

Chapter 1

Fundamentals

1.1 Pitch

Definition 1 (Pitch) *Pitch is the property of the sound which allows a relative ordering of perceived sounds on a frequency-related scale.*

On a keyboard, pitch goes up to the right of the keyboard, while it goes down on the left.

Pitches are expressed through **notes**. There are 7 note names¹, which are repeated in **octave registers**, identified by the bottom number.

$$\cdots A_3 B_3 \underbrace{C_4 D_4 E_4 F_4 G_4 A_4 B_4}_{\text{Octave register 4}} C_5 D_5 \cdots$$

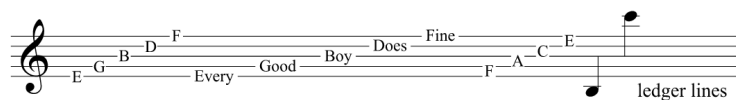


Figure 1.1: Treble clef

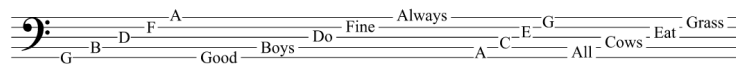


Figure 1.2: Bass clef

Definition 2 (Octave) *The distance / interval between two notes with the same name.*

¹C-B in anglophone countries, C-H in Germany and Do-Si for the rest of Europe.

Figure 1.3: The Grand Staff (a specific stave *system*)

Definition 3 (Middle C) The C_4 pitch, usually located in the middle of a keyboard (on the instrument) and always annotated in the middle of the grand staff, shared by the two staves.

Definition 4 (Accidental) A symbol placed before a note to raise / lower its pitch by a given amount.

An accidental is effective only for a measure. They affect the entire piece if they are placed before the clef in a **key signature**.

\flat	Flat	−1 half step
\sharp	Sharp	+1 half step
$\flat\flat$	Double flat	−2 half steps / −1 whole step
$\sharp\sharp$	Double sharp	+2 half steps / +1 whole step
\natural	Natural	Cancels preceding accidentals

There exists also **half-accidentals**, whose altered notes cannot be played on a keyboard.

Definition 5 (Half step) On the keyboard, the distance / interval between one key (either black or white) and the next (either black or white).

Definition 6 (Whole step) The interval made up of two half steps.

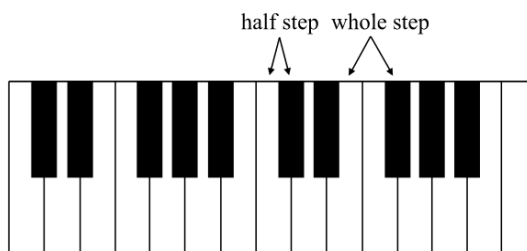


Figure 1.4: Half steps and whole steps

Definition 7 (Enharmonic) Which has the same sound, but different name.

1.2 Rhythm

Definition 8 (Beat / pulse) *The basic pulse underlying measured music and thus the unit by which musical time is reckoned.*

Definition 9 (Tempo) *Speed of the beat.*

The tempo is usually expressed through metronome markings in **BPM / Beats Per Minute**.

1.2.1 Time signatures

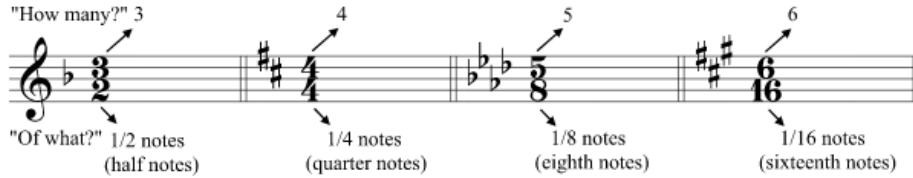


Figure 1.5: Meaning of the time signatures

1.2.2 Note / rests durations

Both notes and rests last for certain duration, which is always a 2^n number of beats, where $n \in \mathbb{Z}$. Common values for 2^n are the following ones:

$$\left\{ 4, 2, 1, \frac{1}{2}, \frac{1}{4} \right\} \text{ beats}$$

Values different from these ones can be gathered through **ties** and **dots**. A dot adds $\frac{1}{2}$ the value of the note dotted, while a double dot adds $\frac{1}{2} + \frac{1}{4}$ the original value.

1.2.3 Meters

Definition 10 (Meter) *Describes the number of beats in a measure / bar and how they are divided.*

Simple meters break the beat into 2 parts, while **compound meters** break it into 3 parts.

They can be **double** (2 beats / bar), **triple** (3 beats / bar) or **quadruple** (4 beats / bar).

Simple or Compound?	Duple, Triple, Quadruple?	Beat Grouping	Beat Division	Example Time Signatures
Simple	Duple	2	2	$\frac{2}{4}$ $\frac{2}{8}$ $\frac{2}{2}$ $\frac{2}{16}$
Simple	Triple	3	2	$\frac{3}{4}$ $\frac{3}{8}$ $\frac{3}{2}$ $\frac{3}{16}$
Simple	Quadruple	4	2	$\frac{4}{4}$ $\frac{4}{8}$ $\frac{4}{2}$ $\frac{4}{16}$
Compound	Duple	2	3	$\frac{6}{8}$ $\frac{6}{4}$ $\frac{6}{16}$
Compound	Triple	3	3	$\frac{9}{8}$ $\frac{9}{4}$ $\frac{9}{16}$
Compound	Quadruple	4	3	$\frac{12}{8}$ $\frac{12}{4}$ $\frac{12}{16}$

Figure 1.6: Meters

1.2.4 Triplets

Definition 11 (Triplet) *Rhythmic grouping of notes which would typically not occur in the specified meter.*

Definition 12 (Triplet / Triplet / Triplet / Triplet) *Common triplet instances.*

1.2.5 Syncopation

Chapter 2

Scales

2.1 Major scale

Definition 13 (Tetrachord) *A 4-note scale segment with the following steps: $W - W - H$.*

Definition 14 (Major scale) *A 8-note scale made up of 2 tetrachords, joined by a whole step.*

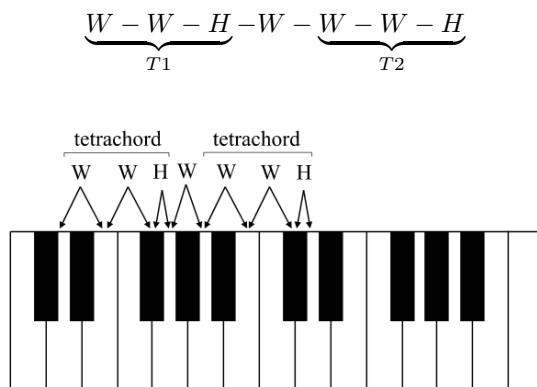


Figure 2.1: Tetrachords in a (D) major scale

A major scale uses all the 7 notes in order. No one is skipped and there are no duplicates.

2.1.1 Key signatures

There are 15 major key signatures:

- 1 with no accidentals: C Major.
- 7 with 1 to 7 flats.
- 7 with 1 to 7 sharps.



Figure 2.2: Major key signatures (sharps)



Figure 2.3: Major key signatures (flats)

A key signature can be quickly identified with the following mnemonic:

- With *sharps*: +1 half step from the last “sharped note”.
- With *flats*: the second to last flat is the key (along with the flat).

2.2 Minor scales

In contrast to major scales, there are 3 different minor scales. They all follow the following formulas, while the melodic minor is only used as an *ascending* scale (the *descending* part is the same as the natural minor scale).

2.2.1 Key signatures

In respect to the major keys, minor keys can be derived by adding 3 flats (or subtracting sharps and adding flats if needed).

In doing so, the corresponding major scale will also have three of its scale degrees lowered, resulting in what is called a **parallel** minor scale.

Definition 15 (Parallel scale relationship) *Two major / minor scales with the same 1st scale degree.*

On the other hand, if it is the key signature to be shared, then we call it a **relative** minor key.

Definition 16 (Relative key relationship) *Two major / minor key signatures with the same key signature.*

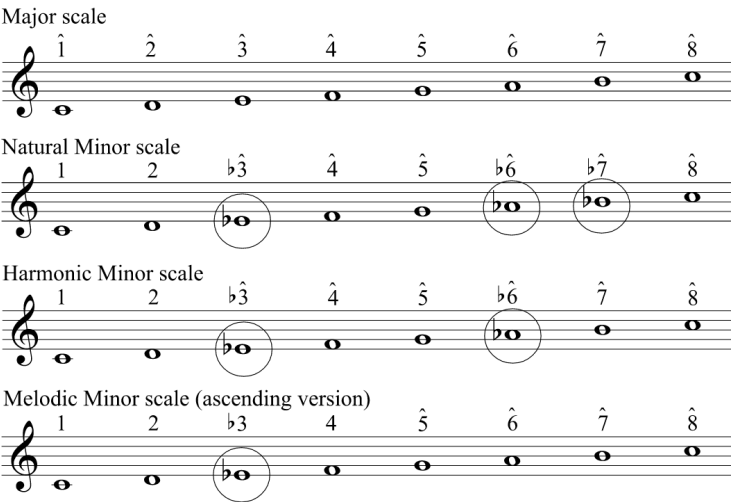


Figure 2.4: Minor scales

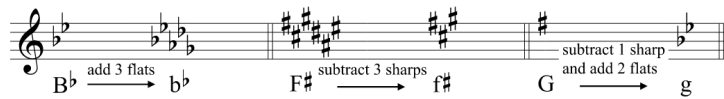


Figure 2.5: Parallel relationship

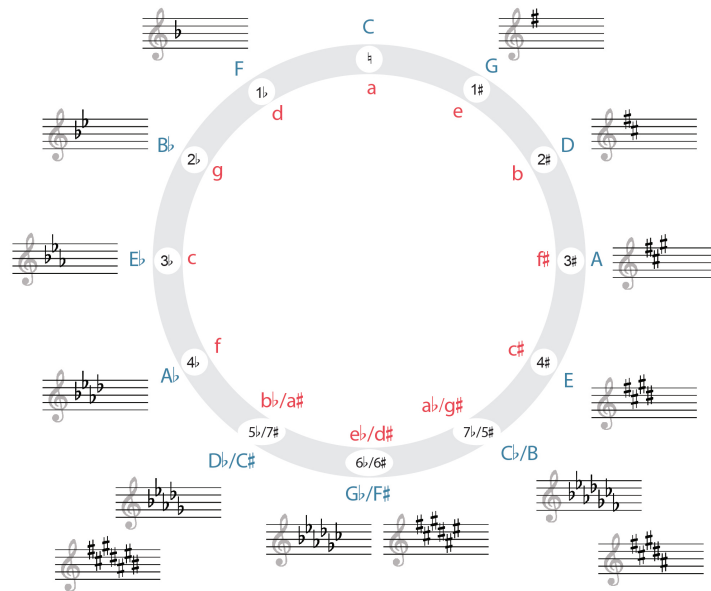


Figure 2.6: Circle of fifths

The circle of fifths is a convenient aid for the visualization of both minor and major keys and scales:

- To the right, we add sharps / remove flats and we go up a 5^{th} .
- To the left, we remove sharps / add flats and we go down a 5^{th} .