Introduction

Based on optional user inputs, this app generates short musical examples that follow the rules of species counterpoint. Each example is 3–16 bars long and contains 2–4 parts.

Once generated, the music can be:

- Played back and modified within the app
- Exported as a MIDI file for use in other music software

Inputs

There are five inputs:

1. Cantus firmus
2. Species assignments
3. Number of results
4. Mode selection
5. Rule variations

Each input is optional, and you can always just click **“Generate.”**

1. Cantus Firmus

The **cantus firmus** is a sequence of **3–16 whole notes** in only one of the parts.

Manual Entry

- Click in the staff area when the cursor changes to a **gray whole note** to enter and delete notes.
- Use the **arrow, return, and delete keys** immediately after entering a note with the mouse for faster entry.
- Press '**c**' or **‘x**' to **clear** the entire cantus firmus.

Restrictions

1. **Parts are limited to their corresponding vocal ranges.**
2. **No accidentals.**
3. **If a part contains notes, entering notes in other parts is disabled.**

When entered manually, the cantus firmus itself does not need to follow the rules of species counterpoint. However, it’s recommended to:

- **Avoid leaps larger than an octave**
- **Start and end on the same note**
- **End in a way that allows for a V-I or vii-I cadence by referring to the following table**

Maximum Number of Cadential Possibilities

Last Cantus Firmus Interval	Cantus Firmus Not in Bass	Cantus Firmus In Bass
Unison / +8th / -8th	1	0
+2nd / -7th	3	1
-2nd / +7th	2	1
+3rd / -6th	0	0
-3rd / +6th	1	0
+4th / -5th	2	1
-4th / +5th	0	0

Auto Entry

To **auto-generate** a cantus firmus, click on the clef of a part without any manually entered or changed notes. An auto-generated cantus firmus will **follow the rules of species counterpoint** and be in the **selected mode** (explained below).

To **auto-complete** a cantus firmus, click on the clef of a part with manually entered notes that are either non-consecutive or fewer than three in number. An auto-completed cantus firmus will follow the rules of species counterpoint as best as possible. You can click on the clef repeatedly to see different variations, but the possibilities may be limited.

Alternatively, when you click **"Generate,"** a cantus firmus will be created or completed as above when needed. However, in this case, it will appear only with the completed results, and not in the input display. When auto-generated, it will be **randomly assigned** to one of the available parts.

2. Species Assignments

To assign or unassign species, click the **note icons** to the right of the score. When selected, they look **black** instead of gray. Press **'x'** to clear all species assignments.

Rules

- **At least one** species must be assigned.
- Each part can have **at most one** species assigned.

- **All active parts must be adjacent**—the cantus firmus and any assigned species must involve consecutive parts.

- Only **one fourth species assignment** — assigning it to one part will automatically unassign it from any others.

When you click **"Generate,"** if no species are assigned, the app will **randomly assign** them to any of number of available parts. If there's a gap between active parts, the app will randomly assign species to fill it. Auto-generated assignments are **not shown** in the input display.

3. Number of Results

Selecting **20** is recommended, since multiple results are generated in parallel and do not take noticeably more time. After generation, results are ordered from best to worst based on the app's evaluation function.

With very limited configurations (e.g., a three-note cantus firmus and two parts), generating **20 unique results** may not be possible.

4. Mode Selection

The mode is determined by the **cadence**, so the possible cadences (see table above) typically determine the possible modes. The mode may also influence the melodic ranges, and if possible, the app will match the **first and last harmony**.

- **"Auto"** – Uses the last pitch class of the cantus firmus as the tonic when possible.
- **"Random"** – Selects a mode randomly from the available possibilities.
- If a specific mode is selected but not possible, then **"Auto"** will be used.

5. Rule Variations

These can be accessed via **CounterpointBot > Settings > Rule Variations**. Changes are **automatically saved** and will take effect upon generating new results.

The defaults are based on **Fux.** Most rules are **fixed and not listed** (e.g., no parallel fifths). Of those, however, a handful are worth mentioning due to inconsistencies in or with the literature:

- **The "nota cambiata" is omitted** – This is for simplicity, but it may be included in future versions.

- **Voice crossing restriction** – A voice crossing can only occur with oblique motion. The only exception is when the voices form a **unison** immediately before crossing.

- **First-inversion minor triads** – A complete minor triad in first inversion that occurs on a **root change** must be approached by **stepwise, octave, or oblique motion**, either **within the same parts or across different ones**.

- **Attacked unisons** – Must be approached by **contrary motion**, with the **upper voice moving by step**. Even then, they are only allowed with the **bass**.

- **No attacked dissonances** – Dissonances must not be attacked under any circumstances. Whether or not a perfect fourth, tritone, or 6/4 chord is considered dissonant depends on context. Passing 6/4 chords are not allowed.

- **Faulty leap** – A skip over the bar that immediately follows a step in the same direction is not allowed in **second** or **third species**. Similarly, in **third species**, a skip larger than a third from **beats 2 to 3** may not follow a step in the same direction.

Additionally, there are many soft rules (e.g, prefer contrary motion) not listed which are used in the app's evaluation function. Future versions may allow these to be configurable as well.

Generating Results

As mentioned above, you can click **"Generate"** at any point. While generating, the button text will change to **"Abort."** Press **Cmd+G** to simulate clicking the button, regardless of its text.

Results are almost always possible, and generation is usually very fast. If it takes more than a few seconds, a **progress bar** will appear with three possible states:

- **Empty** – Getting initial results. If stuck in this state for more than **10 seconds**, a result is likely not possible, and it's advisable to click **"Abort."** One occasional exception is when **fourth species** is involved—the app will periodically substitute an increasing number of fourth species instances with second species until it gets results. This may take a bit longer, but will still almost certainly complete within **30 seconds** if results are possible. If generation fails on its own, the **button text will revert to "Generate,"** and the app will return to input mode. Impossible results are almost always due to:

  - Very **wide leaps** of over an octave in the cantus firmus because of the above mentioned **voice crossing restriction**.

  - An impossible combination of rule variations and other inputs (e.g. disallowing tritone cross relations in **Mixolydian** mode when the cantus firmus ends with A-B). This should not happen with default rules.

- **Half Full** – Improving the initial results. Once in this state, results are always possible. The time spent here is proportional to the **complexity of the input**—for example, a **16-bar cantus firmus** with **three parts of third species** will typically take the longest.

- **Full** – Generation is done.

Playback

From left to right, the playback controls are:

- **Current result**
- **Current bar**
- **Play / Pause** : *(Space key)*
- **Stop and reset playback position** : *('B' key)*
- **BPM** : *(Click and either drag up/down or enter numbers to adjust)*
- **Volume** : *(Click and either drag up/down or enter numbers to adjust)*
- **Loop on/off** : *('L' key)*
- **Highlight cantus firmus during playback** : *('H' key)*

Immediately below the playback controls:

- On the **left** is the **page navigator** with a checkbox to enable or disable syncing the page view with playback.
- On the **right** is the **instrument selector**.

Playback is **sample-based**, using sounds made with **Pianoteq** and **Organteq** with the kind permission of **MODARTT**.

Any value, including **BPM and instrument**, can be changed in real time during playback.

You can use the playback in both **input** and **result** mode. In input mode, it will playback silence for empty bars as if they were rests.

Double-click on any value to reset it to its default.

Click on **"m"** and **"s"** to **mute** and **solo** parts.

Click on the **result numbers** in the score (e.g., **1.0, 2.0, 3.0, …**) to begin playback from a specific result.

You can manually select the **audio output device** via **CounterpointBot > Settings > MIDI & Audio**. You might need to do this if you're not hearing anything.

Looping is explained below.

Editing

Duplicating and Deleting Results

Each result is labeled with a **number**, a **“+” button** to duplicate it, and a **“–” button** to delete it.

- **Duplicated results** are inserted **one position to the right** of the original.
- Initially, results are numbered **1.0, 2.0, 3.0**, etc.
- The number **before the decimal** is the **group number**, and the number **after the decimal** is the **sub number**.
- **Duplicated results** will **keep the same group number** and **increment the sub number**.
    - For example, duplicating **1.0** creates **1.1**.

Group numbers will always be sequential starting from **1**, and **sub numbers** within each group will always be sequential starting from **0**. After duplicating or deleting, the numbering will be adjusted as necessary to keep this pattern.

Changing Bars

You can **select or deselect bars** within the same result by clicking on them.

When bars are selected:

- You can change at least one of them at a time by using the **left and right arrows** either on your keyboard, or on the **widget** that appears next to the playback controls. On your keyboard, you can also hold down the arrows instead of pressing them repeatedly.
- In the widget, the number **to the left of the “/”** indicates the **current change** being displayed, and the number **to the right** shows the **total number of changes** made so far for the current selection.
- When the two numbers are equal, using the **forward arrow** will attempt to generate and display a **new change**, incrementing both numbers.
    - If no new changes are possible, nothing will happen.
- Otherwise, using the arrows will display **previously generated changes**.
- Changes follow the **same rules variations** used to generate the original results.
- Changes are ordered **lexicographically** by **bar** and **register**. Unlike in the original results, they are not filtered in any “musical” way taking into account the context of the

whole solution. They generally consist of all the valid single bars that follow the two bar rules with their neighbors.

- The number of possible changes varies greatly depending on the **number of bars selected,** the **complexity of the input,** and whether or not **fourth species** is used.

Note:

- Duplicating a result copies the **currently displayed changes**.
- You can **listen to changes in real time**. If the **loop option** is on, the playback will loop the region from the first through the last selected bar if it enters it.
- **Undo and Redo** apply to **duplicating**, **deleting results**, and **changing bars**. However, **bar changes are only logged** once the **bar selection changes**, since otherwise you can just use the arrows as explained above.
- Press **"."** to **duplicate** and **","** to **delete** results with selected bars.

Files

MIDI

Export results as a **.mid** file via **File > Export MIDI…**
Also see **CounterpointBot > Settings > MIDI & Audio** to adjust **velocity** and **track settings**.

Note: Single-track output is intended for convenient playback in a **DAW** or with an **external instrument**, but **not** for notation software.

.CPB

You can save results as an app-specific **.cpb** file via **File > Save…**
This will also save the **rule variations** used when the results were generated.

When you open a **.cpb** file:

- The rule variations as seen in **Settings** will **temporarily change** to match those in the file.
- These variations will apply to any **edits**, as explained earlier.
- If you manually make any changes from there, the rule variations as as seen in **Settings** will be automatically **saved** as usual. Otherwise, they will **revert** when you click **"New"** or **restart the app**.

Account

Manage your account via **CounterpointBot > Settings > Account**. You can use the app without subscribing, but after a certain number of generations, results will be limited to **first species only**. Currently, there is a fully functional 30-day **free trial**. Click **"terms"** in the Account window to see the rest of the terms for new subscribers. Managing your account is extremely easy and secure, and you can unsubscribe with just one click in the account window.

Updates

The app is actively being worked on. Check counterpointbot.com or the Microsoft store page for the latest release. If you've registered, you may receive emails, but only about major updates at most a few times a year.

Updating or reinstalling the app won't affect your subscription or use extra storage.

Uninstalling

The app uses **6GB** of data, which mainly consists of a pre-computed database of single bars for faster results.

For a full uninstall:

- **Windows**: Simply uninstall the app.
- **Mac**: Delete the app and also remove ~/Library/Application Support/CounterpointBot

Resources

Website: https://counterpointbot.com

Privacy Policy: https://counterpointbot.com/privacy

Manual: https://counterpointbot.com/user_manual

Microsoft Store: https://apps.microsoft.com/detail/9MT4T102M4H7

Contact: support@counterpointbot.com