Music Theory

Basic Level

June 2005

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Introduction

This document is part of a compilation of a series of threads that deal with music theory and that were originally published by Eowyn on www.mysongbook.com. The compilation has been reorganized into three separate documents:

- Basic Music Theory – this document
- Intermediate Music Theory
- Advanced Music Theory

This has been done for two reasons:

1. The size of one single file was too large for download
2. The material covered by the different topics is of varying levels of complexity and targets different audiences.

The text of the original threads has been modified and/or extended in several places where it was deemed appropriate for increased readability. The rather crude layout of the original text (due to the limitation of the forum) has also been improved. Finally, the text has been proof-read by Arnold and Blackiel.

This is by no means an exhaustive treatise about music theory and harmony. Much more modestly, the purpose of this series of topics is to give those willing to better understand what they are doing with their guitar, the ability to get this knowledge into a quick and concise form. The underlying objective is lead work and improvisation in a rock music context (broadly speaking), but most topics are of a more general nature and they can also easily be adapted to other musical genres.
There are numerous books and web sites about general music theory and more specialised topics. Interested readers will find a short reference list at the end of the document.

Intervals

Theory

Intervals aren't much fun to learn but they are essential and we'll need them:

- in the context of scales
- in order to define chords
- to help in analysing phrases and solos

and most importantly, we absolutely need to know how to play them. So please, bear with me and read on.

As you probably know, the whole western musical system is built on 12 notes:

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

Some points worth noting:

- Some notes have two names (e.g. C# - "C sharp", or Db - "D flat"). This is required for theoretical reasons that we will not go into but in practice they are one and the same note.
- This ordered sequence of notes is called a scale; this particular one is the "chromatic scale". We'll get into scales in future topics.
- Between any pair of consecutive notes in the scale above, there is an equal distance of a halftone (H); two halftones form a whole tone (W). Because of that equal distance of a halftone, this scale is called *equal-tempered*. Why there are only twelve notes and why there is that equal distance of a halftone between any pair of adjacent notes is a very complex subject that we won't go into here.

The "distance" between two arbitrary notes is called an "**interval**". When the notes are played sequentially, the interval is called "melodic". When they are played simultaneously, it is called "harmonic".

The name of an interval depends on the number of notes it contains, including the end notes; for example, the interval C - F contains 4 notes (C, D, E, F), and will be called a "fourth".
The type of an interval depends on the number of H's and W's that it contains. An interval can be "*minor*" (m), "*major*" (M) or "*perfect"* (P); in addition, intervals can be "*augmented*" (aug or # or +) (raised by an H) or "*diminished*" (dim or b) (lowered by an H). When nothing is specified, the interval is considered to be major or perfect.

Here's a table of the intervals you should know:

Name	M2	2	m3	3	4	b5	5	M6	6	m7	7	8
Distance	H	W	W+H	2W	2W+H	3W	3W+H	4W	4W+H	5W	5W+H	6W
Example	C-Db	C-D	C-Eb	C-E	C-F	C-Gb	C-G	C-Ab	C-A	C-Bb	C-B	C-C

The "8" is not called a perfect eighth but a perfect octave or simply octave. Intervals can span more than one octave. A "9th" is a 2nd an octave higher, an "11th" in a 4th an octave higher and a "13th" is a 5th an octave higher. I've never seen intervals larger than a 13th being used in practice... and in blues and rock music, you'll rarely need more than the m7.

And finally this: make sure you know the difference between a "chromatic" H and a "diatonic" H:

- A *chromatic* H is when you raise (or lower) a note by an H without changing its name. For example, C - C#, Db - D, Gb - G, A - A# are all chromatic intervals.

- A *diatonic* H is when you raise (or lower) a note by an H and change its name. For example, C - Db, C# - D, F# - G, A - Bb are all diatonic intervals.

Please note: C - C# is musically identical to C - Db... but not theoretically. Damn theorists!

Usage

We'll use intervals a lot when we'll talk about chords and scales.

In standard tuning a guitar is tuned EADGBE from 6th string to 1st string (the 6th string being the low thick string). Interval-wise this means that between any two adjacent strings the interval is a perfect fourth (4), except between the G and B string, where there it is only a major third (3).

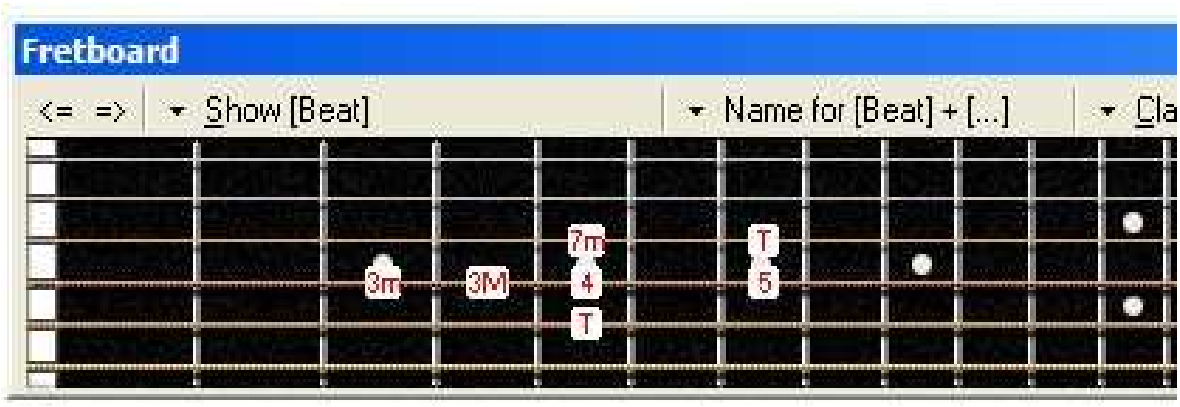
As you probably know, whenever you move up (or down) by one fret on the fret board, the corresponding interval is an ascending (or descending) H. A distance of two frets on the fret board corresponds to a whole tone (W).

As a guitarist (especially lead guitarist), you *have to* be able to *instantaneously* locate the m3, 3, 4, 5 and m7 with respect to any given note anywhere on the fret board. You will need this for fast and correct soloing!

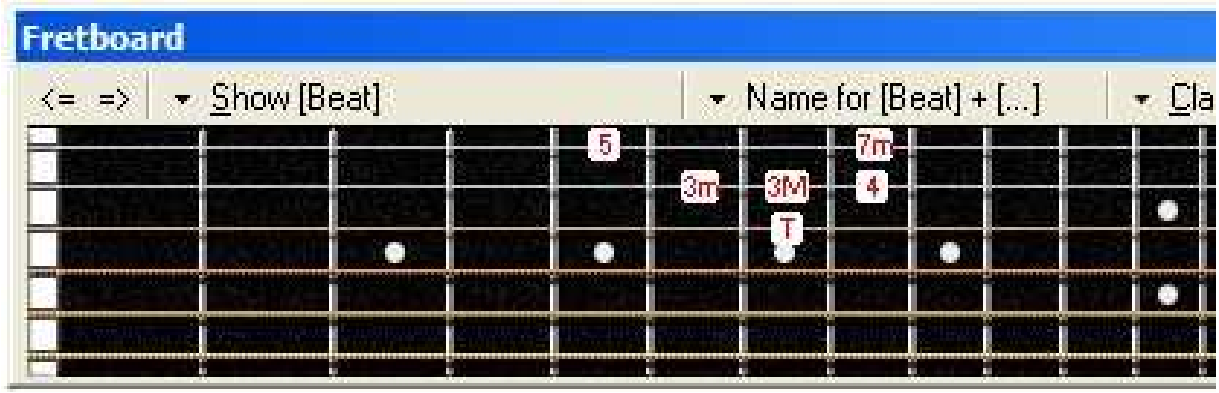
Let's assume you are currently playing the 5th fret on the A string (that's a D note), and let's take that as the basis for our intervals:

- playing the note one fret higher gives you an D# note (or Eb); two frets higher gives you an E; one fret lower gives a Db (or C#); two frets lower gives a C.
- playing the 5th fret on the D string represents a 4, and the resulting note is a G; playing the 4th fret on the D string results in a 3, and the note is an F#. Playing the 3rd fret on that string produces a m3 (an F).
- playing the 5th fret on the G string (that's two strings away) produces a m7 (a D)

The following diagram represents all this information graphically. This diagram is valid anywhere on the fret board, as long as you stay "under" the B string.



Whenever the B string is involved (a note lands on the B string or the interval crosses that string) we need to remember that between the G string and the B string there is only an interval of a 3rd. That changes the shape of the interval patterns; for example:



I strongly recommend you do this exercise for yourself for all the strings at all the fret positions.

Another useful exercise I recommend you do is *intervallic analysis*. Take any melody you know, but take a simple one to start with. Play that melody on the guitar. Now write down the sequence of intervals formed by the notes of the song, using a plus sign whenever the interval is ascending, and a minus sign otherwise. For example, if the melody goes C E G E G A G, the corresponding sequence of intervals will be (+3, +3, -3, +3, +2, -2).

This form of intervallic analysis is useful in relating a melody (or a solo) to the fret board of the guitar, and makes it easier to memorize the melody.

Chords

Intervals are used to define chords. Needless to say, knowing chords and how to build them is very important for the rhythm guitarist. But chords are also very important for the lead guitarist, because the lead phrases must blend with the harmony and not clash with it. In other words, when improvising, you create a melodic line that needs to remain connected with the chord progression played in the background. What that means exactly is something we'll talk about in another section.

For now, let's look at the chords themselves.

Theory

You play a chord when you play at least three different notes simultaneously. Two notes played simultaneously don't really constitute a "chord" but rather a harmonic interval (sometimes called a "dyad").

There are of course many different ways to build chords; we'll stick to the most common approach of stacking up intervals of 3rds (m3 and/or 3) above a starting note called the "root" (R). The root gives its name to the chord.

R + 3rd + 3rd = 3 notes chord, usually called a *triad*
R + 3rd + 3rd + 3rd = 4 notes chord
R + 3rd + 3rd + 3rd + 3rd = 5 notes chord
...etc...

When the first third in the chord is a major third, the chord is *major*; when that first third is a minor third, the chord is *minor*.

For each chord type, there is an equivalent formula, in which all the constituent notes are related to the root. For example, if the construction formula is R + 3 + m3, then the equivalent formula will be (R, 3, 5), because if you add a m3 on top of a 3 you get a 5 with respect to the starting note (i.e. the root).

Triads are the most frequent chords (in rock music at least) and consist of a root (R), a 3rd and a 5th; there are four possible types of triads: *major*, *minor*, *5+* and *b5*.

Four-note chords are less frequent in rock, but abound in classic, jazz and other genres. These chords consist of a root, a 3rd, a 5th and a 7th. There are seven possible types of four-note chords, but the most frequent ones are the *dom7*, *m7*, *maj7* and *dim7*.

Higher order extensions (chords with a 9th, an 11^{th} or a 13th) can be found in blues, funk and jazz music, but very rarely in rock.

Let's build the most important types of chords.

Triads

Type	Formula	Equivalent Formula	Example
Major Chord	R + 3 + m3	(R, 3, 5)	A = (A, C#, E)
Minor Chord	R + m3 + 3	(R, m3, 5)	Am = (A, C, E)
Power Chord	R + 5 + Octave	(R, 5, 8)	A5 = (A, E, A)

PLEASE NOTE: the power chord has no 3rd, and is therefore neither major nor minor!

Four-note chords

Type	Formula	Equivalent Formula	Example
Dominant 7^{th} chord	R + 3 + m3 + m3	(R, 3, 5, m7)	A7 = (A, C#, E, G)
Minor 7th chord	R + m3 + 3 + m3	(R, m3, 5, m7)	Am7 = (A, C, E, G)
Maj7 chord	R + 3 + m3 + 3	(R, 3, 5, 7)	Amaj7 = (A, C#E,G#)
Diminished chord	R + m3 + m3 + m3	(R, m3, dim5, dim7)	Adim = (A, C, Eb, Gb)

PLEASE NOTE: in "Amaj7", the "maj" refers to the interval of a 7th; the chord itself is major! Musical conventions are not always consistent, and here we have an example where it isn't! Usually, when nothing is specified, the interval is major. Here we have the opposite: A7 means "an A major chord with a *minor* 7^{th}", while Amaj7 means "an A major chord with a *major* 7^{th}" and Am7 means "an A minor chord with a *minor* 7^{th}".

In all the examples so far, we have assumed that the root is the lowest note in the chord; but this isn't necessarily the case. When the lowest note is not the root, the chord is said to be "inverted".

There are as many possible inversions as there are notes in the chord. Inversions are notated with the "slash" notation. For example, C/G means a C chord with a bottom G. An inversion certainly changes the way a chord will sound, but does not change its quality: C/G remains a C chord.

Usage

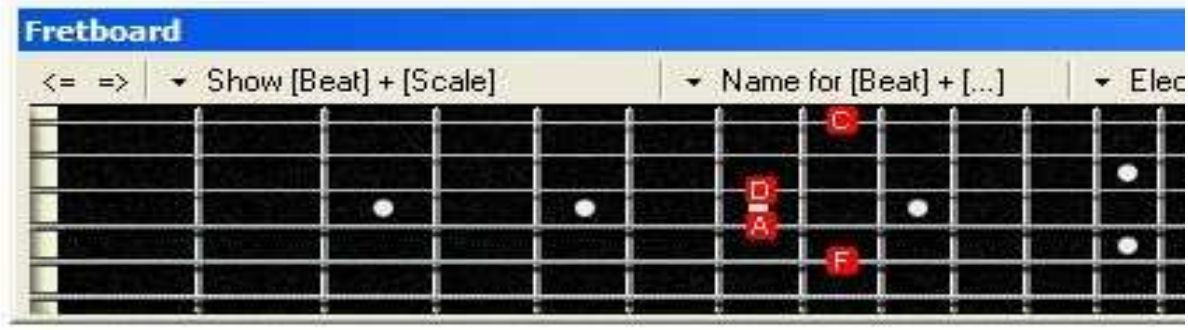
In order to build a chord on the guitar, proceed as follows:

- Find the chord's constituent notes first.
- Next, select a string where you'll play the root (or lowest note in case of an inversion). This is typically the 6th, 5th or 4th string, but can also be the 3^{rd} string.
- Locate the 3rd of the chord on the next string, then the 5th of the chord, and so on. However, if fingering requires, you can change that order. In other words, it is not mandatory to play the notes of the chord in the order of the theoretical chord formula. You can also double up certain notes at the octave (but never double a 7th).

Here is an example: suppose we want to build a Dm7 (D – F – A – C) on the fret board, and suppose we want the 3^{rd} (F) to be in the bass on the 5^{th} string. We can work out a fingering pattern as follows:

- The F on the 5^{th} string is at the 8^{th} fret
- The A is a minor third higher, which brings us on the 4^{th} string at the 7^{th} fret
- The D can be played at the 7^{th} fret of the 3^{rd} string
- Finally, there is a C note waiting to be played at the 8^{th} fret of the 1^{st} string

The resulting diagram is:



The B string should not be played.
The actual way you decide to play the chord is called its *voicing*, and the way the various voices of the chords move when changing chords is called *voice-leading*. Excellent voicing and voice-leading skills are required for chord-based improvisations (frequent in jazz), and are also important in classical music.

The Major Scale

The chromatic scale is unquestionably the cradle of all scales, but the Major Scale is the mother of most of them!

Theory

A scale is a sequence of notes organised in ascending pitch order.

Let's start with the following scale:

C D E F G A B (C)

The first note of a scale is called the **tonic**, and gives its name to the scale - so this is a C scale. If the first 3rd of the scale (with respect to the tonic) is a major third (3), the scale will be "major"; if it is a minor third (m3), the scale will correspondingly be "minor". So the scale above is a "C Major scale". Although you may think that any scale is either major or minor, in fact this is not the case. Some scales are neither major nor minor because they contain a minor third *and* a major third! Other scales don't contain any third. We'll get into to that later on.

This C major scale is not the only possible C major scale; there are other major scales starting with C. However, this particular C major scale has become extremely important in what is called tonal music, and has acquired a dominant position over all the other major scales. This is why we will call it *the* C major scale (more on the other "major" scales later on).

Instead of writing the notes of the C Major scale, let us write the intervals between each pair of consecutive notes in the scale; that gives us:

W W H W W W H

and leads to the following *extremely* important definition:

For a scale to be major, its notes must be laid out according to the interval pattern (W W H W W W H).

With that definition we can build all the major scales we want. For example, let's build the G Major scale. First, we write down the plain notes:

G A B C D E F (G)

Next, we check that the interval between each pair of consecutive notes corresponds to the prescribed pattern. We find that this is almost the case; the only discrepancies are between E and F where we have an H instead of a W, and between F and G where we have the opposite situation. So, we need to sharpen the F note; the resulting scale is:

G A B C D E F# (G)

As you can verify, this scale now corresponds to the prescribed pattern.

In a G Major scale, the F note will *always* be sharp; on a music staff, this is indicated at the clef by placing a sharp sign on the F line. This is called the "key signature" and it immediately tells us that the tune is written in G Major (or a relative of G Major - more on this later). G Major (in this case) is the "key" or "tonality" of the tune.

Building a major scale can sometimes be a tad bit more complicated; for example, let's build the F# Major scale. The plain notes are:

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

Starting with the tonic, we inspect the scale, and sharpen up every note that needs it (according to the major scale pattern). The end result is:

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

Surprise! This scale contains an E# note! Isn't that strictly equivalent to F? Absolutely, but by convention in any scale, we can have only one occurrence of each note (name); if we wrote F and F#, we would violate this rule. So we "cheat" and we write E#!

Finally, please note that not all major scales are build with sharps; sometimes you need to use flats instead. For example, the Ab Major scale is:

Ab Bb C Db Eb F G Ab

Similarly, the F Major scale is:

F G A Bb C D E (F)

Tip: in a scale, you can use sharps or flats, but not both!

Since the chromatic scale contains twelve distinct notes, and since each note can become the tonic of a major scale, there are twelve different major scales; the following table lists them all:

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

In fact, this table only contains the most common forms of the major scales. In theory, there are *24* different notes, since each note has two different names (F# can be called Gb, for example, and C can be called B#). So theoretically there are 24 different major scales, and nor 12.

We already talked about chords. Chords and scales are related in many ways. Here's one link between the two.

Let's take that C major scale again:

C D E F G A B (C)

Now, on each degree of the scale, we build a triad the way we did in the section on chords (i.e. stacking up 3rds), *and* we restrict ourselves to notes belonging to the scale (notes belonging to a scale are said to be *diatonic* to that scale; for example F# is not diatonic to C major, but is diatonic to D major). This gives us the following series of chords, called the *harmonisation* of the major scale:

- (C, E, G) = C
- (D, F, A) = Dm
- (E, G, B) = Em
- (F, A, C) = F
- (G, B, D) = G
- (A, C, E) = Am
- (B, D, F) = Bm(b5)

Let's write them down in sequence:

C Dm Em F G Am Bm(b5)

As you can see, the chords on the 1st, 4th and 5th degree of the scale are major; all the other chords are minor (and the chord on the 7th degree has a flatted 5th). This will clearly be the case for *any* major scale, since the notes of any major scale will correspond to the same interval pattern (make sure you fully understand this!!). So instead of writing the actual chord names, we write, in general:

I ii iii IV V vi vii(b5)

In this convention the Roman numerals represent the degrees of the major scale (of *any* major scale, in fact); uppercase numerals indicate major chords, and lowercase numerals indicate minor chords (sometimes, you will also find minor chords notated IIm, IIIm, etc.).

The Roman numeral notation is very convenient, and you should know this sequence by heart; it will let you anticipate the chords to be expected in any given key.

For example, the harmonisation of the A Major scale produces the following triads:

A Bm C#m D E F#m G#m(b5)

Instead of harmonising a scale with triads, we can also use four-note chords; in that case the chords are:

Imaj7 ii7 iii7 IVmaj7 V7 vi7 vii7(b5)

In A major, we have:

Amaj7 Bm7 C#m7 Dmaj7 E7 F#m7 G#m7(b5)

Usage

The first obvious usage of this information is transposition. Say you have a tune in A major, but that's too high for you to sing comfortably; you can "translate" it note for note and chord for chord in another key (e.g. D major):

A Major Scale	A	B	C#	D	E	F#	G#
A Major Harmonisation	A	Bm	C#m	D	E	F#m	G#m(b5)
D Major Scale	D	E	F	G	A	B	C#
D Major Harmonisation	D	Em	F#m	G	A	Bm	C#m(b5)

So, each C#m chord in the key of A becomes an F#m chord in the key of D, and so on.

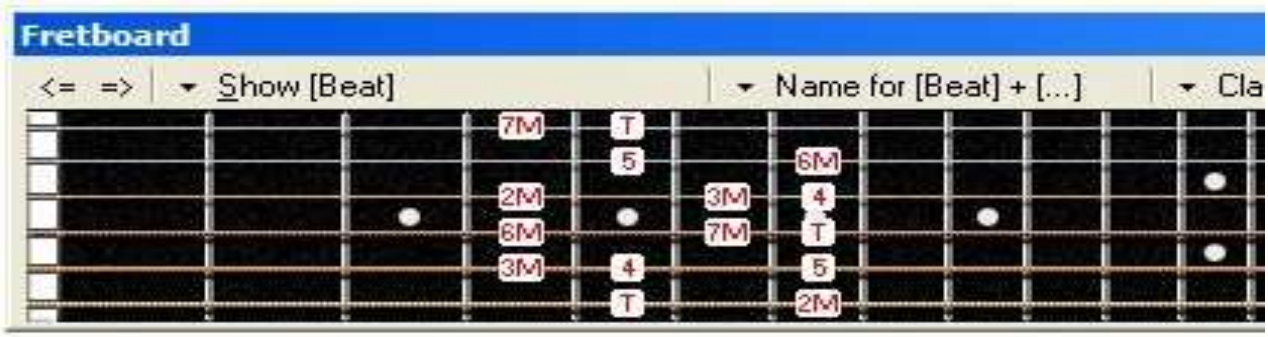
A second usage is harmonising a melody. To obtain a basic harmonisation for a given melody:

- Concentrate on the strong beats (downbeats) of each bar. Those are the 1st and 3rd beat of each bar.
- Identify the melody notes that fall on the strong beats
- Pick up a chord from the scale harmonisation, such that the melody note is either the root, or the 3rd, or the 5th, or the 7th of that chord.

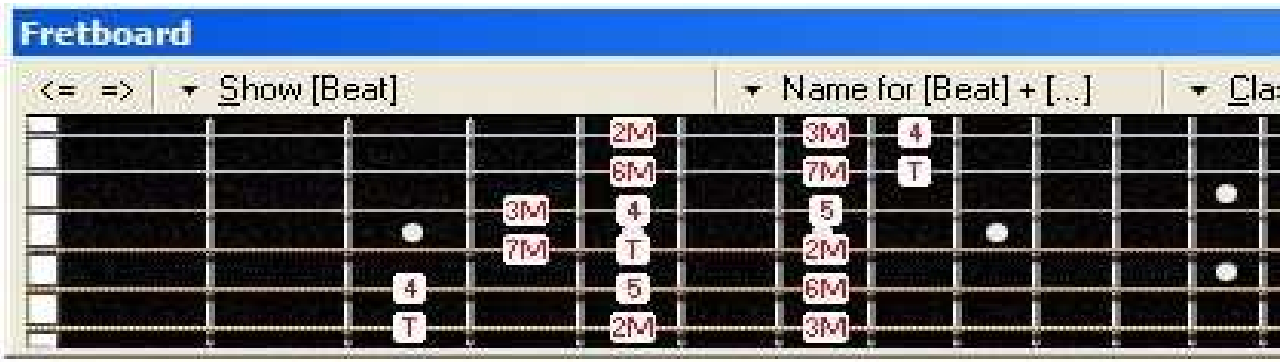
Finally, the major scale can be used for improvisation, especially if you're after long lyrical melodic phrases like in classical music.

You'll probably find out that the Major Scale is actually much more difficult to use for soloing than you may think - it is very easy to sound "cheesy" with it!

The following diagram represents a very simple and compact "implementation" of the major scale on the fret board (there are of course many other possibilities). This diagram is of course moveable along the fret board, and to make that obvious I have represented the degrees of the scale instead of the names of the notes.



Another possibility is as follows:



The Minor Scales

After the Major scale, we explore the minor scales. Things are going to become slightly more complicated, and we'll meet some new chords.

Theory

The Natural Minor Scale

A smooth an easy way to approach the minor scales is to start from… the major scale! Here is the C Major scale again:

C D E F G A B (C)

Let's build a scale whose tonic is located a m3 below the current tonic, or (equivalently) a 6 above it, and whose notes are the same as those of the current major scale; the note located a m3 below C is A, so the new tonic is the A, and the new scale becomes:

A B C D E F G (A)

This scale is called the "A natural minor scale"; it is minor by construction, since its first 3rd (A – C) is a m3. We say that this scale is a relative minor scale to C Major, which is (conversely) its parent major scale.

Every major scale has a relative natural minor scale whose tonic is located a m3 below the tonic of the major scale and containing the same notes as the major scale. Conversely, every minor scale has a parent major scale whose tonic is located a m3 higher than its own tonic and containing the same notes as the minor scale.

For example, the E natural minor scale is a relative minor scale to G Major, as follows:

E F# G A B C D (E)

So, given a major scale, we can always determine its relative natural minor scale. But we can also describe the structure of this scale, as we did for the major scale, by writing down the series of intervals between each pair of consecutive notes; in this case we find

W H W W H W W

That gives us another mechanism for building natural minor scales. Simply write down the plain sequence of notes first, and then alter them so as to obtain the pattern above.
For example, let's build the D natural minor scale. We first write the plain notes:

D E F G A B C (D)

We see that the only discrepancy is between the A and the B, where we have a whole tone and we need a halftone instead. So we flatten the B, giving:

D E F G A Bb C (D)

This scales happens to contain the same notes as the F major scale, as expected (D is located a minor third lower than F).

We can also harmonise the natural minor scale, with triads or four notes chords, as we did for the major scale: for example, in A minor we have

Triads	Am	Bm(b5)	C	Dm	Em	F	G
Four notes	Am7	Bm7(b5)	Cmaj7	Dm7	Em7	Fmaj7	G7

Generalising that as we did for the major scale, and using the roman numerals notation:

Triads	i	ii(b5)	III	iv	V	VI	VII
Four notes	i7	ii7(b5)	IIImaj7	iv7	v7	VImaj7	VII7

As you can see, these are just the exact same chords as for the major scale, but "shifted" by a m3.

In the natural minor scale the 7th degree is located a m7 away from the tonic (or equivalently, a 2 below the octave); this has two main disadvantages:

- the W step from the 7th degree to the octave is relatively difficult to negotiate for a singer when going up the scale
- compared with the major scale, the natural minor scale lacks a clear resolution from 7 to tonic. As we will discuss in a future topic, the ascending H melodic movement from the 7th degree to the tonic is one of the strongest and most conclusive ways to establish a tonality, and therefore one of the strongest features of the major scale. We lack this ability with the natural minor scale.

The Harmonic Minor Scale

To compensate for this, early music theorists of the XVIIth century have invented the harmonic minor scale: it is similar to the natural minor scale, except it has a raised seventh; the harmonic A minor scale for example becomes:

A B C D E F G# (A)

Interval-wise, we now have:

W H W W H WH H

A side effect of this modification is a more complex harmonisation of the scale; harmonising with triads gives us:

Chord	I	ii(b5)	III(#5)	Iv	V	VI	vii(b5)
Formula	(R,m3,P)	(R,m3,b5)	(R,3,5+)	(R,m3,5)	(R,3,5)	(R,3,5)	(R,m3,b5)
Example	Am	Bm(b5)	Caug	Dm	E	F	Gm(b5)

Two things to note:

- the fifth degree now supports a major chord, as in the major scale
- on the third degree we have an augmented chord, i.e. a chord with a raised 5th. This is a very unstable chord.

Harmonising with four notes chords gives:

Chord	imaj7	ii7(b5)	IIImaj7(#5)	iv7	V7	VImaj7	Vii dim
Formula	R,m3,5,7	R,m3,b5,m7	R,3,5+,7	R,m3,5,m7	R,3,5,m7	R,3,5,7	R,m3,b5,m7
Example	Am(maj7)	Bm7(b5)	Cmaj7(#5)	Dm7	E7	Fmaj7	G dim

Again, a couple of remarks:

- the first degree supports a new chord: a minor chord with a major seventh
- on the seventh degree, we have a fully diminished chord; this is dominant seventh chord (e.g. G7), in which all the notes except the root are lowered by a H (unlike the m7(b5) where only the 5th is lowered).

With the harmonic minor scale we have again this conclusive melodic H movement from 7th degree to tonic *but* we also have a nasty WH interval between the 6th and 7th degree! This was not considered very convenient, and has led to a third version of the minor scale.

The Melodic Minor Scale

To address the nasty WH interval problem in the harmonic minor scale, the 6th degree of the harmonic minor scale was in turn raised by a H, giving birth to the melodic minor scale:

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

Compare this scale with the A Major scale:

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

As you can see, the only difference is the flatted third - the melodic minor scale sounds very major, apart from the m3.

The triad-based harmonisation of the melodic minor scale is:

I	Ii	III aug	IV	V	vi(b5)	vii(b5)
R,m3,5	R,m3,5	R,3,#5	R,3,5	R,3,5	R,m3,b5	R,m3,b5

and the four-notes counterpart:

imaj7	ii7	IIImaj7	IV7	V7	vi7(b5)	vii7(b5)
R,m3,5,7	R,m3,5,m7	R,3,#5,7	R,3,5,m7	R,3,5,m7	R,m3,b5,m7	R,m3,b5,m7

You will also often see i6 (R, m3, 5, 6) as the tonic chord; this chord is not build in thirds only, but highlights the sixth of the scale, which is characteristic of the melodic minor scale.

Usage

As stated previously (and should now be obvious), the minor scales are significantly more complex than the major scale; but they also offer much more expressive power than the simpler major scale.

The natural minor scale was very popular in the western middle-ages (as we will see later, it corresponds to the old Aeolian church mode).

The two other minor scales are a more recent invention of the classical period; their usage was extremely codified: one would use the melodic minor scale only for ascending movements, and the natural minor scale for descending movements (for that reason, the melodic minor scale is sometimes called the *ascending* melodic minor scale).

Nowadays, the rules for using the minor scales aren't so strict anymore. The natural minor scale enjoys a new popularity, so you won't upset anyone by playing it. In fact, you are free to use and mix all these scales as you want. This gives you a lot of freedom.

If you use triads, you have the following harmonic options:

1st Degree	2nd Degree	3rd Degree	4th Degree	5th Degree	6th Degree	7th Degree
I	ii(b5)	III	Iv	v	VI	VII
		III aug	IV	V	vi(b5)	vii(b5)

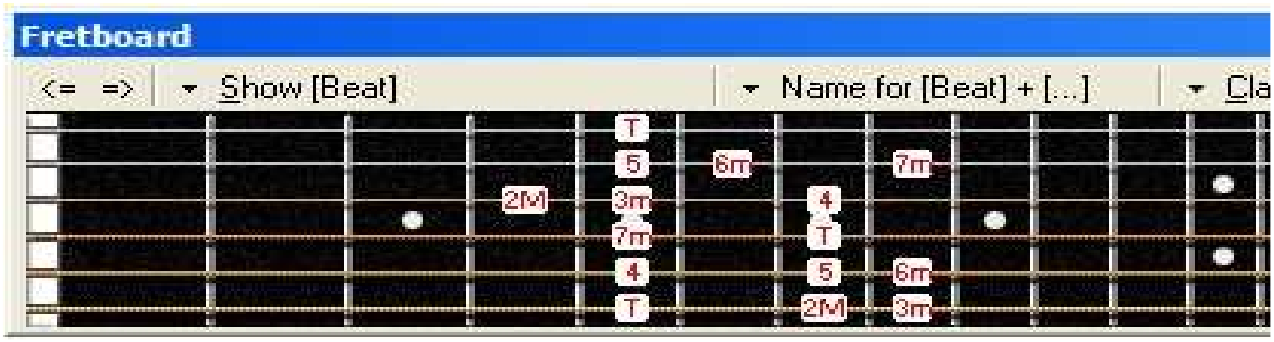
If you use four-note chords, the possibilities are:

1st Degree	2nd Degree	3rd Degree	4th Degree	5th Degree	6th Degree	7th Degree
i7	ii7(b5)	IIImaj7(#5)	iv7	V7	VImaj7	VII dim
imaj7	ii7		IV7		vi7(b5)	vii(b5)

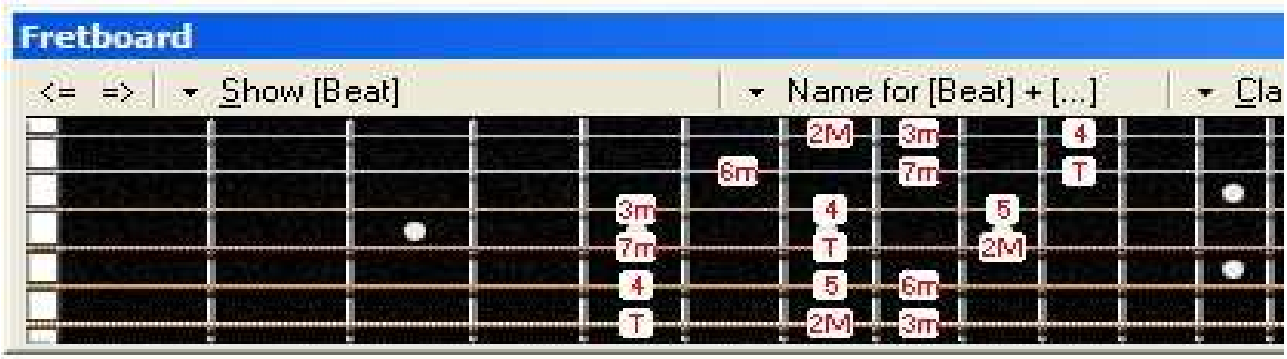
From an improvisation standpoint, the major scale and its relative minor scales are of course *completely equivalent*. You can therefore use a relative minor scale over a major harmony, and vice-versa.

When the harmony is minor, you really have to take the harmonic constraints into consideration and choose the scale with care. For example you will probably find that the harmonic minor scale doesn't sound very well, except over the V chord. Therefore, in practice, you will probably stick to the natural minor scale, and only use the harmonic minor over the V chord.

The following diagram represents one way of playing the natural minor scale, and is a simple adaptation of the major scale pattern described previously:



Another fingering (similar to the second diagram of the major scale) is as follows:



You can easily find the fingering patterns for the two other minor scales (harmonic and melodic).

References

Books:
Clefs Pour l'Harmonie - Jo Anger-Weiler

Internet Sites
www.schenkerguide.com
www.tonalityguide.com
www.teoria.com
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