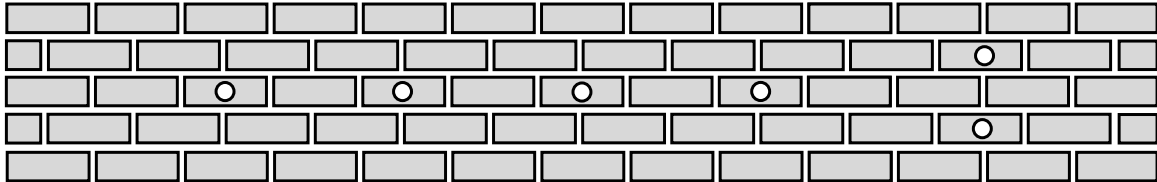


# Fretboard Foundation

*Practical building blocks for intermediate guitarists. By Jason Grimes.*



## Summary

Practical music theory for intermediate guitarists. Fretboard Foundation aims to organize and simplify the information required for fluency on guitar, including playing by ear, chords and harmony, and scales and melody.

Start reading at the [Table of Contents](#).

## Version

This edition: **First Edition, February 2024**

The latest version of this book can always be found at [fretboardfoundation.com/book.html](https://fretboardfoundation.com/book.html)

All editions are available at [fretboardfoundation.com/editions.html](https://fretboardfoundation.com/editions.html)

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# Preface

*Why this book exists and who it's for.*

In this chapter:

- [Why this book?](#)
- [Intermediate material is needed](#)
- [Triage is needed](#)
- [Perspective is needed](#)
- [Who this book is for](#)

## Why this book?

This is the book I always wanted to learn guitar from. It didn't exist, so eventually I just had to write it. Now I use it as the core of my ongoing music studies.

## Intermediate material is needed

Countless resources are available for beginning guitarists, and excellent materials exist for advanced musicians with a solid background in theory and practice. But for those of us in between, the “intermediate” guitarists, it can be a long and hard slog to master the instrument well enough to really express ourselves.

Most of the material aimed at this level sorts into either classical or jazz styles.

Classical guitar instruction tends to focus on the precise performance of a composer's work, with little emphasis on improvisation or creativity.

Jazz digs deep into improvisation and theory, but with techniques that often don't translate well to other styles because of an emphasis on dissonance and extended chords.

And both approaches promise *at best* a long and winding road toward mastery, requiring years of study and a somewhat blind faith that it will lead somewhere we want to go.

## Triage is needed

The approach taken in this book is different. It's based on an idea of "triage", doing the most important things first to make the best of limited time and resources.

In the long run, it would be ideal to learn everything. But life is rarely ideal, and the length of our run is unknown.

If our studies get interrupted in a few months and we are unable to return to them indefinitely, will the next months of study have been well spent? Making music we enjoy, building a foundation that will endure throughout our lives? Or will that time be essentially lost, with nothing to show for it?

Right *now*, given the overwhelming amount there is to learn, how can we make the most progress in the shortest time? What's the minimum we need to learn, and the fastest way to learn it?

Obviously the answer depends, in part, on where we want to go. But there is a common foundation that is generally required. This book aims to provide that foundation in the most practical way.

## Perspective is needed

The pedagogy of Western music is somewhat insular.

Teachers tend to present material from a single theoretical perspective, a "euroclassical" framework that was popular among affluent Europeans in the 18th and 19th centuries.

These ideas are often presented as facts, like "the V chord wants to resolve to the I chord", even though they are really just elegant descriptions of one particular way of doing things that, in some cases, is *not even that common anymore*.

It is well known among music theorists that many concepts of Western harmony are not very useful for describing modern popular music, or even the quintessentially American sounds of the Blues, let alone styles like rap or ambient music.

Then consider that many cultures use more than the twelve tones of Western music, and that some have arguably more advanced and useful theoretical frameworks (such as the Arabic "maqāmāt"). In these other systems, Western harmony is treated as just one mode (the "Ionian mode") among many.

By simply taking a step back and realizing that Western harmony is just one framework among many—albeit one that is particularly suited to Western musicians—otherwise confusing concepts suddenly become clear, even obvious.

For example, why don't V chords in popular music follow the harmonic function of pulling home to the I chord? Because that's just one way of doing things, and most popular music does things differently.

Why doesn't the "blues scale" sound like actually playing the Blues? Because the Blues uses tones from outside euroclassical tonality.

This book attempts to sustain a broader perspective, in the hope that it both clarifies the material and encourages others to take a broader perspective about music outside the euroclassical tradition.

## **Who this book is for**

If you are among the audience imagined for this book, you might describe yourself as an intermediate guitarist. You can play some songs, and you know whatever you consider to be "the basics". You can play chords, and maybe some scales (or maybe not). The subjects in this book sound at least vaguely familiar to you.

Most importantly, you want to make music on guitar, with a facility and a graceful freedom that allows you to express yourself creatively, and produce the sounds you hear inside as fluently as possible.

If this describes you, welcome. I'm glad you're here. Please read on.

# Introduction

*An overview of the topics ahead and how to use this book.*

In this chapter:

- [An overview of the ideas in this book](#)
  - [Playing by ear](#)
  - [Chords and harmony](#)
  - [Scales and melody](#)
  - [What's not covered](#)
- [Studying music on guitar](#)
  - [Differences from piano](#)
  - [Intervals over notes](#)
- [How to learn](#)
  - [Chunking](#)
  - [Slow practice](#)
  - [Mental work](#)
  - [Variety in repetition](#)
- [How to use this book](#)
  - [Skimming](#)
  - [Get an overview](#)
  - [Work on a bit at a time](#)
  - [Quick reference](#)
- [Additional resources](#)

## An overview of the ideas in this book

If this was a step-by-step guitar method, it might be organized in reverse. First it might teach scales, then how to assemble the scales into chords, and finally improvisation, chord melody, and playing by ear.

But I have found it more effective to study guitar in the opposite order, and in short iterations rather than a long step-by-step path. First improvising by ear, however clumsy or imperfect, because making music is the whole point. Then practicing chords and changes, to play a bunch of songs. Then refining with scale practice. And then iterating again and improvising, “*improving*”, in an intermittent upward spiral.

## Playing by ear

The most important skill for learning a musical instrument is “using your ears”. That means listening, essentially, though “tuning” might be a better word for it. Listening, making adjustments, and listening again, in a feedback loop until the tone suits our taste. Without this fundamental habit, it’s hard to make music.

The simplest way to practice using our ears, and arguably the simplest way to play a guitar at all, is to “play by ear”. This turns out to be easier than most people can believe, until they actually try it as described in [Part 1](#).

## Chords and harmony

Most beginning guitar players start by learning open position chords, and gradually become adept at changing between them. Then it’s common to learn a few movable barre chord shapes.

To achieve fluency and command of the entire fretboard, we need to understand the intervals of the chords and how they harmonize together. That’s the objective of [Part 2](#).

## Scales and melody

Scales are often misunderstood or misused, to the extent that some guitar players avoid them entirely, while others memorize and repetitively practice arcane shapes with little understanding or melody.

This is unfortunate, because scales are the simple patterns that underlie almost all music. In theory, if we were stranded on a desert island with only the major scale (and a full stock of provisions), we might eventually reinvent diatonic harmony from first principles.

A practical and hopefully enlightening approach to scales is given in [Part 3](#).

## What’s not covered

Technique.

Rhythm.

Guitar basics.

See [References](#) for better sources on these topics.



## Studying music on guitar

Over 2000 years ago, a Greek philosopher and mathematician named Pythagoras laid the foundations of Western music by studying the properties of vibrating strings.

Today, the guitar is an ideal instrument on which to explore music ourselves in a similar way.

## Differences from piano

There are some basic differences when studying music on guitar as compared to a more conventional instrument like the piano.

For one thing, on guitar it's easier to play the same tune in different keys, known as "transposition". Different keys can often be played with the same fingerings at a different fret, so on guitar it's less important to devote equal practice to all 12 keys. It's more useful to have C major down cold than to be partially fluent in many keys.

Musical staff notation is not as well suited to guitar as it is to other instruments like piano, in part because on guitar the exact same pitch can be found at multiple places on the fretboard.

On a fretboard, intervals are the same shape in every key, but notes are hard to identify. On a piano keyboard, it's the opposite.

## Intervals over notes

Because of these differences, on guitar it can be efficient to study music by focusing more on intervals, and less on note names and staff notation.

That's the approach taken in this book.

## How to learn

Master guitar educator Christopher Berg wrote an invaluable book that must be mentioned here: *Practicing Music by Design: Historic Virtuosi on Peak Performance* ([2019](#)). He reviewed "peak performance" literature about research into the development of expert skill, and combined it with his own expertise on the techniques of centuries of master musicians. The result is a gold mine of practical advice for learning an instrument with maximum efficiency.

It is well worth the time of any aspiring guitarist to read the entire book and put it into practice. But in the interest of triage, here's a quick summary of some of Berg's findings about the most efficient ways to learn.

## Chunking

Chunking means breaking information into constituent “chunks”, learning each chunk separately, then learning them in combination as a larger chunk.

Most people can hold about 5-7 things in mind at any one time. This seems like a pretty low limit, but fortunately each of those “things”, or “chunks”, can themselves be composed of 5-7 chunks, each of which can be a composite of more chunks, ad infinitum. Experts can rapidly chunk together bits of new material because they can relate it to a foundation of prior knowledge.

The key is to master the smaller chunks thoroughly before moving on. Trying to learn more than 5-7 new things at a time will result in learning none of them well.

## Slow practice

Contemporary neuroscience research and the “old masters” seem to agree that **the slower we practice, the faster we advance**.

The main point is to carefully avoid mistakes in early practice, and to address mistakes by replaying them correctly several times over, so the correct information encodes itself into the physical structures of our brain.

Imagine starting a saw cut in a piece of wood, or scratching an irrigation channel into the dirt with a stick.

For a variety of reasons, this kind of slow practice can result in learning several times faster than otherwise.

## Mental work

Perhaps surprisingly, the same brain structures we carefully grow through slow practice and chunking can also be developed just by using our imagination—away from the instrument.

Reasoning about the music, and visualizing ourselves playing it, allows us to practice in a pure and focused way, without the distractions of physical reality.

As with all of these techniques, incorporating visualization into practice is reported to dramatically increase the speed of learning.

## Variety in repetition

Studies show that repeatedly practicing the same thing over and over is actually harmful in many ways. Instead of mindless repetition, a more effective approach is to analyze a particular subject and practice it from multiple angles.

Varying rhythm, dynamics, accents, and articulation keeps practice interesting, helps to solve technical problems, improves the ability to effect musical nuance, and trains us to make sophisticated adjustments in real time to adapt to unexpected circumstances.

The appearance of fluid grace by expert performers is a sort of illusion created by these skillful micro-adjustments and compensations.

## How to use this book

This book does not provide a step-by-step method for learning guitar. It's more of an encyclopedia. Or maybe a grimoire.

## Skimming

This book is designed to be “skimmed”.

Try relaxing your eye muscles to soften your focus, and scroll rapidly through a chapter, so that all you can really see are the headings and figures and the general shape of the text. That's “skimming” the chapter.

The headings throughout the text are written as an outline, intended to be readable on their own, as a summary of the text. This makes it easy to take in an overview by quickly skimming tables of contents and chapter texts.

## Get an overview

The best way to get started with this book is with an overview of the subject matter. Read the [Table of Contents](#) first.

The topics in this book are presented in a deliberate order, with a narrative through line that can be read from beginning to end.

But perhaps more practically, each section starts out simply and gets denser and more complex as it proceeds. So the book is designed to be read until one gets stuck, confused, or bored, and then skimmed ahead to the next section, chapter, or part.

## **Work on a bit at a time**

For example, unless you already have an encyclopedic knowledge of CAGED voicings, after working through the C CAGED shapes you might want to digest them for awhile, rather than trying to grind through scores of CAGED shapes and fingerings in one sitting.

So skim ahead to the next section on ergonomics, and then continue on to the chapter on major harmony. Later on, if you find you need to learn a couple more chord shapes to play in one of the major key positions, refer back to the CAGED chapter to study those particular shapes.

## **Quick reference**

Once an overview of the topics has been acquired, the book is designed to be used as a quick and fairly comprehensive reference, in order to support your own guitar studies.

Any topic or diagram should be easy to find within a few “taps” through the tables of contents.

## **Additional resources**

In addition to this book, supplementary tools and materials are available on the Fretboard Foundation website.

For example, there are software applications that provide interactive, playable, editable, and audible fretboard diagrams for exploring the ideas in this book in an experiential way.

See [fretboardfoundation.com/tools](https://fretboardfoundation.com/tools) for details.

# PART 1: PLAYING BY EAR

*Playing guitar by ear is easier than most people think. It's also the best way to practice the most important skill for playing music: using our ears.*

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# Chapter 1: Anyone can improvise

*Start with a single note, and listen. A few tricks can help, too.*

In this chapter:

- [What is improvisation?](#)
- [Why improvise?](#)
- [The first note](#)
- [The next note](#)
- [The melody](#)
- [Some tricks](#)

Anyone can make music on a guitar, from the first moment we hold one. Even if we have no training. Even if we have never seen a guitar in our lives. The instrument itself shows us how, right away. All we need is the will to create something beautiful, and an ear to listen.

## What is improvisation?

Improvisation means playing off the top of our head, “extemporaneously”, or “without time” to prepare.

Improvisation involves an element of novelty—some unique expression that only we could make—but that doesn’t mean coming up with an entirely original composition (if there even is such a thing).

We can play parts of existing tunes, flowing from one bit to the next on a whim, floating on a stream of consciousness, adding our own embellishments as we are moved to do so.

## Why improvise?

For one thing, improvisation is so much fun.

It’s worth bearing in mind that the whole point of all this is to create music. To create art, to express ourselves, to make our novel contribution to the universe. And in order to do so, to play the guitar with the same freedom as one might sing.

We can make art without first mastering the art form. The reason to study and practice music is to make *better* music. The *music* is the point, not the theory or the practice.

Every practice should begin and end with the improvisation of music.

## The first note

The first note can be literally anything.

A tune can be played in any key. Or we can slide up and down the string to find an exact starting pitch.

## The next note

Finding the next note is like a game.

It's like making an educated guess. We can use anything we already know to inform our guess, but it's often best to not think at all and just let our fingers choose. Then pause, listen, adjust.

## The melody

Try to pick out a short melody. Whatever comes first to mind, something simple and short.

It's hard at first, random and full of wrong notes. But it gets easier, the wrong notes fewer, as we explore, listen and learn.

## Some tricks

There are some tricks that can make it easier to improvise in this way.

### Beginner's mind (aka lighten up)

The most useful trick for improvising on any instrument is to *lighten up* about what sounds good.

Rather than worry about how it will sound, or whether others would appreciate it, or whether we will live up to some expectation, it is far more effective to let go and allow ourselves to discover whatever we happen to find.

Like a beginner, or a child. With curiosity, innocence, and joy, and without expectation or fear.

## Quiet quiet loud loud

If we are unsure what a note is going to sound like, we can play it quietly at first, to get our bearings, before playing louder with a more certain note.

## Any random note is probably “in”

Finding an “in” note is almost as good as finding the “right” note. If we land on a note that wasn’t intended but which is still “in” the key, it still sounds musical, and we can treat it as a “melodic approach” to our intended note.

By the law of chance, any note picked at random is going to be “in” most of the time (58%, 7/12 chance).

## Out notes are nearly in

Any note that is “out” is only one fret either direction from being “in”, so we can treat it as a “chromatic approach” into an “in” note, like we did it on purpose, and shift “in” by a fret in the chosen direction.

## In notes are usually two frets apart

From an “in” note, the next closest “in” note is most likely two frets away (70%, 5/7 chance).

If the next “in” note is only one fret away, we can often feel it “pulling” to resolve.

If we *don’t* feel this pull, we should try going two frets in either direction and see what happens.

## Vibrato can make intonation close enough

A trick for blending in with other musicians: differences in tuning and intonation between instruments can sometimes be covered with *vibrato*. A note doesn’t have to be perfectly in tune if it is passing back and forth (vibrating) through the perfect pitch.



## Chapter 2: Play on a single string

*The most natural way to find the next note is also the easiest way to move up and down the fretboard.*

In this chapter:

- [The most logical place to begin](#)
- [No tuning required](#)
- [No training required](#)

The simplest way to start improvising a melody is to play up and down a single string.

### The most logical place to begin

In *The Advancing Guitarist*, Mick Goodrick explained it beautifully.

“Playing on a single string is absolutely the most logical place to begin on a guitar,” he wrote.

“Consider the following observations:

- The simplest way to see notes is in a straight line.
- A single string *is* a straight line.
- On a single string, there is a direct relationship between interval distance and movement in space.
- Playing on a single string helps to eliminate two potential problems: “paralysis” (fear of movement) and “acrophobia” (fear of higher frets), since the entire length of the fingerboard is utilized from the very beginning.
- ...Elements of fundamental theory can be shown to a beginner in clear and simple visual and aural terms: intervals, scale constructions, chords, arpeggios, etc. The same could be said for dynamics, articulations, and timbre.” ([Goodrick, 1987, p. 10](#))

### No tuning required

Playing on one string also has the benefit that we don’t have to worry about being in tune, in the sense that a string is always in tune with itself.

We can pick up any stringed instrument from any random junk pile. No matter how well or poorly maintained, how old or in disrepair, as long as the instrument has one string that can vibrate, it can make music.

## **No training required**

Nearly everyone seems to know how to do this without training, to some degree.

Give a rubber band to a small child, and it's a safe bet that before long, without any prompting, they will discover how to make different sounds with it.

On a basic level we all know how to make music with a vibrating string.

## Chapter 3: Play across strings

*Playing across the strings means navigating the guitar's tuning.*

In this chapter:

- [Playing in position](#)
- [Finding notes across strings](#)
- [Finding chords across strings](#)
- [Intervals between strings](#)

### Playing in position

After thoroughly exploring a melody on a single string, try playing the same melody across strings, without moving the fretting hand out of position.

This is sometimes called “position playing”.

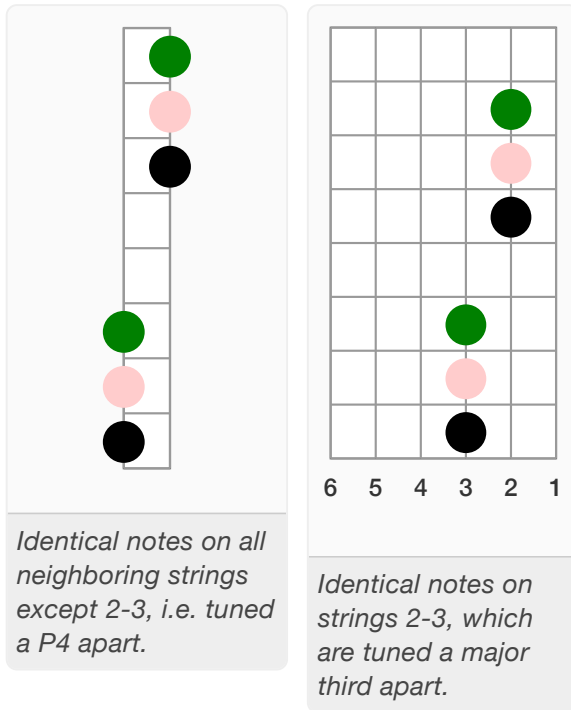
### Finding notes across strings

At first, picking out a melody across strings seems like a matter of random guessing, and then remembering what we find. It gets easier over time. It's like a memory game that never resets.

The following figures show where notes are located on neighboring strings.

Every pair of neighboring strings has the same relationship between their notes, **except between strings 2 and 3**. While all other strings are tuned the same distance apart, there is a slightly smaller difference in pitch between strings 2 and 3.

### Identical notes on neighboring strings



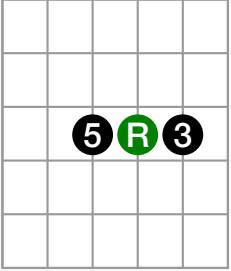
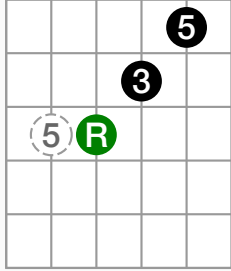
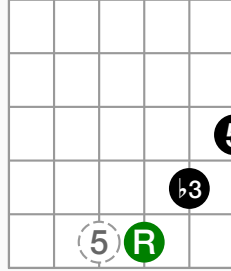
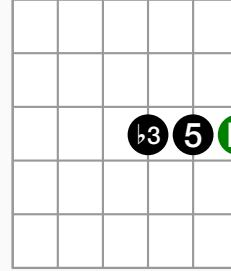
To get better at finding notes across strings, it can be helpful to study scales. See [Chapter 15. Introduction to scales](#).

## Finding chords across strings

Major and minor “triad chords” are the most common chords used in all of Western harmony.

There are many of these three-note triad chords around the fretboard. Listen and explore to find them. The following figures show some examples.

## Common triad chord shapes

			
Major triad with 3rd-string root on upper-middle strings.	Major triad with 4th-string root on upper-middle strings.	Minor triad with 3rd-string root on upper strings.	Minor triad with 1st-string root on upper strings.

See [Chapter 7. Practical CAGED grips](#) for more about triad chord shapes.

## Intervals between strings

On a guitar in standard tuning, the differences in pitch (“intervals”) between the strings are carefully chosen as some of the most fundamental sounds in music.

The interval between a string and its neighbor to the left (except strings 2-3) is called a descending **perfect fifth**. The perfect fifth is the most common musical sound in the world (partly because it is the dominant harmonic in the “[overtone series](#)”, a natural phenomenon of acoustics).

The interval between the 3rd and 2nd string is called a **major third**. It’s arguably the most important sound in Western harmony, and it’s the *next* most distinguishable harmonic in the overtone series.

Between them, these intervals ( R-3-5 ) describe a major triad chord, the most common chord in Western music. Lowering the major third by one fret turns it into a minor triad, the second most common type of chord.

As Bert Ligon said in *Comprehensive Technique for Jazz Musicians*, the major triad consists of “the first three pitches in the overtone series and the natural laws of physics insist that the planet vibrates with these tones when the winds blow, which may explain the universal occurrence of the triad in melodies.” ([Ligon, 1999](#))

For more information about chord intervals and playing in position, see [Chapter 8. Major key harmony](#).

## Chapter 4: Skate around the fretboard

*Ranging freely over the entire instrument.*

In this chapter:

- [The electric ice-skating rink](#)
- [Orientation and landmarks](#)
- [Notes on the fretboard](#)

### The electric ice-skating rink

Once we can play a melody on both a single string and across strings, it's natural to combine approaches and play all over the fretboard. We can follow a melody up and down a string, and then turn a corner and play across strings for awhile.

This free ability to range all over the fretboard can be liberating and fun. It feels like we have unlocked the complete tonal reach of the instrument.

The eloquent Mick Goodrick called it “the realm of the electric ice-skating rink” ([1987, p. 30](#)).

### Orientation and landmarks

When skating around the fretboard, orientation becomes important. It's useful to have landmarks to locate where we are on the fretboard and where we want to go.

Look at the dots on the fretboard to identify the location of a fret. Sometimes it helps to think of the coordinates of the string number and fret number, to focus the mind.

Try to remember meaningful locations while playing. Remembering fretboard locations lets us return to where we were, and recognize where we arrive.

### Notes on the fretboard

Orientation can be helped by knowing the names of some of the notes on the fretboard. See [Appendix A: Notes on the fretboard](#).

## Chapter 5: Chord melody

*Combining chord progressions, melodies, and bass lines.*

In this chapter:

- [What is chord melody?](#)
- [Find the melody in the chords](#)
- [Improvising chords](#)
- [Bass lines](#)
- [Harmony](#)

### What is chord melody?

Chord melody improvisation may be the richest form of expression on guitar. It involves freely interweaving chord progressions, melodies, and bass lines in a fluid and captivating way.

Chord melody makes a composition sound full and rich, like a complete solo performance rather than just a guitar part.

### Find the melody in the chords

A good way to get started with chord melody is to play a song's chord progression delicately, articulating each note, and listen for the melody in the chord tones.

Begin emphasizing the melody notes in the chords, and then gradually let the melody lead on its own, adding in non-chord tones as necessary, playing chords more sparsely.

### Improvising chords

"Treble triads" can be used to improvise freely with chords, forming chords around notes from the melody. See [Chapter 7. Practical CAGED grips](#) for details.

Another little trick for filling out a melody on the high string is to play the first and second strings at the same fret, a little two-note chord called a "double stop" or "power chord". In most cases, a power chord played on a scale tone will be "in tune" ("diatonic").

## Bass lines

Another way to fill out melodies is to add bass notes on the lower strings. Start by playing the chord root notes on their own, before (or instead of) the chord. Add more variety to the bass line by playing fifths, octaves, and approach tones. See [Chapter 10. Bass lines](#).

## Harmony

For more information about what chords sound good together and how to harmonize a melody, see [Chapter 6. Introduction to Western harmony](#).



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# Chapter 6: Introduction to Western harmony

*A quick overview of the most practical bits of euroclassical harmony.*

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## Emotion and story

Music is a form of communication. It's used to express ideas and emotions, and to evoke the same in others.

Western harmony, which derives from the European classical music ("euroclassical") tradition, provides tools to do this based on tension and release, consonance and dissonance, and shared cultural experience.

## Tension and release

"Tension and release" is a basic biological mechanism, shared perhaps by all life.

It is the basis of locomotion—it physically moves us—and it moves us emotionally as well.

## Consonance and dissonance

Tension and release are created with "consonant" and "dissonant" sounds.

Consonant sounds are mathematically simple and harmonically relaxed.

Dissonant sounds are mathematically complex and harmonically tense.

## Expectation and surprise

Tension and release can also be created by playing with listeners' expectations.

All the music we have previously heard creates expectations about music we will hear in the future.

If we have a similar enough background to the listener to understand their expectations, we can play with those expectations to provoke a response.

For example, we can produce something they expect, provoking familiarity; delay meeting their expectations, provoking tension; give them something they didn't expect but are also familiar with, provoking surprise and hopefully delight; and so on.

## The hero's journey

"Harmonic functions" can be used to tell a kind of story, similar in some ways to the "hero's journey" narrative pattern which is common in myths and stories across many cultures.

In both the hero's journey and in harmonic progressions, the hero goes on an adventure, is victorious in a decisive crisis, and comes home transformed.

## Intervals: the building blocks

Intervals are the basic building blocks of harmony.

They are responsible for the way music sounds, and how it makes us feel.

## The difference between two pitches

An interval describes the difference in pitch between two notes. The greater the difference in pitch, the larger the interval. The difference in pitch creates the sound and feeling of the interval.

## Pitch and frequency

*Pitch* is the frequency at which a sound wave vibrates. The higher the frequency, the faster the vibration, and the higher the pitch sounds to our ears.

An interval is defined as the difference in frequency between two pitches.

## Interval names

Each interval is also given a name, like “major third” or “perfect fifth”.

Interval names are comprised of two parts: *quality* (like “major”) and *number* (like “third”).

## Interval numbers

The *number* of an interval is the number of letter names from one note to the next in the musical alphabet.

For example, the interval from a C to a D is a second, from C to E is a third, and from C to G is a fifth. The interval from C to A is a sixth, because the musical alphabet goes to G and then wraps around to A again.

The interval from C to the next C above or below is called an “octave” (meaning 8), and from a note to itself is called a “unison” (meaning 1).

## Perfect intervals

The *quality* of fourth, fifth, octave, and unison intervals is called “perfect”, because the sound waves of the pitches separated by those intervals vibrate together in an overlapping and mathematically elegant way. This makes them sound highly consonant.

## Major and minor

The *quality* of the remaining, non-perfect interval numbers are called “major” or “minor”, which is determined by how many “semitones” or frets they span.

## Semitones, tones, and frets

A “semitone” is the smallest interval in most Western music. On a guitar fretboard, it’s the distance across one fret on one string. Semitones are sometimes called “half steps”, or (on guitar) “frets”.

In Western music, there are twelve semitones in an octave.

The term “tone”, when used as an interval name, means two semitones, a distance of two frets. Sometimes the terms “whole tone” or “whole step” are used instead.

Be aware that the term “tone” has other meanings as well, such as “any note with a discernible pitch”. See [“tone” in the glossary](#) for details.

## Interval table

This table shows the names of intervals based on how many semitones they contain, i.e. how many frets they span on one string.

## Intervals on the fretboard

Semi-tones (frets)	Interval	Note from C	Short scale degree name	Scale degree name	Frequency ratio (dissonance)
0	unison (P1)	C	1	tonic, one	1:1
1	minor second (m2)	C#/Db	b2	flat two	25:24
2	major second (M2)	D	2	two	9:8
3	minor third (m3)	D#/Eb	#2/ b3	sharp two/ flat three	6:5
4	major third (M3)	E	3	three, major three	5:4
5	perfect fourth (P4)	F	4	four	4:3
6	tritone (TT)/ augmented fourth/ diminished fifth	F#/Gb	#4/ b5	sharp four/ flat five	45:32
7	perfect fifth (P5)	G	5	five	3:2
8	augmented fifth/ minor sixth (m6)	G#/Ab	#5/ b6	sharp five/ flat six	8:5
9	major sixth (M6)	A	6	six	5:3
10	minor seventh (m7)	A#/Bb	b7	flat seven	9:5
11	major seventh (M7)	B	7	major seven, raised seven, leading tone	15:8
12	octave (P8)	C	8	tonic, eight	2:1

Notice that this table **maps directly onto the fretboard**. For example, place the first finger on the 2nd string, 1st fret, the note C, and consider that fret 0 in the interval table above. Every row in the table describes the matching fret down the 2nd string.

The table gives the corresponding note of a C chromatic scale for reference, and the short and long names commonly used for those scale degrees.

It also shows the dissonance of each interval, in terms of its frequency ratio to the tonic. Ratios with bigger numbers are more complex and therefore more dissonant.

Perfect intervals can be raised or lowered by a semitone / fret, changing their quality from perfect to “augmented” (raised) or “diminished” (lowered).

## Chords

Western harmony is expressed through chords.

A chord is a group of two or more notes sounded together.

## Stacking thirds

In most Western music, chords are constructed by “stacking thirds”.

Stacking thirds refers to adding successive intervals of a third until the chord has as many notes as we want it to. Another way to think of stacking thirds is adding *every other* note in a scale.

Building chords from stacked thirds is called “tertian harmony”, which is the most common type of harmony in Western music. There are others, like “quartal harmony”, which is based on stacking fourths.

## Triad chords

Triads are the most common chords in Western music.

A triad chord is a three-note chord, built by stacking thirds.

The three notes in a triad chord are called the “root”, “third”, and “fifth” factors of the chord, which are generic intervals of (some quality of) a third and a fifth from the root. The specific intervals determine the chord type.

## Major triads

The major triad is the most common chord in Western music.

It is considered the most “stable” chord, constructed from a major third and a perfect fifth, the first two distinguishable harmonics in the overtone series.

As Bert Ligon said in *Comprehensive Technique for Jazz Musicians*, the major triad consists of “the first three pitches in the overtone series and the natural laws of physics insist that the planet vibrates with these tones when the winds blow, which may explain the universal occurrence of the triad in melodies.” ([Ligon, 1999](#))

## Types of triad chord

There are four types of triad chord. The chord type is determined by the intervals between its factors and the root.

Chord type	Intervals	Symbol (on C)	Notes (on C)
major	R 3 5	C, CM, Cmaj, CΔ	C-E-G
minor	R b3 5	Cm, Cmin, C-	C-Eb-G
diminished	R b3 b5	Cdim, C°	C-Eb-Gb
augmented	R 3 #5	Caug, C+	C-E-G#

## Triad thirds

If the third factor is a major third (4 semitones), it is a major chord. If the third is a minor third (3 semitones), it's a minor chord.

- Stacking a major third (4 semitones) on a minor third (3 semitones) gives a perfect fifth (7 semitones).
- Stacking a minor third (3 semitones) on a major third (4 semitones) gives a perfect fifth (7 semitones).
- Stacking two minor thirds (3 semitones) gives a tritone / diminished fifth (6 semitones).
- Stacking two major thirds (4 semitones) gives an augmented fifth (8 semitones).



## Harmonizing a scale

Harmonizing a scale refers to assembling chords from the notes of a given scale, by starting on each degree of the scale and stacking thirds to form a triad chord. The result is one chord for each degree in the scale.

The chords will be of different types depending on how the scale degree intervals fall within the chord.

Chords are numbered with Roman numerals matching the number of their scale degree. Uppercase Roman numerals are used for major chords, and lowercase Roman numerals are used for minor chords.

## Harmonizing the major scale

For example, the **major scale** has degrees

**1-2-3-4-5-6-7** (C-D-E-F-G-A-B).

Harmonizing the major scale gives the following chords:

Chord	In C	Scale degrees	In C	Chord factors	Chord type
<b>I</b>	<b>C</b>	1-3-5	C-E-G	R 3 5	major
<b>ii</b>	<b>Dm</b>	2-4-6	D-F-A	R b3 5	minor
<b>iii</b>	<b>Em</b>	3-5-7	E-G-B	R b3 5	minor
<b>IV</b>	<b>F</b>	4-6-1	F-A-C	R 3 5	major
<b>V</b>	<b>G</b>	5-7-2	G-B-D	R 3 5	major
<b>vi</b>	<b>Am</b>	6-1-3	A-C-E	R b3 5	minor
<b>vii°</b>	<b>B°</b>	7-2-4	B-D-F	R b3 b5	diminished

The type of each chord is determined by the intervals of its chord factors.

See [more about intervals](#) for information about determining the intervals between chord factors.

## Harmonizing the natural minor scale

As another example, the **natural minor** scale has degrees

**1-2-b3-4-5-b6-b7** (C-D-Eb-F-G-Ab-Bb).

Harmonizing the natural minor scale gives the following chords:

Chord	In C	Scale degrees	In C	Chord factors	Chord type
<b>i</b>	<b>Cm</b>	1-b3-5	C-Eb-G	R b3 5	minor
<b>ii°</b>	<b>D°</b>	2-4-b6	D-Fb-Ab	R b3 b5	diminished
<b>bIII</b>	<b>Eb</b>	b3-5-b7	Eb-G-Bb	R b3 5	major
<b>iv</b>	<b>Fm</b>	4-b6-1	F-Ab-C	R b3 5	minor
<b>v</b>	<b>Gm</b>	5-b7-2	G-Bb-D	R b3 5	minor
<b>bVI</b>	<b>Ab</b>	b6-1-b3	Ab-C-Eb	R 3 5	major
<b>bVII</b>	<b>Bb</b>	b7-2-4	Bb-D-F	R 3 5	major

Note that minor *key* harmony is slightly more complicated than just harmonizing the natural minor scale. See [Chapter 9. Minor key harmony](#) for details.

## Keys

### Major, minor, and modal

Most songs in Western music revolve around a keycenter or tonic—a note which serves as the musical “home” of the composition. Such compositions are said to be “tonical” (or, confusingly but commonly, “tonal”).

Songs in a major or minor key are said to be “in the key of” the tonic note. Sometimes a song changes key one or more times, to add interest.

A song in one key can be played in another key, and it will sound the same to all known listeners, but at an overall higher or lower pitch. Changing the key of a song is called “transposing” it to another key.

Most Western music is in a major or minor key. See [Chapter 8. Major key harmony](#) and [Chapter 9. Minor key harmony](#) for details.

Some songs are based around a mode, rather than being based on a major or minor key. See [Chapter 18. Diatonic modes](#) for details.

## The musical alphabet

The name of a key, and of each note within it, comes from one of the seven letters of the “musical alphabet”. A–B–C–D–E–F–G, in English.

Each letter represents a standard fundamental pitch. For example, A (above middle C) is 440 Hz. Each letter also represents the “pitch class” of all other pitches a whole number of octaves apart. For example, the pitch class A consists of all the As in all octaves.

A whole tone interval separates each note of the musical alphabet, except for semitones between B–C and E–F. When starting from C, the musical alphabet describes a major scale.

	T	T	S	T	T	T	S
1	2	3	4	5	6	7	1
C	D	E	F	G	A	B	C

See [Chapter 16. Major scale](#) for details.

## Sharps and flats

To accommodate the twelve tones of Western music, the seven letters of the musical alphabet are supplemented with “accidentals”: sharp (#) and flat (b) symbols that indicate a semitone above (#) or below (b) a given note from the musical alphabet.

For example, F# describes the pitch between F and G, a semitone above F and a semitone below G.

The note name Gb *also* describes the pitch between F and G. F# and Gb describe the same pitch, so they are called “enharmonic” symbols for that pitch.

It's useful for the same pitch to be described by two different letters in this way, because it allows every key to have seven notes with exactly one of each letter from the musical alphabet, **A–B–C–D–E–F–G** , with some different combination of sharps or flats.

## Notes in each key

<b>C (Am)</b>	no sharps or flats	C	D	E	F	G	A	B
<b>G (Em)</b>	1 sharp	G	A	B	C	D	E	F#
<b>D (Bm)</b>	2 sharps	D	E	F#	G	A	B	C#
<b>A (F#m)</b>	3 sharps	A	B	C#	D	E	F#	G#
<b>E (C#m)</b>	4 sharps	E	F#	G#	A	B	C#	D#
<b>B (G#m)</b>	5 sharps	B	C#	D#	E	F#	G#	A#
<b>F# (D#m)</b>	6 sharps	F#	G#	A#	B	C#	D#	E#
<b>Gb (Ebm)</b>	6 flats	Gb	Ab	Bb	Cb	Db	Eb	F
<b>Db (Bbm)</b>	5 flats	Db	Eb	F	Gb	Ab	Bb	C
<b>Ab (Fm)</b>	4 flats	Ab	Bb	C	Db	Eb	F	G
<b>Eb (Cm)</b>	3 flats	Eb	F	G	Ab	Bb	C	D
<b>Bb (Gm)</b>	2 flats	Bb	C	D	Eb	F	G	A
<b>F (Dm)</b>	1 flat	F	G	A	Bb	C	D	E

See [Chapter 14. Keys and their notes](#) for details, and some tricks for determining which notes are in each key.

## Harmonic function

“Harmonic function” describes the theoretical tendency of certain chords to “want” to progress to other chords, or remain at rest.

This approach originated in euroclassical music in the 18th and 19th centuries, and still heavily influences jazz music. It is less evident in modern and non-Western music.

## Euroclassical scale degree names

Harmonic function terminology is based on the names given to the scale degrees in the euroclassical tradition.

The most important are the *tonic* (1), the *dominant* (5), and the *leading tone* (7). The rest are defined in relation to those.

Degree	Name	Description
1	Tonic	Tonal center, key center, note of final resolution.
2	Supertonic	A whole tone above (super) the tonic.
3	Mediant	Midway (medi) between the tonic and dominant.
4	Subdominant	Lower (sub) dominant. A perfect fifth <i>below</i> the tonic.
5	Dominant	A perfect fifth above the tonic. So named because this interval is the dominant harmonic (i.e. the most prevalent) in the <a href="#">overtone series</a> .
6	Submediant	Lower (sub) mediant, midway (medi) between the tonic and the subdominant.
b7	Subtonic	A whole tone below (sub) the tonic.
7	Leading tone	A semitone below the tonic. It “leads” to the tonic.

## The leading tone

The leading tone is the note of a scale that is one semitone below the tonic.

The minor second interval between the leading tone and the tonic is very dissonant. Most listeners will find it tense and wish for it to resolve somewhere more consonant.

Western listeners tend to expect the 7 to be followed by the 1, based on past experience. If in most music we have heard in the past, C-D-E-F-G-A-B... has almost always been followed by another C, we will expect this because it's what always happens. (If that has not been our experience, expectations might be different.)

This combination of tension and expectation results in “wanting” the dissonant leading tone to resolve to the consonant tonic.

This is the basic assumption of Western harmony: that the leading tone functions in this way for most listeners, pulling toward the tonic. The other harmonic functions are derived from this function of the leading tone.

## Tonic, subdominant, and dominant

Chords can be grouped into three basic harmonic functions.

- **Tonic:** Home, a place of stability
- **Subdominant:** Away from home, but still stable.
- **Dominant:** A place of tension, pulling toward home.

A harmonic sequence will often start at home (a tonic), move away from it (to a subdominant), then to a place of tension (a dominant), before providing emotional release or resolution by returning home (to the tonic).

This progression mirrors a classic storytelling arc. Compare it to the “hero’s journey” narrative pattern:

1. The hero goes on an adventure (subdominant),
2. is victorious in a decisive crisis (dominant), and
3. comes home transformed (tonic).

In a major key, the diatonic chords are generally assigned harmonic functions as follows:

- **Tonic:** I, vi, iii
- **Subdominant:** IV, ii
- **Dominant:** V, vii

One way to understand this is by comparing the intervals of the chords to the tonic.

The harmonic functions are named after the scale degree of the I, IV, and V chords. These are the “primary chords”, and serve as archetypes of the chord functions.

- **Tonic** I (1-3-5) is home.
- **Subdominant** IV (4-6-1) is away from home, sharing only one note with the I, but stable, being a major triad and having no leading tone.
- **Dominant** V (5-7-2) is away from home, sharing only one note in common with the I. It is also dissonant, because it has the leading tone ( $\hat{7}$ ). Consequently we “want” it to resolve to the  $\hat{1}$  (the root of the tonic).

The remaining chords sort into functions by similarity:

- **Tonic** vi (6-1-3) and sometimes iii (3-5-7) are close to home, sharing two notes with the I. (The iii does have the leading tone (7) however, so in some cases it can act more as a dominant than a tonic.)
- **Subdominant** ii (2-4-6) is away from home, sharing no notes with I and one note with vi and iii; and it is close to the IV (sharing two notes with no dissonant intervals).
- **Dominant** vii° (7-2-4) is tense, containing a highly dissonant tritone interval between its root and diminished fifth (the  $\hat{7}$  and  $\hat{4}$  scale degrees). It has the leading tone as its root, pulling to the tonic.

## V-I cadence

A defining characteristic of most euroclassical and jazz music is the use of “cadences”, standard chord movements that end a musical phrase and establish a key center.

Cadences use the primary chord functions to establish their tension and resolution. The basic cadence is called an “authentic cadence”, which moves from the V chord (the dominant) to the I chord (the tonic).

This chord movement in a descending fifth (or ascending fourth) is a standard aspect of jazz and euroclassical idioms.

Listeners of these types of music have heard V-I cadences so often, they have formed an expectation that the V will often lead to the I. This common expectation reinforces and enables the tricks of harmonic function. On the other hand, listeners who have little experience of hearing music with V-I cadences will not have the same expectations, and will not have the same response to harmonic functions.

## Circle of fifths progressions

Jazz takes the cadential movement of descending fifths even further, by putting a ii chord in front of the V-I cadence.

The ii is a perfect fifth above the V, so the ii-V-I cadence gives the effect of repeatedly falling by perfect fifths until we reach the tonic.

In this context, the ii is said to be “preparing” the V, and it is referred to as having “pre-dominant” function.

The ii-V-I is the most common chord progression in jazz music.

Jazz arrangers typically don’t stop there; they also prepare the pre-dominant chord with another chord a fifth above it, and onward until the chord progressions are often based on a long series of descending fifths. Often they will alter the intermediate chords in the progression by making them dominant sevenths, to increase tension and propel the progression along to its final V-I cadence.

## More about intervals

### Finding intervals on the fretboard with the major scale

The easiest way to find any interval on the fretboard is to know the major scale on the fretboard.

Every degree of the major scale is a major or perfect interval from the tonic. Degree  $\hat{2}$  of the major scale is a major second from the tonic, degree  $\hat{5}$  is a perfect fifth, degree  $\hat{7}$  is a major seventh, and so on. To find a major third interval on the fretboard, imagine the lower note is the tonic of a major scale, and find the  $\hat{3}$ . The minor intervals are a fret below the major ones.

See [Chapter 16. Major scale](#) for more information.

### Inverting intervals

“Ascending intervals” describe the distance from the *lower to the higher* pitch, and are often described as going “up”, such as “up a (perfect) fourth”.

“Descending intervals” describe the distance from the *higher to the lower* pitch, and are often described as going “down”, such as “down a (perfect) fifth”.

Because we hear two notes an octave apart as the same note, it is somewhat counterintuitive that the interval from the lower to the higher pitch is *different* than the interval from the higher to the lower pitch. The descending interval is an “inversion” of the ascending interval.



For example, the interval from C to E is a major third. But the interval from E to C is a *minor sixth*. This is because the interval from C to E spans C-D-E, but the interval from E to C spans E-F-G-A-B-C.

Similarly, the interval from C to F is a perfect fourth, and the interval from F to C is a perfect fifth. A perfect fourth inverts to a perfect fifth. Therefore, moving “up a fourth” or “down a fifth” arrives at the same note (in a different octave).

A simple formula for inverting an interval is to (1) invert the quality of the original interval (major to/from minor, augmented to/from diminished, perfect stays perfect); and (2) subtract the number of the original interval from 9.

Therefore, up a major third is the same as down a minor sixth, up a perfect fifth is the same as down a perfect fourth, up a minor seventh is the same as down a major second, and so on.

## Interval arithmetic

The intervals of the chord factors can be determined by counting the number of semitones between the factors and the root.

To find the chord factor intervals using the [interval table](#), look up the number of semitones in the factor’s scale degree, and subtract the number of semitones in the root scale degree. If the number is negative, add 12 semitones (because the chord spans the end of the scale into the next octave). The resulting difference is the number of semitones in the interval, which can then be looked up from the table.

For example, the V chord has scale degrees  $\hat{5}$ - $\hat{7}$ - $\hat{2}$ . (Scale degree numbers are sometimes written with “hats” ( $\hat{5}$ ) when it adds clarity, to distinguish them from other numbers.) The chord’s root is degree  $\hat{5}$ , which is 7 semitones from the tonic. The chord’s third factor is degree  $\hat{7}$ , which is 11 semitones from the tonic. The interval between the root and third factors is  $11-7=4$  semitones, which is a major third. So the chord’s third factor is a major third.

The V chord’s fifth factor is degree  $\hat{2}$ , which is 2 semitones from the tonic. The interval between the root and fifth factors is  $2-7=-5$  semitones, which is a negative number because the chord spans the end of the scale into the next octave. Adding 12 semitones to account for the octave,  $-5+12=7$  semitones, which is a perfect fifth.

So the V chord’s factor intervals are R 3 5 (root, major third, perfect fifth), which makes it a major chord, represented by an uppercase Roman numeral (V and not v).

## Consonance, dissonance, and frequency ratios

When two pitches sound together, their sound waves overlap. The more closely they overlap, the more consonant and harmonically relaxed they sound. The less they overlap, the more dissonant and harmonically tense they sound.

This overlap between sound waves can be measured by the ratio between the frequencies of the two pitches. The more closely they overlap, the simpler the ratio. The frequency ratio of each interval is listed in the [interval table](#).

In a unison interval, since the two pitches are the same, their sound waves oscillate at the same frequency. The ratio between the frequencies is one-to-one (1:1).

In an octave, one pitch vibrates twice as fast as the other. The pitch frequency ratio of an octave is therefore two-to-one (2:1).

The ratio of a perfect fifth is 3:2, and a perfect fourth is 4:3.

Because these small-integer ratios are mathematically elegant, and because they sound particularly consonant to our ears, they are called perfect intervals.

Other intervals get mathematically more complex, and therefore more dissonant.

The “tritone” interval, considered the most dissonant, has a pitch frequency ratio of the square root of 2.

These much more complex sound waves require more attention and processing from our brains, which may account for their perceived dissonance.

## Chapter 7: Practical CAGED grips

*Chord grips for movable CAGED shapes that are actually useful.*

In this chapter:

- [About CAGED](#)
- [Mind the intervals](#)
- [Notation](#)
- [C shapes](#)
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- [Treble triads](#)
  - [First-string root](#)
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- [Third-string root](#)
- [Major chords on the entire fretboard](#)
- [Ergonomics](#)
  - [Notice the elbow](#)
  - [Neutral fretting wrist](#)
  - [Hands are not crowbars](#)
  - [More on guitar ergonomics](#)

## About CAGED

The CAGED system is a convenient way of thinking about movable chord shapes on guitar. Movable chords are chord grips that can be played in any position up and down the neck, because they don't have any open strings. Every string is either stopped at a fret, or muted by a convenient positioning of the hand. (Muting strings is the magic trick that makes movable chords possible.)

When looked at in this way, a guitar in standard tuning has only five of these core movable shapes, which in turn form the basis of every chord it is possible to play on guitar.

The shapes are named after the familiar C, A, G, E, and D chord shapes in “open position” (that is, having open strings).

## Mind the intervals

When learning and practicing these shapes, it's important to be mindful of the purpose each note serves in the chord, rather than thoughtlessly memorizing occult chord shapes. We must always be aware of which note is the root, third or minor third, fifth, etc.

This is important for two reasons. First, it allows us to make any chord we need by adjusting a chord shape we already know. (For example, lowering the third of a major chord by one fret makes it a minor chord.)

Second, it leads to almost accidentally learning the most important interval shapes and sounds all over the fretboard, which is extremely useful for improvising and playing by ear.

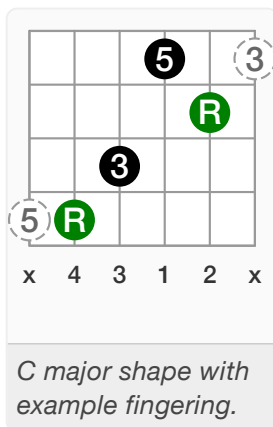
Of course it's especially important to know the root notes in each chord shape, since that's how we know where to place the chord.

## Notation

The dots in the following chord diagrams are labeled with the simple interval of each chord tone from the root. **R** is the root note, **3** is the major third, **b3** is the minor third, etc.

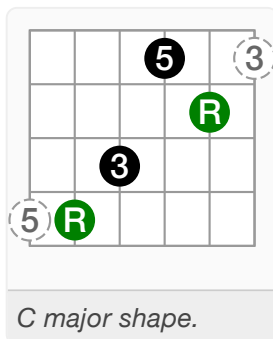
Chord fingerings are notated like this: **x4312x**. The six symbols represent the six strings of the guitar from lowest pitch to highest, left to right, and indicate the number of the finger used to fret each string, or an “x” indicating the string is muted. Finger 1 is the index finger, 2 is the middle finger, 3 is the ring finger, and 4 is the little finger.

The fingering symbols are intuitive if we imagine them placed at the bottom of the chord diagrams, lined up with the strings. For example, imagine the **x4312x** fingering for the C major shape like this:



## C shapes

### C major shape



The basic C major shape is a straightforward triad chord. The chord tones are in the order R–3–5 , (which is called “root position”), the third and fifth are stacked directly on top of the root with no gaps (which is called a “closed voicing”), and then the root note is repeated again at the octave, so the root is both the highest and lowest note.

Play the chord tones in sequence R–3–5–R , and notice how it sounds just like walking up the stairs, with all the tones packed together into a single octave. That’s the sound of a closed voicing. This kind of closed-voice root-position triad sounds strong and clear.

The basic chord grip for this shape is x4312x . It’s a surprisingly comfortable and convenient grip, once it becomes familiar. The 1st string can be comfortably muted with the side of the fretting hand, and the 6th string can be muted by either the tip of the little finger or the thumb.

The bass note for this chord is played with the little finger on the 5th string. It’s common to reach the little finger over to the 6th string, to play an alternating bass line between the root and fifth.

Sometimes it sounds good to add the major third on the highest string, which can be done by flattening the first finger: x43121

Another variation is to play just the “treble triad” on the top three (“treble”) strings xxx121 , with the root on the 2nd string, optionally adding the bass note with the little finger: x4x121 .

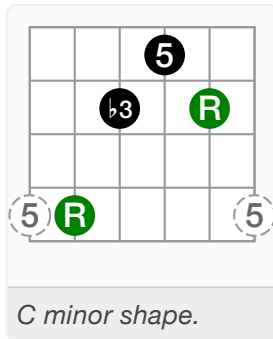
To get a feel for the C major chord shape, first play it in open position, with the little finger on the 3rd fret of the 5th string (the note C, which makes it a C chord). Then move it up the neck so the root is on the 8th fret (note F, an F chord). Then move the root up to the 10th fret (G). Finish by moving the root up to the 15th fret (aka the 3rd fret above the octave), another C chord.

Play around with these three “primary” chords for awhile to get familiar with the shape at different parts of the neck.

#### Practice the C shape with primary chords in the key of C major:

5th string root on fret	C shape	Chord
3	major	C
8	major	F
10	major	G
15 (3+12)	major	C

## C minor shape



The C minor shape is just the C major shape with the third lowered by one fret. But what a difference that small change makes for playability.

The C minor shape can seem impractical, unsuited to human hands. But when we realize that we can leave out some of the notes, it becomes more useful.

One common grip for this shape is `x421xx`, a minimalist, three-note closed-voice triad. The first finger mutes the top two strings.

Sometimes it's nice to have the root note repeated on top of the chord as the highest pitch. In that case, pull the first finger down to the 2nd string, using the tip of it to mute the 3rd string: `x42x1x`.

In this grip, we're no longer playing the fifth of the chord. But having the bass in the root, the minor third (making it a minor chord), and then repeating the root at the top, we often don't notice the missing fifth.

Another variation is to play the treble triad on the upper-middle three strings, with the root on the second string: `xx213x`.

Try playing the chord tones in order, `R-b3-5-R`, starting with the fingers in `x421xx`, and then rotating into `xx213x`.

To get comfortable with the C minor shape in different places on the neck, use it to play the secondary chords in the key of C major up and down the fretboard.

**Practice the C minor shape with secondary chords in the key of C major:**

5th string root on fret	C Shape	Chord
12	minor	Am
5	minor	Dm
7	minor	Em

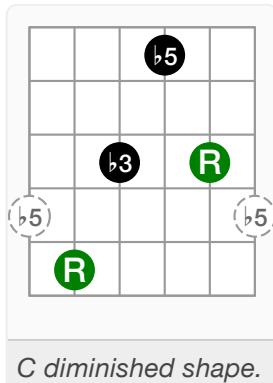
When both the C major and C minor shapes are familiar, practice them together by playing all the triads in the key of C major, as shown.

**Practice C shapes with harmonized triads in the key of C major:**

5th string root on fret	C shape	Chord
3	major	C
5	minor	Dm
7	minor	Em
8	major	F
10	major	G
12	minor	Am
14 (2+12)	minor (no 5) x42x1x	Bm (no 5)
15 (3+12)	major	C



## C diminished shape



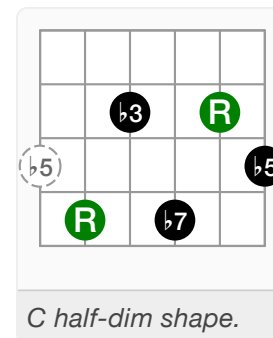
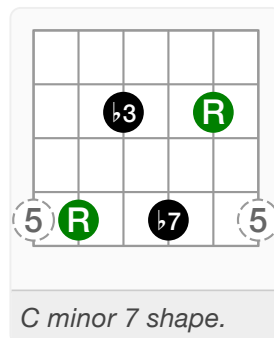
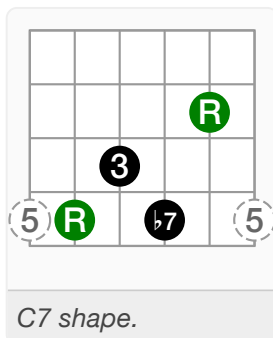
All the triad chords in a major key are either major or minor chords, except one: the vii chord is a diminished triad. See [Chapter 8. Major key harmony](#) for details.

In the key of C, the vii chord is actually Bdim, a B diminished triad. We got away with playing Bm(no 5) earlier, because Bdim and Bm are the same chord except for the fifth.

One common grip for this shape is `x421xx`, and another is to play the root at the top with the treble triad `xx213x`. Sometimes it's also useful to grip it with `xx2134` or even `xx1x23`.

To practice this shape, play the harmonized triads from C major again, but play Bdim instead of Bm(no 5).

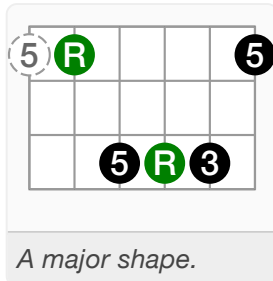
## C seventh shapes



See [Chapter 11. Seventh chords and drop voicings](#) for a detailed discussion of seventh chords.

## A shapes

### A major shape



The A major shape is one of the first barre chords learned by beginning guitarists.

Unlike the C major shape, the A major shape is an “open voicing”. The third is an octave above the root. Play the chord tones in order to hear the difference: R–3–5–R (strings 5–2–4–3 ).

The main triad in this chord shape is the mini-barre on the upper-middle strings, with chord tones ordered 5–R–3 . This ordering is called the “second inversion” of the chord, which sounds noticeably different than the root position voicing. The root note is somewhat overpowered by the other chord tones, because it’s at neither the top nor bottom of the voicing.

The bass note for this chord is played with the first finger on the 5th string. As with the C shape, it’s common to reach the first finger over to the 6th string, to play the perfect fifth in an alternating bass line.

Played as a barre chord, the fingering for this shape is x13331 , or x13341 . As when playing any barre chord, never try to clamp down the first finger across the whole fretboard like a vice, which will lead to pain. Instead, the first finger should be slightly curved, pressing down only at the tip (on the 5th string) and the side of the base of the finger (on the first string).

More comfortably, we often don’t need the extra fifth on the top string, so we can just play it like this: x1333x or x1444x or x1334x , muting the 1st string with the side of the third (or fourth) finger.

Even more comfortably, the upper root note isn’t particularly important, and can be left out, removing the need for a barre at all: x13x4x .

Perhaps the best grip of all is the comfortable, lazy, and flexible approach that starts as x13x4x , without the barre. A half-hearted effort is then made to also lay the third finger over onto the 3rd string, x13(3)4x , either stopping it to play the “R” or muting it, however it

happens to work out. The base of the first finger can comfortably be laid across the 1st string as needed, `x13(3)4(1)` .

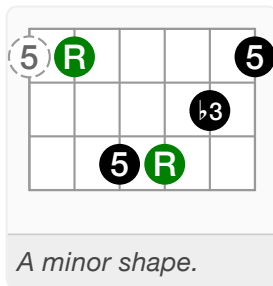
We can also just play the treble triads by themselves: `xx333x` and `xxx341` .

To get familiar with this shape up and down the neck, use it to play the primary chords in the key of C major.

**Practice the A shape with primary chords in the key of C major:**

5th string root on fret	A shape	Chord
3	major	C
8	major	F
10	major	G

## A minor shape



The A minor shape is another common barre chord learned by beginners. Played as a barre, the fingering is `x13421` .

There are other grips that can be more comfortable than the barre chord.

One comfortable grip is `x1342x` , like the barre chord without the top string.

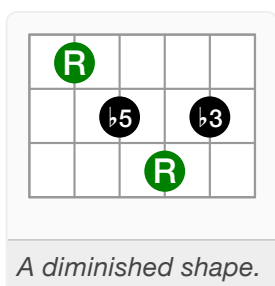
An interesting grip for this shape is `x1x432` . This voicing focuses on the treble triad on the top-3 strings, which is a root-position closed-voice triad. It then adds the root note in the bass.

The treble triads can also be played by themselves: `xxx321` and `xx231x` .

Practice the A minor shape with secondary chords in the key of C major:

5th string root on fret	A shape	Chord
0 (open)	minor	Am
5	minor	Dm
7	minor	Em
12	minor	Am

## A diminished shape

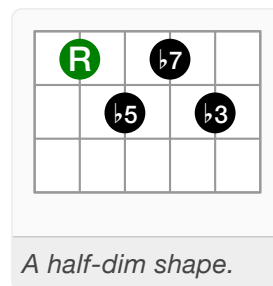
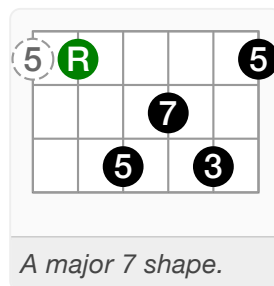
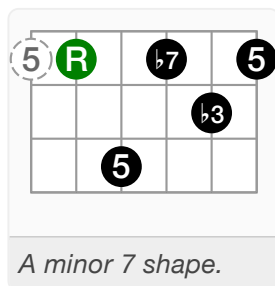
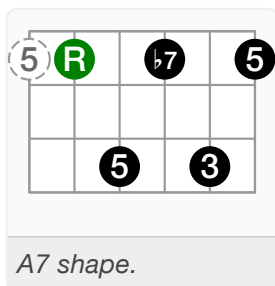


This shape is typically fingered as `x1243x`.

Practice A shapes with harmonized triads in the key of C major:

5th string root on fret	A shape	Chord
3	major	C
5	minor	Dm
7	minor	Em
8	major	F
10	major	G
12	minor	Am
2	diminished	Bdim

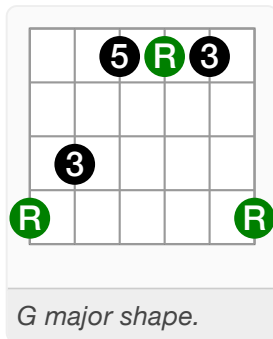
## A seventh shapes



See [Chapter 11. Seventh chords and drop voicings](#) for a detailed discussion of seventh chords.

## G shapes

### G major shape



The G major shape uses the same treble triad as the A major shape, the 5–R–3 on the upper middle strings, but it builds out the chords below the treble triad, while the A shape builds chords above it.

The G shape is most usefully thought of as two separate shapes: a bass shape on the lower strings, and a treble shape on the upper strings. The two shapes are never gripped at the same time, but it's easy to switch between them. (And sometimes it sounds great to switch back and forth between them, like a big Beethoven finale.)

The treble shape is normally gripped as xx1114. If this grip seems difficult, move the elbow in toward the body to increase the reach of the fourth finger.

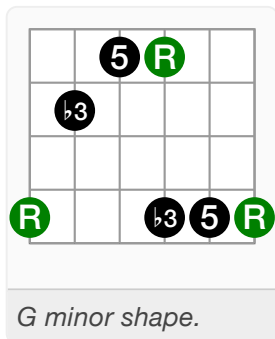
The typical bass shape fingering is 43111x or 4311xx (lifting the first finger slightly to mute the 2nd string).

In the bass shape, the chord is a root-position closed-voiced triad, very similar to the C major shape. (In fact, it's common to switch between C and G shapes rooted on the same fret.)

#### Practice the G shape with primary chords in the key of C major:

6th string root on fret	G shape	Chord
8	major	C
13 (1+12)	major	F
3	major	G

## G minor shape



Like most G shape chords, the G minor shape is best thought of as two separate shapes.

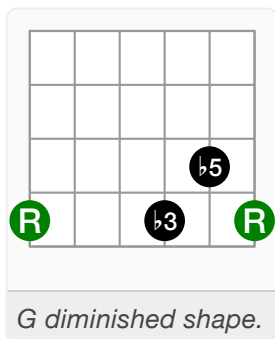
The bass shape grip is `4211xx`, a closed-voice root-position triad.

More common, however, is this oddly comfortable grip that barres the treble strings while easily muting others: `3xx444` or `2xx333`.

**Practice the G minor shape with secondary chords in the key of C major:**

6th string root on fret	G shape	Chord
5	minor	Am
10	minor	Dm
12	minor	Em

## G diminished shape

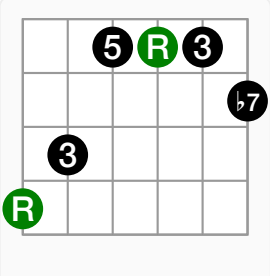


The G diminished shape can be gripped as `1xx324` or `2xx314`.

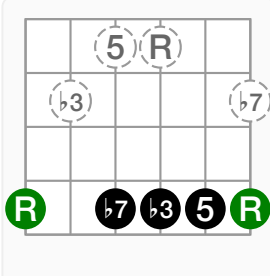
Practice G shapes with harmonized triads in the key of C major:

6th string root on fret	G shape	Chord
8	major	C
10	minor	Dm
12	minor	Em
13 (1+12)	major	F
3	major	G
5	minor	Am
7	diminished	Bdim

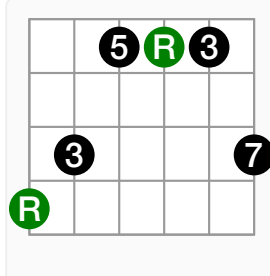
## G seventh shapes



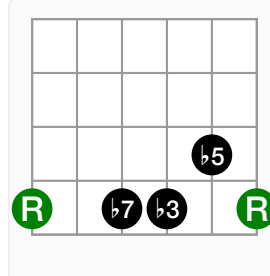
G7 shape.



G minor 7 shape.



G major 7 shape.



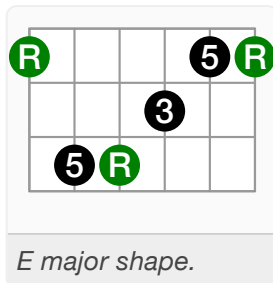
G half-dim shape.

See [Chapter 11. Seventh chords and drop voicings](#) for a detailed discussion of seventh chords.



## E shapes

### E major shape



The E major shape is normally the first barre chord learned by beginning guitarists, in order to play an F major chord. Unfortunately, it often causes pain and difficulty due to an improper grip. The typical barre chord grip is `134211`. Like all first-finger barres, the first finger should curve and touch only at the tip and base.

But there are other grips for this shape that are more comfortable.

The first adjustment that can be made is to lift the base of the finger so it mutes the top two strings instead of barring them: `1342xx`.

If we want to hear the root note at the top of the chord, we can temporarily press down the barre again, `1342x1`.

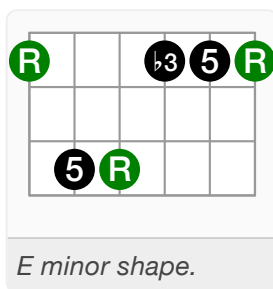
Another option is to barre *just the top two strings* with the first segment of the first finger, and play the *bass note with the second finger*. Like this: `2xx311`. From this basic grip, the little finger can optionally alternate between the root on the 4th string and the perfect fifth on the 5th string.

Another interesting grip is `1x432x`. To occasionally add the root note on top of this shape, use the base of the first finger to make a temporary barre, `1x4321`, or move the second finger to the 1st string, muting the 2nd string, as `1x43x2`.

Practice the E shape with primary chords in the key of C major:

6th string root on fret	E shape	Chord
8	major	C
1	major	F
3	major	G

## E minor shape



The E minor shape is essentially the same as the G minor shape, except gripped from below rather than above.

This shape is commonly played as a barre chord, **134111**. But like the E major shape, there are more comfortable choices.

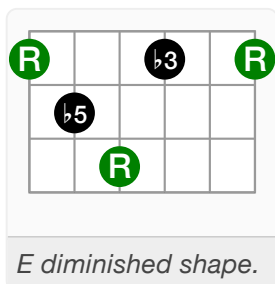
The easiest grip is **2xx111**. The little finger can then optionally play root and fifth bass notes on the 4th and 5th strings.

If we want the first finger to play the bass note, it's also possible to grip with **1xx444**.

Practice the E minor shape with secondary chords in the key of C major:

6th string root on fret	E shape	Chord
5	minor	Am
10	minor	Dm
12	minor	Em
0 (open)	minor	Em

## E diminished shape



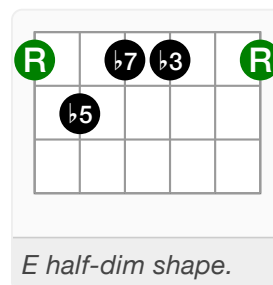
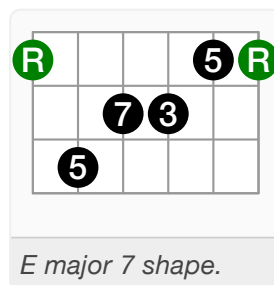
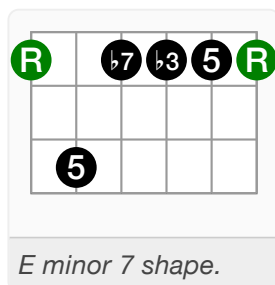
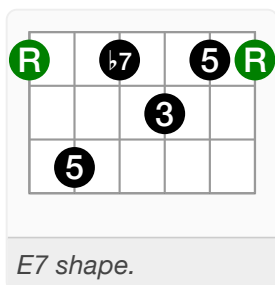
The E diminished shape can be gripped with 1342xx .

Roll into the G diminished shape treble triad xxx213 to arpeggiate the rest of the chord.

**Practice E shapes with harmonized triads in the key of C major:**

6th string root on fret	E shape	Chord
8	major	C
10	minor	Dm
0 (open)	minor	Em
1	major	F
3	major	G
5	minor	Am
7	diminished	Bdim

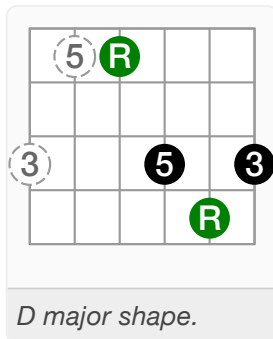
## E seventh shapes



See [Chapter 11. Seventh chords and drop voicings](#) for a detailed discussion of seventh chords.

## D shapes

### D major shape



The D major shape tends to sound weaker and thinner than the other chord shapes, because the lowest reachable root note is on the 4th string. It's a good effort, but it's never going to resonate like a chord with a root on the 5th or 6th strings. So the D major shape is often not a chord we want to land on or linger on. But as the only chord shape with a 4th-string root, it's often in a convenient place for transitioning between other chords.

The conventional grip for this shape is `xx1243`, but in practice this grip is rarely comfortable, and the sound is so thin it's scarcely worth the effort anyway.

One common way to grip this shape is as a treble triad, leaving out the awkward bass note:

`xxx121` or `xxx132`.

To keep the root note in the bass, there are two comfortable grips, depending on which note we want on top.

The grip `xx134x` has the root note at the top and bottom. This is really just a power chord, with the root and fifth but no third, which sounds a bit "vague" because it's neither major nor minor. But for use in passing, on the way to another chord shape, this grip is often perfect.

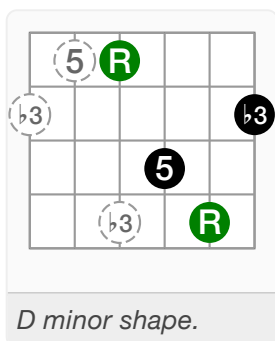
The grip `xx13x4` is a full triad chord with the third at the top and the root in the bass.

One interesting voicing for this chord, favored by guitar virtuoso Joe Pass, is `2x134x`. It's a little unusual, with the third in the bass, and sometimes it just does not sound right. But sometimes it sounds amazing, especially when leading to another chord with a nearby bass note, as when playing a D shape V chord leading to a G shape I chord.

Practice the D shape with primary chords in the key of C major:

4th string root on fret	D shape	Chord
10	major	C
3	major	F
5	major	G

## D minor shape

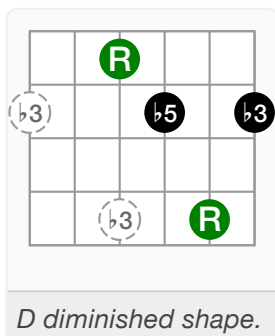


Compared to the D major shape, the D minor shape is refreshingly comfortable to play, typically gripped as `xx1342`.

Practice the D minor shape with secondary chords in the key of C major:

4th string root on fret	D shape	Chord
7	minor	Am
0 (open)	minor	Dm
2	minor	Em

## D diminished shape

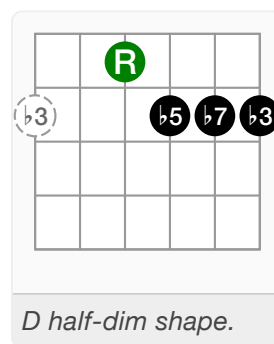
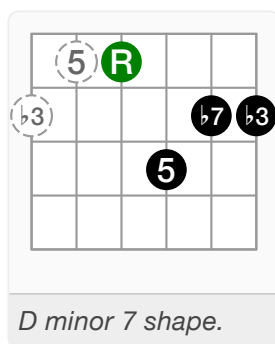
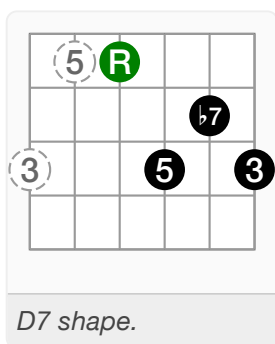


The D diminished shape can be gripped with `xx1242`.

**Practice D shapes with harmonized triads in the key of C major:**

4th string root on fret	D shape	Chord
10	major	C
0 (open)	minor	Dm
2	minor	Em
3	major	F
5	major	G
7	minor	Am
9	diminished	Bdim

## D seventh shapes



See [Chapter 11. Seventh chords and drop voicings](#) for a detailed discussion of seventh chords.

## Treble triads

Treble triads are minimalist triad chords on the upper, “treble” strings, derived from core shared triads within the CAGED shapes.

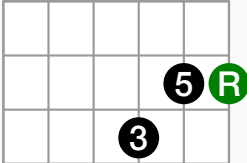
Treble triads are useful for quick changes, chord improvisation, and harmonizing melody lines.

Shapes are included for the most commonly used chords: major, minor, and dominant seventh.

(Though of course seventh chords are not actually “treble *triads*”, a better term has proven elusive.)

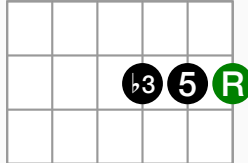
## First-string root

The treble triad with its root on the first string is derived from the E CAGED shape.



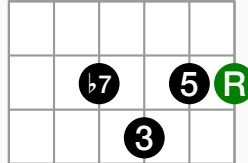
A 3x5 grid representing a guitar fretboard. The root note 'E' is on the 1st string, 2nd fret, marked with a black circle containing the number '3'. The major triad notes are marked: 'E' (root, 3rd fret, 1st string, black circle with '5'), 'G' (3rd fret, 2nd string, green circle with 'R'), and 'B' (4th fret, 2nd string, black circle with '5').

*Major treble triad  
with 1st-string root.*



A 3x5 grid representing a guitar fretboard. The root note 'E' is on the 1st string, 2nd fret, marked with a black circle containing the number '3'. The minor triad notes are marked: 'E' (root, 3rd fret, 1st string, black circle with '5'), 'G' (3rd fret, 2nd string, black circle with 'b3'), and 'B' (4th fret, 2nd string, green circle with 'R').

*Minor treble triad  
with 1st-string root.*

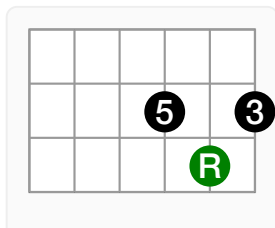


A 3x5 grid representing a guitar fretboard. The root note 'E' is on the 1st string, 2nd fret, marked with a black circle containing the number '3'. The dominant seventh triad notes are marked: 'E' (root, 3rd fret, 1st string, black circle with '5'), 'G' (3rd fret, 2nd string, black circle with 'b7'), and 'B' (4th fret, 2nd string, green circle with 'R').

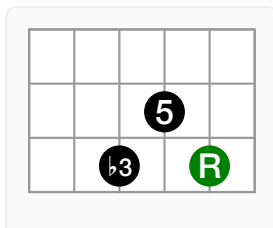
*Dominant seventh  
treble voicing with  
1st-string root.*

## Second-string root

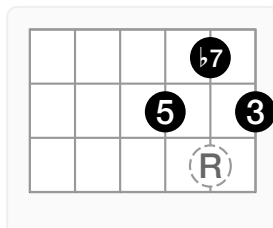
The treble triad with its root on the second string is derived from the C and D CAGED shapes.



*Major treble triad  
with 2nd-string root.*



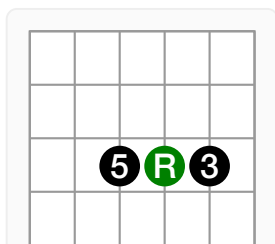
*Minor treble triad  
with 2nd-string root.*



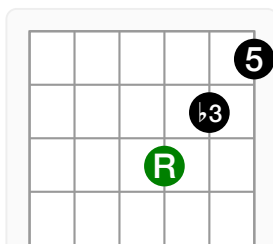
*Dominant seventh  
treble voicing with  
2nd-string root.*

## Third-string root

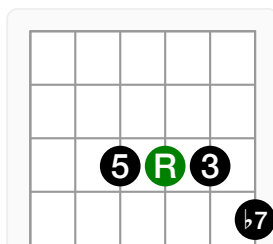
The treble triad with its root on the third string is derived from the A and G CAGED shapes.



*Major treble triad  
with 3rd-string root.*



*Minor treble triad  
with 3rd-string root.*



*Dominant seventh  
treble voicing with  
3rd-string root.*



## Major chords on the entire fretboard

The following figures illustrate how CAGED shapes fit together on the fretboard, and point the way toward playing all the chords in a given key in one position (that is, without moving the fretting hand up or down the neck). Though only primary chords are shown here, all chords in the key can be played in position using one of the different CAGED shapes.

For each CAGED position, practice changing between different shapes for C, F, and G chords in the same position on the fretboard. For example, play C major in a G shape, F major in a C shape, and G major in a D shape.

For more on position playing in a major key, see [Chapter 8. Major key harmony](#).

The image displays three fretboard diagrams, each representing a different CAGED shape for a major chord. Each diagram is a 6-string fretboard with 12 frets. Frets are numbered 1 through 12. Chord shapes are indicated by black circles with numbers (1, 2, 3, 4, 5) and green circles with 'R' (Root). The diagrams show how these shapes repeat across the fretboard, allowing for playing all chords in a given key in one position.

- C major on the whole fretboard:** Shows the C major chord shape (C4, E4, G4) in the CAGED shape (C4, E4, G4, B4, C5, E5) across the fretboard. The shape is repeated every 5 frets, with the root moving up the neck.
- F major on the whole fretboard:** Shows the F major chord shape (F4, A4, C5, E5, F5, A5) in the CAGED shape (F4, A4, C5, E5, F5, A5) across the fretboard. The shape is repeated every 5 frets, with the root moving up the neck.
- G major on the whole fretboard:** Shows the G major chord shape (G4, B4, D5, F5, G5, B5) in the CAGED shape (G4, B4, D5, F5, G5, B5) across the fretboard. The shape is repeated every 5 frets, with the root moving up the neck.

Each diagram includes a caption at the bottom: "C major on the whole fretboard.", "F major on the whole fretboard.", and "G major on the whole fretboard." respectively.

## Ergonomics

Some of the CAGED chord shapes are awkward or even impossible to play completely. Some CAGED grips, notably barre chords, can lead to significant pain if done improperly.

Pain is a signal from our bodies that we are doing something wrong. If we ignore the pain and don't change what we are doing, the injury will get worse and take longer to heal. Eventually, our bodies will *force* us to stop doing it.

Far better to listen to our bodies from the beginning. **If something hurts, stop doing it right away**, and figure out a painless way to do it before the painful way becomes habit.

Aside from this general advice, a few observations can be particularly helpful.

### Notice the elbow

The fretting hand's reach and range of motion changes dramatically depending on the position of the elbow.

Move the elbow in toward the body to allow the 3rd and 4th fingers to reach down the neck and the first finger to reach back up the neck more easily, or move it out to the side of the body to allow the first finger to reach down the neck. Move the elbow out in front of the body to improve the fingers' reach of the low strings, or pull it back to better reach the high strings.

Often when we are struggling to place our fingers into a challenging chord grip, the problem can be solved almost magically by simply adjusting the elbow until the position is more comfortable.

### Neutral fretting wrist

The fretting wrist should be kept at a neutral angle, with the hand curved slightly forward so there is no bend where the tendons cross the wrist. In addition to improving dexterity and speed, this prevents tendons from rubbing, which can cause inflammation and injuries like carpal tunnel syndrome.

Keeping the wrist at a neutral angle can be made easier by adjusting the elbow, as already described, and by tilting the guitar neck upward. A strap with a suede backing can help hold the guitar tilted in a comfortable fretting position.

## Hands are not crowbars

While it is possible to use the thumb as a fulcrum to lever the fingers onto the fretboard with considerable force, our hands are full of joints that need to be held rigidly in place in order to do so. But joints are made to move, not to hold rigid, especially not against forces applied in the joint's weakest direction. This technique may seem powerful at first, but over time it is likely to lead to injury, possibly including basal joint arthritis.

Instead, the thumb should be pressed lightly against the neck, *if at all*. The fretting thumb's main use should be to keep the hand gently in contact with the neck, so it stays in one place instead of floating around in space when the fingers are off the fretboard.

If the perfect intonation can't be achieved without the thumb, bring it into play by gently pinching the back of the neck directly behind the fingers, just hard enough that the frets don't buzz.

## More on guitar ergonomics

Christopher Berg's excellent *Mastering Guitar Technique: Process and Essence* ([1997](#)) has a great deal more about optimal positioning of the body for playing guitar.

## Chapter 8: Major key harmony

*The basic template of Western music.*

In this chapter:

- [What is a major key?](#)
- [Chords in a major key](#)
- [Playing in position](#)
- [C shape I chord position](#)
- [Practicing these chords](#)
  - [Ascending and descending](#)
  - [Primary and secondary chords](#)
  - [Circle of fourths/fifths](#)
  - [Playing songs in one position](#)
- [More about major key harmony](#)
  - [The dominant V7](#)
  - [The diminished vii°](#)
- [A shape I chord position](#)
- [G shape I chord position](#)
- [E shape I chord position](#)
- [D shape I chord position](#)
- [Shapes on the whole fretboard](#)

### What is a major key?

The vast majority of songs in Western music are written in a major key.

Songs in a major key use notes and chords derived from the major scale, with a special emphasis on the first scale degree: the “tonic” or “keycenter”, the note the key is named for.

Major key compositions treat the tonic as home, a point of reference and a point of rest, and typically use the tonic note more frequently than any other note in the scale.

Music that revolves around a tonic in this way is called “tonical”. (Or, unfortunately, “tonal”. See [“tonal”](#) in the glossary for argument against that usage.)

## Chords in a major key

The chords in a major key are determined by harmonizing the major scale. See [Chapter 6. Introduction to Western harmony](#) for details.

Notice that in a major key:

- the **I**, **IV**, and **V** chords are always **major**,
- the **ii**, **iii**, and **vi** chords are always **minor**, and
- the **vii** chord is always a **diminished** triad.

The chords derived from the scale in this way are called “diatonic” chords, meaning the chords that are “in” the key.

Chord	In C	Scale degrees	In C	Chord factors	Chord type
<b>I</b>	<b>C</b>	1-3-5	C-E-G	R 3 5	major
<b>ii</b>	<b>Dm</b>	2-4-6	D-F-A	R b3 5	minor
<b>iii</b>	<b>Em</b>	3-5-7	E-G-B	R b3 5	minor
<b>IV</b>	<b>F</b>	4-6-1	F-A-C	R 3 5	major
<b>V</b>	<b>G</b>	5-7-2	G-B-D	R 3 5	major
<b>vi</b>	<b>Am</b>	6-1-3	A-C-E	R b3 5	minor
<b>vii°</b>	<b>B°</b>	7-2-4	B-D-F	R b3 b5	diminished

## Playing in position

It’s useful to be able to play all the chords in a key in one “position” on the fretboard. This means that all chords are found within the same span of four or five frets, so all chords can be played without moving the fretting hand up or down the guitar neck.

This makes chord progressions easier to play, and helps us develop an intuitive understanding of how the chord tones relate to each other.

It also makes for smooth “voice leading”, meaning the chord tones change only by small intervals from one chord to the next, as they would if composed for singing by a choir of human voices.

A useful, movable way to identify fretboard positions is by specifying the CAGED shape used for the I chord, resulting in five different positions.

## C shape I chord position

<p>I chord in C shape I position.</p>	<p>ii chord in C shape I position.</p>	<p>iii chord in C shape I position.</p>	<p>IV chord in C shape I position.</p>
<p>V chord in C shape I position.</p>	<p>vi chord in C shape I position.</p>	<p>vii chord in C shape I position.</p>	<p>V7 chord in C shape I position.</p>

## Practicing these chords

### Ascending and descending

When first getting familiar with the chords in a position, it's helpful to start by focusing on the underlying major scale, and playing the chord having a root on each scale degree in ascending or descending order. For example:

**I-ii-iii-IV-V-vi-vii°-I**

(C-Dm-Em-F-G-Am-B°-C)

**I-vii°-vi-V-IV-iii-ii-I**

(C-B°-Am-G-F-Em-Dm-C)

By knowing the major, minor, and diminished chord shapes, and knowing which type of chord has its root on each degree of the major scale, it's easy to assemble each chord on each scale degree, without having the whole position memorized.

### Primary and secondary chords

In a major key, the major chords (I, IV and V) are called “primary chords”.

These three chords, called the “tonic”, “subdominant”, and “dominant” in euroclassical terminology, are enough to create a full and rich chord progression by themselves. A surprising number of popular songs are composed of only these three primary chords.

It's therefore helpful to practice various chord changes with the primary chords. For example:

**I-IV-V-I** (C-F-G-C)

The minor chords (vi, ii, and iii) are called “secondary chords”.

The secondary chords have the same relationships to each other as the primary chords do. The vi can act as the tonic, the ii as the subdominant (a perfect fifth below the vi), and the iii as the dominant (a perfect fifth above the vi).

Example secondary chord progression:

**vi-ii-iii-vi** (Am-Dm-Em-Am)

## Circle of fourths/fifths

It can be helpful to practice chord changes in order of ascending fourths (aka descending fifths). It's a pleasant sounding chord progression that can cycle around endlessly. For those intending to play jazz, it also contains the most common chord changes in most jazz music.

The circle of fourths/fifths:

**I-IV-vii°-iii-vi-ii-V-I**

(C-F-B°-Em-Am-Dm-G-C)

## Playing songs in one position

Possibly the most useful way to practice these chords is to practice chord changes for major key songs we already know, without moving out of one position.

This helps make the chords more real and less abstract, and begins to integrate them into our actual playing.

## More about major key harmony

### The dominant V7

In major key harmony, the V chord is often played as a “dominant seventh chord” (sometimes referred to as simply a “seventh chord”). A dominant seventh chord is a major triad with an added minor seventh interval. It's notated by simply adding a “7” to the chord symbol, like “G7” or “V7”. See [Chapter 11. Seventh chords and drop voicings](#) for more information.

The V7 chord is constructed by stacking another third onto the V triad, like this:

Chord	In C	Scale degrees	In C	Chord factors	Chord type
<b>V</b>	<b>G</b>	5-7-2	G-B-D	R 3 5	major
<b>V7</b>	<b>G7</b>	5-7-2-4	G-B-D-F	R 3 5 b7	dominant seventh

Dominant seventh chords are tense, because they contain the highly dissonant tritone interval between their third and seventh factors (scale degrees  $\hat{7}$  and  $\hat{4}$  in the V7 chord). The V chord also contains the leading tone (scale degree  $\hat{7}$ ), which “wants” to resolve to the  $\hat{1}$  (the tonic, the I



chord) according to theories of harmonic function.

In other words, the V7 chord tends to pull urgently toward the I chord in Western harmony.

The V is the only dominant seventh chord that occurs when harmonizing a major key. That's where the name "dominant seventh" comes from. In euroclassical harmony, the V chord is called the "dominant" because it's based on scale degree  $\hat{5}$ , a perfect fifth, which is the dominant harmonic in the overtone series.

In short, the "dominant seventh" is the chord type of the "dominant" chord (V) when it includes its "seventh" factor (V7).

## The diminished vii°

The diminished triad vii chord doesn't get much love, with most people dismissing it as "rarely used" or "not practical".

But notice that it contains almost exactly the same notes as the harmonically vital dominant V7 chord.

Chord	In C	Scale degrees	In C	Chord factors	Chord type
<b>V7</b>	<b>G7</b>	5-7-2-4	G-B-D-F	R 3 5 b7	dominant seventh
<b>vii°</b>	<b>B°</b>	7-2-4	B-D-F	R b3 b5	diminished

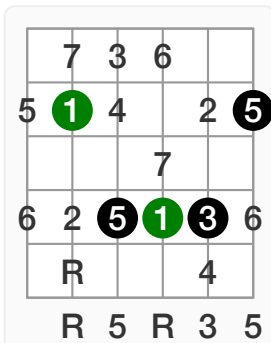
The vii° is essentially a "rootless" V7 chord.

It contains the same tritone (between  $\hat{7}$  and  $\hat{4}$ ) and leading tone ( $\hat{7}$ ) as the V7.

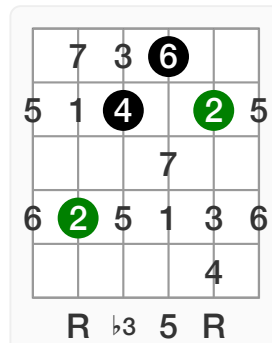
As such it has nearly the same harmonic effect as the V7, and it is often exactly the right sound to drive a chord progression home. It's easy to play, and easy to add a bass note of either the  $\hat{5}$  (for a true V7 chord) or the  $\hat{7}$  (for a richer diminished triad) as desired.

The diminished vii is rather practical after all.

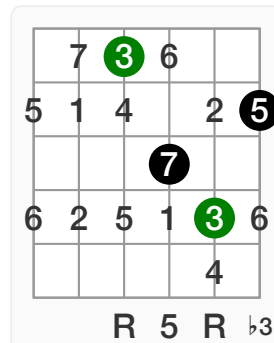
## A shape I chord position



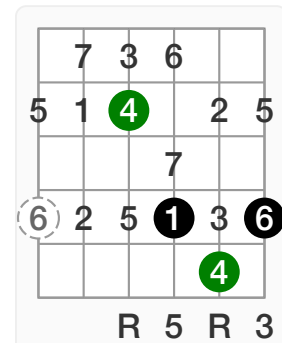
*I chord in A shape I position.*



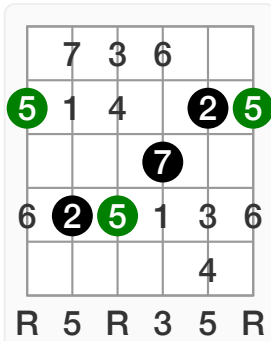
*ii chord in A shape I position.*



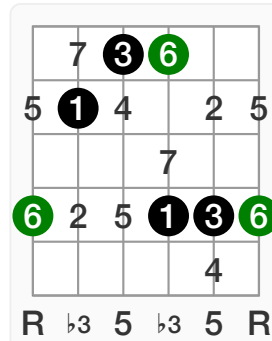
*iii chord in A shape I position.*



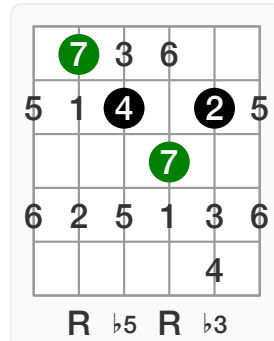
*IV chord in A shape I position.*



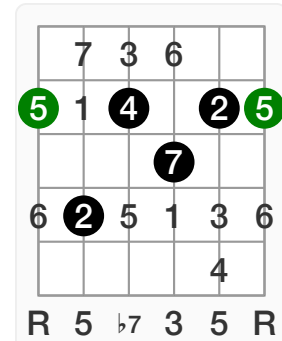
*V chord in A shape I position.*



*vi chord in A shape I position.*

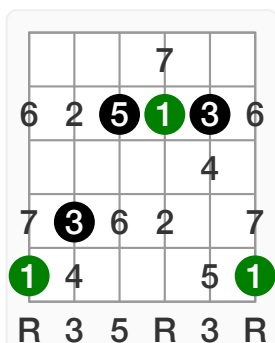


*vii chord in A shape I position.*

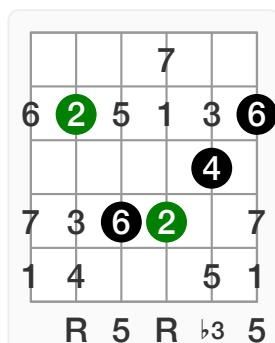


*V7 chord in A shape I position.*

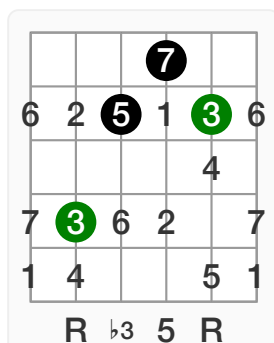
## G shape I chord position



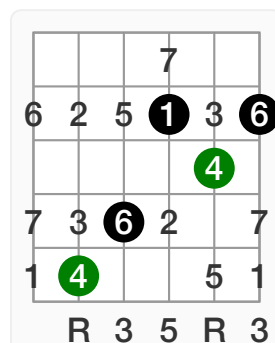
*I chord in G shape I position.*



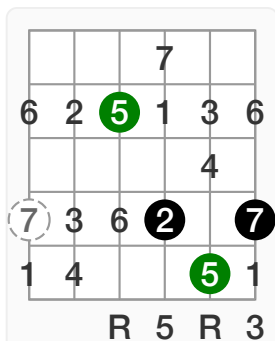
*ii chord in G shape I position.*



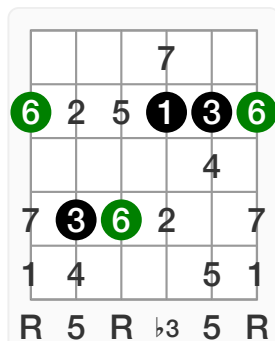
*iii chord in G shape I position.*



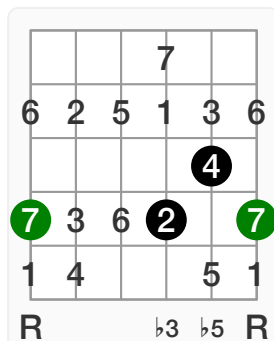
*IV chord in G shape I position.*



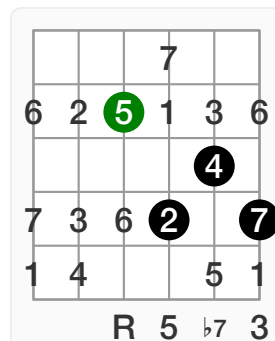
*V chord in G shape I position.*



*vi chord in G shape I position.*

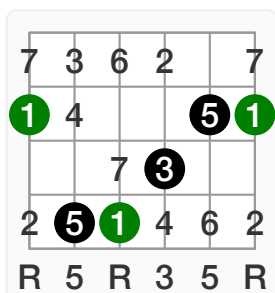


*vii chord in G shape I position.*

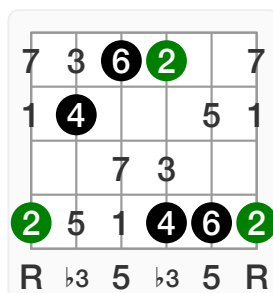


*V7 chord in G shape I position.*

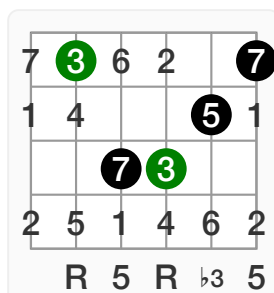
## E shape I chord position



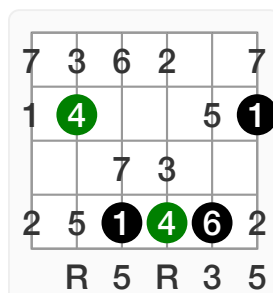
*I chord in E shape I position.*



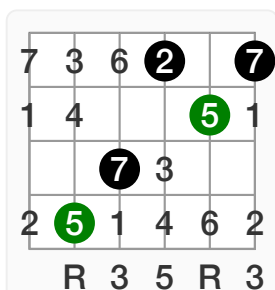
*ii chord in E shape I position.*



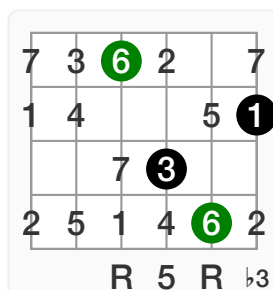
*iii chord in E shape I position.*



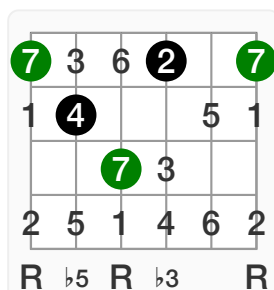
*IV chord in E shape I position.*



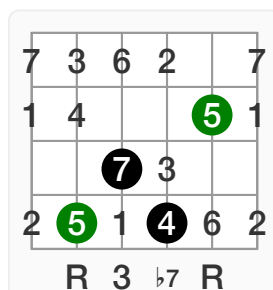
*V chord in E shape I position.*



*vi chord in E shape I position.*

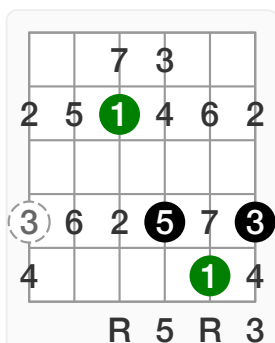


*vii chord in E shape I position.*

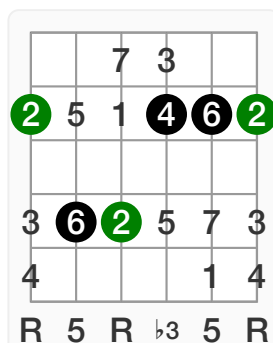


*V7 chord in E shape I position.*

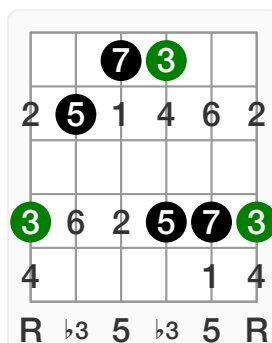
## D shape I chord position



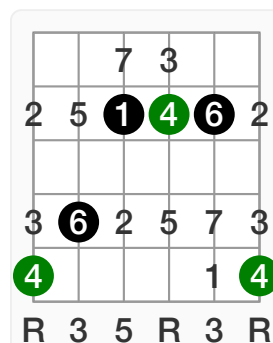
*I chord in D shape I position.*



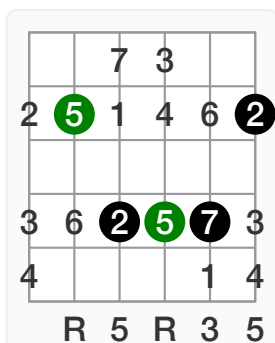
*ii chord in D shape I position.*



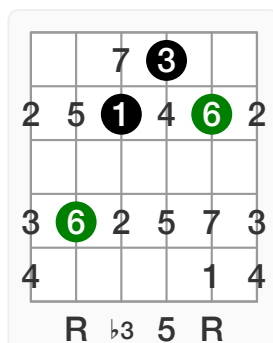
*iii chord in D shape I position.*



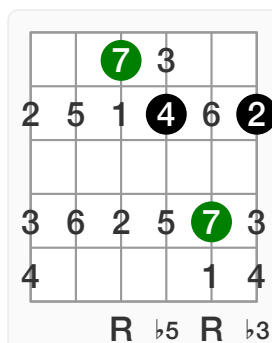
*IV chord in D shape I position.*



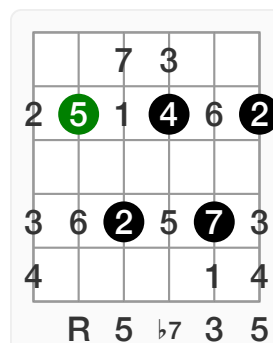
*V chord in D shape I position.*



*vi chord in D shape I position.*

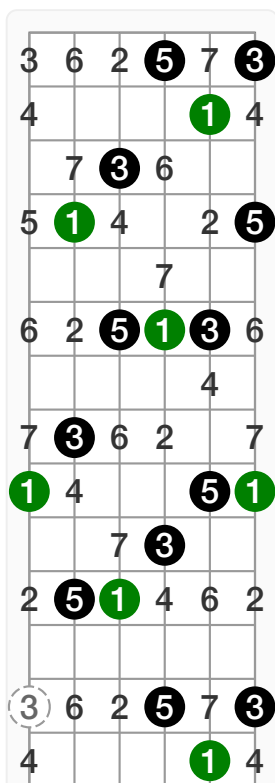


*vii chord in D shape I position.*

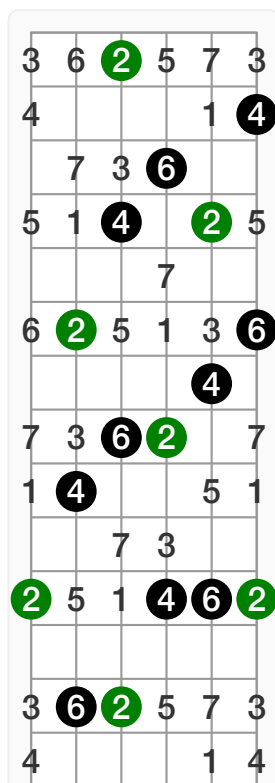


*V7 chord in D shape I position.*

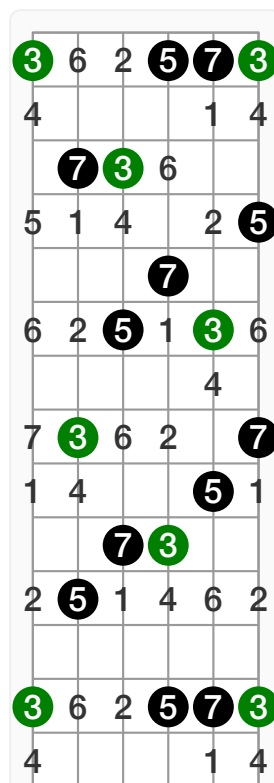
## Shapes on the whole fretboard



*I chord on whole fretboard.*



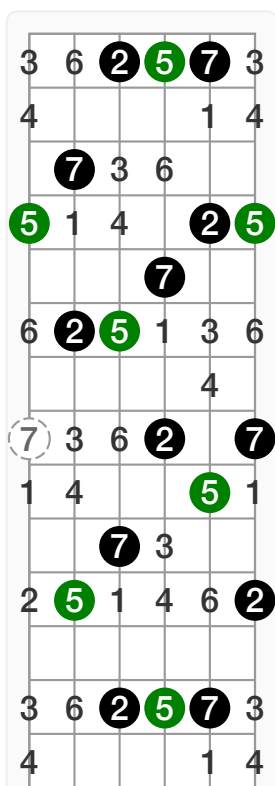
*ii chord on whole fretboard.*



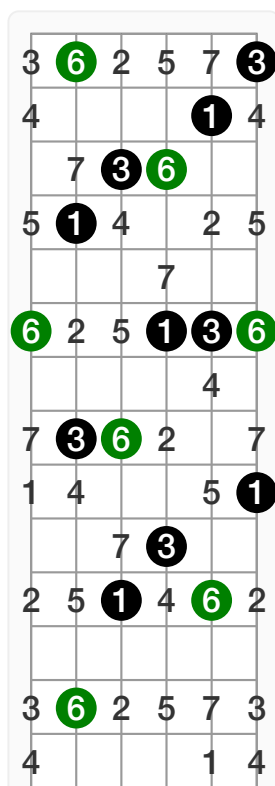
*iii chord on whole fretboard.*



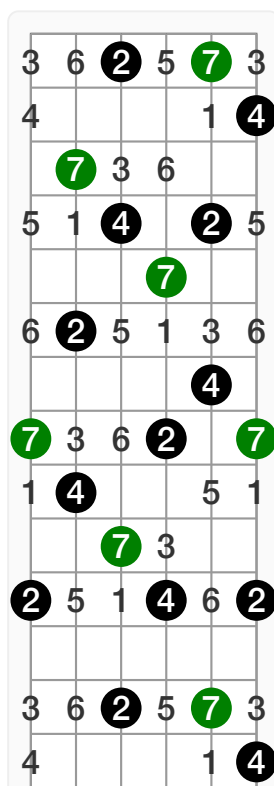
*IV chord on whole fretboard.*



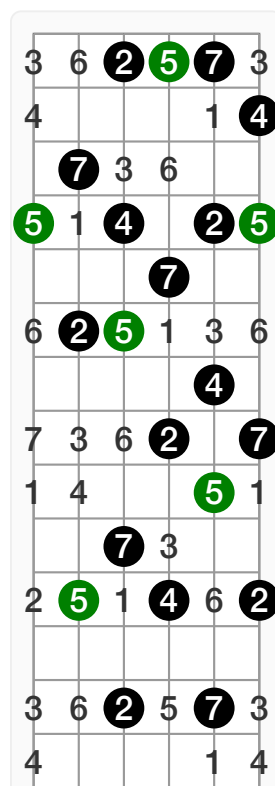
*V chord on whole fretboard.*



*vi chord on whole fretboard.*



*vii chord on whole fretboard.*



*V7 chord on whole fretboard.*

## Chapter 9: Minor key harmony

*A practical approach to minor keys. Relative major and minor, plus the euroclassical "leading tone".*

In this chapter:

- [What is a minor key?](#)
- [Chords in natural minor](#)
- [Relative major and minor](#)
- [Leading tone and harmonic minor](#)
- [C shape i chord position](#)
- [Practicing these chords](#)
  - [Play minor key songs in position](#)
  - [Think in relative major with a dominant III](#)
  - [Think in primary and secondary chords](#)
  - [Think in minor with a leading tone](#)
- [A shape i chord position](#)
- [G shape i chord position](#)
- [E shape i chord position](#)
- [D shape i chord position](#)
- [Shapes on the whole fretboard](#)

### What is a minor key?

Minor keys are the moody counterparts of major keys. In Western music, minor keys tend to be considered sad and dark, and major keys happy and bright, though this is not universal. Minor keys include intervals not explored in major keys, which can lend an air of mystery and sophistication.

Songs in a minor key use notes and chords derived from the natural minor scale, plus an added leading tone and adjustments to the sixth and seventh degrees (see [Chapter 17. Minor scales](#)). Like major keys, minor keys are tonical: they place a special emphasis on the first scale degree, the “tonic” or “keycenter”, the note for which the key is named.



## Chords in natural minor

Most of the chords in a minor key are determined by harmonizing the natural minor scale. See [Chapter 6. Introduction to Western harmony](#) for details.

Notice that in a minor key:

- the **i**, **iv**, and **v** diatonic chords are **minor**,
- the **bIII**, **bVI**, and **bVII** chords are **major**, and
- the **ii** chord is a **diminished** triad.

Chord	In Am	Scale degrees	In Am	Chord factors	Chord type
<b>i</b>	<b>Am</b>	1-b3-5	A-C-E	R b3 5	minor
<b>ii°</b>	<b>B°</b>	2-4-b6	B-D-F	R b3 b5	diminished
<b>bIII</b>	<b>C</b>	b3-5-b7	C-E-G	R 3 5	major
<b>iv</b>	<b>Dm</b>	4-b6-1	D-F-A	R b3 5	minor
<b>v</b>	<b>Em</b>	5-b7-2	E-G-B	R b3 5	minor
<b>bVI</b>	<b>F</b>	b6-1-b3	F-A-C	R 3 5	major
<b>bVII</b>	<b>G</b>	b7-2-4	G-B-D	R 3 5	major

## Relative major and minor

The notes in a natural minor scale are identical to the notes in the relative major scale a minor third above it. For example, the notes and chords in A natural minor are the same as the notes in C major.

This is a quick way to get started learning the chords in a minor key: by learning a major key we get the relative minor for free.

Minor key (Am)	Chord	Major key (C)	Major degrees	Minor degrees	Notes	Chord factors	Chord type
<b>i</b>	Am	<b>vi</b>	6-1-3	1-b3-5	A-C-E	R b3 5	minor
<b>ii°</b>	B°	<b>vii°</b>	7-2-4	2-4-b6	B-D-F	R b3 b5	diminished
<b>bIII</b>	C	<b>I</b>	1-3-5	b3-5-b7	C-E-G	R 3 5	major
<b>iv</b>	Dm	<b>ii</b>	2-4-6	4-b6-1	D-F-A	R b3 5	minor
<b>v</b>	Em	<b>iii</b>	3-5-7	5-b7-2	E-G-B	R b3 5	minor
<b>bVI</b>	F	<b>IV</b>	4-6-1	b6-1-b3	F-A-C	R 3 5	major
<b>bVII</b>	G	<b>V</b>	5-7-2	b7-2-4	G-B-D	R 3 5	major

Though the keys of C major and A minor have the same chords and the same notes, the two keys feel different. The chords in the different keys have a different meaning, a different keycenter, different scale degrees, and different harmonic functions.

## Leading tone and harmonic minor

The natural minor scale does not have a leading tone. Its seventh degree is a minor seventh, not a major seventh.

But euroclassical composers used the leading tone in minor key songs anyway, and called it “harmonic minor”. The irresistible pull of the leading tone into the tonic is a seductive harmonic device, and it can sound particularly poignant in a minor key.

Adding the leading tone to natural minor creates some new chords that can be used in cadences: **dominant V** and **diminished vii**, *just like in a major key*.

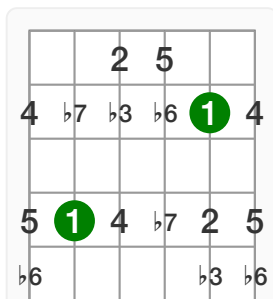
More specifically, raising the  $\hat{b}7$  degree of the scale changes the **v chord** from minor v to **major V** (or V7), and changes the **bVII chord** from major bVII to **diminished vii°**. These are the same **dominant V** and **diminished vii** degrees as in a major key, enabling all the same cadences and tricks of harmonic function.

Chord	In Am	Scale degrees	In Am	Chord factors	Chord type
<b>v</b>	<b>Em</b>	5-b7-2	E-G-B	R b3 5	minor
<b>V</b>	<b>E</b>	5-7-2	E-G#-B	R 3 5	major
<b>V7</b>	<b>E7</b>	5-7-2-4	E-G#-B-D	R 3 5 b7	dominant 7
<b>bVII</b>	<b>G</b>	b7-2-4	G-B-D	R 3 5	major
<b>vii°</b>	<b>G#°</b>	7-2-4	G#-B-D	R b3 b5	diminished

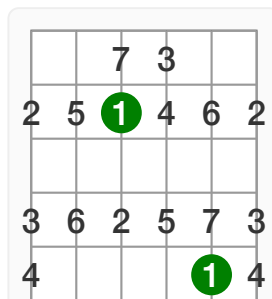
It is common to mix both  $\hat{7}$  and  $\hat{b}7$  degrees freely in the same minor key composition. The chords minor v and dominant V7 might be used in the same song, and the bIII is usually played as a major triad (with the  $\hat{b}7$ , rarely as an augmented triad with the leading tone.)

Additionally, euroclassical composers preferred to avoid melodic leaps around the leading tone, and so adjusted the intervals of the sixth and seventh scale degrees in melodic lines according to taste. These contortions are collectively called “melodic minor”. (See [Chapter 17. Minor scales](#)).

## C shape i chord position



*Natural minor scale  
in C shape i position*



*Relative major scale  
in D shape I position*

Compare these diatonic minor chords around a C shape i chord with their relative [diatonic major chords in D shape I position](#).

## Minor key chords in C shape i position

*i chord in C shape i position.*

*ii° chord in C shape i position.*

*bIII chord in C shape i position.*

*iv chord in C shape i position.*

*v chord in C shape i position.*

*bVI chord in C shape i position.*

*bVII chord in C shape i position.*

*vii° chord in C shape i position.*

*V chord in C shape i position.*

*V7 chord in C shape i position.*

## Practicing these chords

### Play minor key songs in position

One of the most effective ways to practice is to play minor key songs we already know using chords in a single position.

### Think in relative major with a dominant III

When first working with a minor key, it can be easiest to think in terms of a relative major key we are already familiar with. If we know the chords in C major, we can play in the key of Am while thinking of the C major chords.

To make it feel more like the minor key and less like the relative major, hang out around the vi (Am) to make it feel like home. Play III-vi cadences to help establish vi as the tonic (E-Am or E7-Am). Use the leading tone a semitone below the  $\hat{6}$  (G#-A) in melody lines.

### Think in primary and secondary chords

The primary chords in a minor key are the same as the secondary chords in its relative major, and vice versa.

	Primary chords	Secondary chords
Minor key	i, iv, v (Am, Dm, Em)	bIII, bVI, bVII (C, F, G)
Major key	I, IV, V (C, F, G)	vi, ii, iii (Am, Dm, Em)

This example practice loop combines primary and secondary chords with cadences from relative major and minor scales, and transitions of descending fifths. It's a way to practice the relative major and minor keys at the same time.

**I-IV-I-V** (C-F-C-G)

**I-V-vii°-I** (C-G-B°-C)

**IV-vii°-iii-vi** (F-B°-Em-Am) (bridge)

**vi-ii-vi-iii** (Am-Dm-Am-Em)

**vi-iii-III-vi** (Am-Em-EM-Am)

**ii-V...** (Dm-G...) (turnaround)

(repeat)

## Think in minor with a leading tone

Once some familiarity with the chords is developed, start to practice them while thinking of the *i* minor chord as the tonic, and all chords and scale degrees oriented toward that.

Use the leading tone in cadences with dominant *V* and diminished *vii* movements to the tonic to establish the minor feel.

It can be constructive to try flipping perspectives back and forth, thinking of a chord in context of both the minor and relative major scales.

## A shape *i* chord position

5	1	4	b7	2	5
b6				b3	b6
	2	5	1		
b7	b3	b6		4	b7

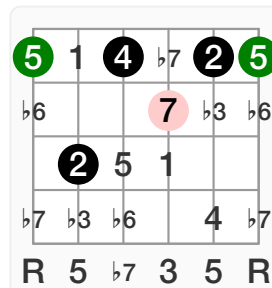
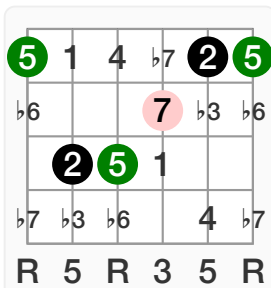
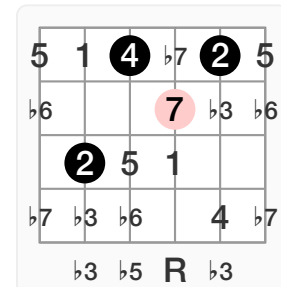
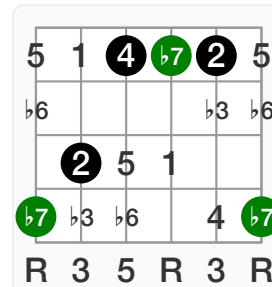
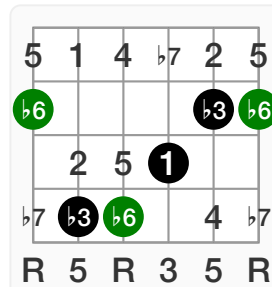
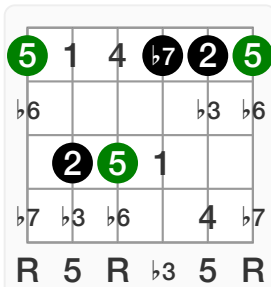
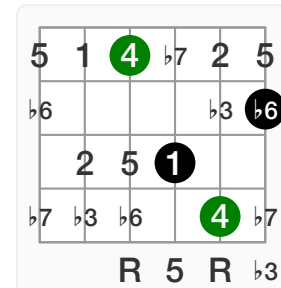
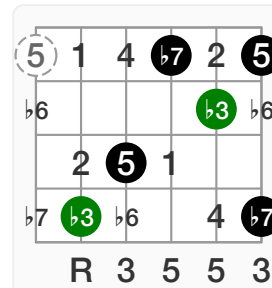
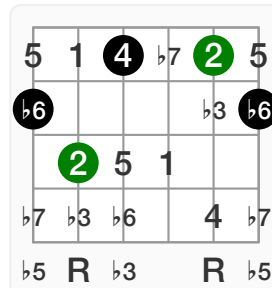
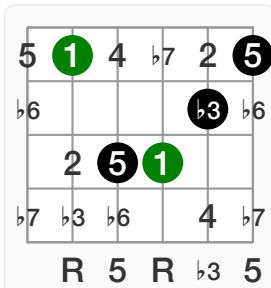
*Natural minor scale in A shape *i* position*

3	6	2	5	7	3
4				1	4
	7	3	6		
5	1	4		2	5

*Relative major scale in C shape *I* position*

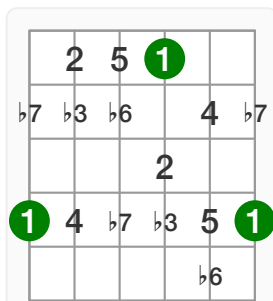
Compare these diatonic minor chords around an A shape *i* chord with their relative [diatonic major chords in C shape \*I\* position](#).

## Minor key chords in A shape i position

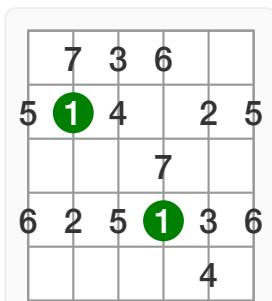




## G shape i chord position



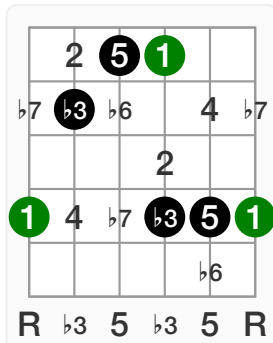
*Natural minor scale  
in G shape i position*



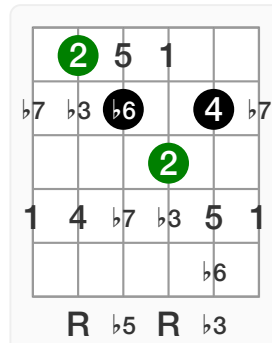
*Relative major scale  
in A shape I position*

Compare these diatonic minor chords around a G shape i chord with their relative [diatonic major chords in A shape I position](#).

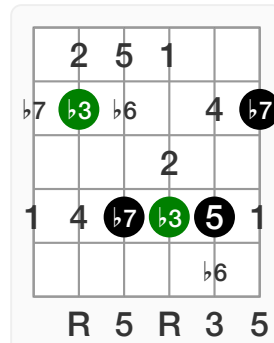
## Minor key chords in G shape i position



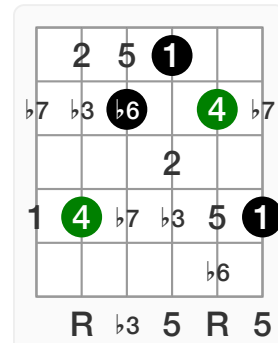
*i chord in G shape i position.*



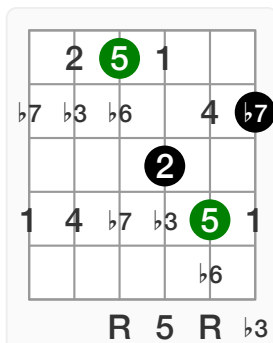
*ii° chord in G shape i position.*



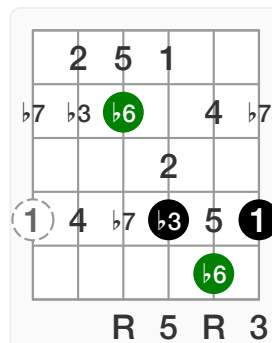
*bIII chord in G shape i position.*



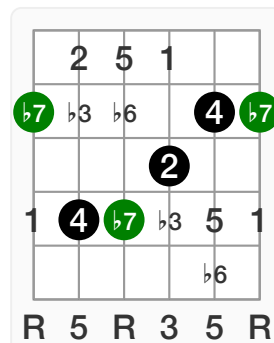
*iv chord in G shape i position.*



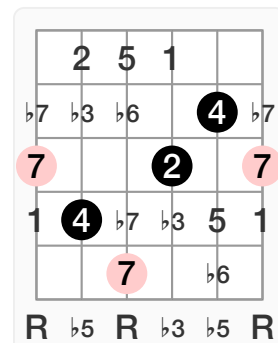
*v chord in G shape i position.*



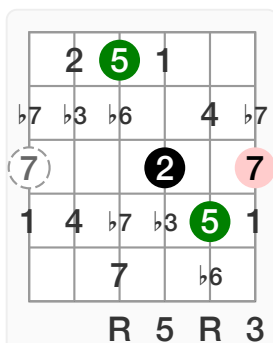
*bVI chord in G shape i position.*



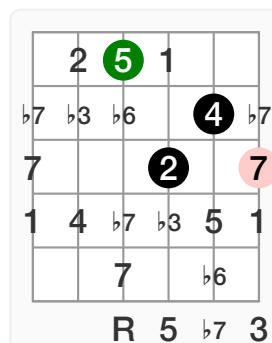
*bVII chord in G shape i position.*



*vii° chord in G shape i position.*

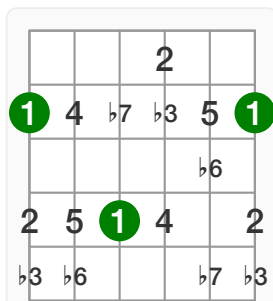


*V chord in G shape i position.*

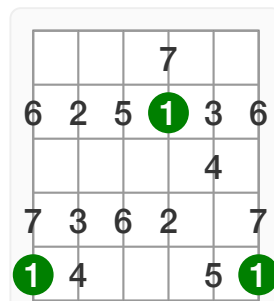


*V7 chord in G shape i position.*

## E shape i chord position



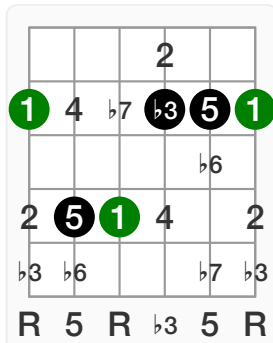
*Natural minor scale  
in E shape i position*



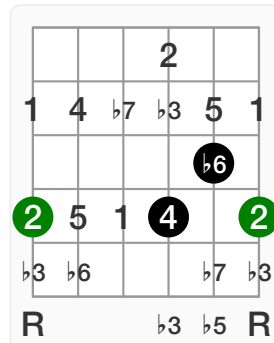
*Relative major scale  
in G shape I position*

Compare these diatonic minor chords around an E shape i chord with their relative [diatonic major chords in G shape I position](#).

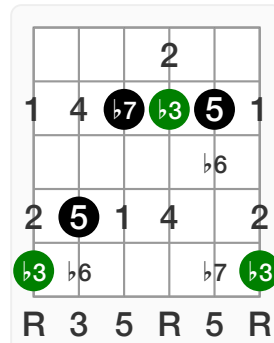
## Minor key chords in E shape i position



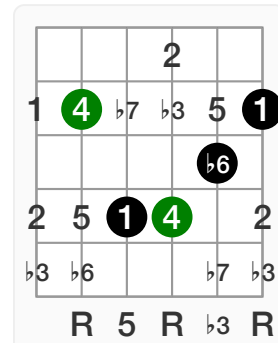
*i chord in E shape i position.*



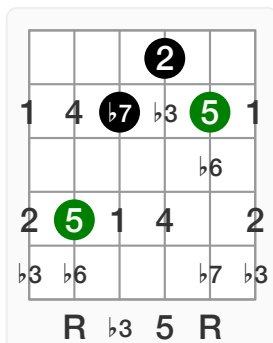
*ii° chord in E shape i position.*



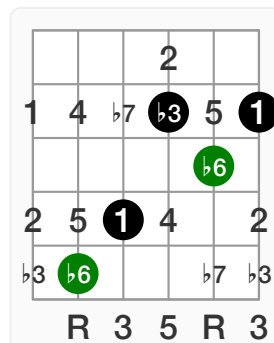
*bIII chord in E shape i position.*



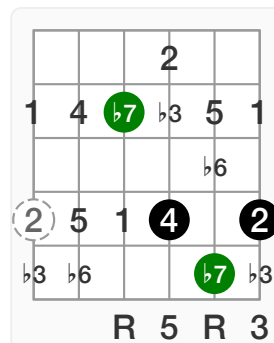
*iv chord in E shape i position.*



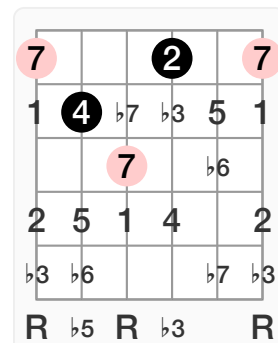
*v chord in E shape i position.*



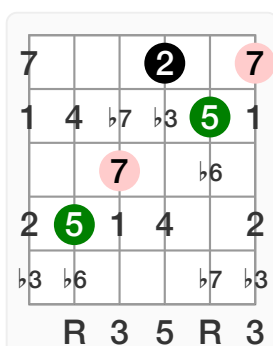
*bVI chord in E shape i position.*



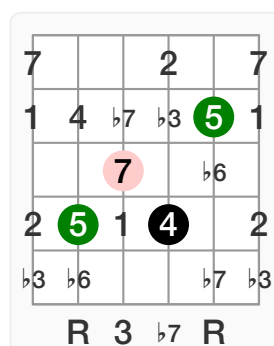
*bVII chord in E shape i position.*



*vii° chord in E shape i position.*

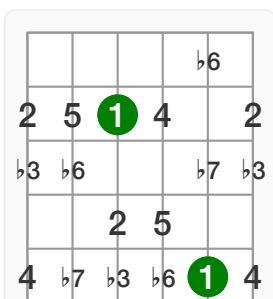


*V chord in E shape i position.*

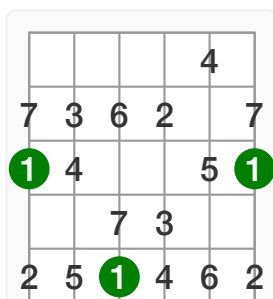


*V7 chord in E shape i position.*

## D shape i chord position



*Natural minor scale  
in D shape i position*



*Relative major scale  
in E shape I position*

Compare these diatonic minor chords around an D shape i chord with their relative [diatonic major chords in E shape I position](#).

## Minor key chords in D shape i position

*i* chord in D shape *i* position.

*ii*° chord in D shape *i* position.

*b*III chord in D shape *i* position.

*iv* chord in D shape *i* position.

*v* chord in D shape *i* position.

*b*VI chord in D shape *i* position.

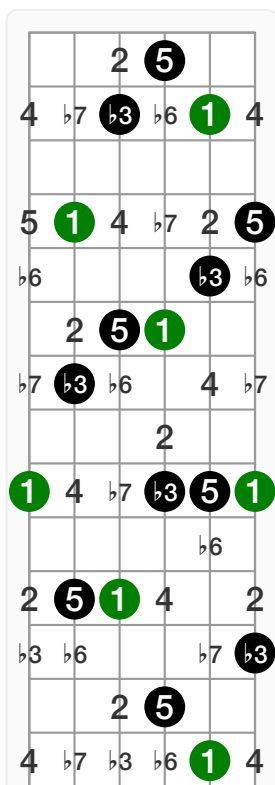
*b*VII chord in D shape *i* position.

*vii*° chord in D shape *i* position.

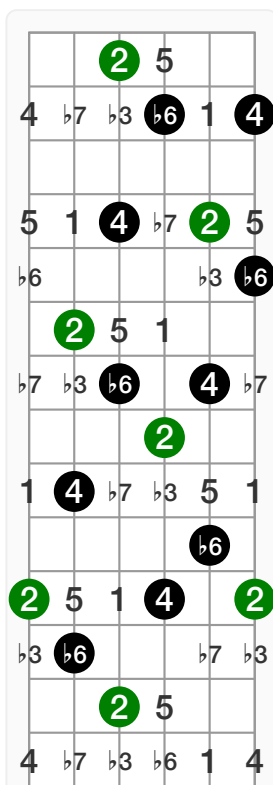
*V* chord in D shape *i* position.

*V*7 chord in D shape *i* position.

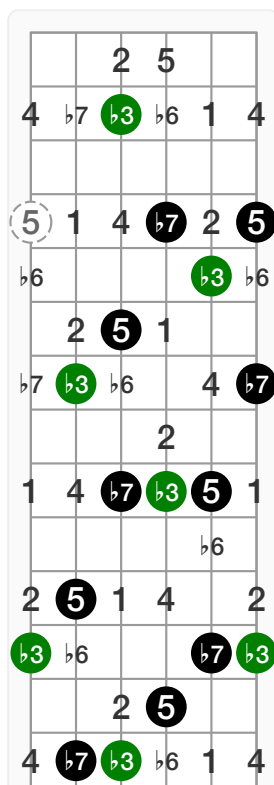
## Shapes on the whole fretboard



*i* chord in minor key  
on whole fretboard



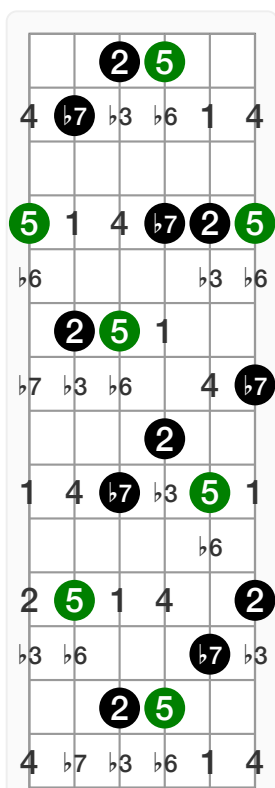
*ii*° chord in minor  
key on whole  
fretboard.



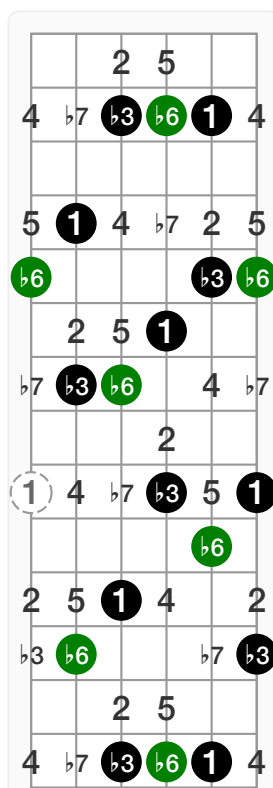
*bIII* chord in minor  
key on whole  
fretboard.



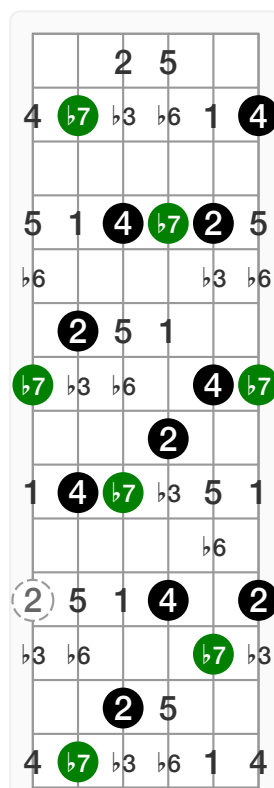
*iv* chord in minor  
key on whole  
fretboard.



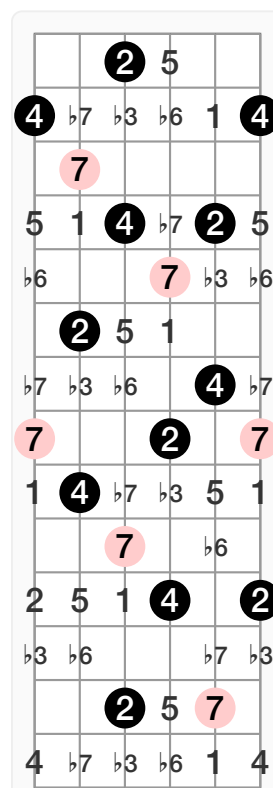
*v chord in minor key  
on whole fretboard.*



*bVI chord in minor  
key on whole  
fretboard.*

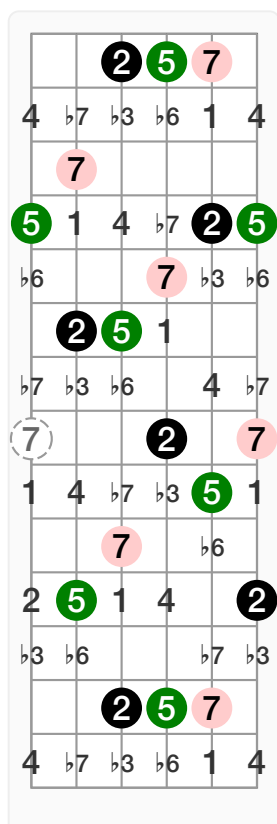


*bVII chord in minor  
key on whole  
fretboard.*

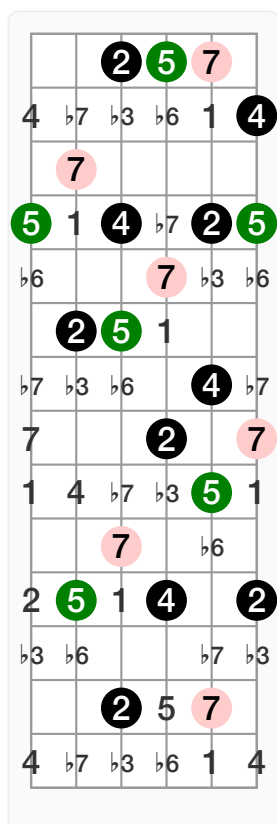


*vii° chord in minor  
key on whole  
fretboard.*





V chord in minor key  
on whole fretboard.



V7 chord in minor  
key on whole  
fretboard.

## Chapter 10: Bass lines

*Tie chord changes together with a smooth bass line.*

In this chapter:

- [A built-in bass guitar](#)
- [Root note on down beats](#)
- [Add fifths, octaves, and approach tones](#)

### A built-in bass guitar

The guitar is one of the few instruments that that can cover both the bass and treble registers.

When accompanied by a bass or piano player, we actually need to be careful not to interfere with them in the lower frequencies, which can cause the “low end” (of the frequency spectrum) to sound muddy or blurred. In those cases we can leave out the notes on low strings and play “inside” and “treble” voicings.

But in the absence of a bass player, we can provide the bass line ourselves.

### Root note on down beats

To begin playing bass lines on guitar, start by playing chord root notes on the down beat of chord changes, before or even instead of the rest of the chord.

Hear the bass notes as comprising their own line, which leads and complements the chords.

### Add fifths, octaves, and approach tones

Make the bass line more interesting by adding in the fifth and the octave in rhythmic approaches to the root.

Smooth out the bass line by adding approach notes before the root and fifth—either a chromatic tone, scale tone, or chord tone immediately above or below the target note.

For more information about creating good bass lines, *Building Walking Bass Lines*, by Ed Friedland ([1995](#)), is a great resource.

# Chapter 11: Seventh chords and drop voicings

*Add a seventh interval to a triad chord to create a little tension. Introducing drop 2 and drop 3 chord voicings.*

In this chapter:

- [What are seventh chords?](#)
- [Types of seventh chord](#)
- [About seventh chord voicings](#)
  - [Open voicings are more playable](#)
  - [Drop 3 voicing](#)
  - [Drop 2 voicing](#)
- [Chord grips](#)
  - [E shape \(drop 3\)](#)
  - [A shape \(drop 2\)](#)
  - [D shape \(drop 2\)](#)
- [More about drop voicings](#)

## What are seventh chords?

Seventh chords are triad chords with an additional “stacked third” on top, which is always some kind of seventh interval. See [Chapter 6. Introduction to Western harmony](#) for more information about stacking thirds.

The seventh interval adds some dissonance to the triad chord, but not *too* much. It’s a familiar sound to Western ears, and a good way to add a little tension and interest to a chord.

## Types of seventh chord

There are five types of seventh chord used in euroclassical harmony.

Chord type	Intervals	Symbol (on C)	Notes (on C)
major seventh	R 3 5 7	Cmaj7, CΔ7	C-E-G-B
dominant seventh	R 3 5 b7	C7, Cdom7	C-E-G-Bb
minor seventh	R b3 5 b7	Cm7, Cmin7, C-7	C-Eb-G-Bb
half diminished	R b3 b5 b7	Cm7b5, C <sup>ø</sup>	C-Eb-Gb-Bb
diminished seventh	R b3 b5 bb7	Cdim7, C <sup>°</sup> 7, C <sup>°</sup>	C-Eb-Gb-A

The first four are harmonized from the major scale, as described in [Chapter 8. Major key harmony](#). The V chord is a dominant seventh, the vii chord is half diminished, and the other major and minor chords are major sevenths and minor sevenths. The half diminished chord is sometimes called a “minor 7 flat 5”.

The diminished seventh chord arises in minor harmony, when raising the root of the bVII chord a semitone to create the leading tone. See [Chapter 9. Minor key harmony](#) for details.

The bb7 interval may be unfamiliar. It’s called a “diminished seventh” interval, the result of lowering a minor seventh by one semitone. It’s enharmonically equivalent to a major sixth.

## About seventh chord voicings

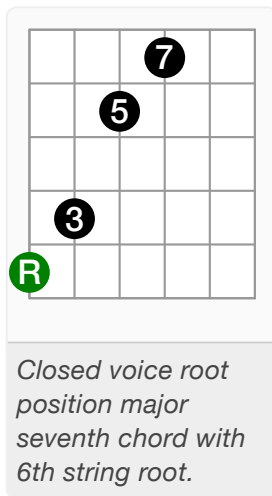
The more notes we add to a chord, the fewer playable chord grips are available.

Seventh chords are most usefully organized around three basic shapes, one each with roots on the 6th, 5th, and 4th strings. These are essentially the E, A, and D CAGED shapes.

Seventh chord grips are often categorized by their “voicing”.

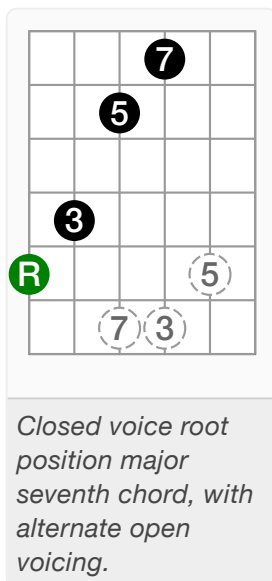
## Open voicings are more playable

Look at a closed voice seventh chord in root position on the fretboard, like the following major seventh chord.



While it may be possible to grip that chord shape, it's probably not going to be comfortable. And most seventh chords have a b7, making them even less playable.

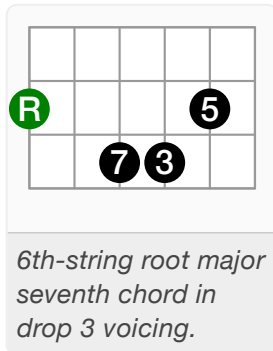
As shown in the following figure, the solution is to play the chord tones in more comfortable locations.



In this example, the 7 is the same pitch at a more convenient location (a unison), and the 3 and 5 have been raised an octave.

Raising the chord tones an octave creates an open voicing, which changes how the chord sounds. Fortunately, seventh chords usually sound better in these open voicings. The closed voicings can sound “muddy”, and opening them up can make them sound lighter and more spacious.

## Drop 3 voicing



The open voicing shown above is an example of a “drop 3” voicing.

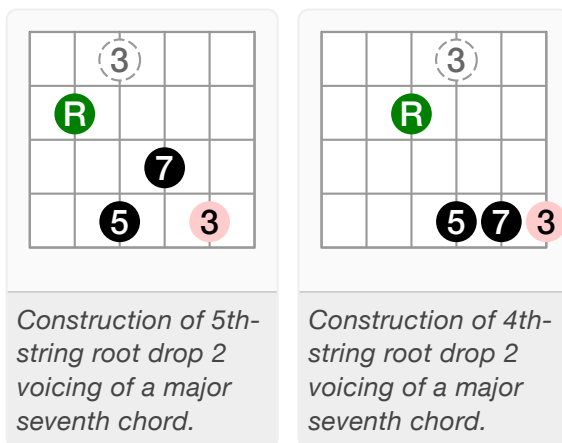
The reason it’s called a drop 3 voicing is a bit complicated, and not particularly important to understand. See [“More about drop voicings”](#) later in this chapter for details.

For simplicity, we just need to remember a few things about drop voicings on guitar.

**Drop 3 voicings** on guitar have the following properties.

- A **6th-string root** (mostly, but 5th string roots are also possible).
- A signature **string skip** over the muted 5th string.
- A **R-7-3-5** voicing, **third** and **fifth** factors **raised** an octave.

## Drop 2 voicing



These are examples of “drop 2” voicings.

**Drop 2 voicings** on guitar have the following properties.

- A **5th-string** or **4th-string** root.
- **No string skip**, on 4 contiguous strings.
- A R-5-7-3 voicing, the **third** factor **raised** an octave.

## Chord grips

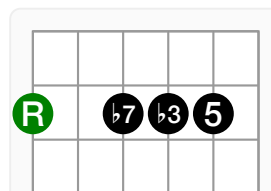
### E shape (drop 3)



*Major seventh chord in E CAGED shape (drop 3 voicing).*



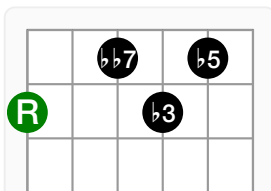
*Dominant seventh chord in E CAGED shape (drop 3 voicing).*



*Minor seventh chord in E CAGED shape (drop 3 voicing).*

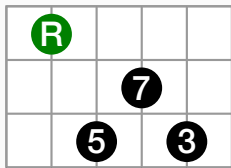


*Half diminished chord in E CAGED shape (drop 3 voicing).*

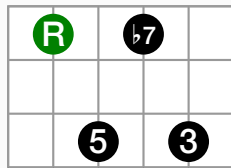


*Diminished seventh chord in E CAGED shape (drop 3 voicing).*

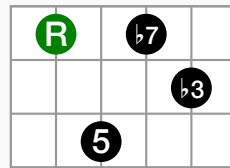
## A shape (drop 2)



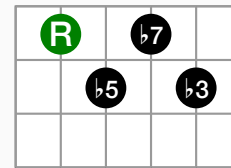
Major seventh chord in A CAGED shape (drop 2 voicing).



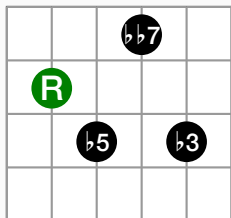
Dominant seventh chord in A CAGED shape (drop 2 voicing).



Minor seventh chord in A CAGED shape (drop 2 voicing).



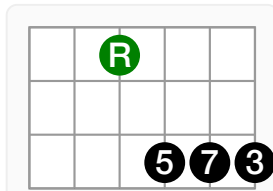
Half diminished chord in A CAGED shape (drop 2 voicing).



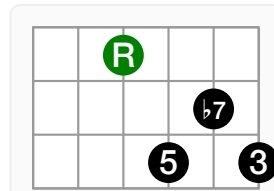
Diminished seventh chord in A CAGED shape (drop 2 voicing).



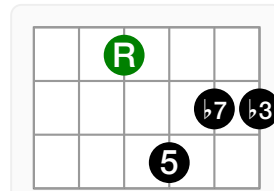
## D shape (drop 2)



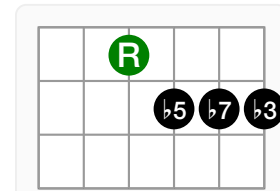
Major seventh chord in D CAGED shape (drop 2 voicing).



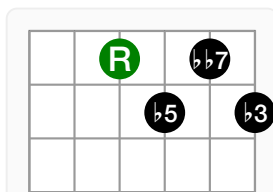
Dominant seventh chord in D CAGED shape (drop 2 voicing).



Minor seventh chord in D CAGED shape (drop 2 voicing).



Half diminished chord in D CAGED shape (drop 2 voicing).



Diminished seventh chord in D CAGED shape (drop 2 voicing).

## More about drop voicings

In drop 2 voicings, the second note from the top of the chord is dropped down an octave. This is typically applied to the second inversion ( 5–7–R–3 ), so the root note remains in the bass: R–5–7–3 .

In drop 3 voicings, the third note from the top of the chord is dropped down an octave. This is typically applied to the third inversion ( 7–R–3–5 ), so the root note remains in the bass: R–7–3–5 .

After these common drop 2 and drop 3 voicings have been mastered, it can be interesting to explore drop voicings of other inversions, creating chords with notes other than the root in the bass.

# Chapter 12: Shell voicings

*Lightweight seventh chords with just three notes.*

In this chapter:

- [About shell voicings](#)
- [Shell chord grips](#)
  - [6th string root](#)
  - [5th string root](#)
- [Shell chord progressions](#)
  - [ii-V-I cadences](#)
  - [Diatonic progressions](#)
  - [Back cycling](#)
- [More on shell voicings](#)

## About shell voicings

Shell voicings are partial chord shapes which include only the essential notes required to evoke the sound of the desired chord.

In the case of the seventh chord shell voicings in this chapter, the essential notes are the root, third, and seventh chord factors.

The perfect fifth can be left out of most chords without being missed. One reason is that almost all chords contain a perfect fifth, so having one doesn't distinguish one chord from another.

Another reason the perfect fifth can be omitted is that it's already resonating as the dominant overtone of the root's fundamental pitch. This makes our brains hear a "phantom" fifth even when it's not actually being played.

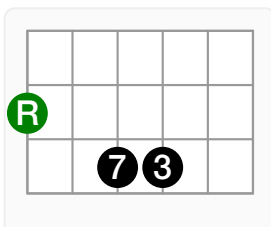
The shell voicings given in this chapter are particularly useful. They are easy to play, they sound great together with naturally smooth voice leading, and they are used as the basis for many extended and altered chords later on.

## Shell chord grips

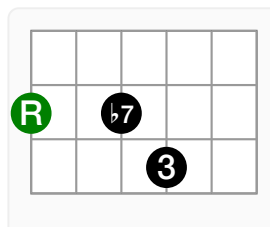
Grips are given for major seventh, minor seventh, and dominant chords, which are enough to cover all the diatonic chords of Western harmony. Min7 shell voicings can be played instead of m7b5, since it omits the fifth.

Major seventh chords can sound a bit harsh at times, especially as the I chord (which should typically feel like a place of rest). Major sixth shell voicings can substitute for major 7 chords as a more relaxed alternative. See [Chapter 13. Color chords](#) for more about substituting chords in this way.

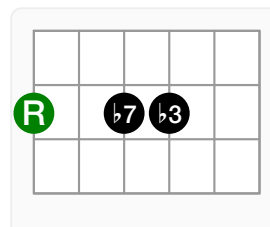
### 6th string root



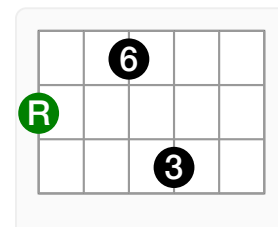
Major 7 shell voicing with 6th string root.



Dominant 7 shell voicing with 6th string root.

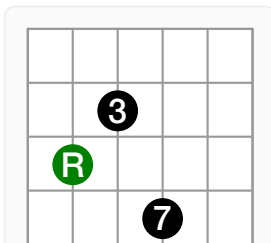


Minor 7 shell voicing with 6th string root.

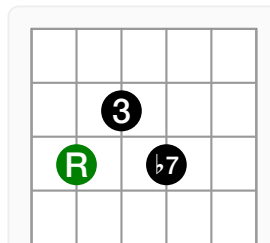


Major 6 shell voicing with 6th string root.

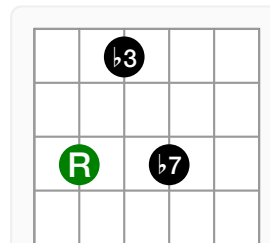
### 5th string root



Major 7 shell voicing with 5th string root.



Dominant 7 shell voicing with 5th string root.



Minor 7 shell voicing with 5th string root.



Major 6 shell voicing with 5th string root.

## Shell chord progressions

### ii-V-I cadences

In jazz, these shell voicings are commonly used for “comping” (playing chords in “accompaniment”), commonly in the ii-V-I cadential progression. See [Chapter 6. Introduction to Western harmony](#) for more information about ii-V-I cadences.

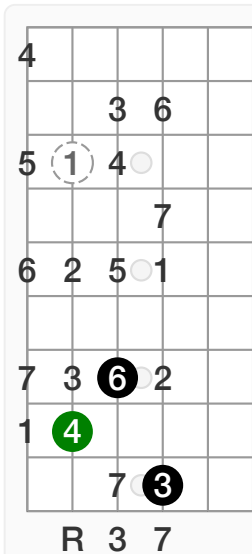
#### 6th string tonic

<i>ii minor 7 shell voicing for 6th string tonic.</i>	<i>V dominant 7 shell voicing for 6th string tonic.</i>	<i>I major 7 shell voicing for 6th string tonic.</i>	<i>I major 6 shell voicing for 6th string tonic.</i>

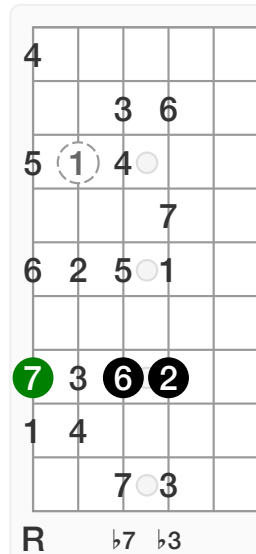
#### 5th string tonic

<i>ii minor 7 shell voicing for 5th string tonic.</i>	<i>V dominant 7 shell voicing for 5th string tonic.</i>	<i>I major 7 shell voicing for 5th string tonic.</i>	<i>I major 6 shell voicing for 5th string tonic.</i>

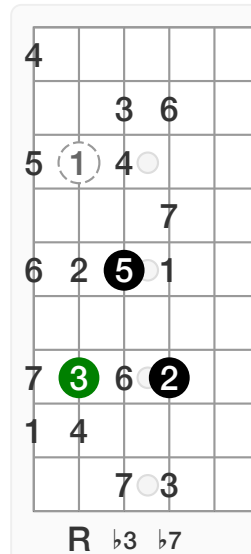
## Diatonic progressions



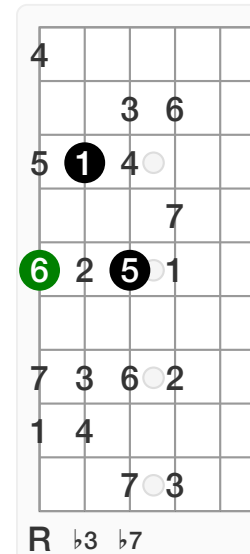
*IV major seven shell voicing in diatonic progression.*



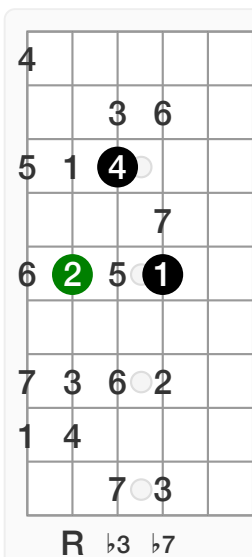
*vii minor seven shell voicing in diatonic progression.*



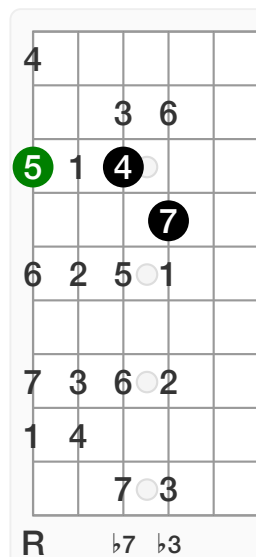
*iii minor seven shell voicing in diatonic progression.*



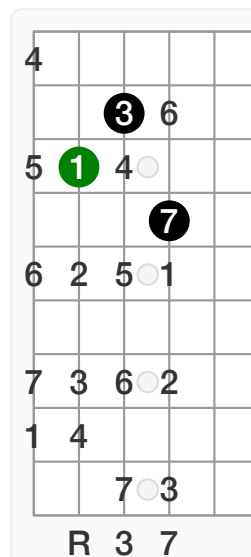
*vi minor seven shell voicing in diatonic progression.*



*ii minor seven shell voicing in diatonic progression.*



*V dominant seven shell voicing in diatonic progression.*



*I major seven shell voicing in diatonic progression.*

## Back cycling

Back cycling refers to a progression of dominant seventh chords in a sequence of descending fifths, until they finally resolve to a tonic I, like **III7-VI7-II7-V7-I** .

All the dominant chords except the V use notes from outside the key. They are called “secondary dominants”, which “want” to resolve to the chord a fifth below according to euroclassical harmony.

This long chain of descending fifths creates increasing tension as it propels toward the final V-I cadence.

The shell voicings in this chapter are well suited to back cycling.

### Basic dominant back cycling

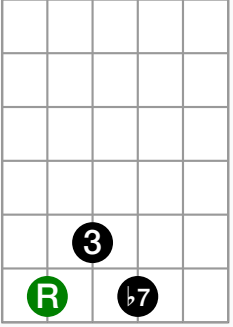
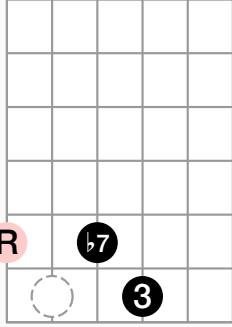
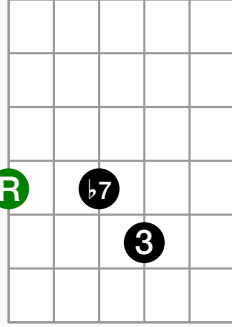
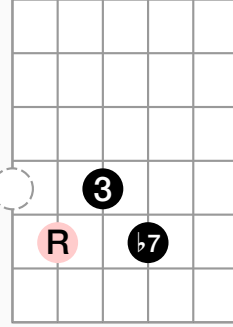
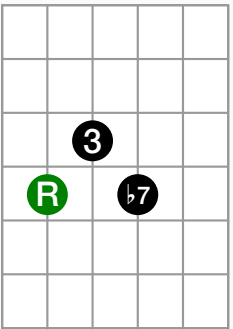
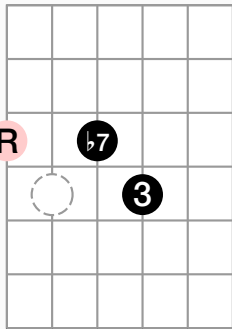

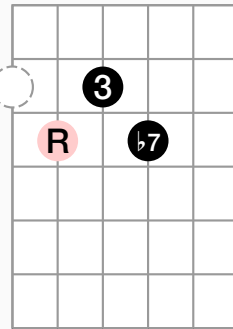
<i>III7 shell voicing with 5th string tonic.</i>	<i>VI7 shell voicing with 5th string tonic.</i>	<i>II7 shell voicing with 5th string tonic.</i>	<i>V7 shell voicing with 5th string tonic.</i>
<i>I maj7 shell voicing with 5th string tonic.</i>	<i>I6 shell voicing with 5th string tonic.</i>		

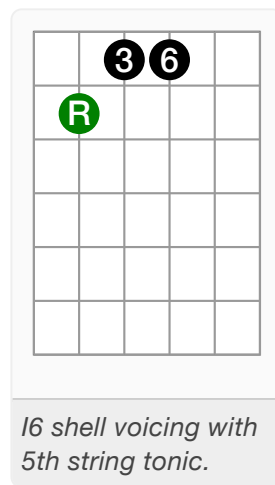
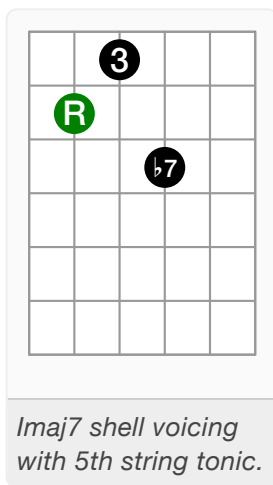
## Backcycling with tritone substitution

Jazz guitarists often use a device called “tritone substitution” to make the bass line more interesting.

After each secondary dominant, another chord is inserted with all the same notes except for the root, which is a tritone interval away.

Notice how smooth the voice leading is in this progression.

 <p><i>III7 shell voicing with 5th string tonic.</i></p>	 <p><i>bVII7 shell voicing with 5th string tonic.</i></p>	 <p><i>V7 shell voicing with 5th string tonic.</i></p>	 <p><i>bIII7 shell voicing with 5th string tonic.</i></p>
 <p><i>II7 shell voicing with 5th string tonic.</i></p>	 <p><i>bVI7 shell voicing with 5th string tonic.</i></p>	 <p><i>V7 shell voicing with 5th string tonic.</i></p>	 <p><i>bII7 shell voicing with 5th string tonic.</i></p>



## More on shell voicings

To learn more about shell voicings, the book *Three-Note Voicings and Beyond*, by Randy Vincent (2011), is an excellent resource.



# Chapter 13: Color chords

*Sixth, sus, add, extended, and altered chords provide color and more tension.*

In this chapter:

- [About color chords](#)
  - [Chord families](#)
  - [Understanding chord names](#)
  - [Compound intervals](#)
  - [Chords in this chapter](#)
- [Major chords](#)
  - [6th](#)
  - [add9](#)
  - [add11](#)
  - [6add9](#)
- [Minor chords](#)
  - [Minor 6th](#)
  - [Minor 9th](#)
  - [Minor 11th](#)
- [Suspended chords](#)
  - [sus2](#)
  - [sus4](#)
- [Dominant chords](#)
  - [Dominant 9th](#)
  - [Dominant 13th](#)
- [Altered dominants](#)
  - [7b5 \(aka 7#11\)](#)
  - [7#9 \(aka Hendrix chord\)](#)
  - [7b13 \(aka 7#5\)](#)
  - [7b5b9](#)
  - [7b5#9](#)
  - [7#5b9](#)
  - [7#5#9](#)

## About color chords

To increase tension, add “color” and express a range of emotion, diatonic chords of Western harmony can be enriched by adding one or more tones from outside the chord.

This leads to a bewildering variety of guitar chords that can seem endless, disorganized, and confusing. And there really are quite a lot of wonderful chord voicings and grips to be explored.

But all of these chords can be organized into a few families, and clarified by understanding a few conventions of chord naming and construction.

## Chord families

Color chords can be grouped into three main families: major, minor, and dominant.

- **major** chords have a **major third** and a **major seventh**.
- **minor** chords have a **minor third** and a **minor seventh**.
- **dominant** chords have a **major third** and a **minor seventh**.

Suspended chords are neither major nor minor, so they fit into both families.

Color chords can be used in a progression to replace any chord from the same family (ex. C major could be replaced by C6 or Cadd9, C7 could be replaced by C13 or C7#9, etc.).

## Understanding chord names

Chord names follow a basic convention.

- **add**: a non-chord tone added to a major or minor chord. Ex. Cadd9
- **6**: Shorthand for “add6”. Ex. C6 or Cm6 (aka “Cadd6” and “Cm add6”)
- **7,9,11,13**: An “extended” dominant seventh chord, with additional thirds stacked up to the given interval. Ex. C13 is technically R-3-5-b7-2-4-6 (aka R-3-5-b7-9-11-13), but in practice some of the inner notes are usually left out.
- **7 #/b 5,9,11,13**: A dominant seventh chord with the given tones altered as specified.

## Compound intervals

Chord intervals bigger than 7 indicate compound intervals, an octave above the simple interval.

In order to focus on how the chord tones fit together in the overall harmony, rather than on what they are named, it can be useful to think of compound intervals as reduced to their simple intervals, ex. “2” rather than “9”.

- **9** is an octave above **2**
- **11** is an octave above **4**
- **13** is an octave above **6**

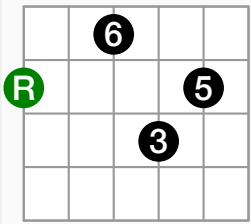
## Chords in this chapter

This chapter does not include a comprehensive list of chords and voicings.

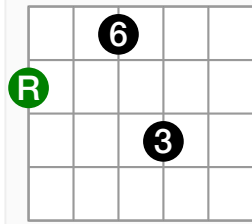
Rather, it's a curated list aiming to include the most common chord grips for some of the most common chords.

## Major chords

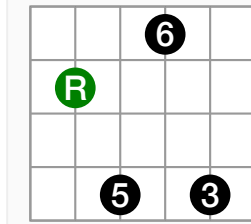
### 6th



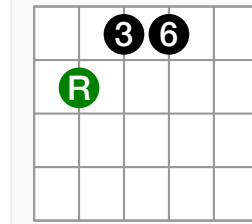
*Sixth chord with 6th string root.*



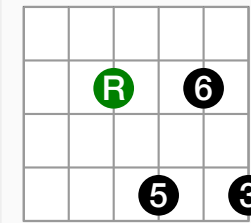
*Sixth chord shell voicing with 6th string root.*



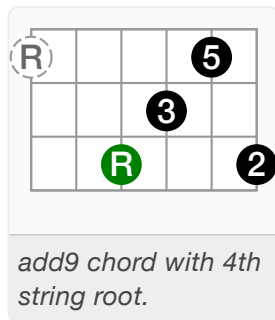
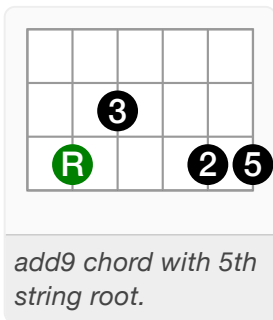
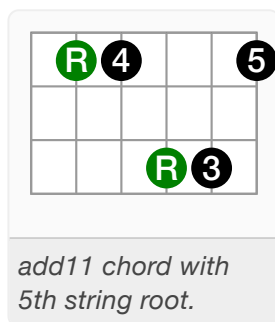
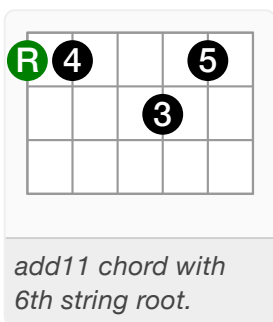
*Sixth chord with 5th string root.*



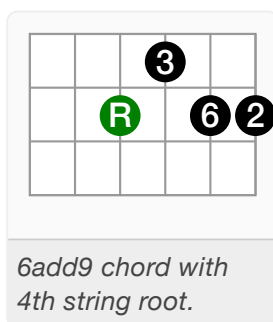
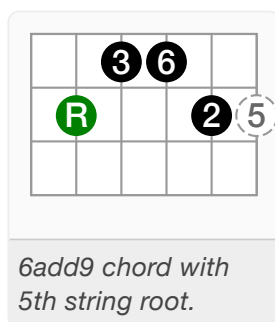
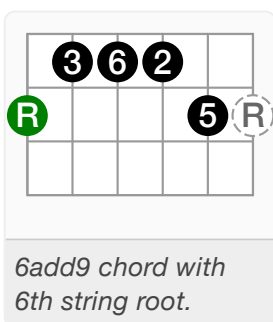
*Sixth chord shell voicing with 5th string root.*



*Sixth chord with 4th string root.*

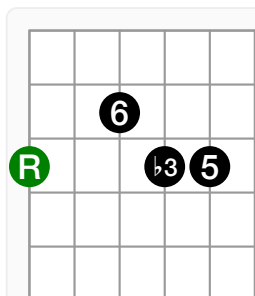
**add9****add11****6add9**

6add9 chords are also known as “6/9” chords.

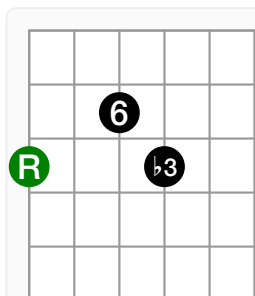


## Minor chords

### Minor 6th



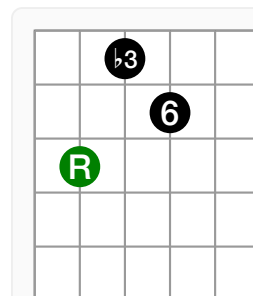
Minor sixth chord  
with 6th string root.



Minor sixth shell  
voicing with 6th  
string root.

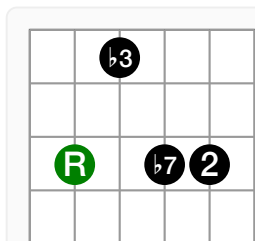


Minor sixth chord  
with 5th string root.

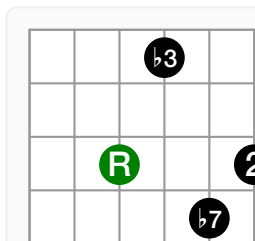


Minor sixth shell  
voicing with 5th  
string root.

### Minor 9th

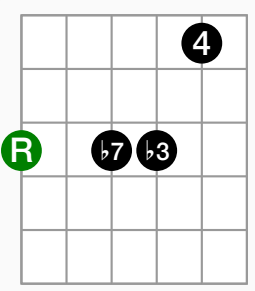


Minor ninth chord  
with 5th string root.



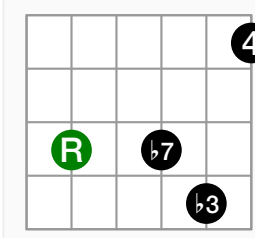
Minor ninth chord  
with 4th string root.

## Minor 11th



A fretboard diagram showing a 5-fret section of a 6-string guitar. The 6th string (bottom) has a green circle with a white 'R' at the 1st fret. The 5th string has a black circle with a white 'b7' at the 2nd fret and a black circle with a white 'b3' at the 3rd fret. The 4th string has a black circle with a white '4' at the 4th fret.

*Minor eleventh chord with 6th string root.*



A fretboard diagram showing a 5-fret section of a 6-string guitar. The 5th string (bottom) has a green circle with a white 'R' at the 1st fret. The 4th string has a black circle with a white 'b7' at the 2nd fret. The 3rd string has a black circle with a white 'b3' at the 3rd fret. The 2nd string has a black circle with a white '4' at the 4th fret.

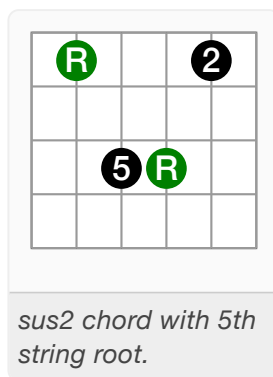
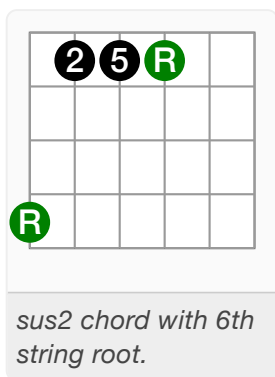
*Minor eleventh chord with 5th string root.*

## Suspended chords

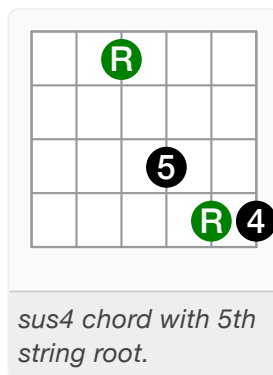
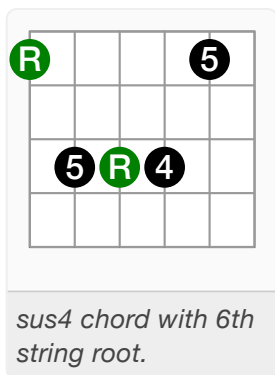
Suspended chords contain no third interval, so they are considered neither major nor minor, and can be substituted for chords of either quality.

These chords are often created as side effects of a melody line, or in short riffs and flourishes.

### sus2

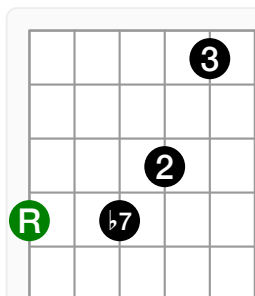


### sus4

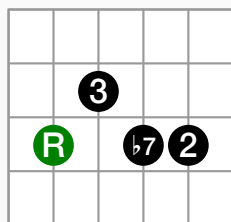


## Dominant chords

### Dominant 9th



*Dominant ninth  
chord with 6th string  
root.*



*Dominant ninth  
chord with 5th string  
root.*



*Dominant ninth  
chord with 4th string  
root.*

### Dominant 13th



*Dominant thirteenth  
chord with 6th string  
root.*

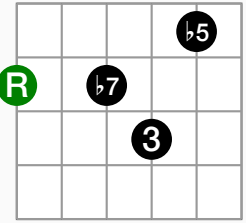


*Dominant thirteenth  
chord with 5th string  
root.*

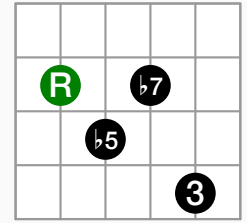


## Altered dominants

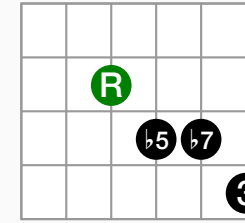
### 7b5 (aka 7#11)



*Dominant 7b5 chord with 6th string root.*



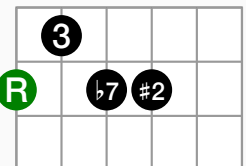
*Dominant 7b5 chord with 5th string root.*



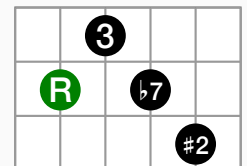
*Dominant 7b5 chord with 4th string root.*

### 7#9 (aka Hendrix chord)


The 7#9 chord is also called the “Hendrix chord”, because it was favored by Jimi Hendrix.



*Dominant 7#9 chord with 6th string root.*

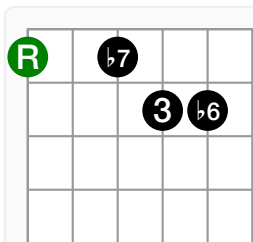


*Dominant 7#9 chord with 5th string root.*



*Dominant 7b5 chord with 4th string root.*

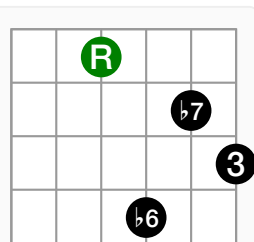
## 7b13 (aka 7#5)



*Dominant 7b13  
chord with 6th string  
root.*



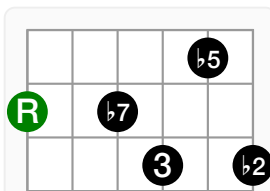
*Dominant 7b13  
chord with 5th string  
root.*



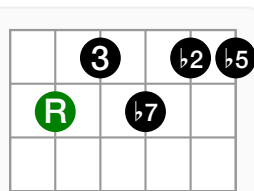
*Dominant 7b13  
chord with 4th string  
root.*

## 7b5b9

These chords are often played without the root note.



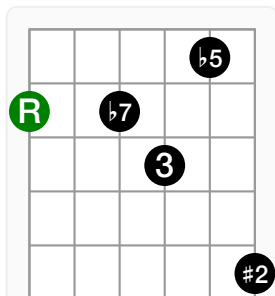
*Dominant 7b5b9  
chord with 6th string  
root.*



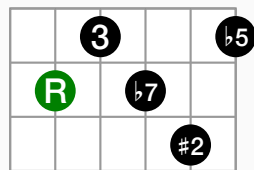
*Dominant 7b5b9  
chord with 5th string  
root.*

## 7b5#9

These chords are often played without the root note.



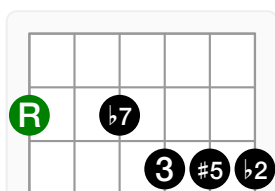
*Dominant 7b5#9  
chord with 6th string  
root.*



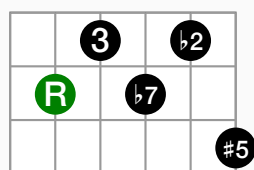
*Dominant 7b5#9  
chord with 5th string  
root.*

## 7#5b9

These chords are often played without the root note.



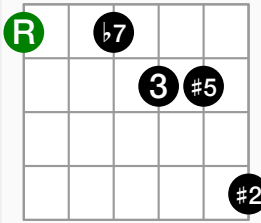
*Dominant 7#5b9  
chord with 6th string  
root.*



*Dominant 7#5b9  
chord with 5th string  
root.*

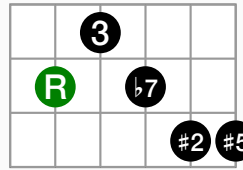
## 7#5#9

These chords are often played without the root note.



A fretboard diagram for a 6-string guitar. The 6th string (bottom) has a green circle with a white 'R' at the 1st fret. The 5th string has a black circle with a white 'b7' at the 2nd fret. The 4th string has a black circle with a white '3' at the 3rd fret and a black circle with a white '#5' at the 4th fret. The 3rd string has a black circle with a white '#2' at the 5th fret.

*Dominant 7#5#9  
chord with 6th string  
root.*



A fretboard diagram for a 6-string guitar. The 5th string (bottom) has a green circle with a white 'R' at the 1st fret. The 4th string has a black circle with a white '3' at the 2nd fret and a black circle with a white 'b7' at the 3rd fret. The 3rd string has a black circle with a white '#2' at the 4th fret and a black circle with a white '#5' at the 5th fret.

*Dominant 7#5#9  
chord with 5th string  
root.*

# Chapter 14: Keys and their notes

*Play in any (not every) key.*

In this chapter:

- [About keys](#)
- [Learn fewer keys better](#)
- [Order of sharps and flats](#)
- [Notes in each key](#)
- [Finding the sharp/flat notes in a key](#)
  - [Natural keys](#)
  - [Flat keys](#)
  - [Sharp keys](#)
- [The circle of fifths](#)

## About keys

The key of a composition gives the name of the note serving as the tonal center of the piece. It also identifies the underlying scale to be used. The scale specifies which 7 notes, out of the 12 notes in Western music, are *diatonic* (“in tune”) in that key.

From this scale, the chords in the key are harmonized. See [Chapter 8. Major key harmony](#) and [Chapter 9. Minor key harmony](#) for details.

## Learn fewer keys better

“Practice in all 12 keys” is a common recommendation in music instruction, and it is probably a useful thing to do eventually. But it violates the principle of triage if there are other more productive ways to spend that time.

It’s usually going to be more productive to spend two hours practicing something in C major than 10 minutes practicing it in each of 12 keys.

Transposing keys is much easier on guitar than on an instrument like the piano. On guitar the fingerings in different keys are mostly the same, anchored around a different part of the fretboard. As a result, on guitar it is more efficient to learn a few keys well than it is to practice in every key.

The time to add another key to our practice is when there's a real-world need to play in that key, or we have become bored with every key we have already practiced. Otherwise, it's best to continue working with an already-practiced key.

## Order of sharps and flats

Of the 12 notes in Western music, 7 are “natural”, represented by letters A-G from the musical alphabet, and 5 are “accidental”, represented by a letter plus a sharp or flat sign.

When all the 12 chromatic notes are arranged in order of ascending fifths, each key adds one more sharp or flat note to those in the key before it. The order in which sharp and flat notes are added also follows a sequence of fifths.

Order of sharps: F C G D A E B (ascending fifths)

Mnemonic: *Father Charles Goes Down And Ends Battle*

Order of flats: B E A D G C F (the inverse, descending fifths)

Mnemonic: *Battle Ends And Down Goes Charles' Father*

## Notes in each key

<b>C (Am)</b>	no sharps or flats	C	D	E	F	G	A	B
<b>G (Em)</b>	1 sharp	G	A	B	C	D	E	F#
<b>D (Bm)</b>	2 sharps	D	E	F#	G	A	B	C#
<b>A (F#m)</b>	3 sharps	A	B	C#	D	E	F#	G#
<b>E (C#m)</b>	4 sharps	E	F#	G#	A	B	C#	D#
<b>B (G#m)</b>	5 sharps	B	C#	D#	E	F#	G#	A#
<b>F# (D#m)</b>	6 sharps	F#	G#	A#	B	C#	D#	E#
<b>Gb (Ebm)</b>	6 flats	Gb	Ab	Bb	Cb	Db	Eb	F
<b>Db (Bbm)</b>	5 flats	Db	Eb	F	Gb	Ab	Bb	C
<b>Ab (Fm)</b>	4 flats	Ab	Bb	C	Db	Eb	F	G
<b>Eb (Cm)</b>	3 flats	Eb	F	G	Ab	Bb	C	D
<b>Bb (Gm)</b>	2 flats	Bb	C	D	Eb	F	G	A
<b>F (Dm)</b>	1 flat	F	G	A	Bb	C	D	E

## Finding the sharp/flat notes in a key

### Natural keys

Memorize a couple:

- C: no sharps or flats
- F: Bb

Natural keys other than C and F:

1. Find the key in the order of sharps: F C G D A E B
2. Find the 2nd note to the left.
3. All notes in the order of sharps *up to the second note to the left* are sharp.

Ex. key of E has F# C# G# D#

### Flat keys

1. Find the key in the order of flats: B E A D G C F
2. Find the note to the right.
3. All notes in the order of flats *up to the note to the right* are flat.

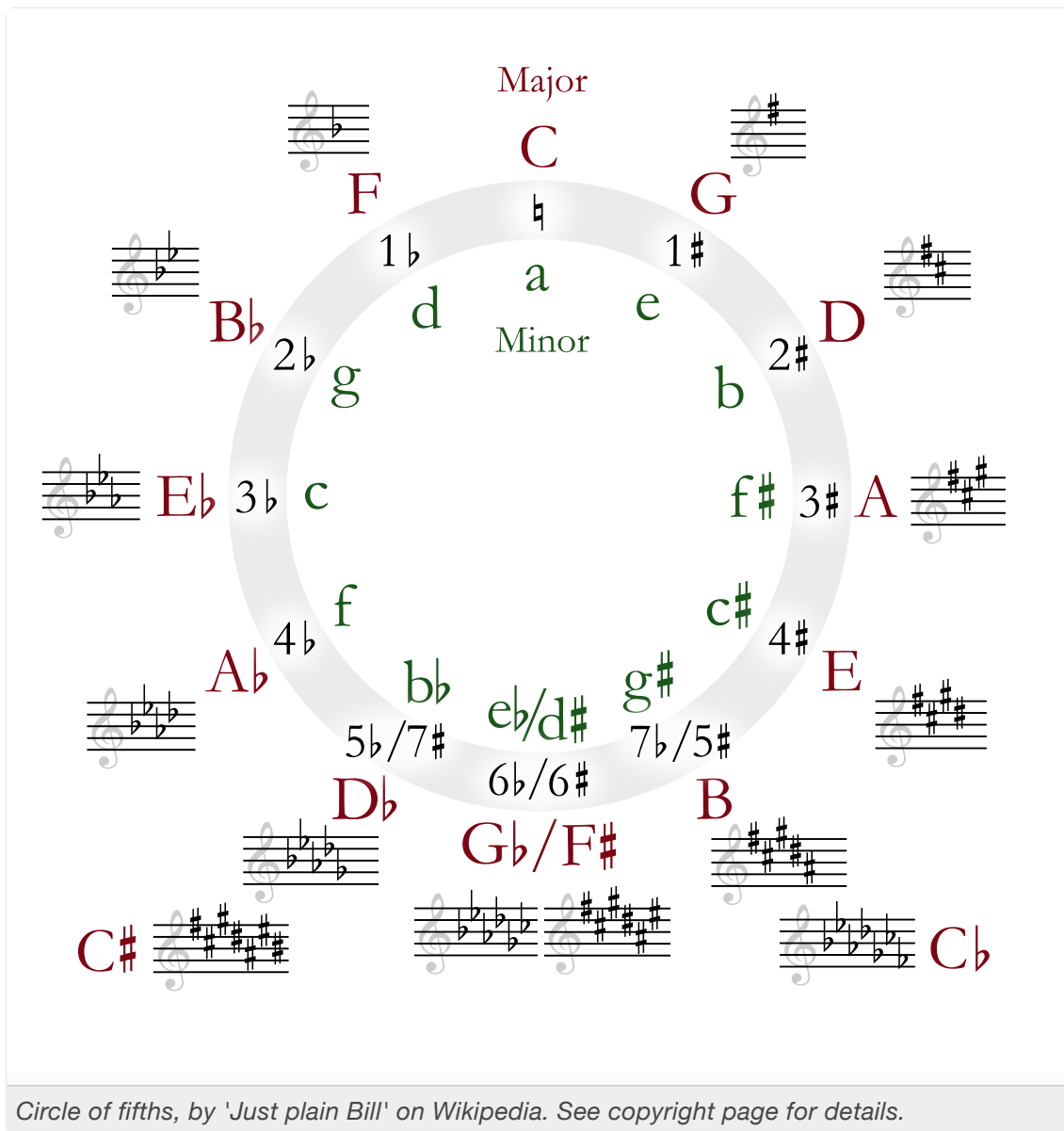
Ex. key of Db has Bb Eb Ab Db Gb

### Sharp keys

Figure out notes in the natural key, and sharpen every one.



## The circle of fifths





## PART 3: SCALES

Chapter 15. Introduction to scales	132
<i>Scales are for the brain, not the fingers. Don't play like a robot.</i>	
Chapter 16. Major scale	141
<i>The foundation of Western music for the past 400 years.</i>	
Chapter 17. Minor scales	147
<i>The natural minor scale, with adjustments to degrees 6 and 7 as harmonic and melodic circumstances require.</i>	
Chapter 18. Diatonic modes	164
<i>The seven modes of the major scale describe the tonal environments of the seven diatonic chords in a major key.</i>	
Chapter 19. Pentatonic and blues scales	175
<i>Pentatonic scales are the most commonly used modes in the world outside the euroclassical domain. Blues tonality is related, but goes far beyond "blue notes".</i>	
Chapter 20. Specialty scales	186
<i>A few of the more interesting scales used in jazz and non-Western styles.</i>	

# Chapter 15: Introduction to scales

*Scales are for the brain, not the fingers. Don't play like a robot.*

In this chapter:

- [What scales are good for—and bad for](#)
  - [Scales describe the notes](#)
  - [Scales are habit-forming](#)
- [What is a scale?](#)
  - [Scale degrees](#)
  - [Diatonic scales](#)
  - [Scale formulas](#)
- [Assembling scales on one string](#)
- [Tetrachords](#)
- [Assembling scales across strings](#)
- [CAGED scale forms](#)
- [Practicing scales](#)
  - [Practicing mindfully](#)
  - [Chunking](#)
  - [Focus on intervals, not scale shapes](#)
  - [Ascending and descending, slowly](#)
  - [Tunes and licks](#)
  - [Patterns and arpeggios](#)

## What scales are good for—and bad for

### Scales describe the notes

Scales are the foundation of harmony and melody. Every key is derived from a scale. The notes in the key are the notes of the scale, and the chords in the key are harmonized from the scale.

See [Chapter 6. Introduction to Western harmony](#) for details.

Scales are immensely helpful for understanding music by *reason*. When practice time is governed by reason, and performance time is governed by habit and intuition, an understanding of scales can guide our practice so we develop useful habits and intuitions about sounds and how to produce them.

## Scales are habit-forming

But practicing scales can also be dangerous. The danger is that when scales are practiced by rote, the creative and inquisitive mind gets lulled to sleep. Mindless repetition of scales digs deep ruts of habit in our nervous system, which makes improvisation sound mechanical and boring. It can be hard to avoid this trap.

The way to avoid accidentally programming ourselves into scale-playing robots is to *always be mindful* when practicing scales. We have to think about each note as we play it, and slow down to give ourselves time to do so. See “[practice mindfully](#)” below for details.

## What is a scale?

A scale is an ordered collection of tones.

## Scale degrees

The tones in a scale are numbered in order, from lowest pitch to highest. These numbers are called “scale degrees”. The first degree of a scale is called the “tonic”. The other degrees are named for their interval from the tonic.

Scale degree numbers are sometimes written with “hats” ( $\hat{1}$ ,  $\hat{2}$ ,  $b\hat{3}$ , etc.) when it adds clarity, to distinguish them from other numbers.

## Diatonic scales

Most scales in Western music are “diatonic”, which means they have seven notes, with five whole tone intervals and two semitones spaced as far apart as possible.

## Scale formulas

Scales are defined by their intervals, either between degrees (**T-T-S-T-T-T-S**), from the tonic (**1-2-3-4-5-6-7** or **1-2-b3-4-5-b6-b7**), or by the location of semitones (semitones at **3-4** and **7-1**).

For example, the *major scale* is a seven note diatonic scale with semitones between degrees 3-4 and 7-1. Canonically, all the major scale degrees are major or perfect intervals.

### Major scale intervals

	T	T	S	T	T	T	S
1	2	3	4	5	6	7	1
C	D	E	F	G	A	B	C

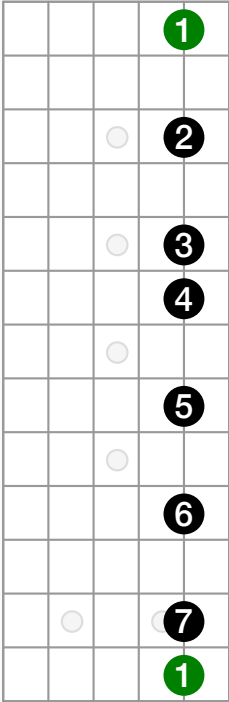
As another example, the *natural minor scale* is a seven note diatonic scale with semitones between degrees 2-b3 and 5-b6.

### Natural minor scale intervals

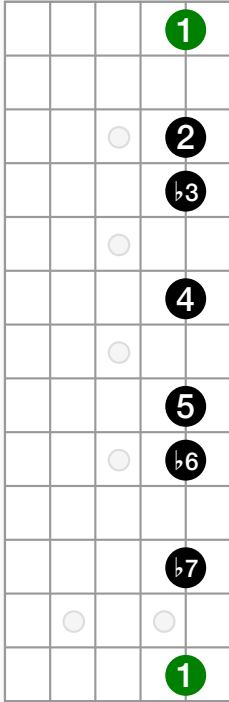
	T	S	T	T	S	T	T
1	2	b3	4	5	b6	b7	1
C	D	Eb	F	G	Ab	Bb	C

## Assembling scales on one string

The simplest way to visualize a scale is on a single guitar string. The scale semitones and tones are one and two frets apart.



*C major scale on second string.*



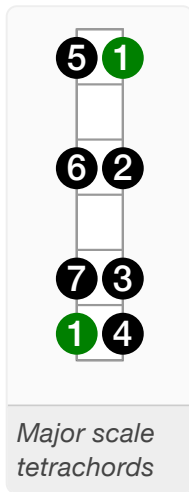
*C natural minor scale on second string.*

## Tetrachords

A 7-note scale with the tonic repeated at the octave can be split into two 4-note sequences called *tetrachords*. As more scales are learned, it can become easier to think in tetrachords rather than full scale sequences, since scales often share tetrachords.

The two tetrachords of a scale can be played on guitar in a convenient box shape, with the upper tetrachord to the *left* of the lower, on every pair of strings except for 2-3.

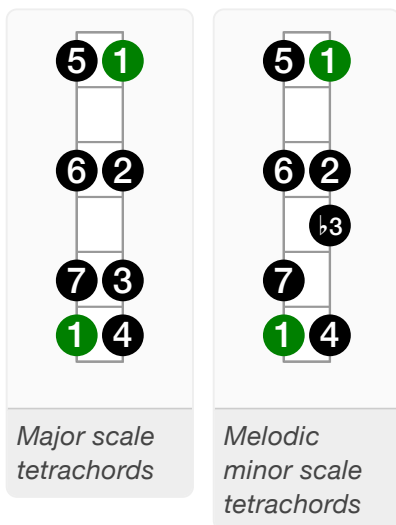
Here are the two tetrachords of the major scale.



In the major scale, both tetrachords are the same, which is not the case with all scales.

Comparing tetrachords with a known reference scale is a good way to get familiar with a new scale.

For example, compare the major and melodic minor tetrachords:



Compared to the major scale, it's easy to see the melodic minor differs by having a minor third.



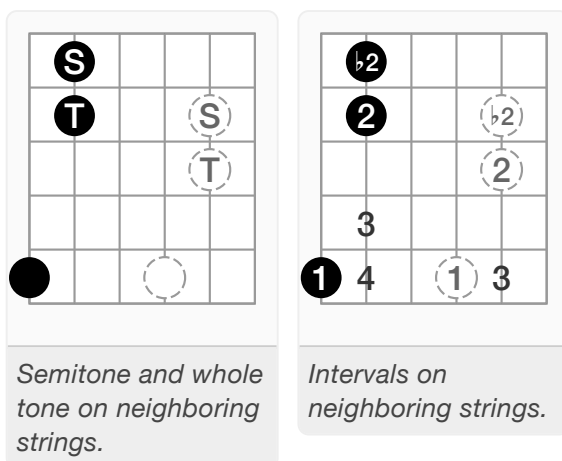
Some common tetrachord names:

major	T-T-S	1-2-3-4	C-D-E-F
minor	T-S-T	1-2-b3-4	C-D-Eb-F
hijaz / upper harmonic minor	S-TS-S	1-b2-3-4	C-Db-E-F
phrygian	S-T-T	1-b2-b3-4	C-Db-Eb-F
lydian	T-T-T	1-2-3-#4	C-D-E-F#

## Assembling scales across strings

Assembling a scale across strings requires knowing where to find semitone and whole tone intervals on neighboring strings. Remember the intervals are the same between all strings (a perfect fourth), except the “third rail” major third interval between strings 2-3.

Interval shapes that cross the third rail are diminished one semitone when approached from the left, and augmented one semitone when approached from the right.



As a trick for finding the next scale degree on the neighboring string, notice that when playing the lower note with the pinkie, the whole tone up on the neighboring string is under the index finger. **A whole tone across strings spans four fingers/frets.** To reach the semitone instead, stretch the index finger back one fret. **(A whole tone across strings 3-2 spans only 3 fingers/frets, ex. pinkie to middle finger.)**

## CAGED scale forms

Scales are typically taught in a variety of “forms” or “shapes”, with different teachers using different forms having often contradictory names.

This book focuses on scale forms based around CAGED chord shapes. This is practical because it integrates with the chords we are actually playing, and we gradually develop an understanding and muscle memory for chords and scales blended together. This blended intuition helps things flow when improvising.

Anchoring scales on CAGED roots also results in a clear and obvious way to name scale forms, like “C form” or “A form”, rather than using ambiguous terms like “form 1” or “position 5-2”.

To assemble a scale on a CAGED form, put the first note of the scale on the lowest root of one of the CAGED chord shapes, and assemble the scale across the strings without moving the hand out of position.

See [Chapter 7. Practical CAGED grips](#) for more on CAGED chord shapes.

## Practicing scales

### Practicing mindfully

The way to avoid accidentally programming ourselves into scale-playing robots is to *always be mindful* when practicing scales. We have to think about each note as we play it.

For example, which note is it? What scale degree / interval from the tonic? What’s the interval from the root of the chord? How does it sound and feel in this context? (If it sounds really good, play it again!)

It’s not necessary to think about *all* of this for each note, but it’s critical to think about *something*; to engage our brain and not just our fingers.

This also means we have to slow down when we practice scales. There’s no time to think about each note if we’re shredding at top speed. Perhaps surprisingly, practicing slowly and intentionally like this is actually the most effective way to develop speed. At performance time, with the analytical mind mostly turned off, our fingers are unleashed to repeat the habits that we’ve formed during practice. And if the habits are deep, it’s surprising how fast we can execute them.

The trick is to slowly and carefully form the intended habits during practice, which sound good to our ear and which carefully exclude sloppiness and mistakes. It's like carving a rut into the dirt to direct the future flow of rain water to irrigate the crops.

## Chunking

Scales can be practiced most effectively by *chunking*. This means breaking information into *chunks*, learning each chunk separately, then learning them in combination as a larger chunk.

Most people can hold about 5-7 things in mind at any one time. Chunking makes optimal use of this capability.

It's important to take the necessary time to learn a chunk thoroughly before trying to combine it with other chunks.

## Focus on intervals, not scale shapes

Don't waste any effort trying to memorize the shapes of scales on the fretboard.

Focus on the *intervals between the notes* instead. How they sound, where to find them, what they mean.

Gradually it will become apparent that our fingers have learned the scale shapes on their own, wired into the sounds and feelings of the intervals.

It's efficient to learn something without effort in this way. But more importantly, this approach makes it possible to direct the fingers by thinking of a sound or an interval and have the fingers place themselves automatically, much as we can write a word on paper without thinking of the specific squiggles of our fingers. This ability is useful for playing by ear and improvising.

Practicing in this way strengthens neural pathways in the brain, which can then be reused automatically at performance time. It's like digging an irrigation ditch so that when the rain falls it is routed to water our plants. Or like clearing a pathway in a forest that will later be run downhill in the dark.

## Ascending and descending, slowly

From the tonic note, thoughtfully assemble the scale from its intervals as far as it can go ascending and descending. Play slowly and mindfully, knowing each note before moving on to the next. Gradually learn where each interval is in this form. Aim for perfection. Any mistakes

should be repeated over correctly many multiples of times. Think of carving a niche in the dirt for irrigation, or starting a saw cut in a piece of wood.

## Tunes and licks

While ascending or descending, switch directions at will to prevent boredom and make little melodic phrases. This may reveal melodies from tunes long buried in deep memories. It can be surprising how many popular, classical, folk, and religious traditional songs consist largely of snippets of scales.

Sounds that we like should be replayed, slowly, thoughtfully, and repeatedly, so they will become part of our personal style.

## Patterns and arpeggios

It's worth practicing scales in the following patterns. They sound good, it's more interesting than just playing ascending and descending, and a lot of melodies incorporate these patterns.

- Thirds: Ascending thirds up and down, then descending thirds up and down
- 3-note diatonic arpeggios: ascending up and down, then descending up and down
- Cyclical quadruplets (3123, 3213, 1321, 1231)

# Chapter 16: Major scale

*The foundation of Western music for the past 400 years.*

In this chapter:

- [About the major scale](#)
- [Assemble on one string](#)
- [Tetrachords](#)
- [Practicing scale forms](#)
- [C form](#)
- [A form](#)
- [G form](#)
- [E form](#)
- [D form](#)
- [Whole fretboard](#)

## About the major scale

The major scale, also called the “Ionian mode”, is one of the most common musical modes in the world. It has been the basis of Western harmony for at least 400 years. See [Chapter 8. Major key harmony](#) for more information.

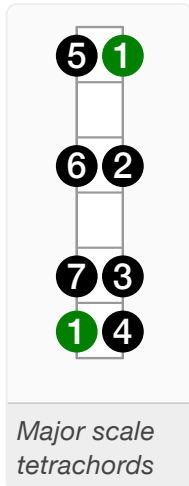
The major scale is a seven note diatonic scale with semitones between degrees 3-4 and 7-1. Not coincidentally, all the major scale degrees are major or perfect intervals.

	T	T	S	T	T	T	S
1	2	3	4	5	6	7	1
C	D	E	F	G	A	B	C



## Tetrachords

Here are the two tetrachords of the major scale.



Both tetrachords of a major scale are the same, with intervals **1-2-3-4 (T-T-S)**. This is sometimes called the **major tetrachord**.

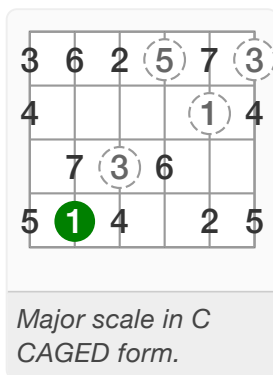
## Practicing scale forms

Practice slowly and thoughtfully, first ascending and descending, then with tunes, licks, scale patterns and arpeggios.

See “practicing scales” in [Chapter 15. Introduction to scales](#) for details.

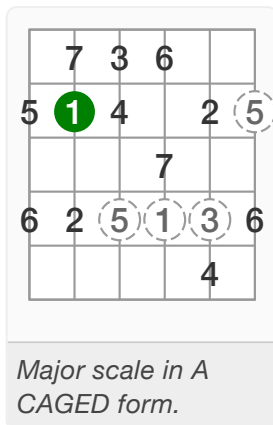
## C form

Here is the major scale assembled in CAGED C form.



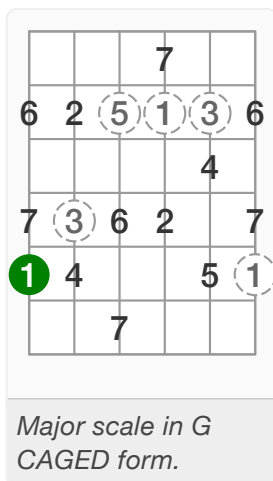
Fingering in the C form is straightforward and comfortable, with the fourth finger on the 5th-string tonic.

## A form



Fingering for the A form is mostly straightforward except for the 4 on the 2nd string. Use the fourth finger to play both the 3 and the 4.

## G form



This is a comfortable and convenient scale form.

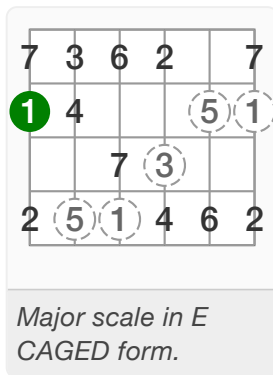
It can be played with a partial barre shape, enabling fast performance of scale patterns and chords.

The 7 is usually played on the 3rd string with the first finger, sliding between the 1 as needed.



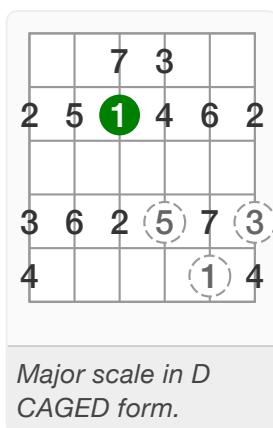
In cases when it's preferable to keep the barre intact, the 7 can also be played by reaching up with the fourth finger on the 4th string.

## E form



Fingering is straightforward in this form. Start with the second finger on the sixth string tonic.

## D form



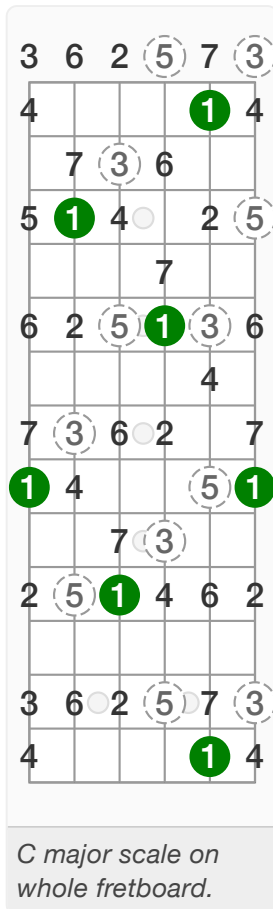
Fingerings for the D form involve some shifting around.

One approach is to use the first finger for the lower 7 and 3 as well as the 1 and 4, with a lot of slides. This is a fast and fluid way to do it, when a legato sound is acceptable.

Another approach is to shift the whole hand back, playing the lower 7 and 3 with the first finger, the 1 and 4 with second finger, and bringing the fourth finger into play as needed to enable the shift. It's a bit awkward at first but it feels more natural after awhile.

## Whole fretboard

The following diagram shows the major scale on the entire fretboard.



# Chapter 17: Minor scales

*The natural minor scale, with adjustments to degrees 6 and 7 as harmonic and melodic circumstances require.*

In this chapter:

- About minor tonality
  - Minor scale tones
  - The leading tone
  - The tone-and-a-half interval
  - Adjustable 6 and 7
- Minor scales
  - Natural minor scale
  - Harmonic minor scale
  - Melodic minor scale
  - Combined minor scale
- Relative major and minor
- Practicing minor scales
  - Approach the tonic through the leading tone
  - Mind the tone-and-a-half interval
  - Think in combined minor with adjustable 6 and 7
  - Practice as relative major
  - Practice as minor
  - Think in both minor and relative major
- C form
- A form
- G form
- E form
- D form
- Whole fretboard

## About minor tonality

### Minor scale tones

Notes in a minor key come from the natural minor scale, with adjustments to the sixth and seventh degrees as circumstances require.

### The leading tone

In a minor key, it is common to approach the tonic from a half-step below, from  $\hat{7}-1$ , through the major  $\hat{7}$  or leading tone. This is so even though the natural minor scale does not contain a major  $\hat{7}$  degree. Natural minor with a major  $\hat{7}$  is called the *harmonic minor* scale. See [Chapter 9. Minor key harmony](#) for details.

### The tone-and-a-half interval

The use of the leading tone  $\hat{7}$  results in a tone-and-a-half interval between the  $b\hat{6}$  and  $\hat{7}$ .

This tone-and-a-half interval (aka augmented second, #2, TS) is an uncommon sound in Western music, connoting “otherness” or “foreignness”, and euroclassical composers preferred to avoid it. Instead, when composing melody lines in minor keys, they would either (1) raise the  $b\hat{6}$  degree to  $\hat{6}$ , which is called the (ascending) melodic minor scale, or (2) use both  $b\hat{7}$  and  $b\hat{6}$  when descending and the leading tone is not needed, which is the natural minor scale.

### Adjustable 6 and 7

The third degree of a minor scale is always a minor third, by definition.

But the sixth and seventh scale degrees in minor tonality can be thought of as adjustable. They can be major or minor, depending on the circumstances.

While the different permutations are labeled as melodic, harmonic, and natural minor scales, it can be more helpful to think of them as one general minor scale, with an adjustable sixth and seventh as needed.

# Minor scales

## Natural minor scale

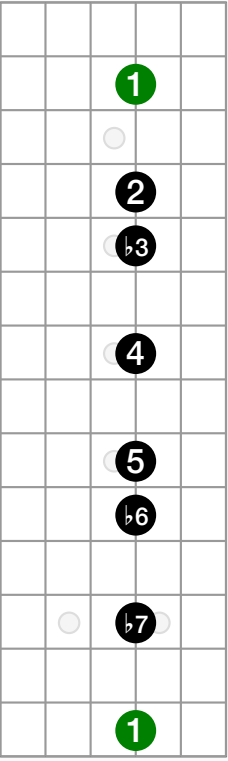
The natural minor scale is the basis of minor key harmony (see [Chapter 9. Minor key harmony](#)).

It is a seven note diatonic scale with semitones between degrees 2-b3 and 5-b6. It has a b3, b6, and b7.

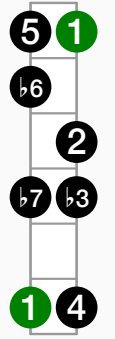
Natural minor is also the sixth diatonic mode of the major scale, the *Aeolian mode*. See [Chapter 18. Diatonic modes](#) for details.

**A natural minor**

	T	S	T	T	S	T	T
1	2	b3	4	5	b6	b7	1
A	B	C	D	E	F	G	A



*A natural minor scale on third string*



*Natural minor scale tetrachords*

The lower tetrachord of natural minor is the *minor* tetrachord (**1-2-b3-4**). This same lower tetrachord is used for all of the minor scales in this chapter.

The upper tetrachord is **5-b6-b7-1** (**1-b2-b3-4**). This minor second (b2 and b6) is relatively uncommon. This tetrachord is sometimes called *phrygian* or *upper minor*.

## Harmonic minor scale

The harmonic minor scale is a seven note scale created by raising the seventh degree of the natural minor scale to create a leading tone. See [Chapter 9. Minor key harmony](#) for details.

The harmonic minor scale has semitones between degrees 2-b3, 5-b6, and 7-1, and a tone-and-a-half interval (TS, 3 semitones) between b6 and 7. It has a b3 and a b6.

### A harmonic minor

	T	S	T	T	S	TS	S
1	2	b3	4	5	b6	7	1
A	B	C	D	E	F	G#	A

Harmonic minor scale tetrachords

A harmonic minor scale on third string.

## Melodic minor scale

The melodic minor scale is a seven note scale created by raising the sixth degree of the harmonic minor scale, to get rid of the tone-and-a-half interval between b6 and 7.

The melodic minor scale is often used for minor key melodies. In euroclassical pieces it is traditionally played ascending, in order to move from the leading tone to the tonic, but when descending the natural minor scale with b7 and b6 is often played instead, since the leading tone is no longer needed and there is no longer a foreign tone-and-a-half interval for which to adjust the b6.

In jazz, the melodic minor scale is used both ascending and descending, and minor key melodies usually use the major 6 and 7. Some jazz musicians call the ascending melodic minor scale “real minor”. It is given primacy as a minor scale, and is commonly harmonized, with the various modes of melodic minor regularly used in jazz pieces.

The melodic minor scale has a b3, with semitones between degrees 2-b3 and 7-1.



**A melodic minor**

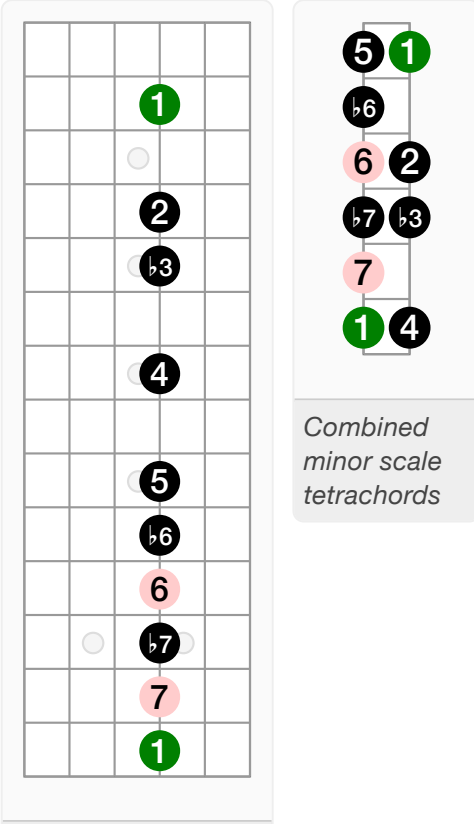
	T	S	T	T	T	T	S
1	2	b3	4	5	6	7	1
A	B	C	D	E	F#	G#	A

*A melodic minor scale on third string.*

*Melodic minor scale tetrachords*

## Combined minor scale

While there are several different minor scales, it can be helpful to think primarily in terms of a single general minor scale, with adjustable sixth and seventh degrees.



The diagram illustrates a combined minor scale on the third string of a guitar. On the left, a fretboard grid shows the scale from the 1st to the 12th fret. The notes are: 1st fret (green circle with '1'), 2nd fret (black circle with '2'), 3rd fret (black circle with 'b3'), 4th fret (black circle with '4'), 5th fret (black circle with '5'), 6th fret (black circle with 'b6'), 7th fret (pink circle with '6'), 8th fret (black circle with 'b7'), 9th fret (pink circle with '7'), and 10th fret (green circle with '1'). On the right, a vertical stack of notes shows the tetrachord components: 5 (black), 1 (green), b6 (black), 6 (pink), 2 (black), b7 (black), b3 (black), 7 (pink), 1 (green), and 4 (black). A bracket groups the bottom four notes (1, 4, 7, b3) as the lower tetrachord.

*A combined minor scales on third string.*

*Combined minor scale tetrachords*

Notice that the lower tetrachord (**1-2-b3-4**) is always the same, as is the perfect fifth. It can be useful to learn licks and phrases with the lower tetrachord and fifth since they will work regardless of what's happening with the 6 and 7.

## Relative major and minor

The notes in a natural minor scale are identical to the notes in the relative major scale a minor third above it. For example, the notes and chords in A natural minor are the same as in C major. C is said to be the *relative major* of Am, and Am is said to be the *relative minor* of C.

### C major

	T	T	S	T	T	T	S
1	2	3	4	5	6	7	1
C	D	E	F	G	A	B	C

### A natural minor

	T	S	T	T	S	T	T
1	2	b3	4	5	b6	b7	1
A	B	C	D	E	F	G	A

### C major laid over relative minor

		T	T	S	T	T	T	S	T	T	S	T	T	T	S
	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C
C major	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1
A natural minor						1	2	b3	4	5	b6	b7	1		

Notice that the  $\hat{1}$  of the relative minor is the  $\hat{6}$  of the relative major. The natural minor is the sixth *mode* of the major scale. See [Chapter 18. Diatonic modes](#) for details.

This is a quick way to get started learning notes in a minor key. By learning a major key we get the relative minor for free.

## Practicing minor scales

See “practicing scales” in [Chapter 15. Introduction to scales](#) for general information about practicing scales.

### Approach the tonic through the leading tone

When approaching the tonic from below as a point of resolution, precede the tonic with the leading tone, major 7-1. Even when approaching the tonic from above, it can sound good to slide into the tonic with the leading tone, such as with **5-4-b3-2-7-1**.

### Mind the tone-and-a-half interval

When playing both the sixth and seventh degrees, be mindful of the potential tone-and-a-half interval if there's a b6 and major 7.

Either avoid it, by lowering the 7 or raising the 6, or embrace it—it can be a cool sound. But be aware of it and practice working with it.

### Think in combined minor with adjustable 6 and 7

When practicing, try to think in the combined form of the minor scale, adjusting the sixth and seventh degrees as appropriate.

Even if this amounts to just practicing the melodic, harmonic, and natural minor scales separately, try to think in terms of the adjustable sixth and seventh degrees.

### Practice as relative major

When first getting familiar with a minor key, play the scale for its relative major, starting and ending on the 6. Get a sense of the 6 as the tonal center.


### Practice as minor

Once the sound of the scale is familiar, start thinking of the minor key tonal center as 1, and play the same exercises with this new point of view.

## **Think in both minor and relative major**

It can be constructive to switch perspective back and forth, thinking of a tone as a degree of both the minor scale and the relative major.

## C form



*Combined minor scales in C CAGED form.*

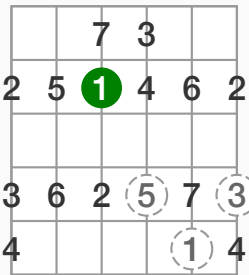
This combined scale includes the natural minor scale, plus highlighted additional major 6 and 7 degrees.

- Played without highlighted notes, it's the natural minor scale.
- Played with the highlighted major 7 instead of the b7, it's harmonic minor.
- Played with both highlighted 6 and 7 instead of b6 and b7, it's melodic minor.

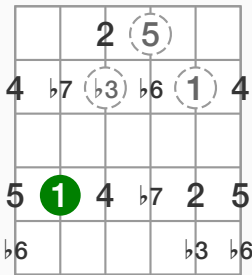
Compare the relative major form below. It has the exact same notes, but different intervals. The 1 in the minor is the 6 in the major, and so on.

The separate melodic, harmonic, and natural minors are also shown.

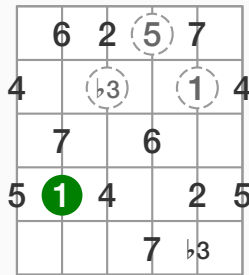
Compare the relative major and separate minor scales.




*Relative major scale in D CAGED form.*



*Natural minor scale in C CAGED form.*



*Melodic minor scale in C CAGED form.*



*Harmonic minor scale in C CAGED form.*

## A form

Compare the relative major and separate minor scales.

3 6 2 5 7 3

4 1 4

7 3 6

5 1 4 2 5

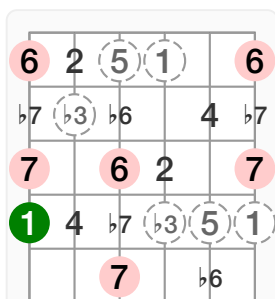
*Relative major scale in C CAGED form.*

*Natural minor scale in A CAGED form.*

*Melodic minor scale in A CAGED form.*

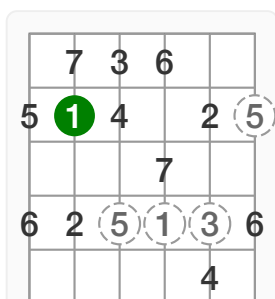
*Harmonic minor scale in A CAGED form.*

## G form

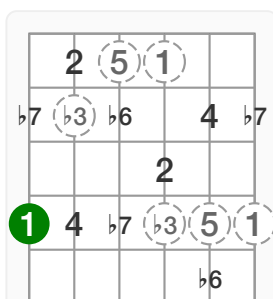


Combined minor  
scales in G CAGED  
form.

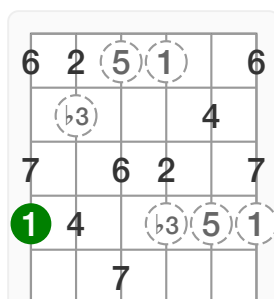
Compare the relative major and separate minor scales.



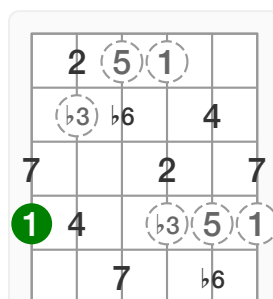
Relative major scale  
in A CAGED form.



Natural minor scale  
in G CAGED form.



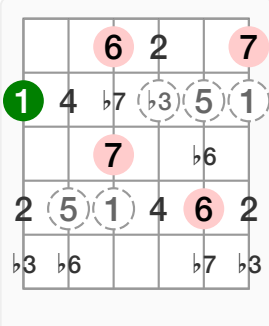
Melodic minor scale  
in G CAGED form.



Harmonic minor  
scale in G CAGED  
form.



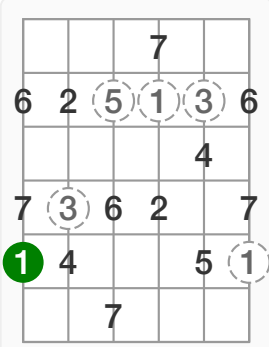
## E form



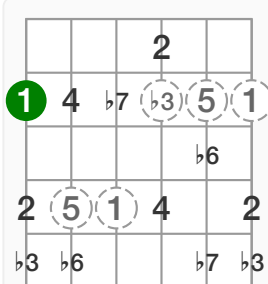
Combined minor scales in E CAGED form.

This form requires a slight shift of position to reach back to the 2 (and sometimes the 6 and 7). This can be done by stretching the first finger back just enough to reach the 2. When playing the 2 and b3 in sequence, play them both with the same finger, and slide to the second note.

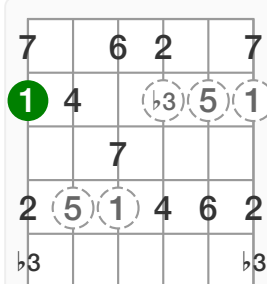
Compare the relative major and the separate minor scales below.



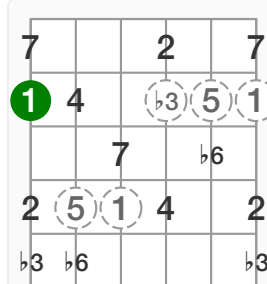
Relative major scale in G CAGED form.



Natural minor scale in E CAGED form.



Melodic minor scale in E CAGED form.



Harmonic minor scale in E CAGED form.

## D form

*Combined minor scales in D CAGED form.*

Compare the relative major and the separate minor scales below.

*Relative major scale in E CAGED form.*

*Natural minor scale in D CAGED form.*

*Melodic minor scale in D CAGED form.*

*Harmonic minor scale in D CAGED form.*

## Whole fretboard

The following diagrams show minor scales on the entire fretboard.

*Am combined minor scale on the whole fretboard with CAGED outlines.*

*Am natural minor scale on the whole fretboard with CAGED outlines.*

## Chapter 18: Diatonic modes

*The seven modes of the major scale describe the tonal environments of the seven diatonic chords in a major key.*

In this chapter:

- [What are diatonic modes?](#)
- [Reference modes](#)
  - [I: Ionian - major](#)
  - [vi: Aeolian - minor](#)
- [ii: Dorian](#)
- [iii: Phrygian](#)
- [IV: Lydian](#)
- [V: Mixolydian](#)
- [vii: Locrian](#)

### What are diatonic modes?

The diatonic modes are the seven rotations of the major scale, each starting at a different degree of the major scale and wrapping around the end to the beginning.

For example, the first mode of C major has the notes `C-D-E-F-G-A-B-C`. The second mode of C major has the notes `D-E-F-G-A-B-C-D`, and the third mode `E-F-G-A-B-C-D-E`.

While the different modes have the same notes, they have a different note as the  $\hat{1}$ , which changes the tonal center and all the scale degree intervals, since they are measured from the  $\hat{1}$ . This gives each mode a different sound and feel.

Each mode is intimately linked to the corresponding chord in the harmonized major scale. For example, the second mode is the scale that underlies the ii chord, and the fifth mode is the scale under the V chord. The sound and feel of each mode is the sound and feel of the corresponding chord.

Diatonic modes are named with obscure Greek-related terms that make little sense and just have to be memorized. Starting with the first degree of the major scale, the diatonic modes are (1) Ionian, (2) Dorian, (3) Phrygian, (4) Lydian, (5) Mixolydian, (6) Aeolian, and (7) Locrian.

A mnemonic to help remember the modes is “I Don’t Punch Like Mohammed A-Li”.

**Modes of the major scale**

		T	T	S	T	T	T	S	T	T	S	T	T	T	S
	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C
Ionian	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1
Dorian		1	2	b3	4	5	6	b7	1						
Phrygian			1	b2	b3	4	5	b6	b7	1					
Lydian				1	2	3	#4	5	6	7	1				
Mixolydian					1	2	3	4	5	6	b7	1			
Aeolian						1	2	b3	4	5	b6	b7	1		
Locrian							1	b2	b3	4	b5	b6	b7	1	

## Reference modes

A simple way to get familiar with modes is to first determine if they are major or minor (having a  $\hat{3}$  or  $b\hat{3}$ ) and then compare them to a major or minor “reference mode”.

Ionian, the major scale, is the major reference mode.

Aeolian, the natural minor scale, is the minor reference mode.

Each of the other modes differs from Ionian or Aeolian by only a single interval (except the dissonant Locrian, which flattens every Ionian interval *but* one). This single interval difference creates the mode’s unique sound and feel.

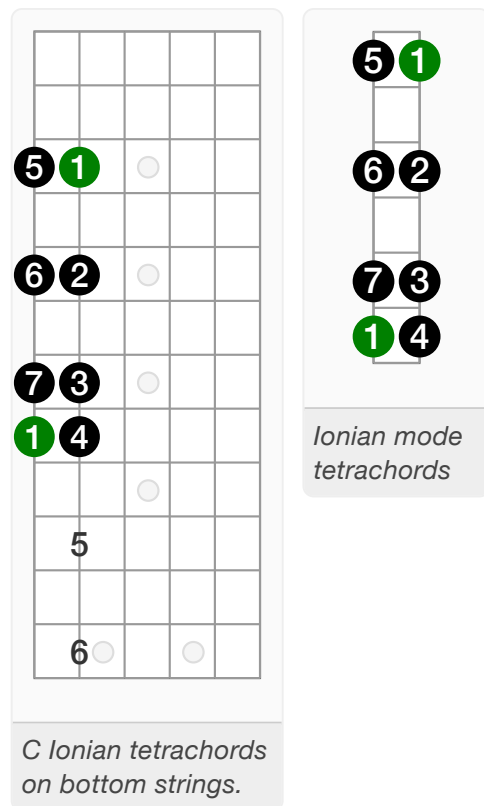
We can focus on these small differences to summarize the mode in our mind. For example, it’s much easier to remember that Phrygian is “a minor with a  $b2$ ” rather than that it has scale degrees 1– $b2$ – $b3$ –4–5– $b6$ – $b7$  .

This is an example of the memory technique “chunking”. By learning the natural minor mode well, it becomes one “chunk”. We can then learn other minor modes as “minor with one difference”, essentially holding two “chunks” in memory to define Phrygian (“minor” and “ $b2$ ”),

rather than seven “chunks” ( 1-b2-b3-4-5-b6-b7 ).

See “[How to learn](#)” in the Introduction for details.

## I: Ionian - major



The Ionian mode is the major scale.

It describes the harmonic environment of the **I chord**.

As the major scale, it's the ultimate reference mode. All scales in Western music are implicitly compared against this mode, because it describes every major and perfect interval. The minor intervals are then found one fret below them.

Compare any tetrachord to this mode to quickly identify the intervals of its scale degrees.

The Ionian mode should be memorized. It allows us to immediately identify the interval between any two notes up to an octave apart on the fretboard.

**vi: Aeolian - minor**

*A Aeolian tetrachords relative to C major on bottom strings.*

*Aeolian mode tetrachords*

The Aeolian mode is the natural minor scale.

It describes the harmonic environment of the **vi chord** (or the **i chord** in a minor key).

**Aeolian**, natural minor, has a **b3**, **b6**, and **b7**, compared to the Ionian mode.

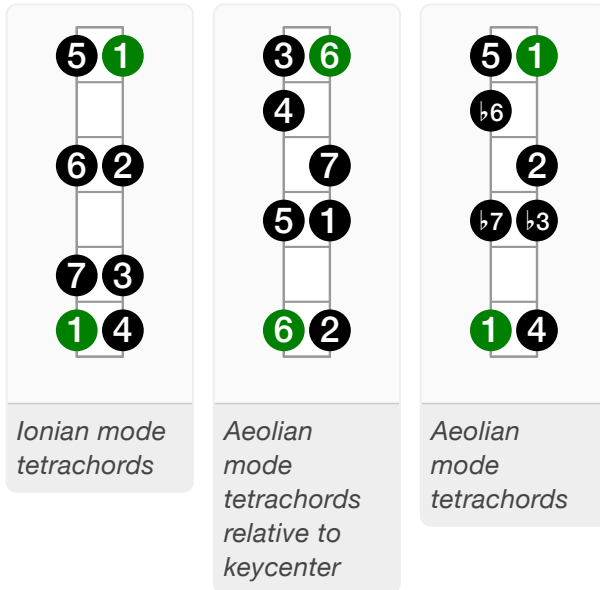
The **b3** is the sound of a minor mode.

The **b7** is a whole tone below the tonic rather than being a leading tone. The absence of a leading tone is the cause of all the mischief with harmonic and melodic minor scales. See [Chapter 17. Minor scales](#) for details.

To get familiar with the sound of the Aeolian mode, play a **vi chord** in a major key, then starting from the root note of the **vi chord**,  $\hat{6}$ , continue the major scale up to the  $\hat{6}$  an octave above, **6–7–1–2–3–4–5–6** (remembering the semitone between 3–4 and 7–1), and then play another **vi chord**. Improvise for awhile within those notes, making a point of dwelling on the  $\hat{6}$  as “home”.

Assembling modes in this way is easier than memorizing the shapes of all the modes on the fretboard. We just have to memorize the major scale and the Ionian tetrachord.

Compare the assembled tetrachords to Ionian to quickly identify the intervals.



To compare the sound of this mode to others in the key of C major, play an Am chord with its root on the open 5th string, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another Am.



## ii: Dorian

The diagram illustrates the Dorian mode on a fretboard and its constituent tetrachords. The fretboard shows the mode starting on the 2nd string, 1st fret (B), with notes B, C, D, E, F, G, A, B. The tetrachords are shown as pairs of strings and frets: (5, 1), (6, 2), (b7, b3), and (1, 4).

*D Dorian tetrachords relative to C major on bottom strings.*

*Dorian mode tetrachords*

The Dorian mode describes the harmonic environment of the **ii chord**.

**Dorian** is the only diatonic **minor** mode with a **natural 6**.

To get familiar with the sound of this mode, play a ii chord, then play the parent major scale starting from the chord root to the octave above it, **2-3-4-5-6-7-1-2** (remembering the semitone between 3-4 and 7-1), and then play another ii chord. Improvise for awhile within those notes, dwelling on the  $\hat{2}$  as “home”.

Pay particular attention to the unique sound of the natural 6 in this mode. It’s the  $\hat{7}$  degree of the parent major key. In D Dorian (the second mode of C major), it’s the B note. This sound is the defining characteristic of the Dorian mode.

To compare the sound of this mode to others in the key of C major, play a Dm chord with its root on the 5th string 5th fret, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another Dm.

### iii: Phrygian

The diagram illustrates the E Phrygian mode on a fretboard and its constituent tetrachords. The fretboard shows the mode starting on the 3rd fret (E), with notes marked as 1 (circled), 2, 7, 1, 2, 3, 1, 4, 2, 5, 3, 6. The tetrachords are shown as pairs of notes: (5, 1), (b6, b2), (b7, b3), and (1, 4). The text below the fretboard reads: "E Phrygian tetrachords relative to C major on bottom strings." The text below the tetrachords reads: "Phrygian mode tetrachords".

The Phrygian mode describes the harmonic environment of the **iii chord**.

**Phrygian** is a diatonic **minor** mode with a **b2**.

The b2 interval tends to sound “foreign” to Western ears, vaguely Arabic or Spanish.

To get familiar with the sound of this mode, play a iii chord, then play the parent major scale starting from the chord root to the octave above it, 3–4–5–6–7–1–2–3 (remembering the semitone between 3–4 and 7–1), and then play another iii chord. Improvise for awhile within those notes, dwelling on the  $\hat{3}$  as “home”.

Pay particular attention to the unique sound of the b2 in this mode. It’s the  $\hat{4}$  degree of the parent major key. In E Phrygian (the third mode of C major), it’s the F note. This sound is the defining characteristic of the Phrygian mode.

To compare the sound of this mode to others in the key of C major, play an Em chord with its root on the 5th string 7th fret, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another Em.

## IV: Lydian

The diagram illustrates the F Lydian mode on the fretboard and its constituent tetrachords. On the left, a fretboard grid shows the F Lydian mode starting on the 5th string, 7th fret (F). The notes are marked with circles: 1 (F, 5th string, 7th fret), 2 (G, 5th string, 8th fret), 3 (A, 5th string, 9th fret), 4 (Bb, 4th string, 10th fret), 5 (C, 4th string, 11th fret), 6 (D, 4th string, 12th fret), and 7 (Eb, 3rd string, 12th fret). Below the fretboard, the text reads: "F Lydian tetrachords relative to C major on bottom strings." On the right, a vertical diagram shows the Lydian mode tetrachord starting on the 5th string, 7th fret. The notes are marked with circles: 5 (F, 5th string, 7th fret), 1 (G, 5th string, 8th fret), 6 (A, 5th string, 9th fret), 2 (Bb, 4th string, 10th fret), 7 (C, 4th string, 11th fret), 3 (D, 4th string, 12th fret), 1 (Eb, 3rd string, 12th fret), and #4 (F, 3rd string, 13th fret). Below this diagram, the text reads: "Lydian mode tetrachords".

The Lydian mode describes the harmonic environment of the **IV chord**.

**Lydian** is the only diatonic **major** mode with a **#4**.

The #4 is a tritone, enharmonic with the b5 which is well-known as a dissonant tone. But sometimes, as in Lydian, it can evoke a brighter and dreamier sound.

To get familiar with the sound of this mode, play a IV chord, then play the parent major scale starting from the chord root to the octave above it, 4-5-6-7-1-2-3-4 (remembering the semitone between 3-4 and 7-1), and then play another IV chord. Improvise for awhile within

those notes, dwelling on the  $\hat{4}$  as “home”.

Pay particular attention to the unique sound of the  $\#4$  in this mode. It's the  $\hat{7}$  degree of the parent major key. In F Lydian (the fourth mode of C major), it's the B note. This sound is the defining characteristic of the Lydian mode.

To compare the sound of this mode to others in the key of C major, play an F chord with its root on the 5th string 8th fret, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another F.

## V: Mixolydian

*G Mixolydian tetrachords relative to C major on bottom strings.*

*Mixolydian mode tetrachords*

The Mixolydian mode describes the harmonic environment of the **V chord**.

**Mixolydian** is the only diatonic **major** mode with a **b7**.

The b7 interval is kind of a gritty sound. It is common in blues, and well-known as a way to add dissonance to a chord. The interval between the major  $\hat{3}$  and the  $b\hat{7}$  is a tritone, and the basic sound of a dominant 7 chord.

To get familiar with the sound of this mode, play a V chord, then play the parent major scale starting from the chord root to the octave above it, 5–6–7–1–2–3–4–5 (remembering the semitone between 3-4 and 7-1), and then play another V chord. Improvise for awhile within those notes, dwelling on the  $\hat{5}$  as “home”.

Pay particular attention to the unique sound of the b7 in this mode. It's the  $\hat{4}$  degree of the parent major key. In G Mixolydian (the fifth mode of C major), it's the F note. This sound is the defining characteristic of the Mixolydian mode.

To compare the sound of this mode to others in the key of C major, play an F chord with its root on the 5th string 8th fret, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another F.

## vii: Locrian

The diagram illustrates the B Locrian mode on a guitar fretboard and its constituent tetrachords. The fretboard shows the mode starting on the 5th string, 2nd fret (B). The notes are: 4 (4th string, 2nd fret), 7 (5th string, 3rd fret), 5 (5th string, 2nd fret), 1 (5th string, 1st fret), 6 (4th string, 1st fret), 2 (4th string, 2nd fret), 7 (4th string, 3rd fret), 3 (4th string, 4th fret), 4 (3rd string, 2nd fret), 5 (3rd string, 3rd fret), 6 (3rd string, 4th fret), and 7 (3rd string, 5th fret). The tetrachords are shown as two groups of four notes:  $\flat 5$  (1),  $\flat 6$  (2),  $\flat 7$  (3), and 1 (4).

*B Locrian  
tetrachords relative  
to C major on  
bottom strings.*

*Locrian  
mode  
tetrachords*

The Locrian mode describes the harmonic environment of the **vii chord**.

Compared to Ionian, in **Locrian** every degree is **flattened but the  $\hat{4}$** . It's also the only diatonic **minor** mode with a  **$\flat 5$** .

Locrian is a disagreeable sort of mode. It's rumored to be popular among heavy metal guitarists because of its dissonance, but examples are hard to find.

To get familiar with the sound of this mode, play a vii chord, then play the parent major scale starting from the chord root to the octave above it, **7-1-2-3-4-5-6-7** (remembering the semitone between 3-4 and 7-1), and then play another vii chord. Improvise for awhile within those notes, dwelling on the  $\hat{7}$  as "home".

To compare the sound of this mode to others in the key of C major, play a Bdim chord with its root on the 5th string 2nd fret, assemble the tetrachord on the 5th and 6th strings starting from the root of the chord, and then play another Bdim.

# Chapter 19: Pentatonic and blues scales

*Pentatonic scales are the most commonly used modes in the world outside the euroclassical domain. Blues tonality is related, but goes far beyond "blue notes".*

In this chapter:

- [About pentatonic scales](#)
  - [Ancient and universal](#)
  - [Just intonation vs. equal tempered](#)
  - [Major pentatonic and its modes](#)
  - [No semitones or tritones](#)
  - [Properties of pentatonic intervals](#)
- [Major and minor pentatonic](#)
  - [Major pentatonic scale](#)
  - [Minor pentatonic scale](#)
  - [Relative major and minor](#)
  - [C form](#)
  - [A form](#)
  - [G form](#)
  - [E form](#)
  - [D form](#)
- [Blues tonality](#)
  - [Origins of the Blues](#)
  - [Blue notes and flexible pitch areas](#)
  - [Pentatonic blues scale with pitch areas](#)

## About pentatonic scales

A pentatonic scale is a musical scale with five notes per octave.

Pentatonic scales tend to sound good over many modes and harmonies.

They are often the first scales learned by beginning guitarists. They are easy to play on guitar, in comfortable positions with two notes per string.

## Ancient and universal

Pentatonic scales were developed independently by many ancient civilizations.

This may be because the notes of pentatonic scales are acoustically linked by simple pitch ratios. The pentatonic major scale can be constructed by stacking five perfect fifths.

## Just intonation vs. equal tempered

Cultures that developed pentatonic modes often used a system of tuning called “just intonation”, in which tones occur naturally as a result of the overtone series. Inconveniently, in just intonation each key contains intervals that are slightly different from the intervals in every other key.

Modern instruments use “equal tempered” tuning instead, in which every key has the exact same intervals. But music composed with just intonation often can’t be reproduced properly on equal tempered instruments. Only instruments like the guitar which support “microtone” intervals (ex. by bending strings) can approximate it.

## Major pentatonic and its modes

The major pentatonic scale is the most commonly used pentatonic scale.

As with any scale, modes can be derived from each degree of the major pentatonic.

Modes of the major pentatonic scale contain 3 whole tone intervals (T), and two tone-and-a-half intervals (TS) spaced as far apart as possible.

Just as diatonic modes can be identified by the location of their semitones, pentatonic modes can be identified by the location of their tone-and-a-half intervals.

Of the five modes, the “minor pentatonic” mode is the next most common.

## No semitones or tritones

The pentatonic scales used most commonly around the world contain no semitones. Scales without semitones are called “anhemitonic”. They are very consonant and blend well in many contexts.

Pentatonic scales with semitones, called “hemitonic”, are a different and more dissonant beast. Examples include the Japanese “in” or “Sakura” pentatonic scale, and certain interpretations of the blues scale such as the one given later in this chapter.



Pentatonic scales with semitones are less common. In most cases, when people talk about pentatonic scales they are referring to scales without semitones.

## Properties of pentatonic intervals

Pentatonic scales without semitones can be played using only the black keys on a piano keyboard.

Comparing the major and minor pentatonic scales to the major and minor diatonic scales, the pentatonic scales have two fewer notes. They omit the two notes that form a tritone together, and which also create semitones with other scale degrees. In the major scale, it's the  $\hat{4}$  and  $\hat{7}$ ; in the minor scale, it's the  $\hat{2}$  and  $b\hat{6}$ .

The absence of the two most dissonant intervals in Western music make these pentatonic scales highly consonant.

## Major and minor pentatonic

### Major pentatonic scale

The major pentatonic scale has tone-and-a-half intervals between degrees  $\hat{3}-\hat{5}$  and  $\hat{6}-\hat{1}$ .

	T	T	TS	T	TS
1	2	3	5	6	1
C	D	E	G	A	C

Just as diatonic scales can be represented by two tetrachords, pentatonic scales can be represented by two “trichords”. The missing fourth and seventh intervals from the diatonic major scale are also shown, to demonstrate how their absence removes the tritone and semitones.

**C major pentatonic scale and its trichords on the fretboard**

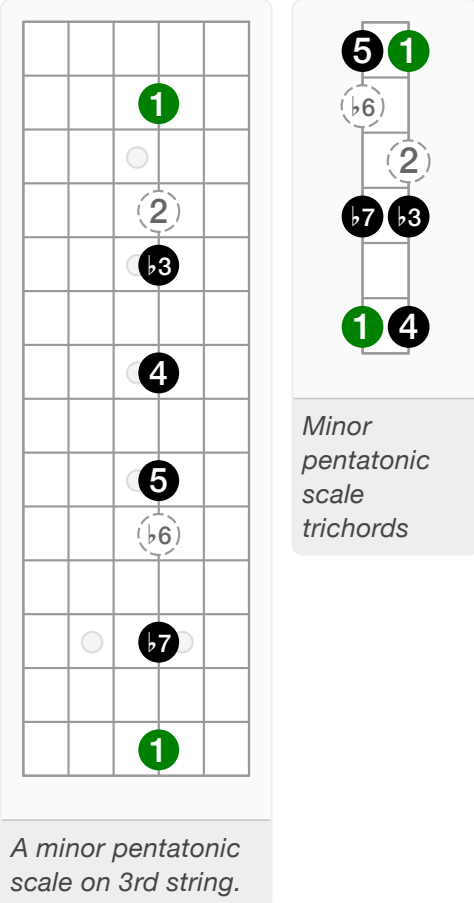
The diagram illustrates the C major pentatonic scale on the 5th string of a guitar. The scale is shown on a fretboard grid with 12 frets and 4 strings. The notes are: 1st fret (C), 3rd fret (D), 5th fret (E), 7th fret (F), and 9th fret (G). The 1st fret (C) and 9th fret (G) are highlighted in green. The 4th fret (F) is circled with a dashed line. The 7th fret (F) is also circled with a dashed line. The 3rd fret (D) and 5th fret (E) are marked with small grey circles. To the right, the trichords are shown: 5-1 (1st fret C, 3rd fret D), 6-2 (3rd fret D, 5th fret E), 7-3 (5th fret E, 7th fret F), and 1-4 (7th fret F, 9th fret G). The 1st fret (C) and 9th fret (G) are highlighted in green. The 7th fret (F) is circled with a dashed line. Below the fretboard, the text reads: *C major pentatonic scale on 5th string.* To the right of the trichords, the text reads: *Major pentatonic scale trichords*.

The major pentatonic scale can be played with just the black keys on a piano keyboard, starting from Db.

## Minor pentatonic scale

The minor pentatonic scale has tone-and-a-half intervals between degrees  $\hat{1}$ - $\flat\hat{3}$  and  $\hat{5}$ - $\flat\hat{7}$ .

	TS	T	T	TS	T
1	$\flat 3$	4	5	$\flat 7$	1
A	C	D	E	G	A



*A minor pentatonic scale on 3rd string.*

The minor pentatonic scale can be played with just the black keys on a piano keyboard, starting from B $\flat$ .

## Relative major and minor

Like the natural minor (Aeolian) mode of the major scale, the minor pentatonic mode is a major sixth above, and minor third below, the tonic of the major scale. It's also the fifth mode of the major pentatonic scale.

### C major pentatonic over relative minor

		T	T	TS	T	TS	T	T	TS	T	TS
	C	D	E	G	A	C	D	E	G	A	C
C major	1	2	3	5	6	1	2	3	5	6	1
A minor					1	b3	4	5	b7	1	

**C major and relative A minor pentatonic scales on the fretboard**

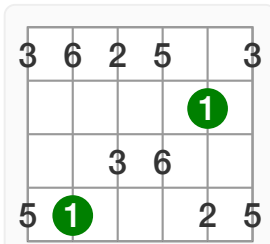
A fretboard diagram for the 5th string, showing frets 1 through 7. The notes of the C major pentatonic scale are marked: C (fret 1, green circle), D (fret 2, black circle), E (fret 3, black circle), F (fret 4, dashed black circle), G (fret 5, black circle), and A (fret 6, black circle). The 7th fret is marked with a dashed circle containing the number 7. The 1st fret is also marked with a green circle containing the number 1. The notes are: C (1st fret), D (2nd fret), E (3rd fret), F (4th fret), G (5th fret), and A (6th fret).

*C major pentatonic scale on 5th string.*

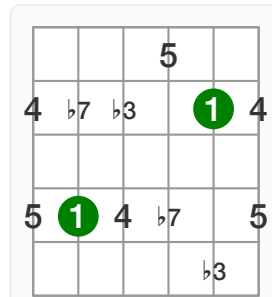
A fretboard diagram for the 5th string, showing frets 1 through 7. The notes of the A minor pentatonic scale are marked: A (fret 1, green circle), Bb (fret 2, black circle with flat), C (fret 3, black circle), D (fret 4, black circle), E (fret 5, black circle), and F (fret 6, dashed black circle with flat). The 7th fret is marked with a dashed circle containing the number 7. The 1st fret is also marked with a green circle containing the number 1. The notes are: A (1st fret), Bb (2nd fret), C (3rd fret), D (4th fret), E (5th fret), and F (6th fret).

*A minor pentatonic scale on 5th string.*

## C form



Major pentatonic scale in C CAGED form.

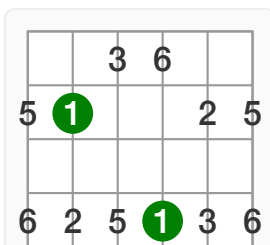


Minor pentatonic scale in C CAGED form.

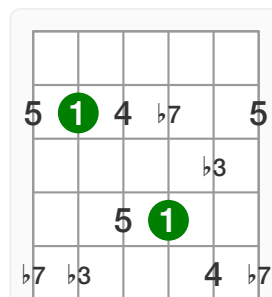
Notice the relative major and minor forms:

- The C major form is the same as the A minor form (below).
- The C minor form is the same as the D major form.

## A form



Major pentatonic scale in A CAGED form.

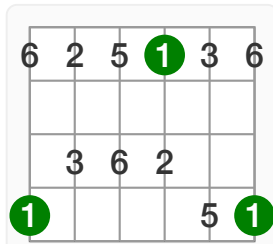


Minor pentatonic scale in A CAGED form.

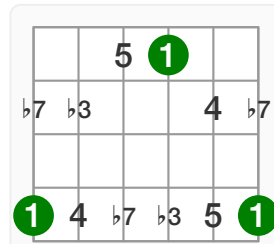
Notice the relative major and minor forms:

- The A major form is the same as the G minor form (below).
- The A minor form is the same as the C major form (above).

## G form



Major pentatonic  
scale in G CAGED  
form.

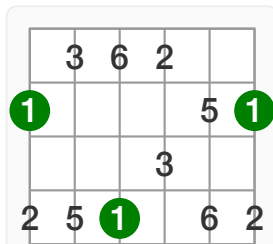


Minor pentatonic  
scale in A CAGED  
form.

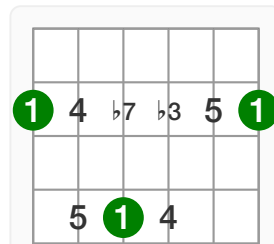
Notice the relative major and minor forms:

- The G major form is the same as the E minor form (below).
- The G minor form is the same as the A major form (above).

## E form



Major pentatonic  
scale in E CAGED  
form.

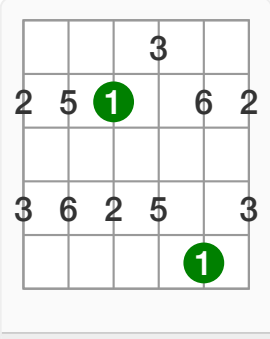


Minor pentatonic  
scale in E CAGED  
form.

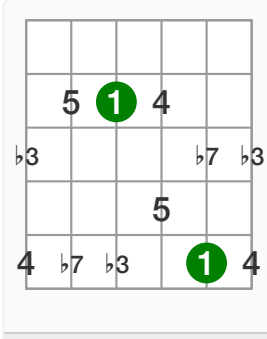
Notice the relative major and minor forms:

- The E major form is the same as the D minor form (below).
- The E minor form is the same as the G major form (above).

## D form



*Major pentatonic scale in D CAGED form.*



*Minor pentatonic scale in D CAGED form.*

Notice the relative major and minor forms:

- The D major form is the same as the C minor form.
- The D minor form is the same as the E major form (above).

## Blues tonality

### Origins of the Blues

The Blues originated in the southern United States in the late 19th century, after the American Civil War. It evolved as a combination of traditional African music transmitted by slaves, and the Western European tonality of their enslavers.

Musicologists have long speculated that the Blues sound arises from efforts to reproduce African folk tonalities on Western instruments having twelve-tone equal tempered tuning (12-TET).

### Blue notes and flexible pitch areas

When euroclassical music theorists began trying to analyze Blues music, they struggled to understand and even to hear the microtones required to produce Blues intonation on 12-TET Western instruments.

In an effort to simplify Blues tonality for purposes of instruction, the “blues scale” was often described as a minor pentatonic scale with an added  $b5/\#4$ , or a major pentatonic with a  $\#2/b3$ . This added tone is often called a “blue note”. But this is an oversimplification, and playing the



scale that way does not really sound like the Blues.

A more practical way to view the blues scale is as a series of flexible “pitch areas”, rather than as specific notes.

There are three main pitch areas in the blues:

- Between  $\hat{2}$  and  $\hat{3}$  (spanning both major and minor thirds)
- Between  $\hat{4}$  and  $\hat{5}$  (or more specifically,  $\hat{4}-\#\hat{4}$  and  $b\hat{5}-\hat{5}$ )
- Between  $\hat{6}$  and  $b\hat{7}$  (or a bit past it)

On guitar, we bend the string within these pitch areas to achieve the desired inflection. Blues musicians treat these pitch areas each as its own distinct “toneme”, a single unit of sound similar to a note, which is then inflected as appropriate based on tonal environment and emotional nuance.

## Pentatonic blues scale with pitch areas

Here’s one way to think of a blues scale. Scale degrees are labeled with generic intervals, which actually represent adjustable pitch areas.

Generic degree	$\hat{1}$	$\hat{3}$	$\hat{4}$	$\hat{5}$	$\hat{7}$	$\hat{1}$
Pitch area	$\hat{1}$	$\hat{2}-\hat{3}$	$\hat{4}-\#\hat{4}$	$b\hat{5}-\hat{5}$	$\hat{6}-b\hat{7}$	$\hat{1}$
Notes in C	C	D-E	F-F $\sharp$	G $b$ -G	A-B $b$	C
Notes in A	A	B-C $\sharp$	D-D $\sharp$	E $b$ -E	F $\sharp$ -G	A

For a minor sound, play the lower, minor third range of the  $\hat{3}$  pitch area.

For a major sound, play the upper, major third range of the  $\hat{3}$  pitch area.

## Chapter 20: Specialty scales

*A few of the more interesting scales used in jazz and non-Western styles.*

In this chapter:

- [Hijaz](#)
- [Bebop](#)
- [Jazz minor and its modes](#)
  - [i: Jazz minor \(melodic minor\)](#)
  - [ii: Dorian b2](#)
  - [bIII: Lydian #5](#)
  - [IV: Lydian b7](#)
  - [V: Mixolydian b6](#)
  - [vi: Locrian #2](#)
  - [vii: Altered scale](#)
- [And many more...](#)

### Hijaz

Hijaz is an Arabic “maqam”, which is like a Middle Eastern scale or mode with characteristic motifs and traditional patterns of use.

Hijaz is sometimes called “majorized phrygian”, “phrygian dominant”, “flamenco”, and “gypsy major”.

It conveys a beautiful, “foreign” type of sound to Western listeners, coming across as vaguely Arabic, Gypsy, Jewish, Balkan, or even Spanish. This is due to two characteristics of Hijaz that are unusual in euroclassical harmony: the **flat two** and the **tone-and-a-half** interval.

In addition to being popular in Middle Eastern music, Hijaz is one of the most common scales used in Flamenco.

**Hijaz scale**

	S	TS	S	T	S	T	T
1	b2	3	4	5	b6	b7	1
C	Db	E	F	G	Ab	Bb	C

*Hijaz maqam in C on 2nd string*

*Hijaz tetrachords*

A maqam like Hijaz is understood in terms of an upper and lower part, usually tetrachords (called “jins” in Arabic). The lower tetrachord of the Hijaz maqam is also called Hijaz. Its intervals are 1–b2–3–4 . The upper tetrachord is called “Kurd” in Arabic, but it’s the same as the phrygian tetrachord, 1–b2–b3–4 .

## **Bebop**

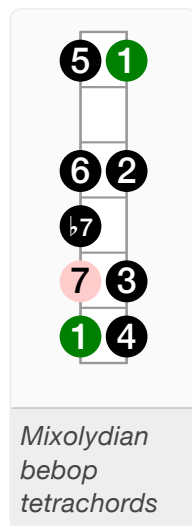
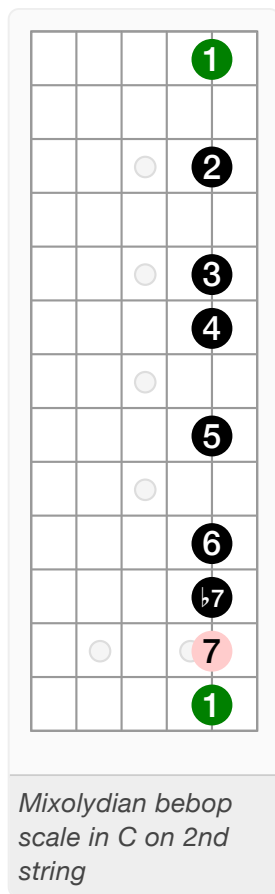
Bebop scales are 7-note scales with an added passing tone, placed so that each chord tone occurs on a downbeat.

The resulting 8-note scale allows playing fast 16th notes with all downbeats on chord tones and the bebop passing tone on an upbeat.

The most common bebop scale is based on the Mixolydian mode. This is also called the “dominant bebop scale”.

**Mixolydian bebop scale**

	T	T	S	T	T	S	S	T
1	2	3	4	5	6	b7	7	1
C	D	E	F	G	A	Bb	B	C



## Jazz minor and its modes

Jazz musicians are fond of the melodic minor scale.

It's the simplest possible minor scale: a major scale with a b3. It includes a leading tone and no tone-and-a-half interval, simplifying minor key tonality. See [Chapter 17. Minor scales](#) for details.

In the context of jazz, melodic minor is often called “jazz minor”, and it's played the same ascending and descending.

The different modes of jazz minor are also commonly used jazz scales.

### Modes of jazz minor

			T	S	T	T	T	T	S	T	S	T	T	T	T	S
		C	D	Eb	F	G	A	B	C	D	Eb	F	G	A	B	C
i	Melodic minor	1	2	b3	4	5	6	7	1	2	b3	4	5	6	7	1
ii	Dorian b2		1	b2	b3	4	5	6	b7	1						
bIII	Lydian #5			1	2	3	#4	#5	6	7	1					
IV	Lydian b7				1	2	3	#4	5	6	b7	1				
V	Mixolydian b6					1	2	3	4	5	b6	b7	1			
vi	Locrian #2						1	2	b3	4	b5	b6	b7	1		
vii	Altered							1	b2	b3	b4	b5	b6	b7	1	

**i: Jazz minor (melodic minor)**

The diagram illustrates the melodic minor tetrachords on the bottom strings of a guitar fretboard. It consists of two parts: a fretboard grid and a vertical string diagram.

**Fretboard Grid:** A 12-fret grid with 6 strings. Fingering numbers are placed on the strings as follows:

- String 6 (top): Fret 5 (black circle with '5'), Fret 1 (green circle with '1').
- String 5: Fret 6 (black circle with '6'), Fret 2 (black circle with '2').
- String 4: Fret 3 (black circle with 'b3'), Fret 7 (black circle with '7').
- String 3: Fret 1 (green circle with '1'), Fret 4 (black circle with '4').
- String 2: Fret 5 (black circle with '5').
- String 1 (bottom): Fret 6 (black circle with '6').
- String 1 (bottom): Fret 7 (black circle with '7').
- String 1 (bottom): Fret 1 (black circle with '1').

**String Diagram:** A vertical diagram showing the fret positions for each string. Fingering numbers are placed on the strings as follows:

- String 6 (top): Fret 5 (black circle with '5'), Fret 1 (green circle with '1').
- String 5: Fret 6 (black circle with '6'), Fret 2 (black circle with '2').
- String 4: Fret 3 (black circle with 'b3'), Fret 7 (black circle with '7').
- String 3: Fret 1 (green circle with '1'), Fret 4 (black circle with '4').

**Text:**

*A melodic minor tetrachords on bottom strings.*

*Melodic minor tetrachords*

## ii: Dorian b2

Dorian b2 is also known as “Phrygian #6”, “Assyrian”, or “Phrygidorian”.

The diagram illustrates the B Dorian b2 scale and its tetrachords on a guitar fretboard. The fretboard is shown with strings numbered 1 to 6 from top to bottom. The scale notes are: B (1), C (2), D (3), E (4), F (5), G (6), A (7). The tetrachords are shown as follows:

- B Dorian b2 tetrachord (relative to A minor):** B (1), C (2), D (3), E (4). This tetrachord is shown in two positions: one starting on the 1st string (B) and another starting on the 2nd string (C).
- B Dorian b2 tetrachord (relative to A minor):** F (5), G (6), A (7), B (1). This tetrachord is shown in two positions: one starting on the 3rd string (F) and another starting on the 4th string (G).

*B Dorian b2 tetrachords relative to A minor on bottom strings.*

The diagram illustrates the Dorian b2 tetrachords. The tetrachords are shown as follows:

- Dorian b2 tetrachord (relative to A minor):** B (1), C (2), D (3), E (4). This tetrachord is shown in two positions: one starting on the 1st string (B) and another starting on the 2nd string (C).
- Dorian b2 tetrachord (relative to A minor):** F (5), G (6), A (7), B (1). This tetrachord is shown in two positions: one starting on the 3rd string (F) and another starting on the 4th string (G).

*Dorian b2 tetrachords*



## bIII: Lydian #5

Lydian #5 is also known as “Lydian augmented”.

*C Lydian #5 tetrachords relative to A minor on bottom strings.*

*Lydian #5 tetrachords*

## IV: Lydian b7

Lydian b7 is also known as “Lydian dominant”.

The diagram illustrates the D Lydian b7 scale and its tetrachords. On the left, a fretboard grid shows the scale starting on the 5th string, 2nd fret (D). The notes are: D (1), E (2), F# (b3), G (4), A (5), Bb (b7), C (6), and D (7). The tetrachords are shown as pairs of black and green circles: (1, 4), (2, 5), (b3, 6), and (7, 1). On the right, a vertical scale representation shows the notes: 5 (black), 1 (green), 6 (black), 2 (black), b7 (black), 3 (black), 1 (green), and #4 (black). Below the fretboard, the text reads: "D Lydian b7 tetrachords relative to A minor on bottom strings." Below the vertical scale, the text reads: "Lydian b7 tetrachords".

*D Lydian b7 tetrachords relative to A minor on bottom strings.*

*Lydian b7 tetrachords*

**V: Mixolydian b6**

Mixolydian b6 is also known as “Melodic major”, “Hindu”, or “Myxaeolian”.

**1**

**2**

b**3**

**4**

**2** **5**

b**3**

**6**

**4**

**7**

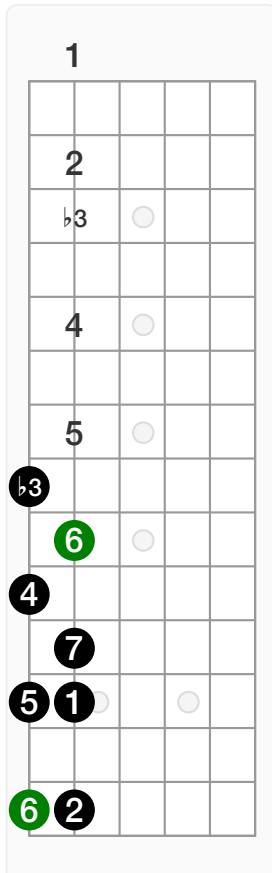
**5** **1**

**Mixolydian**  
**b6**  
**tetrachords**

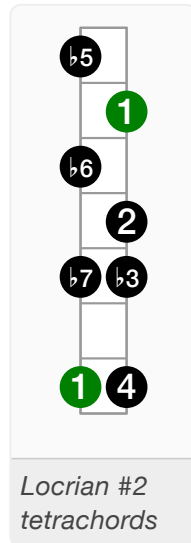
E♭ Mixolydian b6  
tetrachords relative  
to A minor on  
bottom strings.

## vi: Locrian #2

Locrian #2 is also known as “Half-diminished” or “Aeolocrian”.



*F Locrian #2  
tetrachords relative  
to A minor on  
bottom strings.*



*Locrian #2  
tetrachords*

## vii: Altered scale

The altered scale is also known as “Super Locrian” or “Altered dominant”.

The diagram illustrates the G Altered scale tetrachords on a guitar fretboard. The left diagram shows the scale relative to A minor on the bottom strings (E, A, D, G). The right diagram shows the altered scale tetrachords.

**G Altered scale tetrachords relative to A minor on bottom strings.**

**Altered scale tetrachords**

## And many more...

This has just been a taste of the abundant variety of scales to be explored. Jazz guitarists in particular will come across a great deal more.

By this point, hopefully it's easy to break down and study new scales on our own.

# Appendix A: Notes on the fretboard

*Locating the natural notes on the fretboard, with attention to distinguishing between octaves.*

In this chapter:

- [Octaves and scientific pitch notation](#)
- [C notes](#)
- [D notes](#)
- [E notes](#)
- [F notes](#)
- [G notes](#)
- [A notes](#)
- [B notes](#)
- [All natural notes](#)

## Octaves and scientific pitch notation

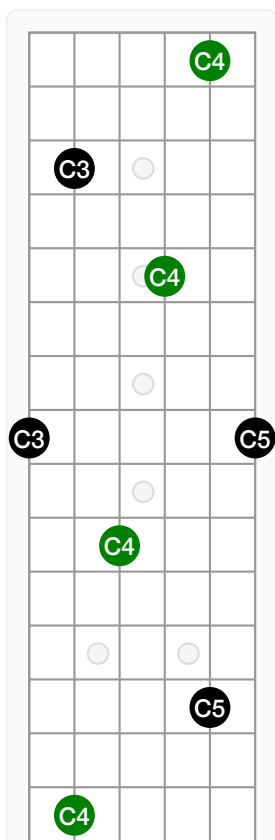
To distinguish between the same note in different octaves, “scientific pitch notation” adds an octave number to the note name.

C4 is “middle C”, the C in between the bass and treble clefs, and near the middle of a piano keyboard.

B4 is the B above middle C, and B3 is the B below middle C.

The lowest note on a guitar in standard tuning is E2 (the open low E string), and the highest is around E5 (the 12th fret on the high E string).

## C notes



*C notes on fretboard  
in standard tuning.*



*C3 on  
guitar  
staff.*

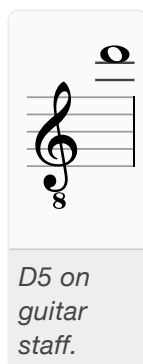
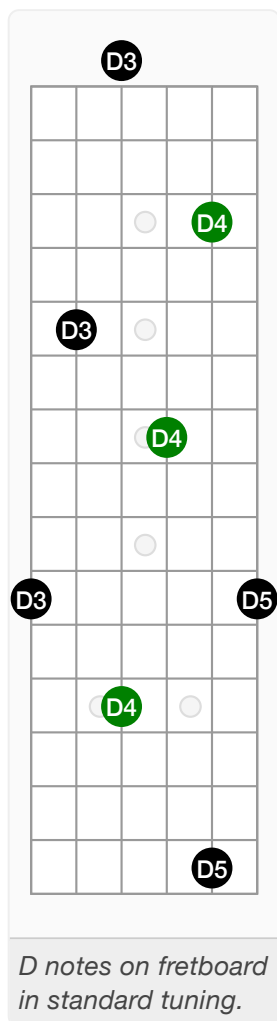


*C4 on  
guitar  
staff.*



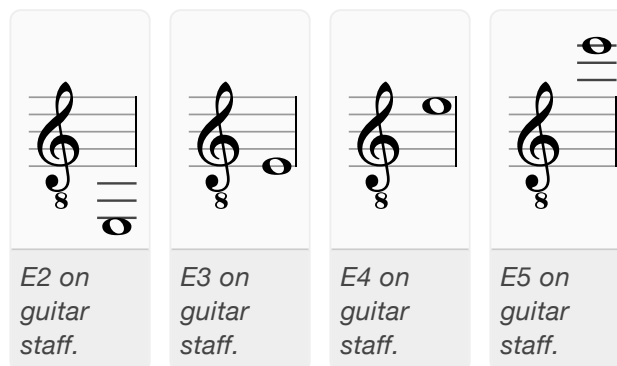
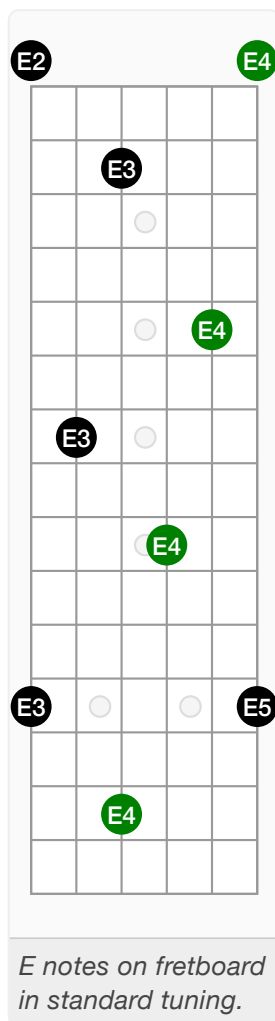
*C5 on  
guitar  
staff.*

## D notes

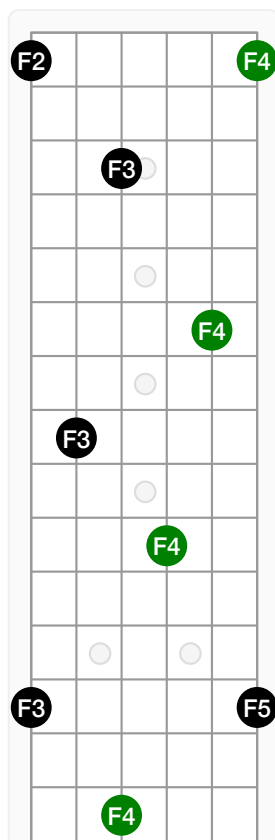




## E notes



## F notes



*F notes on fretboard  
in standard tuning.*



*F2 on  
guitar  
staff.*



*F3 on  
guitar  
staff.*

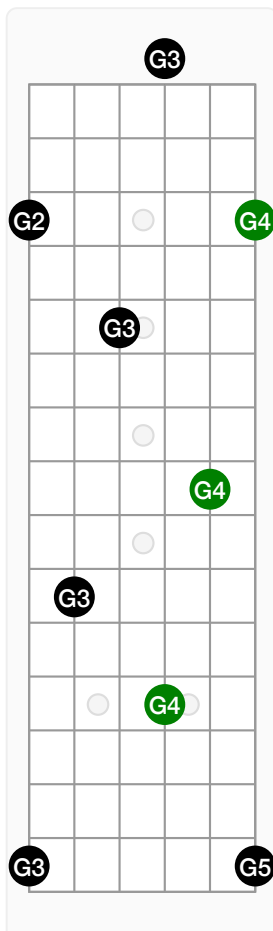


*F4 on  
guitar  
staff.*



*F5 on  
guitar  
staff.*

## G notes



*G notes on  
fretboard in  
standard tuning.*



*G2 on  
guitar  
staff.*



*G3 on  
guitar  
staff.*

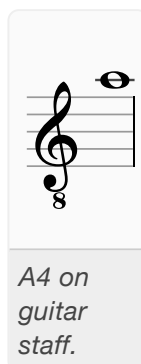
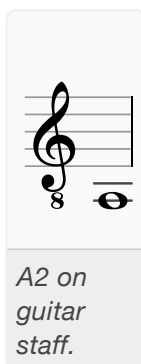
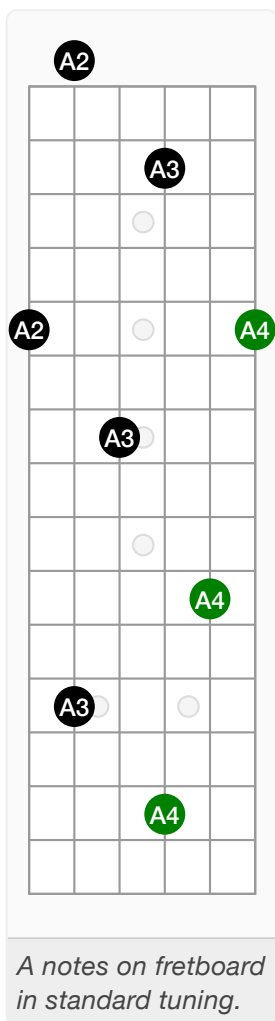


*G4 on  
guitar  
staff.*

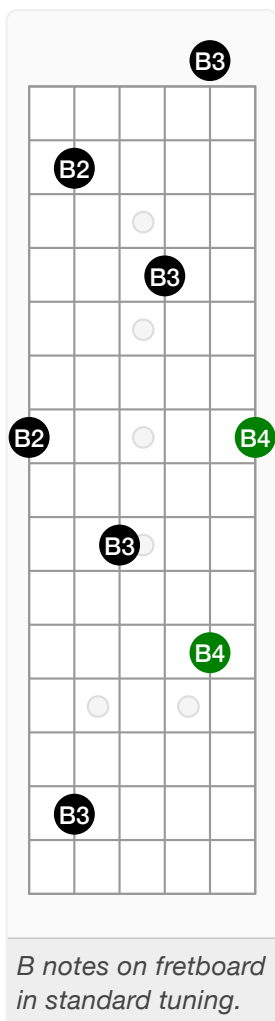


*G5 on  
guitar  
staff.*

## A notes



## B notes



*B2 on  
guitar  
staff.*



*B3 on  
guitar  
staff.*



*B4 on  
guitar  
staff.*

## All natural notes

E2	A2	D3	G3	B3	E4
F2				C4	F4
	B2	E3	A3		
G2	C3	F3		D4	G4
			B3		
A2	D3	G3	C4	E4	A4
				F4	
B2	E3	A3	D4		B4
C3	F3			G4	C5
		B3	E4		
D3	G3	C4	F4	A4	D5
E3	A3	D4	G4	B4	E5
F3				C5	F5
	B3	E4	A4		
G3	C4	F4		D5	G5

*All natural notes on  
the fretboard in  
standard tuning.*

# Appendix B: Reading music for guitar

*A minimal introduction to understanding music staff notation for guitar.*

In this chapter:

- [Why read music?](#)
- [The staff and clef](#)
- [Octave displacement](#)
- [Notes on the staff](#)
- [Key signatures](#)
- [Accidentals](#)
- [Notes on the fretboard](#)

## Why read music?

It is possible to go a long way in our guitar studies without knowing how to read music. Many guitarists never learn at all.

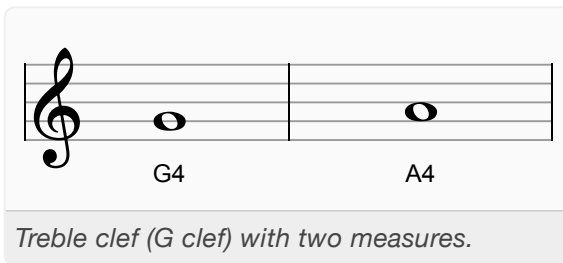
But most of the best guitar books express their ideas in music staff notation. If we want to read those advanced materials, we need to acquire a minimal ability to read music for guitar.

Fortunately, in most cases this just means being able to decipher the notes on the staff and locate them on the fretboard. Reading rhythms is a bit harder, but it's not strictly necessary in order to extract the basic melodic ideas, so it won't be covered here.

## The staff and clef

The music staff consists of five lines and four spaces, each of which represents a natural note, in ascending order from bottom to top. The staff is broken into "measures" by "bar lines".

A "clef" sign indicates where notes fall on the staff. Guitar music is written in the "treble clef", also known as the "G clef" because it identifies the location of the G note on the staff. Notice how the clef is a stylized letter G that curls around the G line on the staff.

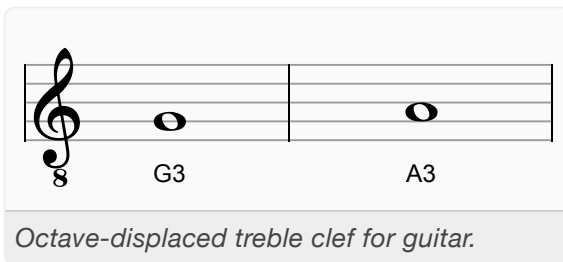


## Octave displacement

The range of the guitar is from E2 to around E5, in scientific pitch notation.

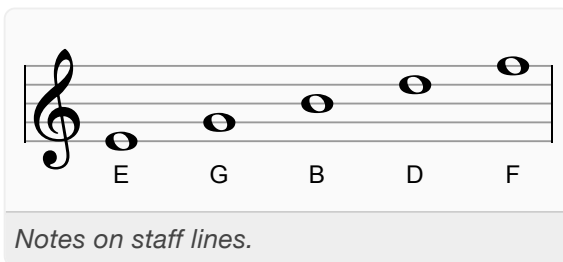
Staff notation for guitar is written an octave higher than it sounds, so that the full range of the instrument can fit easily on a single treble staff.

This octave displacement can be indicated with a little “8” below the clef. Guitar sheet music often leaves out this annotation, but it is always implied.



## Notes on the staff

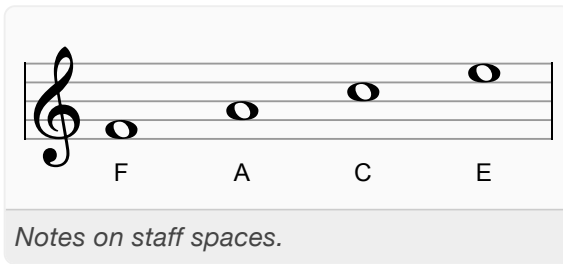
The lines on the treble staff represent the notes E–G–B–D–F. A mnemonic to help remember them is “Every Good Boy Does Fine”.



Notice how the lines represent every other note (every “third” note), just like stacked thirds in triad chords. E–G–B is E minor, G–B–D is G major, G–B–D–F is G7, etc.



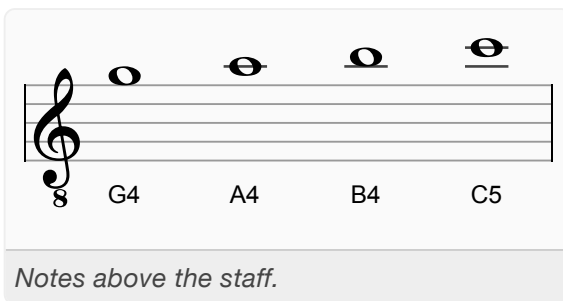
The spaces on the treble staff represent the notes **F–A–C–E** .



The spaces are also separated by thirds, like triad chords. **F–A–C** is F major, **A–C–E** is A minor, etc.

See [Chapter 6. Introduction to Western harmony](#) for more about stacking thirds to make triad chords.

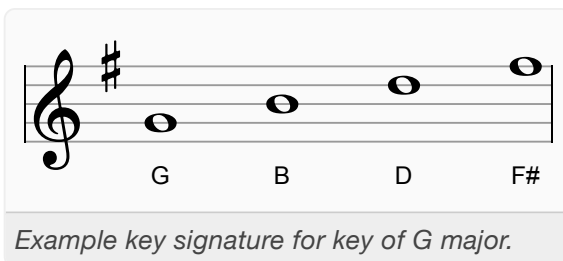
Notes can continue above and below the staff, with additional lines added as needed.



## Key signatures

When a sharp or flat appears in the “key signature”, immediately after the clef sign, it is used throughout the entire piece.

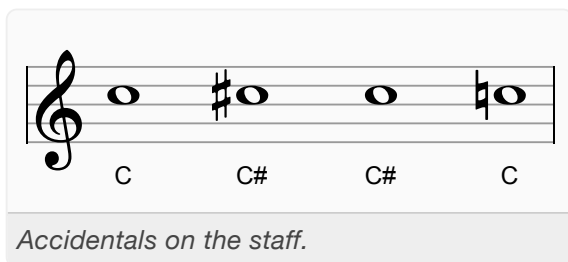
The number of sharps or flats in the key signature identifies the key. See [Chapter 14. Keys and their notes](#) for details.



## Accidentals

When a sharp or flat that is not in the key signature is added to a note, it is called an “accidental” and continues for the remainder of the measure. The next bar line cancels it out.

The natural sign (♮) is used to cancel out accidentals within the same measure, and sometimes as a reminder that a bar line has canceled an accidental.



## Notes on the fretboard

See [Appendix A: Notes on the fretboard](#) for a detailed mapping of notes on the staff to their location on the fretboard.

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# Glossary

- **atonal:** (1) Music or other sounds without [tones](#). (2) Confusingly but commonly (and somewhat disrespectfully), *atonal* can also refer to music that is [atonical](#). See discussion of [tonal](#).
- **atonical:** Music without a [tonic](#).
- **chromatic:** (1) Relating to the complete scale of 12 tones available in euroclassical tonality. (2) Notes outside of the [diatonic mode](#) or scale upon which a composition is based.
- **diatonic:** (1) Conforming to a seven-note [mode](#) or scale which, when arranged in ascending order with the initial note repeated at the octave, contains intervals of two half steps (semitones) and five whole steps (whole tones). (2) Notes that are inside a diatonic mode, as opposed to [chromatic](#) notes which are outside the mode.
- **diatonic mode:** One of seven rotations of a [diatonic](#) scale, with each mode starting on a different degree of the scale and wrapping around to the beginning. Starting with the first degree of the major scale (the (1) Ionian mode), the other diatonic modes are (2) Dorian, (3) Phrygian, (4) Lydian, (5) Mixolydian, (6) Aeolian (the natural minor scale), and (7) Locrian. A mnemonic: “I Don’t Punch Like Mohammed A-Li”. See [Chapter 18. Diatonic modes](#).
- **fundamental pitch:** The lowest frequency (or “partial”) of a sound wave (which also contains various “overtones” or “harmonics” at multiples above the fundamental frequency). See [overtone series](#).
- **interval:** The difference in [pitch](#) between two [tones](#).
- **modal:** (1) Music which has the characteristics of a [mode](#). (2) Also commonly used to refer to music based on one of the 5 [diatonic modes](#) *other than* the Ionian (major) or Aeolian (minor).
- **mode:** A type of scale which results from distilling a tonal vocabulary down to a set of individual tones, normally arranged in ascending order and delimited by scale degree 1 ( $\hat{1}$ , the [tonic](#)) at the bottom and top of one [octave](#), coupled with a set of characteristic melodic and harmonic behaviors, motifs, and turns of phrase.
- **non-tonical:** [Atonical](#). Music without a [tonic](#).
- **note:** Any single, discrete sound of finite duration in music.

- **note name:** One of the first seven letters of the English alphabet (A-G) and any necessary accidental (flat or sharp) used to designate [notes](#) of a standard fundamental pitch (like A at 440 Hz).
- **octave:** The [interval](#) between one [pitch](#) and another with double its frequency. Notes separated by octaves have the same [note name](#) and [pitch class](#). The octave relationship is a natural phenomenon that has been referred to as the “basic miracle of music,” the use of which is “common in most musical systems”, [says Wikipedia](#).
- **overtone series:** aka “harmonic series”. A tone sung or played at a particular pitch consists of sound waves oscillating at a particular frequency (its fundamental pitch), and it also includes overtones or harmonics (aka partials) oscillating at integral multiples of the fundamental. The overtone series is the sequence of these overtones, expressed as intervals from the fundamental. The first five overtones in the series are: octave, perfect fifth, octave, major third, perfect fifth. Notice that the first three distinct pitches in the overtone series form a major triad chord, which helps explain why it is the most common chord in Western music. The fifth is the most common (or dominant) distinguishable overtone, which explains why the fifth degree of a major scale is called the “dominant”. How strongly which harmonics are present in a given tone is an essential aspect of [timbre](#).
- **pitch:** The aspect of a sound determined by the rate of vibrations producing it—its acoustic frequency. Frequency is measured in Hertz (Hz).
- **pitch class:** A set of all [pitches](#) that are a whole number of [octaves](#) apart. For example, the pitch class C consists of all the Cs in all octaves.
- **scale:** An ordered collection of [tones](#). Similar to a [mode](#), but without mode’s implication of characteristic musical applications.
- **semitone:** The smallest interval in most Western music, and the smallest interval on a guitar fretboard, the distance across one fret on one string. On guitar, semitones are often referred to as “frets”. Sometimes they are also called “half steps”. In Western music, there are twelve semitones in an octave.
- **timbre:** (*pronounced /'tamber/*) aka “tone quality” or “tone color”. A complex acoustic phenomenon allowing us to distinguish between two [notes](#), [tonal](#) or *otherwise*, sounded at the same [pitch](#) and volume.
- **tonal:** (1) any music which has the properties of a [tone](#). (2) Confusingly, but commonly, “tonal” sometimes refers to music that has a [tonic](#). Philip Tagg makes a convincing argument that this usage, in addition to causing confusion by obscuring the fact that there

are other ways of doing things, is chauvinist and biased against tonal idioms not used in the euroclassical or jazz canons (Tagg, 2018, pp. 52–55). Referring to most types of music in the world as “not tonal”, essentially, “not musical”, seems clearly a poor choice of words. Tagg suggests the term “**tonical**” instead of “tonal” for “music that has a **tonic**”, and using “tonal” for “any music which has the properties of a **tone**” (including contemporary classical music, which may be **atonical** but is not literally **atonal**). This book generally follows these terminology suggestions.

- **tone:** (1) A **note** with an easily discernible fundamental **pitch**. (2) An interval of two **semitones**, aka “whole tone” or “whole step”; a distance of two frets. (3) Purity of expression, **timbre** and articulation, as in “good tone” or “tone is in the fingers”.
- **tonic:** A noun meaning *keynote or reference pitch*. Its adjective is **tonical** (recommended) or **tonal** (in common usage).
- **tonical:** Music that has a tonic. Compare **tonal**.

Several of these definitions are taken nearly verbatim from the well-reasoned terminology choices in Philip Tagg’s *Everyday Tonality II (towards a tonal theory of what most people hear)* (2018), to which this book is indebted. Errors and omissions are, of course, my own.

## About the author

*Jason Grimes is just some guy who plays guitar.*

Jason Grimes has been playing guitar off and on for over 30 years. He's self-taught and likes to do things his own way. He enjoys improvising, studying, and analyzing things from multiple perspectives.

Having taken many long breaks from music over the years, and then needing to relearn everything when he returned, he likes to think he has some insight into the most practical things worth knowing about the guitar, and the fastest ways to learn them.

He is a software developer by profession. He considers himself fortunate to be able to do music for love and not money. His aim is to condense, clarify, and share freely the things he's learned about music that might be useful to others.