

# Unofficial MusicXML test suite

# 1 Introduction

## Why a MusicXML test suite?

This test suite of sample MusicXML (<http://www.musicxml.org/>) files is supposed to fill a severe gap for all developers implementing MusicXML support in their application: There is no complete test suite of MusicXML files available for testing purposes.

## Downloading the test suite

The complete set of MusicXML test files contained in this suite can be downloaded here ([MusicXML-TestSuite-0.1.zip](#)) as a ZIP archive.

## License of the test suite

This collection of MusicXML test files is distributed under the MIT license (<http://www.opensource.org/licenses/mit-license.php>), which means that you can use the files for any purpose, as long as you leave the copyright notice (or the LICENSE file) intact.

## Connection with LilyPond (<http://lilypond.org/>)

At the same time as providing a generic test suite for MusicXML document, this test suite also serves as proofs for the `musicxml2ly` script provided with LilyPond 2.20.0. The images shown in the Chapter 2 [Test cases], page 4, chapter were generated by running `musicxml2ly` and `lilypond` on the MusicXML files. As `musicxml2ly` does not yet perfectly support every single aspect of MusicXML, the output is not supposed to be used as a definitive reference rendering, but rather as an indication how one particular application supports and interprets each of the test files.

If something does not seem right in the output, it might either be that this feature has not been implemented yet, has been wrongly implemented, or a regression has crept in recently...

In the web version of this document, you can click on the file name or figure for each example to see the corresponding `.ly` intermediary file.

## Structure of this test suite

Each test file (typically hand-crafted from the MusicXML "specification") checks one particular aspect of MusicXML. A short description of the particular feature for a file is given element inside the file in a comment element of the form:

```
<identification><miscellaneous>
  <miscellaneous-field name="description"> .... </miscellaneous-field>
</miscellaneous></identification>
```

The files are categorized by their first two digits with the following meaning:

- 01-03 ... Basics: Pitches, Rests, Rhythm
- 11-13 ... Staff attributes: Time signatures, Clefs, Key signatures
- 21-24 ... Note settings: Chorded notes, note heads, tuplets, grace notes
- 31-33 ... Notations and articulations: Dynamics (staff-attached), Notations (note-attached), Spanners
- 41-44 ... Parts: Multiple parts, multi-voice parts, multi-staff parts
- 45-46 ... Measure issues and repeats
- 51-52 ... Page issues: Header fields, page layout

- 55-59 ... Exact positioning of items, offsets, etc.
- 61-69 ... Vocal music
- 71-75 ... Instrument-specific: Guitar (Chord, fretboards), Transposing instruments, Percussion, Figured Bass, Others
- 81-89 ... MIDI generation (all sound-related issues)
- 90-99 ... Various Other: Compressed MusicXML files, compatibility with broken MusicXML files exported by other applications

Some of the categories (in particular the exact item positioning and the MIDI generation don't have any test cases yet.

## 2 Test cases

### 01 ... Pitches

All pitches from G to c'' in ascending steps; First without accidentals, then with a sharp and then with a flat accidental. Double alterations and cautionary accidentals are tested at the end.

01a-Pitches-Pitches.xml

### Pitches and accidentals

The musical score consists of four staves of music in treble clef, 4/4 time. The first staff starts with a common time signature 'C' and shows a sequence of chords and single notes ascending from G4 to c6. The second staff begins at measure 8 and continues the sequence with various accidentals (sharps and flats) and double alterations. The third staff begins at measure 14 and includes cautionary accidentals. The fourth staff begins at measure 20 and concludes with a double bar line.

All pitch intervals in ascending jump size.

01b-Pitches-Intervals.xml

### Various pitches and interval sizes

The musical score consists of two staves of music in treble clef, 2/4 time. The first staff starts with a 2/4 time signature and shows a sequence of notes with various accidentals and interval sizes. The second staff begins at measure 11 and continues the sequence with various accidentals and interval sizes.

The <voice> element of notes is optional in MusicXML (although Dolet always writes it out). Here, there is one note with lyrics, but without a voice assigned. It should still be correctly converted.

01c-Pitches-NoVoiceElement.xml

1. A

Some microtones: c flat-and-a-half, d half-flat, e half-sharp, f sharp-and-a half. Once in the lower and once in the upper region of the staff.

01d-Pitches-Microtones.xml

Accidentals can be cautionary or editorial. Each measure has a normal accidental, an editorial, a cautionary and an editorial and cautionary accidental.

01e-Pitches-ParenthesizedAccidentals.xml

Microtone accidentals can be cautionary or editorial. Each measure has a normal accidental, an editorial, a cautionary and an editorial and cautionary accidental.

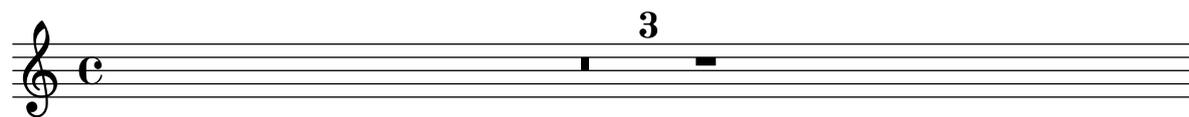
01f-Pitches-ParenthesizedMicrotoneAccidentals.xml

## 02 ... Rests

All different rest lengths: A two-bar multi-measure rest, a whole rest, a half, etc. until a 128th-rest; Then the same with dotted durations.

02a-Rests-Durations.xml

### Rest unit test



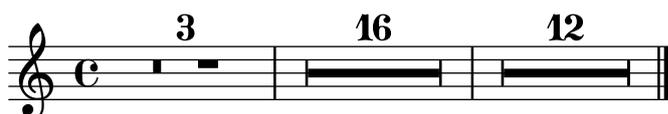
Rests can have explicit pitches, where they are displayed. The first rest uses no explicit position and should use the default position, all others are explicitly positioned somewhere else.

02b-Rests-PitchedRests.xml



Four multi-measure rests: 3 measures, 15 measures, 1 measure, and 12 measures.

02c-Rests-MultiMeasureRests.xml



Multi-Measure rests should always be converted into durations that are a multiple of the time signature.

02d-Rests-Multimeasure-TimeSignatures.xml



In some cases, a rest might not have its type attribute set (this happens, for example, with voices in Finale, where you don't manually insert a rest).

02e-Rests-NoType.xml



### 03 ... Rhythm

All note durations, from long, brevis, whole until 128th; First with their plain values, then dotted and finally doubly-dotted.

03a-Rhythm-Durations.xml

The image shows three staves of musical notation. The first staff starts with a treble clef and a 16/4 time signature. It contains a whole note, followed by a dotted half note, and then a sequence of eighth notes: quarter, eighth, sixteenth, and thirty-second notes. The second staff starts with a treble clef and a 24/4 time signature. It contains a whole note, followed by a dotted half note, and then a sequence of eighth notes: quarter, eighth, sixteenth, and thirty-second notes. The third staff starts with a treble clef and a 28/4 time signature. It contains a whole note, followed by a dotted half note, and then a sequence of eighth notes: quarter, eighth, sixteenth, and thirty-second notes.

Two voices with a backup, that does not jump to the beginning for the measure for voice 2, but somewhere in the middle. Voice 2 thus won't have any notes or rests for the first beat of the measures.

03b-Rhythm-Backup.xml

The image shows a single staff of musical notation with a common time signature (C). It contains a quarter note, followed by a dotted quarter note, and then a dotted eighth note.

Although uncommon, the divisions of a quarter note can change somewhere in the middle of a MusicXML file. Here, the first half measure uses a division of 1, which then changes to 8 in the middle of the first measure and to 38 in the middle of the second measure.

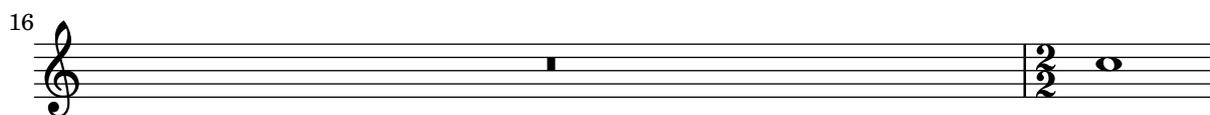
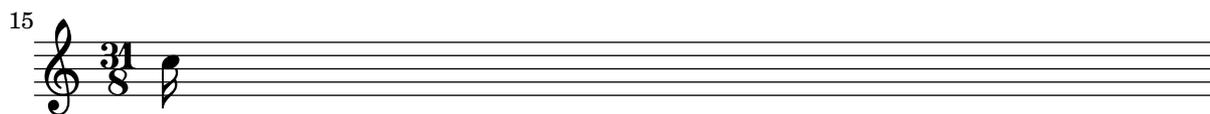
03c-Rhythm-DivisionChange.xml

The image shows a single staff of musical notation with a common time signature (C). It contains a quarter note, followed by a dotted quarter note, and then a dotted eighth note.

Several durations can be written with dots. For multimeasure rests, we can also have durations that cannot be expressed with dotted notes (like 5/8).

03d-Rhythm-DottedDurations-Factors.xml

The image shows two staves of musical notation. The first staff starts with a treble clef and a 1/8 time signature. It contains a quarter note, followed by a multimeasure rest for 2 measures in 2/8, a quarter note, followed by a multimeasure rest for 3 measures in 3/4, a dotted half note, followed by a multimeasure rest for 4 measures in 4/4, and a whole note, followed by a multimeasure rest for 5 measures in 5/16. The second staff starts with a treble clef and a 5/16 time signature. It contains a quarter note, followed by a multimeasure rest for 7 measures in 7/8, a dotted half note, followed by a multimeasure rest for 9 measures in 9/8, a whole note, followed by a multimeasure rest for 31 measures in 31/8.



## 11 ... Time signatures

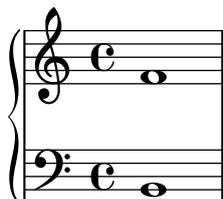
Various time signatures: 2/2 (alla breve), 4/4 (C), 2/2, 3/2, 2/4, 3/4, 4/4, 5/4, 3/8, 6/8, 12/8

11a-TimeSignatures.xml



A score without a time signature (but with a key and clefs)

11b-TimeSignatures-NoTime.xml



Compound time signatures with same denominator:  $(3+2)/8$  and  $(5+3+1)/4$ .

11c-TimeSignatures-CompoundSimple.xml



Compound time signatures with separate fractions displayed:  $3/8+2/8+3/4$  and  $5/2+1/8$ .

11d-TimeSignatures-CompoundMultiple.xml



Compound time signatures of mixed type:  $(3+2)/8+3/4$ .

11e-TimeSignatures-CompoundMixed.xml



A time signature of 3/8 with the symbol="cut" attribute and two symbol="single-number" attributes with compound time signatures. Shall the symbol be ignored in this case?

11f-TimeSignatures-SymbolMeaning.xml



Time signature displayed as a single number.

11g-TimeSignatures-SingleNumber.xml



Senza-misura time signature

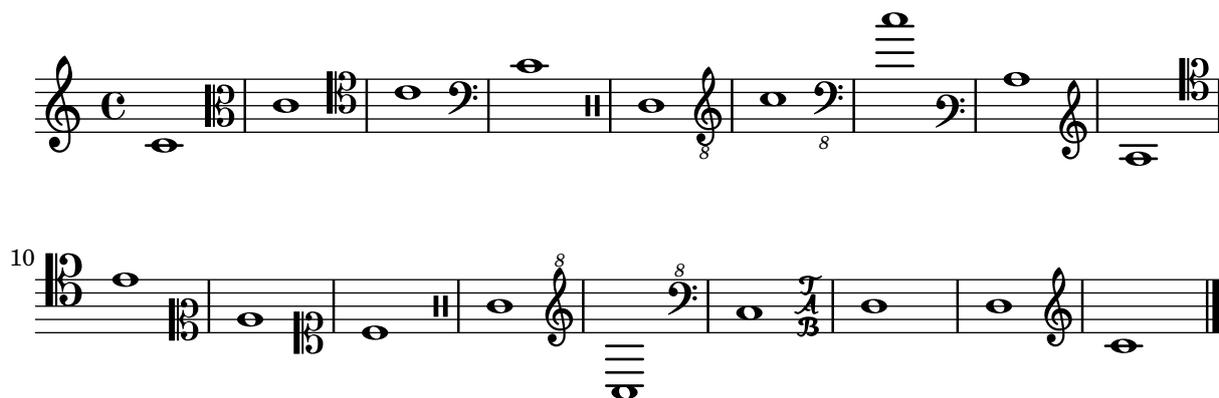
11h-TimeSignatures-SenzaMisura.xml



## 12 ... Clefs

Various clefs: G, C, F, percussion, TAB and none; some are also possible with transposition and on other staff lines than their default (e.g. soprano/alto/tenor/baritone C clefs); Each measure shows a different clef (measure 17 has the "none" clef), only measure 18 has the same treble clef as measure 1.

12a-Clefs.xml



A score without any key or clef defined. The default (4/4 in treble clef) should be used.

12b-Clefs-NoKeyOrClef.xml



### 13 ... Key signatures

Various key signature: from 11 flats to 11 sharps (each one first one measure in major, then one measure in minor)

13a-KeySignatures.xml

### Different Key signatures

The image displays 11 staves of musical notation, each representing a different key signature. The notation is in treble clef and 2/4 time. The first five staves (measures 1-15) show key signatures with 11 flats: C major (no sharps or flats), C minor (one flat), D minor (two flats), E minor (three flats), and F minor (four flats). The next five staves (measures 16-30) show key signatures with 11 sharps: G major (one sharp), G minor (one sharp and two flats), A minor (two sharps), B minor (three sharps), and C major (four sharps). The final staff (measures 31-42) shows the C major key signature (no sharps or flats) with various accidentals (sharps and flats) placed on the notes to represent different modes.

All different modes: major, minor, ionian, dorian, phrygian, lydian, mixolydian, aeolian, and locrian; All modes are given with 2 sharps.

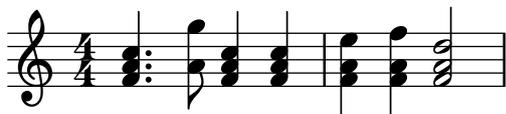
13b-KeySignatures-ChurchModes.xml

The image shows a single staff of musical notation in treble clef and common time (C). The key signature has two sharps (F# and C#). The notes are C, D, E, F#, G, A, B, C, representing the first mode (C major).

1. major minor ionian dorian phrygian lydian mixolydian aeolian locrian



21c-Chords-ThreeNotesDuration.xml



Chords in the second measure, after several ornaments in the first measure and a p at the beginning of the second measure.

21d-Chords-SchubertStabatMater.xml



Check for proper chord detection after a pickup measure (i.e. the first beat of the measure is not aligned with multiples of the time signature)!

21e-Chords-PickupMeasures.xml



Between the individual notes of a chord there can be direction or harmony elements, which should be properly assigned to the chord (or the position of the chord).

21f-Chord-ElementInBetween.xml



## 22 ... Note settings, heads, etc.

Different note styles, using the <notehead> element. First, each note head style is printed with four quarter notes, two with filled heads, two with unfilled heads, where first the stem is up and then the stem is down. After that, each note head style is printed with a half note (should have an unfilled head by default). Finally, the Aiken note head styles are tested, once with stem up and once with stem down.

22a-Noteheads.xml



12

back slashed normal cluster none slash triangle diamond square

18

cross x circle-x inverted triangle arrow down arrow up slashed back slashed

22

normal cluster do re mi fa so

28

la ti do re mi fa so la ti do do re mi fa so la ti do

Staff-connected note styles: slash notation, hidden notes (with and without hidden staff lines)

22b-Staff-Notestyles.xml

1. slash, no stem slash, with stem normal settings restored

Different note styles for individual notes inside a chord, using the <notehead> element.

22c-Noteheads-Chords.xml

1. normal cross
2. triangle
3. slash

Parenthesized note heads. First, a single parenthesized note is tested, once with a normal and then with a non-standard notehead, then two chords with some/all parenthesized noteheads and finally a parenthesized rest.

22d-Parenthesized-Noteheads.xml

## 23 ... Triplets, Tuplets

Some tuplets (3:2, 3:2, 3:2, 4:2, 4:1, 7:3, 6:2) with the default tuplet bracket displaying the number of actual notes played. The second tuplet does not have a number attribute set.

23a-Tuplets.xml



Different tuplet styles: default, none, x:y, x:y-note; Each with bracket, slur and none. Finally, non-standard 4:3 and 17:2 tuplets are given.

23b-Tuplets-Styles.xml



Displaying tuplet note types, that might not coincide with the displayed note. The first two tuplets take the type from the note, the second two from the <time-modification> element, the remaining pair of tuplets from the <tuplet> notation element. The tuplets in measure 3 specify both a number of notes and a type inside the <tuplet-actual> and <tuplet-normal> elements, the ones in measure 4 specify only a note type (but no number), and the ones in measure 5 specify only a number of tuplet-notes (but no type, which is deduced from the note's type). The first tuplet of measures 3-5 uses 'display-type="actual"', the second one 'display-type="both"'. FIXME: The tuplet-normal should coincide with the real notes!

23c-Tuplet-Display-NonStandard.xml



Tuplets can be nested. Here there is a 5:2 tuplet inside a 3:2 tuple (all consisting of written eighth notes).

23d-Tuplets-Nested.xml



Tremolo tuplets are tuplets on single notes with a tremolo ornament. The application shall correctly import these notes with 2/3 or their time...



A grace note on a different staff than the actual note.

24e-GraceNote-StaffChange.xml



A grace note with a slur to the actual note. This can be interpreted as acciaccatura or appoggiatura, depending on the existence of a slash.

24f-GraceNote-Slur.xml



### 31 ... Dynamics and other single symbols

All <direction> elements defined in MusicXML. The lyrics for each note describes the direction element assigned to that note.

31a-Directions.xml

## MusicXML directions (attached to staff)

The image displays three staves of musical notation illustrating various MusicXML direction elements. Each note is accompanied by a label representing the direction element.

Staff 1 (Measures 1-4):

- Measure 1: reh.A (def=sq.)
- Measure 2: reh.B (none)
- Measure 3: reh.Test (sq.)
- Measure 4: reh.Crc (crc.)

Staff 2 (Measures 5-8):

- Measure 5: Segno
- Measure 6: Coda
- Measure 7: Words
- Measure 8: Eyegl.

Staff 3 (Measures 9-16):

- Measure 9: p
- Measure 10: pp
- Measure 11: ppp
- Measure 12: pppp
- Measure 13: ppppp
- Measure 14: pppppp
- Measure 15: f
- Measure 16: ff

Staff 4 (Measures 17-24):

- Measure 17: mp
- Measure 18: mf
- Measure 19: sf
- Measure 20: sfp
- Measure 21: sfpp
- Measure 22: fp
- Measure 23: rf
- Measure 24: rfz

Staff 5 (Measures 25-32):

- Measure 25: sfz
- Measure 26: sffz
- Measure 27: fz
- Measure 28: abc-ffz
- Measure 29: abc-ffz (oth.)

9 *tr*

hairpin cresc dash - es bra - cket oct. - shift pedalchange - mark

12 ♩ = 60

Metr. Harp ped. Damp Damp all Scord. Accordion reg. sub p ppp crescto fff

Tempo Markings: note=bpm, text (note=bpm), note=note, (note=note), (note=bpm)  
 31c-MetronomeMarks.xml

♩ = 100 Adagio (♩ = 100) (♩ = 77)

### 32 ... Notations and Articulations

All <notation> elements defined in MusicXML. The lyrics show the notation assigned to each note.

32a-Notations.xml

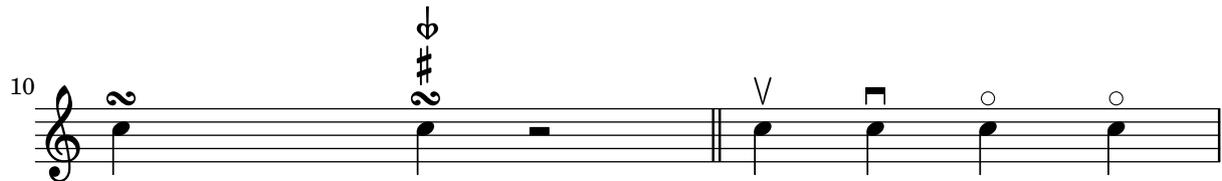
#### MusicXML notations (attached to note)

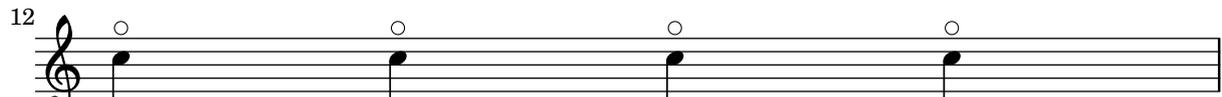
1. ferm. normal ferm. angled ferm. square ferm.

inv.ferm. arp. non-arp. acc.mark acc. str.-acc. stacc. ten.

det.-leg. stacc.ss spicc. scoop plop doit falloff breath caes. stress unstr.

tr. turn del.turn inv.turn shake wavy wavyline mord. inv.mord. schl. trem.

10    
 turn+acc. turn+acc.(ab.+bel./rel to turn) up-b. down-b. harm. nat.harm.

12    
 art.harm. nat.h./base nat.h./touching nat.h./sounding

13    
 open-str. thumb-pos. empty fing. fing.1 fing.2 fing.3 fing.4 fing.5

15    
 something  
 fing.sth. mult.fing. empty pluck pluck a dbl.tng. trpl.tng. stopped snp.pizz.

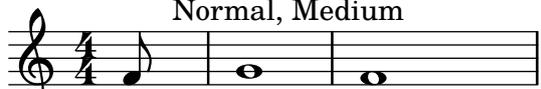
17    
 empty fret fret0 empty str. str. 5 hammer - on pull - off

19    
 bend b.3 with-bar pre-b. -0.5 b. release 3.5 tap tap T heel toe

21    
 fingern. **f** *ppp* *sfp* *sffz*  
 f ppp sfp Oth.dyn. both above ab./bel./bel.

Text markup: different font sizes, weights and colors.

32b-Articulations-Texts.xml

Normal, Small  
 Normal, Large  
 Normal, Medium  
  
 Bold, Medium  
 Bold, Large

It should not make any difference whether two articulations are given inside two different notation elements, inside two different articulations children of the same notation element or

inside the same articulations element. Thus, all three notes should have a staccato and an accent.

32c-MultipleNotationChildren.xml



Different Arpeggio directions (normal, up, down, non-arpeggiate)

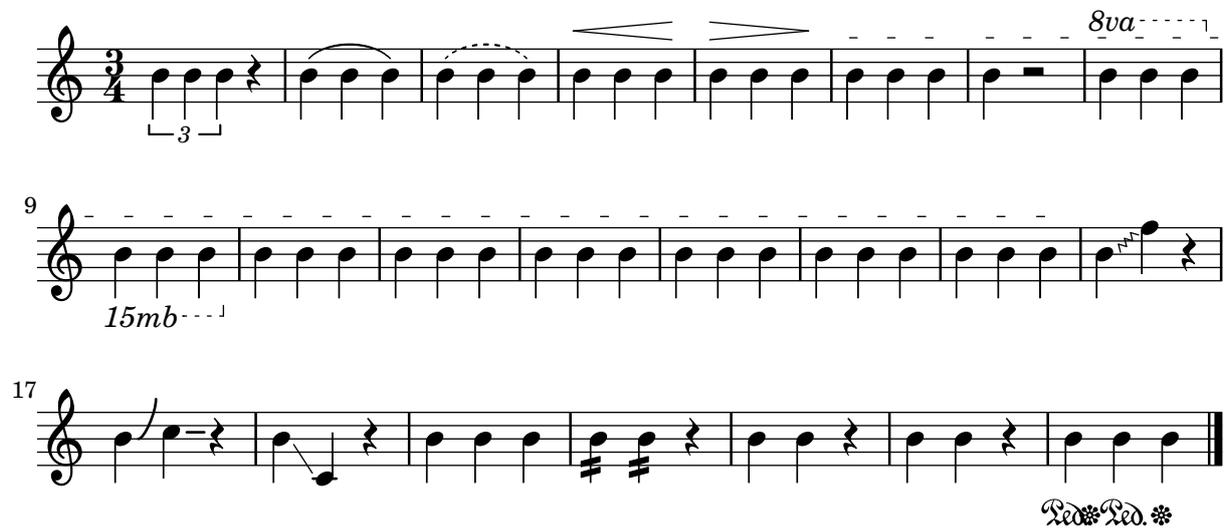
32d-Arpeggio.xml



### 33 ... Spanners

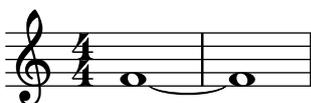
Several spanners defined in MusicXML: tuplet, slur (solid, dashed), tie, wedge (cresc, dim), tr + wavy-line, single-note trill spanner, octave-shift (8va,15mb), bracket (solid down/down, dashed down/down, solid none/down, dashed none/up, solid none/none), dashes, glissando (wavy), bend-alter, slide (solid), grouping, two-note tremolo, hammer-on, pull-off, pedal (down, change, up).

33a-Spanners.xml



Two simple tied whole notes

33b-Spanners-Tie.xml



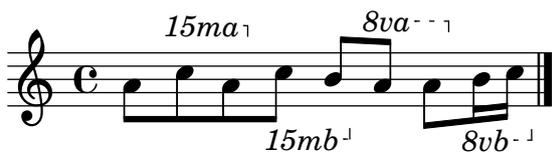
A note can be the end of one slur and the start of a new slur. Also, in MusicXML, nested slurs are possible like in the second measure where one slur goes over all four notes, and another slur goes from the second to the third note.

33c-Spanners-Slurs.xml



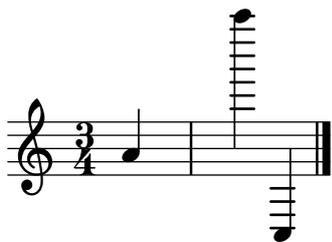
All types of octave shifts (15ma, 15mb, 8va, 8vb)

33d-Spanners-OctaveShifts.xml



Invalid octave-shifts: 27 down, 11 up.

33e-Spanners-OctaveShifts-InvalidSize.xml



A trill spanner that spans a grace note and ends on an after-grace note at the end of the measure.

33f-Trill-EndingOnGraceNote.xml



Slurs on chorded notes: Only the first note of the chord should get the slur notation. Some applications print out the slur for all notes – these should be ignored.

33g-Slur-ChordedNotes.xml

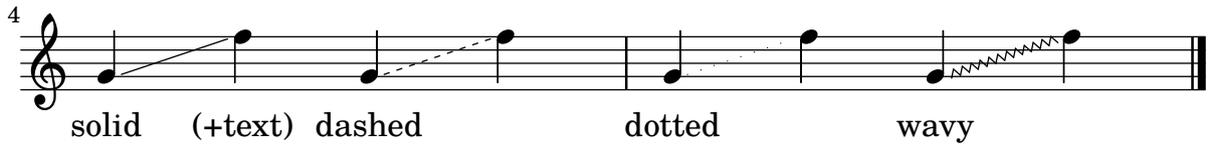


All different types of glissando defined in MusicXML

33h-Spanners-Glissando.xml

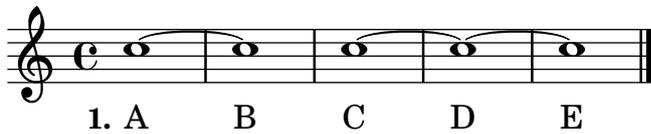


1. normal glissando solid (+text) dashed dotted wavy normal slide



Several ties that have their end tag missing.

33i-Ties-NotEnded.xml



## 41 ... Multiple parts (staves)

A piece with four parts (P0, P1, P2, P3; different from what Finale creates!). Are they converted in the correct order?

41a-MultiParts-Partorder.xml



A piece with 20 parts to check whether an application supports that many parts and whether they are correctly sorted.

P0  
P1  
P2  
P3  
P4  
P5  
P6  
P7  
P8  
P9  
P10  
P11  
P12  
P13  
P14  
P15  
P16  
P17  
P18  
P19

A huge orchestra score with 28 parts and different kinds of nested bracketed groups. Each part/group is assigned a name and an abbreviation to be shown before the staff. Also, most of the groups show unbroken barlines, while the barlines are broken between the groups.

The image shows a musical score for a full orchestra. The instruments are listed on the left, and their corresponding staves are on the right. The staves are grouped into two main sections: woodwinds and brass/strings. The woodwind section includes Piccolo, Flute 1, Flute 2, Oboe, English Horn, Bassoon 1, Bassoon 2, and Contrabassoon. The brass section includes Horn in F 1, Horn in F 2, Trumpet in C 1, Trumpet in C 2, Trombone 1, Trombone 2, and Tuba. The string section includes Timpani, Percussion, Harp, Piano, Violin I, Violin II, Viola, Cello, and Contrabass. The score is written in a single system with a common time signature. The woodwind and brass parts are written in treble clef, while the string parts are written in bass clef. The percussion parts are written in a simplified notation. The woodwind and brass parts are grouped together with a square bracket, and the string parts are grouped together with a curly bracket.

Piccolo  
Flute 1  
Flute 2  
Oboe  
English Horn  
Bassoon 1  
Bassoon 2  
Contrabassoon  
Horn in F 1  
Horn in F 2  
Trumpet in C 1  
Trumpet in C 2  
Trombone 1  
Trombone 2  
Tuba  
Timpani  
Percussion  
Harp  
Piano  
Violin I  
Violin II  
Viola  
Cello  
Contrabass

Two properly nested part groups: One group (with a square bracket) goes from staff 2 to 4) and another group (with a curly bracket) goes from staff 3 to 4.

41d-StaffGroups-Nested.xml

A musical score consisting of five staves. The first staff is a single treble clef staff. The second, third, and fourth staves are grouped together by a large left-facing curly bracket on the left side. The fifth staff is a single treble clef staff. Each staff contains three measures of music in common time (C), with a whole note in the first measure and a whole rest in the second and third measures.

Part names and abbreviations can contain line breaks.

41e-StaffGroups-InstrumentNames-Linebroken.xml

A musical staff with a treble clef and common time signature. The staff contains five measures, each with a whole note. To the left of the staff, the text "Long Staff Name" is written vertically, with a line extending from the "S" of "Staff" across the entire length of the staff.

A musical staff with a treble clef and common time signature. The staff contains eight measures, each with a whole note. To the left of the staff, the text "St. Nm." is written vertically. A superscripted number "6" is positioned above the first measure.

A musical staff with a treble clef and common time signature. The staff contains eight measures, each with a whole note, followed by a whole rest in the final measure. To the left of the staff, the text "St. Nm." is written vertically. A superscripted number "15" is positioned above the first measure.

MusicXML allows for overlapping part-groups, while many applications do not allow overlapping groups, but require them to be properly nested. In this case, one group (within parenthesis) goes from staff 1 to 4 and another group (also within parenthesis) goes from staff 3 to 5.

41f-StaffGroups-Overlapping.xml

The image shows a musical score with five staves. The first two staves are grouped together with a bracket labeled "Group 1". The next two staves are grouped together with a bracket labeled "Group 2". The fifth staff is not grouped. Each staff contains a single note (a quarter note) followed by a rest. The notes are positioned such that the groups overlap: Group 1 covers the first two staves, Group 2 covers the second and third staves, and the fifth staff is separate.

A part with no id attribute. Since this piece has only one part, it is clear which part is described by the one part element.

41g-PartNoId.xml

This piece has more part elements than the part-list section gives. One can either convert all the parts present, but not listed in the part-list, or simply not import / ignore them.

41h-TooManyParts.xml

The image shows a single musical staff with a treble clef, a common time signature (C), a single note (a quarter note), and a rest.

MusicXML allows part-name and part-name-display in the score-part element. If part-name-display is given, it overrides the part-name for display.

The first staff uses only part-name, while the second one (same part-name) overrides it with a custom text. Similar for the part-abbreviation used in subsequent staves.

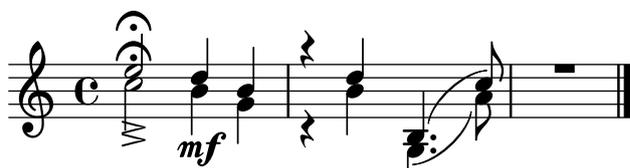
41i-PartNameDisplay-Override.xml

The image shows four musical staves. The first staff is labeled "Part name" and contains a treble clef, a common time signature (C), and a single note (a quarter note). The second staff is labeled "Overridden Part Name" and contains a treble clef, a common time signature (C), and a single note (a quarter note). The third staff is labeled "abbrv." and contains a treble clef, a common time signature (C), and a single note (a quarter note). The fourth staff is labeled "Overrr.abbrv." and contains a treble clef, a common time signature (C), and a single note (a quarter note). The notes are positioned such that the staves are vertically aligned.

## 42 ... Multiple voices per staff

Two voices share one staff. Each voice is assigned some lyrics.

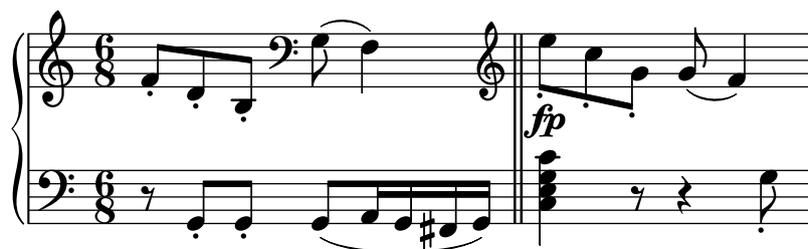
42a-MultiVoice-TwoVoicesOnStaff-Lyrics.xml



1. This is the lyrics of Voice1  
1. This is the lyrics of Voice2

A multi-voice / multi-staff part with a clef change in the middle of a measure and a <backward> for voice 2 jumping back beyond that clef change.

42b-MultiVoice-MidMeasureClefChange.xml

Musical notation for a multi-voice part with a mid-measure clef change. The piece is in 6/8 time. The first voice (Voice 1) starts with a quarter note G4, followed by a quarter note A4, and a quarter note B4. The second voice (Voice 2) starts with a quarter note G3, followed by a quarter note A3, and a quarter note B3. In the middle of the measure, the second voice changes clef from bass to treble. The dynamics are marked as *fp*.

## 43 ... One part on multiple staves

A simple piano staff

43a-PianoStaff.xml

Musical notation for a piano staff with different keys and clefs for each staff. The piece is in 4/4 time. The first staff is in treble clef with a key signature of one sharp (F#). The second staff is in bass clef with a key signature of one sharp (F#). Both staves have a whole note G4.

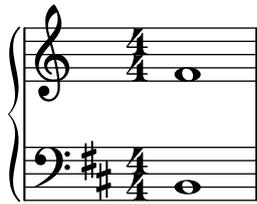
A piano staff with different keys and clefs for each of its staves. The keys and clefs for both staves are given at the very beginning of the measure.

43b-MultiStaff-DifferentKeys.xml

Musical notation for a piano staff with different keys and clefs for each staff. The piece is in 4/4 time. The first staff is in treble clef with a key signature of one sharp (F#). The second staff is in bass clef with a key signature of two sharps (F# and C#). Both staves have a whole note G4.

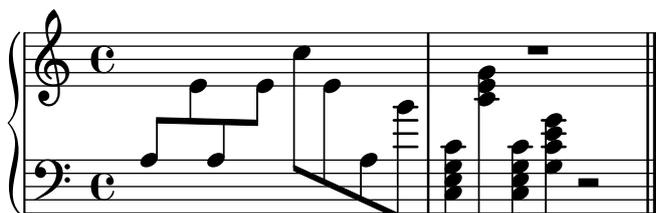
A piano staff with different keys and clefs for each of its staves. The key and clef for the second staff is given only after a backward, just before the first note of the second staff is given, but after the whole measure for staff 1 has been given.

43c-MultiStaff-DifferentKeysAfterBackup.xml



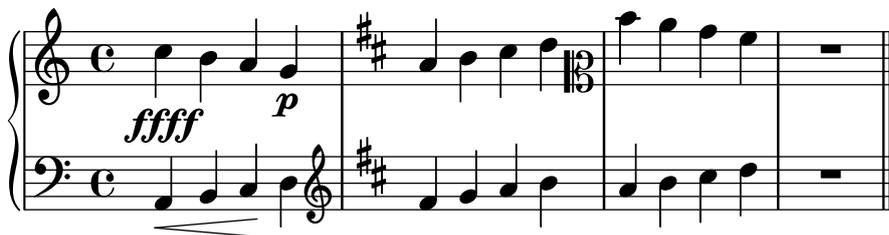
Staff changes in a piano staff. The voice from the second staff has some notes/chords on the first staff. The final two chords have some notes on the first, some on the second staff.

43d-MultiStaff-StaffChange.xml



A piano staff with dynamics and clef changes, where each element (ffff, wedge and clef changes) applies only to one voice or one staff, respectively.

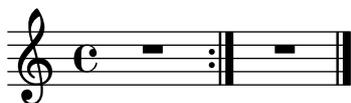
43e-Multistaff-ClefDynamics.xml



## 45 ... Repeats

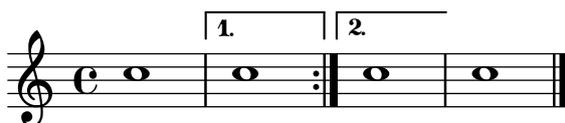
A simple, repeated measure (repeated 5 times)

45a-SimpleRepeat.xml



A simple repeat with two alternative endings (volta brackets).

45b-RepeatWithAlternatives.xml



Repeats can also be nested.

45c-RepeatMultipleTimes.xml



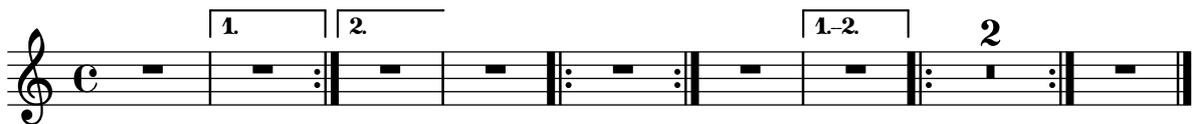
Nested repeats, each with alternative endings.

45d-Repeats-Nested-Alternatives.xml



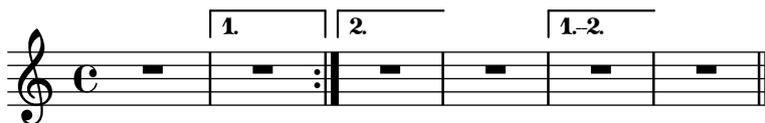
Some more nested repeats with alternatives. The barline between measure 7 and 8 will probably be messed up! (Should be a repeat on both sides!)

45e-Repeats-Nested-Alternatives.xml



Some more nested repeats with alternatives, where the MusicXML file does not make sense in the first place. How well are applications able to cope with improper repeats and alternatives?

45f-Repeats-InvalidEndings.xml



A forward-repeating bar line without an ending repeat bar.

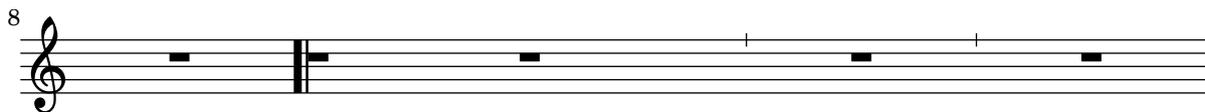
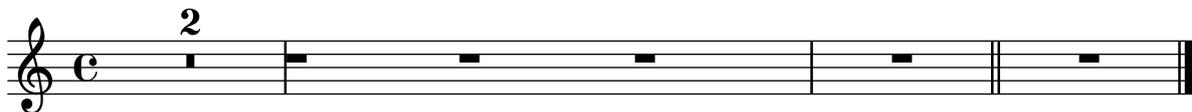
45g-Repeats-NotEnded.xml



## 46 ... Barlines, Measures

Different types of (non-repeat) barlines: default (no setting), regular, dotted, dashed, heavy, light-light, light-heavy, heavy-light, heavy-heavy, tick, short, none.

46a-Barlines.xml



Barlines can appear at mid-measure positions, without using an implicit measure!

46b-MidmeasureBarline.xml



A clef change in the middle of a measure, using either an implicit measure or simply placing the attributes in the middle of the measure.

46c-Midmeasure-Clef.xml



A 3/8 pickup measure, a measure that is split into one (incomplete, only 2/4) measure and an implicit measure, and an incomplete measure (containing 3/4).

46d-PickupMeasure-ImplicitMeasures.xml



Voice 2 should start at 2nd beat of first full measure.

46e-PickupMeasure-SecondVoiceStartsLater.xml



Measures can contain less notes than the time signature says. Here, the first and third measures contain only two quarters instead of four.

46f-IncompleteMeasures.xml



Pickup measure with chord names and figured bass.

46g-PickupMeasure-Chordnames-FiguredBass.xml



## 51 ... Header information

Several header fields and part names can contain quotes (" ). This test checks whether they are converted/imported without problems (i.e. whether they are correctly escaped when converting).

51b-Header-Quotes.xml

## " Quotes" in header fields

Some " Tester" Name



There can be multiple <rights> tags in the identification element of the score. The conversion shall still work, ideally using both of them.

51c-MultipleRights.xml



A piece with an empty (but existing) work-title, but a non-empty movement-title. In this case the movement-title should be chosen, even though the work-title exists.

51d-EmptyTitle.xml

## Empty work-title, non-empty movement-title

### Empty work-title, non-empty movement-title



## 52 ... Page layout

Several page layout settings: paper size, margins, system margins and distances, different fonts, etc.

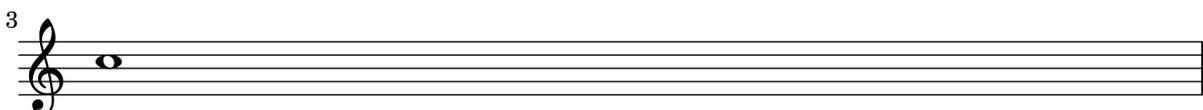
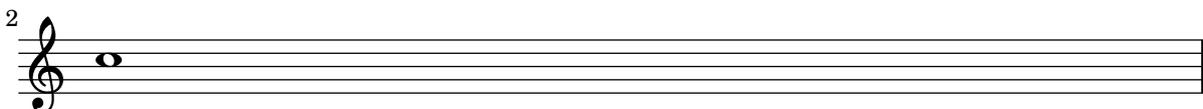
52a-PageLayout.xml

### Layout options



System and page breaks, given in a <print> element

52b-Breaks.xml



## 61 ... Lyrics

Some notes with simple lyrics: Syllables, notes without a syllable, syllable spanners.

61a-Lyrics.xml



1. Trala-li Ja! Tra - ra! Bah!

Multiple (simple) lyrics. The order of the exported stanzas is relevant (identified by the number attribute in this test case)

61b-MultipleLyrics.xml



1. 1.Tra-la-la, ja! — Tra-ra...
2. 2.tra-la-la, ja! — Tra-ra.
3. 3.TRALALA, JA! — TRA-RA...

Lyrics assigned to the voices of a piano staff containing two simple staves. Each staff is assigned exactly one lyrics line.

61c-Lyrics-Pianostaff.xml



1. TRALALI JA! \_

How to treat lyrics and slurred notes. Normally, a slurred group of notes is assigned only one lyrics syllable.

61d-Lyrics-Melisma.xml



1. Me - lis - ma. \_

Assigning lyrics to chorded notes.

61e-Lyrics-Chords.xml



1. Lyrics on chords

Grace notes shall not mess up the lyrics, and they shall not be assigned a syllable.

61f-Lyrics-GracedNotes.xml



1. Ly - rics on notes \_

The image shows a musical staff in treble clef with a common time signature (C). It contains a sequence of notes: a quarter note, a quarter note with a grace note, a quarter note, and a quarter note. The lyrics "1. Ly - rics on notes \_" are aligned with the notes.

A lyrics syllable can have both a number and a name attribute. The question is: What should be used to put syllables of the same voice together. This example uses different number/name combinations to check how different applications handle this unspecified case (The advice on the MusicXML mailing list was "there is no correct way, each application can do what it thinks is best").

61g-Lyrics-NameNumber.xml



1. Verse1AChorus1AAnotherChorus1A1BVerse1CChorus1D  
2. Chorus1A - 2B - Chorus2C  
3. VerseE  
4. NoneF

The image shows a musical staff in treble clef with a 6/4 time signature. It contains a sequence of six quarter notes. The lyrics are listed below the staff, with some syllables aligned with the notes.

Beaming or slurs can indicate melismata for lyrics. Also make sure that notes without an explicit syllable are treated as if they were part of a melisma.

61h-Lyrics-BeamsMelismata.xml



1. Me - lisma \_ Me - lisma \_ Me - lisma \_ Me - lisma \_

The image shows a musical staff in treble clef with a common time signature (C). It contains a sequence of notes with beams and slurs. The lyrics "1. Me - lisma \_ Me - lisma \_ Me - lisma \_ Me - lisma \_" are aligned with the notes.

Each note of a chord can have some lyrics attached. In this case, each note of the chord has lyrics of the form "Lyrics [123]" attached, where each lyrics has a different number attribute to distinguish them. These syllables should be imported into three different stanzas and the timing should be correct.

61i-Lyrics-Chords.xml



1. Lyrics 1  
2.  
3.

The image shows a musical staff in treble clef with a common time signature (C). It contains a single chord represented by a vertical line with a dot on each staff line. The lyrics "1. Lyrics 1", "2.", and "3." are listed below the staff.

Multiple lyrics syllables assigned to a single note are implemented either using a space in the lyrics or by using the <elision> lyrics element. This testcase checks both of them. First, a note with one syllable is given, then a note with two syllables separated by a space and finally a note with two and one with three syllables implemented using <elision> is given.

61j-Lyrics-Elisions.xml



1. a b c d e f g h

The image shows a musical staff in treble clef with a common time signature (C). It contains a sequence of eight quarter notes. The lyrics "1. a b c d e f g h" are aligned with the notes.

Lyrics spanners: continued syllables and extenders, possibly spanning multiple notes. The intermediate notes do not have any <lyric> element.

61k-Lyrics-SpannersExtenders.xml

A musical staff in treble clef with a common time signature (C). The melody consists of quarter notes: A4, B4, C5, C5, D5, E5, F5, G5, A5, B5, C6. Below the staff, the lyrics are: 1. A \_ b - CC \_ e \_ \_ \_ . The notes A, B, and C are underlined, and there is a hyphen under B. The final note C is underlined.

## 71 ... Guitar notation

A normal staff with several (complex) chord names displayed.

71a-Chordnames.xml

A musical staff in treble clef with a common time signature (C). The melody consists of quarter notes: A4, B4, C5, C5, D5, E5, F5, G5, A5, B5, C6. Above the staff, the following chord names are written: C, C<sup>lyd</sup>, B<sup>7</sup> #5 #9, E<sup>b</sup> <sup>sus2</sup>, G, D<sup>#</sup>, A<sup>o7</sup>, A<sup>#5</sup>.

A staff with chord names and some fretboards shown. The fretboards can have an arbitrary number of frets/strings, can start at an arbitrary fret and can even contain fingering information.

71c-ChordsFrets.xml

A musical staff in treble clef with a common time signature (C). The melody consists of quarter notes: A4, B4, C5, C5, D5, E5, F5, G5, A5, B5, C6. Above the staff, the following chord names are written: C, C<sup>lyd</sup>, B<sup>7</sup> #5 #9, E<sup>b</sup> <sup>sus2</sup>, G, D<sup>#</sup>, A<sup>o7</sup>, C. Below the staff, several fretboard diagrams are shown, each corresponding to a chord name. The diagrams show the fretting pattern for each chord, including fingering information (i, ii, xi, iii, iv) and string muting (x).

Chords and fretboards assigned to the voices in a multi-voice, multi-staff part. There should be fret diagrams above each of the two staves.

71d-ChordsFrets-Multistaff.xml

A multi-staff musical score in common time (C). The top staff is in treble clef and the bottom staff is in bass clef. The melody in the top staff consists of quarter notes: A4, B4, C5, C5, D5, E5, F5, G5, A5, B5, C6. Above the top staff, the following chord names are written: E<sup>b</sup> m<sup>9</sup>, C, D<sup>7</sup>, C m<sup>7</sup> 11. Below the top staff, several fretboard diagrams are shown, each corresponding to a chord name. The diagrams show the fretting pattern for each chord, including fingering information (iv) and string muting (x). The bottom staff shows a bass line with quarter notes: A3, B3, C4, C4, D4, E4, F4, G4, A4, B4, C5.

Some tablature staves, with explicit fingering information and different string tunings given in the MusicXML file.

71e-TabStaves.xml

The image displays a musical score for five instruments: four Guitars and one Bass Guitar. Each instrument is represented by two staves, labeled 'A' and 'B'. The notation is a mix of standard musical notation (treble clef, notes) and guitar-specific notation (fret numbers, bar lines). The first measure of each instrument shows complex fretting patterns, while the second measure shows simpler patterns, often with '0' for open strings. The instruments are arranged vertically from top to bottom: Guitar, Guitar, Guitar, Guitar, Bass Guitar, Banjo, Lute, and Ukulele.

All chord types defined in MusicXML. The staff will only contain one c' note (NO chord) for all of them, but the chord names should be properly printed.

71f-AllChordTypes.xml

## All MusicXML chord names/types with <root>

The image shows a musical staff with a treble clef and a common time signature. The staff contains eight notes, each representing a different chord type. The chord names are printed below the notes. The notes are placed on the first line of the staff, which corresponds to the C4 note.

1. major: C

minor: C

augmented: C<sup>#5</sup>

diminished: C<sup>b5</sup>

2. dominant: C<sup>7</sup>

major-seventh: C<sup>△</sup>

minor-seventh: Cm<sup>7</sup>

diminished-seventh: C<sup>o7</sup>

3  $C^{7\#5}$   $C^{7\flat5}$   $Cm^{\Delta}$   $C^6$   
 augmented-seventh half-diminished major-minor major-sixth

4  $Cm^6$   $C^9$   $C^{\Delta 9}$   $Cm^9$   
 minor-sixth dominant-ninth major-ninth minor-ninth

5  $C^{11}$   $C^{\Delta 11}$   $Cm^{11}$   $C^{13}$   
 dominant-11th major-11th minor-11th dominant-13th

6  $C^{\Delta 13}$   $Cm^{13}$   $C^{sus2}$   $C^{sus4}$   
 major-13th minor-13th suspended-second suspended-fourth

7  $C^5$   $C$   
 Neapolitan Italians French German pedal power Tristan other

9  $F^{\#5}$   $F^{\flat5}/C$   $G^{\#5}/D^{\#}$   $C^5$   $C^{\flat5}$   $G^{sus\flat2}$   
 Inversion  $F^{\flat\flat}/C$   $G^{\#}/D^{\#}$   $C$   $C-3+5b$

There can be multiple subsequent harmony elements, indicating a harmony change during a note

71g-MultipleChordnames.xml

$C$   $F^{\#m6}$   $Dm^7$   $G^7$

## 72 ... Transposing instruments

Transposing instruments: Trumpet in B $\flat$ , Horn in E $\flat$ , Piano; All of them show the C major scale (the trumpet with 2 sharp, the horn with 3 sharp).

72a-TransposingInstruments.xml

The image shows a musical score with three staves. The top staff is labeled 'Trumpet in Bb' and has a key signature of two sharps (F# and C#) and a common time signature (C). The middle staff is labeled 'Horn in Eb' and has a key signature of three sharps (F#, C#, and G#) and a common time signature (C). The bottom staff is labeled 'Piano' and has a common time signature (C). All three staves contain a sequence of notes: a quarter note on the first line (C), followed by quarter notes on the second line (D), second space (E), third space (F), and third line (G), and finally a quarter note on the fourth line (A). The notes are written in a way that illustrates transposition: the Trumpet part starts on C4, the Horn part starts on C5, and the Piano part starts on C4.

Various transposition. Each part plays a  $c''$ , just displayed in different display pitches. The second-to-last staff uses a transposition where the displayed  $c'$  is an actual  $f'''$  concert pitch. The final staff is an untransposed instrument.

72b-TransposingInstruments-Full.xml

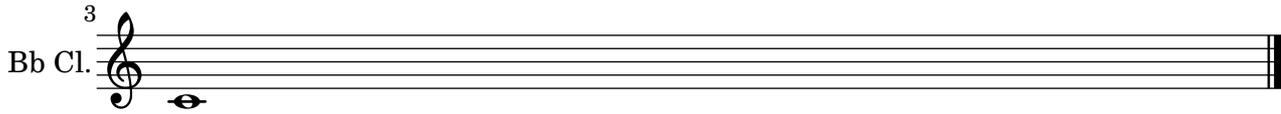
The image shows a musical score for ten different instruments, each on a separate staff. The instruments and their key signatures are: Clarinet in Eb (three sharps), Clarinet in Bb (two sharps), Clarinet in A (one flat), Horn in F (two sharps), Horn in Eb (three sharps), Piccolo Trumpet in A (one flat), Trumpet in Bb (two sharps), Trumpet in C (one sharp), Trumpet in D (one flat), and displayed c'=fis''' (four sharps). Each staff contains a single note on a whole rest, indicating a sustained pitch. The notes are positioned on the staff lines to represent the specific transposition for each instrument.

An instrument change from one transposition (Clarinet in Eb) to another transposing instrument (Clarinet in Bb). The displayed instrument name should also be updated.

The whole piece is in Bb major (sounding), so first the key signature should be one flat, after the change it should have no accidentals.

72c-TransposingInstruments-Change.xml

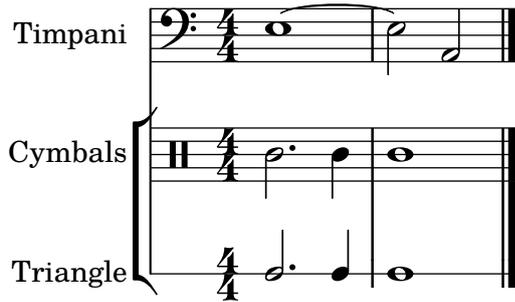
The image shows a musical score for a Clarinet in Eb. The staff is divided into two measures. The first measure has a key signature of one sharp (F#) and a whole note on the second line of the staff. The second measure has a key signature of no accidentals and a whole note on the second line of the staff. This illustrates the change in key signature required for the instrument change.



### 73 ... Percussion

Three types of percussion staves: A five-line staff with bass clef for Timpani, a five-line staff with percussion clef, and a one-line percussion staff with only unpitched notes.

73a-Percussion.xml



### 74 ... Figured bass

Some figured bass containing altered figures, bracketed figures and slashed figures. The last note contains an empty <figured-bass> element, which is invalid MusicXML, to check how well applications cope with malformed files.

Note that this file does not contain any extenders!

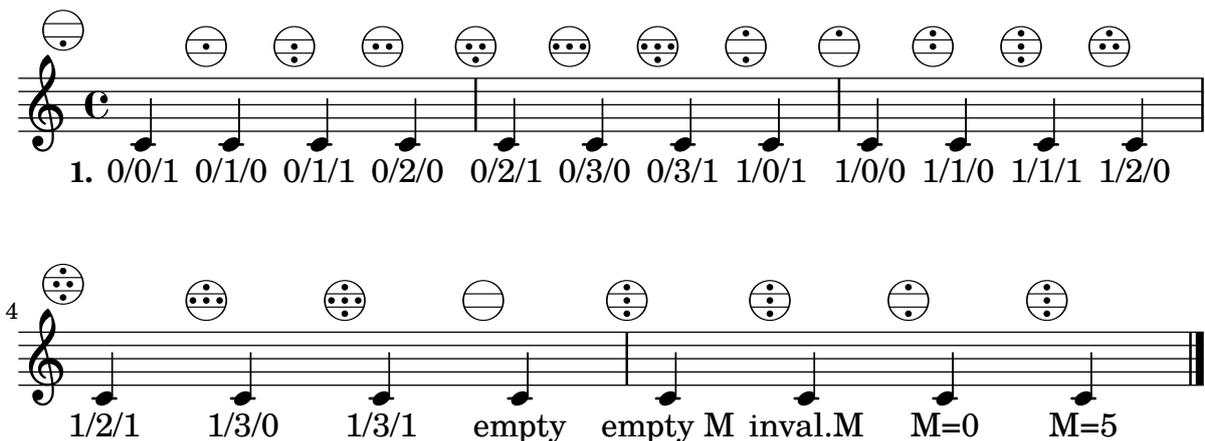
74a-FiguredBass.xml



### 75 ... Other instrumental notation

All possible accordion registrations.

75a-AccordionRegistrations.xml



## 90 ... Compressed MusicXML files

A compressed MusicXML file, containing a simple MusicXML score and the corresponding .pdf output for reference.

90a-Compressed-MusicXML.mxl

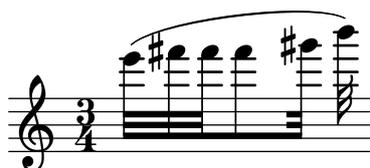
### Compressed MusicXML file



## 99 ... Compatibility with broken MusicXML

Dolet 3 for Sibelius (5.1) did not print out any closing beam tags, only starting and continuing beam tags. For such files, one either needs to ignore all beaming information or close all beams

99a-Sibelius5-IgnoreBeaming.xml



If we properly ignore all beaming information from the Dolet 3 for Sibelius export file, make sure that the lyrics syllables are still assigned to the correct notes.

99b-Lyrics-BeamsMelismata-IgnoreBeams.xml



1. Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_

A musical staff in treble clef with a common time signature (C). The melody consists of a series of eighth notes beamed together, followed by a quarter note. The lyrics are '1. Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_'.