

Brief Explanation of Music Theory

Many music theory books are targeted for specific instruments and they often use music notation as a means of explaining the theory. Since I am not so good at either music notation or a specific instrument these explanations were confusing for me so I decided to create my own brief explanation of music theory.

Frequencies

Sound is a sequence of waves of pressure that propagates through compressible media such as air. When many waves have different length then it is noise and when they have the same length then it has a tone. A tone is often described by the cycles per second measured in Hertz (Hz). A human is said to be able to hear 20 Hz up to 20 kHz. In that range Pythagoras (Born 570bc until 495bc) figured out that it would be useful to arrange various tones with each other. He decided to group tones by twelve based on the frequency of the tone. He made this in a repetitive circular way so that after one complete turn of twelve tones the tones of the next turn had the frequency of twice as many cycles per second. We still organize tones according to this system; it is called the Even Tempered Scale.

In Italy around 1700ac Bartolomeo Cristofori di Francesco invented the Piano. His work lays the foundation for the music in the western world until this day, namely he decided to create a layout of the keys giving 7 notes of the Even Tempered notes more importance and he made them white.

When using seven notes the next turn of the circle becomes the eighth note and these seven notes was called one octave – from the Latin and Greek numerical prefix ‘Octo’ for eight. Later we will find out that it happens that we use more than 7 tones.

The specific layout of what 7 notes of the 12 notes to use is called a scale. There exist four common scales in western culture: Major, Natural minor, Harmonic minor and Melodic minor. When we understand these four scales we have enough knowledge to make loads of music. Since the piano has the layout of the Major scale ‘hardwired’ into the layout it is common to start explaining scales with the major scale.



The pattern for the Major scale

The major scale represents the white keys of the Piano keyboard. We could use the keyboard of a piano to explain the major scale and continue from there and many books on this subject are doing that. However in this explanation I will illustrate the pattern for the Major scale with a ladder. Each rod of the ladder represents a tone. The distance between the rods below is the pattern of the Major scale. The 'drawback' of my method is that when you start learning other scales you need to map the tones back to that major scale but one way or another, this is my way. Begin reading the steps of the ladder from the bottom and climb higher up in the ladder. To be able to talk about the various steps in the ladder without being confused by the Latin alphabet I give the steps the nonsense names: Do, Re, Mi, Fa, So, La, Ti and starting over on Do and so on.

Do			
Ti	1	Half	Note 7
La	2	Whole	Note 6
So	2	Whole	Note 5
Fa	2	Whole	Note 4
Mi	1	Half	Note 3
Re	2	Whole	Note 2
Do	2	Whole	Note 1
Tone Ladder, Nonsense word	Twelve based note size	Seven based note size	Decimal Note number

In the ladder you notice that the distance between the rods of Do, Re, Fa, So, La is twice the height of the distance to the next rod at Mi and Ti. In the twelve based scale, the Even Tempered Scale, the bigger distance between the rods are two steps and the smaller distance are one step. From the seven notes perspective, like for example on a Piano, the smaller steps are half notes and the bigger steps are whole notes. The places on the piano where two white keys are next to each other there is a half note step between the notes. Don't summarize the seven based steps to see what the total is because that is irrelevant. The sum of the twelve based steps always adds up to twelve. All white and black keys of one octave always add up to twelve half notes.

The Do position in the ladder is the root note of the scale. Many times a half note is called a semi-note.

Pattern for the natural minor scale

Here we have another pattern of half and whole notes making up the pattern for the natural minor scale.

do			
ti	2	Whole	Note 7
la	2	Whole	Note 6
so	1	Half	Note 5
fa	2	Whole	Note 4
mi	2	Whole	Note 3
re	1	Half	Note 2
do	2	Whole	Note 1
Tone Ladder, Nonsense word	Twelve based note size	Seven based note size	Decimal Note number

In this table I used lowercase for the nonsense words. Lowercase symbols are common for notation of minor scales.

The pattern for harmonic minor scale

The harmonic minor scale is a variation of the natural minor scale.

do			
ti	1	Half	Note 7
la	3	Whole+Half	Note 6
so	1	Half	Note 5
fa	2	Whole	Note 4
mi	2	Whole	Note 3
re	1	Half	Note 2
do	2	Whole	Note 1
Tone Ladder, Nonsense word	Twelve based note size	Seven based note size	Decimal Note number

The pattern for the melodic minor scale

The melodic minor scale is a variation of the natural minor scale. Both the sixth and as well as the seventh note are increased one half step.

do			
ti	1	Half	Note 7
la	2	Whole	Note 6
so	2	Whole	Note 5
fa	2	Whole	Note 4
mi	2	Whole	Note 3
re	1	Half	Note 2
do	2	Whole	Note 1

Tone Ladder,
Nonsense word

Twelve based
note size

Seven based note
size

Decimal Note
Number

In the melodic minor scale the tones follows the pattern here only when the tune is ascending. When the tune is descending the pattern of the natural minor scale is used. Exceptions to this can be found.

Latin alphabet, Flat and Sharp

Since notes are coming back in each octave in a circular fashion is there no firm beginning and ending to the note system. You could begin on the first letter of the alphabet but that is normally **not** the case. The reason for this is that the piano that Bartolomeo Cristofori di Francesco invented around 1700ac could produce the tones covering the ranges of most other instruments at that time so it became the de facto standard for music. The **center** of the piano has a key C so that became the start letter of the notes and also the reason why there are so many Italian names for all sorts of things in music.

The 7 notes are C, D, E, F, G, A, B. Here below you can see an image of the keys of a piano oriented in such way that the keys of the lower frequency are lower on the image and keys of higher frequency are higher in the image.

To be able to give names to all 12 notes the black keys on the piano are given its name based on the neighboring white keys. A note directly adjacent above C is called 'C Sharp' written C#. Directly under D is called 'Des' written Db. C# and Db are two names of one and the **same** tone.

A#/Bb	B
G#/Ab	A
F#/Gb	G
	F
D#/Eb	E
C#/Db	D
	C

There are two black keys forming one group and then three black keys forming another group and there are white keys around these two black groups. In total are there 12 black and white keys. The key below the group of two black keys is the C key. The white keys are also the Major scale. Between E and F, B and C is a half note difference. This is so to speak the native distance between notes. When we play other scales it is always a half note between E and F, B and C.

The scales can start from any of the twelve keys. For example a 'C-Major' is having the Major pattern where the Do of the pattern is the C note.

Memorize the scales

Do you need to memorize the scales? Some books on this subject claim that this is strictly necessary. I think you can read the rest of this text without memorizing the scales. I even think that you can compose music without knowing the scales with help of modern computer programs because modern programs have **scale detection** that works like a spell checker. However at some point it is really nice to know the scales anyway because among many things – this scale detection might not work in all situations.

I have tried to memorize the scales myself but I find it really hard. I developed a memorization trick that might help. Essentially I compressed the four scales with help of symbols so that I could write them down on a little paper.

For each scale I dedicated a symbol. For the major scale I decided to use a square '□'. For melodic I decided to use a triangle pointing upwards '△' because it is used for ascending notes. For natural minor I decided to use a triangle pointing downwards '▽'. For harmonic minor I decided to use a circle '○'. For most of the scales the characteristic difference is the position of the half notes, semi notes, so I use the symbols to indicate the location of these. So when nothing is mentioned in my cheat table then it is per definition a whole note step at that position. For one special case, the 6th

note of the harmonic minor scale we need to indicate one and a half whole notes and for this I use a filled circle '●'. Here is a table of the scales and the special places have their symbol:

Major Scale	Natural Minor	Harmonic Minor	Melodic Minor
7. Ti □	7. ti	7. ti ○	7. ti △
6. La		6. la ●	6. la
5. So	5. so ▽		5. so ○
4. Fa	4. fa	4. fa	4. fa
3. Mi □	3. mi	3. mi	3. mi
2. Re			
1. Do	1. do	1. do	1. do

When combining the symbols you get this "cheat" table:

1	2	3	4	5	6	7
	△ ○ ▽	□		○ ▽	●	△ ○ □
□ Major		▽ Natural		○ Harmonic		△ Melodic

This table is compact enough to be stored on a stamp or your finger nails or on the edge of your computer screen, fridge etc.

Example: Let's say we are searching for the scale of D major. We start on position 1 with D to E. Position 2 is E to F# because E to F is a half-step so we need to add one more half and we land on F#. In position 3 we have a square so that is a half-step giving F# to G which is such step. In position 4 we get G to A. In position 5 we get A to B. Position 6 is B to C# because B to C is just a half-step so we need to add one more half-step. Finally in position 7 we find a square and C# to D is such half-step natively.

Basic Triad Chords

On instruments where it is possible to play more notes at the same time a chord is constructed of three notes played at the same time. A triad note can start from any note in the scale major or minor. The lowest note of the triad is the root note of the chord. The chord is named from the note of the root note. It is always so that a triad chord has two unused notes from the scale between the three used notes.

Chord variations

- Augmented: The highest tone of the triad is raised by a semi-tone. Written with a '+' in chord notation.
- Diminished: The highest tone of the triad is lowered by a semi-tone. Written with a '°' in chord notation.

- Seventh Chord: Adding a fourth note on top of the triad after a skipped note of the scale. This can be combined with the augmented and diminished chords. Written with '7' in chord notation.
- Suspended 4: A triad with an added note between the two last regular notes of the triad. Written as 'sus4' in chord notation.
- Suspended 2: A triad with an added note between the two first regular notes of the triad. Written as 'sus2' in chord notation.

Chords in the Major Scale

Regardless if the chord is played in Major or minor scale the chord is said to be a Major if there are four twelve based steps to the second note of the triad. The chord is said to be minor if there are three twelve based steps to the second note of the triad.

Here we will introduce roman numbers to represent the chord. Uppercase is Major and lowercase roman numbers are minor.

Here in the table below is a sample of chords in C Major scale. The rods taking part of the triad are made thicker. On top of the rod is the note name written with Latin characters.

2	G	G	G	G	G	G	G
2	F	F	F	F	F	F	F
1	E	E	E	E	E	E	E
2	D	D	D	D	D	D	D
2	C	C	C	C	C	C	C
1	B	B	B	B	B	B	B
2	A	A	A	A	A	A	A
2	G	G	G	G	G	G	G
2	F	F	F	F	F	F	F
1	E	E	E	E	E	E	E
2	D	D	D	D	D	D	D
2	C	C	C	C	C	C	C
Twelve based note size	C Major, C+D=4 steps, I	D Major, D+E=3 steps, ii	E Major, E+F=3 steps, iii	F Major, F+G=4 steps, IV	G Major, G+A=4 steps, V	A Major, A+B=3 steps, vi	B minor, B+C=3 steps, vii°

Notice the number of steps to the third note of all the chords of the major scale. In all cases they are 7 twelve based steps to the third note of the triad except for B-D-F where it is 6 steps. This makes it a diminished chord.

Chords in a minor scale

The sixth and seventh notes of the three minor scales are different. This means that for each chord in a minor scale there are several constructions possible. For C minor the following chords are the most common: i, ii°, III, iv, V, VI, #vii°. In the table below 'nms' stands for natural minor scale. 'hms' stands for harmonic minor scale. 'mms' stands for melodic minor scale.

7																					
6																					
5																					
4																					
3																					
2																					
1																					
12																					
11																					
10																					
9																					
8																					
7																					
6																					
5																					
4																					
3																					
2																					
1																					
	n	h	m	n	h	m	n	h	m	n	h	m	n	h	m	n	h	m	n	h	m
	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
	i	i	i	ii°	ii°	ii	III	III+	III+	iv	iv	IV	v	V	V	VI	VI	vi°	VII	vii°	vii°

Chord Inversions

The position of the notes in a chord can alter by moving the top note one octave lower. Also other notes of a chord can be moved one octave up or down. Normally the original root of the chord remains the root. In general the reason for inverting chords is to make successive chords flow over in each other more naturally.

Chord Progressions

For the major scale the following progressions are common:

Chord	Is often followed by
I	Any other chord
ii	I, V, vii°
iii	I, IV, vi
IV	I, ii, V, vii°
V	I, vi
vi	I, ii, iii, IV, V
vii°	I

For chords in the minor scale the following progressions are often used:

Chord	Is often followed by
i	Any other chord
ii° (ii)	i, V(v), vii°(VII)
III (III+)	i, iv(VI), VI(#vi°), #vii°(VII)
iv (IV)	i, V(v), #vii°(VII)
V (v)	i, VI (#vi°)
VI (#vi°)	i, III(III+), iv(IV), V(v), #vii°(VII)
vii° (VII)	i

The chords in parenthesis are less common.

Cadence

Music is often composed of successive pieces. Such piece often starts with an I/i chord and then progressing through various number of chords to the IV or V chord, the harmonic goal of the piece. Then the piece returns to I chord through various progressions. The music is building up and releasing tension and the I chord is always the harmonic base point.

The last part of the progression from the chord V or IV to chord I is called cadence, the ending of the music.

It is possible to form the ending in several ways. It is for example possible to make use of all notes of the scale while progressing to chord I. This gives a complete feeling to the music. It is also possible to use just some of the notes of the scale while progressing to chord I. It is also possible to skip chord I. In such case the composer is teasing the listener a bit. Normally when this is used it is only taking place inside a piece and not at the very end of the piece.

Music Sentence structure

A musical sentence normally starts from I and ends with a cadence. The word sentence in this respect is a metaphor. It is often so that one sentence is followed by another and then the first is coming back. In such case is one sentence often noted as A and the next is B. The piece is then AB. In popular music is AABA a common form. Then it is common with AABA followed by a bridge B2 and then returning to AABA. This is then often noted as AABAB2. Another common structure of popular music is: Intro, Verse, Chorus, Verse, Chorus, Bridge, Chorus with fade out or ending with an I chord.

The intro is often instrumental. The verse is the main part of the song. Chorus is the repetition theme and it is also called refrain. The bridge is contrasting to the verse. It arise usually only once in a song.

Make some music!

Traditionally you have to have an instrument to play music. These days you could bypass that step and go directly into composing and producing music with help of a computer. On a computer such programs are called Digital Audio Workstation software, DAW. There exist many various types of DAW programs and manufacturers. It is a delicate matter to make the right choice of what DAW to go with. Inform yourself. Look beyond the ooh and aah. Many producers are passionate about their

DAW but you need to read between the lines and make up your own choice. Think of the choice of DAW as a long term commitment. If you are going to make music then you are probably going to spend much time on learning the program. Find out what sources of information are available for various DAWs because you are going to read a lot about these programs. Also be very aware of that some manufacturers are better than others in marketing. Currently Ableton is world leader in marketing their DAW. You find Ableton advertisement everywhere. Sometimes you can even have Ableton advertisements in your cornflakes package of breakfast cereals. :) Image-Line is doing almost no marketing, as it appears to me. That a company is good in marketing does not necessarily means they are good at serving you. When you make your choice you should also try to find out if the people making the DAW fit with your taste.

For me it became FL Studio by Image Line. I am not affiliated with Image Line in any way. Image Line got a life time license scheme and I liked that. This means that you buy the software once and then you have the license for the rest of your life – with free upgrades along the way. I figured out that in the long run that would be the cheapest solution for me. This combined with that I liked the way the program worked made me buy a license of FL Studio. Some days I am less happy with FL Studio but other times I absolutely love it.

A full working demo version FL Studio can be downloaded and used for free. You can save projects with the demo but you cannot open the projects. That should be enough to evaluate the program to decide if you like it or not. You will be flabbergasted by the number of knobs, menus and widgets in FL Studio. That is how it is. If this was easy then it would be no challenge so just hang in there and keep learning while having fun.

There exists really many ways to start learning FL Studio and they are available on Internet, if you just search for them. You find many Youtube channels about FL Studio and sites, and blogs about producing music with FL Studio. I also recommend searching for the #flstudio hash tag on Twitter.

1. So, if you have not done it already – download FL Studio.
2. Start the program.
3. In the Channels menu select Add One. And then FL Keys. Now you just added a Piano!
4. Press F7. Now you opened the Piano Roll of the Piano. On the left side you see piano keyboard and in the middle of the window you can see a grid. Click in the grid. From the computer speaker you can hear the piano and in the grid you can see a green block representing a note in your piece that you just started to compose. To play the notes you made press the space bar key.
5. Congratulations, you are a music producer!

Here are some tips that will make life easier for you. In the upper left corner of the piano roll window (F7) there is a triangle displaying a drop down menu if you click on it. Turn on the ghost channel. Press Alt + V or Press the drop down menu and Helpers and Ghost Channel. Still in the piano roll menu in the Helpers menu also select Detect score scale. With this enabled FL Studio will help you detect the scale. In the main menu -> Options -> General Settings, disable "Click and hold functions of piano roll" This is prevents the piano roll from duplicating notes when holding them too long which is annoying when you just want to hear the sound. Click on things and then Press F1. I repeat, F1 is your friend. First I hated it but now I like it better and better! **Good luck!**