



Da Capo

Research Document

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Example Simple Guitar Tab

<https://www.wikihow.com/Read-Guitar-Tabs>

<https://tabs.ultimate-guitar.com/tab/led-zeppelin/stairway-to-heaven-tabs-9488>

Tab Name: Stairway to Heaven (Intro) - Led Zeppelin

Key: A Minor

Time Signature: 4/4

```
E|-----5-7-----7-|-8-----8-2-----2-|-0-----0-----|-----|
B|-----5-----5-----|---5-----3-----|---1---1-----1---|-0-1-1-----|
G|---5-----5-----|---5-----2-----|---2-----2-----|-0-2-2---2-----|
D|-7-----6-----|-5-----4-----|-3-----|-----|
A|-----|-----|-----|-2-0-0---0---/8-7-|
E|-----|-----|-----|-----|
```

Recognizing Notes

The base notes for Strings are as follows: E2, A2, D3, G3, B3, E4 (from bottom line to top)

Numbers along a string represent how many **semi-tones** a note is above the base note.

Semi-tones are as follows:

C > C#/Db > D > D#/Eb > E > F > F#/Gb > G > G#/Ab > A > A#/Bb > B > Loops back to C

C# is noted as C sharp and Db is noted as D flat. C#/Db means that this note may be C# or Db, depending on the key of the music. The key in this particular example is A minor, which will have F# and G# instead of Gb and Ab (generally). When you step up to C, the numerical value increases as well. For example, a semi-tone up from B4 is C5.

```
E|-----5-7-----7-|-8-----8-2-----2-|-0-----0-----|-----|
B|-----5-----5-----|---5-----3-----|---1---1-----1---|-0-1-1-----|
G|---5-----5-----|---5-----2-----|---2-----2-----|-0-2-2---2-----|
D|-7-----6-----|-5-----4-----|-3-----|-----|
A|-----|-----|-----|-2-0-0---0---/8-7-|
E|-----|-----|-----|-----|
```

Translated notes are as follows (each line is a measure, which is the space in the tab between the vertical bar lines "|"; N1+N2 means chord):

A3	C4	E4	A4	G#3+B4	E4	C4	B4
G3+C5	E4	C4	C5	F#3+F#4	D4	A3	F#4
F3+E4	C4	A3	C4		E4	C4	A3
B2+G3+B3	A2+A3+C4	A2+A3+C4		A2+A3		F3	E3

IMPORTANT: Music for the guitar is written in the treble clef, but actually “sounds” one octave lower. That means the numerical values for the translated notes will have to be raised by 1! (Setting the base notes to be one numerical value higher at the start works too!)

That means the “transposed” translation of the above tab is as follows:

A4	C5	E5	A5	G#4+B5	E5	C5	B5
G4+C6	E5	C5	C6	F#4+F#5	D5	A4	F#5
F4+E6	C5	A4	C5		E5	C5	A4
B3+G4+B4	A3+A5+C5	A3+A4+C5		A3+A4		F4	E4

Recognizing Note Length

The time signature of **4/4** signifies that this piece has a total length of **4 quarter notes per bar/measure** (generally). Remember, the start and end of a measure is signified by a vertical bar “|”. **Quarter notes (4th)** may be split into 2 **eighth notes (8th)**, and each eighth note may be split into 2 **sixteenth notes (16th)**.

Looking at the dashes in the tab, the first “-” in a measure is just for padding, to make it easier to read. Each “-” afterwards represents the value of a sixteenth note. (17 total in a measure, with 1 padding).

Music is read vertically (through time), and thus, the length of a note is determined by the number of dashes after the number, with no other number vertically aligned with those dashes.

For example, the first note, A3 would have a length of 2 sixteenth notes, which is an eighth note. We almost always want to represent each note using the “largest” length description. Therefore, priority is: quarter note > eighth note > sixteenth note.

All notes in a chord can have the same note length.

```

E | -----5-7-----7- | -8-----8-2-----2- | -0-----0----- | -----
B | -----5-----5----- | ---5-----3----- | ---1---1-----1--- | -0-1-1-----
G | ---5-----5--- | -----5-----2--- | -----2-----2- | -0-2-2---2-----
D | -7-----6----- | -5-----4----- | -3----- | -----
A | ----- | ----- | ----- | -2-0-0---0---/8-7-
E | ----- | ----- | ----- | -----

```

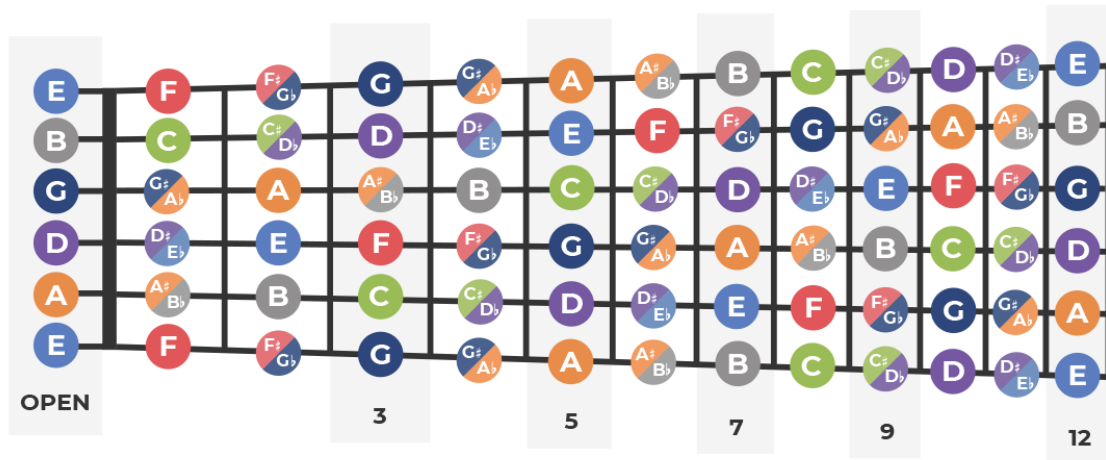
Translated Note Length are as follows (each line is a measure, 4th for quarter, 8th for eighth, 16th for sixteenth):

8th	8th	8th	8th	8th	8th	8th	8th
8th	8th	8th	8th	8th	8th	8th	8th
8th	8th	8th	4th		8th	8th	8th
8th	8th	4th		4th		8th	8th

Note: Two quarter notes is equal to a half note. Two half notes is equal to a whole note.

Guitar Fretboard Diagram

GUITAR FRETBOARD NOTES DIAGRAM



Recognizing Special Symbols

This example has one special symbol “/”, and can be found in the 4th measure.

This means that there will be a **slide up** to the note F3.

Special Symbol Reference

Symbol	Musical Meaning	MusicXML Translation
<p>“h” or “^” between lower to higher notes</p> <p>Ex. 7h9 or 7^9</p>	Hammer On	<p>First Note, under <technical>: <hammer-on type=”start”>H</hammer-on></p> <p>First Note, under <notations>: <slur type=”start”/></p> <p>Second Note, under <technical>: <hammer-on type=”stop”/></p> <p>Second Note, under <notations>: <slur type=”stop”/></p>
<p>“p” or “^” between higher to lower notes</p> <p>Ex. 9p7 or 9^7</p>	Pull Off	<p>First Note, under <technical>: <pull-off type=”start”>P</pull-off></p> <p>First Note, under <notations>: <slur type=”start”/></p> <p>Second Note, under <technical>: <pull-off type=”stop”/></p> <p>Second Note, under <notations>: <slur type=”stop”/></p>
<p>Combination of “h” or “p” between three or more notes</p> <p>Ex. 0h5p0</p>	Sequential Hammer Ons and Pull Offs	Same as above, except only slur start on first note and slur stop on last note.
<p>“b” between two notes</p> <p>Ex. 4b6</p>	Bend	<p>First Note, under <technical>: <bend> <bend-alter>n</bend-alter> </bend></p> <p>Where n is the number of semi-tones between the first and second notes.</p>
<p>“r” between two notes</p> <p>Ex. 6r4</p>	Release	<p>First Note, under <technical>: <bend> <bend-alter>-n</bend-alter> <release/> </bend></p> <p>Where n is the number of semi-tones between the first and second notes.</p>

"/" between two notes	Ascending Slide	First Note, under <notations>: <slide type="start"/> Second Note, under <notations>: <slide type="stop"/>
"\" between two notes	Descending Slide	First Note, under <notations>: <slide type="start"/> Second Note, under <notations>: <slide type="stop"/>
"/" before a note	Scoop	Note, under <notations>: <articulations> <scoop/> </articulations>
"s" between two notes	Legato Slide	First Note, under <notations>: <slide type="start"/> <slur type="start"/> Second Note, under <notations>: <slide type="stop"/> <slur type="stop"/>
"x" instead of a note	Muted Note	???
"t" between two notes	Tapping	Second Note, under <technical>: <tap/>
"<" and ">" around a note	Natural Harmonic	???
"[" and "]" around a note	Pinch Harmonic	???
"(" and ")" around a note	Tapped Harmonic	???

Example Simple Drum Tab

<https://www.wikihow.com/Read-Drum-Tabs>

<https://www.911tabs.com/link/?4672198>

<https://thoucandrum.com/drum-music/>

Tab Name: Smells Like Teen Spirit (Intro) - Nirvana

Time Signature: 4/4

```
C: | X----- | X----- | X----- | X----- |
HH: | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- |
S: | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- |
B: | o--o---o--o--o-- | o--o---o--o--o-- | o--o---o--o--o-- | o--o---o--o--o-- |
```

Recognizing Drum Parts and Hits

The parts of a drum-set that are used are signified to the left the start of each line. In this example, "C" represents the crash cymbal, "HH" the high-hat, "S" the snare drum, and "B" the bass drum.

Drums can be struck a number of different ways, with different symbols representing each.

"o" means a strike (normal hit)

"O" means accent (harder hit)

"g" means ghost (softer hit)

"f" means flam

"d" means double stroke

Cymbals and Hi-Hats can also be struck a number of different ways.

"x" means strike (normal hit)

"X" means hit hard cymbal or loose hi-hat

"o" means hit open hi-hat

"#" means choke (hitting the cymbal then grabbing it)

Drums have a Percussion Clef, which is treated the same as a Treble Clef, and each individual drum part has an unpitched note assigned to it. They are as follows (from highest to lowest):

Crash Cymbal:	A5
High Hat:	G5
Ride:	F5
Tom 1:	E5
Snare Drum:	C5
Tom 2:	A4
Bass Drum:	F4
High Hat with Foot:	D4

```

C: | X----- | X----- | X----- | X----- |
HH: | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- | ---o---o---o--- |
S: | ---o---o---o---o--- | ---o---o---o---o--- | ---o---o---o---o--- | ---o---o---o---o--- |
B: | o--o---o---o---o---o--- | o--o---o---o---o---o--- | o--o---o---o---o---o--- | o--o---o---o---o---o--- |

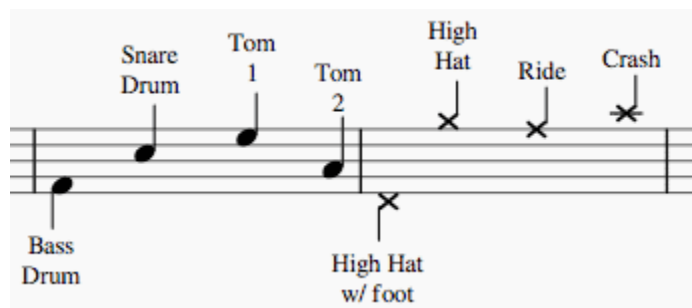
```

Translated hits as follows (<> indicates sixteenth beat):

F4+A5 <> <> <F4>	C5+G5 <> <> <C5>	F4+G5 <C5> <F4> <F4>	C5+G5 <> <F4> <>
F4+A5 <> <> <F4>	C5+G5 <> <> <C5>	F4+G5 <C5> <F4> <F4>	C5+G5 <> <F4> <>
F4+A5 <> <> <F4>	C5+G5 <> <> <C5>	F4+G5 <C5> <F4> <F4>	C5+G5 <> <F4> <>
F4+A5 <> <> <F4>	C5+G5 <> <> <C5>	F4+G5 <> <C5> <C5>	C5 <C5> <C5> <C5>

Stems and Noteheads (Drums)

On a staff of music, notes are represented by a combination of noteheads and stems.



Different noteheads are used to either help represent the duration of a note, denote a particular technique, or in this case, to distinguish between different parts in percussion. In the above diagram, you can see that the Bass Drum, Snare Drum, and Toms have **normal** noteheads, while the High Hats, Ride and Crash Cymbal have **x** noteheads.





















Stems are vertical lines to the right and down, or left and up, of a note head. They help make music easier to read (and in some cases, how it should be played). In this above diagram, you can see that the Bass Drum and High Hat with Foot have stems **down**, while the Snare Drum, Toms, High Hat, Ride, and Crash Cymbals have stems **up**.

Complex Note Lengths and Rests

In the previous section, we stated that two 16th notes is equal to an 8th note, and that two 8th notes are equal to a quarter note. However, what happens if there are three 16th notes or three 8th notes?



Notes and Rests - Notations

Name	Beats	Note	Rest
Whole Note	4		
Dotted Half Note	3		
Half Note	2		
Dotted Quarter Note	1 1/2		
Quarter Note	1		
Dotted 8 th Note	3/4		
8 th Note	1/2		
Dotted 16 th Note	3/8		
16 th Note	1/4		
32 nd Note	1/8		

Drum Hits Reference:

Symbol	Musical Meaning	MusicXML Translation
“o”	strike (normal hit)	N/A
“O”	accent (harder hit)	> above or below notehead (opposite of stem direction) (Work in progress)
“g”	ghost (softer hit)	() around notehead (Work in progress)
“d”	double stroke	???
“x”	strike (normal hit)	N/A
“X”	hit hard cymbal / loose hi-hat	???
“o”	hit open hi-hat	???
“#”	choke (hitting the cymbal then grabbing it)	???

Example Bass Guitar Tab

<https://www.studybass.com/lessons/reading-music/how-to-read-bass-tab/>

<https://tabs.ultimate-guitar.com/tab/the-white-stripes/seven-nation-army-bass-51486>

Tab Name: Seven Nation Army (Instrumental Chorus) - The White Stripes

Time Signature: 4/4

```
G|-----|-----|-----|-----|
D|-----|-----|-----|-----|
A|-7-----7-10--7--5-|-3-----2-----|-7-----7-10--7--5-|-3--5--3-2---0---|
E|-----|-----|-----|-----|
```

Recognizing Notes

The base notes for Strings are as follows: E1, A1, D2, G2 (from bottom line to top)

The numbers on the lines work exactly the same as a guitar.

Translated Notes are as follows (one line per measure):

E2		E2	G2 <> <> <E2>	<> <> D2
C2			B1	
E2		E2	G2 <> <> <E2>	<> <> D2
C2 <> <> <D2>	<> <> C2	B1		A1

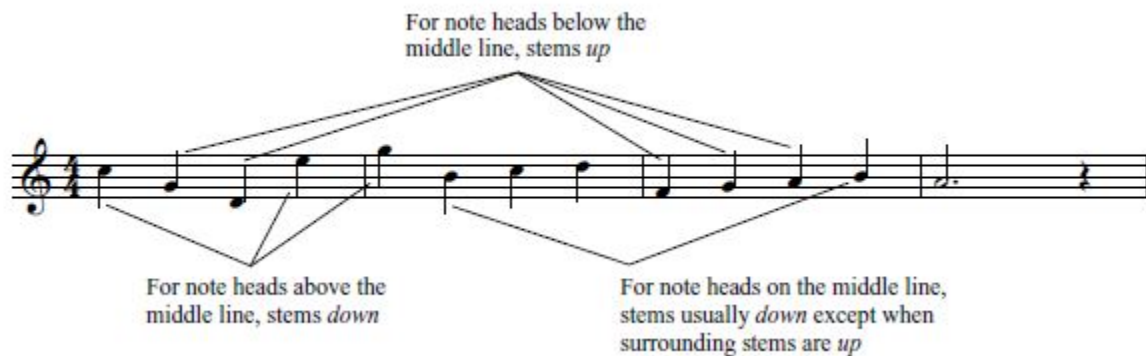
IMPORTANT: Music for the bass guitar is written in the bass clef, but actually “sounds” one octave lower. That means the numerical values for the translated notes will have to be raised by 1! (Setting the base notes to be one numerical value higher at the start works too!)

That means the “transposed” translation of the above tab is as follows:

E3		E3	G3 <> <> <E3>	<> <> D3
C3			B2	
E3		E3	G3 <> <> <E3>	<> <> D3
C3 <> <> <D3>	<> <> C3	B2		A2

Simple Note Stems for Pitched Instruments

Notes for pitched instruments have stems that are based around the center line in a staff of music. **The pitch of this center line is B4 in the treble clef, and D3 in the bass clef.**



In 4/4 time, the direction of the stems for quarter notes (and longer) can be determined by comparing them to the middle line, as shown in the above diagram. This is because there are 4 quarter notes (of note value) per measure, and so each quarter note represents a “beat” in the measure. However, stem direction becomes more complex when smaller note values (anything less than a beat) are involved.

Beams in 4/4 Time

Beams are music notations that connect together notes that have less length than a beat and helps the musician visually see where the beat is on the music. For example, in 4/4 time, the stems of two eighth notes can be connected together with a beam.

However, there are certain rules when it comes to using beams in 4/4 time.



As seen in the above diagram, beams should not cross over beats, even if there are eighth notes on either side of the beat. This is the same even if there are rests, which is shown below.



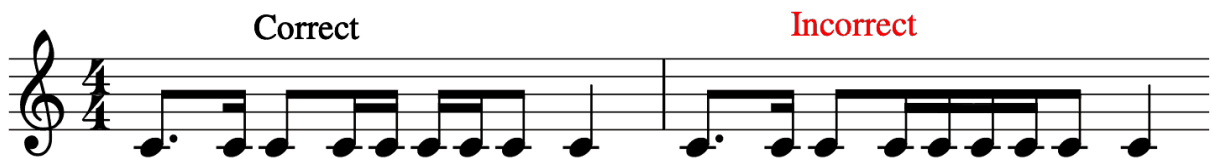
However, there is one exception to this rule. If the first and second beats, or the third and fourth beats consist entirely of eighth notes (4 total), then they are allowed to be beamed together. Note that 4 eighth notes are the same length as one half note, as this will be important later on.



One important thing to keep in mind though, is that beams should never go over the second and third beats (as shown in all above diagrams). Note that this represents going from an imaginary first half note of the measure, to an imaginary second half note in the measure.

This beaming concept carries over in a similar fashion for subdivisions less than an 8th note. For 16th notes, beaming should not carry over quarter notes (two subdivisions up from 16th), and for 32nd notes, beaming should not carry over 8th notes (two subdivisions up from 32nd).

More complex rhythm within a beat itself (such as a beat consisting of an eighth note and two 16th notes), can only have beams up to that beat. An example is shown below:



In the above diagram, the first beat consists of d8th+16th, second beat consists of 8th+two16ths, third beat consists of two 16ths+eighth, and the fourth beat consists of a single quarter note. Note how each beat is beamed separately, as they contain subdivisions smaller than an 8th note.

Complex Note Stems for Pitched Instruments

Stems for notes that are connected by a beam need to take in consideration the position of each note relative to the middle line in the staff. (Reminder: B4 in the treble clef and D3 in the bass clef). **The distance from the middle line is counted in semitones.**

Case 1: All notes are on the middle line.

All notes will be stemmed according to the original rules (found in the simple note stems section).

Case 2: Zero or more notes are on the middle line, while all other notes are above the middle line.

All notes will be stemmed down.

Case 3: Zero or more notes are on the middle line, while all other notes are below the middle line.

All notes will be stemmed up.

Case 4: Some notes are above the middle line, while some notes are below the middle line.

Case 4a: The max distance from the middle line by any note is the same from above and below.

Case 4a1: The majority of the notes are above the middle line.

All notes will be stemmed down.

Case 4a2: The majority of the notes are below the middle line.

All notes will be stemmed up.

Case 4a3: The number of notes above and below the middle line are the same.

All notes will be stemmed according to the original rules (found in the simple note stems section).

Case 4b: A note above the middle line has the max distance from the middle line.


All notes will be stemmed down.

Case 4c: A note below the middle line has the max distance from the middle line.

All notes will be stemmed up.

Case 4 Examples:

Stem Directions of Beamed Notes
Majority "wins"



The note further from middle line "wins"

The image displays two musical staves with beamed notes. The top staff is labeled 'Majority "wins"' and shows a sequence of notes where the majority are above the middle line; the stems for the first three notes are down, and the stems for the last three notes are up. The bottom staff is labeled 'The note further from middle line "wins"' and shows a sequence of notes where the note furthest from the middle line (the lowest note) determines the stem direction for all notes in the group, resulting in all stems being up.

Stems for Chords for Pitched Instruments

If a chord is not beamed, the stem direction will be by the same rules above, but only considering the notes within the chord itself.

If a chord is beamed, all of the chord's notes are taken into consideration for determining the stem direction for the whole group that shares the beam.

Simple and Compound Time Signatures

Time Signatures

Time signatures are musical notations that help musicians determine how many beats are in a measure, as well as the length of each beat. They are represented by a number on top of another or as number/number:



This is an example of **4/4 time**, and how it is represented on a staff.

Simple Time Signatures

Simple Time Signatures are time signatures with **2, 3, or 4** at the top (or to the left of the “/”). With these time signatures, the top number represents the number of **beats** in a measure, while the bottom number represents the length of each beat.

Some examples of simple time signatures are:

4/4 3/4 3/8 (rare) 2/2 (rare)

Compound Time Signatures

Compound Time Signatures are time signatures with **6, 9, or 12** at the top (or to the left of the “/”). With these time signatures, the top number represents the number of **divisions** in a bar, while the bottom number represents the length of each division. In Compound Time, **three divisions form a beat**, and thus, anything with a 6 on top will have 2 beats in a measure, 9 will have 3 beats in a measure, and 12 will have 4 beats in a measure.

Some examples of compound time signatures are:

6/8 9/8 9/4 (rare) 12/8 (rare)

Time Signature: Top Reference

Number	Musical Meaning	XML Translation
2 (rare)	Simple Time: 2 beats per measure	Under <time>: <beats> 2 </beats>
3	Simple Time: 3 beats per measure	Under <time>: <beats> 3 </beats>
4	Simple Time: 4 beats per measure	Under <time>: <beats> 4 </beats>
6	Compound Time: 6 divisions per measure, 2 beats per measure	Under <time>: <beats> 6 </beats>
9	Compound Time: 9 divisions per measure, 3 beats per measure	Under <time>: <beats> 9 </beats>
12 (rare)	Compound Time: 12 divisions per measure, 4 beats per measure	Under <time>: <beats> 12 </beats>

Time Signature: Bottom Reference

Number	Musical Meaning	XML Translation
2 (rare)	Each beat (simple) or each division (complex) has half-note length	Under <time>: <beat-type> 2 </beat-type>
4	Each beat (simple) or each division (complex) has quarter-note length	Under <time>: <beat-type> 4 </beat-type>
8	Each beat (simple) or each division (complex) has eighth-note length	Under <time>: <beat-type> 8 </beat-type>
16 (rare)	Each beat (simple) or each division (complex) has sixteenth-note length	Under <time>: <beat-type> 16 </beat-type>

Tabs and Time Signatures

Tabs are typically notated with dashes ("-"), each representing a 16th note in length. Thus, we can count the number of dashes in a measure and find the corresponding time signature.

```
E | -----0----- | -0----- |
B | -----0---0--- | -0----- |
G | -----1-----1- | -1----- |
D | -----2----- | -2----- |
A | ---2----- | -2----- |
E | -0----- | -0----- |
```

Taking a look at the example above, we can see that there is 1 dash for padding at the start of every measure, followed by 16 dashes. Looking at the Dash Number Reference Table (in the following section), we can see that 16 dashes correspond with the time signature 4/4.

Dash Number Reference

Number of “-”	Corresponding Time Signature (common only)
8	2/4
12	3/4 or 6/8 (make the user select?)
16	4/4
18	9/8

Time Signatures and Beams (work in progress)

Sample Text

MusicXML Tags

Tutorial Doc: <https://wpmedia.musicxml.com/wp-content/uploads/2017/12/musicxml-tutorial.pdf>

<part-list>

-list of parts in the score, represented by the child tag <score-part>

<score-part>

-a part in the score, represented by the child tag <part-name>

-id attribute: <score-part id=" _ ">, required id for the score part, convention is "P1", "P2", etc.

<part-name>

-name of the part in the score

<part>

-information regarding a certain instrument part in the piece, must share an id with an instrument in <score-part>

-id attribute: <part id=" _ ">, specifies which instrument id in <score-part>

<measure>

-a measure of the piece, represented by the child tags <attributes>, <note>, and <barline>

-number attribute: <measure number=" _ ">, represents the measure number

<attributes>

-information to interpret notes/musical data, represented by the child tags <divisions>, <key>, <time>, <clef>, and <staff-details>

<divisions>

-how many divisions exist in a quarter note, directly affecting the <duration> of <notes>

-ex. With a <division> of "2", an 8th note will have a <duration> of "1"

-important: should almost always be 4

<key>

-key signature of the piece, represented by the child tag <fifths>

<fifths>

-positive values represent number of sharps, while negative values represent number of flats, in the key signature of the piece

-ranges from [-7 to 7]

-ex. "0" means no sharps or flats

<time>

-time signature of the piece, represented by the child tags <beats> and <beat-type>

<beats>

- represents the number of beats in a measure
- common values are [2, 3, 4, 6, 9]
- ex. "4" means 4 beats in a measure

<beat-type>

- represents the length of each beat in a measure
- common values are [2, 4, 8]
- ex. "4" means each beat in the measure has a quarter note length

<clef>

- clef of the piece, represented by the child tags <sign> and <line>

<sign>

- represents the sign of the clef
- common values are [G for treble, F for bass, TAB for tab, percussion for drums]

<line>

- represents the line on which the the clef sign is placed
- ex. "2" means the clef sign will be placed on the 2nd line from the bottom of the staff

<staff-details>

- specifies the details of a tab staff, represented by the child tags <staff-lines> and <staff-tuning>

<staff-lines>

- total number of lines in a tab staff

<staff-tuning>

- specifies the tuning for each line in a tab staff, represented by the child tags <tuning-step>, <tuning-octave> and the required attribute "line"
- line attribute: <staff-tuning line="_">, ranging from "1" to total number of lines in the tab staff

<tuning-step>

- the "step" of the pitch for the tuning of the line
- ex. "E" means the the step of the pitch is an E

<tuning-octave>

- the "octave" of the pitch for the tuning of the line
- ex. "2" means that the octave of the pitch is 2

<note>

-represents a note in a measure, represented by the child tags <chord>, <pitch>, <duration>, <voice>, <type>, and <notations>

<chord>

- indicates that the current note should start at the same time as the previous note, forming a chord
- the first note in the chord shouldn't have the <chord> tag
- format: <chord/>

<pitch>

- indicates the pitch of the note, represented by the child tags <step>, <alter> and <octave>

<step>

- the "step" of the note
- valid values are: [A, B, C, D, E, F, G]
- ex. "B" means the step of the pitch is a B

<alter>

- if the note has a flat or a sharp, with "-1" representing a flat and "1" representing a sharp

<octave>

- the "octave" of the note
- valid values are: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
- ex. "3" means the octave of the pitch is a 3

<duration>

- a note's duration in terms of <divisions> per quarter notes
- ex. With a <division> of "4", a 16th note will have a <duration> of "1"

<voice>

- used to distinguish between different voices in the same instrument part
- ex. A drum set will have two voices, and so will use the voices "1" and "2"

<type>

- the type of note that will be notated on the staff
- ex. "eighth" means that the note will be notated as an 8th note

<notations>

- additional elements associated with a note, represented by the child tag <technical>

<technical>

- technical indications for instruments (ex. tablature for guitar)
- represented by child tags <string> and <fret>

<string>

- the string number (from the top) in the tablature
- ex. "4" means the 4th string down from the top (the D string in a standard guitar)

<fret>

- the fret number on the current <string> in the tablature
- ex. "2" means the 2nd fret on the <string>

<backup>

- used to move backwards within a measure, represented by the child tag <duration>
- usually used to coordinate multiple voices within a part

<duration>

- a positive number, in divisions (check <divisions>), of how much to move backwards within a measure
- ex. A duration of 16 (with divisions = 4) will allow movement to the start of the measure in 4/4 time, from the last note/rest in a measure.

<barline>

- information regarding alternative barlines, such as repeats/ends, represented by the attribute "location" and the child tag <bar-style>
- location attribute: <barline location="_">, valid values ["right", "left"]
 - "left" for forward repeat
 - "right" for backward repeat and final ending bar

<bar-style>

- the style of the alternative barline
- valid values: [heavy-light, light-heavy]
 - heavy-light for forward repeat
 - light-heavy for backward repeat and final ending bar

XML Hierarchy

Taken from Guitar MusicXML file

https://wiki.eecs.yorku.ca/course_archive/2020-21/W/2311/_media/exampleemajor.musicxml.txt

1. Score-partwise (version = ?)
 - a. Part-list
 - i. Score-part (id = ?)
 1. Part name
 - b. Part (id = ?)
 - i. Measure (number = ?)
 1. Attributes
 - a. Divisions
 - b. Key
 - i. Fifths
 - c. Time
 - i. Beats
 - ii. Beat-type
 - d. Clef
 - i.
 - ii. Sign
 - iii. Line
 - e. Staff-details
 - i. Staff lines
 - ii. Staff-tuning (line = ?)
 1. Tuning-step
 2. Tuning octave
 2. **Note**
 - a. Chord *{only for 2nd note onwards}*
 - b. **Pitch**
 - i. **Step**
 - ii. **Alter** *{only sometimes}*
 - iii. **Octave**
 - c. **Duration**
 - d. Voice
 - e. Type
 - f. Notations
 - i. Technical
 1. String
 2. Fret
 3. Barline (location=?)
 - a. Bar-style

Taken from DRUM MusicXML file

https://wiki.eecs.yorku.ca/course_archive/2020-21/W/2311/ media/drumexample.musicxml.txt

1. Score-partwise (version = ?)
 - a. Part-list
 - i. Score-part
 1. Part-name
 2. Score-instrument (id = ?)
 - a. instrument-name
 - b. Part
 - i. Measure (number = ?)
 1. Attributes
 - a. Divisions
 - b. Key
 - i. Fifths
 - c. Time
 - i. Beats
 - ii. Beat-type
 - d. Clef
 - i. Sign
 - ii. Line
 2. Note
 - a. Rest *{not all notes have this}*
 - b. Unpitched
 - i. Display-step
 - ii. Display-octave
 - c. Duration
 - d. Instrument (id =?)
 - e. Voice
 - f. Type
 - g. Step
 - h. Notehead
 - i. Beam (number = ?)
 3. Backup
 - a. Duration
 4. Barline (location = ?)
 - a. Bar-style