

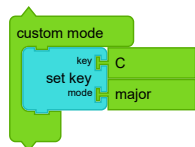
## 4.4 Musical Modes

Musical modes are used to specify the relationship between [intervals](#) (or steps) in a scale. Since Western music is based on 12 half-steps per octave, modes specify how many half steps there are between each note in a scale.

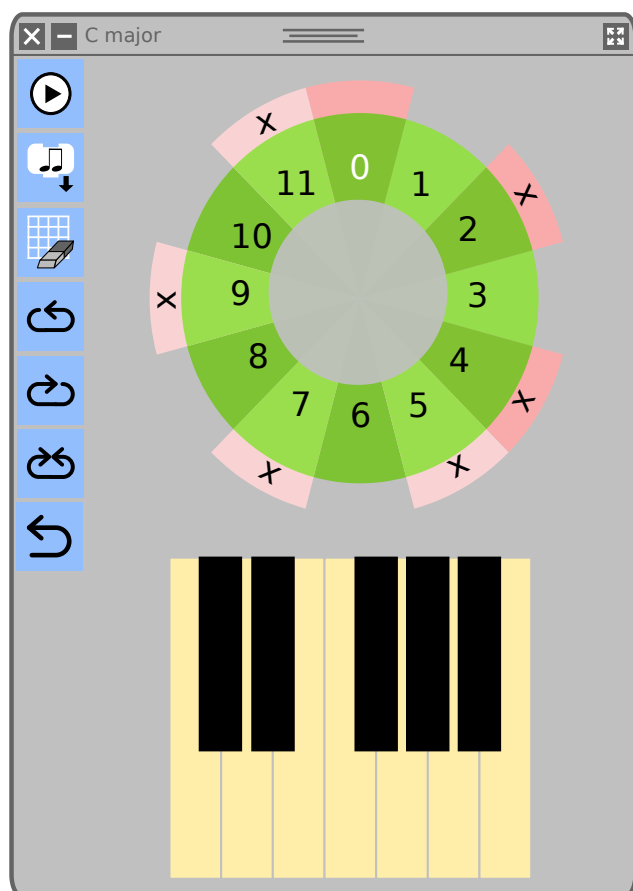
By default, Music Blocks uses the *Major* mode, which, in the [Key](#) of C, maps to the white keys on a piano. The intervals in the *Major* mode are 2, 2, 1, 2, 2, 2, 1. Many other common modes are built into Music Blocks, including, of course, *Minor* mode, which uses 2, 1, 2, 2, 1, 2, 2 as its intervals.

Note that not every mode uses 7 intervals per octave. For example, the *Chromatic* mode uses 11 intervals: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1. The *Japanese* mode uses only 5 intervals: 1, 4, 2, 3, 2]. What is important is that the sum of the intervals in an octave is 12 half-steps.

The *Mode length* block will return the number of intervals (scalar steps) in the current mode.



The *Mode* widget lets you explore modes and generate custom modes. You invoke the widget with the *Custom mode* block. The mode specified in the *Set key* block will be the default mode when the widget launches.



In the above example, the widget has been launched with *Major* mode (the default). Note that the notes included in the mode are indicated by the protruding sectors with 'X's, which are arrayed in a circular pattern of twelve half-steps to complete the octave.

Since the intervals in the *Major* mode are 2, 2, 1, 2, 2, 2, 1, the notes are 0, 2, 4, 5, 7, 9, 11, and 12 (one octave above 0).

The widget controls run along the toolbar at the top. From left to right are:

*Play all*, which will play a scale using the current mode;

*Save*, which will save the current mode as the *Custom* mode and save a stack of *Pitch* blocks that can be used with the *Phrase Maker* block;

*Rotate counter-clockwise*, which will rotate the mode counter-clockwise (See the example below);

*Rotate clockwise*, which will rotate the mode clockwise (See the example below);

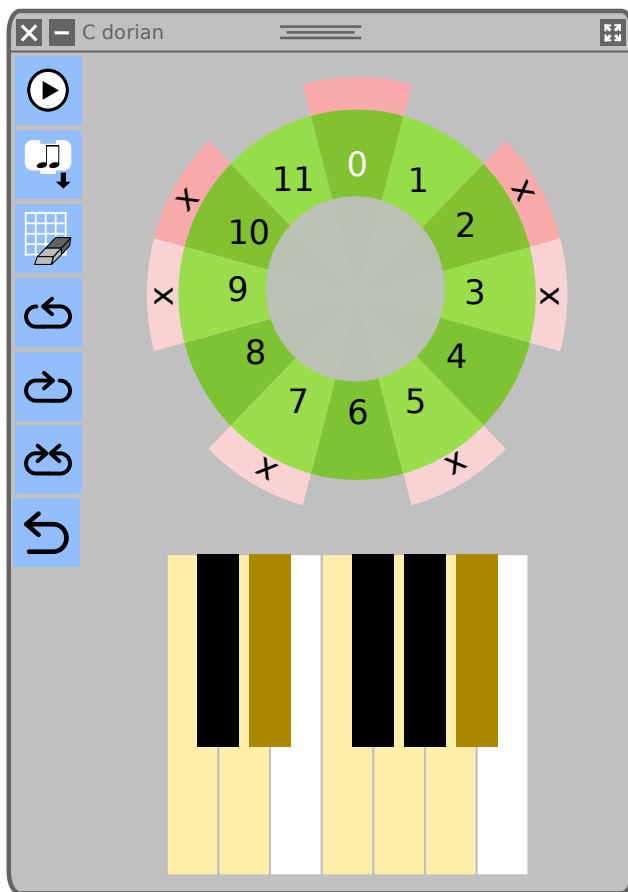
*Invert*, which will invert the mode (See the example below);

*Undo*, which will restore the mode to the previous version; and

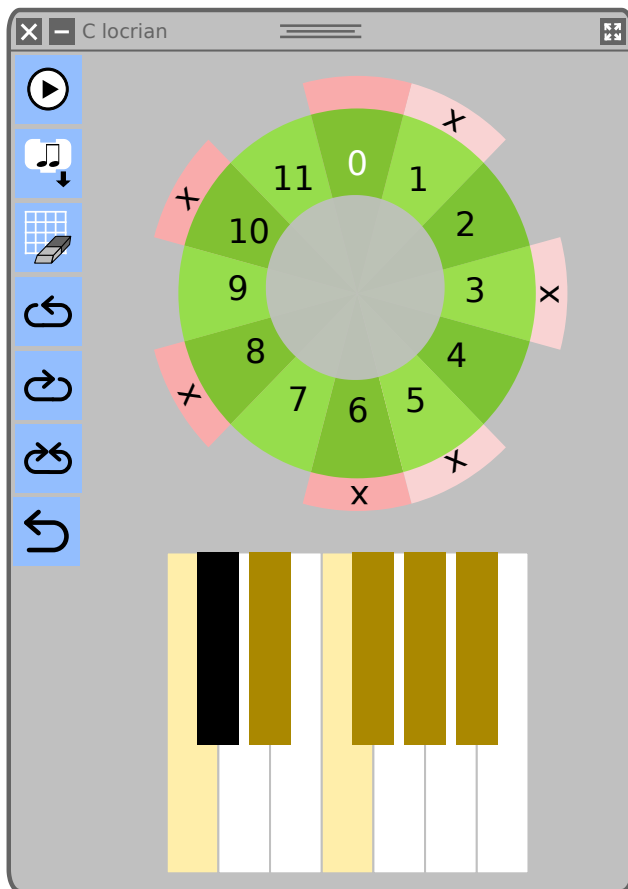
*Close*, which will close the widget.

You can also click on individual notes to activate or deactivate them.

Note that the mode inside the *Custom mode* block is updated whenever the mode is changed inside the widget.



In the above example, the *Major* mode has been rotated counter-clockwise, transforming it into *Dorian*.



In the above example, the *Major* mode has been rotated clockwise, transforming it into *Locrian*.

