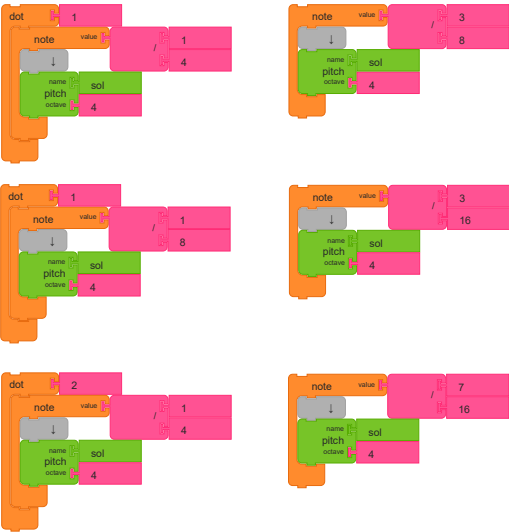


3.3 Note Value Transformations

3.3.1 Dotted Notes



You can “dot” notes using the *Dot* block. A dotted note extends the rhythmic duration of a note by 50%. E.g., a dotted quarter note will play for $\frac{3}{8}$ (i.e. $\frac{1}{4} + \frac{1}{8}$) of a beat. A dotted eighth note will play for $\frac{3}{16}$ (i.e. $\frac{1}{8} + \frac{1}{16}$) of a beat. A double dot extends the duration by 75% (i.e. $50\% + [50\% \text{ of } 50\%]$). For example, a double-dotted quarter note will play for $\frac{7}{16}$ (i.e. $\frac{1}{4} + \frac{1}{8} + \frac{1}{16}$) of a beat (which is the same as $\frac{4}{16} + \frac{2}{16} + \frac{1}{16} = \frac{7}{16}$).

The dot block is useful as an expression of musical rhythm—it is convenient and helps to organize musical ideas (e.g. many melodies use dots as the basis of their rhythmic motifs), however you can achieve the same rhythmic result as dot by putting the calculation directly into note value as well. For example, indicating $\frac{3}{8}$ instead of $\frac{1}{4}$ will result in a dotted quarter note.

The chart below shows two common examples, dotted quarter and dotted eighth, and how to achieve them with either the dot block or by direct calculation into a note's note value.


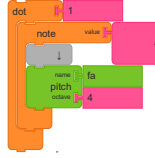
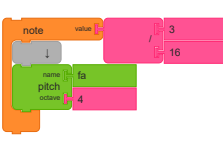

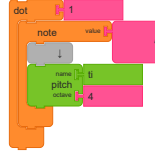
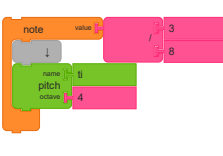
Using Dotted Notes

The dot increases the value of a note by half of its value.

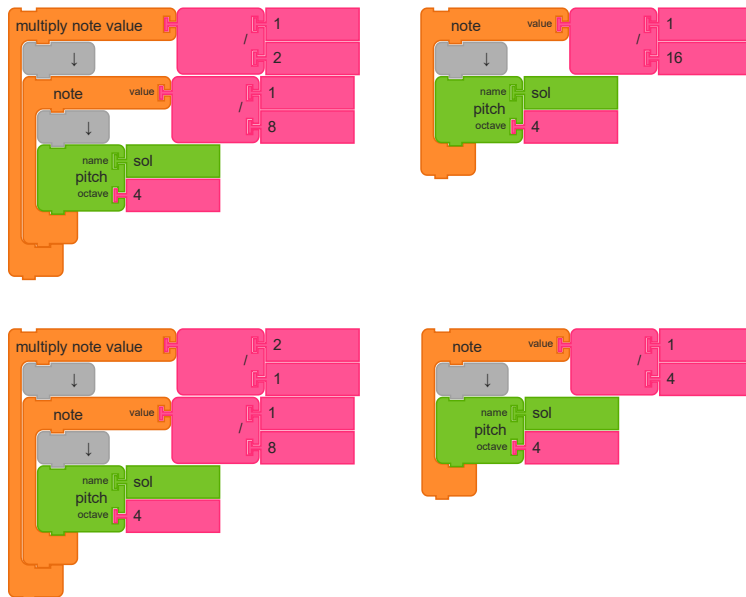
x= value of note

Formula: $x + \frac{x}{2} =$ value of dotted note

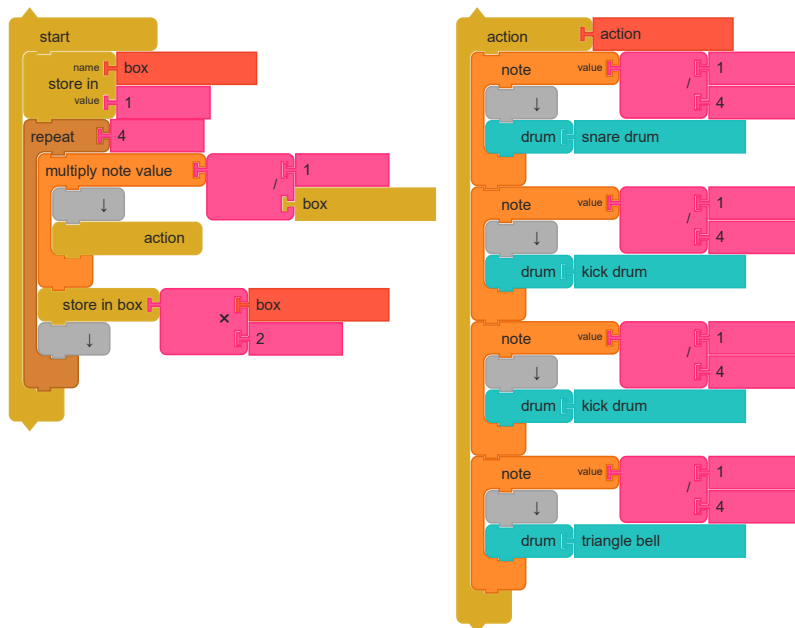
Examples:

Western Notation	Music Blocks Notation with dot	Music Block Notation without dot
 <p>For $x = 1/8$, $\frac{1}{8} + \frac{1}{(8 \cdot 2)} = \frac{1}{8} + \frac{1}{16} = \frac{2}{16} + \frac{1}{16} = \frac{3}{16}$</p>		
 <p>For $x = 1/4$, $\frac{1}{4} + \frac{1}{(4 \cdot 2)} = \frac{1}{4} + \frac{1}{8} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$</p>		

3.3.2 Speeding Up and Slowing Down Notes via Mathematical Operations



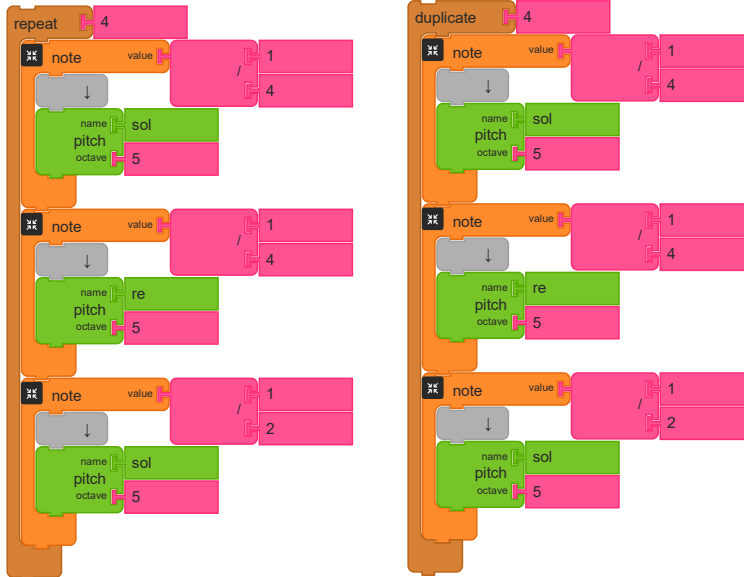
You can also multiply (or divide) the note value, which will change the duration of the notes by changing their note values. Multiplying the note value of an $1/8$ note by $1/2$ is the equivalent of playing a $1/16$ note (i.e. $1/2 \cdot 1/8 = 1/16$). Multiplying the note value of an $1/8$ note by $2/1$ (which has the effect of dividing by $1/2$) will result in the equivalent of a $1/4$ note.



In the above example, the sequence of drum note values is decreased over time, at each repetition.

[RUN LIVE](#)

3.3.3 Repeating Notes



There are several ways to repeat notes. The *Repeat* block will play a sequence of notes multiple times; the *Duplicate* block will repeat each note in a sequence.

In the example, on the left, the result would be `Sol, Re, Sol, Sol, Re, Sol, Sol, Re, Sol, Sol, Re, Sol` ; on the right the result would be `Sol, Sol, Sol, Sol, Re, Re, Re, Re, Sol, Sol, Sol, Sol` .

3.3.4 Swinging Notes and Tied Notes



The *Swing* block works on pairs of notes (specified by note value), adding some duration (specified by swing value) to the first note and taking the same amount from the second note. Notes that do not match note value are unchanged.

In the example, `re5` would be played as a `1/6` note and `mi5` would be played as a `1/12` note ($1/8 + 1/24 == 1/6$ and $1/8 - 1/24 == 1/12$). Observe that the total duration of the pair of notes is unchanged.

Tie also works on pairs of notes, combining them into one note. (The notes must be identical in pitch, but can vary in rhythm.)

Using Notes with Ties

A tie connects two notes of the same pitch* and indicates that they are to be played as the sum of the two notes.

x= value of note 1

y= value of note 2

Formula: $x + y =$ total value of notes contained within tie

Examples:

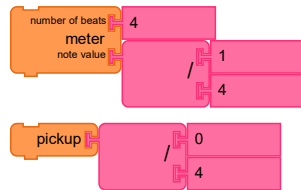
Western Notation	Music Blocks Notation with tie	Music Block Notation without tie
$\frac{1}{4} + \frac{1}{8} = \frac{3}{8}$ <p>Find common denominator:</p> $x = \frac{1}{4} \quad 2 \cdot \frac{1}{4} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$ $y = \frac{1}{8}$		
$\frac{1}{16} + \frac{1}{2} = \frac{9}{16}$ <p>Find common denominator:</p> $x = \frac{1}{16} \quad 8 \cdot \frac{1}{16} = \frac{8}{16} + \frac{1}{16} = \frac{9}{16}$ $y = \frac{1}{2}$		

* Ties affect rhythm, not pitch. For tie to work, both pitches must be exactly the same. If not, it will be considered a slur.

3.3.5 Beat

The beat of the music is determined by the *Meter* block (by default, it is set to 4:4).

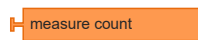
The *Pickup* block can be used to accommodate any notes that come in before the beat.



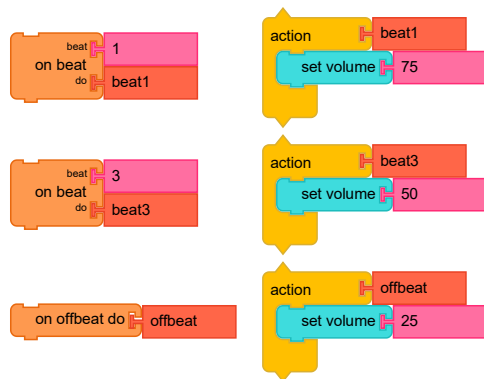
The Beat count block is the number of the current beat, eg 1, 2, 3, or 4. In the figure, it is used to take an action on the first beat of each measure.

beat count

The Measure count block returns the current measure.



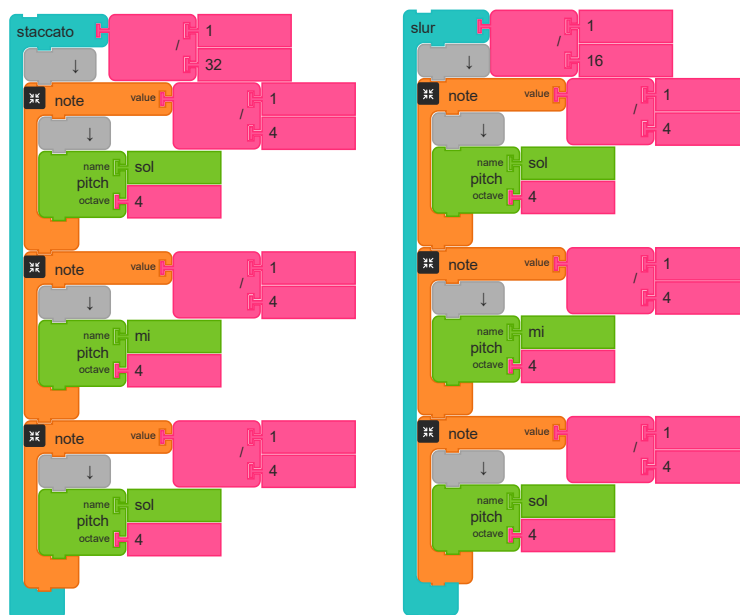
Specifying beat is useful in that you can have the character of a note vary depending upon the beat. In the example below, the volume of notes on Beat 1 and Beat 3 are increased, while the volume of off beats is decreased.



The *On-Beat-Do* and *Off-Beat-Do* blocks let you specify actions to take on specific beats. (Note that the action is run before any blocks inside the note block associated with the beat are run.)

More examples can be found in the [Graphics](#) section below.

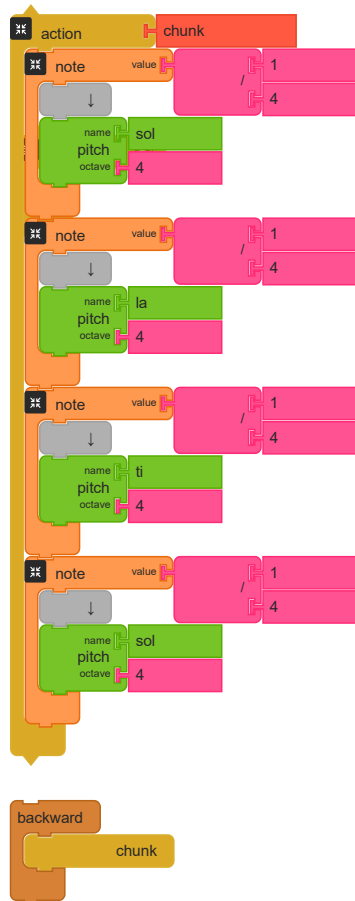
3.3.6 Staccato and Slur



The *Staccato* block shortens the length of the actual note—making them tighter bursts—while maintaining the specified rhythmic value of the notes.

The *Slur* block lengthens the sustain of notes—running longer than the noted duration and blending it into the next note—while maintaining the specified rhythmic value of the notes.

3.3.7 Backwards



The *Backward* block will play the contained notes in reverse order (retrograde). In the example above, the notes in `chunk` are played as Sol , Ti , La , Sol , i.e., from the bottom to the top of the stack.

An example from Bach is provided. In the example, there are two voices, one which plays the composition forward and one that plays the same composition backward. [RUN LIVE](#)

Note that all of the blocks inside a *Backward* block are reverse, so use this feature with caution if you include logic intermixed with notes.