User Manual

Updated for version 1.0.86, November 2023

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Using the EyeHarp

For the best EyeHarp experience, you will need an eye tracker. An eye tracker is a special device, a camera and a dedicated software, that can detect where you are looking at every moment. It is normally placed under the screen.

We recommend Tobii Eye Tracker 5 as an affordable device with great performance. EyeHarp is compatible with any device that communicates through the EyeX server. This includes all Tobii eye tracking consumer devices.

Alternatively EyeHarp can be played with any other device that can control the mouse pointer. For example, a mouse, a head tracking device, a trackball, or a touch-pad.

You can switch between gaze input and mouse input by pressing alt + m. If no special device is connected to the computer, mouse input is the default.

Software Registration and Updates

To activate your premium EyeHarp software, select Manage Registration. You will be taken to an online activation page. Enter the activation key, and click Activate license key:
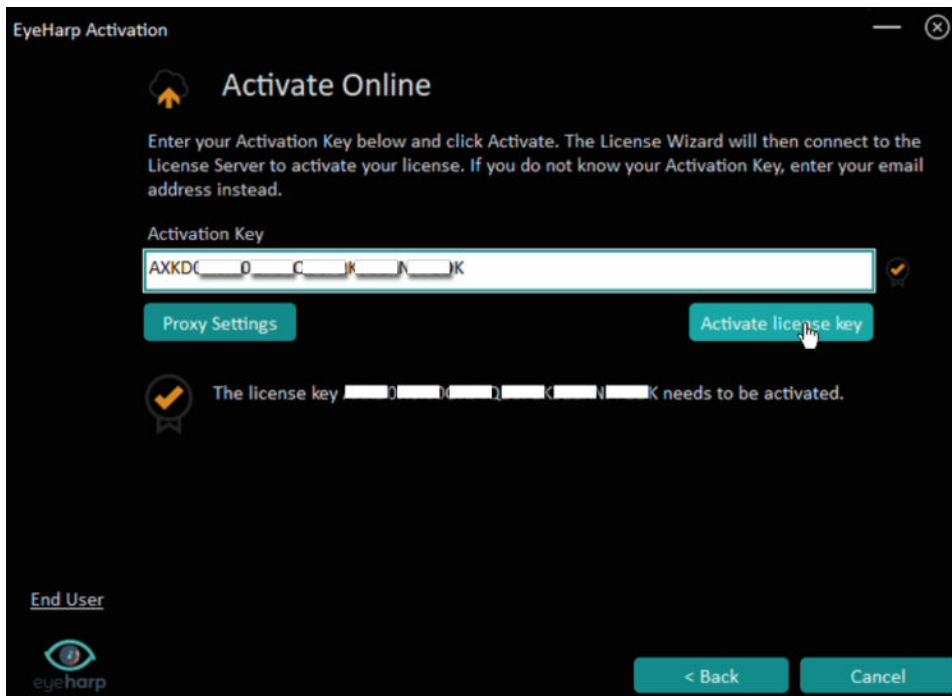
Wait for the confirmation message:
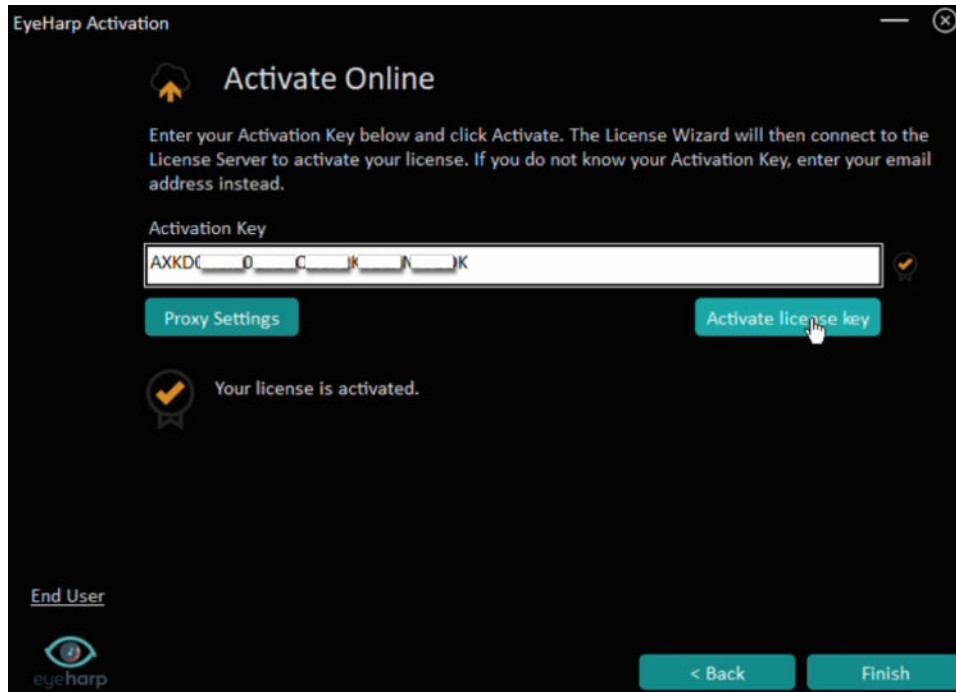
Click Finish

<u>Updates</u>

When a new update is available, a notification message will appear on startup. Go to Manage Registration under the advanced menu to download and install the update.

Interface

The interaction with the EyeHarp is done by looking at buttons and selecting them. A button in the EyeHarp interface is a circle with a small focus point in the center. To select a button, look at the focus point of the button for 1 second. This method is known as dwell time.

Alternatively, the EyeHarp can be configured to perform selection with the mouse pointer (pressing Alt + m to force mouse input, and Alt + k to switch between dwell time selection and mouse click selection).

Remember, the notes you play are not buttons. When you look at a note, it will sound instantly without delay.

EyeHarp has four screens: main screen, catalog, instrumental options menu, and advanced menu.

The main playing screen shows the note selection area, a colorful pie-like keyboard.

The catalog is where you can select songs from the EyeHarp repertoire, activate or deactivate the audio and visual guides, and quit the application.

The instrumental options menu is where you can select sounds and their range, apply reverb or chords, activate volume to distance function, and switch to full screen.

The advanced menu is where you can configure notes and chords settings, define audio and MIDI output, turn selection sounds on and off, and manage your EyeHarp license.

Playing the EyeHarp

The notes on the circular keyboard are arranged in a scale, and selection depends on direction. The notes divide the circle into slices, with a specific selection area for each note. This design improves temporal control, and it is effective for playing free-flowing melodies.

The notes are placed at the perimeter of the pie, with a note selection area of a different color for each one. The starting note is placed below the gap in the circle. The note names are written in the inner part of the circle, next to the note selection area.

When looking at each note area, the corresponding note (or chord, if the chord option is activated) is triggered.

If you activate the distance to volume option, looking at the outer region of the note area will produce louder dynamics, and looking at the inner region of this area will produce softer dynamics. To facilitate dynamic control, four focus points are provided in each note area.

In the inner part of the circle there is a black neutral area where the performer can rest without turning the note off, and also without triggering any new notes. You can search for the right notes by looking at the note names while the sound continues.

To stop notes from playing, simply look anywhere outside the circle (release area).

A replay note button, a grey circle in the center of the pie, will appear when playing notes. This button allows you to easily and quickly play the same note twice consecutively. The same note can be played again and again just by looking at the selection area of a note, then back to the center of the pie and so on. The replay note button disappears when looking at the rest area, or at the release area outside the pie.

It is possible to deactivate or activate the replay note button under the advanced menu.
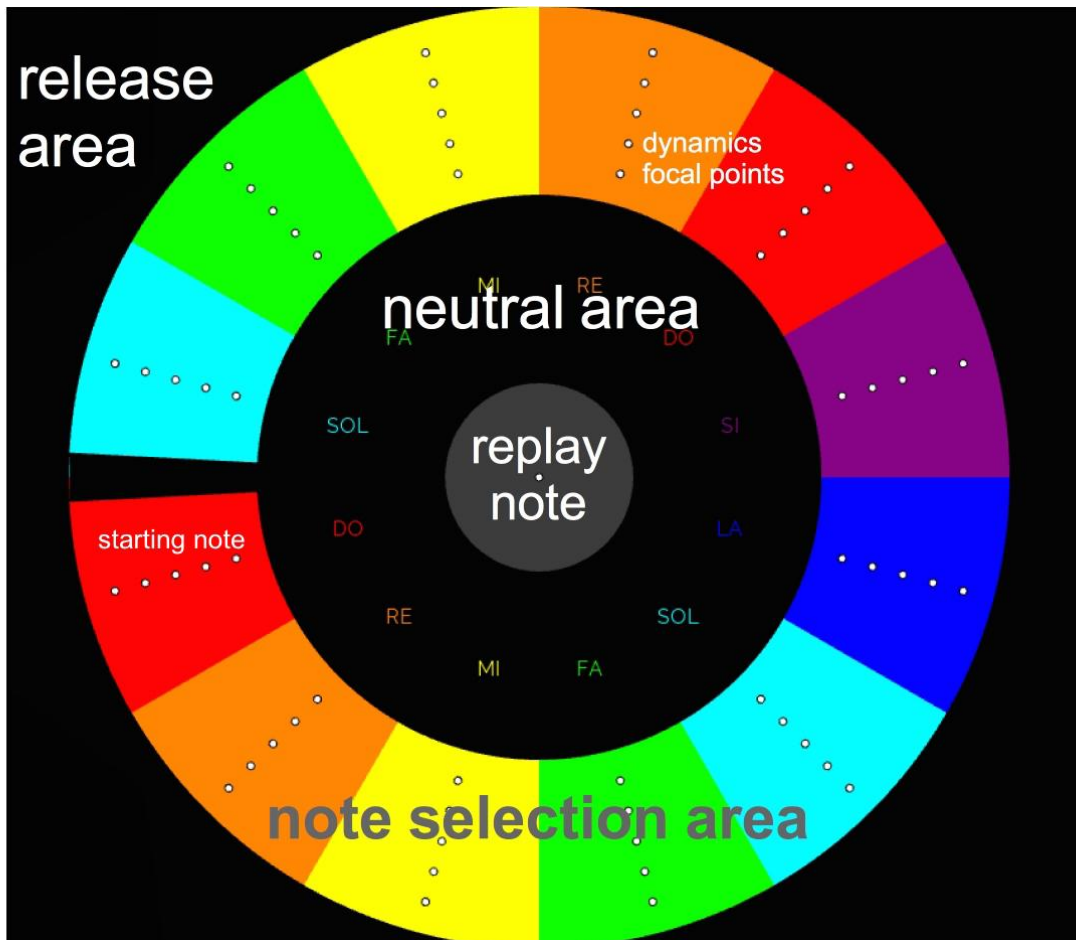
<u>Free Mode</u>

In this mode you can play the EyeHarp without assistance from the software, and change the instrument parameters as you wish.

The default settings are C major diatonic scale (only white keys, in piano terms), with a circle of 12 notes, and a piano sound in the middle octave (starting on C4):
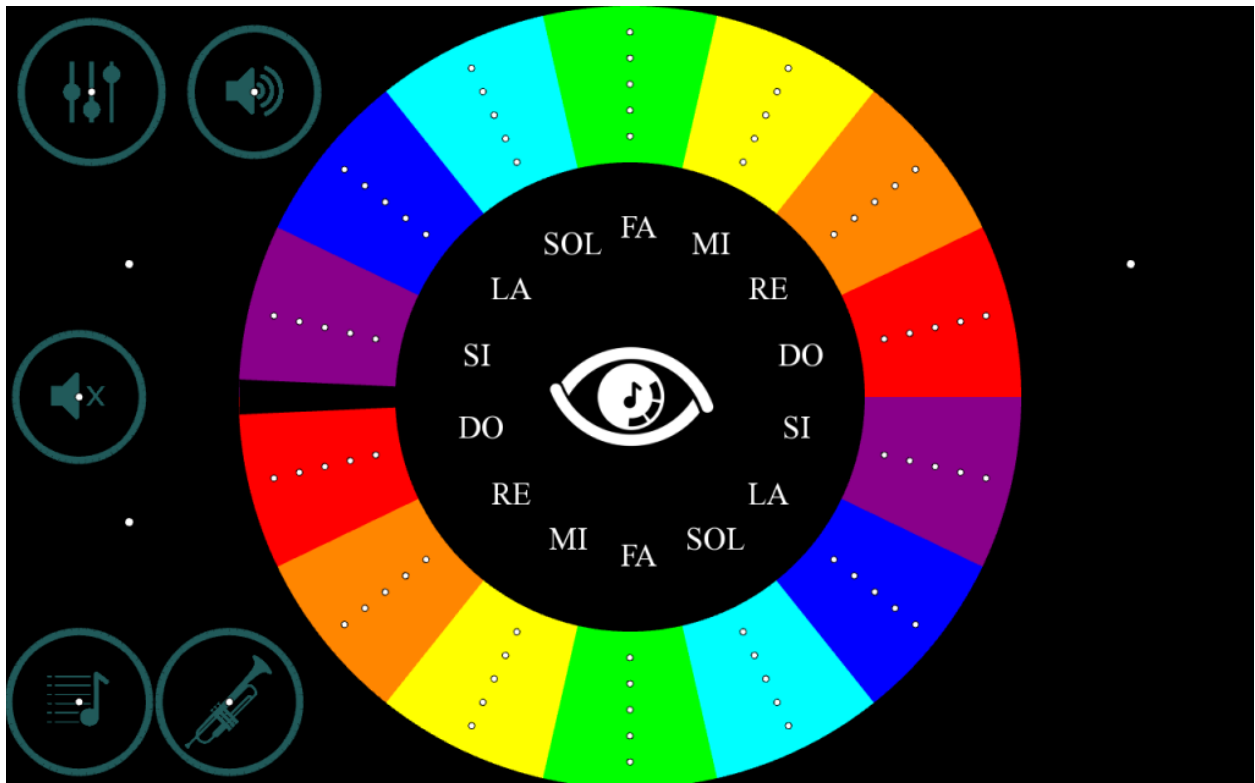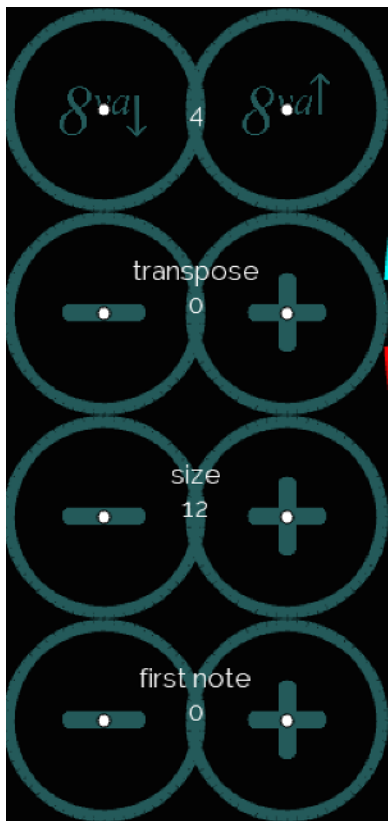

To stop all sounds, select the mute button:

To change the default settings, select settings button:
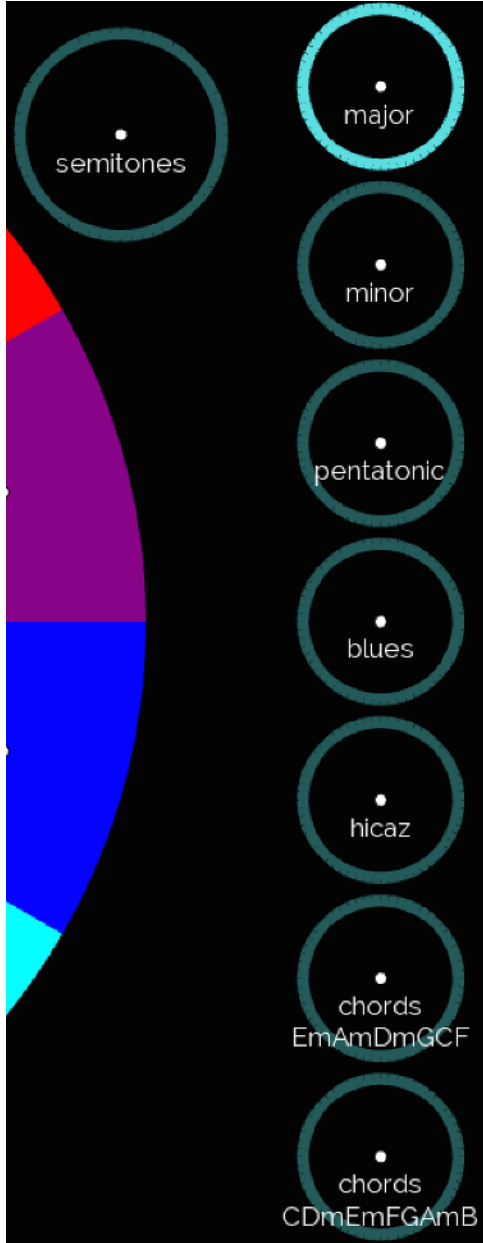
Two menus will appear:

 Transpose by octaves

Transpose by semitones

Adjust number of notes

Move starting note (in order of the notes in the scale)

Show or hide semitones

Select scale:

Major

Harmonic minor

Pentatonic

Blues

Hicaz (dominant phrygian mode)

Select chord progressions

Advanced users:

To modify the notes of the scales, or to create new scales, go to the scales.txt file, under the ProgramData/EyeHarp folder. There you can set the scale by its intervals in semitones from the first note (MIDI value).

When selecting chords, the interface will show chord letter names, and instead of single notes EyeHarp will play chords.
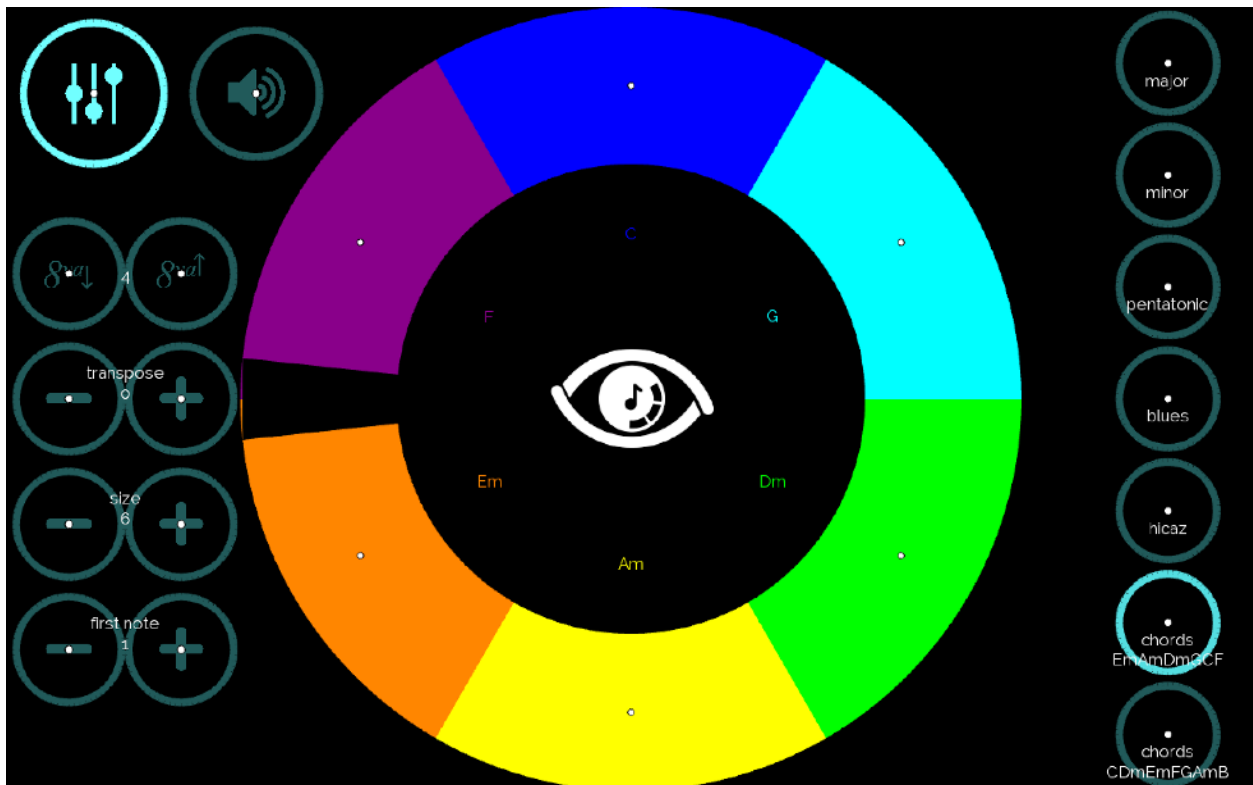
The chords, their shown name, and the name of the button are set via the chords.txt file, under theProgramData/EyeHarp folder.

Each line of the text file must begin with the button name, then each chord name with its notes in MIDI values. Each chord must be separated by a comma, no spaces. Notes within the chords are separated by one space. The chords are shown on the circular keyboard in the same order they are written in the text file, from left to right.

For example:

chords;I-IV-V,C 60 64 67,F 60 65 69,G 62 67 71

In this example the name of the button will be "chords I-IV-V". The circular keyboard will show, and play, C, G, and F in this order.
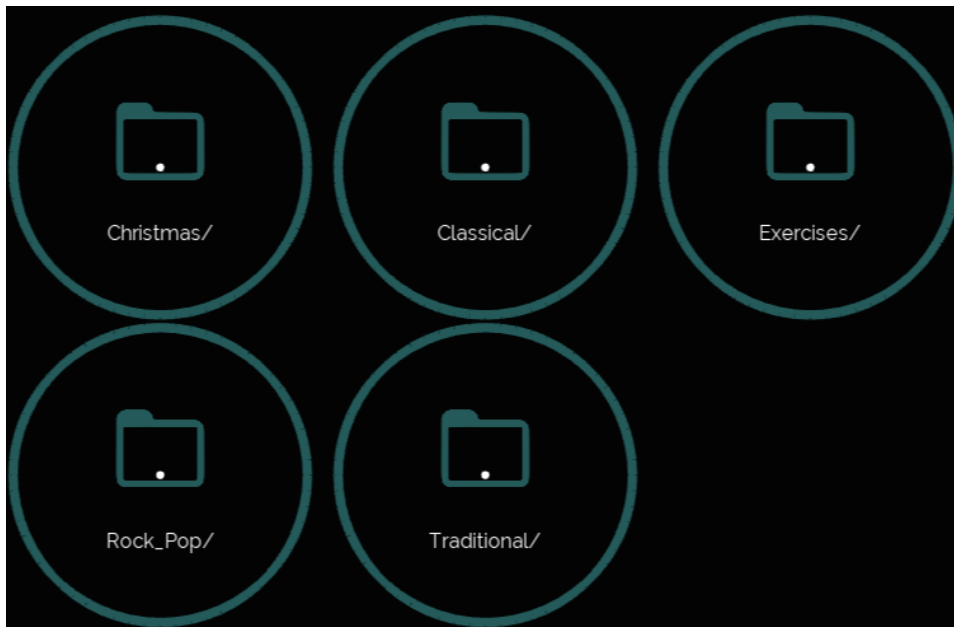
<u>Learning Mode</u>

Use this mode to learn how to play melodies from the EyeHarp's repertoire, with audio and visual assistance.

To play in Learning Mode, load an EyeHarp music score from the catalog. First, select the catalog button:

Then, navigate the folders to find the melody you wish to play:

To continue with the selection, use the checkmark button:

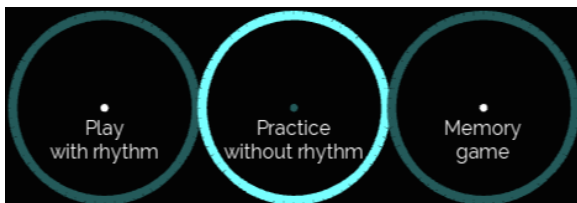To go to back one step, use the upwards arrow button:

After selecting a music score, choose between the three playing option:
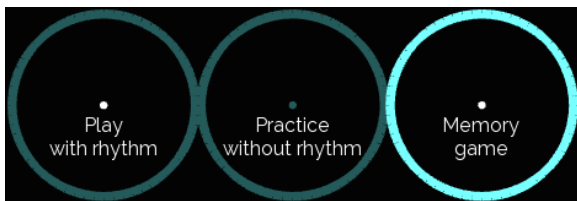
Play with rhythm

Playing the melody all at once, in tempo, following the visual and/or audio guides.

Practice without rhythm

Practicing the melody freely, with a visual guide.

Memory game

Listening to parts of the melody, and repeating them.

To switch between the options after a music score was loaded, select the catalog button, and then the desired option.

To return to Free Mode, select the Play Free button:

<u>Play With Rhythm</u>

Once a melody is loaded, press play to start playing. Follow the visual guide on the screen, and the audio guide. You can also turn on error silence, so only the notes that are part of the melodies are active and the rest of the notes are muted. When you finish playing the melody, you will receive the performance stats, including a percentage score.

The visual guide shows a round chronometer, which indicates the duration of the note, and an arrow that directs to the following note:

The audio guide includes a metronome and a playback of the melody.

You can activate or deactivate each of these guides and silence errors under the catalog menu:

If the button is highlighted, the option is activated (and vice versa).

The visual guide can also be turned on and off from the playing screen.

Transpose the melody by semitones (+ raises by one semitone, - lowers by one semitone):
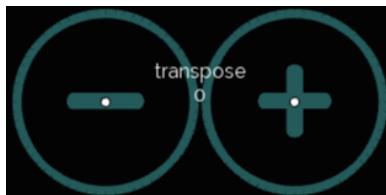
On the playing screen, adjust the tempo (+ raises by 5 BPM ,- lowers by 5 BPM) :

<u>Practice Without Rhythm</u>

Use this option if you wish to practice a melody freely, without metronome and without receiving a score for your performance. Once a melody is loaded, press play to start practicing.

When practicing, only the visual guide is activated, and the metronome is off. The visual guide follows you. It shows the next note after you play the current note.

When silence errors is turned on, only the notes that are part of the melodies are active, and the rest of the notes are muted:
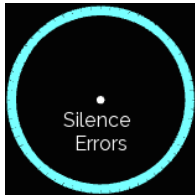
In the playing screen, you can choose the starting position of the melody, by the number of notes per step, as well as to leap by 5 times the notes per step:
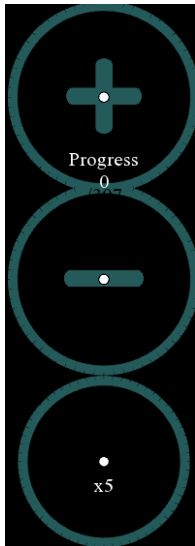
To change the number of notes by which the starting position moves, adjust the notes per step option in the catalog menu:
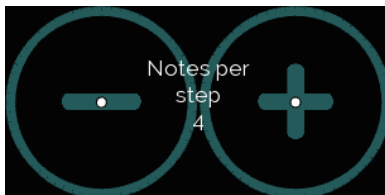
To stop the sound all together, select the mute button:

To hide and show the buttons in the playing screen, select the Hide Buttons button twice:

Memory Game

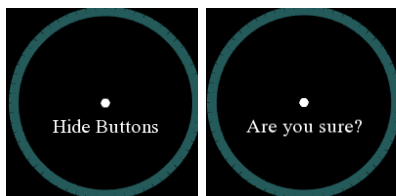In the memory game, EyeHarp will play the melody in steps of a few notes at the time, and the player needs to repeat the notes, until the melody is completed. Each new step of the melody is added to the previous ones.

Here only the visual guide can be used:

Arrows indicate the next note; the ordinal number of the note is shown as well:
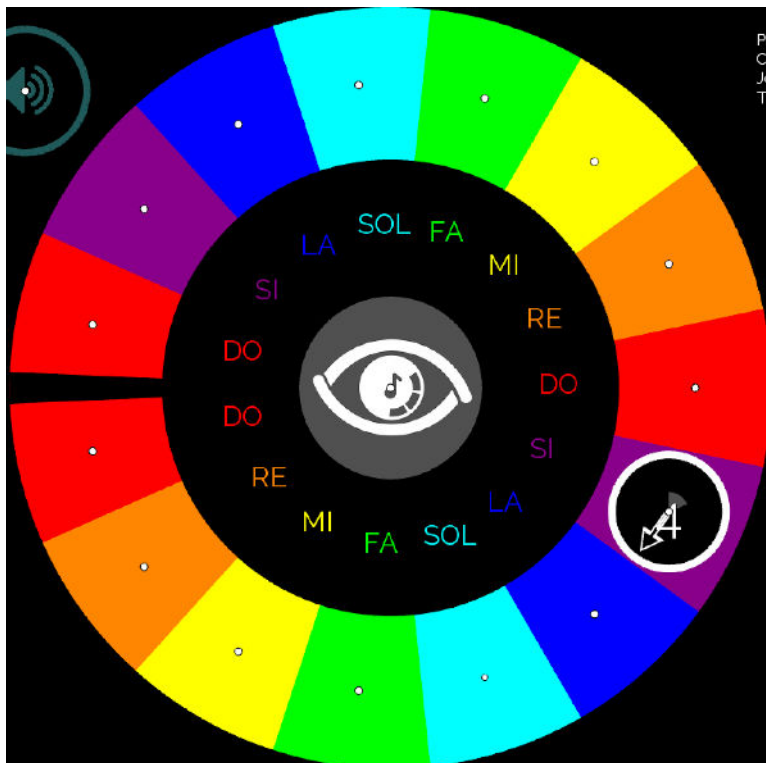
The numbers indicate the overall progress.

With every new step, you need to press play to restart the melody again with the new step.

If you make a mistake, you will need to start from the beginning.

To hear only the new steps, use the Just New play button. But note that you will still need to play the melody from the beginning, not only the new steps.

Playing a correct note will show a green checkmark with the number of the note:
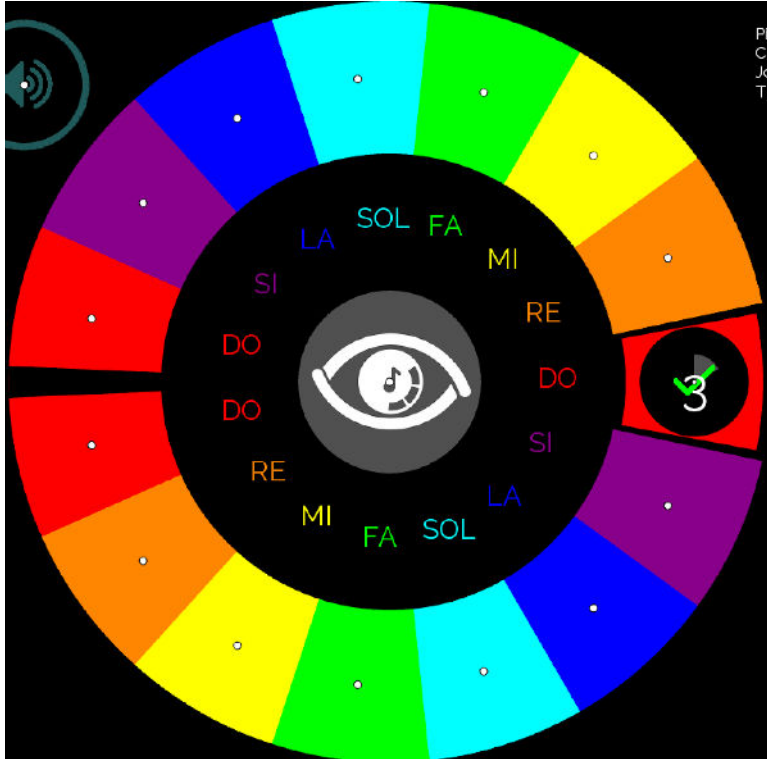
When each step of the melody is played correctly, a blue checkmark will appear in the middle:

And playing a wrong note will show a red X:

When the melody is finished, a green double checkmark will appear in the middle:

If you want to practice more before continuing the game, simply deactivate the mute button:

In the game, you can also choose the starting position of the melody:

The start position jumps by the number of notes per step.

Adjust the number of notes played in each step in the catalog menu:

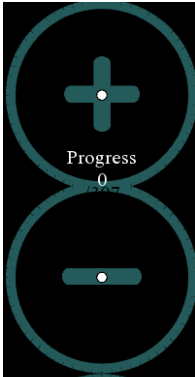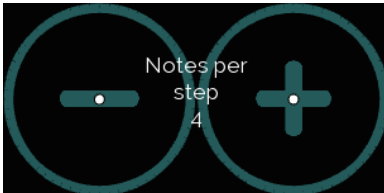## Sound

The premium version of the EyeHarp comes with a bank of instrumental sounds. The default is piano.

To change sound, go to the instrumental options menu:

Note that this button changes according to the current selected instrument.

Select your desired instrument:

The selected instrument is highlighted (in this picture, piano is selected).

The thick circle indicates instruments that can be used as the audio guide sound. To change the audio guide instruments, select the instrument twice - one time to highlight it and a second time to set it up as the audio guide sound. After the second time, the background of the selected instrument will be gray (like the marimba in the picture above).

<u>Volume</u>

To adjust the volume, select the volume button:

Upon selection, the following options will appear on the screen:

Master volume

User volume

Audio guide volume

Metronome volume

Accompaniment volume
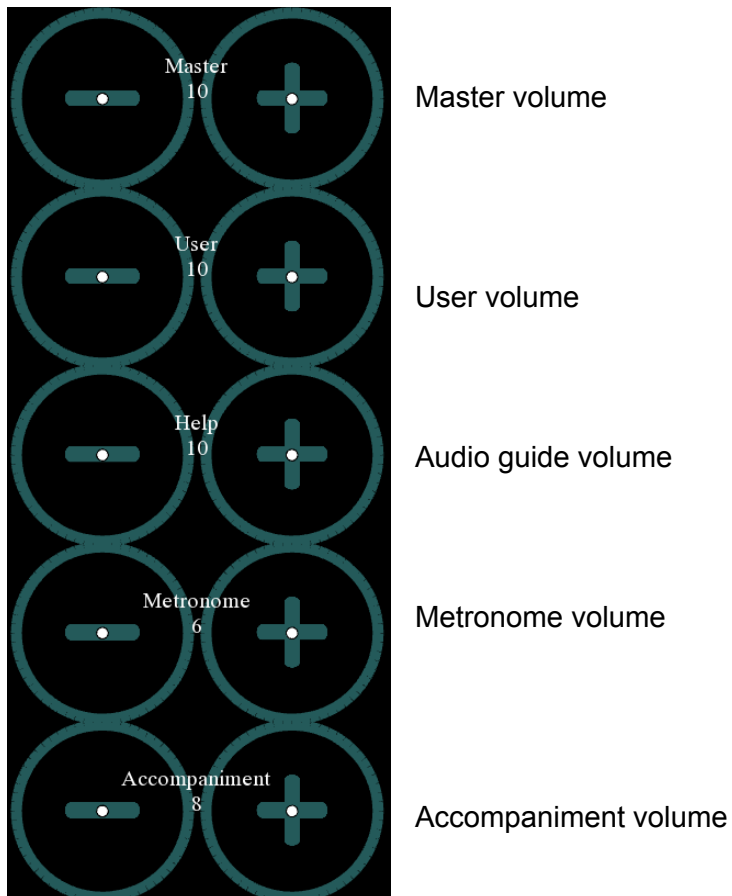
+ to increase the volume, and - to lower the volume. The range of all the options is 0-20.
To hide the volume options, select the volume button again.

More Instrument Options
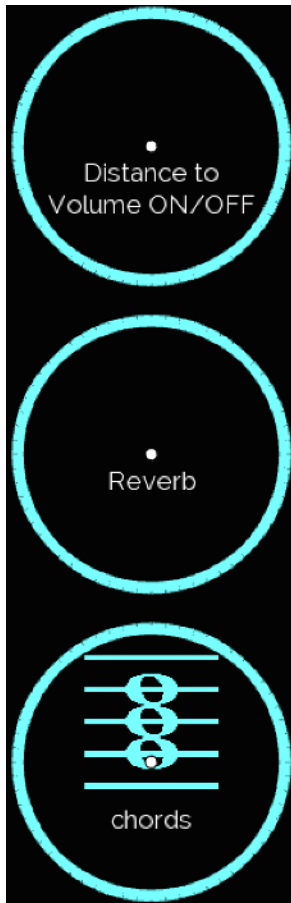
Activate or deactivate the distance to volume option. When activated, looking at the outer region of the note area will produce louder dynamics, and looking at the inner region of this area will produce softer dynamics (see Playing the EyeHarp section).

Activate or deactivate reverb effect.

Play each note as a chord. The default is a triad (based on scale degrees). You may change the notes of the chords under advanced settings.

If the button is highlighted, the option is activated (and vice versa).

Adjust the range of the instrument:

Raise by one octave

Lower by one octave

Range of EyeHarp instruments corresponds to their true range.

MIDI

EyeHarp can also function as a MIDI controller, with any VST plug-in. You can set any instrument and sound in the VST plug-in, such as Kontakt, with one sound per MIDI channel.

Remember, a MIDI controller does not produce any sound. It only sends control messages to another external synthesizer or virtual instrument.

To send MIDI from EyeHarp, activate MIDI OUT in the settings.

To change the MIDI channel, select a different instrument from the instrument options menu. The channels are ordered from left to right, starting from the top left. So piano is channel 1, drum kit is channel 2, flute is channel 3, and so on. The free version is limited to channel 1 only.

In some cases, like when sending MIDI to a DAW, a virtual MIDI port is required. We recommend LoopMIDI, a free virtual MIDI port.

In LoopMIDI, create a new MIDI port called eyeharp (single word, all lowercase). EyeHarp will automatically identify this MIDI port. Also, make sure to deactivate the feedback-detection, under the LoopMIDI Advanced tab.

In addition, you can use additional MIDI controllers with EyeHarp. When MIDI out is activated, a selection of controllers will appear:
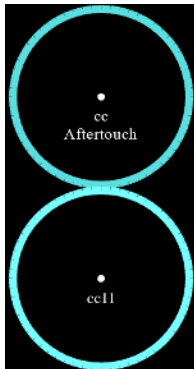
To change the default MIDI controllers, you would need to edit the setting.txt file, located in the ProgramData/EyeHarp folder. In this text file, find a line that says midicc_distance. The two numbers after it refer to the MIDI controllers. Edit these numbers according to the CC you need. This works in both the free version and premium version.

Advanced Settings

Access the advanced settings through the instrumental options menu, selecting the cog button:

Audio and Sound Settings
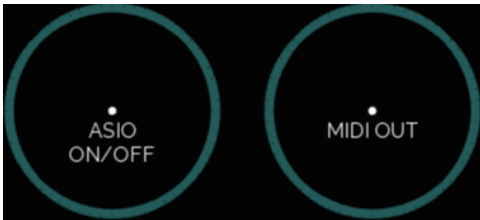
Select sound   Activate or deactivate
card   MIDI output

Select chord notes or type of chord (when playing chords is activated):

The highlighted intervals will be included in the chord (and vice versa).

EyeHarp Appearance and Control

- **Clock with Mouse:** Switch between dwell time or mouse left-clicks button selection. When this option is highlighted, selecting buttons in the app is done by clicking with the mouse. When this option is not highlighted, selecting buttons in the app is done by dwell time (the default mode).
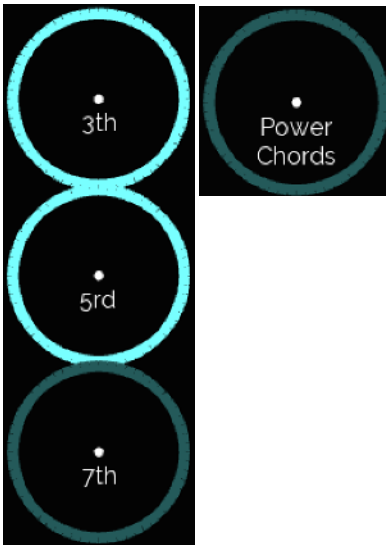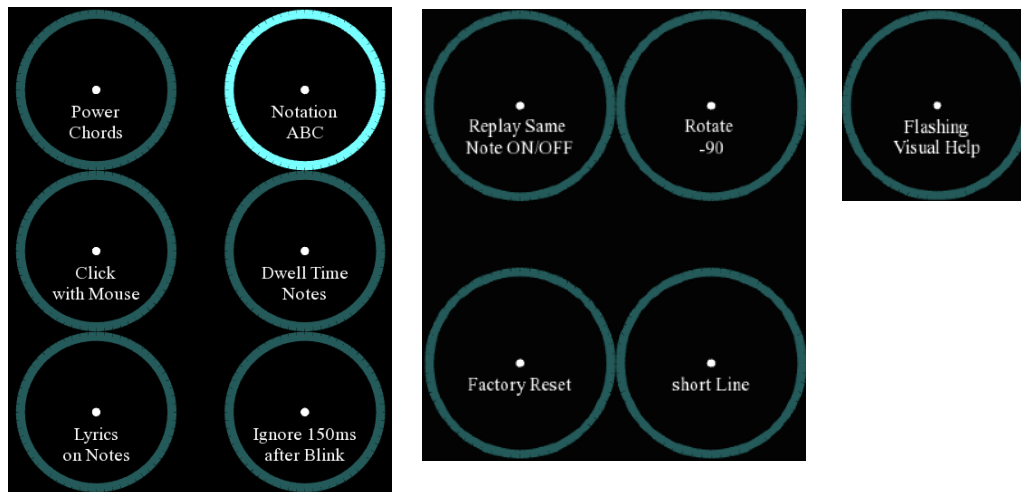- **Lyrics on Notes:** Shows lyrics when playing songs. Only for songs that have lyrics written in their score.
- **Notation:** Choose the type of notes shown in the circle. The options are ABC notation, solfege notation (DoReMi), or no notation (OFF) .
- **Dwell Time Notes:** Activate or deactivate the option to select notes on the circular keyboard with dwell time, the same way as buttons
- **Ignore 150ms after Blink:** Ignores the first 150 milliseconds after the gaze is lost (which happens after a blink). Might reduce responsiveness.
- **Replay Same Notes ON/OFF:** Activate or deactivate the repeat note button in the center of the circle.
- **Rotate -90:** Rotate the EyeHarp circle by 90 degrees so the starting note is on top.
- **Short Line:** Use a short line for the visual guide.
- **Flashing Visual Help:** Makes the visual guide flash in red.
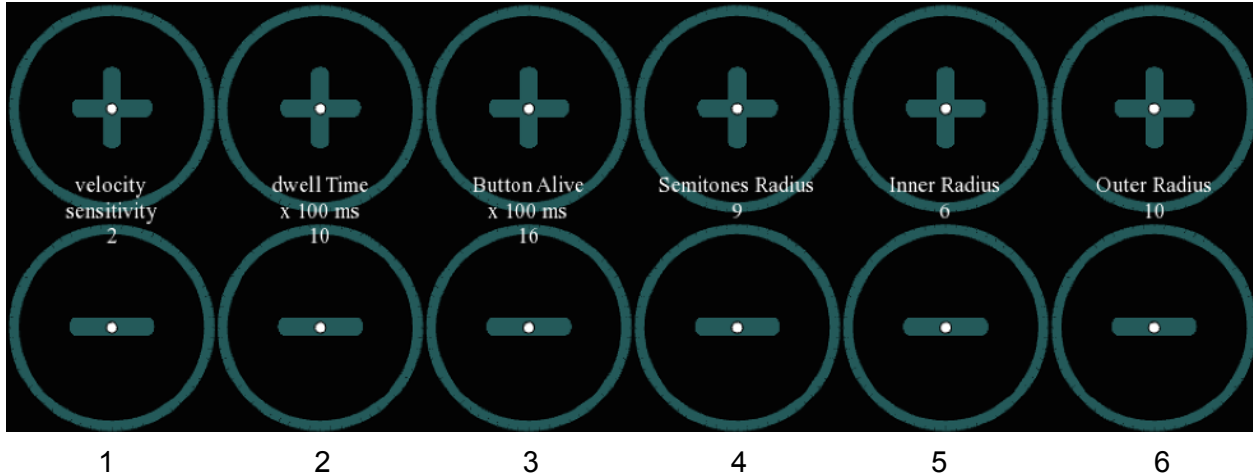
1. Adjust the sensitivity of dynamic control (when distance to volume is activated). Higher velocity sensitivity (max. 3) will expand the dynamic range of each note button. Lower velocity sensitivity (min. 1) will reduce the dynamic range. To make the changes in volume smoother, turn on the Smooth Key Velocity button:
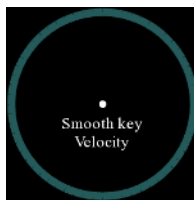
2. Adjust the amount of dwell time in milliseconds needed to select buttons.
3. Adjust the duration the button is still active.
4. Adjust the radius of the semitones.
5. Adjust the radius of the inner EyeHarp circle.
6. Adjust the radius of the outer EyeHarp circle.

When adjusting to the radius, a circle will appear on the screen to show the new size:
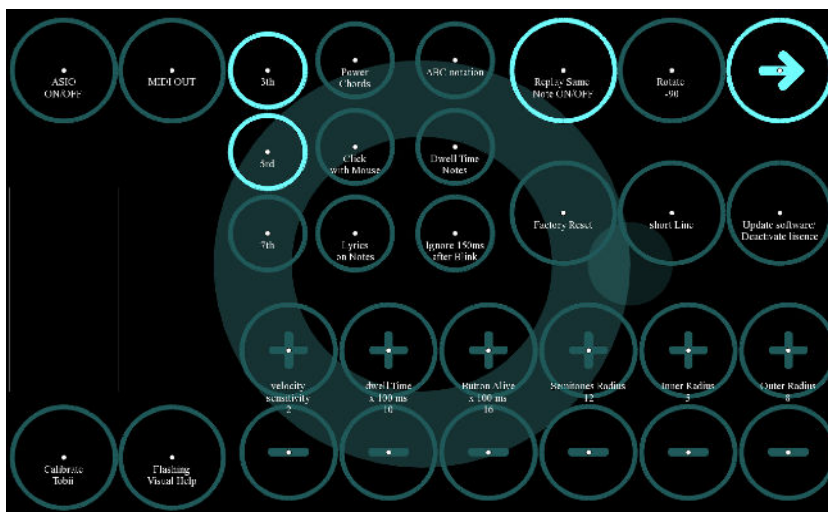
<u>Other Software Settings</u>

Restore all settings to default (requires to select twice):

Software updates or manage license:

Keyboard Shortcuts

Basic	
alt + h	Show or hide shortcuts
alt + f	Toggle full screen
alt + n	Show/hide gaze circle
alt + space	Play/stop
alt + 1/q	Tempo up/down
→	Next note (only in slave mode)
←	Previous note (only in slave mode)
alt + shift + h	Audio help on/off
alt + r	Reload score
Esc	Quit EyeHarp
Mixer	
↑	Master volume up
↓	Master volume down
alt + 0/p	User volume up/down
alt + 9/o	Metronome volume up/down
alt + 8/i	Audio guide volume up/down
Free Mode	
alt + 2	Increase number of notes
alt + w	Decrease number of notes
alt + 3/e	Starting note up/down
5	Transpose half-step up
t	Transpose half-step down

Advanced	
alt + m	Switch between mouse and gaze control
alt + k	Disable or enable dwell time button selection
alt + l (lowercase L)	Lock/unlock buttons
alt + j	Visual guide on or off
alt + c/d	visual guide speed up/down
alt + v	Slave mode on/off[1]
alt + shift + t	Flashing target on or off
alt + 5/t	Increase/decrease gaze buffer time
alt + shift + m	Metronome view on or off
alt + shift + d	Show or hide debug info
alt + shift + c	Chronometer colors on or off
alt + r	Rotate circle
alt +b/g	Increase/decrease dispersion factor
alt + a/z	Increase/decrease inner circle center radius
alt + s/x	Increase/decrease outer circle radius
alt + shift + s	Send metronome to MIDI

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[1] Slave mode can be activated in the play free mode. It allows the music teacher to advance the notes of the performance using the arrows of the keyboard.

Creating scores

Creating your own EyeHarp scores is done with [MuseScore](#), a free music notation software.

You can either create a new score from scratch, or download a score from the MuseScore online database (although MuseScore is free, using their database requires a paid subscription).

The following is an example of creating an EyeHarp score of Twinkle Twinkle Little Star.

1. First Create a new score with one part. This will be the part that the user will play. In the home screen, select *New score*, then add an instrument by selecting one from the list and clicking the arrow. It can be any instrument.

   This staff must be at the top of the score

   If necessary, later in the score window, move this staff to the top by selecting it in the *Instruments* tab on the left, and moving it with the arrow.

   After selecting the instrument, click *Next* and set additional score information such as key, time signature, tempo, title, etc. Then click *Done.*
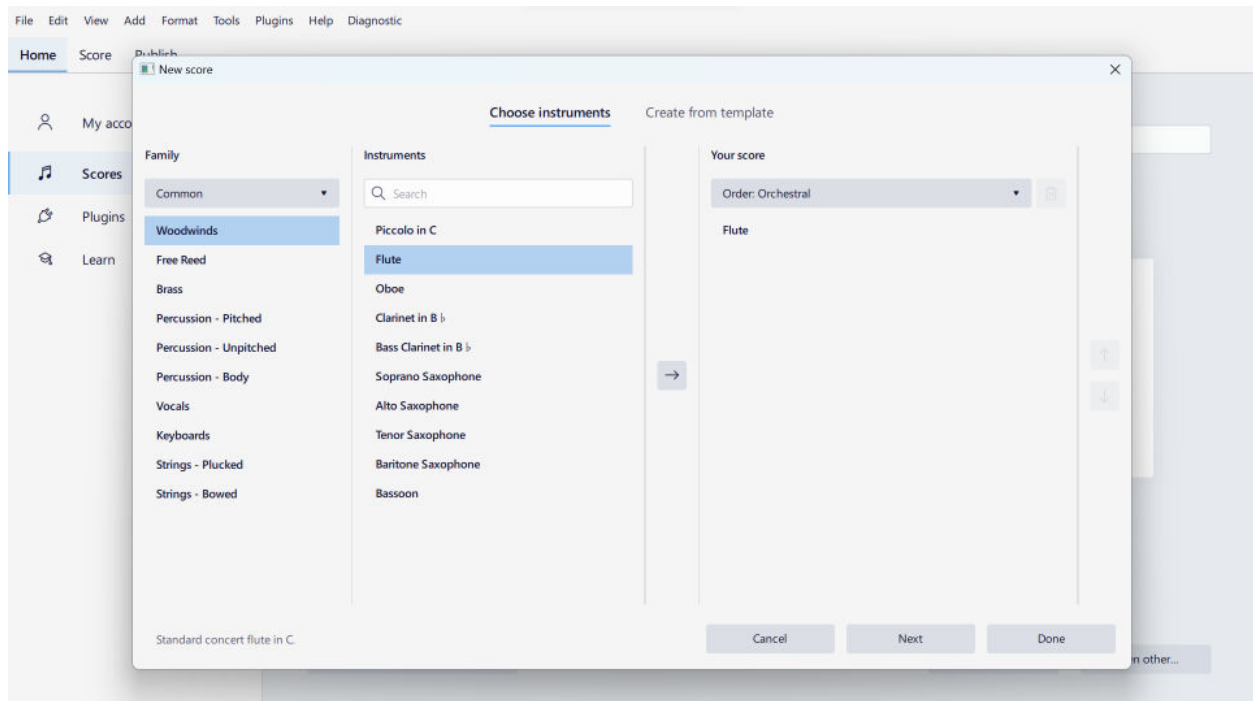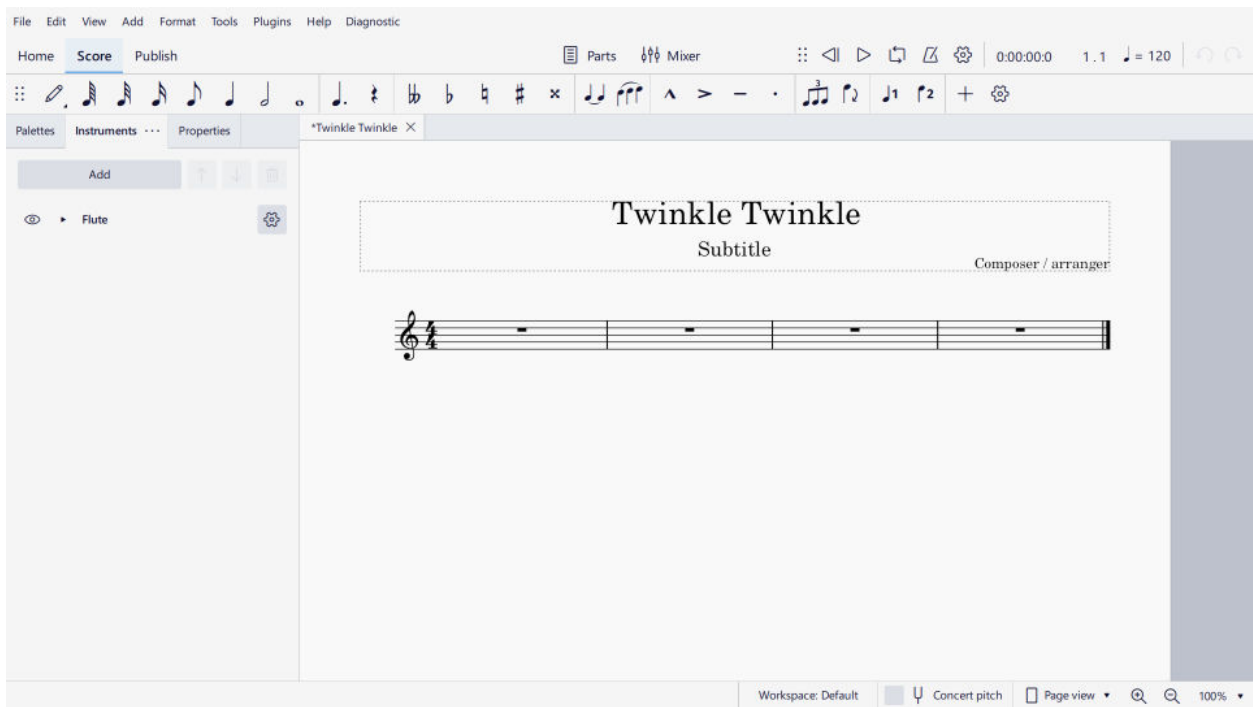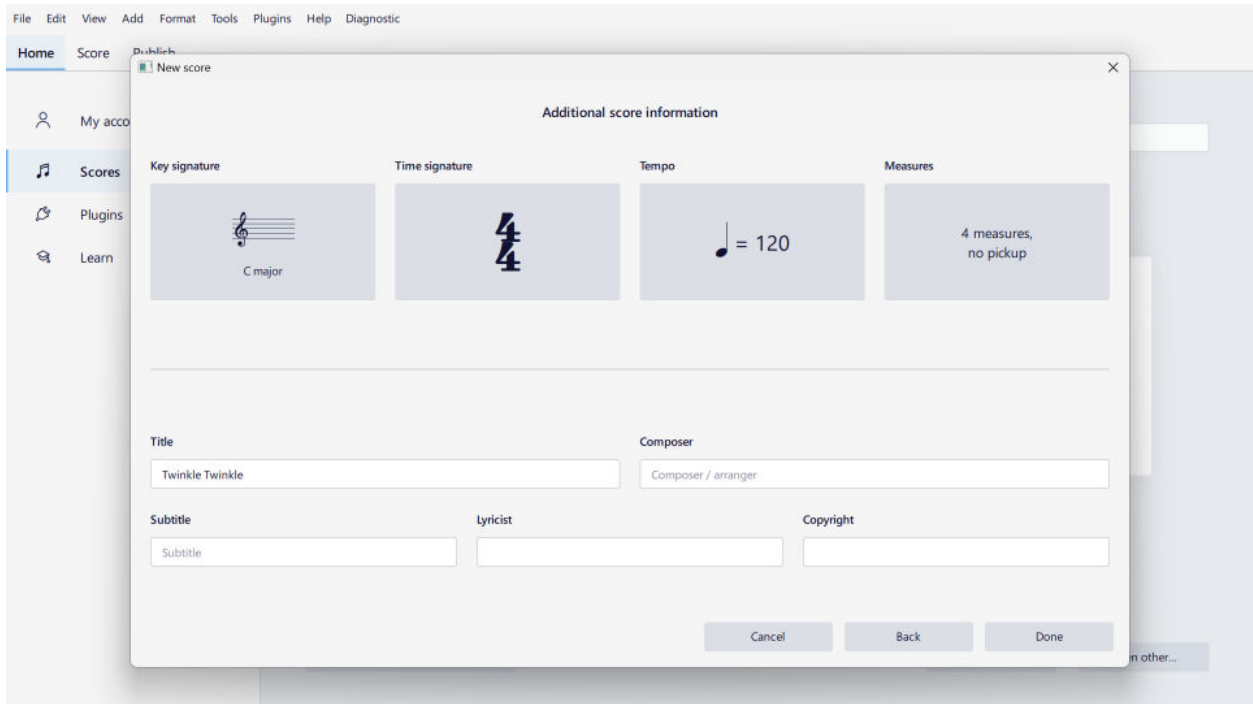
2. Write the melody. Make sure that it is only a single melodic line, no harmony.

3. Optional: add accompaniment from the score window. In the *Instrument* tab on the left, click *Add.* This will open the same instrument selection window as before. The accompanying instruments must be of the same ones that EyeHarp has:
    ● **Piano**
    ● Drums
    ● Flute
    ● Oboe
    ● Clarinet
    ● Trumpet
    ● French Horn
    ● Tenor Saxophone
    ● Violin
    ● Violin pizz.
    ● Violoncello
    ● Cello pizz.
    ● **Contrabass**
    ● Marimba
    ● **Harp**
    ● Glockenspiel
    ● Xylophone
    ● Vibraphone
    ● **Organ**
    ● Accordion
    ● Acoustic Guitar
    ● Electric Guitar
    ● Distortion Guitar
    ● Electric Bass
    ● Banjo
    ● Bouzouki

For better quality, we advise mostly using the instruments that are in bold.

When adding an accompaniment, always make sure that the user part is on the very top
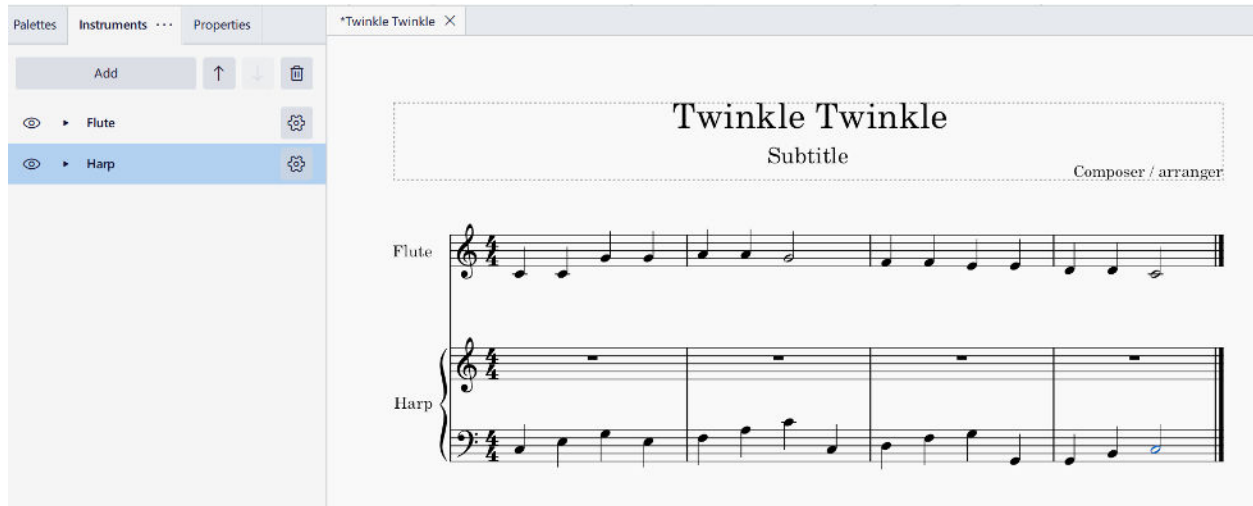
4. Save the file in the MuseScore scores folder. Go to File → save and navigate to the folder you wish to save your MuseScore scores. You will need to open this file again if you wish to modify the score.

5. For the first time you create a score you will need to make the folder C:\ProgramData\EyeHarp\ editable. To do that, open windows file explorer and go to C:\. In the *View* menu, make sure the option *hidden items* is enabled. Then double click on *ProgramData.* Once in C:\ProgramData, right click on the *EyeHarp* folder and select *properties.* Then select the *security* tab and click on *Edit.* Click on *Users* and click on the *full control / Allow* checkbox. In the end click on OK.

6. Create a new folder named *myScores* under C:\ProgramData\EyeHarp\catalog. Add any new score to this folder. To create the actual EyeHarp score, a MIDI file and an XML file are required.

7. To create the MIDI file, go back to MuseScore software and export the new score as MIDI: File → Export and on the *Format* drop down list select *MIDI* and then click *export*. Navigate to the folder C:\ProgramData\EyeHarp\catalog\myscores and place the MIDI file in there.
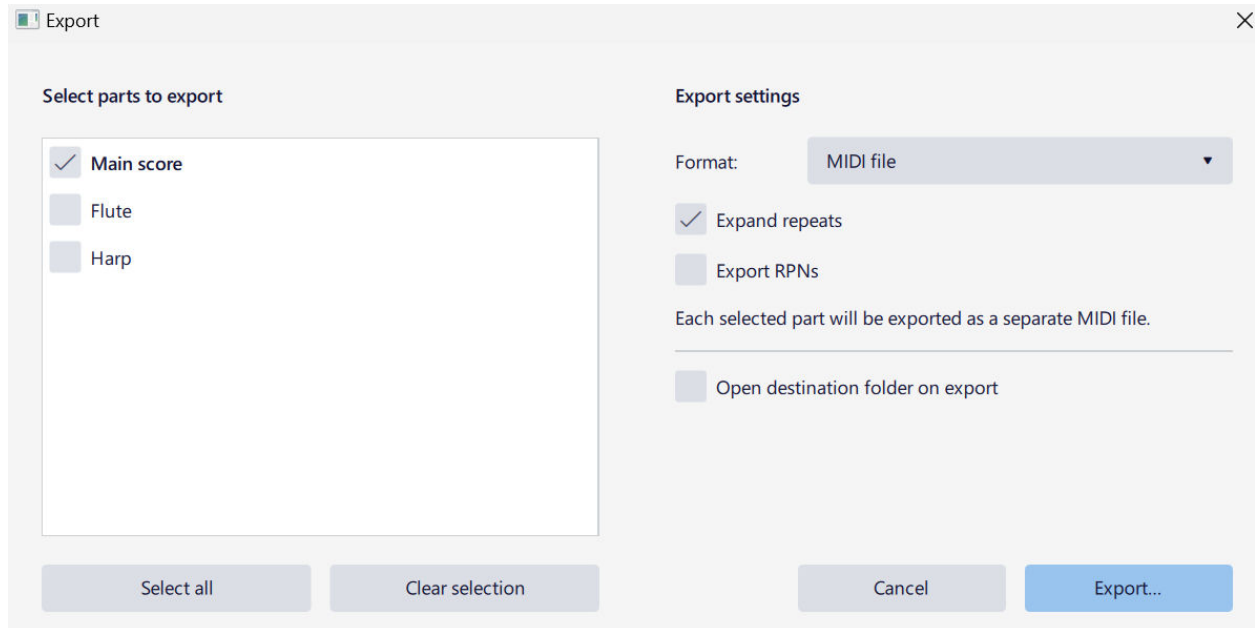
8. To create the XML file open the file browser and navigate to C:\ProgramData\EyeHarp\catalog\myScores. Under *View*, enable the *file name extensions* option. Now from the home tab of the file browser, select *new Item → text document.* Name it as *1-Twinkle.xml.* The number 1 indicates the difficulty level of the score.

9. Open the XML file. Editing the XML file can be done with Windows Notepad, but we recommend installing and using notepad++ to edit the XML files.

10. Paste the following text into the XML file:

```xml
<song>
        <level>1</level>
        <title>Song Title</title>
        <composer>Composer Name</composer>
        <midiFile>myMidi.mid</midiFile>
        <minimumRest>2</minimumRest>
        <mp3File></mp3File>
        <mp3OffsetMS></mp3OffsetMS>
        <tonality>C</tonality>
        <tempo>60</tempo>
        <transpose>0</transpose>
        <countDown>4</countDown>
        <metronome>
                <length>4</length>
                <loop>
                        <note> 2,41,0.7,100,1 </note>
                        <note> 2,44,0.7,80,2 </note>
                        <note> 2,44,0.7,80,3 </note>
                        <note> 2,44,0.7,80,4 </note>
                </loop>
        </metronome>
</song>
```

11. Replace the required fields in order to match the actual song. In the Twinkle Twinkle Little Star example it will look like this:

```xml
<song>
        <level>1</level>
        <title>Twinkle Twinkle</title>
        <composer>Wolfgang Amadeus Mozart</composer>
        <midiFile>Twinkle,_Twinkle,_Little_Star.mid</midiFile>
        <minimumRest>2</minimumRest>
        <mp3File></mp3File>
        <mp3OffsetMS></mp3OffsetMS>
        <tonality>C</tonality>
        <tempo>60</tempo>
        <transpose>0</transpose>
        <countDown>4</countDown>
        <metronome>
                <length>4</length>
```

```
            <loop>
                    <note> 2,41,0.7,100,1 </note>
                    <note> 2,44,0.7,80,2 </note>
                    <note> 2,44,0.7,80,3 </note>
                    <note> 2,44,0.7,80,4 </note>
            </loop>
        </metronome>
</song>
```

12. Save the file.

13. Open your song in the EyeHarp and play.

XML File Functions

- **level:** the level of the song.

- **title:** the title of the song.

- **midiFile:** the name of the MIDI file created in MuseScore.

- **minimumRest**: a number that defines the minimum rest duration in the user's melody in beats. For example if minimumRest is set to 2, then any rest smaller than 2 quarters will be ignored, and its value will be added to the duration of the previous note. This number can also be a part of a beat, such as 0.66.

- **tonality:** defines the tonality of the MIDI file. Diatonic notes will appear as normal keys in the EyeHarp wheel, while the chromatic notes will appear as semitones (circles in the outer region). The value is based on the alphabetical note names: A B C D E F G. This corresponds to the major scale of the defined note. The minor scales are defined using the relative major scale. For example if a piece is in B minor, the right value in the tonality field would be D.

- **transpose:** applies a transposition in semitones to the given MIDI file.

- **countDown:** defines the number of beats that will show up before the song starts. Works only in the *play with rhythm* mode.

- **metronome:** defines a rhythmical loop that would accompany the performance in the *play with rhythm* mode. It has two subfields: length and loop.

- **length:** defines the length of the loop in whole beats. This value can only be a whole number.

- **loop:** defines the musical material of the metronome loop. It contains the **note** subfields**.**

- **note:** defines each note of the loop. It takes 5 values separated by a comma. These values are: [**instrument**],[**note**],[**duration**],[**volume**],[**onset time**]

  - **instrument:** Defines the instrument by a number in the order that they appear in the EyeHarp's instrument catalog (listed above). The common value is 2, which corresponds to the drum kit instrument.

  - **note:** MIDI note value, between 0 and 127.

  - **duration:** duration of the note in beats or part beats.

  - **volume:** defines the volume (MIDI velocity) of the note in a value between 0 and 127.

  - **onset time:** defines the starting point of the note in the loop, by beat. Use values between 1 to loop length + 1.

Adding a Backing Track MP3

It is also possible to use an MP3 as a backing track, accompanying the performance of the user. This audio must be recorded using a metronome, otherwise it will not be synchronized with the performance of the user.

Put the MP3 file in the same folder as the XML file. Insert the name of the MP3 file in the <mp3File> field.

The field <mp3OffsetMS> is used to set the starting point of the MP3 file in milliseconds. This allows to remove silence that might exist at the beginning of a recording, and to make sure the user's performance starts exactly with the backing track.