

Note rhythm-maker

NoteRhythmMaker()

Figure 1 shows two musical staves illustrating the construction of a 12-tone scale. The top staff shows a sequence of intervals: $\frac{4}{16}$, $\frac{5}{16}$, $\frac{1}{2}$, and $\frac{3}{12}$. The bottom staff shows a sequence of intervals: $\frac{1}{2}$, $\frac{2}{12}$, $\frac{4}{16}$, and $\frac{5}{16}$. Both staves include a '1-1' label and a '3:2' ratio label.

[illegible]

```

NoteRhythmMaker(
    tie_specifier=TieSpecifier(
        tie_across_divisions=True,
        tie_split_notes=True,
    ),
)

```

2-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

3:2

2-2

$\frac{1}{11}$ $\frac{3}{8}$ $\frac{1}{11}$ $\frac{3}{8}$

11:8

11:8

2-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$ $\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

5:4 5:4 3:2 3:2 3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

2-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4 5:4

```

NoteRhythmMaker(
    beam_specifier=BeamSpecifier(
        beam_each_division=True,
        beam_divisions_together=True,
    ),
)

```

3-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

3-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

3-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

3-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```
NoteRhythmMaker(  
  duration_spelling_specifier=DurationSpellingSpecifier(  
    decrease_durations_monotonically=False,  
  ),  
)
```

4-1

$\frac{4}{16}$

$\frac{5}{16}$

$\frac{1}{2}$

$\frac{2}{12}$

$\frac{1}{2}$

$\frac{4}{16}$

$\frac{5}{16}$

4-2

$\frac{1}{11}$

$\frac{3}{8}$

$\frac{1}{11}$

$\frac{3}{8}$

4-3

$\frac{3}{15}$

$\frac{3}{16}$

$\frac{5}{24}$

$\frac{5}{16}$

$\frac{2}{12}$

$\frac{2}{8}$

$\frac{3}{28}$

$\frac{3}{16}$

$\frac{1}{9}$

$\frac{1}{8}$

4-4

$\frac{9}{16}$

$\frac{1}{5}$

$\frac{9}{16}$

$\frac{1}{5}$

$\frac{9}{16}$

```

NoteRhythmMaker(
  duration_spelling_specifier=DurationSpellingSpecifier(
    decrease_durations_monotonically=False,
  ),
  tie_specifier=TieSpecifier(
    tie_across_divisions=True,
    tie_split_notes=True,
  ),
)

```

5-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

5-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

5-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

5-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```
NoteRhythmMaker(  
  beam_specifier=BeamSpecifier(  
    beam_each_division=True,  
    beam_divisions_together=True,  
  ),  
  duration_spelling_specifier=DurationSpellingSpecifier(  
    decrease_durations_monotonically=False,  
  ),  
)
```

6-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

6-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

6-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

6-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

NoteRhythmMaker(
    duration_spelling_specifier=DurationSpellingSpecifier(
        decrease_durations_monotonically=True,
        forbidden_written_duration=durationtools.Duration(1, 4),
    ),
)

```

7-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

7-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

7-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

7-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4 5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```
NoteRhythmMaker(  
  duration_spelling_specifier=DurationSpellingSpecifier(  
    decrease_durations_monotonically=True,  
    forbidden_written_duration=durationontools.Duration(1, 4),  
  ),  
  tie_specifier=TieSpecifier(  
    tie_across_divisions=True,  
    tie_split_notes=True,  
  ),  
)
```

8-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

8-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

8-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

8-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4


```

NoteRhythmMaker(
    duration_spelling_specifier=DurationSpellingSpecifier(
        decrease_durations_monotonically=False,
        forbidden_written_duration=durationtools.Duration(1, 4),
    ),
)

```

9-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

9-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

9-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

9-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

NoteRhythmMaker(
    duration_spelling_specifier=DurationSpellingSpecifier(
        decrease_durations_monotonically=False,
        forbidden_written_duration=durationontools.Duration(1, 4),
    ),
    tie_specifier=TieSpecifier(
        tie_across_divisions=True,
        tie_split_notes=True,
    ),
)

```

10-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

10-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

10-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

10-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

NoteRhythmMaker(
  beam_specifier=BeamSpecifier(
    beam_each_division=False,
    beam_divisions_together=False,
  ),
  duration_spelling_specifier=DurationSpellingSpecifier(
    decrease_durations_monotonically=True,
    forbidden_written_duration=durationontools.Duration(1, 4),
  ),
)

```

11-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

11-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

11-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

11-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

NoteRhythmMaker(
  beam_specifier=BeamSpecifier(
    beam_each_division=False,
    beam_divisions_together=False,
  ),
  duration_spelling_specifier=DurationSpellingSpecifier(
    decrease_durations_monotonically=True,
    forbidden_written_duration=durationtools.Duration(1, 4),
  ),
  tie_specifier=TieSpecifier(
    tie_across_divisions=True,
    tie_split_notes=True,
  ),
)

```

12-1

4/16 5/16 1/2 2/12 3:2

1/2 2/12 3:2 4/16 5/16

12-2

1/11 3/8 11:8

1/11 3/8 11:8

12-3

3/15 3/16 5/24 5/16

2/12 2/8 3/8 3/16 1/9

1/8

12-4

9/16 1/5 9/16

1/5 9/16 5:4

```

NoteRhythmMaker(
  beam_specifier=BeamSpecifier(
    beam_each_division=False,
    beam_divisions_together=False,
  ),
  duration_spelling_specifier=DurationSpellingSpecifier(
    decrease_durations_monotonically=False,
    forbidden_written_duration=durationontools.Duration(1, 4),
  ),
)

```

13-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

13-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

13-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

5:4 5:4 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

3:2 3:2 7:4 7:4 9:8 9:8

$\frac{1}{8}$

13-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

NoteRhythmMaker(
  beam_specifier=BeamSpecifier(
    beam_each_division=False,
    beam_divisions_together=False,
  ),
  duration_spelling_specifier=DurationSpellingSpecifier(
    decrease_durations_monotonically=False,
    forbidden_written_duration=durationtools.Duration(1, 4),
  ),
  tie_specifier=TieSpecifier(
    tie_across_divisions=True,
    tie_split_notes=True,
  ),
)

```

14-1

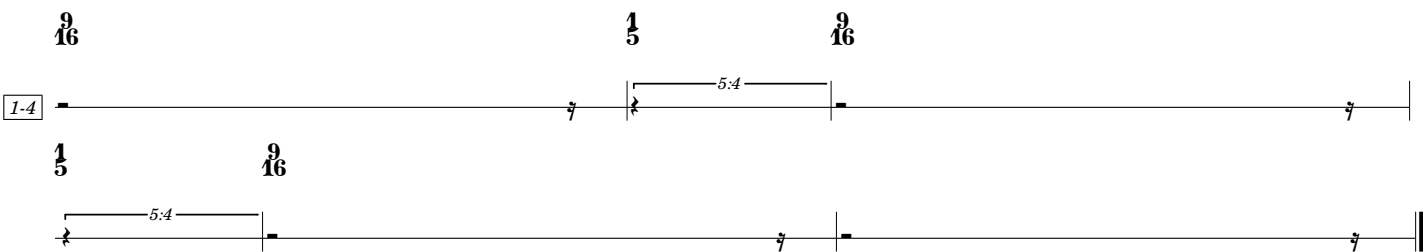
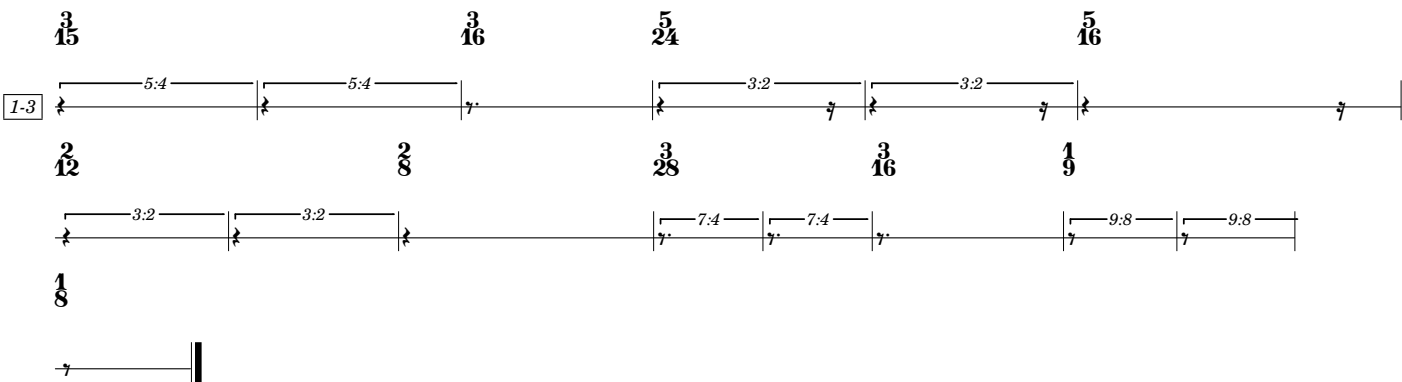
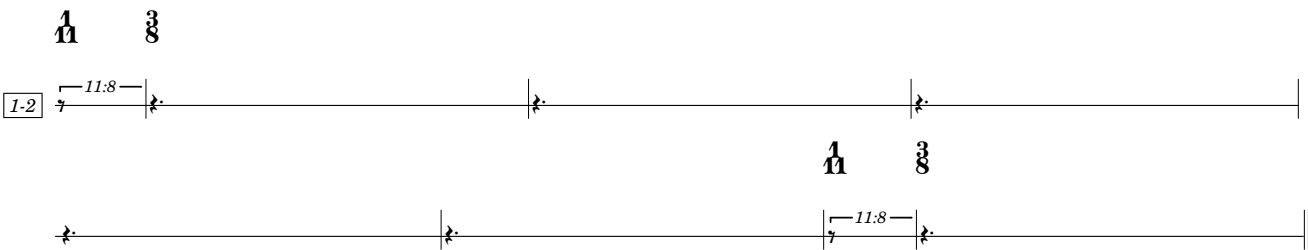
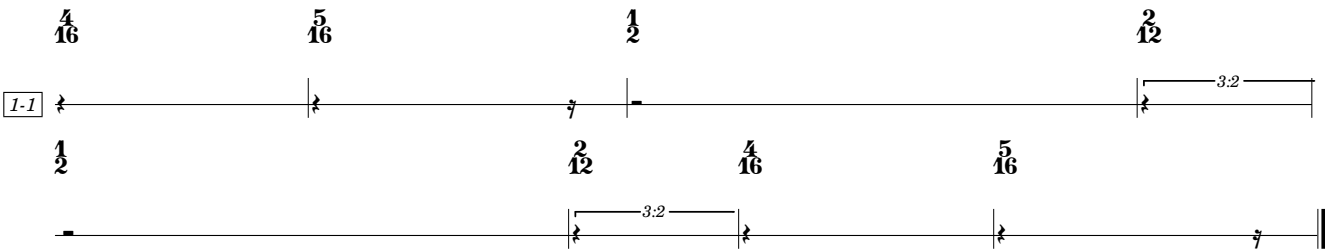
14-2

14-3

14-4

Rest rhythm-maker

RestRhythmMaker()



The figure consists of two horizontal lines, each with several vertical tick marks. The top line has a box labeled '3:2' at the far left and a bracket labeled '11:8' spanning the first three segments. The bottom line has a bracket labeled '11:8' spanning the last three segments. Above and below the lines are labels '1' and '3'.

The diagram illustrates the construction of a 128-measure scale. It features four horizontal lines, each representing a different scale. The notes and their ratios are as follows:

- Line 1:** Notes $\frac{3}{15}$, $\frac{3}{16}$, $\frac{5}{24}$, and $\frac{5}{16}$. Ratios between notes are $5:4$, $5:4$, $3:2$, and $3:2$.
- Line 2:** Notes $\frac{2}{12}$, $\frac{2}{8}$, $\frac{3}{28}$, $\frac{3}{16}$, and $\frac{1}{9}$. Ratios between notes are $3:2$, $3:2$, $7:4$, $7:4$, and $9:8$.
- Line 3:** Notes $\frac{1}{8}$ and $\frac{1}{4}$. Ratio is $9:8$.
- Line 4:** Notes $\frac{1}{8}$ and $\frac{1}{4}$. Ratio is $9:8$.

A box labeled "3-3" is located at the top left of the diagram.

```
RestRhythmMaker(  
  duration_spelling_specifier=DurationSpellingSpecifier(  
    decrease_durations_monotonically=False,  
    forbidden_written_duration=durationtools.Duration(1, 4),  
  ),  
)
```

4-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2 3:2

4-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8 11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

4-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$

5:4 5:4 3:2 3:2 3:2 3:2 3:2 3:2 9:8 9:8

$\frac{1}{8}$

4-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

$\frac{1}{5}$ $\frac{9}{16}$

5:4 5:4

Even-run rhythm-maker

EvenRunRhythmMaker()

The 12th and 13th rows of the 12-tone equal temperament scale are shown. The 12th row features time signatures of 3/15, 3/16, 5/24, and 5/16, with rhythmic groupings of 15:8 and 3:2. The 13th row features time signatures of 2/12, 2/8, 3/28, 3/16, 1/9, and 1/8, with rhythmic groupings of 3:2, 7:4, and 9:8.

```
EvenRunRhythmMaker(
    beam_specifier=BeamSpecifier(
        beam_each_division=True,
        beam_divisions_together=True,
    ),
)
```

2-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

2-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

2-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

15:8 15:8 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$ $\frac{1}{8}$

3:2 3:2 7:4 7:4 9:8 9:8

2-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4 5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```
EvenRunRhythmMaker(
    beam_specifier=BeamSpecifier(
        beam_each_division=False,
        beam_divisions_together=False,
    ),
)
```

3-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

3-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

3-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

15:8 15:8 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$ $\frac{1}{8}$

3:2 3:2 7:4 7:4 9:8 9:8

3-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```

EvenRunRhythmMaker(
    tie_specifier=TieSpecifier(
        tie_across_divisions=True,
        tie_split_notes=True,
    ),
)

```

4-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

4-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

4-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

15:8 15:8 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$ $\frac{1}{8}$

3:2 3:2 7:4 7:4 9:8 9:8

4-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

```
EvenRunRhythmMaker(
    duration_spelling_specifier=DurationSpellingSpecifier(
        decrease_durations_monotonically=True,
        forbidden_written_duration=durationtools.Duration(1, 4),
    ),
)
```

5-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

3:2

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

3:2

5-2

$\frac{1}{11}$ $\frac{3}{8}$

11:8

$\frac{1}{11}$ $\frac{3}{8}$

11:8

5-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

15:8 15:8 3:2 3:2

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$ $\frac{1}{8}$

3:2 3:2 7:4 7:4 9:8 9:8

5-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

5:4

$\frac{1}{5}$ $\frac{9}{16}$

5:4

EvenRunRhythmMaker(
exponent=1,
)

6-1

$\frac{4}{16}$ $\frac{5}{16}$ $\frac{1}{2}$ $\frac{2}{12}$

$\frac{1}{2}$ $\frac{2}{12}$ $\frac{4}{16}$ $\frac{5}{16}$

6-2

$\frac{1}{11}$ $\frac{3}{8}$

$\frac{1}{11}$ $\frac{3}{8}$

6-3

$\frac{3}{15}$ $\frac{3}{16}$ $\frac{5}{24}$ $\frac{5}{16}$

$\frac{2}{12}$ $\frac{2}{8}$ $\frac{3}{28}$ $\frac{3}{16}$ $\frac{1}{9}$ $\frac{1}{8}$

6-4

$\frac{9}{16}$ $\frac{1}{5}$ $\frac{9}{16}$

$\frac{1}{5}$ $\frac{9}{16}$