



Harmony & Theory

Guitar Institute [Nederland](#)

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Harmony & Theory

The objective of the Harmony & Theory module is to help you learn understand the harmonic building blocks of music.

The benefit of understanding harmony & theory can be compared to the benefit of understanding the alphabet. Imagine you would have to learn



reading or writing without knowing the alphabet. It would require learning thousands of words.

Learning music will be a lot easier and faster when you understand the elementary building blocks of harmony. The harmony & theory module will:

- Help you recognize and easily memorize chord progressions and melodies
- Enable you to play songs effortless in any key
- Provide a framework for songwriting and arranging
- Open up countless possibilities in a systematic way for improvisation



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Harmonic roadmap

Major

I	Ionian (major)	1	2	3	4	5	6	7	maj7	9, 11, 13
II	Dorian	1	2	b3	4	5	6	b7	min7	9, 11, 13
III	Phrygian	1	b2	b3	4	5	b6	b7	min7	b9, 11, b13
IV	Lydian	1	2	3	#4	5	6	7	maj7	9, #11, 13
V	Mixolydian (dominant)	1	2	3	4	5	6	b7	dom7	9, 11, 13
VI	Aeolian (natural minor)	1	2	b3	4	5	b6	b7	min7	9, 11, b13
VII	Locrian (half diminished)	1	b2	b3	4	b5	b6	b7	min7b5	b9, 11, b13

Melodic minor

I	Melodic minor	1	2	b3	4	5	6	7	min maj7	9, 11, 13
II	Dorian b2	1	b2	b3	4	5	6	b7	min7	b9, 11, 13
III	Lydian augmented	1	2	3	#4	#5	6	7	maj7#5	9, #11, 13
IV	Lydian dominant	1	2	3	#4	5	6	b7	dom7	9, #11, 13
V	Mixolydian b6	1	2	3	4	5	b6	b7	dom7	9, 11, b13
VI	Aeolian b5	1	2	b3	4	b5	b6	b7	min7b5	9, 11, b13
VII	Super locrian (altered)	1	b2	b3	b4	b5	b6	b7	dom7(b5)	b9, #9, b13

Harmonic minor

I	Harmonic minor	1	2	b3	4	5	b6	7	min maj7	9, 11, b13
II	Locrian nat. 6	1	b2	b3	4	b5	6	b7	min7b5	b9, 11, 13
III	Ionian #5	1	2	3	4	#5	6	7	maj7#5	9, 11, 13
IV	Dorian #4	1	2	b3	#4	5	6	b7	min7b5	9, #11, 13
V	Phrygian dominant	1	b2	3	4	5	b6	b7	dom7	b9, 11, b13
VI	Lydian #2	1	#2	3	#4	5	6	7	maj7	#9, #11, 13
VII	Super locrian bb7	1	b2	b3	b4	b5	b6	bb7	maj6b5	b9, #9, b13

Diminished (octatonic)

I	Half-whole	1	b2	b3	3	#4	5	6	b7	dom7	b9 #9 #11 13
II	Whole-half	1	2	b3	4	b5	b6	6	7	min maj7b5	9, 11, b13, 13

Augmented

I	Whole tone	1	2	3	#4	#5	b7		dom7#5	9, #11
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The Major scale

The notes from the major scale can be considered the foundation from which modern western music derives most of its harmonies and melodies.

The C-major scale on piano

A piano is built around the C-major scale, represented by its 7 white keys that repeat in octaves.

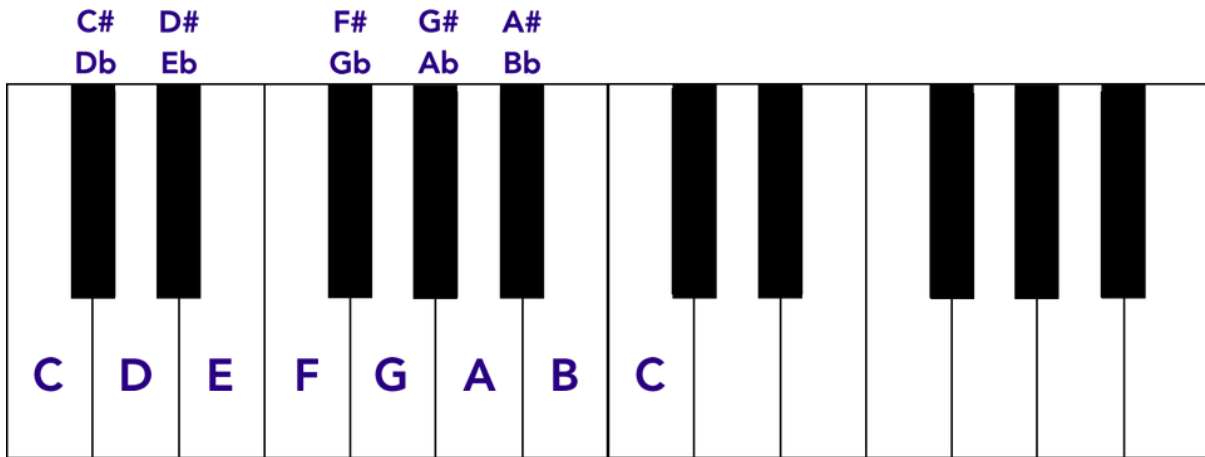


Figure 1: The C-major scale on piano

The black keys in between, are called 'sharp' notes (#) or 'flat' (b) notes, which are inseparable from the major scale as they affect the distances between the notes of the C-major scale:

whole – whole – half – whole – whole – whole – half

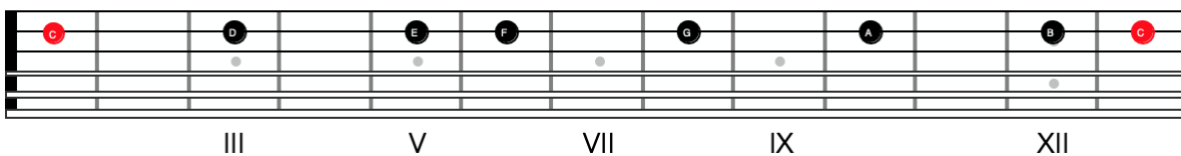
The 7 white keys together with the black keys in between are called the 'chromatic scale'.

Exercise: write down the notes of the following major scales: G, D, A, F, Bb and Eb

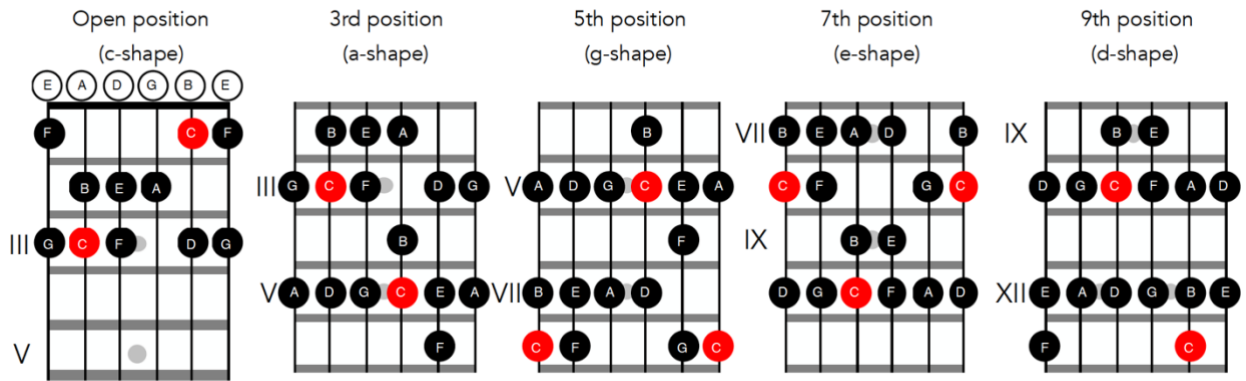
The C-major scale on guitar

The C-major scale is more difficult to play on guitar as its notes are inseparable from the flats and sharps. Still, the distances between the notes are the same, being 2 whole steps, a 1/2 step, 3 whole steps and a 1/2 step:

The C-major scale on the 2nd string



The C-major scale in 5 positions on the guitar:



Intervals

A single note doesn't have that much meaning but gets meaning in relation to an underlying root. For example: the note C is a 'happy note' against an Ab root as it is a major 3rd. The same note is a minor 3rd when an A root is played underneath. Therefore understanding 'distances' between notes - or in music terms *intervals* - is crucial.

The major scale functions as the **measuring rod** in music for these intervals. We can define the intervals of the C-major scale as follows:

From C to:	Interval	Distance (semi-tones)	Interval name
C	1	0	Prime
D	2	1	(Major) Second
E	3	2	(Major) Third
F	4	2 ½	(Perfect) Fourth
G	5	3 ½	(Perfect) Fifth
A	6	4 ½	(Major) Sixth
B	7	5 ½	(Major) Seventh
C	8	6	Octave

Exercise: given the distances provided, write down the intervals for the following notes:

- 1) G → A, C & F#
- 2) E → G#, B & C#
- 3) D → A, C & F#
- 4) Bb → D, Gb & A
- 5) C# → A, C & F#

Exercise: given the root notes provided, write down the notes for the following intervals:

- 1) D → major 3rd, major 6th & perfect 4th
- 2) F → major 2nd, perfect 5th & major 7th
- 3) B → perfect 4th, major 3rd & major 6th
- 4) Ab → major 2nd perfect 4th & major 7th
- 5) Eb → major 3rd, perfect 5th & major 7th

Flats and sharps

Now we have looked at the intervals of the 7 notes of the major scale, we will also look at the remaining 5 notes which are the 'flats' and 'sharps' in the between these notes:

From C to:	Interval	Distance (semi-tones)	Interval name
C# / Db	b2	1/2	Minor second
D# / Eb	b3	1 1/2	Minor third
F# / Gb	#4/ b5	3	Augmented fourth/ Diminished fifth
G# / Ab	#5/ b6	4	Augmented fifth/ Minor sixth
A# / Bb	b7	5	Minor seventh

Note that a second, third, sixth and seventh can be called *major* or *minor* (lowered). A fourth and a fifth can be perfect, diminished (lowered) or augmented (raised).



Exercise: given the root note provided, write down the intervals for the following notes:

- 1) G → Ab, C# & F
- 2) E → G, Bb & C
- 3) D → F, Ab & C
- 4) Bb → Db, E & Ab
- 5) C# → D, A & G

Exercise: given the root note provided, write down the notes for the intervals provided:

- 1) D → minor 3rd, minor 6th & augmented 4th
- 2) F → minor 2nd, diminished 5th & minor 7th
- 3) B → augmented 4th, minor 3rd & minor 6th
- 4) Ab → minor 2nd, augmented 4th & minor 7th
- 5) Eb → minor 3rd, augmented 5th & minor 7th

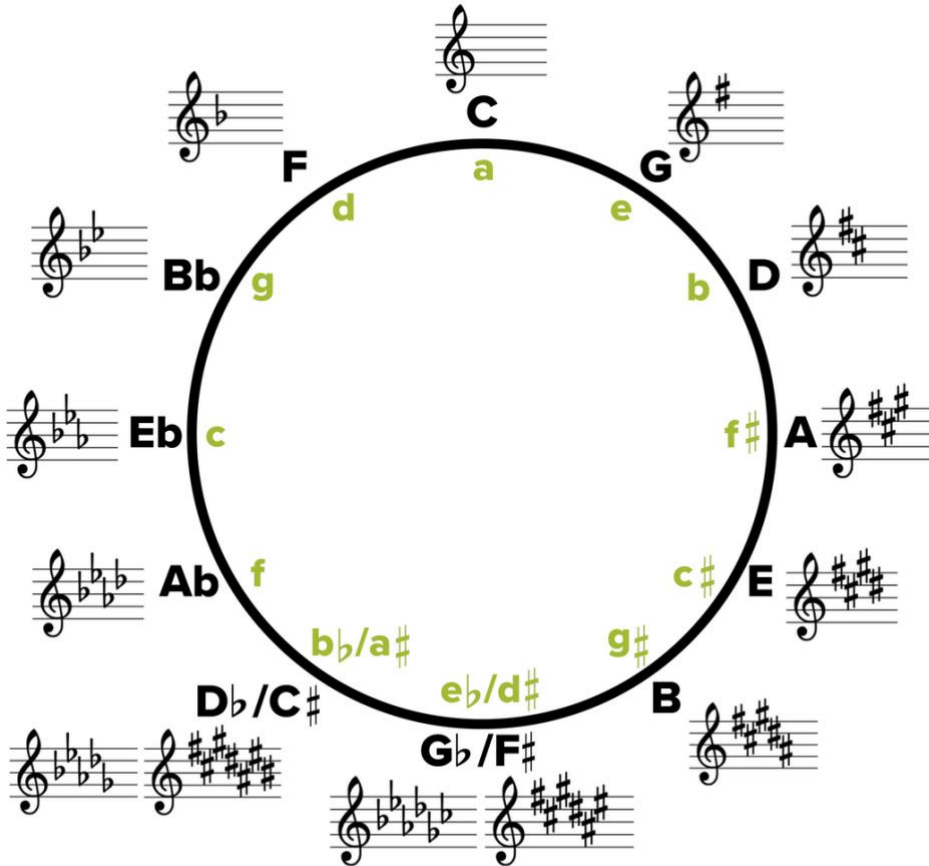
Inversions

We have looked at all 12 intervals of the chromatic scale whereby the root note was assumed to be the lower of the two. Playing a root note, we can of course also play an interval going down in pitch, in which case we find inversion of the interval:

Root = C	Ascending Interval	Descending Interval
D	2	b7
E	3	6
F	4	5
G	5	4
A	6	3
B	7	b2

The cycle of fifths

By now you may have noticed that the C-major scale has no sharps or flats. However, the C-major scale is only 1 major scale out of all 12. All 12 major scales can be ranked according to the number of sharps and flats when they are placed in the right order, being in fifths or fourths:



Starting with the C-major scale (or the 'key' of C), we can move up (clockwise) a fifth to find a new major scale (key) with one additional sharp.

Starting with the C-major scale (or the 'key' of C), we can move down a fifth (counterclockwise) to find a new major scale (key) with one additional flat.

The cycle of fifths is also called the cycle of fourths, as moving down a fourth will give the same result clockwise and moving up a fourth gives the same result counterclockwise.

Chords

Major & minor triads

We can build triad chords by simply stacking a root note, a third and a fifth:

Chord	Notation	Formula	Example: C
Major	maj or M	1 3 5	C E G
Minor	min, m or -	1 b3 5	C Eb G
Diminished	dim or °	1 b3 b5	C Eb Gb
Augmented	aug or +	1 3 #5	C E G#

Exercise: write down the notes of a G, F, A and D major, minor, diminished and augmented triad.

Sus-chords

The triads that we have looked at all contained a third, which defined whether the chord is major or minor.

If we substitute the third by a second or by a fourth, we create a 'sus-chord', which is neither major nor minor:

Chord	Notation	Formula	Example: C
Sus 2	sus2	1 2 5	C D G
Sus 4	sus4, sus	1 4 5	C F G

Note that when notation only states 'sus', it by definition refers to a sus4 chord.

Exercise: write down the notes of a G-, F-, Bb and D-major, minor, diminished and augmented triad.

Seventh chords

When we add a fourth note to a triad, we get a 4-note chord, containing a root, third, fifth and seventh.

Chord	Notation	Formula	Example: C
Major 7	maj7 or M7	1 3 5 7	C E G B
Dominant 7	dom7, or 7	1 3 5 b7	C E G Bb
Minor 7	min7, m7 or -7	1 b3 5 b7	C Eb G Bb
Minor 7b5	min7b5, m7b5 or -7b5	1 b3 b5 b7	C Eb Gb Bb
Diminished 7	dim7 or °7	1 b3 b5 6	C Eb Gb A
Augmented 7	aug7 or +7	1 3 #5 b7	C E G# Bb

Note that when a chord only states '7' - such as in C7 – the chord has a flattened 7 (b7) and not a major 7.

Furthermore, note that a min7b5 chord is also called a 'half diminished' chord. It is 'in between' a normal min7 chord (1 b3 5 b7) and a diminished chord (1 b3 b5 bb7). In contrast to a min7 chord it has a b5 and in contrast to a diminished chord it has a b7 instead of a 6 (or bb7).

Exercise: write down the notes of the following A, Bb, Eb, and E chords: major 7, minor 7, minor 7b5, diminished 7 and augmented 7.

Extended chords

When we add notes beyond the 7th interval, we obtain 'extended' chords, such as 9, 11 and 13 chords.

Extended major chords

Chord	Notation	Formula
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Major 7	maj7 or M7	1 3 5 7
Major 9	maj9 or M9	1 3 5 7 9
Major 11	maj11 or M11	1 3 5 7 9 11
Major 13	maj13 or M13	1 3 5 7 9 11 13

Note there is an exception to the rule: a major 11 chord is generally not played. The reason for this is that the major 3rd and the 11th (4th) are a semi-tone apart, which creates a dissonance.

Particularly in jazz, the 11th interval is sharpened in order to avoid this tension, resulting in a maj9#11 chord.

Exercise: write down the notes of a C, Bb, D and Eb major 13 chord.

Extended dominant chords

Chord	Notation	Formula
Dominant 7	dom7 or 7	1 3 5 b7
Dominant 9	dom9 or 9	1 3 5 b7 9
Dominant 11	dom11 or 11	1 3 5 b7 9 11
Dominant 13	dom13 or 13	1 3 5 b7 9 11 13
Altered dominant*	dom7 alt	1 3 b7 b5,#5 b9,#9

*Altered dominant chords are dominant chords particularly used in jazz, whereby the 5 or 9 is flattened to a b5 or b9 or sharpened to a #5 or #9 to create tension.

Exercise 1: write down the notes of a C, F, G and Bb dominant 13 chord.

Exercise 2: write down the notes of a B7#5b9 chord

Extended minor chords

Chord	Notation	Formula
Minor 7	min7, m7 or -7	1 b3 5 b7
Minor 9	min9, m9 or -9	1 b3 5 b7 9
Minor 11	min11, m11 or -11	1 b3 5 b7 9 11
Minor 13	min13, m13 or -13	1 b3 5 b7 9 11 13

Exercise: write down the notes of a A, D, G and E minor 13 chord.

Add-9, add-11 & 6-chords

As you may have noticed in the previous section, whenever we name a chord a number, all the lower degrees chord tones are in there as well. To clarify: in addition to the 11, a 11-chord also contains a 7 and 9.

If we only want to add a single higher degree interval, we simply call it an 'Add' (from 'additional') chord.

Chord	Notation	Formula	Example: C
Major add9	add9	1 3 5 9	C E G D
Major add11	add11	1 3 5 11	C E G F
Major 6	maj6, 6	1 3 5 6	C E G A
<hr/>			
Minor add9	min add9	1 b3 5 9	C Eb G D
Minor add11	min add11	1 b3 5 11	C Eb G F
Minor 6	min6, m6	1 b3 5 6	C Eb G A

Note that an add-13 chord is actually called a 6-chord because the 6 is not falling in between the root, 3rd and 5th interval. The 9th (2nd) and 11th (4th) would sound 'clustered' if they would be played down an octave as a 2 or 4 respectively.

Exercise: write down the notes of a D, A, G and F major add-9, major add-11, major 6, minor add-9, minor add-11 and minor 6 chord.

6/9 chords

In addition to the 'Add-chords' described above, we can also add the 6th and 13th interval to a major or minor triad, creating a '6/9'-chord:

Chord	Notation	Formula					Example: C				
Major 6/9	maj6/9, 6/9	1	3	5	6	9	C	E	G	A	D
Minor 6/9	min 6/9	1	b3	5	6	9	C	E _b	G	A	D

Exercise: write down the notes of a Eb, A, D and Bb major 6/9 and minor 6/9 chord.

Inversions

So far, we have looked at chords whereby with a prime note as a root. One can also choose to play the 3rd, 5th or even the 7th as a root note instead, called a first inversion, second inversion or third inversion respectively. For a C-major triad chord this looks as follows:

Inversion	Notation	Formula			Example: C		
Root position	C	1	3	5	C	E	G
First inversion	C/E	3	5	1	E	G	C
Second inversion	C/G	5	1	3	G	C	E

Note that inverting a chord, changes the intervals between the new root note and the chord notes:

- A C-major chord in root position consists of a minor third (E to G) on top of a major third (C to E)
- A C-major chord in first inversion consists of a perfect fourth (G to C) on top of a minor third (E to G)
- A C-major chord in second inversion consists of a major third (C to E) on top of a perfect fourth (G to C)

The same can be applied to a minor chord. For a C-minor triad chord this looks as follows:

Inversion	Notation	Formula	Example: C
Root position	Cm	1 b3 5	C Eb G
First inversion	Cm/E	b3 5 1	Eb G C
Second inversion	Cm/G	5 1 b3	G C Eb

Note that inverting a chord, changes the intervals between the new root note and the chord notes:

- A C-minor chord in root position consists of a major third (Eb to G) on top of a minor third (C to Eb)
- A C-minor chord in first inversion consists of a perfect fourth (G to C) on top of a major third (Eb to G)
- A C-minor chord in second inversion consists of a minor third (C to Eb) on top of a perfect fourth (G to C)

Slash chords

In addition to the inversions described earlier, we can replace the root note of a chord by any other note from the corresponding scale.

- Common C-major slash chords are: C/D, C/E, C/F, C/G and C/A.
- Common C-minor slash chords are: Cmin(7)/F, Cmin(7)/G and Cmin(7)/Bb

Note that an inverted chord C/E can be considered a slash chord as well. When inverting a chord, the order of the notes is retained however, which is not necessarily the case for slash chords in general.

Diminished chords

Diminished chords are stacked intervals of minor 3rds and are part of the dominant chord family:

Chord	Notation	Formula
Diminished	dim7 or °7	1 b3 b5 bb7



Note that the 7 has a double flat sign, so it can also be called a 6.

What makes a diminished 7 unique is that any of its inversions retain the same structure of stacked minor 3^{rds}:

Chord	Notes						
C dim7	C	Eb	Gb	A			
Eb dim7		Eb	Gb	A	C		
Gb dim7			Gb	A	C	Eb	
A dim7				A	C	Eb	Gb

From the above we can conclude that the first inversion of a diminished chord is the same as a diminished chord starting on that particular root. So:

$$C \text{ dim7} = Eb \text{ dim7} = Gb \text{ dim7} = A \text{ dim7}$$



Dominant function

Furthermore, a diminished chord is the same as a dominant 7 chord with a b9, whereby the b9 is played as its root:

Chord	Notes				
G7b9	G	B	D	F	Ab
	1	3	5	b7	b9
Ab7dim7	Ab	B	D	F	Ab
	1	b3	b5	bb7	1

So, in this example we can see that $G7b9 = Ab7dim7$

To simplify, we can replace a dominant chord with a diminished chord which is a semi-tone higher.

Modes of the major scale

In the previous chapter we have built chords by stacking notes of the major scale.

When we take the notes of the major scale but change the root note to any of the other notes in the scale, the function of all notes in that scale change. For example, in the C-major scale the note F has the function of a *fourth*. If we change the root note from C to the second note in the scale D, the function of the note F changes to a *minor third*.

Changing the root note within a scale results in a new *mode*. We can do this in a systematic way with the major scale:

Mode	Scale	Chords
I Ionian (Major)	C D E F G A B C 1 1 ½ 1 1 1 1 ½	C, Cmaj7, Cmaj9, C 6/9, Csus2, Csus4, Cadd9
II Dorian	D E F G A B C D 1 ½ 1 1 1 1 ½ 1	Dm, Dm6, Dm7, Dm13, Dm add9
III Phrygian	E F G A B C D E ½ 1 1 1 ½ 1 1	Em, Em7, Em7b9, Em7add11
IV Lydian	F G A B C D E F 1 1 1 ½ 1 1 ½	F, Fmaj7, Fmaj13 #11, Fmaj7b5, F 6/9, G/F
V Mixolydian (Dominant)	G A B C D E F G 1 1 ½ 1 1 ½ 1	G, G7, G7sus, G13, G6, F/G
VI Aeolian (Minor)	A B C D E F G A 1 ½ 1 1 ½ 1 1	Am, Am7, Am11b13, F/A
VII Locrian (Half diminished)	B C D E F G A B ½ 1 1 ½ 1 1 1	Bm7b5, Bmin11b5, G/B

When we look at the intervals between the scale notes and the root of the respective mode we can summarize as follows:

	Mode	Notes	Chords
I	Ionian (major)	1 2 3 4 5 6 7	maj7 9, 13
II	Dorian	1 2 b3 4 5 6 b7	min7 9, 11, 13
III	Phrygian	1 b2 b3 4 5 b6 b7	min7 b9, 11, b13
IV	Lydian	1 2 3 #4 5 6 7	maj7 9, #11, 13
V	Mixolydian (dominant)	1 2 3 4 5 6 b7	dom7 9, 11, 13
VI	Aeolian (natural minor)	1 2 b3 4 5 b6 b7	min7 9, 11, b13
VII	Locrian (half diminished)	1 b2 b3 4 b5 b6 b7	min7b5 b9, 11, b13

Ionian (major)

The major scale (Ionian mode) can be used over a major 7, 9 and 13 chord.

Dorian

The dorian mode can be used over a minor 7, 9, 11 or 13 chord and is characterized by its natural 6.

Phrygian

The phrygian mode can be used over a minor 7 or b9 chord and is characterized by its b2, which creates tension - or in more subjective terms - a dark 'Spanish' sound.

Lydian

The lydian scale can be used over a major 7, 9, #11 and 13 chord and is characterized by its #4. One of the reasons jazz guitar players sometimes choose lydian over ionian is because the #4 doesn't conflict with the major 3rd unlike the natural 4 in the ionian mode.

Mixolydian (dominant)

The mixolydian mode can be used over a dominant 7, 9, 11 and 13 chord.

Aeolian (natural minor)

The aeolian mode is the natural minor and can be used over a minor 7, 9, 11 and b13 chord. It has a darker sound than dorian mode due to its b6.

Locrian (half diminished)

The Locrian mode can be used over a min7b5, b9, 11 and b13 chord has a quite dissonant sound due to its b2, b5 and b6.

Exercise: write down all 7 modes of all 12 keys; use the cycle of fifths to rank the keys by the number of sharps/flats

When we harmonize every mode (build chords), we can summarize:

Degree	Triad	Seventh chord
I	Maj	Maj7
ii	Min	Min7
iii	Min	Min7
IV	Maj	Maj7
V	Maj	Dom7
vi	Min	Min7
vii	Minb5	Min7b5

Taking the order in which the chords are ranked into account, we can determine the degrees and the key center of a chord progression:

Example 1

| Dm7 | G7 | Cmaj7 | Cmaj7 |

The chord progression above contains the dominant chord G7. As there is a dominant 7 chord only on the Vth degree, the G7 has to be the V chord.

Now we know that G7 is V, Dm7 has to be II and Cmaj7 has to be I. So, the degrees of the progression are:

| ii | V | I | I |

Example 2

| Gmaj7 | Am7 | Bm7 | Gmaj7 |

The chord progression above contains two consecutive minor chords that are one tone apart: Am7 and Bm7. As the harmonized major scale only has consecutive minor chords on the IInd and the IIIrd degree, Am7 and Bm7 have to be II and III respectively.

With Am7 being II and Bm7 being III, Gmaj7 has to be I. So, the degrees of the progression are:

| I | ii | iii | I |

Example 3

| Bb | Gm7 | Ab | Ab |

The chord progression above contains two major chords that are one tone apart: Ab and Bb. As the harmonized major scale only has 2 consecutive major chords on the IVth and on the Vth degree, Ab and Bb are IV and V.



With Ab being IV and Bb being V, Gm has to be III. So, the degrees of the progression are:

| V | iii | IV | IV |

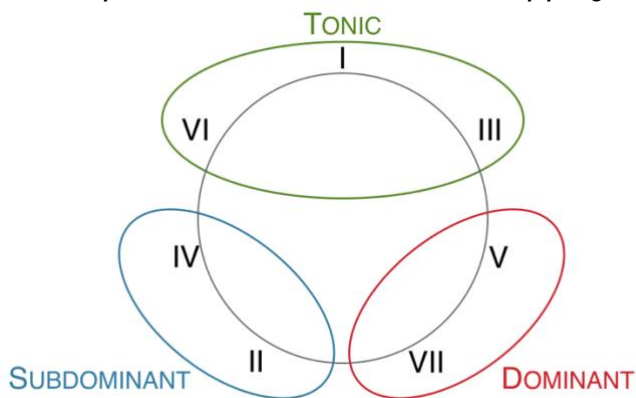
Harmonic functions

A harmonic function of a chord describes the role it often plays in a chord movement or *cadence*.

Harmonies tend to cluster around three high-level categories of harmonic functions. These categories are traditionally called *tonic*, *subdominant*, and *dominant*.

A tonic chord feels like 'home' and is often preceded by a dominant chord which creates tension before it is released upon the tonic chord.

The three harmonic functions can be categorized around the *cycle of thirds* because any chord up or down a third has 2 overlapping chord tones (i.e. is a *relative chord*):



Harmonic functions arranged around the cycle of thirds
Source: <http://openmusictheory.com>

Cadences

This tension-release movement is a common movement in nearly any musical genre by means of a dominant – tonic chord progression:

	G7		C	
	V		I	

The reason the V – I progression works can be explained when we look at the chord notes:

Chord	Notes
G7:	G B D F
Cmaj7	G B C E

The G7 chord has a b5 interval between its major 3rd and minor 7th (B and F) which creates tension. The tension is released by F dropping to E within the Cmaj7 chord, which is the major 3rd.

The dominant chord is often preceded by a subdominant chord, whereby typical pop music progressions use IV as a subdominant degree and jazz progressions use the II as a subdominant degree.

Typical subdominant – dominant – tonic progression in Pop music:

	F		G		C		Am	
	IV		V		I		vi	

Typical subdominant – dominant – tonic progression in Jazz music:

	Dm		G		C		Em	
	ii		V		I		iii	

Modal chord progressions

With a major triad on the first, fourth and fifth degree of a major scale, we can ‘anchor’ from which key a progression is when all three triads are played. By changing root note underneath this progression, we can choose what mode to emphasize.

Below we have 7 different chord progressions from which the characteristics of all 7 modes of the major scale become clear:

Mode		Chords derived from the key of:
I C Ionian	: C F/C G/C F/C :	C
II C Dorian	: Bb/C Eb/C F/C Eb/C :	Bb
III C Phrygian	: Ab/C Db/C Eb/C Db/C :	Ab
IV C Lydian	: G/C C D/C C :	G
V C Mixolydian	: F/C Bb/C C Bb/C :	F
VI C Aeolian	: Eb/C Ab/C Bb/C Ab/C :	Eb
VII C Locrian	: Db/C Gb/C Ab/C Gb/C :	Db

Exercise: play through all seven chord progressions and try to get accustomed to the typical sound of every mode

Chord substitution and additions

We have looked at the chords from the harmonized major scale, which form the basis of chord progressions in pop, jazz and even classical music, whereby common harmonic movements can be distinguished from subdominant to dominant to tonic.

To bring more variation to the table we can substitute chords, for which the most common ways are explained in this section.

Relative major/minor substitution

Any major chord has a 'relative' minor chord down a minor 3rd and any minor chord has a major relative up a minor 3rd. The relation between the chords can be explained by the overlapping chord notes. If we look at a C major and Am7 chord for example, we see the following overlap:

Chord	Notes
C	C E G



Am7 A C E G

Example

The strong relation between the relative major and minor chord enables substitution:

| F G | C | F G | C |

We can substitute the C chord in the last bar by its relative Am chord:

| F G | C | F G | Am |

Secondary dominants

We find a dominant chord on the Vth degree of a major key, which allows to build up tension to be released on the following I chord.

Within a chord progression we can substitute any chord for a dominant chord when it resolves in another chord down a fifth (or up a fourth) such as in the V – I progression.

Example 1

| G | Em | Am | D7 |

In bar 2 we have an Em chord which moves down a fifth to Am and therefore can be replaced by a dominant chord to increase tension:

| G | E7 | Am | D7 |

Example 2

| G | Am | Bm | Cmaj7 |

Taking the chord progression above into account, in the example below we add a secondary dominant chord at the end of bar 1 to introduce the Am chord in bar 2. Similarly, we add a secondary dominant chord at the end of bar 2 to introduce the Bm chord in bar 3:

| G E7 | Am F#7 | Bm | Cmaj7 |

II-V substitution

II-V substitution is similar to secondary dominant substitution. We simply introduce any chord by placing a dom7 before it, which is preceded by a min7 or II chord:

| Gmaj7 | Gmaj7 | Cmaj7 | Cmaj7 |

The chord change from Gmaj7 to Cmaj7 is introduced by a II-V progression leading to the Cmaj7 chord:

| Gmaj7 | Dm7 G7 | Cmaj7 | Cmaj7 |

Similarly, II-V substitution can be applied to a minor key, whereby the II chord is a min7b5 chord:

| Gm7 | Gm7 | Cm7 | Cm7 |

The chord change from Gm7 to Cm7 is introduced by a II-V progression leading to the Cm7 chord:

| Gm7 | Dm7b5 G7 | Cm7 | Cm7 |

II-V substitution is typically used in Bebop jazz, a technical sub-genre within jazz that emerged in the 1950s-1960s with virtuoso saxophone players like Charlie Parker and John Coltrane.

Diminished chords

In the Chord section we have seen that a diminished chord is the same as a dominant 7 chord with a b9, whereby the b9 is played as a root.

Dim chords allow for nice chromatic movements of a root note throughout a chord progression, which in essence are secondary dominant chords. Let's first look at the previous example with the secondary dominants again:

| G E7 | Am F#7 | Bm | Cmaj7 |

When now can add a b9 to the secondary dominant chords E7 and F#7 and replace the E7b9 by a Fdim and the F#9b9 by a Gdim:

$E7 \rightarrow E7b9 = Fdim$

$F\#7 \rightarrow F\#7b9 = Gdim$

We know that a diminished chord has 3 inversions, which are diminished chords as well:

$Fdim = G\#dim$

Gdim = A#dim7

We can now replace the E7 in the progression by a G#dim7 and the F#7 by an A#dim7:

| G G#dim | Am A#dim7 | Bm | Cmaj7 |

The result is a chromatic movement of the root note throughout the progression, which we hear in many jazz standards as well as in commercial Christmas hits.

Tritone substitution

Tritone substitution is the substitution of a dominant seventh chord with another that is three whole steps (a tritone) from the original chord.

Let's see why this would work in the following example whereby G7 is replaced by Db7:

Chord	Notes			
G7	1	3	5	b7
	G	B	D	F
Db7	5	b7	1	3
	Ab	B	Db	F

In jazz the perfect fifth in a chord is often omitted as it does not give any information on the tendency (minor/major/dominant) of a chord. In the example above we see that substituting a G7 chord by its tritone Db7 keeps the essential notes – the major 3rd and minor 7th - of the G7 chord in place. The result is a chromatic movement in roots.

| Dm7 | G7 | Cmaj7 | Cmaj7 |

We now substitute G7 for Db7:

| Dm7 | Db7(b5) | Cmaj7 | Cmaj7 |

In tritone substitution the dominant chord played up a tritone is also often played as a dominant 7 with a b5. The b5 smoothens sound of the new dominant chord as it is the root of the original dominant chord (G7).

The 'backdoor progression'

We have seen that a subdominant – dominant – tonic progression is a common chord movement in many musical genres.

In jazz this usually is a 'ii – V – I' progression. In the key of C this would be:



| Dm7 | G7 | Cmaj7 | Cmaj7 |

If we call this the normal way to resolve to Cmaj7, or the 'frontdoor', there is an alternative 'backdoor progression' to it. This backdoor progression is based on changing a major key for a minor key.

If we take the same progression as above, but start by assuming we are in a minor key, the II – V chords would be Fm and Bb7. This results in the following progression, called the backdoor progression:

| Fm7 | Bb7 | Cmaj7 | Cmaj7 |

The reason the resolution from Bb7 to Cmaj7 works is as follows:

Chord	Notes			
Bb7:	F	Ab	Bb	D
Cmaj7	E	G	B	C

Coltrane changes

Coltrane changes are chord progressions developed by jazz saxophone giant John Coltrane, characterized by key changes in descending major 3rds:

Key centre | Cmaj7 | Abmaj7 | Emaj7 | Cmaj7 |

In one of the most common variation, the major chords from every key centre are preceded by a dominant chord on its Vth degree:

Coltrane change | Cmaj7 Eb7 | Abmaj7 B7 | Emaj7 G7 | Cmaj7 |

Coltrane changes are applied in jazz standards such as ‘Giant Steps’ and ‘Countdown’ but can also be found in earlier standards such as ‘Have You Met Miss Jones’. The latter has been written in the 1930s already, well before John Coltrane’s rise to the jazz scene.

Still, John Coltrane became famous for the application of this particular progression as he applied it as substitution in the common II – V – I jazz progressions:

ii – V - I | Dm7 | G7 | Cmaj7 | Cmaj7

Coltrane substitution | Dm7 Eb7 | Abmaj7 B7 Emaj7 G7 | Cmaj7 | Cmaj7

The harmonic minor scale

In the previous section we have seen that the V-I progression is one of the strongest cadences due to the tension within the dominant chord (V) releasing on the tonic (I).

When we are in a minor key however, the Vth degree is minor, so a V-I progression in the key of A minor would look like this:

| Em | Am |

To create a similar cadence as in a major V-I - with tension and release – we can make the Vth degree in the minor key dominant as well:

| E7 | Am |

The minor 3rd of Em (G) has been changed into a major 3rd (G#). The A minor scale changed into A *harmonic minor*:

A natural minor	A	B	C	D	E	F	G
A harmonic minor	A	B	C	D	E	F	G#

The harmonic minor scale is a natural minor scale with a *major 7*:

A natural minor	1	2	b3	4	5	b6	b7
A harmonic minor	1	2	b3	4	5	b6	7

Looking from the perspective of the Em chord that changed into an E7, we changed E phrygian into E *phrygian dominant*, which is the 5th mode of the harmonic minor scale:

E phrygian:	E	F	G	A	B	C	D
E phrygian dominant:	E	F	G#	A	B	C	D

The phrygian dominant scale is a phrygian scale with a *major 3*:

E phrygian:	1	b2	b3	4	5	b6	b7
E phrygian dominant:	1	b2	3	4	5	b6	b7

In the section ‘Modes of the harmonic minor scale’ an overview of all other modes besides harmonic minor and phrygian dominant is given.

The melodic minor scale

We have looked at the harmonic minor scale, and how it enables the 5th degree of a minor key to become dominant instead of minor. When we look at the harmonic minor scale, we



can see a large 'gap' in between its minor 6th and major 7th interval of a minor 3rd (1½ step):

A B C D E F G# A
 1 ½ 1 1 ½ 1½ ½

Particularly in jazz music, this gap is preferred to be closed by raising the minor 6th interval, which gives birth to the A *melodic minor* scale:

A B C D E F# G# A
 1 ½ 1 1 1 1 ½

The notice the distances changed to:

whole – half – whole – whole – whole – whole - half

When we look at the intervals of the notes of the melodic minor scale, we interestingly get a major scale with a minor 3rd:

A natural minor	1	2	b3	4	5	b6	b7
A harmonic minor	1	2	b3	4	5	b6	7
A melodic minor	1	2	b3	4	5	6	7

Modes of the melodic minor scale

As the melodic minor scale can be looked at as a major scale with a minor 3rd, the names of its modes are derived from the names of the modes of the major scale:

Mode	Scale	Chords
I Melodic minor	A B C D E F# G# A 1 ½ 1 1 1 1 ½	Am maj7 Am9, Am11, Am13
II Dorian b6	B C D E F# G# A B ½ 1 1 1 1 ½ 1	Bm7, Bm9, Bm11
III Lydian augmented	C D E F# G# A B C 1 1 1 1 ½ 1 ½	Cmaj7#5
IV Lydian dominant	D E F# G# A B C D 1 1 1 ½ 1 ½ 1	C7b5, C9b5
V Mixolydian b6	E F# G# A B C D E 1 1 ½ 1 ½ 1 1	E7, E9, E11
VI Aeolian b5	F# G# A B C D E F# 1 ½ 1 ½ 1 1 1	F#m7b5, F#m9b5 F#m11b5
VII Super locrian	G# A B C D E F# G#	G#7alt. (b5, #5, b9, #9)

When we look at the intervals between the scale notes and the root of the respective mode we can summarize as follows:

Mode	Notes	Chords
I Melodic minor	1 2 b3 4 5 6 7	min maj7 9, 11, 13
II Dorian b2	1 b2 b3 4 5 6 b7	min7 b9, 11, 13
III Lydian augmented	1 2 3 #4 #5 6 7	maj7#5 9, #11, 13
IV Lydian dominant	1 2 3 #4 5 6 b7	dom7 9, #11, 13
V Mixolydian b6	1 2 3 4 5 b6 b7	dom7 9, 11, b13
VI Aeolian b5	1 2 b3 4 b5 b6 b7	min7b5 9, 11, b13
VII Super locrian (altered)	1 b2 b3 b4 b5 b6 b7	dom7(b5) b9, #9, b13

The most commonly used modes of the melodic minor scale are:



Melodic minor

The melodic minor scale is often used to play over min7 chords. Even though the scale has a major 7, it is considered as a passing tone and therefore the no.1 scale for many jazz guitar players to use over minor chords.

Lydian dominant

In jazz the lydian dominant scale is the first alternative after the mixolydian scale to use over dominant 7 chords. Furthermore it is the scale that is mostly used over dominant chords from tritone substitution (bII7), as it is a relative to the super Locrian scale (V7).

Mixolydian b6

Even though the mixolydian b6 mode is not the most common scale to use, it is used over altered dominant chords with a b13 (#5) as long as the altered chord does not have a b9 or #9.

Aeolian b5

The Aeolian b5 scale is the preferred scale for many jazz guitar players to play over min7b5 chords as found on the IInd degree in minor II-V-I's.

Super locrian

The super locrian mode the most common scale used to play 'outside' over altered dominant chords as it contains all altered notes: b5, #5, b9 and #9.

Modes of the harmonic minor scale

As with the major scale, we can harmonize all the degrees of the harmonic minor scale:

Mode	Scale	Chords
I Harmonic minor	A B C D E F G# A 1 ½ 1 1 ½ 1½ ½	Am, Am-maj7
II Locrian nat. 6	B C D E F G# A B ½ 1 1 ½ 1½ ½ 1	Bm7b5
III Ionian #5	C D E F G# A B C 1 1 ½ 1½ ½ 1 ½	Cmaj7#5
IV Dorian #4	D E F G# A B C D 1 ½ 1½ ½ 1 ½ 1	Cm9b5
V Phrygian dominant	E F G# A B C D E ½ 1½ ½ 1 ½ 1 1	E7b9
VI Lydian #2 (Minor)	F G# A B C D E F 1½ ½ 1 ½ 1 1 ½	Fmaj7
VII Super locrian bb7	G# A B C D E F G# ½ 1 ½ 1 1 ½ 1½	G#6b5

When we look at the intervals between the scale notes and the root of the respective mode we can summarize as follows:

Mode	Notes	Chords
I Harmonic minor	1 2 b3 4 5 b6 b7	min maj7 9, 11, b13
II Locrian nat. 6	1 b2 b3 4 b5 6 b7	min7b5 b9, 11, 13
III Ionian #5	1 2 3 4 #5 6 7	maj7#5 9, 11, 13
IV Dorian #4	1 2 b3 #4 5 6 b7	min7b5 9, #11, 13
V Phrygian dominant	1 b2 3 4 5 b6 b7	dom7 b9, 11, b13
VI Lydian #2	1 #2 3 #4 5 6 7	maj7 #9, #11, 13
VII Super locrian bb7	1 b2 b3 b4 b5 b6 bb7	maj6b5 b9, #9, b13

The most commonly used modes of the harmonic minor scale are:

Harmonic minor



The harmonic minor scale is used in any minor key with a dominant chord on the Vth degree.

Locrian natural 6

The Locrian natural 6 mode can be a nice mode to play over a min7b5 chord. It has the necessary characteristics of a 1, b3, b5 and b7 but due to its natural 6 sounds less dissonant than the standard locrian scale derived from the major scale.

Phrygian dominant

The phrygian dominant mode is a widely used scale to play over a dominant chord on the Vth degree of a minor key. The scale is used in jazz, latin and has its roots in classical music. For this reason the scale is also used an iconic style ingredient in neo classical metal.

The Diminished scale

The diminished scale or 'octatonic scale' is a symmetric scale consisting of half and whole steps.

The scale can be looked at as a dim7 chord with semitones below every chord tone.

It can also be looked at as stacking two diminished 7 chords on top of each other:

C dim7		C	Eb	Gb	A				
B dim7	B	D	F	Ab					
B octatonic (half whole)	B	C	D	Eb	F	Gb	Ab	A	
C octatonic (whole half)		C	D	Eb	F	Gb	Ab	A	B

The half whole octatonic scale is used to play over dom7(b9) chords and consists of the following intervals:

B octatonic (half whole)	1	b2	b3	3	#4	5	6	b7
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The whole-half octatonic scale can be used to play over dim7 chords and consists of the following intervals:

C octatonic (whole half)	1	2	b3	4	b5	b6	6	7
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Note that both scales share the same notes and its chords played over are inversions:

B7b9 = Cdim7

Furthermore note that the half-whole octatonic scale is the same as the super locrian (7th mod of the melodic minor scale), except for its natural 6. The half-whole scale is therefore used to



play over altered dominant chords with a nat. 13 (or 6). The super Locrian scale is used to play over altered dominant chords with a b13 (or #5).

There are many triads and arpeggios within the octatonic scale which offer a great deal of possibilities for improvisation:

Triads

Root position

Bdim

Bmin

Bmaj

Cdim

1st inversion

Ddim

Dmin

Dmaj

Ebdim

2nd inversion

Fdim

Fmin

Fmaj

Gbdim

3rd inversion

Abdim

Abmin

Abmaj

Adim



Arpeggios

Root position

Bdim7
Bmin7b5
Bmin7
Bdom7
Bdom7b5
Cdim7
Cdim maj7

1st inversion

Ddim
Dmin7b5
Dmin
Dmaj
Ddom7b5
Ebdim
Ebdim maj7

2nd inversion

Fdim
Fmin7b5
Fmin
Fmaj
Fdom7b5
Gbdim
Gbdim maj7

3rd inversion

Abdim
Abmin7b5
Abmin
Abmaj
Abdom7b5
Adim
Adim maj7

The augmented scale

The augmented scale is a scale consisting of whole steps only:

C augmented C D E F# G# Bb

The intervals are:

Augmented 1 2 3 #4 #5 b7

When we harmonize the augmented scale, we can construct a Cdom7#5 or Cdom7b5 chord. The scale is therefore used to play over altered dominant chords with a #5 or b5 as long as there is a natural 9 or no 9 in there at all.