Introduction To Music Theory

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Session 7

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What is music theory?

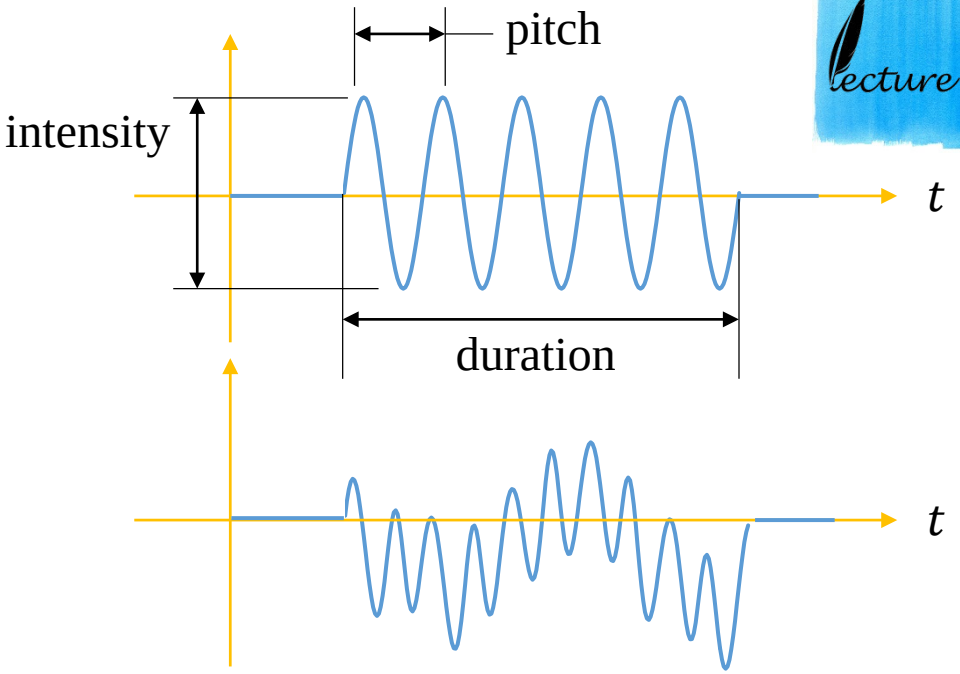
- Is the study of the practices and possibilities of music.
- Derives from observation of, and involves hypothetical speculation about how musicians and composers make music.
- Study and analysis of fundamental elements of music such as pitch, rhythm, harmony, and form.
- Music theory is the consideration of any sonic phenomena, including silence, as it relates to music.

Pitch

Note frequencies are defined as:

$$f = 440 \times 2^{(n/12)} \text{ Hz}$$

$$n \in \mathbb{Z}$$



Musical tone under influences of attack transients, vibrato, and envelope modulation.

…	-1	0	1	2	…	12	13	14	…
…	415.3	440	466.16	493.88		880	932.33	987.76	…

× 2 × 2 × 2

Intervals and scales

Interval: distance between two notes

Scale: is any set of musical notes ordered by fundamental frequency or pitch.

Ascending scale: A scale ordered by increasing pitch.

Descending scale: A scale ordered by decreasing pitch.

Some of the famous scales:

- **Chromatic**: a scale with twelve pitches
- **Diatonic** (heptatonia prima): a scale with seven pitches
- **Major** (Ionian): is one of the Diatonic scales
- **Minor**: heptatonic, natural, harmonic

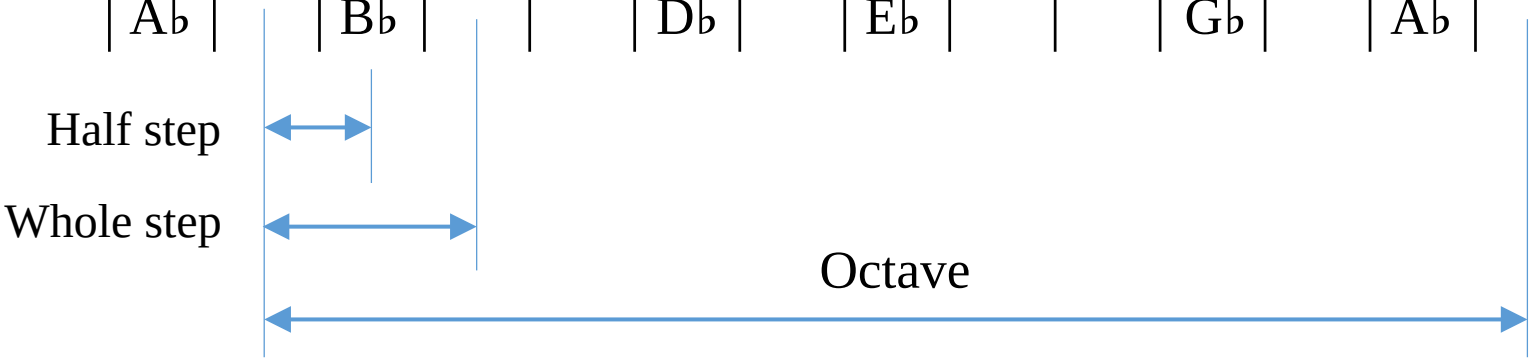
Chromatic scale

- The chromatic scale is a scale with 12 pitches:

$$f = 440 \times 2^{(n/12)} \text{ Hz}$$

Chromatic scale starting from C

$n =$	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
		G♯		A♯			C♯		D♯			F♯		G♯	
	G		A		B	C		D		E	F		G		A
		A♭		B♭			D♭		E♭			G♭		A♭	



Pitch translation

C	Do
D	Re
E	Mi
F	Fa
G	Sol
A	La
B	Si

♯ : Sharp : Diesis

♭ : Flat : Bemolle

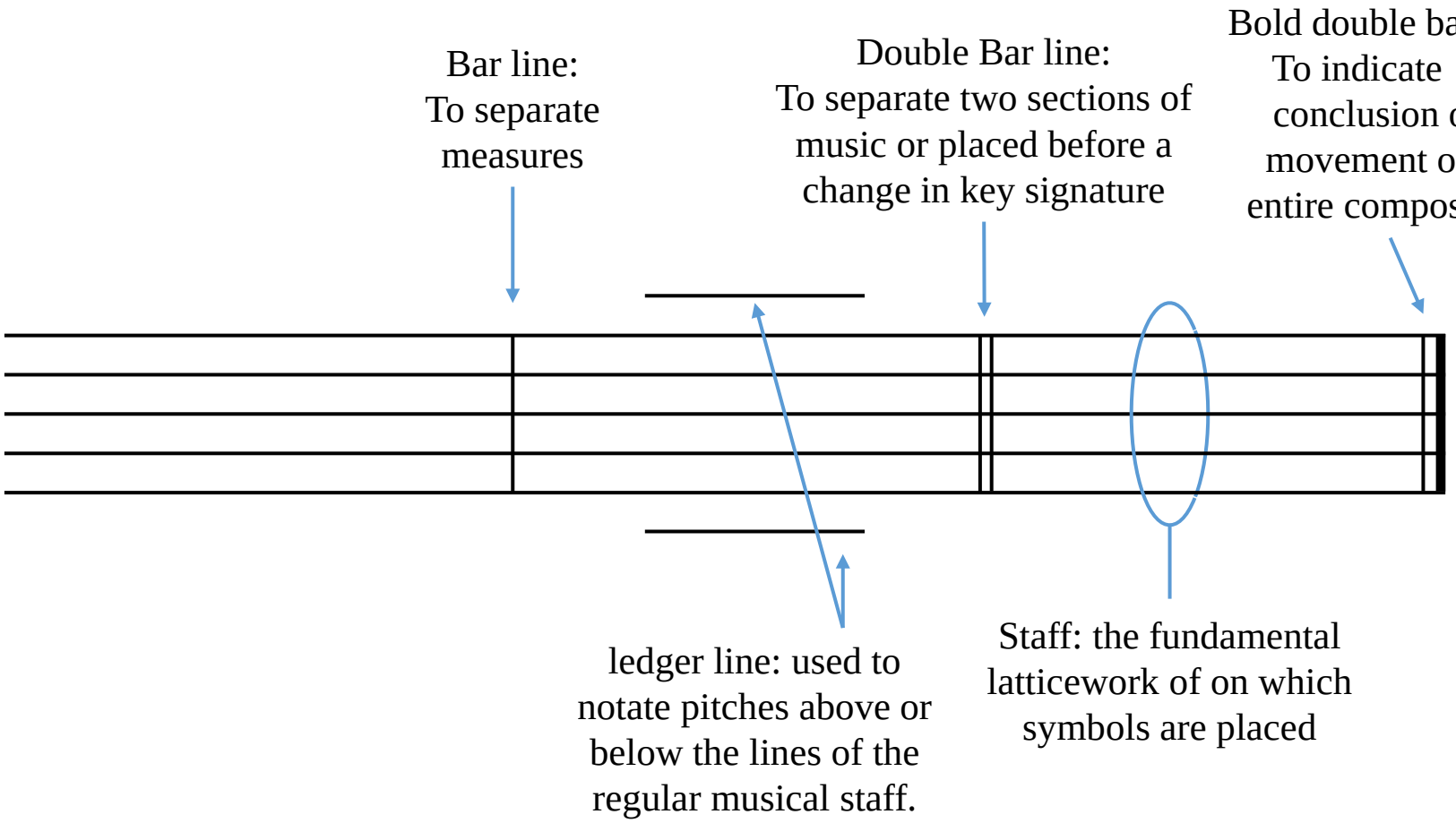
Alphabetic system

English: {C, D, E, F, G, A, B}
German: {C, D, E, F, G, A, H}
Dutch: {C, D, E, F, G, A, B}
Japanese: {変ハ,ニ,ホ,ヘ,ト,イ,ロ}
Korean: {다,라,마,바,사,가,나}

Solmization system

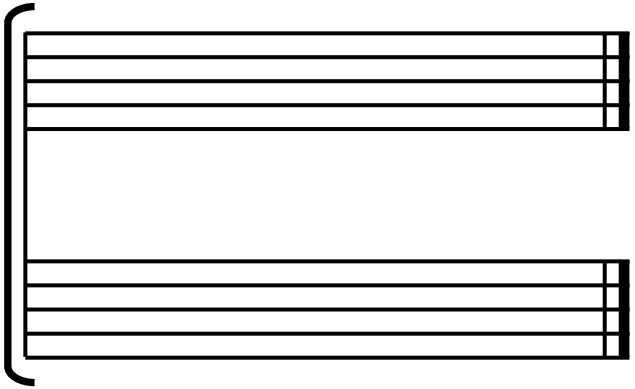
Italian: {Do, Re, Mi, Fa, Sol, La, Si}
French: {Do, Ré, Mi, Fa, Sol, La, Si}
Spanish: {Do, Re, Mi, Fa, Sol, La, Si}
Portuguese: {Dó, Ré, Mi, Fá, Sol, Lá, Si}
Russian: {До, Ре, Ми, Фа, Соль, Ля, Си}
Romanian: {Do, Re, Mi, Fa, Sol, La, Si}
Dutch:{Do, Re, Mi, Fa, Sol, La, Si}

Modern Music Symbols

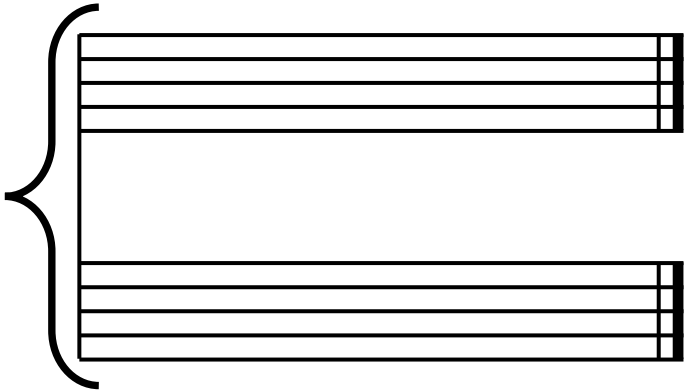


Modern Music Symbols

Bracket: Connects two or more lines of music which sound simultaneously. Usually used to connect the staves of separate instruments



Brace: Connects two or more lines of music that are played simultaneously usually by a single instrument



Modern Music Symbols

Clefs: define the pitch range of the staff on which it is placed.
A clef is usually the leftmost symbol on a staff

G

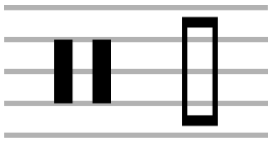
G Clef (Treble clef)
The center of the spiral defines the line for pitch G above middle C

middle C

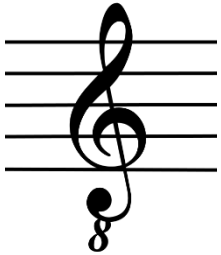
C Clef (Soprano, Alto, Tenor, and Bass)
These clefs point to the line representing middle C

F

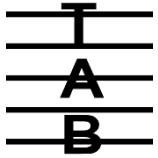
F Clef (Bass clef)
The line or between the dots in this clef denotes F below middle C



Neutral clef
Used for pitch-less instruments, such as percussion instrument (e.g. drum set)

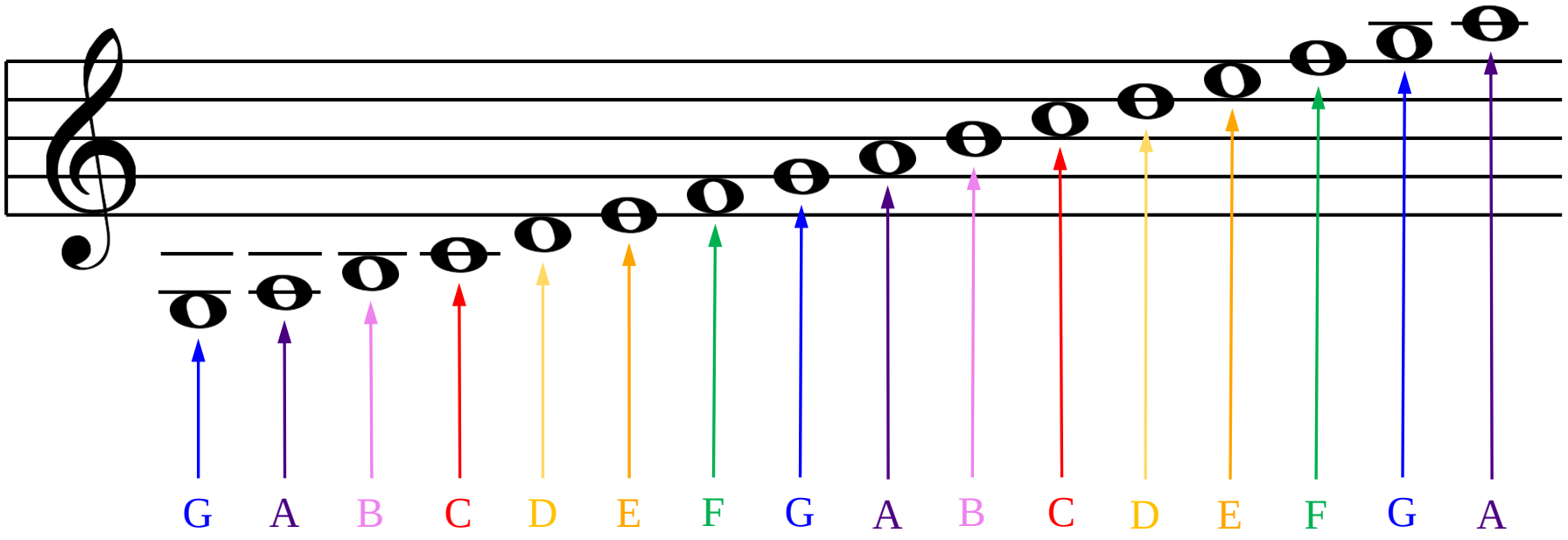


Octave clef
Indicates octave (used for Treble and Bass clefs)

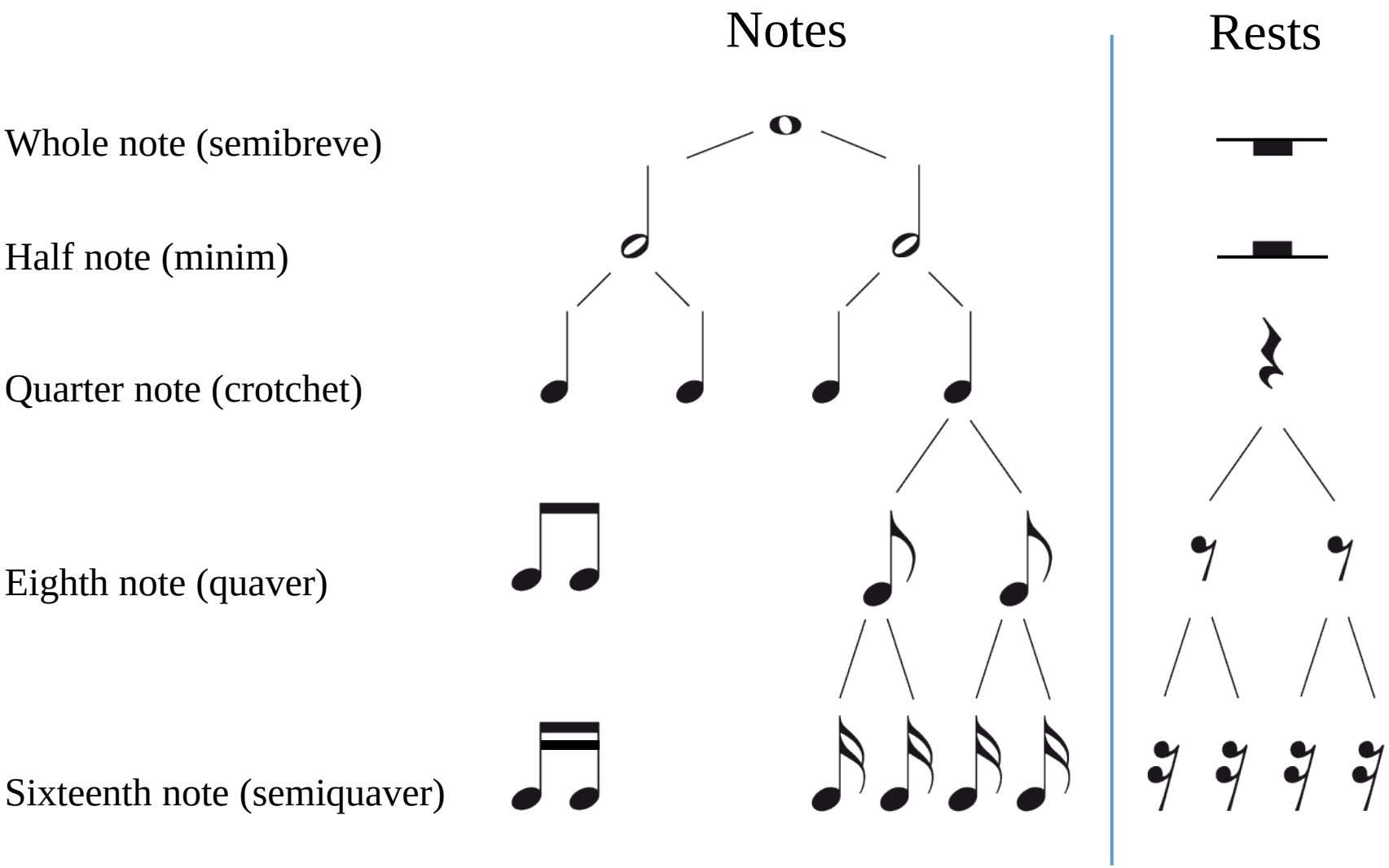


Tablature (TAB)
Used for string instruments such as the guitar (it can have more than 5 lines!)

Music score

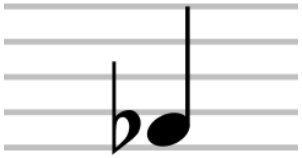


Note values

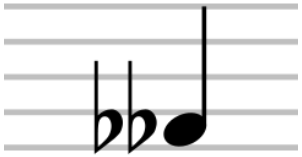

Notes
Rests
Whole note (semibreve)
Half note (minim)
Quarter note (crotchet)
Eighth note (quaver)
Sixteenth note (semiquaver)

Accidentals

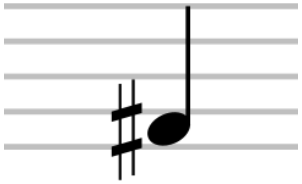
Accidentals modify the pitch of the notes that follow them on the same staff position within a measure (They are not accumulative!).



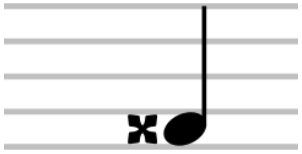
Flat
Lowers the pitch of a note by one semitone



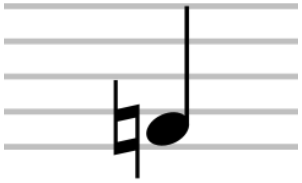
Double Flat
Lowers the pitch of a note by two semitone



Sharp
Raises the pitch of a note by one semitone

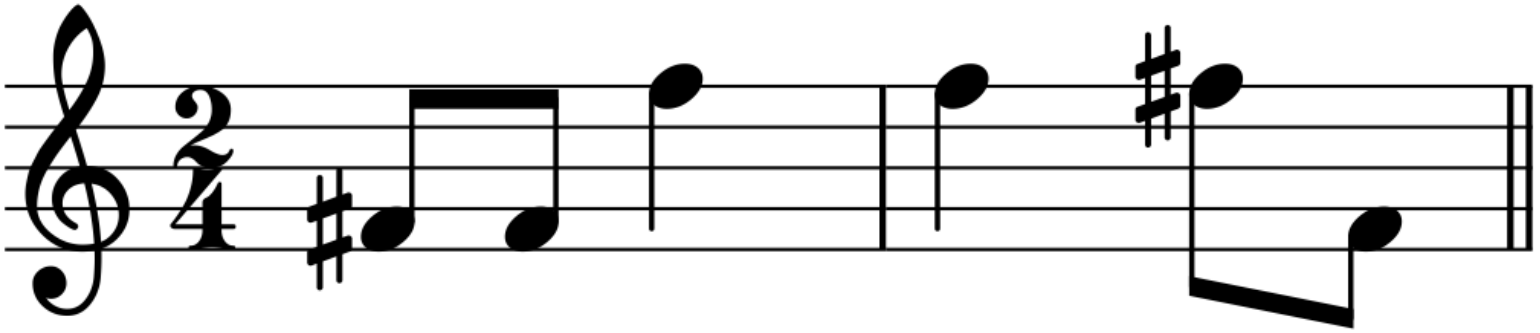


Double Sharp
Raises the pitch of a note by two semitone



Natural
Cancels a previous accidental

Accidentals example



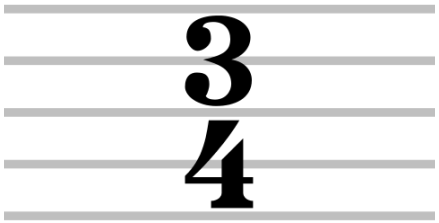
F♯ F♯ F F F♯ F

Score source: Wikipedia.com

Rhythm

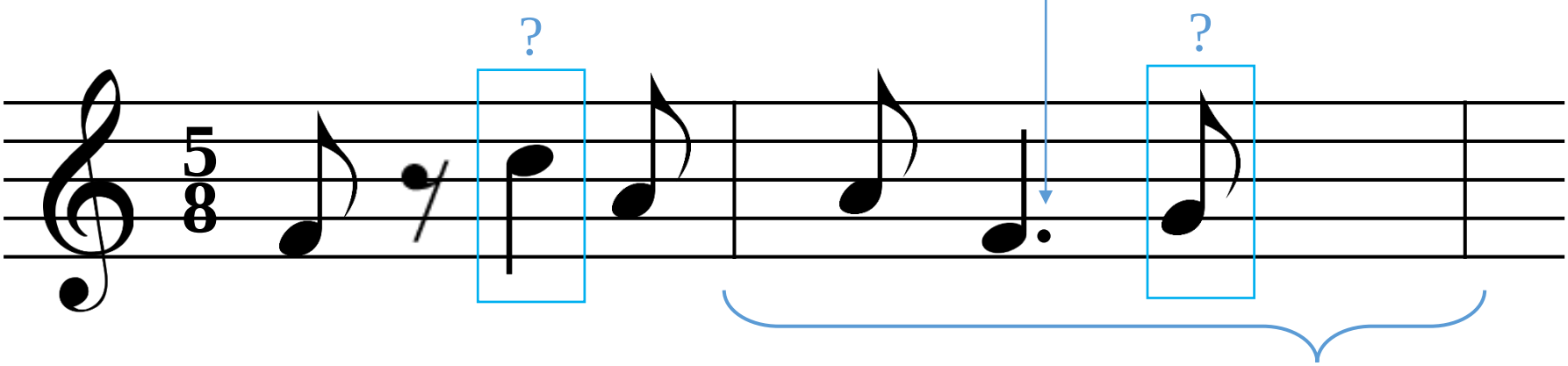
- **Tempo**: The tempo of the piece is the speed or frequency of the tactus, a measure of how quickly the beat flows. Tempo is often measured in “beats per minute” (bpm)

- **Time Signature**: is used to specify how many beats are to be contained in each bar and which note value is to be given one beat

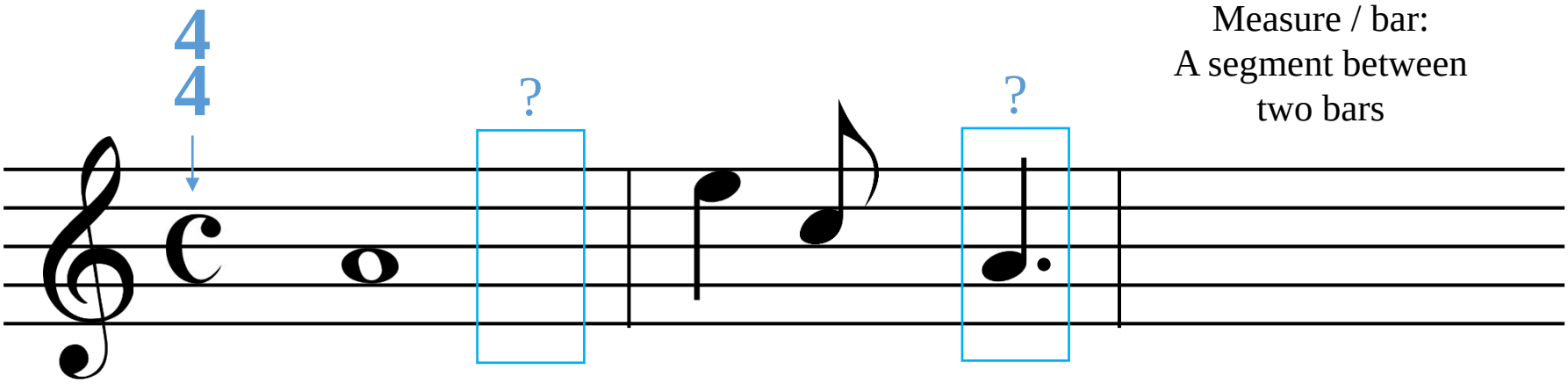


Rhythm example

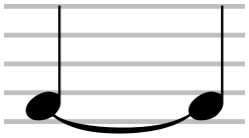
• Increases a note value by its half



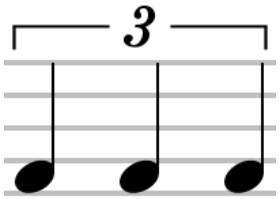
Measure / bar:
A segment between two bars



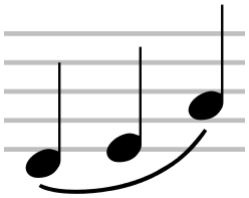
Note relationships



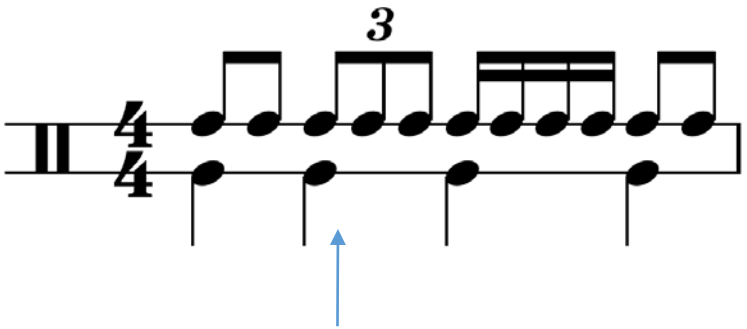
Tie
Indicates that the two (or more) notes joined together are to be played as one. The notes of a tie must be identical.



Tuplet (Duplets, Triplets, Quadruplets, etc.)
A number of notes of irregular duration are performed within the duration of a given number of notes of regular time value.



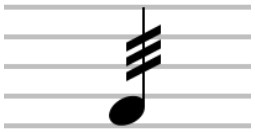
Slur
Indicates to play two or more notes in one physical stroke,



Three quavers are played within the duration of a crotchet

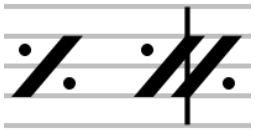
Glissando (**Portamento**)
A continuous, unbroken glide from one note to the next that includes the pitches between.

Repetition and codas



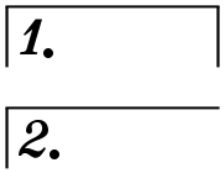
Tremolo
A rapidly repeated note.

Repeat signs
Enclose a passage that is to be played more than once.



Simile marks
Denote that preceding groups of measures are to be repeated.

Repeat the previous two measures



Volta brackets
A repeated passage is to be played with different endings on different playing.

D.C.

Da capo
"From top" To repeat playing of the music from its beginning.

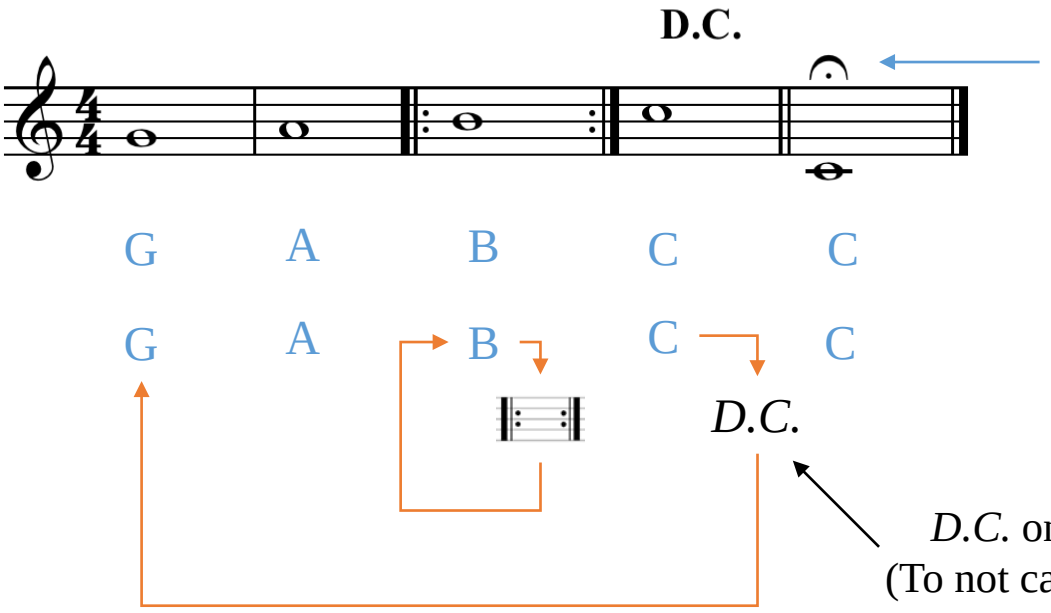
Segno
Mark used with dal segno

D.S.

Dal segno
"From the sign" To repeat playing starting at the nearest segno.

Coda
Indicates a forward jump in the music to its ending passage

Da capo example



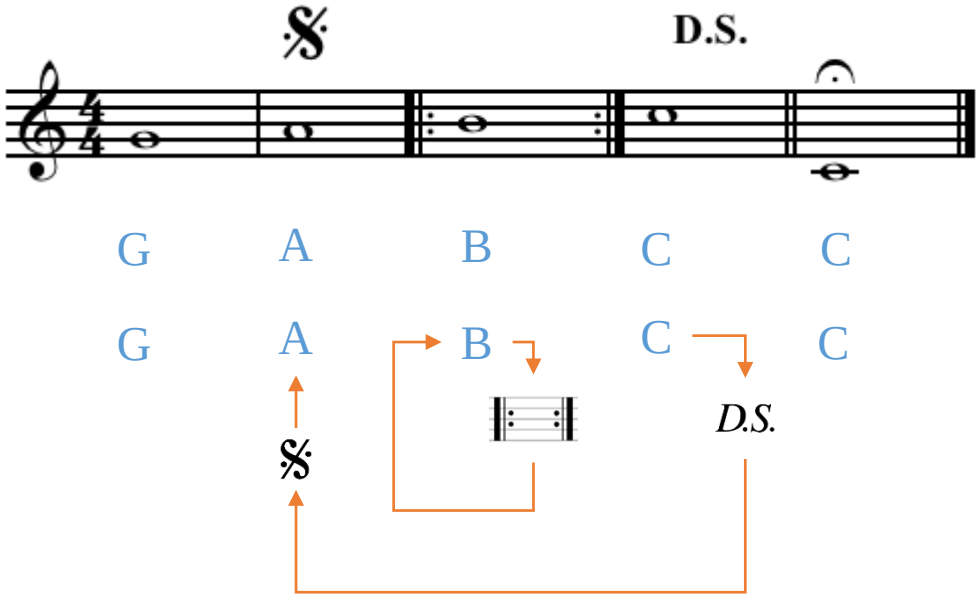
Fermata
A note, chord, or rest sustained longer than its customary value. In other words, you can extend it as much as you want!

D.C. only repeats once!
(To not cause infinite loops!)
This is true for all the other codas

Played as: G, A, B, B, C, G, A, B, B, C, C

Score source: Wikipedia.com

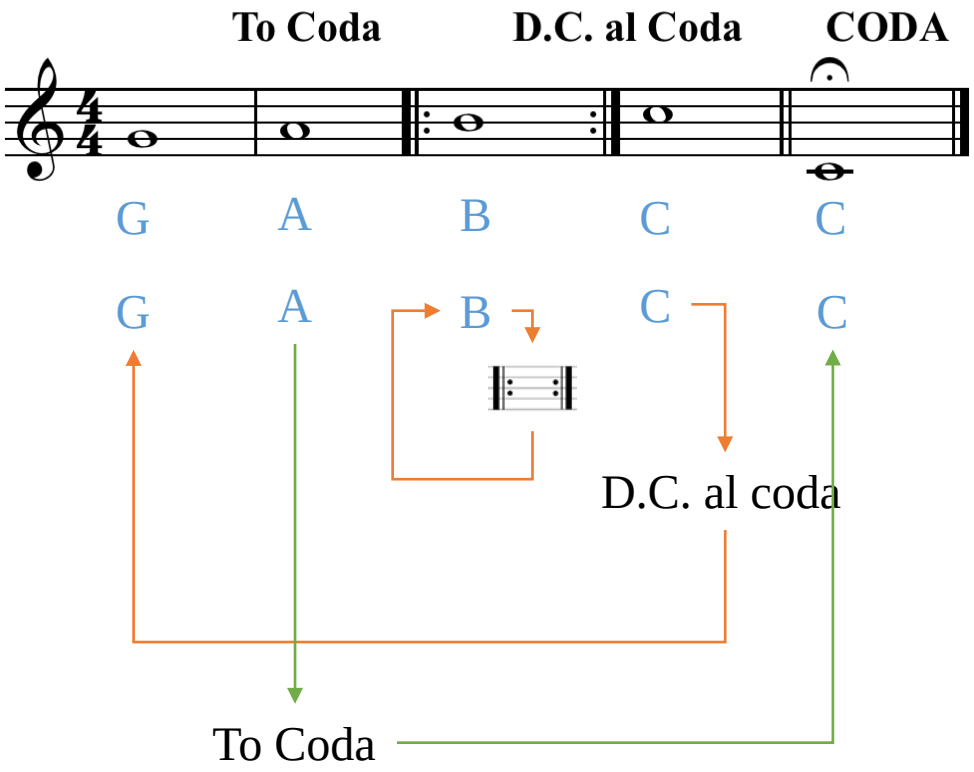
Dal segno example



Played as: G, A, B, B, C, A, B, B, C, C

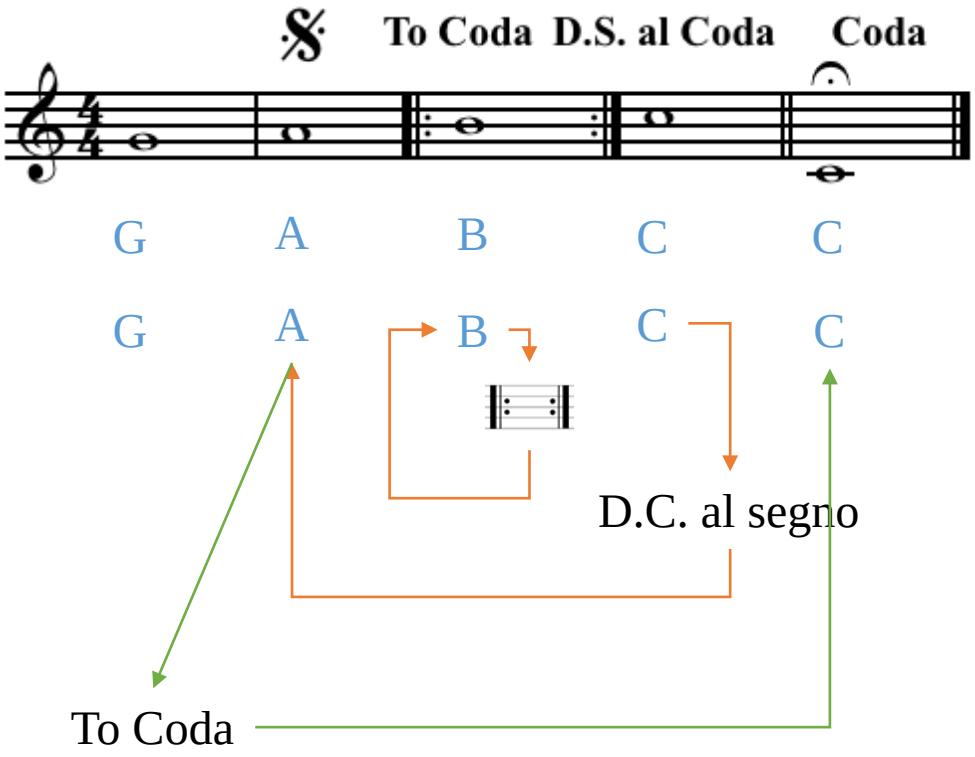
Score source: Wikipedia.com

Da Capo al Coda example



Played as: G, A, B, B, C, G, A, C

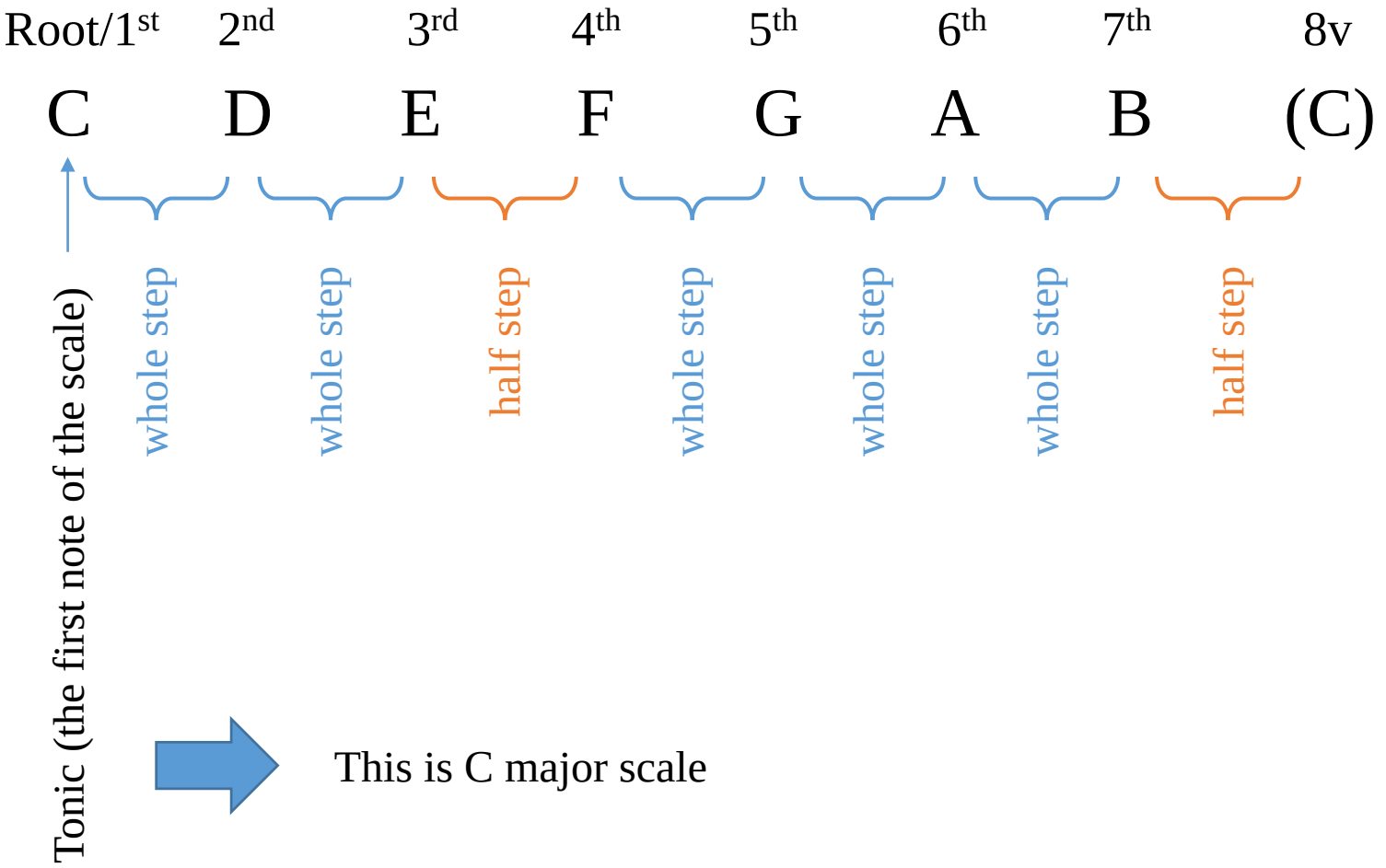
Dal segno al Coda example



Played as: G, A, B, B, C, A, B, C

Major scales

A diatonic interval is an interval formed by two notes of a diatonic scale.



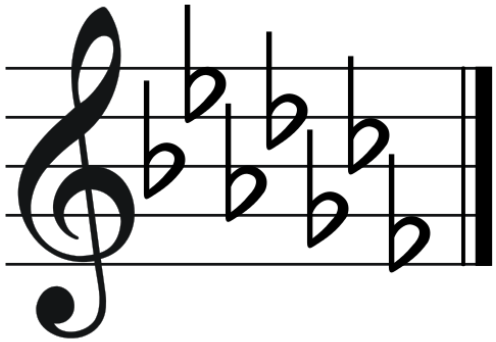
Major scales

Lets make some major scales:

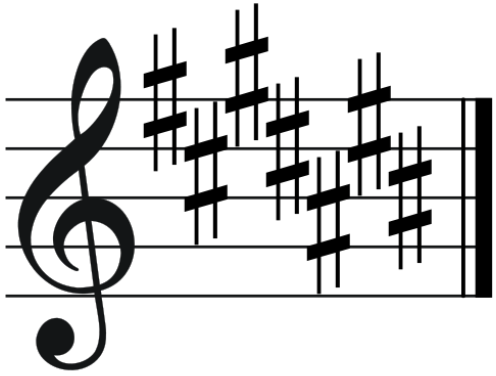
G	A	B	C	D	E	F♯	(G)
D	E	F♯	G	A	B	C♯	(D)
A	B	C♯	D	E	F♯	G♯	(A)
F	G	A	B♭	C	D	E	(F)

key signatures

Key signatures define the prevailing scale of the music that follows to avoid the use of accidentals for all the measures

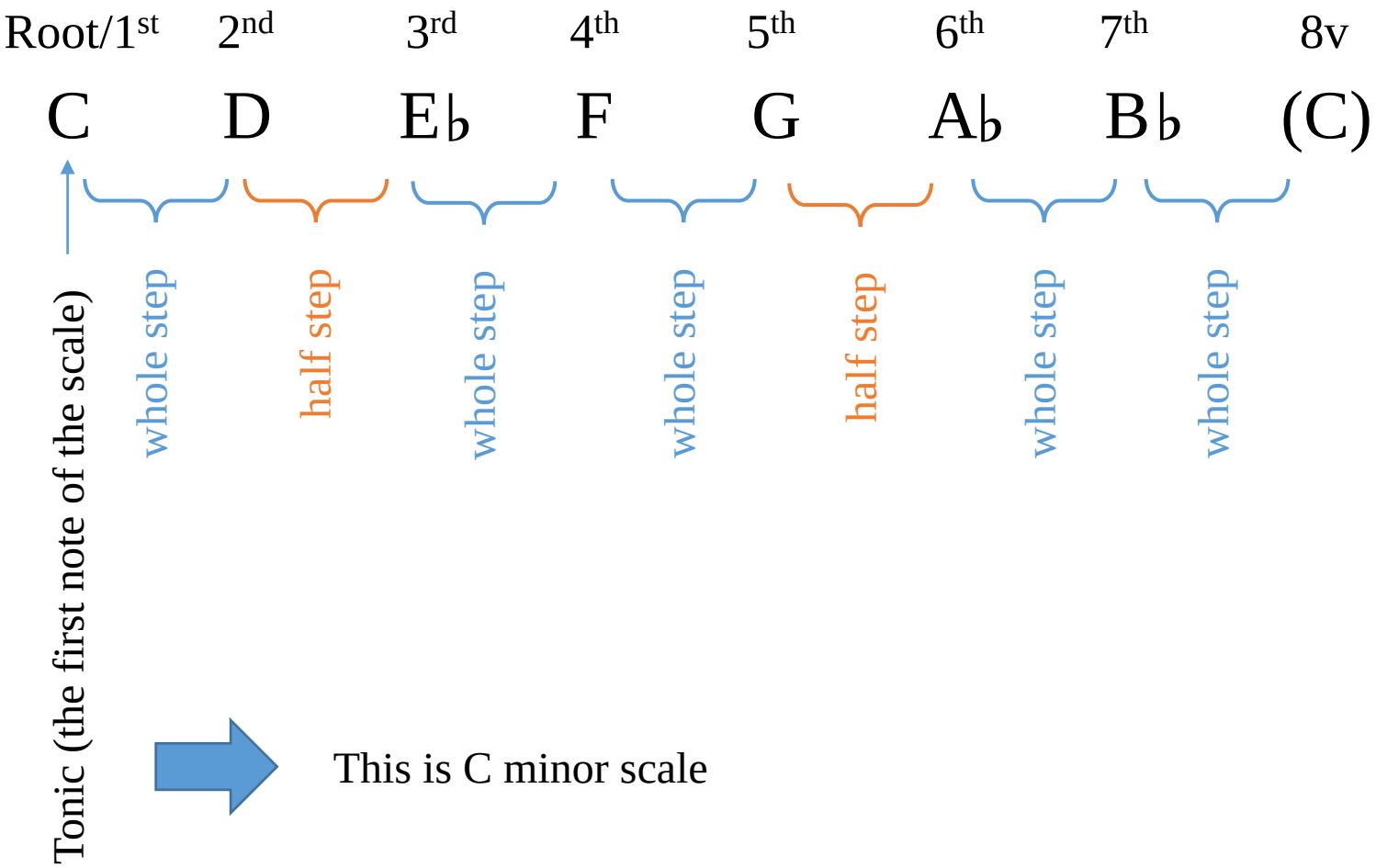


Flat key signature
Lowers the pitch of notes by a semitone on the corresponding line or space.



Sharp key signature
Raises the pitch of notes by a semitone on the corresponding line or space.

Minor scales: Natural minor



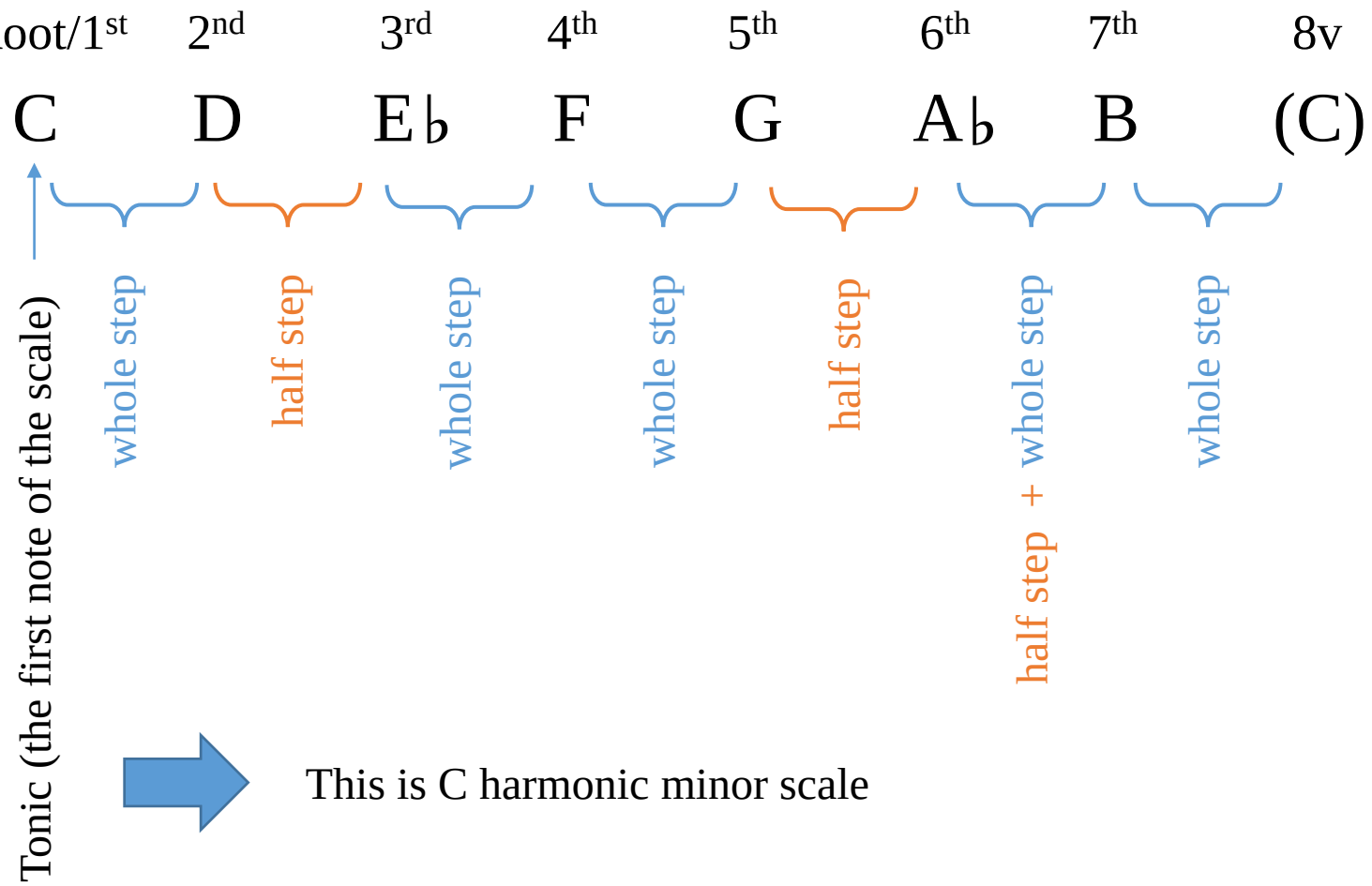
Minor scales: Natural minor

C — D — E♭ — F — G — A♭ — B♭ — (C)

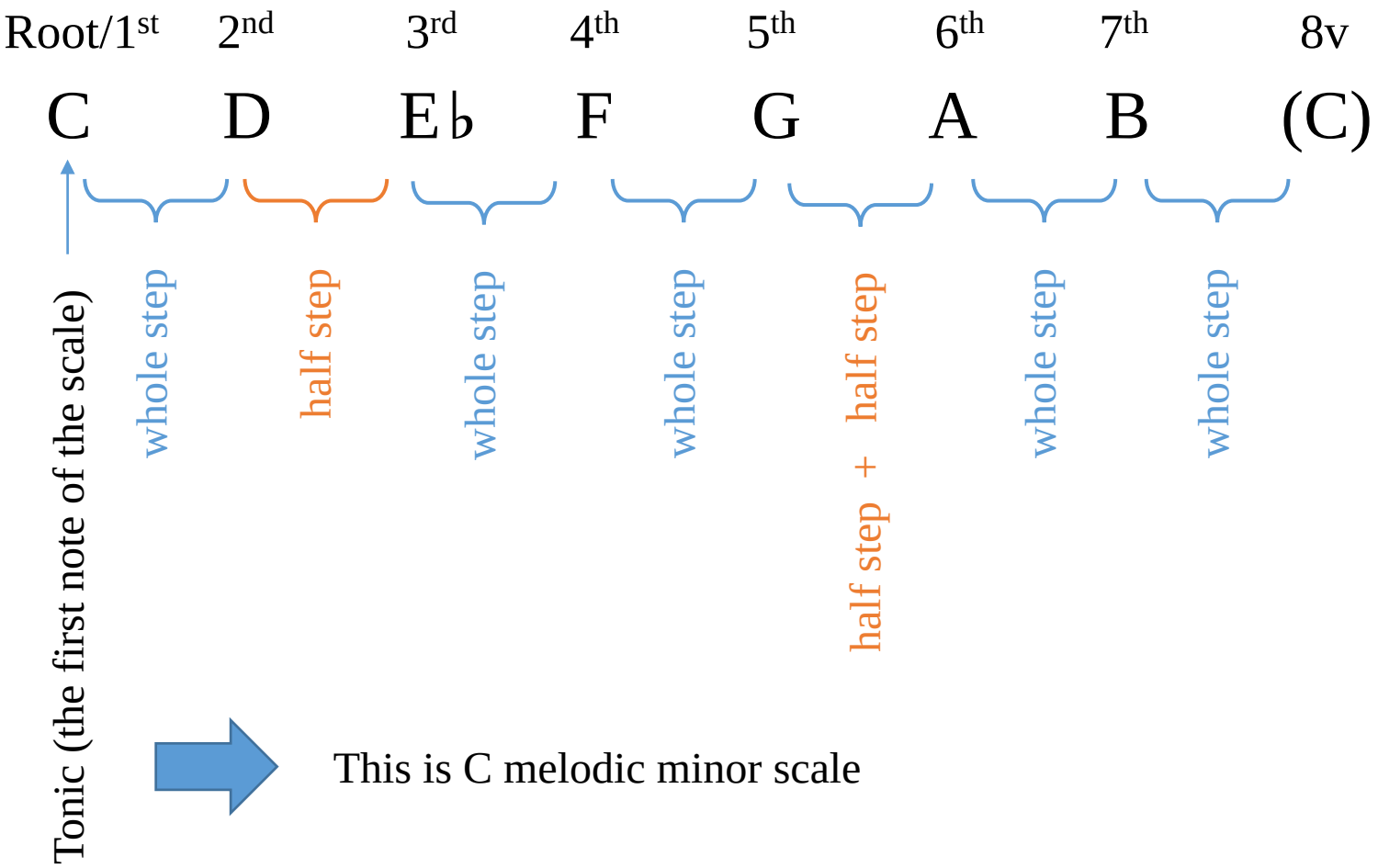
Lets make some major scales:

G	A	B♭	C	D	E♭	F	(G)
D	E	F	G	A	B♭	C	(D)
A	B	C	D	E	F	G	(A)
F	G	A♭	B♭	C	D♭	E♭	(F)

Minor scales(Harmonic minor)



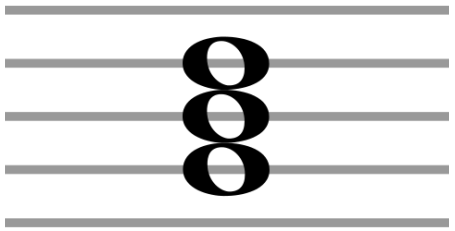
Minor scales(Melodic minor)



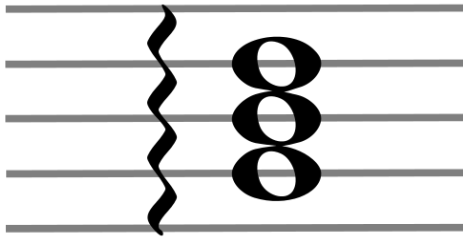
Chords and arpeggios

- **Chord**: is any harmonic set of three or more notes

(played together!)

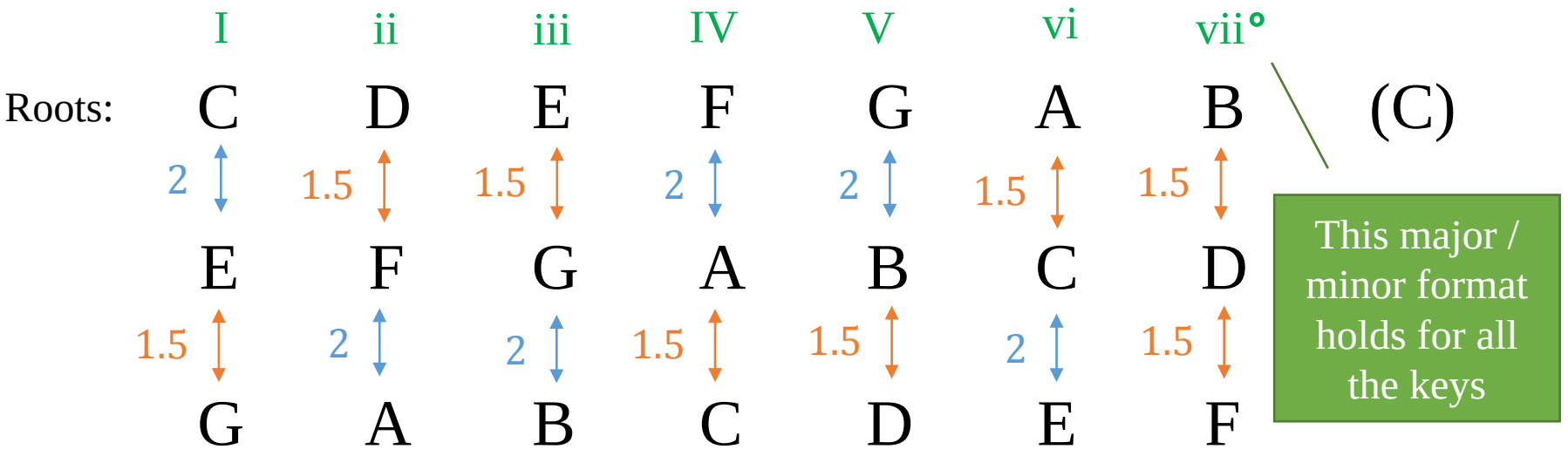


- **Arpeggio**: to separately play the notes in the chord



Chord construction

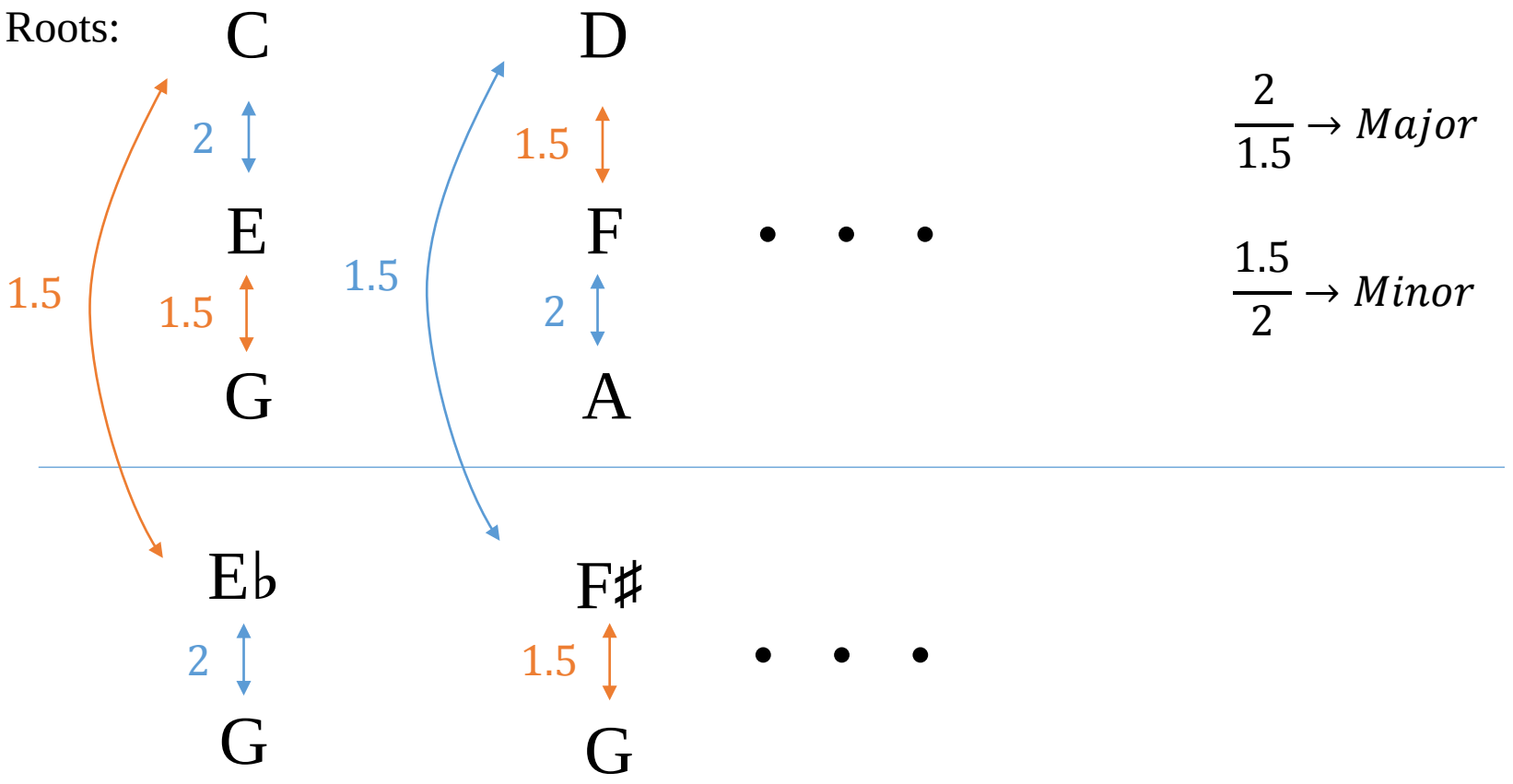
- Let's assume key of C (C Major) and create all the triads (chords with 3 notes) for this scale! We need a root, a 3rd and a 5th to make a triad



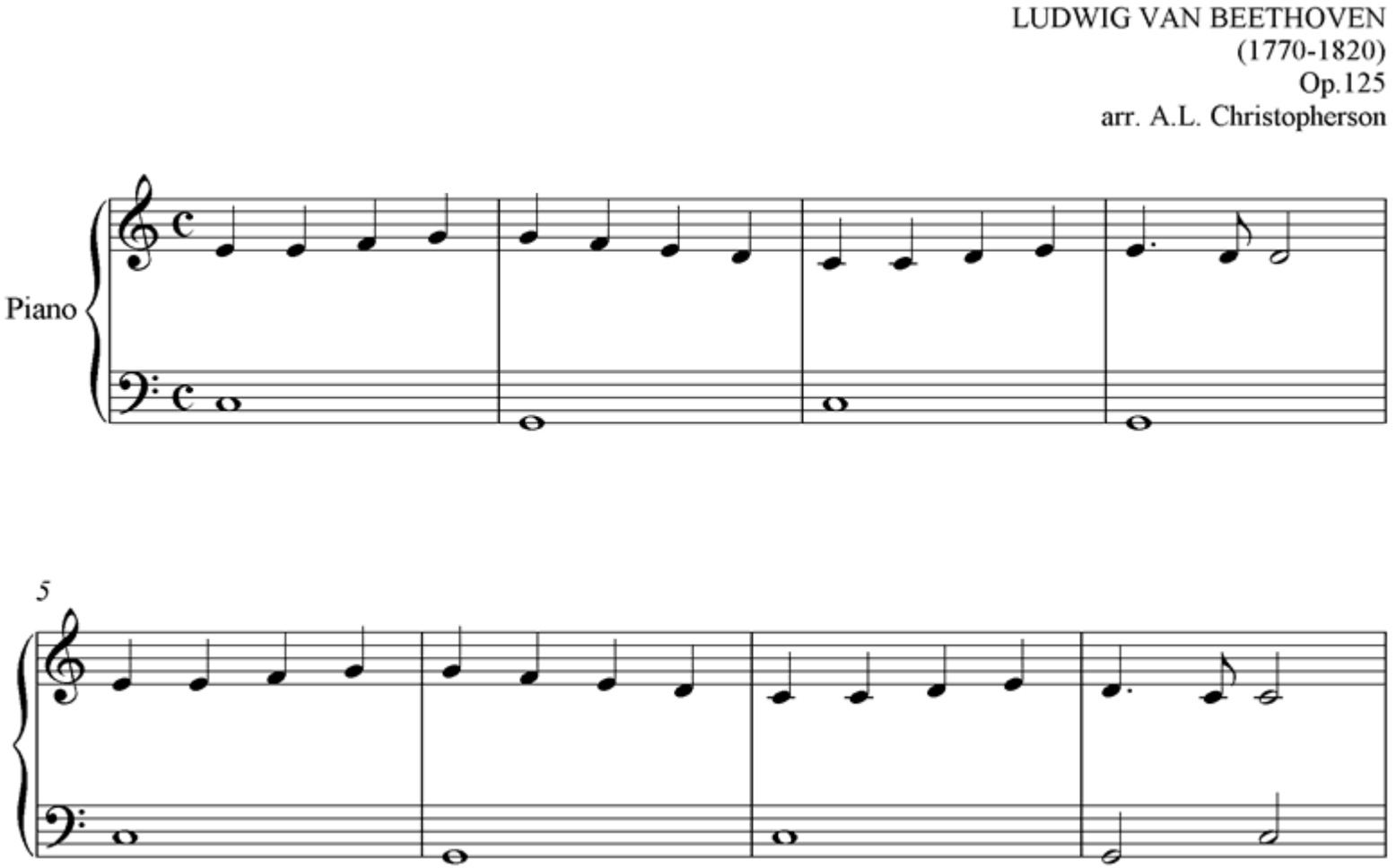
$\frac{2}{1.5} \rightarrow Major$ $\frac{1.5}{2} \rightarrow Minor$ $\frac{1.5}{1.5} \rightarrow diminished$

Chord construction

- Converting a major to minor chord and vise versa:



Ode to Joy



Score source: http://www.music-scores.com/

LUDWIG VAN BEETHOVEN
(1770-1820)
Op.125
arr. A.L. Christopherson