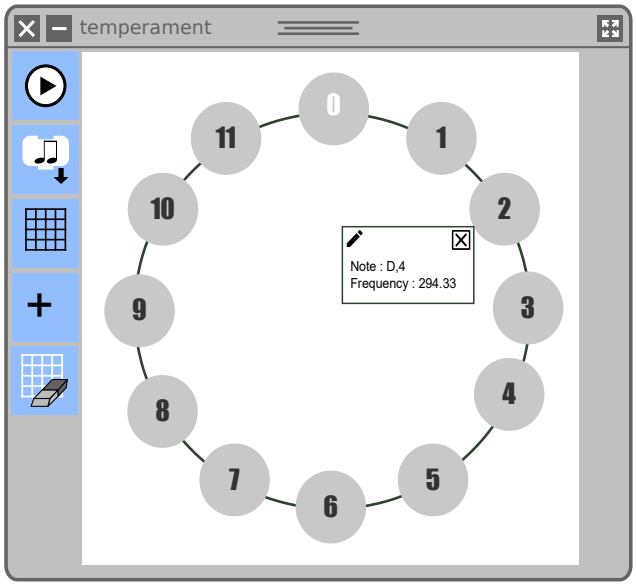
4.12 Changing Temperament

Tempering is the process of altering the size of an interval by making it narrower or wider than pure. It is also possible to change and create different tuning systems.

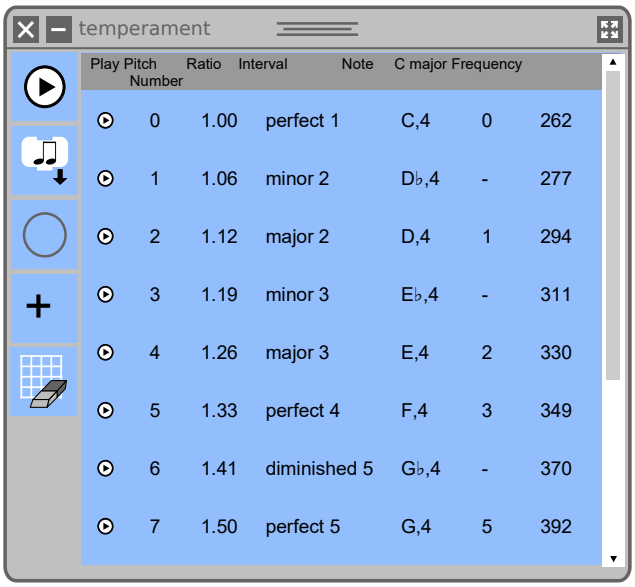
The *Temperament* block is used to launch a widget that enables the user to visualize and edit notes within an octave.

You can select a temperament system from the pie menu which is passed as an argument to the block. This name is passed to the *Set temperament* block in order to play the notes in selected temperament system. *Starting Pitch* is the argument of pitch block inside temperament block. In the above example, starting pitch is `C4`.



In the above example, selected temperament is *Just Intonation*. Notes within an octave can be viewed in the form of circle. These circles represent *pitch numbers*. Note that the pitches that are closer together in selected temperament system are visually closer and pitches that are farther apart looks farther.

The information regarding any note can be viewed by clicking on the respective circle. In the above example, circle (pitch number) `2` is `D4`. The frequency of note can be changed through edit button (left hand side corner of note information popup).



Information regarding notes can also be viewed in the form of a *table* as shown in the above example. The table will show all the information about pitches that lie within an octave. This information includes *pitch number*, *interval*, *ratio*, *note*, *frequency* and *mode*.

The frequency of any note is calculated by `Starting Pitch Frequency` `X` `Ratio`.

The widget controls are as follows:

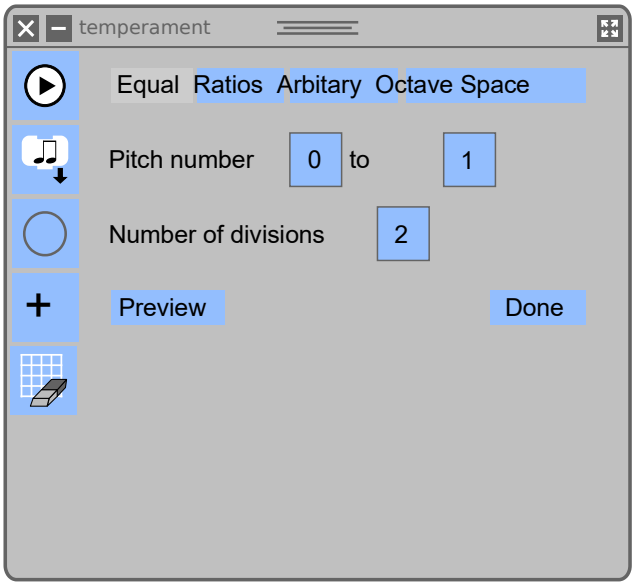
The *Clear* button at the bottom of the widget will clear all pitches except for a single `0` from which the user may add pitches.

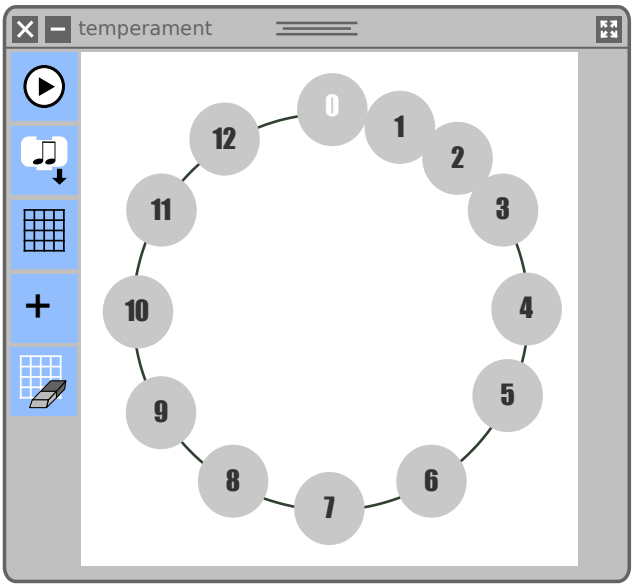
The *Play all* button will play through all the pitches in an octave and then it will play backwards down the pitches.

The *Save* button will save custom temperament for use in your program. It will create a *set temperament* block. This block will tune the notes attached to it according to the selected temperament.

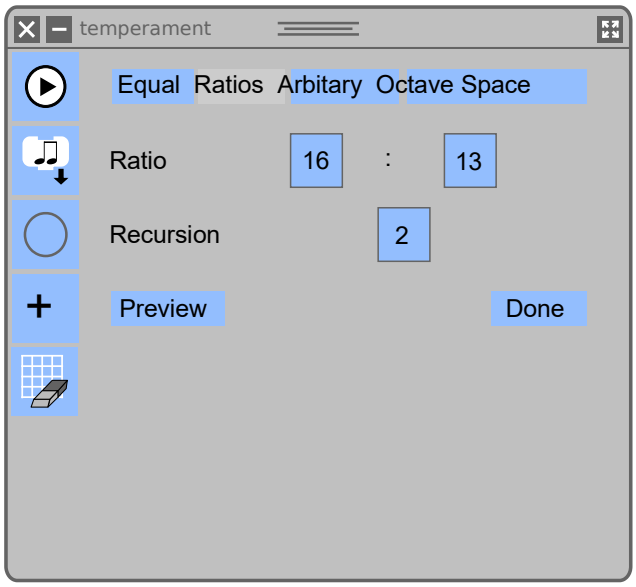
The *Table* button is used to toggle between circular and tabular representation of notes.

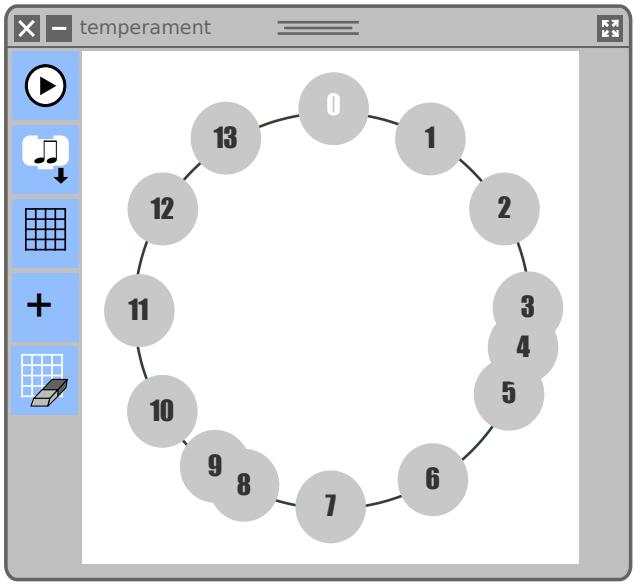
The *Add* button is used to edit notes through different tools:



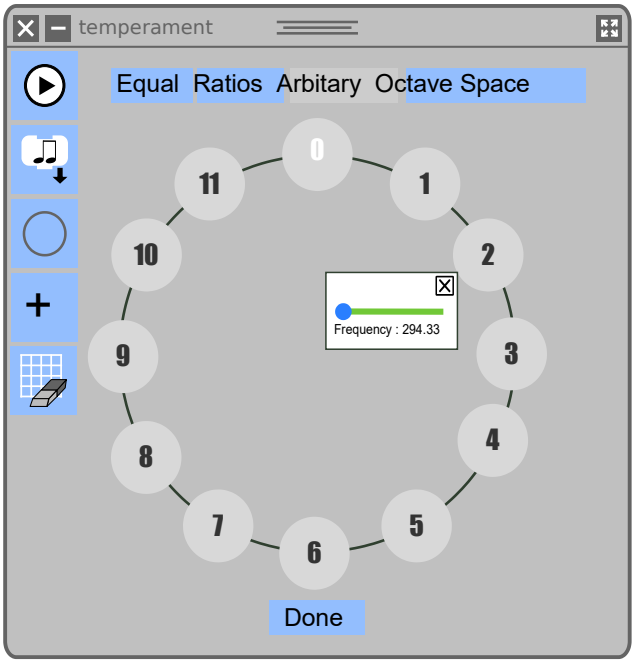


The `Equal` edit tool is used to make *equal divisions* between two pitch numbers. In the above example, two equal divisions are made between pitch numbers `0` and `1` and the resultant number of notes within an octave are changed from 12 to 13.

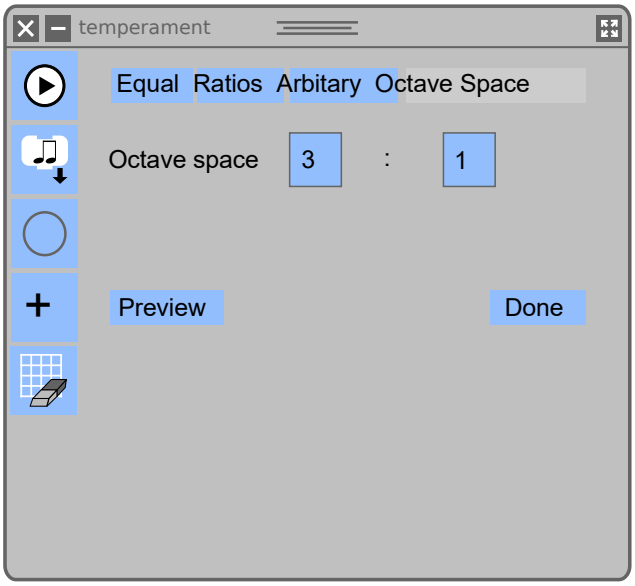




The `Ratio` tool is used to add notes of specified ratios in such a way that the resultant pitches wrap inside a single octave. Recursion represents the number of times notes ratio calculation is repeated. In the above example, 2 notes are added in pitch space and the resultant number of notes within an octave are changed from 12 to 14. Frequency of first pitch is (Starting Pitch Frequency) * (16/13) and second pitch is (Starting Pitch Frequency) * $(16/13)^2$.



The `Arbitrary` edit tool is used to add a note in an arbitrary position. In this panel, whenever the user hovers over the outer circle, a frequency-slider window pops up, allowing the user to add a note according to a chosen frequency. In the above example, a new note will be added somewhere between pitch numbers `2` and `3` by adjusting the frequency slider.



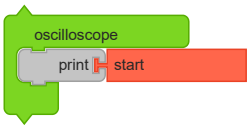
The `Octave Space` tool is used to edit the octave ratio. The standard octave space is 2:1. In the above example, octave space will be changed to 3:1 after clicking on `Done`.

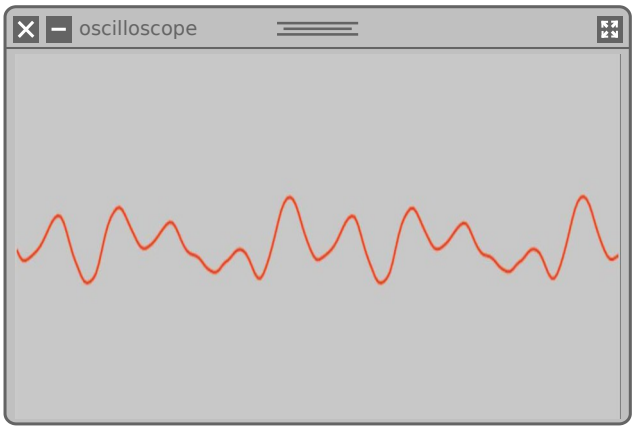
The *Drag* button will drag the widget.

The *Close* button will close the widget.

4.13 The Oscilloscope

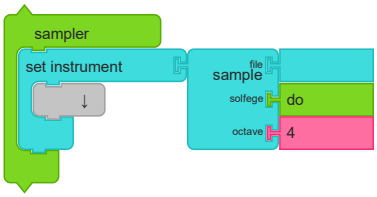
Music Blocks has an Oscilloscope Widget to visualize the music as it plays.



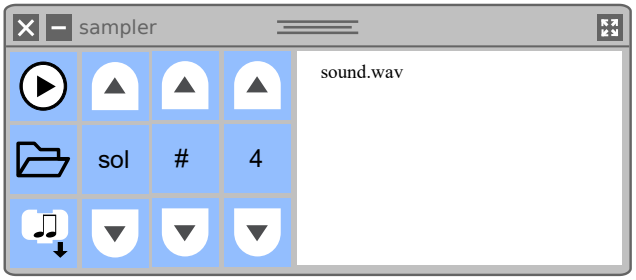


A separate wave will be displayed for each mouse.

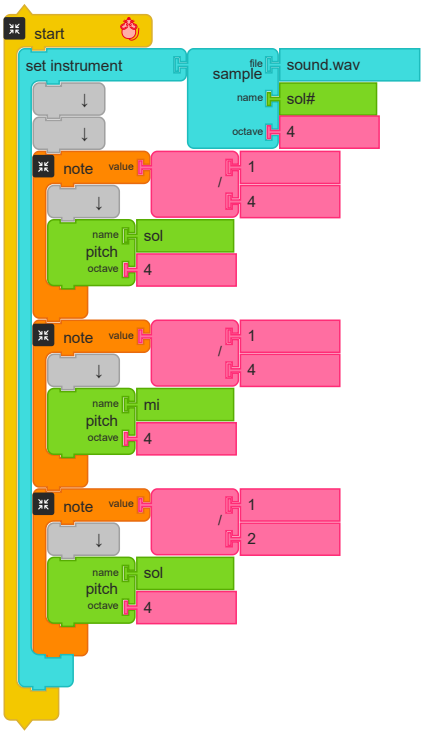
4.14 The Sampler



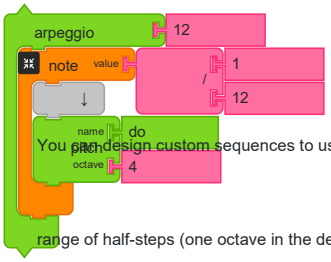
You can import sound samples (.WAV files) and use them with the *Set Instrument" block. The *Sampler* widget lets you set the center pitch of your sample so that it can be tuned.



You can then use the *Sample* block as you would any input to the *Set Instrument* block.



4.15 Arpeggio



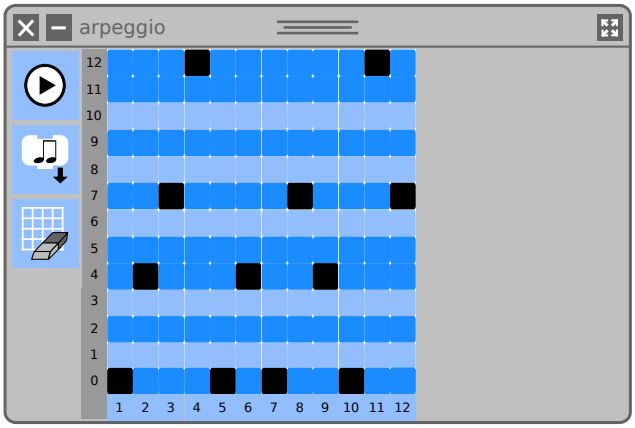
You can design custom sequences to use with the *Arpeggio* block using the *Arpeggio* widget. The widget lets you “paint” intervals that are

in the figure above, designates the number of columns. The widget always provides a range of half-steps (one octave in the default a 12-step equal-temperament tuning). (If you are in a temperament with more notes per

then saved to a “custom” chord, which can be used with the *Arpeggio* block.

The numeric argument to the widget block, `12`

ocatve, the grid will expand.) The rows that represent notes in the current mode are highlighted.



The horizonal axis is time and the verical axis is half-step offsets from the base note.

The sequence in the pattern above is `do mi sol do do mi do sol mi do do sol` .