

# 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 names<sup>1</sup>, which are repeated in **octave registers**, identified by the bottom number.

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

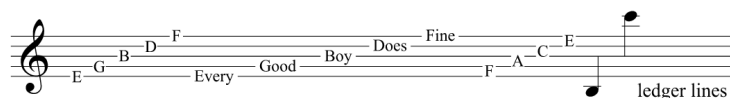


Figure 1.1: Treble clef

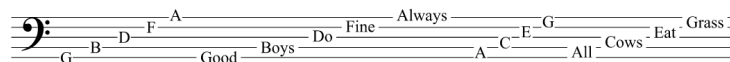


Figure 1.2: Bass clef

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

<sup>1</sup>C-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**.

b	Flat	−1 half step
#	Sharp	+1 half step
bb	Double flat	−2 half steps / −1 whole step
xx	Double sharp	+2 half steps / +1 whole step
♮	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.*

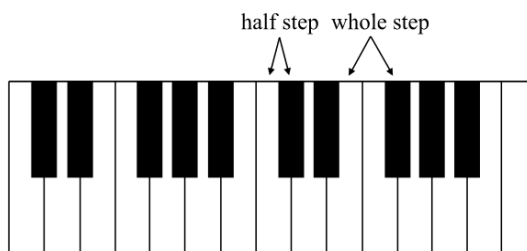


Figure 1.4: Half steps and whole steps

**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

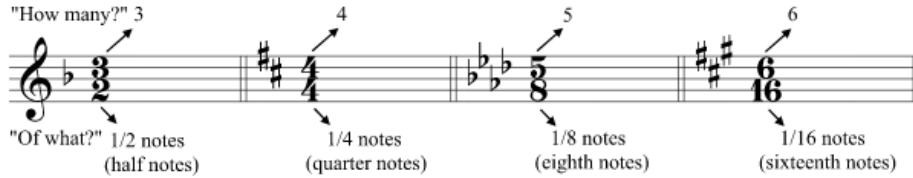


Figure 1.5: Meaning of the time signatures

### 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.*

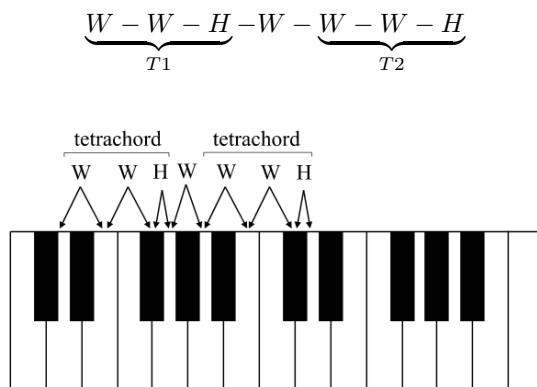


Figure 2.1: Tetrachords in a (D) major scale

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 1<sup>st</sup> 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.*

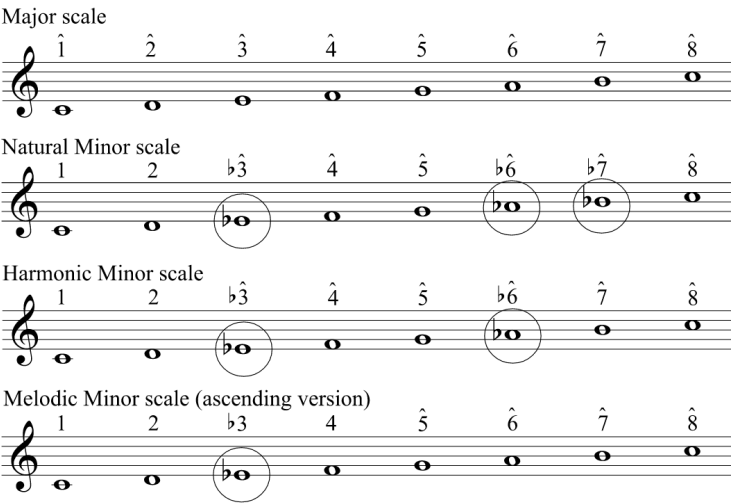


Figure 2.4: Minor scales

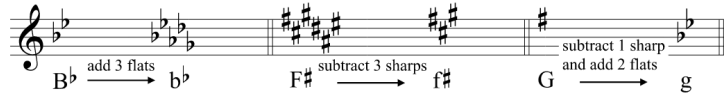


Figure 2.5: Parallel relationship

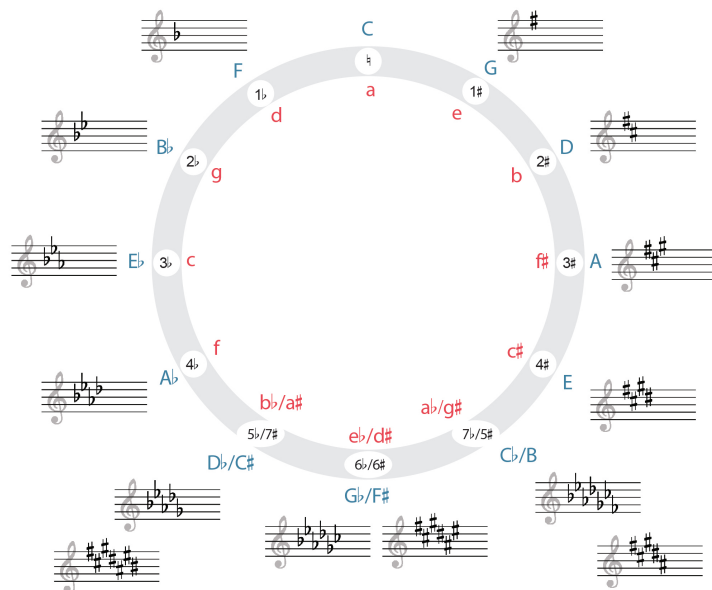


Figure 2.6: Circle of fifths

## 2.3 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  $5^{th}$ .

## 2.4 Key signature identification

Given a piece of sheet music we can devise its key signature as follows:

1. Through the number of flats / sharps we restrict ourselves to 2 key signatures: a major one and a minor one.
2. The tonic can help us do the final discrimination. Usually the tonic note is located at the beginning / end of the piece either in the lower or upper parts.