
Tenor	A2 – E4	A2 – A4
Bass	E2 – B3	D2 – C4

4. Note entry

4.1 Voice and duration selection

Action	Shortcut	Effect
Cycle voice	V	B → T → A → S → B
Whole note	1	4 beats
Half note	2	2 beats
Quarter note	3	1 beat
Eighth note	4	1/2 beat
Sixteenth note	5	1/4 beat
Thirty-second note	6	1/8 beat
Sixty-fourth note	7	1/16 beat

4.2 Accidentals

Shortcut	Accidental	Effect
#	Sharp (#)	+1 semitone
b	Flat (b)	-1 semitone
n	Natural (n)	Cancel
## (double)	Double sharp	+2 semitones
bb (double)	Double flat	-2 semitones

4.3 Modifiers

Dot (.): toggles the dotted note (duration ×1.5).

Rest (R): switches between note and rest.

Tie (L): toggles the tie on the current note.

4.4 Ghost note and note Input

Entering notes via mouse requires the use of the **Ctrl/Cmd** modifier key to prevent accidental clicks. The correct procedure is as follows:

1. **Select the voice:** Ensure you have selected the desired voice (S, A, T, or B) from the toolbar or by pressing the **V** key.
2. **Position on the correct staff:** The pointer must be on the staff corresponding to the chosen voice (e.g., treble clef for Soprano and Alto, bass clef for Tenor and Bass). *Note: if you select a high voice (e.g., Soprano) but position the mouse on the bass clef, the system will block the input to prevent writing errors and will not display any note.*
3. **Hold the Ctrl/Cmd modifier key:** Press and hold **Ctrl** (on Windows) or **Cmd** (on Mac). This step unlocks note input: only while holding the key will you see the semi-transparent "ghost note" appear to guide you.
4. **Click:** While still holding the modifier key, click on the staff to insert the note.

Without holding Ctrl/Cmd, the mouse functions solely as a pointer and selection tool.



[Figure 8 — Ghost note: preview before entry]

4.5 Selection and editing

Action	Shortcut
Select note	Click
Multi-select	Shift + Click
Delete	Backspace / Delete
Transpose ±1 semitone	↑ / ↓
Transpose ±1 octave	Alt + ↑ / ↓
Undo / Redo	Cmd/Ctrl + Z / Shift+Z

4.6 Manual ornament marking

With the T panel open, the "Ornament marking" section allows you to force the ornament type. Shortcuts use Option (Mac) or Alt (Windows):

Shortcut	Type
Option+H	Structural (harmonic) note
Option+P	Passing tone
Option+V	Neighbor tone
Option+A	Appoggiatura
Option+N	Anticipation
Option+S	Escape tone
Option+R	Suspension / Retardation
Option+O	Ornamental (embellishment)
Option+C	Changing tone (nota cambiata)

Note: The Control key on Mac is reserved for activating voice note colors.

5. Measure edit panel (T)

Pressing T with the playhead on a measure opens the side panel with editing features.



[Figure 9 — The T panel: modulation, override, repeat, delete measure]

5.1 Modulation / Tonicization

Allows setting a key change from the current measure. Select the new tonic and mode (Maj/min), then click "Apply context".

5.2 Measure

Delete measure: removes the current measure and shifts everything after it back.

Repeat signs: inserts repeat barlines (open, close, double).

Time change: applies a meter change from the current measure.

5.3 Harmony override

Allows manually overriding the harmonic label with three fields: Roman (e.g. I, V/vi, Ger+), Figure (e.g. 6/5), and Chord symbol (e.g. D7/F#).

5.4 Move to staff

Moves a note between treble and bass staff via Option+Arrow up/down (Mac) or Alt+Arrow (Windows). Enables mixed open/close score writing on the same staff. "Restore default staff" returns the note to the staff assigned by voice.

6. Key and meter

6.1 Key selection

All 24 major and minor keys. Global change from the toolbar, or per-measure from the T panel.

6.2 Minor mode

In minor mode, the toolbar offers two scale options:

Natural (Aeolian): natural minor scale, without raised leading tone.

Harmonic: raised 7th degree to create the leading tone (V–i).

Additionally, the "Auto leading tone" flag (visible in the toolbar) automatically inserts the leading-tone accidental in minor mode: when active, the 7th degree is entered already raised without needing manual alteration.

6.3 Modulations

Automatic recognition: cadential patterns tested against all candidate tonics.

Manual marking: via the T panel.

Lookahead tonicizations: the engine looks up to 2 measures ahead.

6.4 Meter and BPM

Default meter: 4/4. Available: 2/4, 2/2, 3/4, 3/8, 4/4, 5/4, 6/8, 7/8, 12/8, and any custom meter. Meter changes from the T panel. Metronome toggleable with K.

7. Harmonic analysis

7.1 How it works

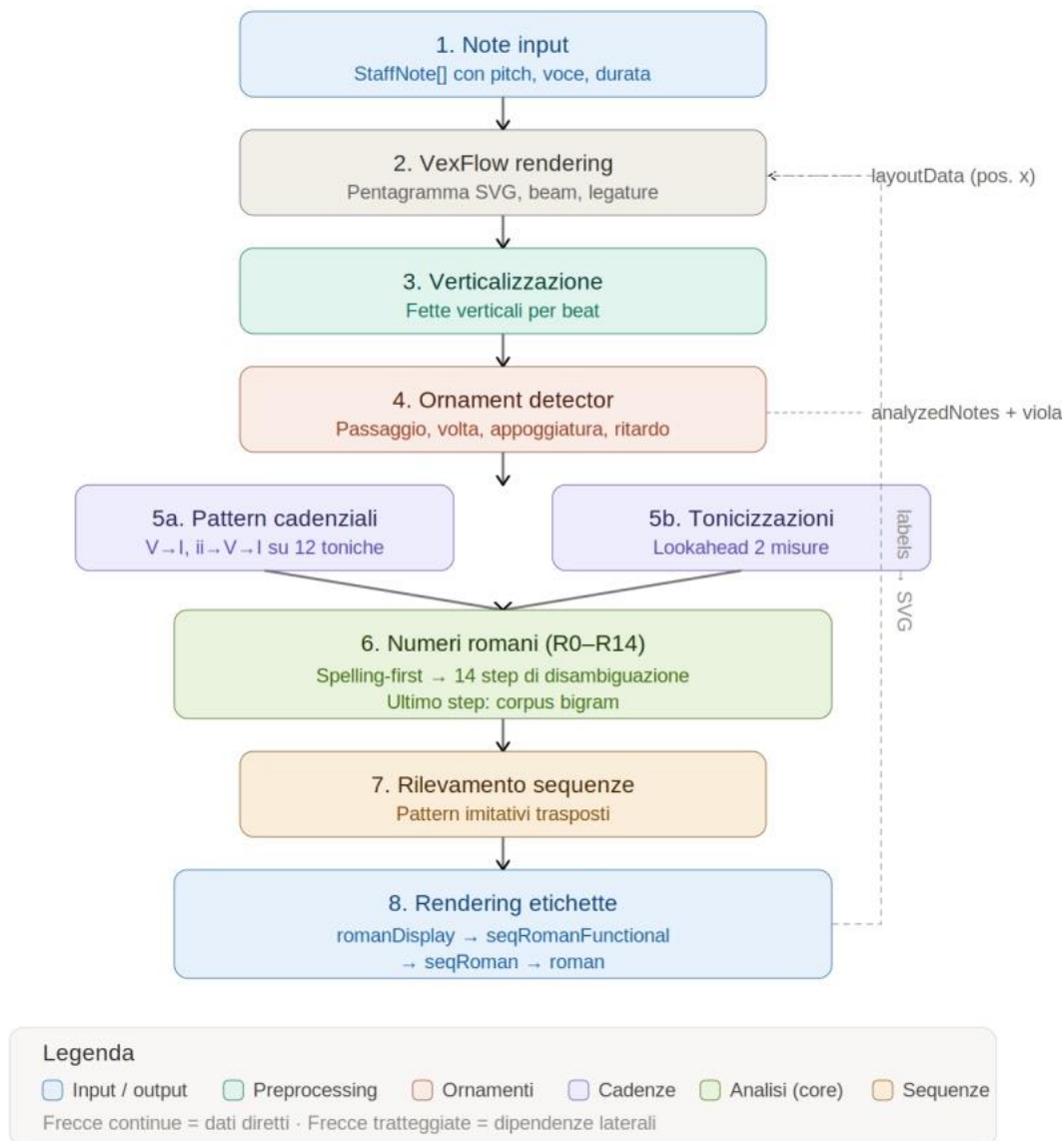
Harmony Tutor analyzes the notes in real time through an 8-block pipeline. The result is a harmonic label (Roman numeral) below the staff for each chord and/or modern chord symbols above the staff, toggleable from the toolbar selector.

[Figure 10 — Score with active harmonic analysis]

The screenshot displays the Harmony Tutor software interface. At the top, the title bar reads "Cantata 2 Bach.htp — Harmony Tutor Grand Staff (dev:restore-2026-01-23)". The toolbar includes playback controls, a BPM of 120, a time signature of 4/4, and analysis settings. The main area shows a grand staff with two systems of music. Above the first system, modern chord symbols are listed: D, Gm, Am6, Gm/Bb, Bbmaj13/A, D/Gb, Gm, D, and Ab/C. Below the first system, Roman numeral analysis is shown: V 5, i 5, vii° 6, i 6, III 9 7, V 6, i 5, V 5, and N #2. The second system has modern chord symbols: Eb7/C#, D, Eb7, D7/Gb, Gm, Gm, D, Gm, Am6, Gm/Bb, and Bbmaj13/A. Below the second system, Roman numeral analysis is shown: Ger+ 7 5, V 5, Ger+ #6 5, V 6 5, i 5, i 5, V 5, i 5, vii° 6, i 6, and III 9 7 i 5.

7.2 The pipeline

The following diagram illustrates the complete flow from note entry to label rendering.



[Figure 11 — Harmonic analysis pipeline: 8 blocks]

In summary:

- 1. Verticalization:** grouping of simultaneous notes.
- 2. Ornaments:** identification and separation of non-chord tones.
- 3. Chord identification:** spelling-first analysis, candidates ranked by plausibility.
- 4. Roman numeral (R0–R14):** 14 disambiguation steps; the last step uses the statistical corpus.
- 5. Cadential patterns:** cadence and tonicization recognition.
- 6. SATB rules:** over 40 voice-leading rules.
- 7. Sequences:** recurring melodic patterns (optional).
- 8. Rendering:** labels below the staff (and symbols above, if enabled).

7.3 Recognized chords

Triads

Type	Example (C)	Intervals
Major	C–E–G	1–3–5
Minor	C–E \flat –G	1– \flat 3–5
Diminished	C–E \flat –G \flat	1– \flat 3– \flat 5
Augmented	C–E–G \sharp	1–3– \sharp 5

Seventh chords

Type	Example (C)	Intervals
Dominant 7	C–E–G–B \flat	1–3–5– \flat 7
Major 7	C–E–G–B	1–3–5–7
Minor 7	C–E \flat –G–B \flat	1– \flat 3–5– \flat 7
Diminished 7	C–E \flat –G \flat –A	1– \flat 3– \flat 5– $\flat\flat$ 7
Half-diminished	C–E \flat –G \flat –B \flat	1– \flat 3– \flat 5– \flat 7

Special chords

Augmented sixths: Italian (It6), French (Fr6), German (Ger6).

Neapolitan (bII): major triad on the lowered 2nd degree.

Dominant ninths: V9, V7 \flat 9, V7 \sharp 9.

The figure displays two systems of musical notation. Each system consists of two staves (treble and bass clef) with notes in various colors (blue, orange, green, red) and stems. Roman numerals and chord symbols are placed above the notes. Ornaments 'P' and 'v' are indicated above specific notes. The first system includes chords: C, Am, D/F#, D7, G, G7/F, C/E, G/D, Am7/C, D. The second system includes: D, Gm, Am6, Gm/Bb Bbmaj13/A, D/Gb, Gm, D7, Ab/C, Eb7/C#, D, Eb7, D7/Gb. Roman numerals like I⁵, vi⁵, v/V⁶, I⁷, I⁵, I₂⁴, I⁶, I₄⁶, vi₅⁶, I⁵, v⁵, i⁵, vii⁶, i⁶, III⁹/₇, v⁶, i⁵, v⁷, N^{b6}, Ger+⁷/₅, v⁵, Ger+^{#6}/₅, v⁶/₅ are used to identify the chords and voice parts.

[Figure 12–13 — Colored voices with symbols and Roman numerals, ornaments (P, v)]

8. Non-chord tones

Harmony Tutor automatically recognizes non-chord tones and excludes them from the chord.

Type	Marker	Characteristic
Passing tone	P	Stepwise between harmonic notes, on a weak beat
Neighbor tone	v	Steps up/down from the chord tone and returns
Appoggiatura	A	Dissonance on a strong beat, resolves by step
Anticipation	N	Anticipates a note of the following chord
Escape tone	S	Leap + stepwise resolution
Suspension / Retardation	R	Held note, resolves downward (or upward)
Changing tone	C	Ornament with a leap from the dissonance

Suspensions are classified: 4–3, 7–6, 9–8, 2–1. Manual marking uses Option (Mac) or Alt (Windows) + the corresponding letter.

9. Rules and violations

The analysis panel flags violations with colored badges. Each item is expandable with a description and advice.

The screenshot shows the Harmony Tutor software interface. The main window displays a grand staff with bass and treble clefs. The bass staff has a key signature of one flat and a 4/4 time signature. The treble staff has a key signature of one flat and a 4/4 time signature. The software interface includes a top toolbar with various icons and settings, a central analysis panel with chord symbols and figured bass, and a right-hand sidebar with a list of rules and violations. The sidebar shows 17 errors, 16 warnings, 40 exceptions, and 0 chromatics. A specific violation, 'R-02: Parallel fifths', is expanded, showing a detailed description and a suggestion for modification.

[Figure 13 — Analysis panel with filters, violations and cadences]

9.1 Severity levels

Color	Severity	Meaning
Red	Error	Serious violation of fundamental rules
Orange	Warning	Situation to avoid, not always prohibited
Green	Exception	Special case tolerated by tradition
Purple	Chromatic	Advanced chromatic harmony

9.2 Errors (red)

The screenshot displays the Harmony Tutor Grand Staff interface. The main window shows a musical score for a piece titled "Titolo" in 4/4 time. The score consists of four measures with chords C, Dm7/F, G, and C. The error R-10, "Doubled leading tone", is highlighted in the G chord. The right-hand panel shows the "FILTERS" section with "Errors (1)" selected, and a detailed explanation of the R-10 error.

R-10: Doubled leading tone

The leading tone (scale degree VII) has a strong functional tendency to ascend by semitone to the tonic. Doubling it means having two voices carrying the same note with the same directional tension: both will need to ascend to the tonic, almost inevitably generating parallel octaves in the next chord.

For this reason, doubling the leading tone is considered a serious error, particularly in the dominant chord (V and V7) where the leading tone plays its most prominent role.

- In sequences and imitative progressions: doubling may be tolerated when the need to maintain melodic symmetry between model and imitation overrides doubling purity.
- In the V7 chord: the problem is aggravated by the presence of the seventh: both dissonant notes (leading tone and seventh) exert pressure on the resolution.
- In viiø7 and vii°7 chords: the accumulated tension is already maximal; doubling the leading tone makes it worse.
- In an inner voice (Alto or Tenor): the doubling is less serious but should still be avoided when possible.

Suggestion: Evita di raddoppiare il 7° grado: preferisci raddoppiare la tonica o la quinta. (ctx C mag: V)

[Figure 14 — Example error R-10 (leading-tone doubling)]

Code	Rule
R-01	Parallel octaves/unisons
R-02	Parallel fifths
R-04	Voice crossing
R-07	Unresolved leading tone
R-09	Cross relation (false relation)
R-10	Leading-tone doubling
R-12	Unresolved seventh

9.3 Warnings (orange)

Code	Rule
R-05	Hidden fifths/octaves
R-08	Excessive spacing S–A / A–T
R-13	All voices in parallel motion
R-15	Wide leaps in inner voice
R-16	Harmonic syncope
R-17a/b/c	Problematic melodic leaps
R-RANGE	Note out of range

9.4 Exceptions (green)

The screenshot shows the Harmony Tutor interface with a musical score titled "Titolo" in 4/4 time. The score consists of five measures with chords C, Dm7/F, G, G7, and C. The bass line is annotated with intervals: I 5, ii 6/5, V 5, V 7/5, and I 3. The right-hand panel shows the "FILTERS" section with "Exceptions (3)" selected. The "Exceptions" list includes:

- Semicadenza (HC)
- Exception: Ottava nascosta T-B con T per grado congiunto (ammessa - regola classica)
- Exception: Subsequent fifth by oblique motion (one voice held)

The "Exception: Subsequent fifth by oblique motion (one voice held)" is expanded, showing the following text:

When a voice remains stationary on a common tone shared by two consecutive chords, reaching a perfect fifth or octave in the next chord is permitted. The pedal note (the stationary voice) ensures continuity and prevents the perception of parallel motion. This is one of the classic exceptions in harmonic theory: the common tone holds the interval and neutralizes the parallel effect.

Suggestion: Marker informativo: non è una parallela "vera" (moto obliquo), ma verifica l'indipendenza delle linee.

[Figure 15 — Exceptions: PAC cadence, HC half cadence, hidden by step]

9.5 Recognized cadences

Code	Type	Formula
CAD-PAC	Perfect authentic	V → I (root position)
CAD-IAC	Imperfect authentic	V → I (with inversion)
CAD-HC	Half cadence	Phrase ending on V
CAD-PLAG	Plagal	IV → I

9.6 The analysis panel

Filters: checkboxes for Errors, Warnings, Exceptions, Chromatic with counts.

Rules: clickable chips + search field (e.g. "R-01", "CAD").

Click on Roman numeral: opens the Explanation tab with all information.

Disable rule: individually silenceable, persists across sessions.

The screenshot displays the Harmony Tutor interface. At the top, there are playback controls (stop, play, BPM 80, time signature 4/4, measure 19, per line 2) and a key signature of C Major/A Minor. Below this, a musical score is shown with Roman numeral analysis: i^5 , $iv^5_{b3} VI^4_3$, $ii^{\circ 5}_3$, $\flat VII^5$, VI^5 , $v^6 VI^b6_5$. Below the score, a chord progression is shown: Dm, D/F#, G, G/D, C, Dm, E7. A second score shows a different analysis: iv^5_{b3} , IV^b6 , $\flat VII^5$, $\flat VII^6_4 III^5$, iv^5_{b3} , V^7 . A third score shows E and Am chords. On the right, a panel titled 'Rules' shows filters for Errors (12), Warnings (19), Exceptions (52), and Chromatics (0). A search field is present. Below the filters, a list of rules is shown, including CAD-IAC, EXC-7-FREE, EXC-7-STATIC, EXC-7-TRANSFER, EXC-7-TRANSFERRED-RES, EXC-7-UP, EXC-Hidden-Stepwise, EXC-LT-Transfer, EXC-OBL-PERF, and EXC-R17-Duration. A section for 'SEQUENCES' is disabled. A detailed explanation for rule R-05 is shown: 'Hidden octave S-A by leap in both voices (forbidden)'. The explanation states: 'A hidden (or direct) fifth or octave occurs when two voices move in the same direction (direct motion) to arrive at a perfect fifth or octave, even if they were not in that relationship in the previous chord. The effect is "hidden" because the fifths are not consecutive, but the direct movement toward them still emphasizes the perfect interval in a way that classical treatises consider objectionable, especially in the outer voices. Hidden intervals between outer voices (Soprano and Bass) are more serious than those between inner voices. For inner voices, the problem is attenuated and often classified as a simple warning. Recognized exceptions: hidden intervals are permitted when the upper voice proceeds by step (second); they are permitted between inner voices on all scale degrees if the higher voice proceeds by step; they are permitted on tonal degrees if the lower voice proceeds by step; they are always permitted in oblique motion. Suggestion: Nella prassi classica, l'ottava nascosta è proibita quando entrambe le voci procedono per salto.'

[Figure 16 — Filters: checkboxes for Errors, Warnings, Exceptions, Chromatic with counts.]

The screenshot displays the Harmony Tutor interface with the following components:

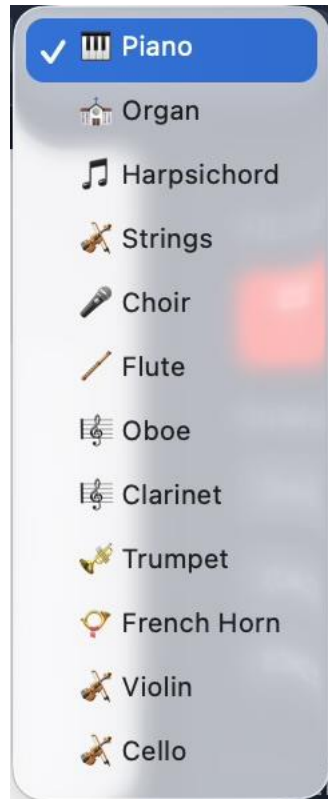
- Top Bar:** Includes playback controls (stop, play, back), BPM 120, Time, Mea: 2, per line 4, and musical symbols (#, x, b, bb, #).
- Header:** Battuta 3, beat 1 — Tonalità attiva: C maj
- Left Panel:**
 - Affidabilità: Alta** (green badge)
 - Etichetta mostrata:** Romano: vi, Sigla accordo: Esus4/A, Fondamentale: E, Basso figurato: 5, Override: no
 - Perché (in breve):** • Candidato unico
 - Note presenti (in questo punto):** Voce 1: A⁴4, Voce 2: E⁴4, Voce 3: A⁴3, Voce 4: A⁴2
 - ▼ Dettagli tecnici (debug):** Posizione interna (absBeat): 8.000
 - Classi di altezza (pitch classes):** Base: 4, 9 (E - A), Dopo filtro figure: 4, 9 (E - A), Dopo filtro roman: 4, 9 (E - A)
 - Candidati accordo (top):** Sus4, no_fifth · 15
 - Note (tecnico):** An4 v1 (69), En4 v2 (64), An3 v3 (57), An2 v4 (45)
- Right Panel:**
 - FILTERS:** Shown: 6/6. Buttons for Errors (5), Warnings (1), Exceptions (0), Chromatics (0). Rules: All, None. Search ruleid (e.g. R-N-RES, ORN-, CAD-). Filtered rules: R-01, R-01c, R-02, R-02c, R-16, R-CHORD-COMPLETE.
 - SEQUENCES:** Sequences: ON. No sequences found.
 - Error Details:**
 - R-01: Parallel octaves** (with warning icon): Parallel octaves occur when two voices move in the same direction (direct motion) while maintaining an octave (or unison) interval between them across two consecutive chords. This is one of the most serious errors in multi-voice writing: the two parts lose their melodic independence and merge into a single line, effectively reducing the texture from four voices to three. The polyphonic tradition considers parallel octaves a fundamental violation of voice independence. The prohibition applies to any pair of voices and any type of direct motion: it is not mitigated by the voices being inner parts. Octaves are permitted in oblique motion (one voice stationary) and tolerated in contrary motion in certain contexts. Suggestion: Modify the voice-leading of one of the two voices: move at least one in contrary or oblique motion relative to the other, or redistribute the chord tones to change the interval between the affected voices.
 - R-01c: Ottave consecutive per moto contrario** (with warning icon)
 - R-02: Parallel fifths** (with warning icon)
 - R-02c: Consecutive fifths in contrary motion** (with warning icon)
 - R-16: Salto melodico di 7^a (minore) — proibito** (with warning icon)
 - R-CHORD-COMPLETE: Incomplete chord (third** (with warning icon)

[Figure 17 — Explanation tab with all information.]

10. Audio playback and MIDI

10.1 Internal playback

Playback via Web Audio API with FluidR3 General MIDI samples. The default timbre is Piano. Available timbres:



[Figure 18 — Available timbres]

Piano, Organ, Harpsichord, Strings, Choir, Flute, Oboe, Clarinet, Trumpet, Horn, Violin, Cello.

10.2 Controls

Shortcut	Action
Space	Play / Stop
Enter	Return to beginning
K	Metronome
+ / -	Speed
Double-click on S/A/T/B	Solo voice

10.3 External MIDI

Supports MIDI keyboards for input and output. You can also use external sound sources or other DAWs (e.g. Logic Pro) for playback by routing MIDI data through a virtual bus (IAC Driver on Mac). Configuration from the Preferences panel (MIDI tab) or the layout menu.

11. Import and export

11.1 Import

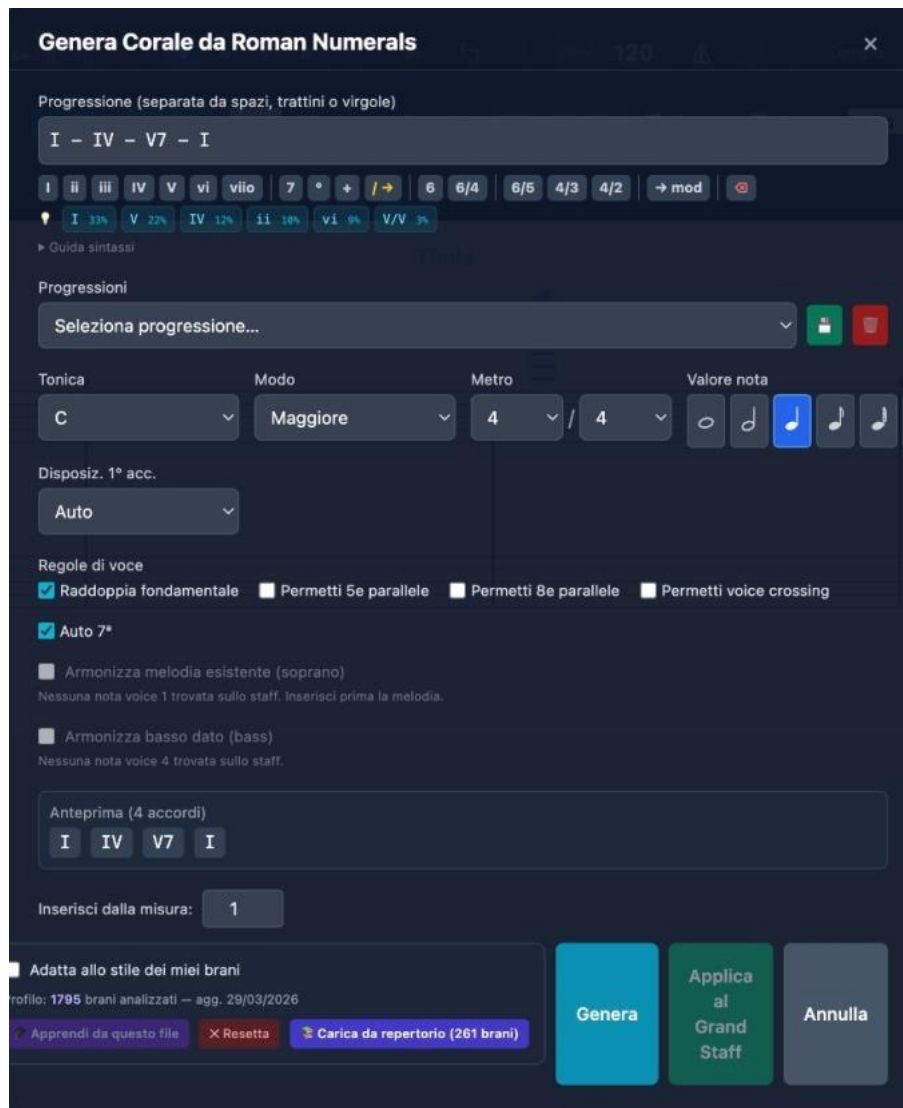
Format	Extension	Notes
Native	.htp / .json	Full format
MIDI	.mid	Heuristic voice assignment

11.2 Export

Format	Extension	Notes
Native	.htp	Complete, re-openable
MusicXML	.xml	MuseScore, Finale, Sibelius
MIDI format 0	.mid	All voices on a single track
MIDI format 1	.mid	Each voice on a separate track
PDF	.pdf	For printing
PNG	.png	Screenshot

12. Automatic choral realizer

Generates four SATB voices from a Roman numeral progression. Access via the Chorale menu → "Insert progression".



[Figure 19 — Choral generator]

12.1 Interface

Progression field: enter chords separated by spaces or dashes.

Quick buttons: I, ii, iii, IV, V, vi, vii°, 7, °, +, 6, 6/4, 6/5, 4/3, 4/2, →mod.

Corpus suggestions: colored chips with the most probable progressions.

12.2 Settings

Tonic, Mode, Meter, Note value: realization configuration.

Voice rules: double root, allow parallel 5ths/8ves, voice crossing, auto 7th.

Constraints: soprano melody or given bass as a fixed constraint.

12.3 Syntax

Syntax	Meaning
I ii IV V vi	Degrees (upper=Major, lower=minor)
I6 I6/4	Inversions
V7 V6/5 V4/3 V4/2	Seventh and inversions
vii° iiø7	Diminished / half-diminished
V/V V7/IV	Secondary dominants
It6 Fr6 Ger6	Augmented sixths
→G: →f#:	Modulation
	Barline (forces new measure)

12.4 Corpus and learning

The realizer uses a statistical system that learns from analyzed pieces. Through bigram and trigram statistics, the software learns the horizontal voice behaviors (stepwise motion, leaps, contrary motion) and the most frequent harmonic progressions. This information guides the choices of inversion, voice-leading, and doubling during automatic generation.

Learn from this file: adds the current exercise to the corpus.

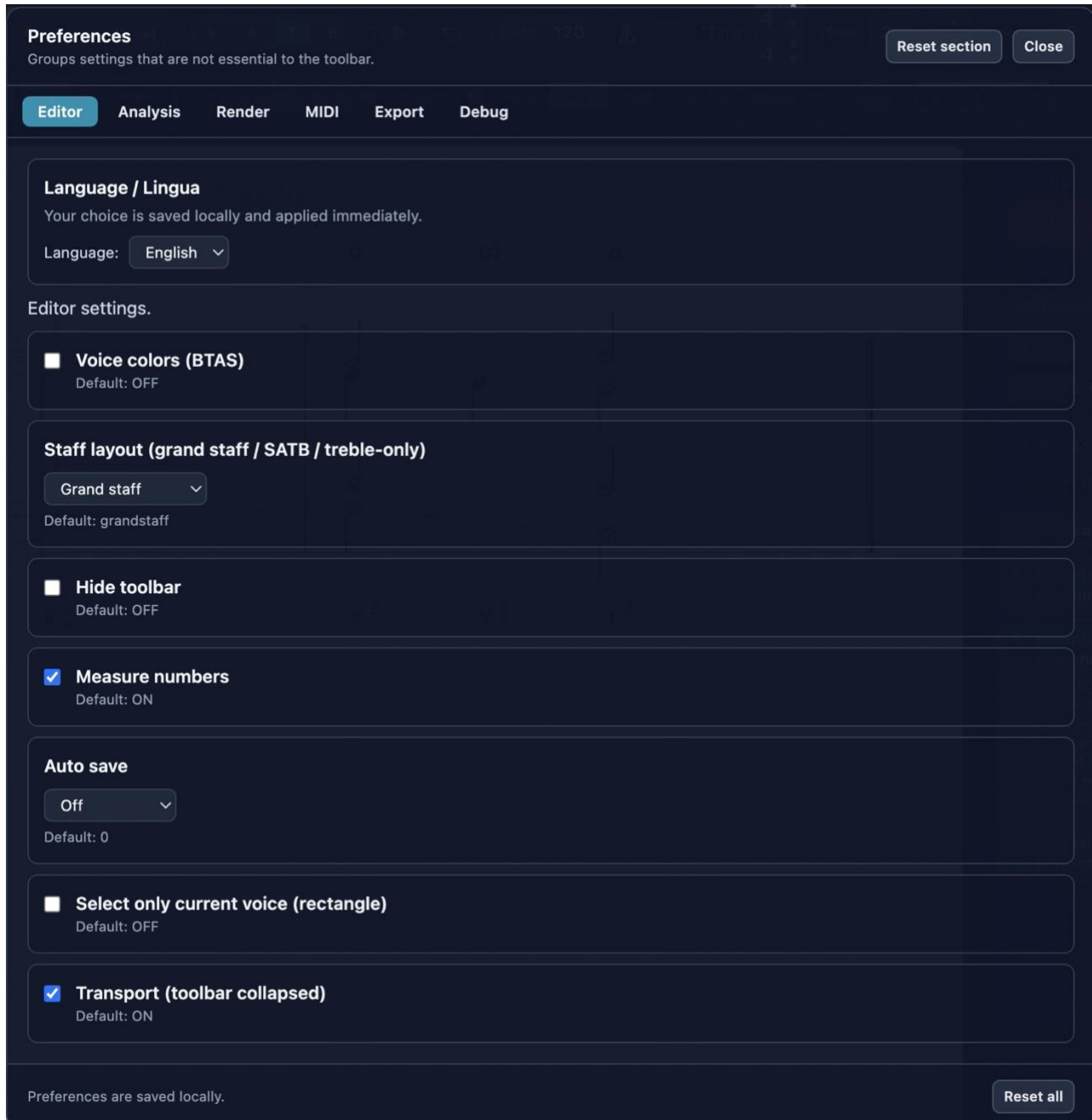
Load from repertoire: imports the pre-calculated profile from the corpus.

Reset: restores the default style profile.

13. Preferences and settings

The Preferences panel is organized in six tabs. Settings are saved automatically.

13.1 Editor tab



[Figure 20 — Preferences: Editor tab

Voice colors (BTAS): distinct color per voice.

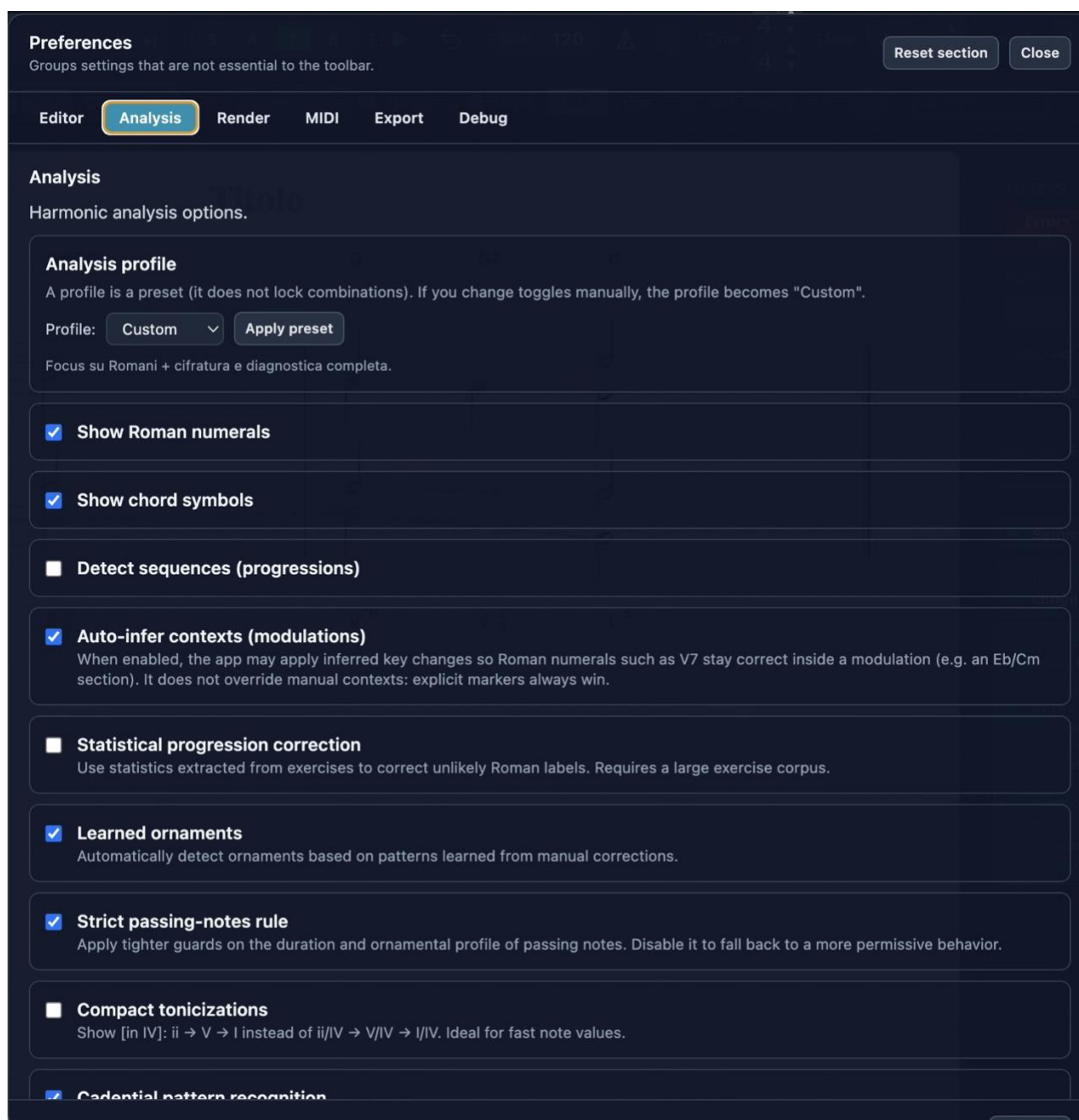
Staff layout: Grand Staff, SATB ancient clefs, Treble-only, Close score, Open score.

Hide toolbar / Measure numbers / Auto-save: interface options.

Select current voice only: rectangular selection filtered by voice.

Transport: keeps transport controls visible with toolbar hidden.

13.2 Analysis tab



[Figure 21 — Preferences: Analysis tab]

Analysis profile: Academic preset (default). Customizable.

Show Roman numerals / chord symbols: display toggles.

Detect sequences: recognition of imitative harmonic sequences.

Infer contexts: automatic modulations (manual ones remain prioritized).

Statistical correction: uses corpus to correct unlikely labels.

Statistical bias threshold: Cautious, Moderate, Aggressive.

Learned ornaments: uses patterns from manual corrections.

Compact tonicizations: compact format.

Cadential patterns: automatic cadence recognition.

13.3 Render / MIDI / Export / Debug tabs

Render: graphic rendering settings. MIDI: input/output devices. Export: format options (including MIDI format 0 and format 1). Debug: advanced diagnostics.

Note: "Reset all" restores all settings. "Reset section" resets only the current tab.

14. Keyboard shortcuts

14.1 Global

Shortcut	Action
Cmd/Ctrl + N	New project
Cmd/Ctrl + O	Open
Cmd/Ctrl + S	Save
Cmd/Ctrl + Shift + S	Save as
Cmd/Ctrl + I	Import MIDI
Cmd/Ctrl + Shift + E	Export MIDI
Cmd/Ctrl + Z	Undo
Cmd/Ctrl + Shift + Z	Redo
Cmd/Ctrl + P	Print

14.2 Editor

Shortcut	Action
Space	Play / Stop
Enter	Return to beginning
V	Cycle voice
Double-click S/A/T/B	Solo voice
1–7	Duration
# / b / n	Sharp / Flat / Natural
.	Dotted note
R	Note / Rest
L	Tie
K	Metronome
T	Measure edit panel
Option+↑/↓	Move note to treble/bass staff
Opt M	Switch to close/open voicing from playhead
Alt+L	Cycle layout
Alt+H	Toggle labels

Cmd/Ctrl +/-	Zoom in/out
Cmd/Ctrl+0	Reset zoom
Backspace	Delete selection
↑/↓	±1 semitone
Alt+↑/↓	±1 octave

14.3 Ornament marking (Option/Alt + letter)

Shortcut	Ornament
Option+H	Structural
Option+P	Passing tone
Option+V	Neighbor tone
Option+A	Appoggiatura
Option+N	Anticipation
Option+S	Escape tone
Option+R	Suspension / Retardation
Option+O	Ornamental
Option+C	Changing tone

15. Frequently Asked Questions

Licenses & Installation

What's the difference between the free trial and Harmony Tutor Pro?

The free trial includes all features for 10 days. After that, advanced features (harmonic analysis, chorale realizer, export) are disabled. Purchasing a Pro license unlocks everything permanently.

Can I install the software on a new computer if I switch?

Yes. Each license allows 2 activations. If you switch computers, deactivate the license on the old device and reactivate on the new one. Contact us by email if you need help.

Does it work on both Windows and Mac?

Yes. Harmony Tutor is available for macOS (10.15+) and Windows (10/11). One license covers both platforms.

Windows shows "PC protected" during installation. What do I do?

This is a standard Windows SmartScreen warning for newer applications. Click "More info" then "Run anyway". The application is safe and digitally signed.

What happens after the 10-day trial?

The application continues to work as a basic editor, but harmonic analysis, chorale realizer, and export options are disabled. You can purchase a license at any time to reactivate them.

How do I activate my purchased license?

After purchase you'll receive a license key by email. Open Harmony Tutor, go to Preferences → License, enter the code and click "Activate". Internet connection required.

Note Input & Writing

I can't insert notes with the mouse and don't see the ghost note. Why?

Note input requires holding Ctrl (Windows) or Cmd (Mac). Hold the key, move the mouse over the staff and you'll see a transparent "ghost note" as a guide. Click to place the note. Also make sure you've selected the correct voice (S/A/T/B) and are in the right staff (treble clef for Soprano and Alto, bass clef for Tenor and Bass).

How do I change voice, duration, or delete a note? [

Change voice: press V or click S/A/T/B in the toolbar. Duration: number keys (1-7) or toolbar. Delete: select the note and press Delete/Backspace. See the manual for all keyboard shortcuts.

Can I use a MIDI keyboard to write exercises?

Yes. Connect your MIDI keyboard, select the voice and duration, then play the desired note. MIDI input works in step-input mode: one note at a time, in the order you play them.

Can I import files from MuseScore, Finale or Sibelius?

Yes, via MusicXML 4.0 format. Export your file as MusicXML from your notation software, then in Harmony Tutor go to File → Import MusicXML. MIDI import is also supported.

Harmonic Analysis

The analysis shows a wrong chord. What can I do?

Check the note spelling. Position the playhead at the desired point, press T and enter the override in the panel that opens. Incomplete chords or tonicizations may generate ambiguity.

Can I see chord symbols?

Yes. Enable "Show chord symbols" in Preferences → Analysis or from the toolbar selector. Symbols appear above the staff.

What do the colored dashed lines mean?

Green = allowed movements, tolerated movements or recognized cadences. Orange = warning. Red = error.

How do I change key in the middle of a piece? Position the playhead, press T, set the new key in the panel.

Playback & Listening

Can I listen to one voice at a time?

Double-click on the voice button (S, A, T or B). Can be activated on multiple voices. Double-click again to deactivate.

How do I use an external DAW for playback?

Enable the MIDI output from the side menu, select the virtual bus (e.g. IAC Driver on Mac) and configure the DAW to receive on that bus.

How can I play the exercise with my own virtual instruments?

Export your work as MIDI (File → Export MIDI) and import it into your DAW. Each voice is exported on a separate MIDI channel, so you can assign different virtual instruments to each part.

What is the difference between MIDI format 0 and format 1?

Format 0: all voices on a single track. Format 1: each voice on a separate track (recommended for DAW editing).

Corpus & Learning

How does corpus learning work?

Every analyzed and saved piece contributes to the statistics. The software learns horizontal voice behaviors and the most frequent harmonic progressions. This information improves both the realizer suggestions and analysis disambiguation.

Supplementary Documentation for Advanced Features

This document compiles and organizes the latest technical and pedagogical implementations introduced in Harmony Tutor. The contents have been structured into three distinct thematic sections to accurately reflect the application's menu architecture and facilitate seamless reference for end-users and instructors alike.

SECTION 1: Automated Modulation Management

The horizontal analytical engine in Harmony Tutor does not merely decode chords as isolated vertical entities. Instead, it continuously evaluates the linear context and voice-leading relationships to detect key changes, transient tonicizations, structural modulations, and cadential pathways.

1.1 Auto-infer Contexts (Modulations) Preferences

This serves as the master toggle for dynamic harmonic analysis. It determines whether the software is authorized to visually apply detected key changes to the Roman numeral labels displayed beneath the staff.

ENABLED (Default): The Roman numeral analysis dynamically adapts to the local tonality. For example, within a piece originally in C Major, a section that temporarily stabilizes in E-flat Major will display clean, local Roman numerals like I - IV - V7 relative to E-flat, enhancing structural readability.

DISABLED: The software suppresses the application of inferred keys. Every chord, even if clearly rooted in a distant tonal region, will be strictly analyzed relative to the original home key. This yields a complex analysis with numerous accidentals (e.g., bIII - bVI - bVII), which can be useful for tracking absolute chromatic distance from the primary tonal center.

1.2 The "Chromatic" Button Main Toolbar

This module is a macro-harmonic detector specialized in identifying extended, well-established chromatic modulations. The underlying mathematical engine is designed to be intentionally conservative to prevent

"false positives" (i.e., erratic key changes caused by fleeting passing notes or local alterations).

For a modulation to be detected and applied, the following strict conditions must be met:

- The piece or section must contain at least 12 distinct real notes.
- The new tonal center must stabilize for a minimum window of 3 consecutive measures.

•The harmonic fit coefficient for the hypothesized new key must exceed 92% (`FIT_THRESHOLD = 0.92`), demonstrating a sharp mathematical separation from the original home key.

If a musical fragment is too short or purely diatonic, toggling this button ON or OFF will yield no visible change. This is not a bug; it is the correct behavior of the engine's rigorous safety filters.

1.3 The "Cadential Patterns" Button Main Toolbar

While the Chromatic module operates on macro-timeframes, the Cadential Patterns filter focuses on micro-windows, tracking **short-term tonicizations** spanning 1 or 2 measures at most.

Harmony Tutor — Supplementary Documentation (Advanced Features) Page 1 It constantly monitors the score for standard cadential formulas (e.g., secondary dominants like II - V - I or resolved augmented fourths). Toggling this feature ON is highly recommended in tandem with the Chromatic module to properly capture the rapid harmonic shifts typical of advanced pop/rock composition and late-Romantic classical music.

1.4 Alternative Readings and the "Tonicizza" Command

Clicking directly on any Roman numeral opens the Harmonic label explanation modal window. The **≈**

Letture alternative **≈** (Alternative Readings) section displays alternative theoretically valid interpretations computed for that specific set of pitches. Clicking the **≈ Tonicizza** (Tonicize) button next to a preferred reading injects a Manual Context Marker which:

1. Always overrides the automated analysis engine.
2. Bypasses all built-in length and density constraints, instantly forcing the selected harmonic interpretation from that specific beat forward.

SECTION 2: Educational Tools (Teacher Mode)

2.1 Analysis Lock for Students

This specialized feature is designed for academic institutions, music schools, conservatory exams, and private instruction. It allows teachers to prepare assignments by freezing the current harmonic analysis and selectively hiding visual aids, clues, or error indicators.

When an instructor activates the lock, the configuration is saved directly into a dedicated project file with a `.htp` extension. The student can open the file, view the sheet music, and play back the audio, but the interface will hide the specific analytical components selected by the teacher.

MASKING OPTIONS (HIDE WHEN LOCKED)

Instructors have total discretion over the assignment's difficulty level and can choose to hide:
 Colored lines and voice-leading errors: Suppresses the red/colored warning lines on the score and entirely deactivates the violations panel.

- Roman numerals: Hides the Roman numeral degree text below the staff.
- Chord symbols: Hides the standard alpha-numeric chord labels.
- Recognized ornaments: Conceals labels for non-harmonic tones (Passing notes tones V , Anticipations A , Suspensions R , ecc..)
- Alternative readings: Removes the harmonic options. ≈ indicator, preventing students from viewing alternative
- Disable export and copy notes: Blocks exporting data to external formats (MIDI, MusicXML, PDF, PNG) and disables copying/pasting notes, ensuring the work is conducted strictly within the controlled app environment.

To restore the full analytical overlay, the user must click the padlock icon and enter the correct ****Teacher password**** established during the initial save. To prevent accidental overrides or unauthorized access by students, no global keyboard shortcut is mapped to this action.

SECTION 3: Editing, Input, and Notation

Features dedicated to formatting agogic and expressive markings on the score, interacting directly with the built-in MIDI playback engine.

3.1 Inserting a Ritardando

The Ritardando marking commands a progressive, linear deceleration of the playback tempo starting from its insertion point.

Only from Keyboard Shortcut Select the first and last note or measure and press Shift + Opt + R. To remove select the first note and then press Shift + Opt + R.

3.2 Fermata / Corona

Only from keyboard Keyboard Shortcut: Select the note/rest and press Opt + F