MUSIC THEORY

FROM ABSOLUTE BEGINNER TO EXPERT

THE ULTIMATE STEP-BY-STEP GUIDE TO UNDERSTANDING AND LEARNING MUSIC THEORY EFFORTLESSLY

UPDATED AND EXPANDED

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Introduction

What is Music Theory, Why is it Important and How Can it Help You?

Most of us have heard of music theory. Some of us are immediately excited by the fact that it is foreign to us, and by the idea that there is, somewhere, a body of knowledge that will make us better players, that will make us play like our heroes. We may even be excited by the idea of spending long hours studying music, learning names and concepts, and working to apply those things to our music. Becoming masters, not just of our instruments but of the fields of sound that they produce.

But many of us may not be so excited. Mastering music theory may seem miles away – difficult, burdensome, time-consuming. We may feel as though we don't want to spend years of our life learning things that may or may not turn us into the sorts of musicians we want to be. We may have the sense that music theory is for the scholars, for the students at universities, for the jazz heads, and not for us. Not for plain musicians who just want to bleed ourselves a little from our instruments. Understanding theory may even feel counterproductive, since it seems like it will turn something expressive, something visceral, into something plainly understandable. Something we can analyze and explain.

Whatever your attitude toward theory is, you will greatly benefit from learning the fundamental concepts of harmony, melody, and rhythm. Far from leeching your affective creativity, learning to think about music gives you a place to depart from, a space in which to work. It amplifies your expressive potential in the same way that knowing something about how to make food amplifies a good meal – when you know what to look for and you are familiar in general with the aesthetic space that you're working in, that space is richer and deeper. Period.

And that is what theory is. Above all, it is a body of ideas that helps familiarize you with the aesthetic space of music. It doesn't tell you what you must do, it only hones your ear and your hands so that you can better discover what you want to do. Theory is harmony, melody and rhythm – the fundamental structures of sound that make it possible for that sound to be organized musically.

Finally, music theory is using intellect to amplify your creative potential and help it come true. It does not ruin it. Relying on intellect at times is important just as relying on your feelings and instincts in creating music. Neglecting this aspect can only block or limit the flow of your expressive ideas. In the same way, relying on intellect too much does this too. There is a delicate balance. True beauty comes from understanding. Use your intellect wisely, and it **will** make you a better player.

* * *

The aim of this book is to help you learn music theory in a structured way that is easy to follow and understand. Music theory is universal and applies to all instruments. Since piano is a heavily theory-oriented instrument (one can play as many as ten notes simultaneously), key concepts are usually best explained on a piano keyboard – which I will do whenever there is something important to demonstrate visually. But don't worry if you're not a piano player – you'll see just how applicable music theory is on any instrument and why it is an essential means of communication between all kinds of musicians.

Music Reading – Is it Necessary to Learn?

Many people associate music theory with reading music. And this is because when people teach theory, most notably in music schools, they often teach it on the staff (the system of musical symbols), and usually with respect to the piano. Reading music can help people understand the fundamentals of harmony, melody and rhythm, because it gives us a way of writing it down, visualizing it, and communicating it clearly.

If you are interested in learning to read music, there are many tools available for you, but it is worth saying here that it isn't a necessary part of learning theory. Theory is a collection of ideas; ideas that interact with one another and guide our ears. Putting that theory down symbolically on the staff can be useful, but it doesn't necessarily mean that we will understand it or be able to use it any better.

In short, when learning music theory, it is not necessary to learn to read music. There are cases, however, when it is useful. If you are a band leader or composer, then it is essential to be able to communicate your vision to other musicians. While that doesn't necessarily mean writing music traditionally, it is useful to know how to. Likewise, if you are a session player or a member of someone else's band, it is highly likely that people will be handing you sheet music to learn, or even to sightread. (Sightreading is the act of playing a piece while you read it, usually one you have never read before.)

In these cases, it is useful to be able to read music. But in general, if you aren't going to be making your living playing in other people's bands and on other people's albums, and if you are happy to learn ways of communicating your music to other players that is non-standard or non-traditional, then you may be just as happy not learning musical notation. There are many great musicians who don't know how to read music, however they do understand music theory and how music works.

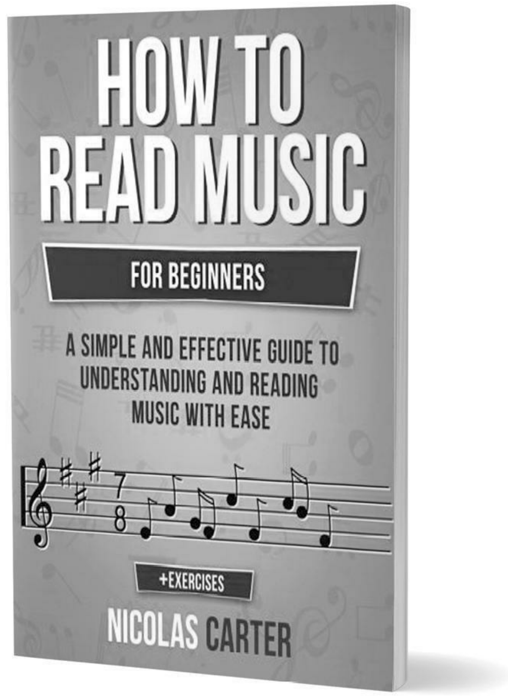
Reading traditional musical notation is part of the big world of music theory. You can learn and use music theory without having attained this skill, but you cannot learn and understand how to read music without understanding basic music theory first.

The choice of whether or not to learn to read music and write it down on the staff using traditional musical notation is entirely up to you – it depends on your goals as a musician. This is certainly a useful skill that will deepen your understanding of how you think about music, and I would definitely recommend you learn at least the basics of how we capture it on the staff. It is also worth noting that for some people's learning styles are more inclined to the visual assistance of reading from the staff, while others consider themselves more suited to learning by ear.

This book explains theory in detail but it doesn't deal with reading or writing down music using traditional notation, because that is a separate subject – more suited to a separate book. It is not essential in order to benefit from learning music theory, plus removing the challenge of note reading makes it less complicated and easier to learn, especially for beginners or nonprofessional musicians.

If you decide that you want to learn to read music, write it down, and interpret written notation, and understand how it's all connected to the music theory, then I have a great tool for you to consider:

A sibling book (the second book in the *Music Theory Mastery* series) dedicated solely to learning how to read music for beginners and attaining the basic level of sightreading. You can check it out here:



www.amazon.com/dp/B071J4HNR5

With this book you'll learn the fundamentals of the notation system and key signatures, clefs, staff elements, notes, how rhythms are written, solfege and much more. There are also progressive exercises at the end in which you'll be required to apply everything you've learned and actually sightread a musical piece. It will also be very exciting to see how it all relates to what you learn here and how many concepts complement each other. You can use this book to follow along with this one, as they complement each other nicely.

Music as a Language

It is sometimes useful to think of music as a calculus, as a rigid system of numerical relationships. When you think about the fact that everything can be reduced to intervals (or distances between notes) and their relationships, it seems that music theory is fundamentally mathematical. This is sometimes useful, but it isn't entirely accurate to think about music that way.

Music isn't a calculus, music isn't an abstract system of numbers, music is expression . It is creative in the same way that painting a portrait is creative, and the difference between creative musical meaning and representing music mathematically is the difference between painting deeply and creatively and painting by numbers.

All of this is to say that music isn't math, music is a language. And just like our ordinary language, it is messy, subtle, complicated, expressive, nuanced and sometimes difficult. There are things you can learn, rules if you like, that make up the grammar of music. This is the system of notes, intervals, scales, chords (which we will learn in this book), etc. But to make use of theory, it is always important to remember the way language works – you can't learn a language by learning a set of rules, you have to learn it by immersing yourself in it and getting a sense of its practices.

To understand music as a language means to always make theory come alive, never to let it sit and become stale. To live it and practice it by listening, playing, singing, expressing, writing and thinking it. Intervals are only as good as the real notes they are composed of, and music is only as good as the linguistic expressions it comprises. All this establishes the basic structure of this book, which is as follows:

- In Part 1 we will set up the fundamental structure that constitutes music language; namely notes, tuning, and intervals.
- In Parts 2 and 3 we'll see how notes and intervals are used to create more complicated structures, such as scales and chords.
- Just like a language, music doesn't happen without time, which is why Part 4 is all about time and rhythm, and how to understand this crucial component of music.
- In Parts 5 and 6 we will learn about the types of harmony, how to approach composing and manipulating musical structures, and how to be more expressive musically – which goes beyond merely playing regular notes or chords.
- Finally, in Part 7 we will dive deep into harmony and examine some advanced musical concepts that will give us a grander perspective on the wide scope of tonal and atonal music, and the possibilities you may not have even considered or knew existed.

How to Use This Book

This book represents the author's best attempt to deconstruct complex music theory structures, establish the foundations and build important concepts on top. However, music theory is not always linear in understanding; for example, sometimes you cannot understand a certain concept at one level without going deep into another related concept. Music theory followed the development of music and has evolved along with it for many centuries. There are different levels of complexity to each concept, and one can go deep down the rabbit hole on each.

This is to say that music theory is a complicated matter. But at the same time, it is as complicated as you want it to be. Complexity is not a bad thing, and true simplicity (or mastery) comes with true understanding of these concepts. In order to make use of music theory, you don't have to understand the deeper levels of its complexity. But as your understanding deepens, and its application widens, it becomes easier to reach those deeper levels, which happens naturally, the more you're exposed to them. As you gradually connect the dots across the levels, you get a clearer picture of the power this knowledge can bring you.

This book will help you connect the dots as it guides you through the different levels of complexity of all of these concepts. It is meant be read and reread multiple times, and also to serve as a reference resource when you apply this knowledge in your playing. It requires you to use logic and really think about the concepts that at first may seem too abstract or difficult to grasp. It is also meant to show that this is well worth the effort.

Audio Clips

As you read the book you'll find links to the audio examples relevant to the section you're reading. This audio is hosted on an external website called SoundCloud. When you open a link, an audio clip will load and play immediately.

If you read the digital version of the book, the links will be hyperlinks, meaning that you can just click/press on them to open.

If you have the paperback version, you'll see the shortened link in textual form that you'll have to manually type into a web browser address bar (letters are case sensitive) and hit the Enter key on a PC or the Return key on a Mac in order to hear it play.

Part 1
Music Theory Fundamentals

Understanding Sound and Pitch

It can be said that everything in nature is energy vibrating at different frequencies. Scientific theories propose that even reality itself at its tiniest layers is just that – a vibration in the quantum field. When something vibrates, it produces waves. Waves, in physics, are simply space disturbances that transfer energy. There are two main types of waves we experience in our perceivable surroundings: mechanical and electromagnetic waves. Their main difference is that mechanical waves require the presence of physical matter, like air, through which they can travel. Electromagnetic waves do not require any physical medium – they can travel through the vacuum of space. An example of mechanical waves would be the waves in the ocean or seismic waves; and electromagnetic waves would be things like radio waves, microwaves, infrared waves, visible light waves, ultraviolet waves, etc.

So what actually is a sound? In simplest terms, **sound** can be defined as mechanical waves produced by a vibrating object that travel through a physical medium, like air, water or solid objects. Sound is a physical process, but it is also the perception of the brain that processes those mechanical waves and produces the experience we perceive as 'sound.' Sound has many of its own unique physical properties, such as frequency, speed, amplitude, duration, etc.

In music, which is a sound-based art form, there are two essential sound properties that music theory studies, and that will be the main scope of this book. Those are **sound duration** (as it relates to rhythm and time), and **sound frequency**, which we can define as the number of mechanical waves that repeat over a period of time. Sound frequency is measured in hertz (Hz), where 1 hertz means that one wave repeats once per second.

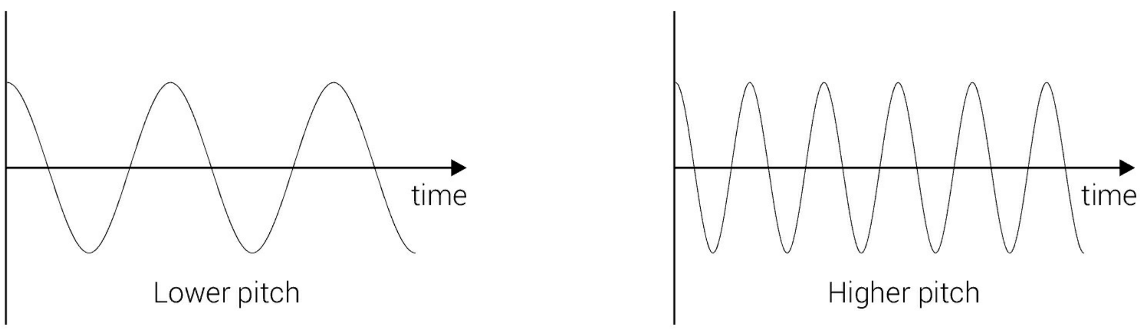


Figure 1: A typical way in which a frequency is shown.

If you look at Figure 1, 'Low' sound frequency (shown on the left) means there are less waves traveling per second – that's what our ears perceive as lower bass sounds. Conversely, when we say 'high' frequency (as shown on the right) it means there are more waves traveling per second, and our ears perceive those as higher trebly sounds.

This brings us to **pitch**. Physically, it can be said that pitch is any particular frequency of the sound produced by a vibrating object, such as a guitar string. In other words, when we say that something has a frequency of, say 237 Hz, we call that pitch. Pitch is what allows us to distinguish one frequency as higher or lower than another frequency. We have the ability to hear a wide range of sound frequencies (or pitches) ranging from 20 Hz to 20 kHz (or 20,000 Hz) on average, although this range reduces as we age (and is nothing compared to some animals like bats and dolphins).

The frequency range that a human ear can hear is called the **audible range**, or sometimes the **sonic range**. Any sound with a frequency below 20 Hz is in a **subsonic** range and known as an **infrasound**, and any sound with a frequency above 20,000 Hz is in a **supersonic** range and known as an **ultrasound**.

Musically, a pitch is like a harmonic value of a note, and it is said to be higher or lower than other pitches. In a sense, studying harmony and melody boils down to studying pitch and the relationships between different pitches. The relationships between pitches are called intervals. We'll explore intervals at great length later in this book.

Pitch is directly correlated with the **wavelength** of a sound. 'Wavelength,' as the name implies, determines how wide a wave pulse is. A longer wavelength means there will be fewer pulses or waves in any unit of time, which means that the frequency and the pitch will be lower. Likewise, shorter wavelength => more pulses in a unit of time => higher frequency => higher pitch.

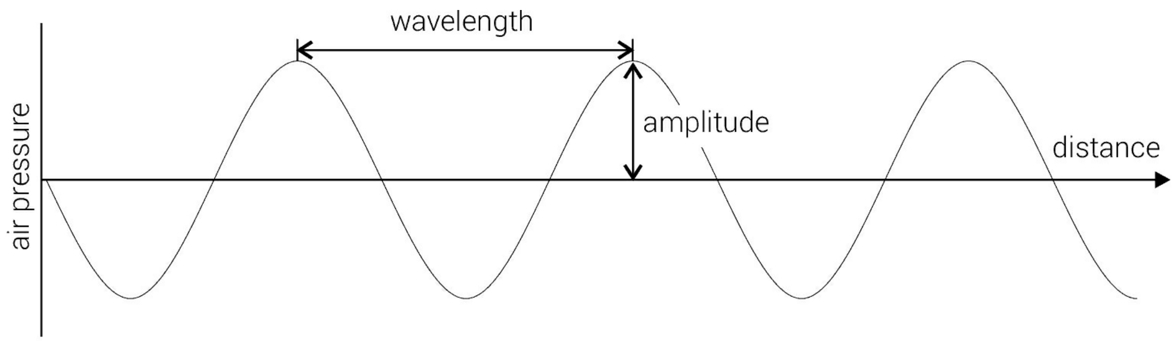


Figure 2: Wavelength is a distance measure between the peaks of two successive waves of a sound. Notice on Figure 1 how wavelength is longer for the lower pitch sound and shorter for the higher pitch sound.

Another sound property that is useful to know about is **amplitude**. Amplitude determines the loudness of a sound. The amplitude's size depends on the vibrating object and the energy it emanates via vibration into a physical medium. Say you turn on a speaker that produces a sound with a pitch of 170 Hz. The stronger the output energy of that speaker, the stronger vibration it will emanate into the air around it, which means that the amplitude of that sound will be larger, and vice versa. This tells us that:

Higher amplitude => louder sound

Lower amplitude => quieter sound

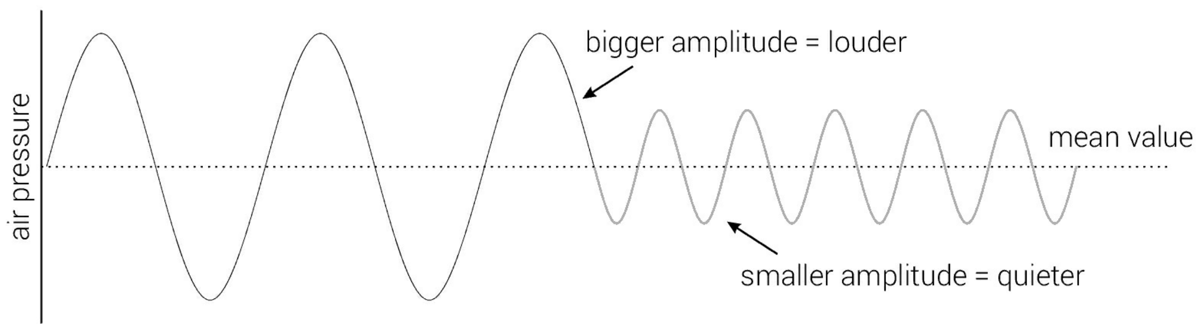


Figure 3: Amplitude is a measure by which a wave oscillates around its mean value. A change in the sound's amplitude does not affect its frequency (pitch), and vice versa.

While wavelength represents the width of a wave and determines how high or low a pitch will be, amplitude represents its height and determines the loudness of that pitch.

Lastly, we should make the distinction between sound and noise. A **noise** is a type of sound, albeit a usually unwanted sound. Physically, it is the same as any other sound, except it doesn't have a stable and clear enough frequency for the brain to perceive it as a musical sound.

We could spend a whole book talking about the physical properties of sound – it's a very diverse topic studied extensively by physicists and scientists alike. For musicians however, these are the most important concepts we should know about in order to have a solid foundation as we dive further into the realm of music and music theory, which as we said, is all about pitch and the relationships between different pitches in time.

Note, Tone and Timbre – What's the Difference?

So what exactly are the 'notes' that we hear musicians constantly talk about? A note is simply a **named specific**

pitch. In other words, we use notes to name different pitches. Notes are represented by alphabet letters ranging from A to G (we'll get to them in a bit), and beside pitch – which is the most defining note property – they have other properties, such as a particular time duration (or rhythmic value), loudness and quality. Each of the notes has its own pitch that makes it the note that it is; for example, on a standardly tuned guitar, when you play the 5th string (the 2nd thickest string from the top) it produces the note A, which is 110 Hz.

Two sounds can have different rhythmic values and can sound different overall but if they have the same pitch, they will still be the same note. If two sounds that are the same note sound different, then it is said that these two sounds have different timbres. A **timbre** is a sound color or sound quality that comes from different instruments. For instance, a C note played on a piano is the same note as C played on a violin, but we experience their sound quality differently because of the timbre.

Finally, the term '**tone**' is often used interchangeably with a few other terms in music theory, which understandably, may cause some confusion. Tone is often synonymous with timbre; when we say that different instruments have different tones, or that they have good tones, we are actually talking about their timbres. On the other hand, in music in general, 'tone' is often synonymous with a note; usually when we talk about playing different notes, we would say instead 'playing different tones.' In music theory however, as we'll soon see, term 'tone' is often used as a name for a particular music interval.

Musical tone is also considered as a steady sound with the same properties as a regular note, except that it is a single pure frequency that can only be produced digitally. This is because a single musical note produced by a musical instrument is more complex than a single frequency due to the instrument's natural resonance and harmonics (as well as the acoustics of the environment, and the way the note is played). What we hear as a single note is actually a whole spectrum of related higher frequencies coming from the instrument, that our ears perceive, more or less, as a single frequency. This is part of the reason why different instruments have different sound colors, or *timbres*, even if they play the same note. If you want to hear a pure single frequency, the best way to do so is with a computer in a soundproof studio on studio speakers (called monitors) in order to eliminate any excess resonance that would color the sound in some way.

Notes in Music

When we see music as a language, it's easy to realize that the notes in music are like the alphabet of a language. Just as the alphabet is the foundation of a language, the notes are the foundation of all music.

There are only twelve notes in Western music, which is historically derived from European music, and is by far the most influential and common 'music system' that we hear today. There are, of course, other music systems out there, including Indian, African, Chinese and other traditional folk music, which are all different and sound unique. (For example, you can recognize a traditional Chinese folk song if you hear it.) Western music today typically encompasses the United States and Europe, but it is the most widespread music system out there and is more or less used all around the globe.

The twelve notes in Western music are as follows:

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

Here are those notes laid out on a piano keyboard:

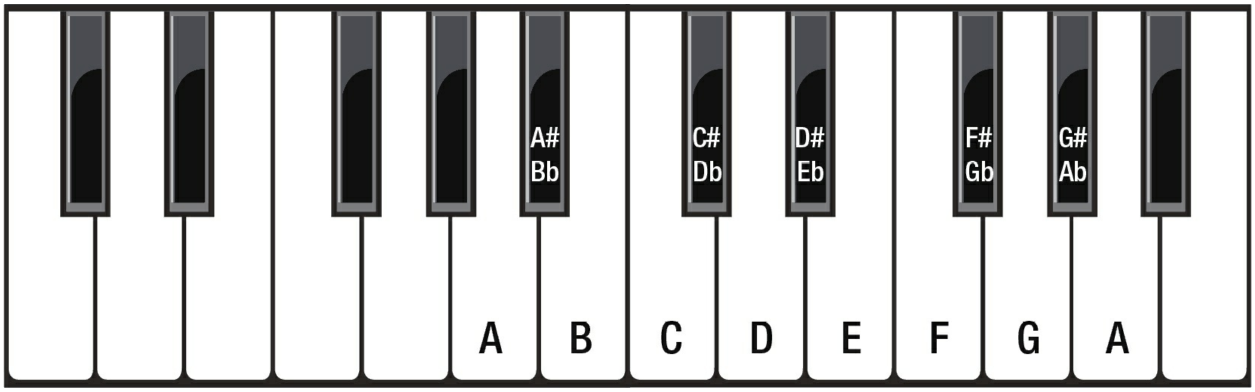


Figure 4: Notes in one octave on piano

There are a couple of things to note here (pun intended).

1. The notes are named after the first 7 letters of the alphabet: A, B, C, D, E, F, G.
2. There are also 5 notes lying between those: A# or Bb, C# or Db, D# or Eb, F# or Gb, G# or Ab, that are named with sharps (‘#’ symbol), which indicate that a note is raised, and flats (‘b’ symbol) which indicate that a note is lowered. In this system, the sharp of one note is considered to be harmonically identical – also called **enharmonically equivalent** – to the flat of the note above it. In other words, A# is exactly the same note as Bb, C# is the same note as Db, D# as Eb, etc.
3. There are no sharps or flats between B and C, or between E and F. This is a fundamental characteristic of the music system we use today. There are numerous historical and traditional reasons for how this came to be, and how the keyboard layout evolved along with the 7-note scales and the introduction of sharps and flats, but it’s enough to remember that we don’t use or think about sharps and flats between B and C, E and F, except in certain rare situations, as we’ll later see.
4. The notes that don’t have any sharps or flats – all white keys on the piano keyboard – are often called **natural notes** (A, B, C, D, E, F, G). The notes with sharps or flats are always the black keys on the piano keyboard that are between the white keys.
5. The distance between any two of these twelve notes that are next to each other is called a **half-step** (abbreviated: H), and each half-step is the same distance. (For example the distance between A# and B is the same as the distance between E and F.) The distance comprising two half-steps, which is the distance between, for instance, C and D, is called a **whole step** (W).

In the previous section we mentioned that the term ‘tone’ is sometimes used as a name for a particular music interval. This is that case – oftentimes the term **semitone** (S) is used instead of the half-step; and **tone** (T) instead of the whole step. These are just different names for the same thing. Half-steps or semitones are equal to the distance from one piano key to the next (black or white), or one fret on the guitar to the next (which is why there are twelve keys or twelve frets per octave on those instruments). Whole steps or tones are equal to the distance of two keys on a piano, or two frets on a guitar, from a starting note. If you look at Figure 4, F# to G# notes are a whole step apart, as are D and E notes, or A and B. On the other hand, C and C# (or Db) are a half-step apart (or one semitone), as well as E and F, or B and C, etc.

The Note Circle

The note circle shows all twelve notes that exist in Western music:

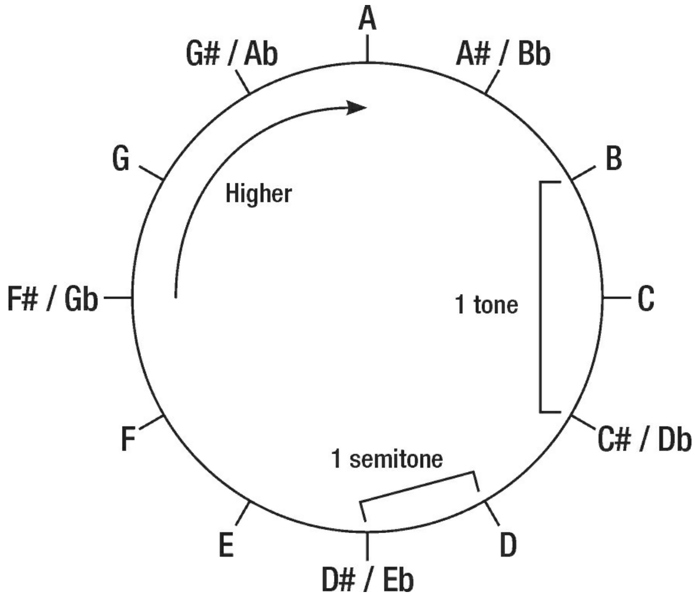


Figure 5: The foundation of Western music

Whenever we're moving clockwise on the note circle (from left to right on the piano keyboard), we are ascending, and the notes are becoming higher in pitch by one semitone each time. That's the situation in which we would use the '#' symbol to name notes; for example, we would use C# instead of Db to indicate that we're ascending.

Conversely, whenever we're moving counter-clockwise (from right to left on piano) the notes are becoming lower in pitch by one semitone, hence we would use 'b' symbol – Db instead of C#, to indicate that we're descending.

Octave and Registry Ranges

Each note has its own pitch, but as we saw above, there are only so many different notes (there are twelve in the Western music system). We use notes to name pitches, but since there are only twelve notes in the Western music system, that doesn't nearly cover the whole range that our ears can hear, which if you remember is from 20 Hz to 20 kHz. That means that the notes have to repeat. And indeed, they do repeat.

We say that the notes are repeated in higher and lower **registers**. All registers in the audible range (the range our ears can hear) contain the same twelve notes. Note registers therefore are groups of the same twelve notes that are repeated across the audible range. They always start from the C note, and each register is equal to going one full way around the note circle (from C to C).

When a note repeats in a higher or lower register – when it has a different pitch but is the same note – we say that the distance between those notes is measured in **octaves**.

An octave is simply the distance between one note and that same note repeated in the next higher or lower register within the audible range. Physically speaking, an octave is the distance between two pitches that results in one pitch having exactly twice as many sound waves in the same amount of time. To put it more briefly, the frequency of a note that is an octave up from another note is twice that of the first, meaning that there are twice as many waves, and the pitch is higher, despite being the same note.

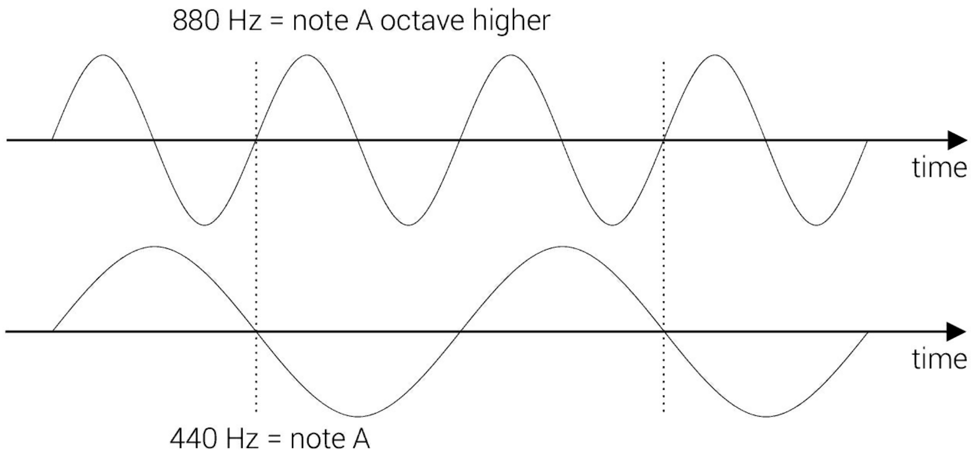


Figure 6: A graph showing the sound wave of two notes that are an octave apart.

Octave audio example on piano that plays a note at 440 Hz, followed by the octave higher note at 880 Hz -> bit.ly/440to880

Between any two octaves there are all of the other notes, and the order of the notes stays the same. What that means is that if you understand something in one octave, you have understood it in all of them. If you look back at the note circle (Figure 5) you can see that an octave is equal to going one full way around the note circle from any starting note. If you go clockwise and end up on the same note you would get an octave higher note, and if you go counter-clockwise you would get an octave lower note. You can see this concept laid out on the piano keyboard in Figure 4, where the note A on the left repeats again to the right after G#; that second A note is an octave higher up from the A on the left, and all of the notes between these two A notes are contained in this octave.

So after one octave the notes just repeat themselves in the same order in the next higher or lower octave. Note that the terms ‘octave’ and ‘register’ are sometimes used interchangeably, although there is a difference. The octave is the distance between **any two notes** with the same name, while **all registers start with the C note**. For example, as you’ll see soon in Figure 7, notes C3 and C4 are one octave apart, but this is also the 3rd register, whereby C3 is the start of the 3rd register, and C4 begins the 4th register. On the other hand, A#3 – A#4 notes are one octave apart, but they are not the same register – A#3 is in the 3rd register, which starts with C3; and A#4 is in the 4th register, which starts with the C4 note.

Octave can also be viewed not just as the distance, but as **a single note** which has the same letter name as the first note but double the frequency. We would name this kind of note an ‘octave’ in certain situations depending on the context, usually in relation to something else. This will be important when we get to scales and chords later in the book. The word ‘octave’ comes from the Latin word *octavus*, which means ‘eighth.’ You may wonder why eighth (8th) is the term for something that represents a range covering twelve notes, where the thirteenth note has double the frequency of the first note (like in Figure 4), and this has to do with the seven-note scales that the whole of Western music is based upon. We’ll talk about that extensively in Part 2 when we come to musical scales.

Limited by what our instruments can produce and the range our ears can hear, there are only so many registers and octaves at our disposal. Different instruments vary a lot in their ranges. Some instruments can cover a number of octaves and others not so many. The best way to show how many octaves can be covered by an instrument is on a piano. Even though there are only twelve notes available to us, there are 88 keys on a full-size piano keyboard; this is 88 different pitches that can be produced, which is as many as seven octaves.

Here’s a picture of a full-size master piano keyboard marked with all C notes repeated in eight different octaves or note registry ranges. You may wonder why C notes start each registry range, and not say, G, D or A notes. There are specific reasons why C notes are important and why they’re marked, but we’ll talk about that in the next section.

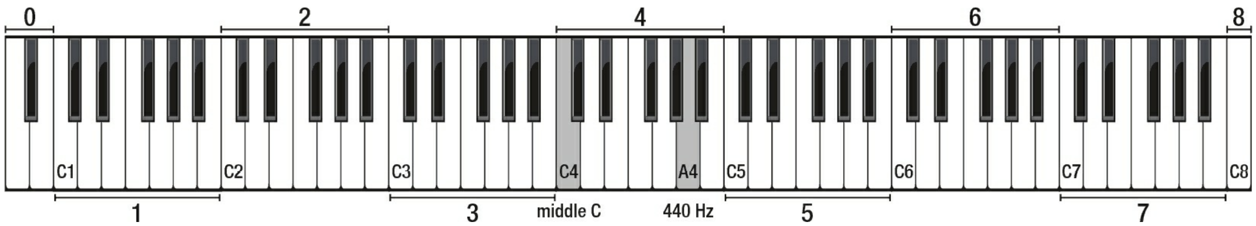


Figure 7: Full-size master piano keyboard. Notice that all octaves or registers start with the note C. The octave with the middle C is called the **middle octave** – it's the 4th octave on a full-size piano keyboard, and C4 note is called **middle C**. We'll see why A4 is marked soon.

You may have previously seen a note with a number next to it and wondered what that number means. Unless we're talking about a particular chord, this number tells us what kind of registry range the note is in. Looking at Figure 7, you can see that there are eight C notes on a piano, and this number (1-8) tells us exactly which C to play (in what registry range or octave). The same goes for any other note; for example, the '3' in 'D3' means that this D note is in the C3-C4 range, or in the third range; G#6 tells us that this G# is in the C6-C7, or the sixth range; Ab7 is in the C7-C8 or seventh range. This is especially important when writing down music using traditional notation symbols because it determines what kind of clefs we will use to best cover the range of a piece and minimize the use of ledger lines. (This is explained thoroughly in my book *How to Read Music for Beginners.*)

In Figure 7 you can see all registry ranges on the piano. Each range starts with C and has the length of one octave – so the distance between C3 and C4 is exactly one octave; same with F2-F3, D6-D7, A4-A5, etc. The distance between C1 and C3 is 2 octaves, G4 to G7 spans 3 octaves, Db5 to Db1 spans 4 octaves, etc. It's important to remember here that C is the starting note of each range, and that **C4 note** is called **middle C**. On a standardly tuned guitar, middle C is found on the 5th fret of the 3rd (G) string.

To get a clearer picture of what frequencies this piano keyboard covers, A0 note (the white key furthest to the left) has a frequency of 27.5 Hz, and C8 note (the white key furthest to the right) has a frequency of 4186 Hz. That's a span of more than 4000 Hz! Most of the frequencies used in the art of music lie within this spectrum. In contrast, the guitar covers an approximate frequency range of 80 Hz-630 Hz, a baritone voice: 110 Hz-425 Hz, violin: 200 Hz-3.5 kHz, etc. Organs cover the highest range of any non-digital instrument – about 7 kHz.

Middle C, Tuning and Pitch Standard (Why C?)

Music has a very long, rich and complex history. Over time, many musical frameworks evolved, adapted and were constantly built upon. Music scholars, composers, performers and instrument makers, under numerous cultural influences of past eras, used these frameworks to establish fundamental structures, such as common systems and standards. These allow us today to talk about music theory and explain why what we hear sounds good, explore music further, communicate musical ideas to one another more easily and cooperate on musical projects on a larger scale.

One of the results of these numerous factors that shaped music – and therefore music theory – is that C became a very important note. There are numerous reasons why this happened, and why it's not, for example, A – the first alphabet letter – that is the most important. Explaining this is far beyond the scope of a music theory book, but we will say that from the music theory perspective, C note became important because it came to be the only note that produces a key comprised of only natural notes. (The natural notes if you recall are the alphabet letters without sharps or flats.) No need to comprehend this now, just bear it in mind.

Another thing that is a legacy of the past are the actual pitches we use. We use pitch to determine how high or low something sounds. But there was a problem back in history (before the 20th century) when notes were not fixed to certain pitches according to some standard. What pitch constituted what note was not standardized, and musicians would just pick certain frequencies according to their subjective hearing and preference and assign notes to them. This caused numerous problems for musicians all around the world because they couldn't easily play together and sound good.

Another problem was that the pitches and ranges used tended to become higher in Hz over time. This was mostly the result of competition between instrument makers and instrumentalists who wanted to make their instruments sound more ‘bright’ and thus subjectively more impactful than those of their competitors. This is what’s known as ‘pitch inflation.’ This eventually became so obvious that it was clear some sort of **pitch standardization** was needed. This would permanently attach notes to certain pitches, and most musicians and instrument makers would agree to follow it by tuning their instruments* according to this standard.

*To tune an instrument means simply to adjust it until it plays the desired pitches when the notes on it are played. The exact tuning process varies a lot between different kinds of instruments.

Throughout history there’ve been many attempts to standardize musical pitch. What ended up being the most common music standard today is called **Standard Pitch**, or **Concert Pitch**. This standard sets the A note above middle C to vibrate at exactly 440 Hz. This A4 at 440 Hz serves as the reference note, and we tune our instruments so that the A4 note on the instrument matches the reference note.

Most instruments today are made and tuned according to this ‘default’ tuning. The A4 note on an instrument tuned to Standard Pitch becomes the same as the reference A4 note set in the Standard Pitch, which means that they both vibrate at 440 Hz. On a standardly tuned guitar, A above middle C is found on the 5th fret of the thinnest string, and it vibrates at 440 Hz. You can see the A4 note depicted on the piano keyboard in Figure 7.

Since A4 has the frequency of 440 Hz, can you guess what frequency an octave lower – A3 would have? And how about an octave higher A5?

The answer is: 220 Hz, and A5 would be 880 Hz. This is because A3 is the lower octave of A4, and A5 is its higher octave. As we saw in the previous section, each new octave has twice as many waves per one second (double the frequency). A4 has 440 waves per one second, so a frequency that has twice as many waves than A4 is 880Hz. This frequency, or pitch, is therefore named A5 note, and it is the octave of A5. It stems that an octave lower frequency from 440 Hz would be 220 Hz, because it has half as many waves travelling per one second.

This tuning standard is widely recognized and used – it allows many different musicians all around the world to play together, be in tune and sound good. If two or more musicians that play together were not in tune according to some standard, they would simply not sound any good because the frequencies would clash.

That being said, it should be pointed out that this is not the only tuning option in use today. There are other tuning choices used by different orchestras around the world, most of which revolve around A4 being set to different frequencies, such as 441 Hz, 442 Hz, 436 Hz, 432 Hz, etc. There is also another type of pitch standard, called **Scientific Pitch** (also called ‘Philosophical Pitch’), where the focus is put on the octaves of C rather than on A. In Standard Pitch, A4 is 440 Hz, and C4 (or middle C) is 261.625 Hz, but in Scientific Pitch C4 is adjusted so that it is equal to a whole number – 256 Hz, and A4 is then 430.54 Hz. This pitch standard is sometimes favored in scientific writings because 256 is a power of 2, which is very useful in the computer binary system, and this serves different scientific purposes.

12-Tone Equal Temperament and Octave Subdivision – Why Do We Have 12 Notes?

Having a standardized pitch solves one problem – it sets a common standard that musicians can agree upon and tune their instruments to. As we said, A4 is 440 Hz in Concert Pitch, the most common pitch standard. (This can also be written just as A440.) This means that whenever we play A4 note on an instrument tuned to this standard it will vibrate at 440 Hz. But A is only one note – how do we know the frequencies of other notes in the octave relative to this note?

An octave is a natural phenomenon where the sound of the higher note produces twice as many waves than the sound of the octave lower note, as we saw in Figure 6. That’s why these two notes share the same name. Between these two notes there are all of the other notes. But why are there only notes there? If we have the reference note, how do we know the frequencies of the rest of the notes? If we use a digital tuner to help tune our instrument, how does it know to make each note relate to one another correctly? This is where 12-Tone Equal Temperament (or 12-

TET), or just 12 Equal Temperament (12-ET) comes in.

12-Tone Equal Temperament is not a pitch standard, it's something else – it's a **tuning system.** This particular tuning system divides the octave into twelve equal parts, or distances (in Hz), where the smallest distance is 1/12th of the octave, or one semitone (one half-step). These twelve equal parts are what we call *notes* in Western music, and the distances between any two notes represent their unique relationships – they are what we call **intervals**.

According to 12-TET, one octave consists of twelve half-steps – that's why we have twelve notes, each a half-step apart. One whole step, if you remember from the Note Circle section (shown in Figure 5), consists of two half-steps, which means that there are six whole steps in one octave. Remember that instead of the 'half-steps' and 'whole steps', we can also use the terms 'semitones' and 'tones' interchangeably. So the basic unit or distance in this system is one semitone.

Musicians sometimes work with musical intervals that are even smaller than a semitone. In equal-tempered tuning, **one semitone consists of up to 100 cents**. What that means is that, for example, D and D# are one semitone apart but between them there are up to 100 cents. Cents in music are typically used to express **microtones**, which are very small intervals – smaller than a semitone. The human ear is very sensitive to pitch differences; those who train their ear regularly can recognize a difference of even only a few cents between two pitches. The interval of one cent between two successive notes is generally too small to be distinguished by the human ear.

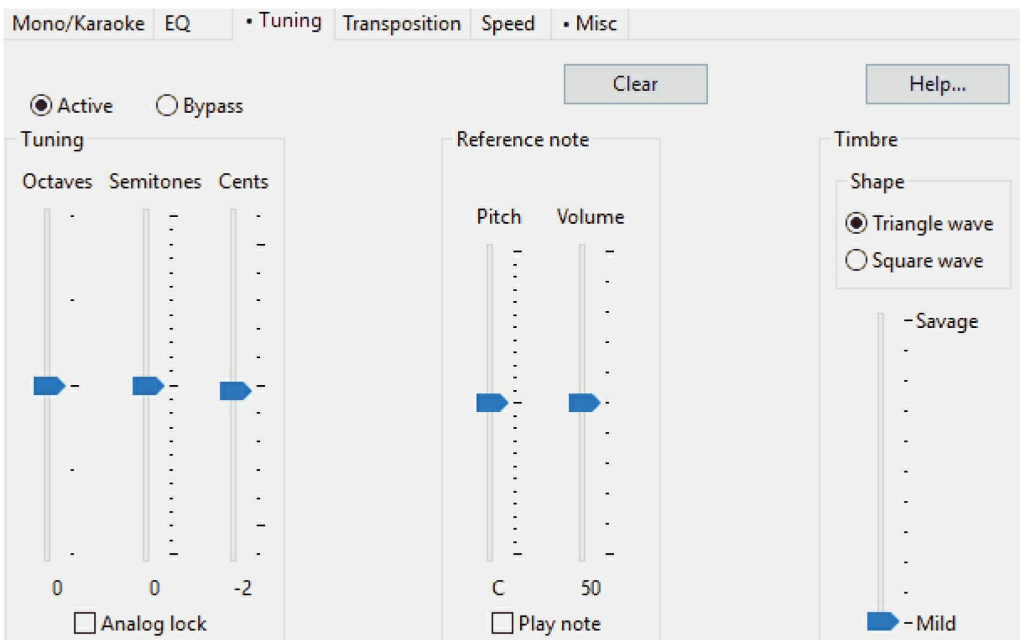


Figure 8: Most software programs that can edit sound files allow you to change the pitch of the audio in octaves, semitones and cents.

The 12-TET system, which has been in use since the 16th century, and regularly since the 20th, is basically the reason we have twelve notes in Western music. It's also how we know the frequencies of other notes once we tune one note to the frequency of the reference note. There are other equal temperaments that divide the octave differently (Arabic equal temperament for example divides the octave into 24 equal parts), and even entirely different kinds of tuning systems, like Well Temperament and Just Intonation, which we'll talk about soon. But 12-TET is the most common one, and along with the pitch standard, it forms the most fundamental structure of music today – as well as the music theory that describes it. We'll examine 12-TET in more details next.

Now a word of warning. The following five sections will involve some math as well as some concepts that go beyond the basics needed to understand the rest of the book. However, they will give you a clearer picture of how these musical structures work and how they came to be. If you're a total beginner I recommend you skip the next three sections and continue from the Mastering Intervals section, then come back to them later, after you've learned about intervals, scales and chords. That being said, if you feel ready or adventurous, then just read on, but make sure to take your time with the material and go through it slowly with focus and attention.

How Note Frequencies Are Calculated in 12-TET

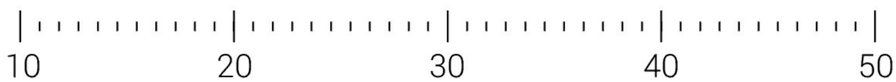
Again, don’t say I didn’t warn you. ;)

Once an instrument is tuned according to some pitch standard, let’s say Concert Pitch, we know that the A4 vibrates at 440 Hz when played. An octave higher A5 would be 880 Hz. In order to determine the frequencies of the other notes between A4 and A5 (and therefore all other octaves in Concert Pitch) 12-TET uses a frequency ratio of a semitone, which is the number: **12th root of 2**.

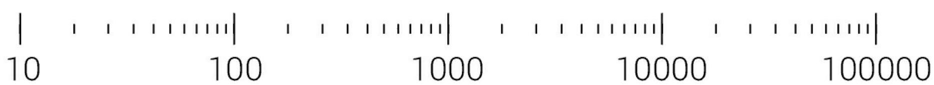
12th root of 2 ≈ 1.0594630943... (etc.)

This is just some irrational number (a number whose decimals repeat randomly forever) whose 12th power is 2. In other words, when you multiply this number (1.0594630943) by itself 12 times, it equals 2. This is a very important number in Western music since **it is a factor**, or a multiple, by which the notes in an octave in the 12-Equal Tempered system are spread equally. However, they are not spread by linearly equal distances – the values don’t increase in a linear fashion, for example: 1, 2, 3, 4, 5, etc. – but rather the value of each distance between the notes (or each semitone) increases logarithmically by this factor. This is to say that 12-TET uses a logarithmic scale to calculate the distance between each of the twelve notes in one octave and determine their frequencies.

Linear scale is a mathematical scale in which numerical values increase linearly and are spaced out equally, for example 10, 20, 30, 40, 50, etc.



Logarithmic scale, or log scale for short, on the other hand is a mathematical concept whereby a wide range of numerical values is expressed in a compact way. Moving along this scale, the numbers increase in a nonlinear way as each number is multiplied by some fixed factor. For example, on a log scale the numerical values such as 10, 100, 1000, 10,000 are also spaced out equally, but they increase nonlinearly – in this case by a factor of 10. Each number after the first one is multiplied by 10.



Now that we’ve got this out of the way, let’s get back to determining the exact note frequencies in 12-TET. The formula we use to do so is this:

$$f_n = f_0 * (a)^n$$

Where:

- f_n is the frequency of the note we’re trying to determine.
- f_0 is the reference note frequency of some tuning standard. Concert Pitch as we said is the most used standard, and we know that the reference note A4 is 440 Hz in this standard, so it follows that the value of f0 will commonly be 440.
- a is the irrational number: 1.0594630943... The 12th root of 2. It’s the fixed factor we mentioned which when multiplied by itself 12 times is equal to 2. The note frequencies increase logarithmically by this factor.
- n is the number of semitones from the reference note. If the note we want to determine (fn) is higher than the frequency of the reference note (f0), then this number is positive, and if it has a lower frequency than the reference note, this number is negative.

1) Now that we know all this, let’s try some examples between A4 and A5 notes. You can use a calculator for this if you want to follow along.

– First note after A4 is **A#4**. It’s one semitone away from the reference note.

$$A\#4 = A4 * (a)^{1}$$

$$A\#4 = 440 * (1.0594630943)^{1}$$

$$A\#4 = 440 * 1.0594630943$$

$$A\#4 = 466.16 \text{ Hz}$$

– The next note after A#4 is **B4**. B4 is two semitones away from A4.

$$B4 = 440 * (1.0594630943)^{2}$$

$$B4 = 440 * 1.1224620482$$

$$B4 = 493.88 \text{ Hz}$$

– The next note after B4 is **C5**, which starts the fifth register. It's three semitones away from A4. (You can count the semitones easily by using the note circle.)

$$C5 = 440 * (1.0594630943)^{3}$$

$$C5 = 440 * 1.1892071148$$

$$C5 = 523.25 \text{ Hz}$$

– Now let's go with a note that is a bit further away. **G#5** is eleven semitones away from A4.

$$G\#5 = 440 *(1.0594630943)^{11}$$

$$G\#5 = 440 * 1.8877486242$$

$$G\#5 = 830.61 \text{ Hz}$$

– Lastly, let's also determine the frequency of **A5** to make it perfectly clear (even though we already know it).

$$A5 = 440 * (1.0594630943)^{12}$$

$$A5 = 440 * 2$$

$$A5 = 880 \text{ Hz}$$

2) Now let's see what happens when we try to calculate the frequency of a note that is lower than the reference note.

– The first note before A4 is **Ab4** (or G#4 but remember, we use flats since we're going down in pitch). It's one semitone lower than the reference note, so *n* value will be negative. Remember that the negative value on the power means you divide the number by itself, and a positive value means you multiply. In this case we use the former.

$$Ab4 = A4 * (a)^{-1}$$

$$Ab4 = 440 * (1.0594630943)^{-1}$$

$$Ab4 = 440 * 0.9438743127$$

$$Ab4 = 415.30 \text{ Hz}$$

– Now we'll skip again some notes and jump down to **C4**, which is middle C. C4 is lower than A4 by nine semitones.

$$C4 = 440 * (1.0594630943)^{-9}$$

$$C4 = 440 * 0.5946035573$$

$$C4 = 261.62 \text{ Hz}$$

This is basically it. Once you select a pitch standard you can use this formula and a calculator to calculate the frequencies of other notes in A3-A4, and A4-A5 octaves, or of any other note for that matter. For reference, here are the frequencies of other notes in these octaves so you can check your results:

Semitones up from A4	0	1	2	3	4	5	6	7	8	9	10	11	12
Note	A4	A#4	B4	C5	C#5	D5	D#5	E5	F5	F#5	G5	G#5	A5
Frequency (Hz)	440	466.16	493.88	523.25	554.37	587.33	622.25	659.25	698.46	739.99	783.99	830.61	880

Table 1

Semitones down from A4	12	11	10	9	8	7	6	5	4	3	2	1	0
Note	A3	A#3	B3	C4	C#4	D4	D#4	E4	F4	F#4	G4	G#4	A4
Frequency (Hz)	220	233.08	246.94	261.62	277.18	293.66	311.13	329.63	349.23	369.99	392	415.3	440

Table 2

Now to understand why equal temperament was invented, we need to dive deeper and first understand what intonation is.

Intonation and Keys – Why Equal Temperament Was Invented

Intonation is the measure of a desired pitch accuracy as reproduced by a musical instrument. It can be **sharp**, when a played note has a pitch which is a few cents or more higher than the desired pitch; **flat**, when a played note has a pitch which is a few cents or more lower than the desired pitch; or **in tune**, when the exact pitch determined by the tuning system is played.

Some instruments can play any pitch within their range, like a flute or a violin. On these kinds of instruments musicians use their ears to guide them to play notes with proper (in tune) intonation. However, it is very impractical or virtually impossible to play chords on these kinds of instruments (there will be an entire section about chords later in the book, but for now understand that chords are simply three or more notes played at the same time). On the other hand, keyboard instruments (like pianos) and fretted instruments (like guitars), can easily play chords, but they cannot play any pitch. They are meant to play only those pitches that are determined by the tuning system they follow, or that they're tuned to. That's why we call these instruments **fixed-pitch** or **fixed-intonation instruments**. This characteristic is what allows keyboard and fretted instruments to easily play chords. Where a musician playing a non-fixed pitch instrument, like a cello, would struggle to play a good sounding chord, a guitar player would easily achieve that.

That's why this system of 'equal temperament' was invented – for a specific purpose to solve a particular problem. Specifically, 12-Equal Temperament was developed to accommodate fixed-pitch instruments and allow them to easily play pleasant sounding chords, and to sound equally good in any musical key, with minimum flaws in intonation across all the notes in any octave.

The concept of '**key**' will be explained in detail throughout the book, but for now imagine that it's like a musical center of gravity, where the center is any one of the notes that a musical piece revolves around and always tends to fall back on. In 12-TET there are twelve notes, which means twelve possible keys that can act as a center of gravity in a musical piece. For example, any note on a piano *key*board can be the key of a musical piece that we are playing. Music is all about movement in time, and this movement in essence means that one note moves to the next, stays there for a bit, then moves on to the next, and so forth. There can be more notes playing at the same time, even by many different instruments (like in the orchestra), but this is essentially what happens. Most of the time there is a center of gravity in this movement; and when it goes out to more distant notes to explore unfamiliar regions of musical space, it always tends to 'go back home' by coming back to a particular note, and producing a safe, stable and 'coming home' feeling. This home, or center of gravity, represents the key of the musical piece. Each key consists of a note, which is called the **tonic note** (or just tonic). This is the center of gravity, and a **set of chords** corresponds to each tonic note. We'll talk more about this later in the book.

Now, remember we mentioned that intervals are what we call any kind of note distances. There are many kinds of musical intervals, and the width (in Hz) of each type of interval is determined by the tuning system. In the 'Master the Intervals' section we'll explore intervals as they are determined in 12-TET, which as we said, is the foundation of modern music theory, as well as most music today. All this brings us to the next important, but somewhat advanced concept we should understand.

The Overtone Series & Just Intonation

Just Intonation or **Pure Intonation** is one of the main tuning systems that were in use before equal temperament became regular. Note frequencies or pitches in this system are based on something called the **harmonic** or **overtone**

series. These series are made up of **pure intervals**, also called **just intervals**.

Now bear with me for a bit as we explain all this. We mentioned at the beginning that when you play a single note on any standard note-producing instrument, it is not just a single note that you hear. What you will hear is a long series of higher frequencies sounding together with the note you played. This series of higher frequencies is called the harmonic series, or overtone series.

The overtone series represents the **naturally occurring frequencies** based on the note distances (i.e. intervals) that resonate perfectly after that initial note you played. In this context, that initial note is called **the fundamental frequency**. So what you hear is made up of two things: the fundamental note (the note you played), and its overtone series, also called overtones. Overtone notes are always higher than the fundamental note.

Overtones are the naturally occurring notes that follow a sequence based on simple mathematical ratios between the wavelengths of the fundamental note and each of its overtones. In other words, the wavelengths of the fundamental frequency and each of its subsequent overtones is related by **whole number ratios**. For example, the wavelength of the first overtone is half of the wavelength of the fundamental note, and this is a 1:2 ratio. You may recognize that the first overtone in the overtone series is the octave of the fundamental note.

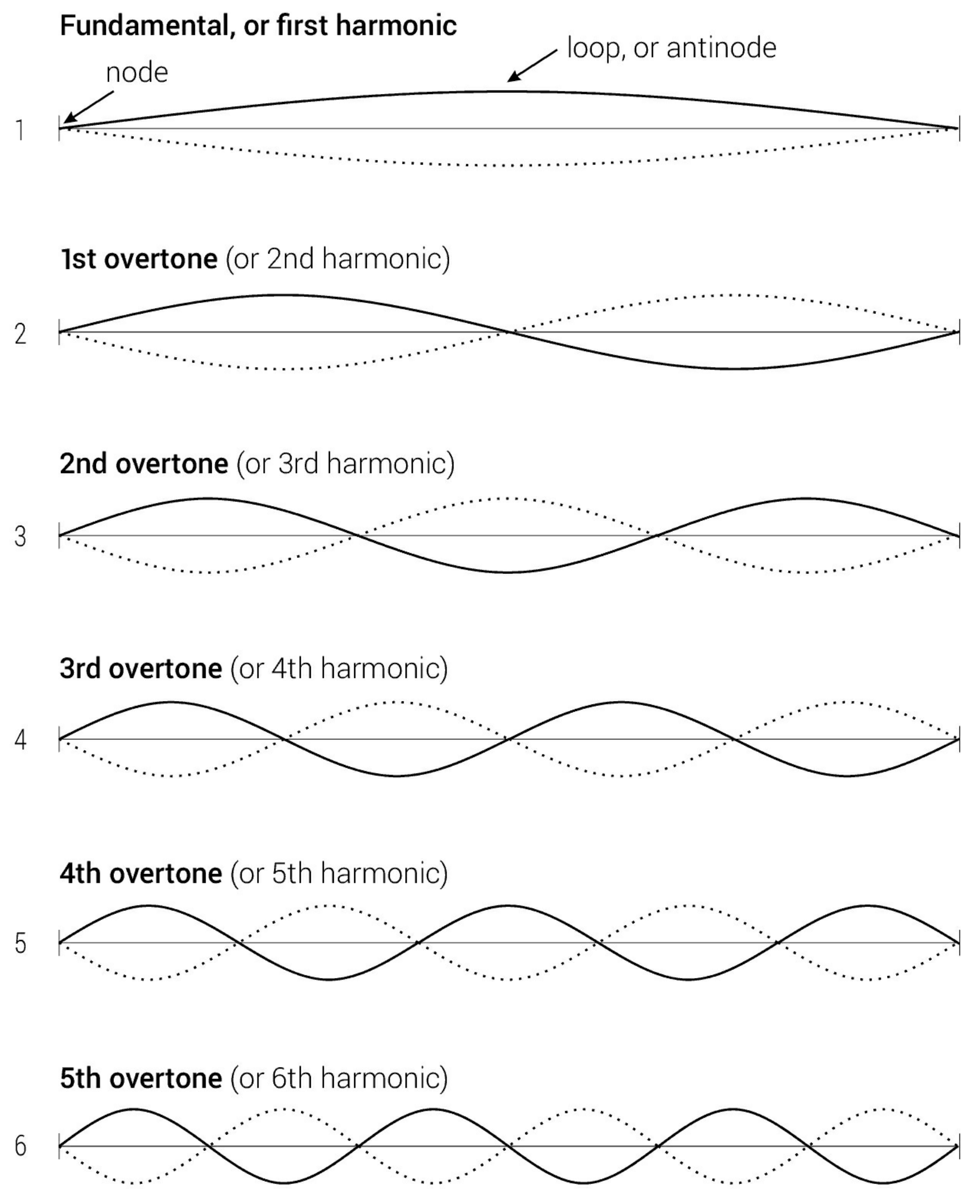


Figure 9: Fundamental note (1) and its overtones as they happen naturally when a note on an instrument is played. Dashed line represents the movement of

the wave. Nodes are the points along the sound wave that don't have amplitude. They are the points of no wave displacement. You can see a node at the middle of the 1st overtone for example, or at the ends of vibrating elements shown above. A great example of a node are the frets on guitar neck that a guitarist uses to change the length of the vibrating string and thereby change the note that is played. Anti-nodes are the opposite — they are the points of maximum displacement on the sound wave, and are always found halfway between the nodes.

The overtones you can see in Figure 9 continue indefinitely (in theory). The more away they are from the fundamental note, the quieter they will be. That's why we can generally hear only the first eight overtones clearly, We don't hear overtones as separate notes, but we do hear them sounding together with the fundamental note, which most often is the loudest note. Together, overtones determine an instrument's timbre. This is because different instruments have different combinations of overtones sounding louder than others. These combinations of overtones that are louder are responsible for the different sound between instruments, as well as for the different sound between the same kind of instruments. Furthermore, this is also the reason why, for example on guitar, strings sound brighter or twangier when plucked near the bridge, and bassier over the sound hole, or further across the neck.

The note distances, or intervals, between the fundamental frequency (the note you played) and its overtones, are what we call pure intervals. These intervals, between the fundamental frequency and any of its overtones, have a particular stability in the way they 'ring' and a pleasant resonance to their sound – more pleasant than the resonance produced by the intervals in equal-tempered tuning.

Any musical scale composed of pure intervals is considered to be a **just scale**. Note that in Part 2 we'll learn about the scales composed of intervals as determined by 12-Tone Equal Temperament, which is just a good approximation of pure intervals that most musicians use.

To summarize: The Just Intonation tuning system is based on just/pure intervals. These intervals come from the naturally occurring overtone series, which is a physical phenomenon of sound. In Just Intonation, every interval between the fundamental note and its overtones is 'perfect,' or 'just,' and produces a very pleasant sounding resonance. The reason for this perfect resonance lies in the whole number ratios we mentioned.

To understand whole number ratios, let's look at more examples by going up the overtone ladder. First we need to pick a fundamental frequency, and for this we'll take A4 note.

1) A4 note has a frequency of 440 Hz (in Standard tuning). If we go up an octave we get to A5, which is 880 Hz; these two notes are an octave apart, and this is the whole number ratio of **2:1**. This means that A5 has exactly double the frequency of A4. This 2:1 ratio constitutes the interval of an octave, as we saw in Figure 9. The wavelength of A5 is smaller by a half than the wavelength of A4. The octave is just one interval; there are other smaller intervals within the octave and they all have specific names. We'll learn about these names soon.

So the first overtone interval after the fundamental frequency is its octave, or we can call it a **Perfect Octave**. This interval is so perfect that in music theory, the notes that are an octave apart are marked with the same note name. It is the most stable interval in music, but only if we exclude the **Perfect Unison**, which is a zero distance interval that happens when you play the same note twice. The Perfect Unison interval has a whole number ratio of 1:1.

2) The second overtone interval from the fundamental frequency is the Perfect Octave plus a Perfect 5th. It has a wavelength which is smaller by a third than the fundamental note. This is a ratio of 1:3, compared to the ground note.

Figure 10: Perfect 5th the second overtone

Remember that the smaller the wavelength, the higher the frequency. So in our case, what pitch is higher by a third than our fundamental note A4 at 440 Hz?

It's 660 Hz, which is the E5 note.

Since the octave (the first overtone) is the same note name as the fundamental frequency, we can exclude it, and just look at the interval between the second and third overtone. We find the **Perfect 5th** interval there, and this is our second overtone.

Now we can conclude that Perfect 5th interval actually has a whole number ratio of **3:2**. This means that if our fundamental note is A4, then the E5 note, which is by a Perfect 5th up from A4, would have the frequency of 660 Hz. We get this in the following way:

We divide 440 by 2 => 440 / 2 = 220, and multiply it by 3 => 220 * 3 = 660 Hz (or just add 220 to 440).

The Perfect 5th is the second most stable musical interval, after the Perfect Octave. It is a very safe sounding interval that works great with the fundamental note. People can easily mix it up with the Octave, since they sound so similar.

3) The third overtone interval from the fundamental note is a Perfect Octave plus a Perfect 5th plus a Perfect 4th. It has the wavelength which is smaller by a **fourth** than the fundamental note. This is actually the total length of two octaves (since one octave is half the wavelength of the fundamental, the fourth would be two octaves). Of course, we're not interested in another octave but in the interval at the top found between the third and fourth overtone. This interval is the **Perfect 4th**, which is the third overtone.

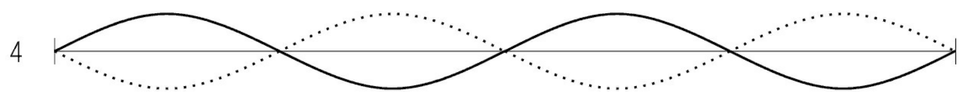


Figure 11: Perfect 4th the third overtone

The Perfect 4th has a whole number ratio of **4:3**. For our fundamental note A4, the pitch that is a Perfect 4th higher would be:

440 / 3 = 146.6666…67

146.6666 * 4 = 586.67 Hz (rounded)

The note that is by a Perfect 4th up from A4 is D5, and D5 has the pitch of 586.67 Hz (when the fundamental note is 440 Hz, as we calculated).

The Perfect 4th is a more distinct sounding interval than the Octave, or the Perfect 5th. It's still very safe sounding and consonant, but it has some unresolved characteristics in its sound that make it a useful building block for creating interesting musical movement.

4) The fourth overtone is: Octave + Perfect 5th + Perfect 4th + Major 3rd away from the fundamental note, or two Octaves + Major 3rd. Again, we're only interested in the interval found between the fourth and fifth overtone, which is the **Major 3rd**, and this is our fourth overtone.

The Major 3rd has a wavelength that is smaller by a **fifth** than the wavelength of the fundamental note. Since we're only looking at the interval between the fourth and fifth overtone, its whole number ratio would now be **5:4**. Notice the pattern?

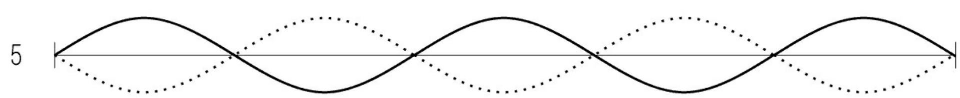


Figure 12: Major 3rd, the fourth overtone

In our case, where the fundamental note is A4, the frequency of the Major 3rd would be determined like with the previous overtones:

5:4 ratio

440 / 4 = 110

110 * 5 = 550 Hz

The note that is a Major 3rd up from A4 is C#5, whose pitch is 550 Hz.

This fourth overtone – the Major 3rd interval – sounds noticeably different to the fundamental note. You will easily recognize it. The Major 3rd is arguably the most important interval in music and music theory, since most of the chords we use are built in stacked thirds, but we'll talk about that in Part 3.

You will notice that this Major 3rd interval has a different name – it's no longer Perfect. The Major 3rd is the most stable Major interval, so much so that it's close to being Perfect. It is the point where, as we go up the overtone ladder, real tension starts to build up. This is because the overtones' wavelengths start to increasingly interfere with the wavelength of the fundamental note. That's why any interval beyond the Perfect 4th (third overtone) in the harmonic series will no longer be Perfect (except for any subsequent Perfect Octaves). We'll learn about intervals in detail in the Master the Intervals section.

We merely scratched the surface of the overtone series here, but know that truly understanding this concept can be very interesting and beneficial (and intellectually demanding) from the perspective that music is structured according to the physical laws of nature reflected by the overtone series. The fact that chords are built in stacked thirds (explained in Part 3), or that the strongest harmonic movement is V-I perfect cadence (also in Part 3), is not something we invented out of thin air. It all stems from the overtone series, which describe the very nature of sound. Although not for everyone, it is well worth spending time studying and slowly wrapping your mind around this concept. The benefit of deeply understanding everything else in the end is well worth the effort.

12-Tone Equal Temperament & Just Intonation Comparison

We just saw how pure intervals are determined, and how their wavelengths form simple mathematical ratios. We did that for the first four overtones in the overtone series. As we move up the overtone ladder, the wavelengths become shorter, the frequencies become higher, whole number ratios become more complicated, and musical tension builds up.

Now, let's compare these pure interval frequencies to the frequencies we got in Table 1, as we calculated them in 12-TET.

Notes	Just Intonation Note frequencies based on Pure Intervals	12-Tone Equal Temperament Note frequencies based on tempered Intervals	Difference in Hz
A4	440 Hz	440 Hz	0 Hz
C#5 Major 3rd up from A4	550 Hz	554.37 Hz	+ 4.37 Hz
D5 Perfect 4th up from A4	586.67 Hz	587.33 Hz	+ 0.66 Hz
E5 Perfect 5th up from A4	660 Hz	659.25 Hz	– 0.75 Hz
A5 Perfect 8th or an Octave up from A4	880 Hz	880 Hz	0 Hz

Table 3: Difference between note distances in 12-TET and Just Intonation.

A couple of things to note here:

- We took 440 Hz to be the fundamental frequency, and in the Just Intonation column we calculated the Major 3rd, Perfect 4th, Perfect 5th and Perfect 8th (or Perfect Octave) intervals by using mathematical ratios for each of those intervals. These mathematical ratios are determined by the wavelengths that the two notes create when they are played one after the other.
- In this way we got the notes with the frequencies: 550 Hz (C#5), 586.67 Hz (D5), 660 Hz (E5) and 880 Hz (A5), each of which resonates perfectly along with the fundamental frequency, although not all of them are called Perfect intervals. As we said, anything after the third overtone (Perfect 4th) is not considered a Perfect interval anymore, even though their resonance is perfect according to the Just Intonation tuning system.
- In 12-Tone Equal Temperament, octaves are the only intervals (note distances) that are always Perfect and

there isn't any difference in Hz with their Just Intonation counterparts – they remain a pure interval. That's why they sound so pleasant.

- Major 3rd intervals in 12-TET are usually those that suffer the highest alteration from their Just Intonation counterparts.
- The frequencies of the overtones in Just Intonation are dependent on what the fundamental frequency is. 12-TET is uniform across all keys, which is what allows fixed-pitch instruments to play chords and easily change keys.

Tempering the Beats

This brings us to finally explaining what the term '**temperament**' means. The term describes any tuning systems that depart from the pure intervals of the overtone series in the Just Intonation system. This departure is done for specific purposes and to solve particular problems, as we saw with the equal temperament. It stems that '**tempering**' is simply the process of altering the size of the 'pure intervals' by making them higher or lower, as we can see in Table 3, the method of which changes between different temperaments.

The main problem was that before equal temperament was invented, keyboard instruments could only sound good in some keys and would sound out of tune in other keys because of problems with intonation. The consequence was that everything boiled down to playing modes (explained in the scales section). For example, in Just Intonation, if we choose G5 note as the fundamental frequency, all other notes based on the pure intervals that come from the naturally occurring overtone series will be derived from this fundamental G5 frequency. This means that these notes will only sound good in the key of G; they will not sound good in other keys, because there will be an accumulation of intonational differences as we move to harmonically more distant keys from G on the **circle of fifths** (explained later in the book). In order for the notes to sound good in other keys we would have to transpose the intervals and pick a different fundamental frequency based on the key we want to play in, and also re-tune our instruments each time we want to change keys. This, of course, is less of a problem for non-fixed pitch instruments such as lutes, because lute players can adjust their intonation by ear 'on the go', but it is a real problem for fixed-pitch instruments such as pianos and guitars. The Equal-Tempered tuning system solves this problem for fixed-pitch instruments.

Equal temperament overcomes the shortcomings of just intonation by distributing the intonational defects evenly across the octave. There is a trade-off of course, and it's that, for all the problems it solves, equal-temperament intervals simply do not resonate as pleasantly as the overtone pure intervals, and this difference can bother people who have a really good musical ear, and who can easily recognize even less than 1 Hz difference. The difference can be quite noticeable for some intervals, especially in the case of Major 3rds; as we can see in Table 3, where the difference from the pure Major 3rd Interval is more than 4 Hz! This is not small, especially as a trained musician can recognize even the slightest differences in the tempered intervals by the presence of '**beats**.'

These 'beats' are not to be confused with rhythmic beats (discussed in the rhythm section). They are a physical phenomenon and refer to the periodical oscillations we can hear when two pitches are played next to each other at same time. If their difference varies by even less than 0.5 Hz, these periodical oscillations – aka beats – will be noticed in their sound, and they can ruin the pleasantness of their resonance and the sound that we hear. However, if their frequencies match perfectly, there won't be any beats. If two pitches are any pure interval apart, there won't be any beats and their resonance will be perfect (as it is in the Just Intonation tuning system). If however, the intervals are tempered, as in 12-TET, their presence will be noticeable, sometimes more, sometimes less.

Here's the audio example of beats using a very simple sound wave, called sine wave, played at 100 Hz and 101 Hz. A sine wave is the simplest form of sound wave. We're not using a musical instrument to play these pitches because that way we also get the overtones, and this would complicate our sound wave. We use computer generated sine waves instead, because this makes hearing the beats easier. First, you'll hear a pitch at 100 Hz, followed by a pitch at 101 Hz, and then both of them will be played at the same time. That way you'll be able to hear the aforementioned periodical oscillations that we call beats.

Beats audio example -> bit.ly/beatsexample

That's why some musicians and orchestras around the world still prefer to stick with Just Intonation in their performances, or use other earlier European tuning systems, like Well Temperament. **Well Temperament** is different from Equal Temperament in that it is not equal, but rather was designed to more closely approximate the overtone intervals in Just Intonation, while still allowing keyboards and fretted instruments to sound more or less good in all keys, and to easily change keys during a musical piece. This causes each key to have a slightly different color and character, unlike in Equal Temperament where all keys are spread equally and don't have any unique colors to their sound. Bach used this characteristic of Well Temperament and composed the famous *Well-Tempered Clavier* for solo keyboard as an experimental departure from other tuning systems that were used before, and to showcase these differences in key colors.

It's important to say that, owing to the way they're built, keyboards and fretted instruments like guitars are impossible to get perfectly in tune. They have mechanical tuning limitations that prevent them from reaching the desired intonation, even in the case of 12-Equal Temperament. But they are good enough, they can play chords, and sometimes it's exactly these imperfections that make them sound interesting and unique, even with the beats.

There've been numerous tuning systems used throughout history, the main ones being: Pythagorean tuning, Just Intonation, Meantone Temperament, and Well Temperament, but in the end, Equal Temperament, and specifically the 12-TET variation, won out. Along with Standard Pitch, this is what most music is built upon today. This concludes the deep fundamentals that form the basis of modern Music Theory. But before we can move on to scales, chords, rhythm and harmony, we have to get to know the intervals, and we have to understand them really well.

Master The Intervals

What is an Interval in Music?

We've talked a bit about intervals already. We've established that an interval is a relationship between two notes. It describes the harmonic distance between notes with a unique sound. Now let's examine intervals in more detail.

It can be said that all music theory is based around studying intervals and how they make up music and affect our emotions. This is because, along with the notes, they form the essence of what we call 'harmony.' Music is about movement, and each time one note moves to another, or two notes are played at the same time, we hear a particular sound – the sound of an interval. A musical interval is the distance between any two notes, and each distance has a unique sound that has a particular harmonic function, or a quality, that we experience in different ways.

We already know that we have only twelve notes in Western music. We also know that these twelve notes repeat in many different octaves across the audible range. Between any of the twelve notes within one octave there is an interval, and just like the notes, the intervals also repeat in higher or lower octaves.

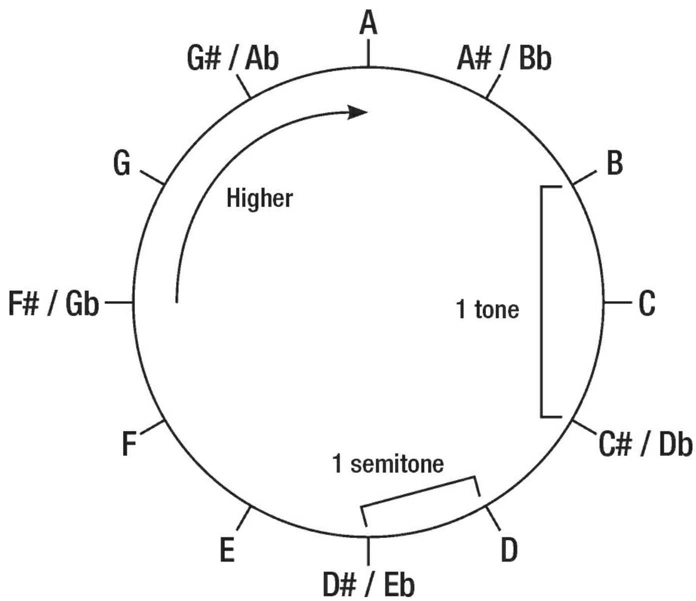
To understand intervals, we first need to understand that an interval, by its name, can be either:

1. Major
2. Minor
3. Perfect
4. Augmented
5. Diminished

Major and minor intervals are used a lot in Western music, while Perfect intervals are generally used more in ethnic music all around the world. Augmented and diminished intervals have a very specific sound which is why they are much more rarely used than the first three. The interval qualities are always followed by a number, for example: *Major 3rd* or *Perfect 5th* (as we saw in previous sections).

Music Intervals Spelled Out

Take a look at the note circle again:



There's an interval between any of the notes from the note circle – you can start on any note and play any other note (including itself), and you will play an interval of some kind.

In order to show you all the intervals, we will first choose the starting note, which can be any note. This starting note is commonly called the **root note**. We will compare all other notes against this root note to showcase all the intervals. In this example, the note C will be used as the root.

1. First we have C to C. Yes, there's an interval between two of the same notes. This happens when the exact same note is played in succession, and this interval is called: **Perfect Unison**.
2. The next note, C#/Db, is a **minor 2nd** above C (and also a Major 7th below it). Note that this interval is the equivalent of one semitone (S), or a half-step (H), which we already learned about. A semitone or a half-step is the minor 2nd interval.
3. D is a **Major 2nd** above C (and a minor 7th below). Note that this is also the equivalent of one tone (T), or a whole step (W). A tone, or a whole step, is the Major 2nd interval.
4. D#/Eb is a **minor 3rd** above C (and a Major 6th below).
5. E is a **Major 3rd** above C (and a Minor 6th below).
6. F is a **Perfect 4th** above C (and a Perfect 5th below).
7. F#/Gb is **Augmented 4th** – also called a tritone – above C (and a tritone below it). This is a strange interval. It is highly dissonant and in many cases avoided. It sometimes functions as a sharp 4th, and other times it is a flat 5th. The tritone is also the only interval that is the inversion of itself – if a note is a tritone up from another note, then it is a tritone down from it as well.
8. G is a **Perfect 5th** above C (and a Perfect 4th below it).
9. G#/Ab is a **minor 6th** above C (and a Major 3rd below).
10. A is a **Major 6th** above C (and a minor 3rd below).
11. A#/Bb is a **minor 7th** above C (and a Major 2nd below).
12. B is a **Major 7th** above C (and a minor 2nd below).
13. And lastly, we have C which is a **Perfect Octave** interval above root C.

We have now gone through the full note circle.

There are four Major intervals, four minor intervals, four Perfect intervals, and that 'strange' interval – the tritone, which can either function as an Augmented 4th or a diminished 5th.

In terms of semitones:

- **Perfect Unison** (C to C) is 0 semitones apart
- **minor 2nd** (C to C#) is 1 semitone
- **Major 2nd** (C to D) is 2 semitones
- **minor 3rd** (C to D#) is 3 semitones
- **Major 3rd** (C to E) is 4 semitones
- **Perfect 4th** (C to F) is 5 semitones
- **Tritone** (C to F#) is 6 semitones
- **Perfect 5th** (C to G) is 7 semitones
- **minor 6th** (C to G#) is 8 semitones
- **Major 6th** (C to A) is 9 semitones
- **minor 7th** (C to A#) is 10 semitones
- **Major 7th** (C to B) is 11 semitones
- **Perfect Octave** (C to C) is 12 semitones.

Sometimes, we define intervals above an octave. These are named by adding 7 to whatever the name was in the first octave. For example, a Major 2nd interval an octave higher becomes a Major 9th, a minor 6th becomes a minor 13th, and so on. Note that in music theory the terms ‘Major’ and ‘Perfect’ are commonly capitalized, while ‘minor’ isn’t.

The interval name consists of its quality (Perfect, Major, minor, diminished, Augmented), and a number. You may wonder where these names come from. The reasons can be numerous and often complicated. One of them has to do with the overtone series you saw in the Overtone Series section – Perfect intervals are more stable and safe; anytime a musical melody (movement) ventures a bit, it can return to a safe and stable sound by coming to a note that is some Perfect interval apart from the tonic note.

This all has to do with consonance and dissonance. Perfect intervals are more consonant than others, and as we move away from them it’s like we’re moving away from home, thus producing more dissonance in our playing. This dissonance creates musical movement and builds up tension and friction that tends to resolve to a ‘home’ sounding note. Perfect intervals, since they’re so similar to the tonic note, can signal which note is the tonic, and what kind of resolution will it be to the tonic. Non-perfect intervals all have varying degrees of dissonance and need for resolution, for example a Major 7th interval has a strong pull toward the octave or the tonic. There are numerous ways to resolve tension in music and create interesting movement, and we’ll learn about that in the section on chord progressions.

There are also other reasons for these interval names. For example, Perfect fourths and fifths are said to be ‘Perfect’ rather than Major or minor because they are the same in the Major and minor scales, as well as most other diatonic scales, but we have yet to go over scales in order to understand this.

As for the number part in the interval’s name, again, it refers to the notes’ position in diatonic scales, which you will learn about soon.

Intervals are used to define both chords and scales because a particular set of intervals defines a unique sound, a unique harmonic space. If you list all the intervals in a given scale or chord, then you will have fully defined that scale or chord. In later sections you’ll see how intervals are used to define chords and scales and how important they are in music theory.

Inverted Intervals (with Interval Exercise)

Beyond the interval quality (Major, minor, Perfect, Augmented, diminished) and its position (the number), there is one more property of intervals which is important to understand.

Take a look at the note circle. Notice that intervals between any note can go up or they can go down. In that way, they can be either:

1. **Ascending** (lower note in pitch going to a higher note; for example C to D#)
2. **Descending** (higher note in pitch going to a lower note; for example, B to Ab)

3. **Harmonic** (when two or more notes are played simultaneously)
4. **Played in Unison** (the same note played twice)

You can say that B is a Major 3rd up from G, but that Eb is a Major 3rd down from G. This means that intervals can be inverted – if B is a Major 3rd up from G, then it is also a different interval – in this case, a minor 6th – down from the G of the next octave.

In this way, **intervals come in pairs**. Every relationship can be defined by two different intervals, one up and one down. That should explain the intervals in parentheses from the intervals list.

To explain it further, interval is a relative property of notes. For example, say we want to figure out what the interval is from A to C. We have two possible solutions.

C note is a particular interval away from A. If the C note is higher in pitch than A, then this interval is ascending. So we can say that C is a *minor 3*rd **up** from A, and that C is A's *minor 3*rd interval.

A -> C = minor 3rd (ascending interval)

But if the note C is lower in pitch than A, then this is a descending interval. We can now say that C is *Major 6*th **down** from A.

A -> C = Major 6th (descending interval)

Like with the normal (ascending) intervals, we'll list out the inverted intervals here. We'll again take C note as the root, but instead of going up from C, we'll consider each subsequent note from C to be lower in pitch. In this way, all ascending intervals we described in the previous section will invert. We'll also use notes with flats instead of sharps to indicate that we're descending.

Perfect Unison interval (C to C) always stays the same, no changes there.

The first note after C is C#/Db. We know that this is the minor 2nd interval from the previous section. But what if C# is lower in pitch than C? Then C – C# would not be a minor 2nd interval anymore, it would be a **Major 7th**. We would denote this as C – Db (enharmonic equivalent of C#) for clarity. You can check this easily by looking at the note circle and counting the semitones from the lower note. B note is a major **7th up** from C, but Db is a **major 7th down** (by 11 semitones) from C.

- D is a **minor 7th** below C (and a Major 2nd above).
- Eb is a **Major 6th** below C (and a minor 3rd above).
- E is a **minor 6th** below C (and a Major 3rd above).
- F is a **Perfect 5th** below C (and a Perfect 4th above).
- Gb is **diminished 5th** interval below C (and **Augmented 4th** above it). This is the Tritone interval (three tones up or down from the root) we mentioned, that is strange because it is the inversion of itself and always remains the same. We use the term 'diminished' instead of 'augmented' to indicate that we're descending.
- G is a **Perfect 4th** below C (and a Perfect 5th above it).
- Ab is a **Major 3rd** below C (and a minor 6th above).
- A is a **minor 3rd** below C (and a Major 6th above).
- Bb is a **Major 2nd** below C (and a minor 7th above).
- B is a **minor 2nd** below C (and a Major 7th above).
- And lastly, we have C which is a **Perfect Octave** interval below or above root C.

When figuring out intervals, unless we don't have any information on what kind of interval it is (ascending, descending or harmonic), we always treat the lower note as the root note, and we count intervals clockwise on the note circle from the lowest note.

Here are some intervals for you to figure out.

- E -> C (ascending) — ?
- E -> C (descending) — ?

- D -> A# (ascending — the sharp symbol tells you that this is an ascending interval) — ?
- D -> Bb (descending — again, the flat symbol indicates that this is a descending interval) — ?
- Gb -> Ab — ?

Remember that when an interval is ascending you will see/use the sharp (#) symbol, and when it is descending you will use the flat (b) symbol.

As stated before, there is a different interval pair for every note of the note circle. You can use the note circle and count the intervals there. The answers will be provided at the end of this book.

Chromatic and Diatonic Intervals

All the intervals shown so far fall under one large group of **chromatic intervals**. The term *chromatic* tells us that this is a set of ALL intervals that exist between the notes that are used in conventional Western music, just as how the chromatic scale (explained at the beginning of Part 2 is the set of all twelve notes that exist in the 12-note music system. A scale is just a collection of notes defined by a unique set of intervals that give it a unique sound.

Within those chromatic intervals that make up the chromatic scale, there is a specific group of intervals, called **diatonic intervals**, which are quite important. Diatonic intervals are those intervals that make up and define the Major scale. The Major scale is, without a doubt, the most important scale in music theory, because everything else is measured against it and relates back to it in one way or another. It is the default scale that the whole of Western music is built upon.

The Major scale is a diatonic scale, and that's why all intervals that make up the Major scale are called diatonic intervals. We will soon find out exactly what the term 'diatonic' means. These diatonic intervals fall within the category of chromatic intervals as a special group of intervals that make up the Major scale. In other words, all of these intervals appear in the Major scale.

In that sense, the diatonic intervals are: **Perfect Unison** (C to C), **Major 2nd** (C to D), **Major 3rd** (C to E), **Perfect 4th** (C to F), **Perfect 5th** (C to G), **Major 6th** (C to A), **Major 7th** (C to B).

Augmented and Diminished Intervals

Beyond Major, minor and Perfect intervals, there are also diminished and Augmented intervals. These are the most dissonant intervals that tend to have the strongest resolution to a stable note. They produce unsafe, unstable and eerie sounds, but when used carefully, they can create very sophisticated movements and beautiful sounding resolutions, as well as unique atmospheres used in scary movies for example. In music theory, these intervals are hidden in a way, because they are used to show the interval structure of only those scales and chords that contain them.

All scales and chords are made up of individual notes and the intervals between those notes. We use this interval structure to write out the notes and name any scale or chord, and to show how they're built. In music theory, when we list the intervals of a scale or a chord, we have to abide by certain rules in music theory when it comes to writing out the notes and intervals.

We will get to these rules soon, but for now understand that **diminished intervals lower or narrow the minor and Perfect intervals by one semitone. Augmented intervals expand or widen the Major and Perfect intervals by one semitone.**

CHROMATIC INTERVALS					
Major, minor and Perfect Intervals	Abbreviation	Diminished and Augmented Intervals	Abbreviation	Distance	In terms of notes
Perfect Unison	P1 or U	Diminished 2nd	dim2	0 semitones	C to C
minor 2nd	m2	Augmented Unison	AugU or Aug1	1 semitones	C to C#
Major 2nd	M2	Diminished 3rd	dim3	2 semitones	C to D
minor 3rd	m3	Augmented 2nd	Aug2	3 semitones	C to D#
Major 3rd	M3	Diminished 4th	dim4	4 semitones	C to E
Perfect 4th	P4	Augmented 3rd	Aug3	5 semitones	C to F
		Diminished 5th	dim5 or Tritone	6 semitones	C to Gb
		Augmented 4th	Aug4 or Tritone	6 semitones	C to F#
Perfect 5th	P5	Diminished 6th	dim6	7 semitones	C to G
minor 6th	m6	Augmented 5th	Aug5	8 semitones	C to G#
Major 6th	M6	Diminished 7th	dim7	9 semitones	C to A
minor 7th	m7	Augmented 6th	Aug6	10 semitones	C to A#
Major 7th	M7	Diminished Octave	dim8 or dimO	11 semitones	C to B
Perfect Octave	P8 or O	Augmented 7th	Aug7	12 semitones	C to C

Table 4: Complete list of chromatic intervals

A couple of things to note here:

- Diminished and Augmented intervals are equivalent to their Major, minor and Perfect interval counterparts – they are the same distance, but have different names. For example, diminished 4th and Major 3rd are physically (distance-wise) the same intervals. The name which will be used for intervals is usually in the Major, minor and Perfect column, but in some instances, depending on the scale or a chord that interval is a part of, we will have to use its alternative diminished/Augmented name.
- Notice that Major, minor and Perfect intervals lack one interval with the distance of six semitones. Two semitones are equal to one tone, so this interval has three tones, and that's why it's commonly called a 'tritone.' This is a diminished 5th or Augmented 4th interval (can be either), and it is the only interval from this column which appears, not in the Major scale itself, but in the modes of the Major scale, also called the diatonic modes (which we'll get to in Part 2).
- Diminished intervals are usually shown with a lower case first letter, while Augmented intervals usually have an upper case first letter.

Understanding intervals – truly understanding them and how they relate to one another and learning to hear and use them – takes a lifetime. In a sense, all of the other learning about scales and keys and chords is a way to make sense of the wide-open space of the network of intervals in the 12-tone system. It is well worth keeping an eye on your comfort level with this idea and training your ear to recognize them.

The Building Blocks of Music – Harmony, Melody and Rhythm

We say that music consists of three things:

1. Harmony,
2. Melody and
3. Rhythm.

The terms ‘harmony’ and ‘melody’ both describe the relationship between pitches (although differently) without respect to their duration, whereas rhythm describes the relationship between sounds and their durations without respect to their pitches.

Harmony is what happens when we combine notes in music. If you add one or more notes to another note, and you play them at the same time or in sequence, then you’ve added harmony to the original note. This is one way to think about harmony.

Harmony is the vertical relationship between pitches. It is a structure, like a lattice; a network. When you understand the relationship between two or more notes harmonically, you are treating them as though they were happening at the same time (even if they are happening one after another). It is possible in this way to think about how the overall harmonic structure of a piece moves and changes.

Melody is like harmony in that it describes the relationship between pitches, but it is a horizontal rather than vertical understanding. While still a matter of relative structure, melody is all about the way notes act in sequence. The same four notes played in different orders have different melodic values, even if those four notes taken together might have the same harmonic structure.

Melody could be considered simply as part of the harmony which focuses on how notes sound together in a sequence. Usually we add harmony to a melody line (which puts the melody in a certain context and makes it sound richer), or we may add melody to an existing harmony.

Rhythm is the relationship, in time, between notes (or sounds in general) regardless of pitch relationships. Rhythm describes the way sounds pulse (or don’t pulse), their speed and regularity. Rhythmic structures describe the way a piece moves according to a particular kind of time-based division. While not generally the focus of as much theoretical attention, rhythm is equally as important. An understanding of the role of time and duration in music is essential since music is, after all, a time-based art form. That’s why there is a whole section dedicated to rhythm in this book.

What Makes a Great Melody?

A strong melody is essential to good music. It is the difference between bringing someone’s ear on a ride and driving right past it. Good melody is all about telling a story. It moves and unfolds, builds and releases. It plays against and with the chord structure of a song (the harmony) in a way that makes people want to hear it.

Good melody is hard to understand, and even harder to prescribe rules for (read: impossible), but in general we say that a melody consists of tension and release. That means that a good melody moves away from the harmonic center of the music, building tension, and then moves back in some interesting way, releasing that tension.

To tell a story is to create an arc. To rise and to fall. And that’s what a good melody does: it begins somewhere, and while it usually follows the structure of the chords, it does so in a way that creates movement and drama, that makes a little friction between the single notes in the melody and the structure of the chords (its harmonic structure). In most music, this is followed by some kind of release, in which the relationship between the single notes and the chords is again easy, consonant and stable.

The Concept of the Root Note

This concept is quite important in music theory and we're going to use it a lot in the following pages, so it is worth explaining now.

The root note of a scale or a chord is the note – usually the lowest note in the scale or chord, or the 'bass' note (but it doesn't have to be) – that is used to define the interval relationships in the rest of the scale or chord. In other words, all the other notes are defined as intervals relating back to that one root note.

The root note is the first thing that the name of a chord or a scale lists, so if someone is talking about a D minor 6th chord for example, then you know that the D is the root of that chord and the rest of the chord is defined relative to that D note. If someone is talking about a G# Major scale, then you know that the G# is the root note of that scale and then the rest of the scale notes are defined relative to that starting G# note.

Lastly, in music theory root note is not same thing as the tonic note. Tonic note is a wider concept that we already touched upon in the Intonation and Keys section. We'll explain it in more detail in the following chapter.

Part 2
Mastering Scales and Modes

What is a Scale in Music?

Scales are some of the most important things in music. The entire harmonic and melodic structure of a piece of music can be described with respect to scales. They can be used to generate chords and chord progressions, and can define and produce melodic ideas to be used over those chords. They can be used to compose complicated works but also to improvise music – even advanced music – with little effort.

Put as simply as possible, a scale is an **abstract collection** of notes and the relationships between those notes or pitches.

It is a collection and not a sequence because it doesn't exist in time – it doesn't have an order, and it doesn't imply any particular melodic arrangement. It is just a set of relationships between notes that defines a harmonic space.

It is abstract because it is not tied to any particular actual arrangement of notes – it doesn't tell you to play the sixth note in a scale or the third note in a scale; all it does is give you a set of tones that define a space in which you can play.

It isn't necessary to play all of the notes in whatever scale you're using, and it isn't necessary to play only those notes, but rather to use the scale as a sort of general category. Scales are loose characterizations of harmonic material, more like a tendency and less like a rule.

Because scales are abstract, they don't depend on any particular expression. In other words, **they are in the background, at a higher, more general level than the actual notes of the music**.

You can play a Led Zeppelin solo or you can play a Stevie Ray Vaughan solo, and they will be completely different things, but they will both be using the minor pentatonic scale. Because of this, scales are useful tools for understanding what someone is doing musically and for knowing what you want to do musically, since they allow you to know, in general, what is going on in the music and what will happen if you, for instance, play a particular series of notes over a particular chord.

Scales come in many forms: some have five notes, some have seven, some have more, but all of them define a root, which is the center of harmony and melody, and a set of relationships between the rest of the notes in the scale and that root.

All scales have their own formula consisting of tones (whole steps) and semitones (half-steps). Simply by knowing the scale formula it is very easy to figure out the notes of any scale and play them on any instrument (as we'll soon see).

Scales are used to define chords, which form the harmonic structure of a song, and also to compose melodies, which (usually) consist of single-note lines played over the top of that harmonic structure. They are also used to create harmonies, which occur when more than one single-note line is played together. The best way to start understanding scales is to start with the chromatic scale.

The Master Scale

The most fundamental scale in Western music is the **chromatic scale**. It is the master scale. The chromatic scale contains all twelve tones in every octave, and so in a sense it is the basis of all other scales. Every chord and every scale is contained within the chromatic scale.

Because the chromatic scale is so large, it is a very useful way of thinking about the overall harmonic landscape. Everything that you can play (as long as you are in tune) has some kind of relationship to everything else, and the chromatic scale is the basis of all of those relationships. The chromatic scale does not have a key itself, rather it is the basis of all keys (more on keys later).

But because it is so democratic and decentralized, the chromatic scale isn't always useful. It is very abstract and it's not musical. Most of the time – you want to cut the chromatic scale up, define a slightly (or radically) more limited harmonic and melodic space. That's when all of the other scales become useful.

Consisting of twelve notes per octave, the chromatic scale is broken evenly into twelve half-steps (H) or six whole steps (W). The notes of the chromatic scale are simply all twelve notes from the note circle in the same order.

It is very easy to play a chromatic scale and it's particularly good to use as a technical exercise (especially for beginners who are getting used to their instrument). Just take a look at Figure 7 again and you'll see how the chromatic scale is laid out on the piano. To play it you can start on any note (it doesn't have to be A), and just play all of the notes in order, ascending or descending, until you get to the octave.

Just as understanding intervals is a lifelong project, making sense of the wide array of possible scales and their interactions is as well. It is useful, however, when undertaking that project, to remember the place of the chromatic scale. It contains all notes and intervals, it democratizes, it spreads the harmony and melody wide open, and it allows you to do virtually anything you want to. Learning to use that freedom responsibly is one of the things that sets great players apart from the rest.

Types of Scales

There are basically only a few types of scales. One of them we have just covered – the chromatic scale. The chromatic scale is the basis of all other scales. It is the master scale. But it doesn't define a distinct harmonic space beyond the division of harmony into twelve equal parts. For that, you need scales with fewer than twelve notes in them.

There are two other scale types that make up the foundation of harmony, and those two types break up into a few others.

1. First, there are five-note scales. These are called **'pentatonic'** scales, meaning 'five-per-octave.' The variations of these simple scales are enough to produce a rich landscape all by themselves. While there are a variety of different note patterns that can make up pentatonic scales, there is one in particular, which defines the **minor pentatonic scale** as well as the **Major pentatonic scale**, that is most often used.
   These scales are found in blues and rock music, and variations of these simple scales are enough to produce a rich landscape all by themselves. There's a reason why they're called 'minor' and 'Major' and it's because they originate from the seven-note scales that bear the same name.

   There are other pentatonic scales, especially in non-Western music, which are rarer but still sometimes useful. For example, the Chinese scale used to compose traditional Chinese folk music is a pentatonic (five-note) scale.
2. Then there are seven-note scales. Seven-note scales have many forms, the most basic of which are called **'diatonic scales'** (more on this later). The most common **Major scale** (do-re-me…) and **natural minor scale** are both seven-note diatonic scales.
   The words 'minor' and 'Major' refer to something like the mood of the scale, with minor scales generally sounding sad, dark and thoughtful and Major scales generally sounding happy, bright, and lively.

   Most blues, for instance, is played in a minor key, which means that it makes use of a minor scale quite often, whereas most pop is played in a Major key, which means it makes use of a Major scale.

There are two other varieties of seven-note scales that are used in classical music, neo-classical, advanced rock, and jazz, and they are the **harmonic minor scale** and the **melodic minor scale** (and their variations).

Beyond five-note and seven-note scales, there are a few specialized eight-note jazz scales (called bebop scales). Otherwise, it is always possible to produce new scales by adding notes from the chromatic scale to an existing scale, resulting in scales with as many as eleven notes (this is most often done in jazz).

It is also possible to create new scales by altering an existing scale chromatically. In general, creating new scales by this chromatic alteration and/or addition results in what we call **'synthetic'** scales or modes.

Keep in mind that there are twelve notes in music, so there are twelve harmonic centers (or root notes) that a scale can start on. This goes for any kind of scale, no matter the number of notes it contains.

Minor Pentatonic Scale

While there are many different kinds of pentatonic scales that can be assembled, there is really only one pentatonic structure that is used commonly in Western music. This structure has two variations in particular that are ubiquitous in blues, rock, pop, country, jazz and bluegrass. Those two scales are the minor pentatonic (which is the most familiar) and the Major pentatonic.

The minor pentatonic scale is the foundation of most of the blues and rock you have likely heard. It is a simple, easy-to-remember scale with a very distinct sound. It connotes a soulful, deep effect and can be made to sound quite sad. This scale consists of notes that are all found in the natural minor scale, and so it is of use any time the minor scale is called for.

It is possible to make an entire career out of this one harmonic collection, as many blues, folk, bluegrass, funk and rock musicians have. Outside of the Western world, this and similar scales are common in traditional Asian and African music (the latter being the historical source of the minor pentatonic scale in the American Folk tradition).

Minor Pentatonic Structure

Remember when I said that we use intervals to define chords and scales? Here's how we do that.

We say that the minor pentatonic scale consists of five notes:

A root note, a minor 3rd, a Perfect 4th, Perfect 5th, and a minor 7th

or (when abbreviated)

R, m3, P4, P5, m7

These numbers refer to the notes' relative position within a diatonic scale (in this case, the natural minor scale), but the intervals themselves exist in many scales, including the minor pentatonic scale.

If the scale is played in order, there is:

1. A root, abbreviated to 'R'.
2. A root is followed by a note a step and a half (three half-steps) above the root – this is the minor 3rd, or simply 'm3'.
3. Then a note a full (whole) step above that – this is the Perfect 4th, or 'P4'.
4. A note a full step above that – this is the Perfect 5th, or 'P5'.
5. And a note a step and a half above that – this is the minor 7th, or m7. *

*NOTE: These are the five notes of the minor pentatonic scale. The distance between the last note (the minor 7th) and the first note in the next octave is one full step.

Now check what is underlined above. These distances (intervals) can be used to describe the scale in another, simpler, way:

WH W W WH W

or (same thing)

TS T T TS T

This is called a **scale formula**. In this case it's the minor pentatonic scale formula. A scale formula simply represents a unique set of intervals found within each scale. It is written by using tones and semitones (and a combination of the two – TS).

Just by knowing a scale formula you can start on any of the twelve notes of any instrument, apply the formula, and easily figure out how to play any scale.

When put in context:

R — **TS —** minor 3rd **— T —** Perfect 4th **— T —** Perfect 5th **— — TS —** minor 7th **— T —** R

For example, if we start from an A note we can then apply the formula: TS — T — T — TS — T, and easily figure out the rest of the notes of the A minor pentatonic scale. The notes would be:

A **— TS —** C **— T —** D **— T —** E **— TS —** G **— T —** A

- A is the **Root**
- C is the **minor 3rd** (above A)
- D is the **Perfect 4th** (above A)
- E is the **Perfect 5th** (above A)
- G is the **minor 7th** (above A)
- and lastly A is the **Perfect 8th** — Octave (O)

When applying a scale formula you can follow the note circle to find out the notes more easily.

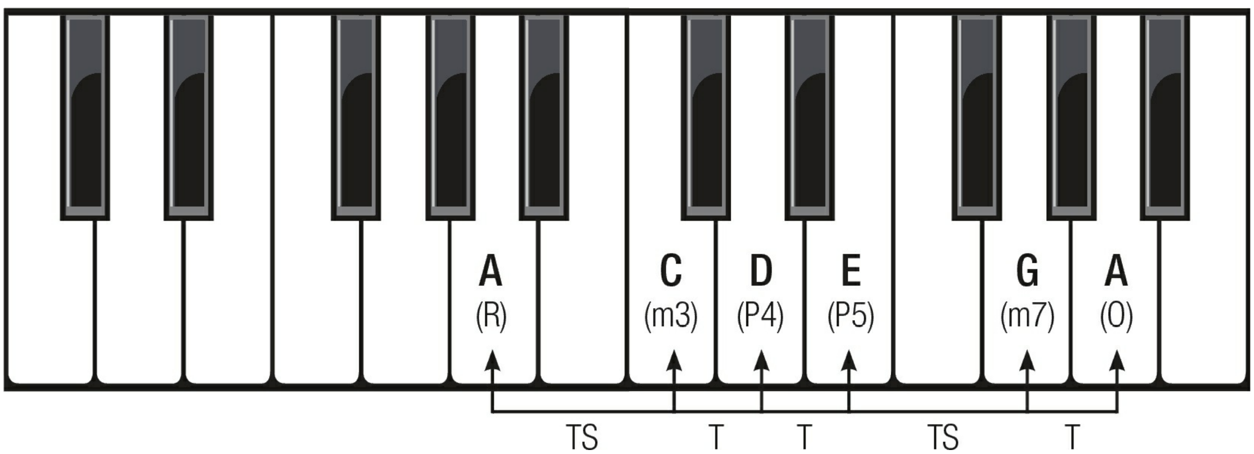


Figure 13: Minor pentatonic structure in A on a piano

This can be done on any note/key.

This is one of the first, if not the first, scale that many people (particularly guitarists) learn, and once learned it can be used very quickly.

If you place the root of this scale on the root of virtually any chord (especially minor and Dominant chords) then the other notes in the scale will almost always sound good. If you're playing the blues, then all you need to do is make sure the root of this scale is the same note as the key that the song is in.

What is a Mode?

It is worth using the minor pentatonic scale to demonstrate an important concept. We saw that this scale consists of a collection of five notes, and that when they are oriented around the root, there is a particular set of intervals that define the scale.

But what if we take those same exact five notes – for instance, the A minor pentatonic scale (A, C, D, E and G) – **and re-orient them**. In other words, what if, rather than calling A the root, we treat *this same collection of notes* as a C scale, treating C as the root?

Now the notes have different names:

- C is no longer the minor 3rd (of A), it is now the root.
- D is no longer the Perfect 4th (of A), it is now the Major 2nd (of C),
- E is now the Major 3rd,
- G is now the Perfect 5th, and
- A is now the Major 6th.

So the new set of notes is:

Root, Major 2nd, Major 3rd, Perfect 5th, Major 6th;

or:

R, M2, M3, P5, M6

This is a completely different abstract collection of notes than the A minor pentatonic scale – **even though it consists of the same five tones** – because it is now a completely different set of intervals.

Major Pentatonic Structure

By using the same pattern, but beginning on a different note, we have created a different scale. The scale is called the **C Major pentatonic scale**, and it's also an important and very common scale in blues, country, rock, pop, etc.

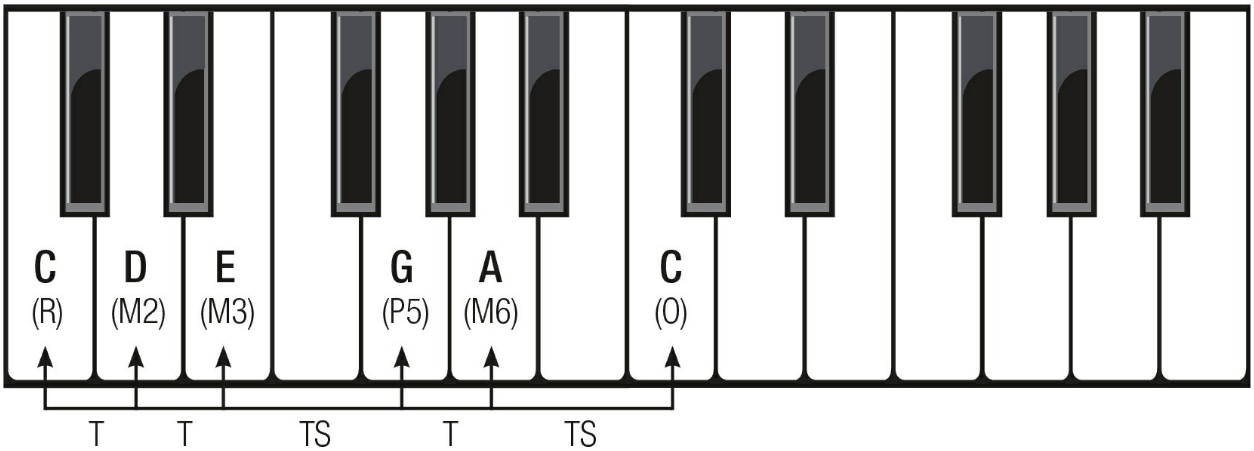


Figure 14: Major pentatonic structure in C on piano

What we have created by re-orienting the scale is called a **'mode.'** We can say that the Major pentatonic scale is a mode of the minor pentatonic scale, or that the minor pentatonic scale is a mode of the Major pentatonic scale. (We usually say the Major pentatonic is derived from the minor pentatonic because it is the one most used in virtually all blues and rock.)

So Major pentatonic scale is derived from the minor pentatonic structure, only it begins on what was the 2nd note of the minor pentatonic.

Like the minor pentatonic scale, the Major pentatonic scale is simple and recognizable, and most of us know it without realizing it. Because of the different set of intervals, this scale sounds different – it has a brighter, happier sound than its minor cousin, which is a result of it being a 'Major' scale. The notes of the Major pentatonic scale are all contained in the Major scale, and so it is useful whenever that scale can be used.

Because there are five notes in the minor pentatonic scale, there are five different notes that can act as the root of different modes. For each note in the collection, there is a different mode in which that note is the root, and the four other notes are defined with respect to it, resulting in five different sets of intervals from each note.

This is a very basic description of modes. As your understanding and application in playing deepens, you will start seeing them as completely separate scales rather than simple note re-orientations of the parent scales (that's why you can sometimes use the terms 'scale' and 'mode' interchangeably).

On a deeper level, modes show the relationships between chords and scales, and **they are completely relative to the chords that are playing underneath in the background, or on the backing track**. This concept will be extremely important when it comes to seven-note scales. But first, let's tackle the minor pentatonic scale modes.

Modes of the Minor Pentatonic Scale (with Audio Examples)

From what we've learned so far, we can easily list all the modes of the minor pentatonic scale. Since it contains five notes, there will be five different modes.

I've included audio examples of each mode to help you hear how that mode/scale sounds. Each audio track consists of the following (in order):

1. Scale tones played up and down (starting and ending on the root note) – this will help to establish the scale's tonal center in our ears.
2. A series of chords that belong to that scale. Since at this point in the book you may not be familiar with how chords are built and generated by scales, just focus on the sound of the chords, and notice how everything relates to the first chord that is played. After you go through the chord section later in the book you can come back to these scale audios again and it will be clear why those chords are played.
3. An improvisation excerpt over a drone note (a note, usually a low bass note, that is sustained or is constantly sounding in the background throughout the excerpt). The following example will be in A, so we'll be using A note as the drone note over which we'll be playing scale tones for each mode separately, in a musical way (i.e improvising).

Hearing, distinguishing and using modes is a process that will take some time, but once you do it, most things in theory will start to make much more sense, the dots will be connected, and it will make you a much better musician. So be patient and take your time with this. Let's get to the modes.

Minor Pentatonic Mode 1 – Minor Pentatonic Scale

The first mode of the minor pentatonic scale is just the minor pentatonic scale. It consists of a:

Root, minor 3rd, Perfect 4th, Perfect 5th, minor 7th

In A, the scale is: **A, C, D, E, G**. Here's how this scale, or mode 1, sounds:

Minor Pentatonic Scale Mode 1 audio example in A -> http://goo.gl/ixb9BQ

Pay close attention to how each of the notes played sound against the backing drone note. Some will add tension, some will feel more pleasant and some will provide resolution.

Minor Pentatonic Mode 2 – Major Pentatonic Scale

The second mode of the minor pentatonic scale has a special name. **It is the Major pentatonic scale**, as we've seen in the previous section.

It consists of the following intervals:

Root, Major 2nd, Major 3rd, Perfect 5th, Major 6th

With abbreviations:

R, M2, M3, P5, M6

In C, the notes are: **C, D, E, G, A**

C is the relative Major key of A minor pentatonic, which is considered its parent scale. You don't need to understand this for now, just keep the idea in your mind.

Here is the crucial thing – in the improvisation excerpt for this mode we will be playing over the A drone note again, so the tonal center will be A. In order to hear how this mode sounds we will play the **Major pentatonic scale, or mode 2 minor pentatonic scale, in A rather than C**, over this backing note. Hope you're still with me.

In order to do that, we need the notes of the A Major pentatonic scale, so we just apply the Major pentatonic formula starting from the A note. This formula is shown in Figure 14, but here it is again:

R **– T –** M2 **– T –** M3 **– TS –** P5 **– T –** M6 **– TS –** R

And the notes of the A Major pentatonic scale are:

A **– T –** B **– T –** C# **– TS – E – T –** F# **– TS –** A (Octave)

Now all we have to do is simply play these notes, improvise a melody with them, and listen to their individual (as well as overall) effect over the A drone note. This will give us the sound of mode 2 of the minor pentatonic scale, also known as the Major pentatonic scale.

Minor Pentatonic Mode 2 audio example in A -> http://goo.gl/x6ExEb

Again, pay close attention to each of the notes and how they sound against the backing A drone note. Notice how the Major 3rd – C# in this case – gives it that Major, upbeat feel. Be patient with this.

Minor Pentatonic Mode 3

Hope your head doesn't hurt much after all this, as we will now examine another mode. :) Luckily, it's the same concept for other modes, and if you get it once, you get it for all modes. From then it's just continuous practice and patience.

The third mode in our A minor pentatonic example begins on D and consists of a:

Root, Major 2nd, Perfect 4th, Perfect 5th, minor 7th

Or simply:

R, M2, P4, P5, m7

Let's quickly recap how we got to this (it's the same process as with the Major pentatonic mode).

In Mode 1 of the A minor pentatonic, the notes were: A, C, D, E, G. Mode 3 begins on the third note, which is D, and continues from there.

So the notes, now in D, are: **D, E, G, A, C**.

- D is no longer the Perfect 4th of A, it is now the root.
- E is no longer the Perfect 5th of A, it is now the Major 2nd relative to D.
- G is no longer the minor 7th of A, it is now the Perfect 4th relative to D.
- A is no longer the root, it is now the Perfect 5th relative to D
- C is no longer the minor 3rd of A, it is now the minor 7th relative to D.

Try to do this for modes 4 and 5 by yourself when we get to them; it will be a nice little mental workout.

Now again, D minor pentatonic mode 3 is relative mode to the A minor pentatonic because they share the same notes, and A minor pentatonic is its parent scale. But since our backing drone note is still A (in the audio example), in order to hear the characteristic sound of this mode we need to use **minor pentatonic mode 3 in A**.

So we just take mode 3's interval structure with the scale formula and apply it starting from the A note again. This will give us the following notes:

A(R) – T – B(M2) – TS – D(P4) – T – E(P5) – TS – G(m7) – T – A(O)

Playing this set of notes and intervals in A, over the A backing drone note will give us the sound of mode 3 of the minor pentatonic scale.

Minor Pentatonic Mode 3 audio example in A -> http://goo.gl/1aQJcV

Minor Pentatonic Mode 4

The fourth mode begins on E and consists of a:

Root, minor 3rd, Perfect 4th, minor 6th, minor 7th

Its notes are: **E, G, A, C, D**.

Now E is the root and we have a new set of intervals. But again, since we will be playing over A drone note we'll need to use minor pentatonic mode 4 in A to get its sound. So we take its interval structure along with the scale formula (Ts and TSs), and apply them starting from A note. This will give us the following notes:

A(R) **– TS –** C(m3) **– T –** D(P4) **– TS –** F(m6) **– T –** G(m7) **– T –** A(O)

It is worth nothing again: the intervals in parentheses explain the note's relationship to the root. **As with any mode, those intervals define a mode and are responsible for its characteristic sound.**

Minor Pentatonic Mode 4 audio example in A -> http://goo.gl/e8BXnq

Minor Pentatonic Mode 5

Finally, the fifth mode begins on the fifth note of the minor pentatonic scale, which in our A minor pentatonic example is G. It has a:

Root, Major 2nd, Perfect 4th, Perfect 5th, Major 6th

Its notes, in G, are: **G, A, C, D, E**.

To get this mode's sound over the A drone note used in the audio example we will have to use minor pentatonic mode 5 in A.

Without repeating the whole process again, the notes of the fifth minor pentatonic mode in A, are:

A(R) **– T –** B(M2) **– TS –** D(P4) **– T –** E(P5) **– T –** F#(M6) **– TS –** A(O)

Minor Pentatonic Mode 5 audio example in A -> http://goo.gl/ngqWWY

We've seen that mode 5 of A minor pentatonic is in G, with the notes G, A, C, D, E. As it has been stated several times, the backing drone note in our audio improvisation excerpts is A, so to get the mode's sound we had to use minor pentatonic mode 5 in A instead. (It can get confusing since modes of the minor pentatonic don't have special names like the diatonic modes do.) The point is, we could've used the fifth mode of A minor pentatonic, which starts on G, for the improvisation excerpts, but in that case we would have to play over a G drone note to hear the characteristics of the A minor pentatonic fifth mode sound. Since we played the fifth mode of the minor pentatonic in A, can you figure out its parent minor pentatonic scale? It's B minor pentatonic.

Don't worry if you don't get this now, it will be clearer when we get to diatonic modes; just remember, modes are completely relative to what's playing in the background – playing the same thing over a different backing will have different effects.

On another note, the sound of a mode becomes a bit more apparent when it's played over a full chord, or a chord progression in the backing track. Nonetheless, it's important (and easier to learn modes) to just start with a drone note and keep it simple at the beginning. We will go over the chords later in the book.

Minor Pentatonic Mode Comparison Charts

To sum up, here's a table showing the minor pentatonic modes in A with their interval functions:

MODES	NOTES	1	2	3	4	5	6	7	8	9	10	11	12	
		R	m2	M2	m3	M3	P4	Aug 4th	P5	m6	M6	m7	M7	Octave
MODES	1st mode (minor pentatonic scale)	A			C		D		E			G		A
	2nd mode (Major pentatopnic scale)	C		D		E			G		A			C
	3rd mode	D		E			G		A			C		D
	4th mode	E			G		A			C		D		E
	5th mode	G		A			C		D		E			G

Table 5: Minor pentatonic modes in A

If you want a good workout you can try to fill out the table in a different key, for example C (you would start with C as the root note in the top left corner).

Minor Pentatonic Mode 1	R	m3	P4	P5	m7	Intervals
	1	**b3**	**4**	**5**	**b7**	Notes
Minor Pentatonic Mode 2 — Major Pentatonic Scale	R	M2	M3	P5	M6	Intervals
	1	**2**	**3**	**5**	**6**	Notes
Minor Pentatonic Mode 3	R	M2	P4	P5	m7	Intervals
	1	**2**	**4**	**5**	**b7**	Notes
Minor Pentatonic Mode 4	R	m3	P4	m6	m7	Intervals
	1	**b3**	**4**	**b6**	**b7**	Notes
Minor Pentatonic Mode 5	R	M2	P4	P5	M6	Intervals
	1	**2**	**4**	**5**	**6**	Notes

Table 6: Minor Pentatonic Interval Comparison

Notice in Table 6 how notes and their functions change with different modes. Notice for example how modes 2 and 5 are similar – Mode 2 has a Major 3rd (3) and Mode 5 has Perfect 4th (4). Look for patterns and notice the differences.

We will now move on to seven-note scales, but first...

What Does the Term ‘Diatonic’ Mean?

A scale is diatonic when it is a mode, or variation, *of the Major scale*. This includes the natural minor scale and all seven of the diatonic modes (of which the Major and minor scales are two).

The word ‘diatonic’ is Greek, and it means ‘across the octave.’ The name refers to the fact that the structure of diatonic scales is such that there is an even distribution of seven notes across the 12-note octave. **There is never, in any diatonic scale, more than a whole step (tone) between two notes, and the half-steps (semitones) are spread**

out by at least two whole steps.

While there are seven diatonic scales – called the diatonic modes, which includes the Major scale and the minor scale **–** there is only one diatonic structure.

This is because all seven of those scales are defined in terms of one another. In fact, they are generated from one another (though in most cases they are said to be generated from the Major scale because it is the most fundamental scale).

They share a structure because they are effectively the same seven-note pattern beginning at different notes/points. (If you treat the first note of the Major scale as the first note of the diatonic structure, then you can define a completely different scale by moving up that structure and beginning on the second note, or the fifth note, or any other note – just like in the minor pentatonic modes.)

Since there is only one diatonic structure, it is possible to talk both about diatonic scales (meaning the modes of the Major scale) and also about THE diatonic scale (as in the underlying structure of those modes).

This is an exclusive usage and understanding of the term 'diatonic scale', which is not entirely consistent, but is by far the most common and recommended. Some theorists also include harmonic and melodic minor modes as diatonic for specific reasons, but this is much rarer and can cause some confusion.

7-Note Diatonic Scales – Natural Major and Natural Minor Scales

As we now know, the most basic, fundamental type of seven-note scale is called a 'diatonic scale', and this category includes what are probably the two most easily recognizable scales by name: the **natural Major scale** (usually simply 'the Major scale') and the **natural minor scale** (usually simply 'the minor scale').

These two scales form the harmonic and melodic bedrock that Western music lies on and has laid on for a very long time, and similar scales are found throughout the history of world music (in traditional Indian music, for instance).

It is worth noting now that, just like with the minor pentatonic and Major pentatonic, natural Major and natural minor scales are simply the modes of each other, but with the Major scale considered the most fundamental diatonic scale.

Also worth noting is that the 5-note Major pentatonic scale is just like the seven-note natural Major scale, except that two notes are omitted. Same goes for the minor pentatonic and the natural minor scale.

These pentatonic scales came from the desire to remove the intervals that are a semitone apart in the diatonic structure. Because of that, minor and Major pentatonic scales are essentially simplified and safer sounding minor and Major scales. See the scale comparison chart later in the book and this will become crystal clear.

Why is the Major Scale the Most Important Scale to Learn?

Beyond the pentatonic scale, the first scale most musicians learn is the major scale. It is also the first scale most of us, even at a young age, can recognize. It is the foundation of Western music, and virtually all seven-note scales are derived from it in one way or another **–** it is the yardstick against which they are defined. For all these reasons, it is often the first piece of real music theory that instructors introduce to beginning musicians.

The Major scale is the scale that results when you sing that familiar 'do, re, me, fa, sol, la, ti, do.' (Singing notes in this way is referred to as **solfege**.) It is generally described as a happy, uplifting scale, and it is easy to produce highly consonant melodies using it. For this reason, many pop songs are written using the Major scale.

The intervals that define any given scale are described according to their relationship to the intervals that make up a Major scale. In other words, all scales are in some way measured against the Major scale.

This seven-note scale is the foundation of all diatonic harmony; all of the variations of the Major and natural minor scales can be generated from the Major scale, and since all non-diatonic harmony can be seen as diatonic harmony that has been altered chromatically in some way, there are virtually no scales that aren't somehow derivable from the

Major scale and its variations.

In most types of Western music, from classical to Celtic to pop, the Major scale forms the foundation of the harmony. Minor pentatonic might be regarded as ‘the king’ in all blues music, but even that scale is derived from the natural minor scale, which is again derived from the Major scale.

In Western music everything relates back to the Major scale in one way or another and that’s why it is the most important scale to learn.

Understanding the Major Scale Structure

The Major scale is a seven-note scale, so it consists of seven notes. The structure of a Major scale is relatively even (the consequence of being a diatonic scale). It consists of:

1. A **root** note (R)
2. Then a note a whole step above that, called the **Major 2nd** (M2)
3. A note a whole step above that – the **Major 3rd** (M3)
4. A note a half step above that – the **Perfect 4th** (P4)
5. A note a whole step above that – the **Perfect 5th** (P5)
6. A note a whole step above that – the **Major 6th** (M6)
7. And a last note a whole step above the 6th, which is the **Major 7th** (M7).

The distance between the seventh note and the first note of the next octave is a half-step, and the overall structure of the scale (you can also say ‘scale formula’) is:

whole, whole, half, whole, whole, whole, half

W W H W W W H

or:

Tone, Tone, Semitone, Tone, Tone, Tone, Semitone

T T S T T T S

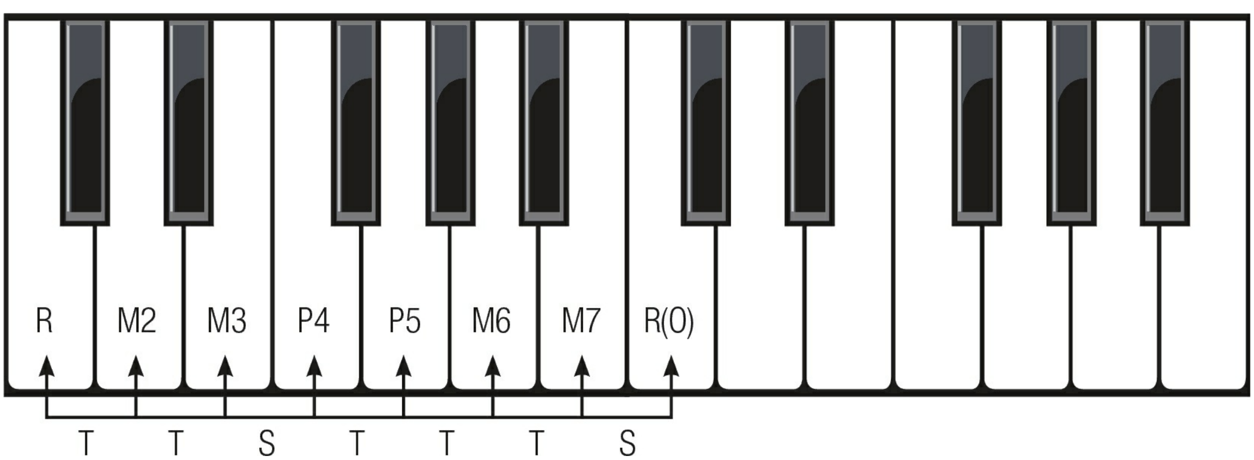


Figure 15: Major scale structure

And here’s how it looks on a guitar fretboard:

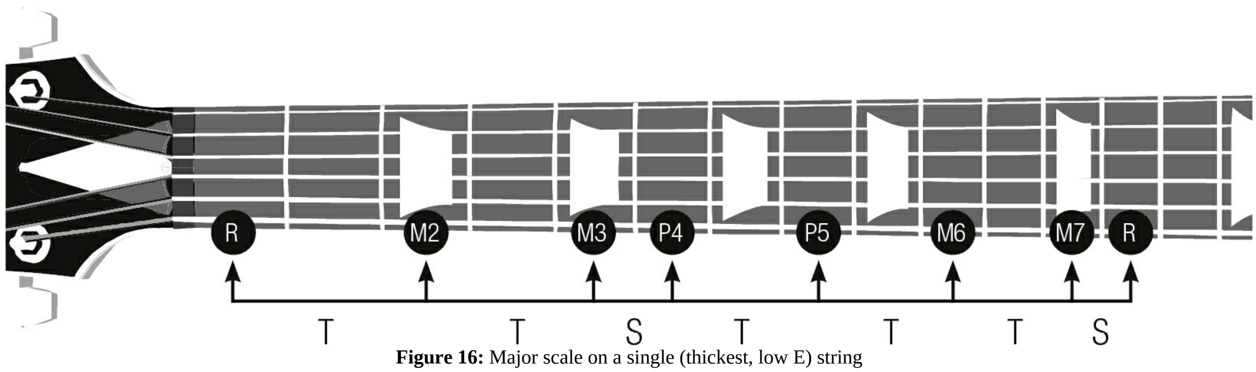


Figure 16: Major scale on a single (thickest, low E) string

So we have:

R — **T** — M2 — **T** — M3 — **S** — P4 — **T** — P5 —— **T** — M6 — **T** — M7 — **S** — R (Octave)

This is the form of all diatonic scales (only since they're modes of each other, they begin at different points in the structure).

Each scale has a starting note – called the root note (R), which gives the scale its name. The root note can be any of the twelve notes from the note circle.

If we say: 'In the key of A major' (or you can just say 'in A', if it's a Major key), it means we use A note as the root note and then apply from it the Major scale structure (T T S T T T S).

So 'in A' the notes would be:

A — **T** — B — **T** — C# — **S** — D — **T** — E — **T** — F# — **T** — G# — **S** — A

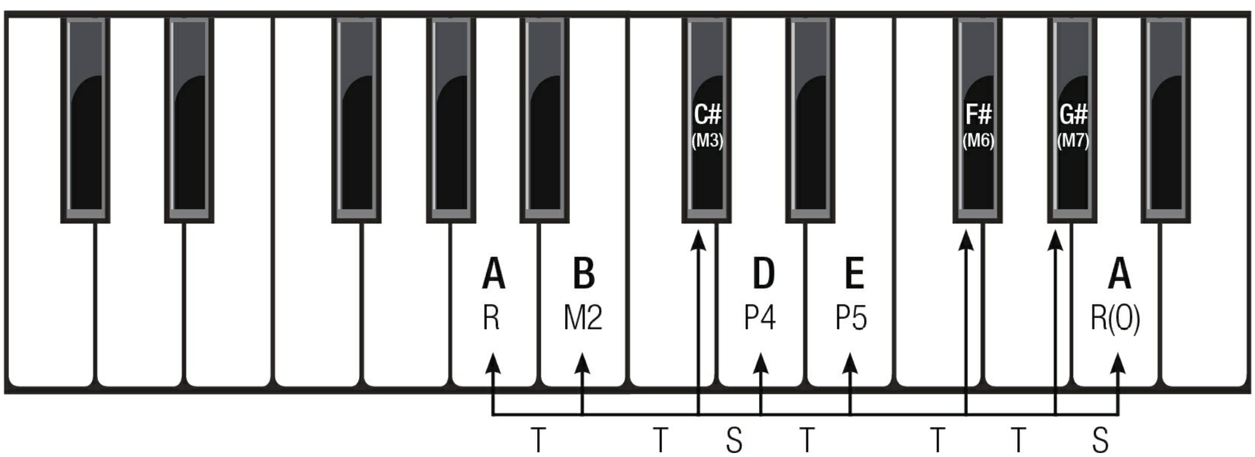


Figure 17: Major scale in A

In the key of C, the notes are:

C — **T** — D — **T** — E — **S** — F — **T** — G — **T** — A — **T** — B — **S** — C

If you start on the D note you would get the D Major scale, if you start on the G, that would be the G Major scale, Bb would be Bb Major scale, and so on.

Out of all twelve keys, C Major key is specific because it contains all the notes of the chromatic scale minus the sharps and flats: C, D, E, F, G, A, B – which means that on a piano the C Major scale is just the white keys. Every other key has one or more black keys (sharps/flats).

It is worth repeating that knowing the scale formula of a scale is very useful because you can start on any note, apply the formula, and you will get all notes of that scale. You don't have to remember all the note positions of a particular scale on your instrument – if you just know the scale formula and understand its interval structure it is very easy to remember, play and use that scale.

In the case of the Major scale this is particularly important because, if you recall, all other scales are derivable from the Major scale, and if you know the Major scale structure it is much easier to understand, learn and use other scales, even the non-diatonic ones.

Natural Minor Scale Structure

Second only to the Major scale is the natural minor scale, or simply the minor scale for short. No less foundational, it is remarkably different. The minor scale is less common in pop music than the Major scale, since it is far harder to create a melody that will stick in someone's ear with the minor scale than with the Major scale.

This scale is useful in many situations, and it is marked by a pronounced tension that creates musical friction while at the same time sounding rather consonant.

The natural minor scale is, according to many people, a sad, deep, dark sounding scale. It is the dark cousin of the Major scale. Though it can be played in ways that make the music move quickly and even brightly, the natural tendency of this scale is in the direction of darkness.

The minor scale is dark, deep, and heavy sounding, and is often described as 'sad.' Though the Major scale is more common in some forms of music, the minor scale is far from rare, occupying a central place in classical and jazz, among other styles.

The minor scale is a mode of the Major scale (the 6th mode). So the minor scale that is the mode of the C Major scale—

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

— is the A minor scale, consisting of the notes A, B, C, D, E, F and G.

The structure of this scale is the same as that of the Major scale: whole, whole, half, whole, whole, whole, half, only it is re-oriented so that the 6th note of the Major scale is the root of the corresponding minor scale (In C, that means the root of the minor scale is A; in A Major the relative minor scale is F# minor, and so on).

So the structure of the minor scale is the same as the Major, only shifted so that it now starts from the 6th note. It's the same concept as with the pentatonics but is worth going through again.

Now it is:

tone, semitone, tone, tone, semitone, tone, tone.

or

T S T T S T T

The minor scale consists of the following notes:

Root, Major 2nd, minor 3rd, Perfect 4th, Perfect 5th, minor 6th, minor 7th

So we have:

R **— T —** M2 **— S —** m3 **— T —** P4 **— T —** P5 **— S —** m6 **— T —** m7 **— T —** R

Here it is on a guitar fretboard:

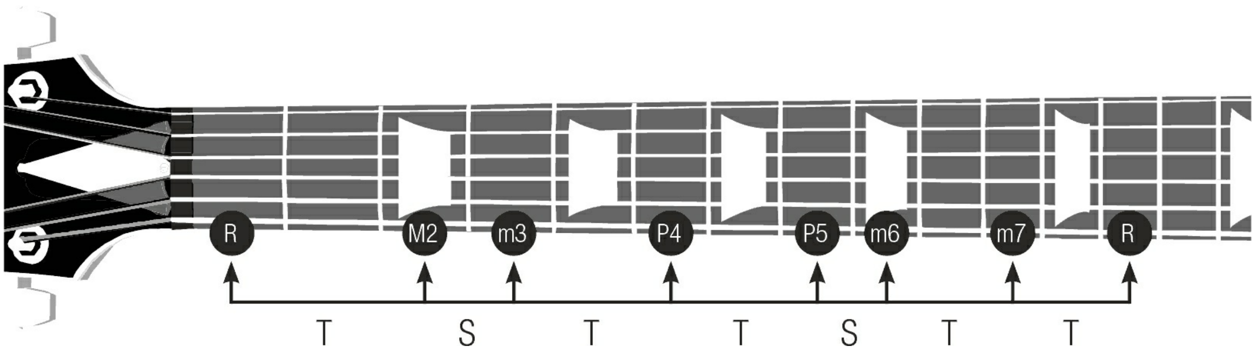


Figure 18: Natural minor scale on the thickest guitar string

The notes in A minor now are:

A — **T** — B — **S** — C — **T** — D — **T** — E — **S** — F — **T** — G — **T** — A

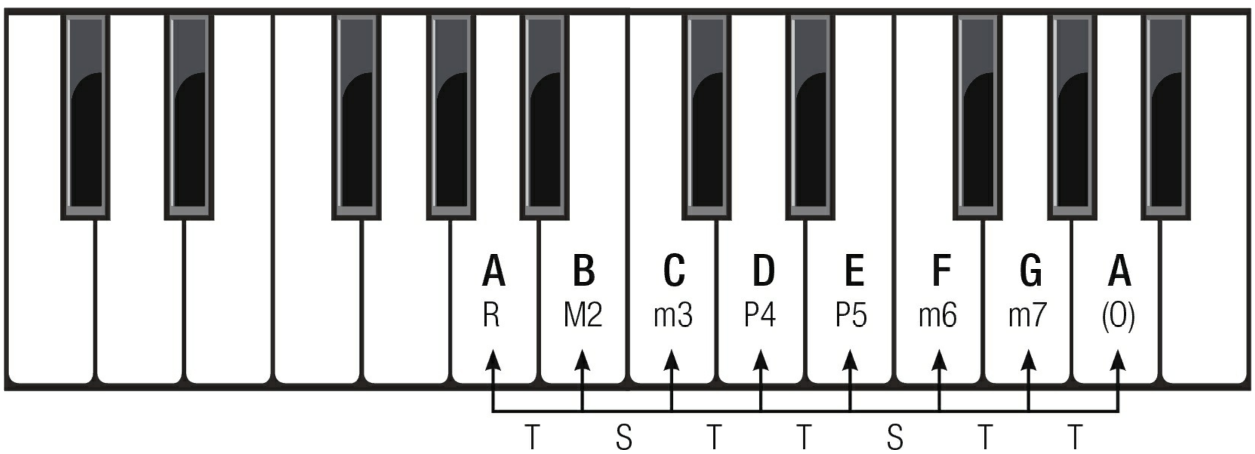


Figure 19: Minor scale structure in A

Notice the similarities between this A minor scale and its relative Major — C Major scale. (It's the same structure only the notes are re-oriented so that now A is the starting note.) Because of this, the key of A minor is also without sharps or flats. This goes for any mode of the C Major key.

Also notice the similarities between this minor scale and the minor pentatonic, and the Major and Major pentatonic scale. Can you figure out which notes are left out? Refer to the scale comparison chart should you have any trouble with this.

As an exercise you can try to figure out the relative minor scales of the following Major keys: G, D, A, E, B, F.

Major and Minor Scale – Understanding the Difference

We have already said that the Major and minor scales are modes of one another. They are each diatonic modes and so they are each variations on the same fundamental harmonic structure.

But that doesn't mean they are the same scale. While they share a structure, they begin at different parts of that structure, which means that the set of intervals that define those scales is radically different. Music is all about the intervals, and if the set of intervals within a scale is different – even though the scales share the same harmonic structure – then the sound of that scale will be different as well.

What was the distance between the first and third notes of the Major scale is now the distance between the third and fifth notes of the minor scale. That means that if you play a Major scale and a minor scale that are relative to each other (i.e. that contain all of the same notes), then the note that was the Major 3rd of the Major scale is now the Perfect 5th of the minor scale. The note that was the Perfect 4th of the Major scale is now the minor 6th of the minor scale.

The Major scale consists of intervals (with respect to its root) that define a happy, bright, typically Major-sounding scale, while the minor scale's intervals (with respect to its root) define a sad, dark, typically minor-sounding scale.

In general, the difference between these scales is quite stark, and it is the difference between darkness and light, between happy, easy play and sad, dark depth. It is easy to hear the difference, and once you do, it will be easy to identify the general difference between Major and minor tonalities in the future.

A word on that last thought: There is the difference between the Major scale and the natural minor scale, but there is also the difference between Major and minor tonalities in general. There are many Major chords and many Major scales, just as there are many minor chords and many minor scales. Each of them is different from the others, sometimes radically.

The thing that all Major scales and chords have in common however, is their being Major. While the natural Major scale is the typical, iconic Major scale and the natural minor scale is the typical, iconic minor scale, there are other Major scales (such as the Lydian mode) and other minor scales (such as the Phrygian mode) that have enough in common with those iconic scales to be in the same Major or minor family – both of which belong to one big diatonic family.

Once you have learned to distinguish between the Major and minor scales, distinguishing between Major and minor tonalities in general is only a step away, and generally comes easily.

Figuring Out the Major Scale in All Keys (Major Scale Exercise)

A great exercise for you now (and a cool learning experience) is to figure out the Major scale tones for each of the notes/keys.

Take a look at the table on the next page, copy it if necessary and fill it out with the appropriate notes. You can use the note circle if you're stuck, or to check afterwards to see if you got it right.

KEY	T	T	S	T	T	T	S
1	2	3	4	5	6	7	1
C	D	E	F	G	A	B	C
G							
D							
A							
E							
B							
F							
Bb							
Eb	F	G	Ab	Bb	C	D	Eb
Ab							
Db							
Gb							
C#							
G#							
D#							
A#	B#	C##	D#	E#	F##	G##	A#
F#							

Figure 20: Major scale in all keys

There are 12 notes in music, so there must be 12 Major scales – each starting from a different note, right? Well, yes, but in music theory it's not that simple. We have to deal with both #'s and b's.

In order to fill out the entire table correctly you have to follow a simple rule in music theory which says that **there can't be two side-by-side notes with the same name**. In other words, you need to have each letter of the alphabet in a scale key only once, and you just add #'s or b's as necessary. A good practice when figuring out the notes of a scale then is to first just write out the alphabet letters from the starting note.

Let's check out the key of A# as an example – a purely theoretical key and a hard one to figure out. One tone after A# is C, one tone after C is D, and one semitone after D is D#, etc. But we can't have A# – C – D – D# because this breaks the rule: B letter is missing and two D's are side by side. That's why we use double sharps (or flats for flat keys) and we write this key in the following way:

A# — **T** — B# — **T** — C## — **S** — D# — **T** — E# — **T** — F## — **T** — G## — **S** — A#

On the table the first 7-8 keys are very commonly used in music. I've left the theoretical keys like A# for you as a challenge and practice. Try to figure them out and you'll gain a much better understanding of Major scale keys.

Note that for the keys starting on a note with sharp (#) you would use #'s, and if the key starts on a note with flat (b), you need to use b's. I've provided a complete list of all notes in all keys at the end of this book so that you can double check your work.

Demystifying Diatonic Modes

If there is one thing that scares musicians, in particular guitarists, it is the diatonic modes. Widely known but rarely understood, 'the modes' are nearly mythical for many players at all levels.

Most of us know that the modes are important, that great players know all about them, but it feels like they are miles away – part of what people call 'music theory' and not at all the sort of thing we can understand, much less make use of.

Maybe we have heard of modal jazz and believe that the modes are of interest to advanced jazz players with years of formal training, but that they are otherwise unnecessary or beyond our reach.

But the modes are not monstrous. They are not a myth. They are not only for people who spent their 20s in music school. They aren't just for jazz musicians, and they aren't, once you have learned them, any more difficult to use than any other scales. What they are, however, is important.

The modes give us a way to understand the interconnectedness of different scales, offer us a variety of scales to choose from in many situations and give us the tools to compose or improvise in any number of ways over and in virtually any harmonic framework.

We have seen that a mode is simply a re-orientation of a scale, treating a different note as the root and re-defining the other notes in the scale. The notes stay the same, but since the harmonic center is different, the set of intervals has changed (e.g. what was a perfect 5th in the A minor scale becomes a Major 3rd in the C Major scale). And that is the essence of modality – the fact of the relative harmonic value of notes.

A note is not a static, unchanging thing; a note does different things in different contexts (depending on the harmony that is playing underneath or in the background). It is relative. That is the fact that confuses many players, and it is the reason modes are often avoided.

Before going any further, it is important to understand a few terms.

Parallel and Relative Modes, Parent Scales and Tonal Center

When we talk about modes and scales, we talk about two ways for scales to relate to one another consonantly. One is being in parallel, and the other is being relative.

Relative Modes

Relative modes are what most of us think about when we think about 'the modes', and it is the way the modes have been presented thus far. Relative modes are scales that **contain all of the same notes but begin at different places**. C Major and A minor are relative scales, as are G Major and E minor.

Coming back to the minor pentatonic modes, it was said that all of the modes of the minor pentatonic are relative to one another because they share the same notes, as we've seen: for example, A minor pentatonic and C Major pentatonic are relative scales, as are mode 3 of A minor pentatonic in D and A minor pentatonic, and so on.

Relative modes are useful when extending the range of a piece up or down the harmonic space, on a guitar fretboard for instance. They are also useful when figuring out which chords will substitute best for other chords, but we'll get to that later in the book.

Parent scales

This is the scale that other modes are derived from. As we've seen, for all five modes of the minor pentatonic, the first mode – the minor pentatonic – is considered the **parent minor scale**, since other modes are derived from it.

It is important to be able to tell quickly what the parent scale of each mode you encounter is. For example, can you figure out what the parent scale of minor pentatonic mode 4 in C# is?

You would need to list out the notes first by applying the minor pentatonic mode 4 formula starting from C#:

C#(R) – TS – **E**(m3) – T – **F#**(P4) – TS – **A**(m6) – T – **B**(m7)

We know that relative modes are just re-orientations of the parent scale, so from which note does C# appear as the 4th?

It's F# (F#, A, B, **C#**, E). So the parent minor scale of the minor pentatonic mode 4 in C# is F# minor pentatonic.

There are quicker methods of figuring out the parent scales which usually involve using your instrument, although this is something that will come naturally with time as you continue to use modes in your playing. On the guitar fretboard for instance, there are physical shapes you can derive from the notes and their positions relative to one another, and you can visualize this shape anytime you want to recall the parent scale and other relative modes of a mode, quickly.

Tonal center

Tonal center is like the center of gravity – it is usually the chord or a note that the mode is played over (as in our audio examples). When we use a mode, there are some notes that will help define the tonal center. These are the **good notes**, or you could also call them the **home notes**. These notes are usually the notes of the chord that is playing in the background at any given moment, and the strongest of them is the root note. (This is usually the safest one to land on during playing.)

Then, there are some notes that pull away from the tonal center, establishing a movement, and there are some that will add lots of tension, which tends to resolve to a home note. There are also bad notes, which can really clash with the tonal center or other notes playing in the background, and they usually won't sound good at all.

Parallel Modes

A parallel mode or scale is simply a scale that shares its root with the original scale in question. In other words, **the modes that share the same tonal center are parallel modes**. For instance, A Major and A minor are parallel modes, B minor pentatonic and B Major pentatonic are parallel modes, as are E Locrian and E Lydian (don't worry about the fancy names for now), or any other mode/scale with the same starting note. In the audio examples for the minor pentatonic modes, we played parallel modes against the A drone note.

Relative modes share the same parent scale – they have the same notes, ordered differently, but they have different roots, which means they have different tonal centers. Parallel modes on the other hand share the same root – the same tonal center – but they have different parent scales. This distinction is important to understand and remember.

Parallel modes are quite useful in modal harmony, when it is not uncommon to alter the harmony of a piece by substituting one parallel mode for another. This is called modal interchange. More on this much later in the book.

Diatonic Modes Spelled Out (with Audio Examples)

We've seen that the Major scale is a mode of the minor scale and that the minor scale is a mode of the Major scale. In general, the Major scale is taken to be primary when talking about the diatonic modes, and when we talk about 'the modes,' we are almost always talking about these scales – diatonic scales: the Major scale and its modes, which include the natural minor scale.

There are 7 notes in the diatonic scale and so there are 7 diatonic modes. Unlike the pentatonic scale modes, diatonic modes each have their own Greek name, and those names are usually how we refer to the modes when we are thinking modally.

Again, we will have audio examples for each mode in the same format:

- A scale/mode played up and down
- Chords from that scale played in order (in triad form)

- An improvisation excerpt, this time over the C drone note

The key we'll be using is C Major and all of the improvisation excerpts will be played over a C drone note.

Ionian Mode

The first mode is the normal Major scale. This is also known as the Ionian mode. In C, its notes are: **C, D, E, F, G, A, B**.

It consists of a:

Root, Major 2nd, Major 3rd, Perfect 4th, Perfect 5th, Major 6th, Major 7th

This mode has a happy, melodic, consonant sound. We have already examined this scale/mode in the previous sections. In the improvisation excerpt we will play this mode over C drone note so we will use C Ionian mode – or you could just say a regular C Major scale.

Ionian mode audio example in C -> http://goo.gl/szNpFJ

Dorian Mode

The second mode of the Major scale is the Dorian mode. It starts on the second note of the Major scale. The Dorian mode is a minor mode (though it is not 'the minor scale') since its 3rd is minor and not Major. (This is generally how scales are divided between Major and minor.)

In D, its notes are: **D, E, F, G, A, B, C**.

It has a:

Root, Major 2nd, minor 3rd, Perfect 4th, Perfect 5th, Major 6th, minor 7th

How did we get these intervals? Easy: just for this mode let's do a quick recap.

D Dorian is relative to C Major scale because, as we can see, they share the same notes – but have different tonal centers. Since we know the notes in C Major, we know them in D Dorian as well, and it's easy to figure out the intervals from there:

- D is the Root
- E is the Major 2nd up from D
- F is the minor 3rd up from D
- G is the Perfect 4th up from D
- A is the Perfect 5th up from D
- B is the Major 6th up from D
- C is the minor 7th up from D

Another way to get to this interval structure without the tonal center is to take the Major scale formula—

T **T** S T T T S

— and re-orient it like we did with the notes. Since this mode starts on the second note of the Major scale, we start on the second 'T' (in bold).

So the scale formula for the Dorian mode is:

T S T T T S T

Now we just start from the root (which could be any note) and continue from there:

R – **T** – M2 – **S** – m3 – **T** – P4 – **T** – P5 – **T** – M6 – **S** – m7 – **T** – R (O)

The Dorian mode is darker than the Ionian mode because of the minor 3rd, but it sounds a little brighter than the minor scale because of the Major 6th. It is a common scale in jazz and especially blues. Make sure to consult the Scale Comparison Charts afterwards to look for these differences.

Now, like with the pentatonic modes, we will play this mode in parallel since our drone note is C. That means that we will play **C Dorian mode** over C in the improvisation excerpt.

First, we need to figure out the notes in C Dorian, which is super easy because we can just apply its Dorian scale formula or its interval structure, both of which we're familiar with:

C – T – **D** – S – **Eb** – T – **F** – T – **G** – T – **A** – S – **Bb** – T – **C (O)**

- Can you explain why we used flats (b's) to write out these notes and not sharps (#'s)?

Dorian mode audio example in C -> http://goo.gl/EiwnD7

Again, listen to the effect of each note over the drone note. Notice which notes are stable and safe sounding and which ones are more dissonant, providing tension, and how that tension is released to a stable note.

Phrygian Mode

The third mode is the **Phrygian mode**. It starts on the third note of the Major scale. It is a minor mode (because of the minor 3rd), though again it is not the natural minor scale. In E, its notes are: **E, F, G, A, B, C, D**.

It has a:

Root, minor 2nd, minor 3rd, Perfect 4th, Perfect 5th, minor 6th, minor 7th.

The Phrygian mode is dark sounding and due to its minor 2nd, is very exotic sounding. The minor 2nd note is just a half-step above the root, so this note adds a lot of dissonance because it naturally wants to resolve to the nearest tonic (the root). This mode is used in some jazz, metal, as well as Latin and Indian-influenced music.

In the audio example we use C Phrygian over the C drone note. The notes in C Phrygian are:

C (R) – **Db** (m2) – **Eb** (m3) – **F** (P4) – **G** (P5) – **Ab** (m6) – **Bb** (m7)

Phrygian mode audio example in C -> http://goo.gl/dvr2ke

Lydian Mode

The fourth mode is the **Lydian mode**. It starts on the fourth note of the Major scale. This is a Major scale because it's 3rd is Major, and its notes in F are: **F, G, A, B, C, D, E**.

It has a:

Root, Major 2nd , Major 3rd, Augmented 4th (tritone), Perfect 5th, Major 6th, Major 7th

The Lydian mode is a very pleasant sounding mode – similar to the Major scale (it differs from it only by one note: the tritone), only slightly more exotic. There is a subtle dissonance in this mode, though it is a Major mode, and so it tends to sound rather complex, even sophisticated. It is widely used in jazz in place of the Major scale and over certain jazz chords.

Since we'll be using C Lydian mode to play over the C drone note, we'll need the notes of the C Lydian scale:

C (R) – **D** (M2) – **E** (M3) – **F#** (Aug4) – **G** (P5) – **A** (M6) – **B** (M7)

Lydian mode audio example in C -> http://goo.gl/YtV1MW

Mixolydian Mode

The fifth mode is the Mixolydian mode. It starts on the fifth note of the Major scale. It is a Major mode and its notes in G are: **G, A, B, C, D, E, F**.

It consists of a:

Root, Major 2nd, Major 3rd, Perfect 4th, Perfect 5th, Major 6th, minor 7th

The Mixolydian mode is a great blues scale and has a round, stable sound. Like the Lydian mode, the only difference to the Major scale is one note – the minor 7th.

In the audio example we will play the C Mixolydian over C note. Its notes are:

C (R) – **D** (M2) – **E** (M3) – **F** (P4) – **G** (P5) – **A** (M6) – **Bb** (m7)

Mixolydian mode audio example in C -> http://goo.gl/nKAPRv

Aeolian Mode

The sixth mode is the **Aeolian mode**. *This is the natural minor scale*. In A, its notes are: **A, B, C, D, E, F, G**.

It has a:

Root, Major 2nd, minor 3rd, Perfect 4th, Perfect 5th, minor 6th, minor 7th

The Aeolian mode is quite dark, even sad sounding, though it is not altogether dissonant, and it is widely used in virtually all types of music. We have examined this scale in the minor scale section.

In the improvisation excerpt we will use C Aeolian mode, or C natural minor scale. Its notes are:

C (R) – **D** (M2) – **Eb** (m3) – **F** (P4) – **G** (P5) – **Ab** (m6) – **Bb** (m7)

Aeolian mode audio example in C -> http://goo.gl/kkGZLh

Locrian mode

The seventh and final mode is the Locrian mode. It starts on the seventh note of the Major scale. In the case of C Major, it starts on B; so in B, its notes are: **B, C, D, E, F, G, A**.

It contains a:

Root, minor 2nd, minor 3rd, Perfect 4th, diminished 5th (tritone), minor 6th, minor 7th

This mode is strange, and rarely used. It is a minor scale, but both its 2nd and 5th notes are flat. It is the only diatonic mode without a Perfect 5th; the Locrian mode is thus highly unstable. Historically, this scale was avoided altogether. Its sound is heavy, dissonant and unstable.

We'll be using C Locrian in the improvisation excerpt over the C drone note. The notes in C Locrian are:

C (R) – **Db** (m2) – **Eb** (m3) – **F** (P4) – **Gb** (dim5) – **Ab** (m6) – **Bb** (m7)

Locrian mode audio example in C -> http://goo.gl/i6DVRG

Diatonic Modes Comparison Charts (Plus PMS Exercise)

I hope that you can see by now how modes are easy once you understand them fundamentally.

To sum up, here's a table showing the diatonic modes:

	NOTES	1	2	3	4	5	6	7	8	9	10	11	12	
		R	m2	M2	m3	M3	P4	Tritone	P5	m6	M6	m7	M7	Octave
MODES	1st mode Ionian (Natural Major scale)	C		D		E	F		G		A		B	C
	2nd mode Dorian	D		E	F		G		A		B	C		D
	3rd mode Phrygian	E	F		G		A		B	C		D		E
	4th mode Lydian	F		G		A		B	C		D		E	F
	5th mode Mixolydian	G		A		B	C		D		E	F		G
	6th mode Aeolian (Natural minor scale)	A		B	C		D		E	F		G		A
	7th mode Locrian	B	C		D		E	F		G		A		B

Table 7: Diatonic modes in C All these modes are relative to C Major scale.

And here's a table showing all modes with their respective intervals and notes:

Ionian	R	M2	M3	P4	P5	M6	M7	Intervals
	1	**2**	**3**	**4**	**5**	**6**	**7**	Notes
Dorian	R	M2	m3	P4	P5	M6	m7	Intervals
	1	**2**	**b3**	**4**	**5**	**6**	**b7**	Notes
Phrygian	R	m2	m3	P4	P5	m6	m7	Intervals
	1	**b2**	**b3**	**4**	**5**	**b6**	**b7**	Notes
Lydian	R	M2	M3	Aug4	P5	M6	M7	Intervals
	1	**2**	**3**	**#4**	**5**	**6**	**7**	Notes
Mixolydian	R	M2	M3	P4	P5	M6	m7	Intervals
	1	**2**	**3**	**4**	**5**	**6**	**b7**	Notes
Aeolian	R	M2	m3	P4	P5	m6	m7	Intervals
	1	**2**	**b3**	**4**	**5**	**b6**	**b7**	Notes
Locrian	R	m2	m3	P4	dim5	m6	m7	Intervals
	1	**b2**	**b3**	**4**	**b5**	**b6**	**b7**	Notes

Table 8: Diatonic modes with their intervals and notes

Study this chart. It is a very important chart for the diatonic modes and you will need to memorize it if you want to use modes in your playing efficiently. Also, take some time to answer the following questions:

- How do b's appear after the Ionian mode? *Notice that Dorian adds b's on the 3rd and the 7th, and Phrygian adds flats just behind those – on the 2nd and the 6th.*
- What is the only mode with a '#' and where?
- What is the mode with only one 'b' and where?
- What is the mode with the most flats and where are they located?
- What is the one big difference between Aeolian and Phrygian modes and why?
- Why does Locrian mode sound obscure and why is it difficult to use?
- Why have we written b5 for the Locrian mode instead of #4?

Parent Major Scales (Exercise)

When using modes, you should think about them in parallel, that is, treat them as separate scales, but at the same time it is important to know their relative scales and what the parent Major scale is of each mode in any key.

For example, the parent Major scale of E Locrian is…

…F Major, and the parent Major scale of F Lydian is…

…C Major.

Let's explain these two. First, E Locrian – we know that Locrian is the 7th mode of its parent Major scale (PMS). We also know that in a Major scale, the 7th note is just a half-step behind the root note. In this case, a note that is a half-step up from E is F, so the PMS of E Locrian is F Major or F Ionian (both are correct, although it's more correct to say F Major in this case). Figuring out the PMS for the Locrian mode is very easy in any key.

You can apply this process for all modes simply by counting the steps and half-steps.

- **Dorian** is just one whole step up from its relative PMS root, or ten half-steps down from the root octave. So in any Dorian key you can just count two half-steps (or semitones) back in your head. For example, the

PMS of D# Dorian is C# Major scale.

- **Phrygian** is two whole steps up from the PMS root or 4 half-steps. In the opposite direction, it is 8 half-steps down from the root octave.
- **Lydian** is 5 half-steps up from the root, or 7 half-steps down from the root octave.
- **Mixolydian** is 7 half-steps up from the root, or 5 half-steps down from the root octave.
- **Aeolian** is 9 half-steps up from the root, or 3 half-steps down from the root octave.
- **Locrian** is 11 half-steps up from the root, or 1 half-step down from the octave.
- **Ionian** is zero half-steps up or down from the root.

But what if we have a mode that is in the middle of the PMS, namely: Phrygian, Lydian, Mixolydian or Aeolian, and we don't want to bother with counting the half-steps?

For that, let's determine the PMS of F Lydian. The process, which can be done for any mode, is as follows (it was described briefly earlier in the parent scale section):

First, we list out the notes of F Lydian (you can use *Table 8 – Diatonic modes with their intervals*, for this):

F (R) – G (M2) – A (M3) – B (#4) – C (P5) – D (M6) – E (M7) – F (O)

Since we know that Lydian is the fourth mode of its PMS, we look at the notes and see from which note F comes as the 4th?

It's C.

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

So PMS of F Lydian is C Major scale.

As an exercise try to figure out the parent Major scale of the following modes:

1. G Dorian?
2. F# Mixolydian?
3. E Phrygian?
4. A# Aeolian?
5. G Lydian?
6. D Locrian?
7. B Ionian?
8. Db Mixolydian?

There will be answers provided at the end of the book in the Cheat Sheet section.

How to Hear a Mode (Practical Exercise)

It is one thing to know what the modes are, to know what modality is in abstraction and to be able to name the modes, even to spell their intervals and relationship. It is one thing to know a scale, but it is quite another to understand it practically. It is one thing to have it in your mind; it is another to have it in your ears. The point of learning scales and their modes is to be able to make use of them, and that means being able to really hear them and to know, from their name, what they will sound like and how they will feel.

In some music courses, there is a lot of focus on formal ear training and sight singing, in which students are asked to recognize, name and notate scales (among other things) by their sound and sing them accurately after only seeing them written down or being told their name.

It is not, for every musician, necessary to be trained in that way. The ability to attach a particular name and a particular set of written symbols to a sound (and to be able to sing those musical structures from memory) is far removed from the act of actually playing or writing with those structures.

But some form of ear training, in which there is a general, emotional, unconscious sense of what different scales do and how they will impact the music is very important when it comes to being a good musician. Even musicians who don't know anything about theory, if they are good, have this sort of internal, unconscious connection to different sets of intervals.

It is how you know what will work and what will not work, and how you know what you like and what you don't like. In short, it is how you know what to play and how to create a style of your own.

So how can you develop that sort of familiarity with scales and their modes? There is no shortcut really, you simply have to learn to hear them and use them… a lot. But there are some exercises (beside the regular ear training exercises) that can help.

This exercise is simple:

1. Play a drone note (on guitar, the E string would be most natural), which will establish your key, your tonal center. Then you can play various scales and modes in that key. So play an E note for example and let it drone (sustain), and then play an E Ionian, and then an E Dorian, and then an E Phrygian, and so on. Play all the modes that share the same tonal center. This is what we have done for the pentatonic and diatonic modes' audio examples, but you should be able to do it on your own now.
   Try it. Listen for differences in harmonic effect and feel for differences in overall affect.
2. Once you have done this, it is useful to move on to playing over a single chord or entire chord progressions. Make or find a backing track for each mode and play over those progressions using those modes. You will develop a sense for the differences between scales. However, if you're not familiar with chords and chord progressions yet, you will be able to do this after you go through the Chords section later in the book.
3. Finally, begin substituting scales and modes for each other over the same chord or progression. If you are playing over a minor progression, for instance in A minor, you can perhaps begin by playing in A Aeolian (natural minor scale) and end by playing in A Phrygian. This takes time to truly understand and be able to do, but it is well worth the effort! By the end of this book you will have a much better understanding of how to go about this.

You might also choose a single chord: a Major 7th chord for instance, and play by cycling through all the various modes of the pentatonic, diatonic, harmonic minor and melodic minor scales. You can even use scales that don't make any natural sense – like a Dorian over a Major 7th chord – just to hear what it sounds like. Doing this sort of substitution will help you really learn to feel the differences between scales and will encourage you to remember certain harmonic techniques and exotic sounds that you enjoy and want to incorporate in your style.

Harmonic Minor Scale – How and Why Was it Derived from the Natural Minor Scale?

The diatonic modes are useful, and they offer a host of harmonic possibilities. They are not, however, exhaustive. There are twelve tones in the chromatic scale, and even if you limit yourself to combining those twelve tones into seven-note Major or minor scales, there are more than seven possibilities.

The diatonic scale is one very stable cutting of the chromatic scale and it organizes an octave in a particularly useful way, but it has a very particular sound. Sometimes musicians want a different sound, and when they do, they reach for other organizations of tones. Generally, these new organizations are derived from the diatonic scale in some way, and so once you know the diatonic modes, learning other sets of scales is often less difficult.

Historically, the most important seven-note scale to be derived from the diatonic scale was what is called the **harmonic minor scale**. The harmonic minor scale was the result of the desire to make the minor scale resolve in a particular way when played ascending.

The Major scale has a Major 7th, so when it is played from start to finish going up, there is a strong resolution at the end – the last note is only a half-step below the root in the next octave (the closer a note is to the root the more it wants to resolve to it), and so when our ears get to the 7th note of the scale they very naturally feel the root coming next (which is like the center of gravity in music). This is particularly useful when it comes to composing and improvising melodies in Major keys because it makes it easy to resolve tension, which is ultimately what melodies are all about.

But in a minor key, it isn't so easy. The 7th note of the minor (Aeolian) scale (and also the Dorian, Phrygian, and Locrian modes) is a full step away from the root in the next octave. This means that the root doesn't pull on the 7th note in the same way that it does in the Major scale, which in turn means that there is less of a sense of magnetism between the 7th note and the root.

The result, practically, is that resolutions in a minor key – whether in the chords or in the melody – feel less stable than resolutions in a Major key. This can be solved, however, by altering the minor scale slightly.

Some time ago, composers realized that if they raised the 7th note in the minor scale by a half step and left the rest of the scale untouched, they could create a new scale that had most of the properties of the minor scale – a generally deep, dark feeling – but that also had the possibility of stable resolutions, since now there was only a half-step between the 7th note of the scale and the root (just like in the Major scale).

This new scale was called the harmonic minor scale, and its structure is derived from the natural minor scale.

Harmonic Minor Scale Structure

The harmonic minor scale derives its structure from the minor scale, which is a version of that diatonic structure, only reordered: whole, half, whole, whole, half, whole, whole. Only now, the final note is raised, which means that the last interval is a half-step, and the second-to-last interval has been increased to a step and a half.

We said that, in A, the notes of the minor scale are: A, B, C, D, E, F, G. The notes of the A harmonic minor scale then are: **A, B, C, D, E, F, G#**

So the harmonic minor structure is this:

whole, half, whole, whole, half, whole + half, half

or:

T S T T S TS S

In terms of intervals:

R — **T** — M2 — **S** — m3 — **T** — P4 — **T** — P5 — **S** — m6 — **TS** — M7 — **S** – R

In A:

A — **T** — B — **S** — C — **T** — D — **T** — E — **S** — F — **TS** — G# — **S** — A

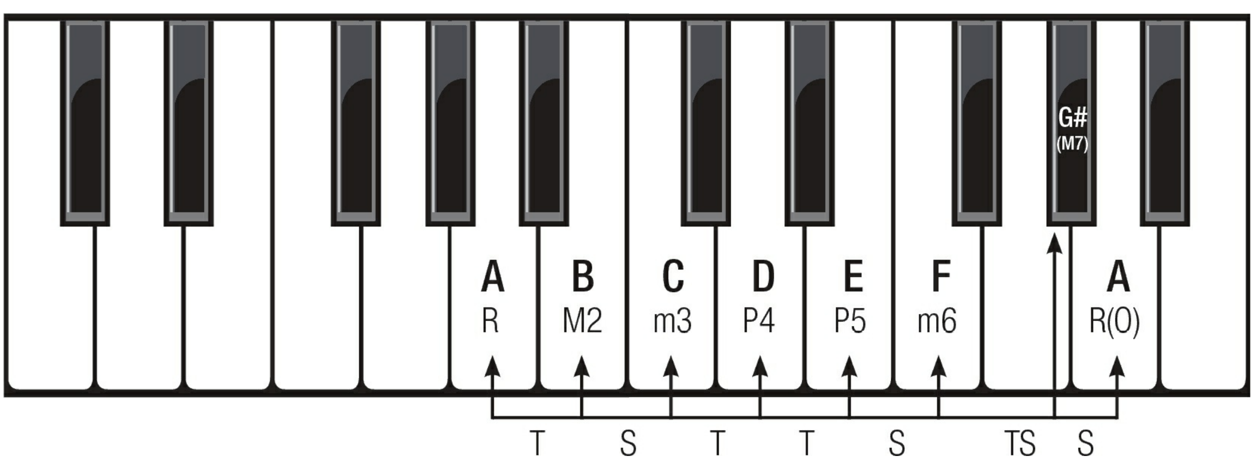


Figure 21: Harmonic minor scale structure in A

Because of the structure like this (a step and a half between the 6th and 7th note) the harmonic minor scale is **not** a diatonic scale.

The Modes of the Harmonic Minor Scale (with Audio Examples)

Now we're getting into some exotic stuff that many people consider advanced. But it really isn't since you now understand modes. Like the Major scale, there are seven notes in the harmonic minor scale. Also like the diatonic scale, there are seven modes of the harmonic minor scale. The same concept we had before applies here as well, so it should be really simple.

Harmonic minor modes do have their own names, which are not very intuitive and may seem confusing. In essence, they are just variations of the diatonic modes' names because they show their relation to the minor scale and other diatonic modes they're derived from.

Here are the harmonic minor modes (HMM for short) listed in the key of A along with the audio examples following the same format we had so far.

Harmonic Minor Mode 1 – Aeolian #7

The first mode of the harmonic minor scale is just the normal harmonic minor scale. It consists of a:

Root, Major 2nd, minor 3rd, Perfect 4th, Perfect 5th, minor 6th, Major 7th.

Why is this mode called Aeolian #7? Well, if you compare this interval structure (which we already examined), to that of the regular diatonic Aeolian mode, you will see that it is the same structure, but with one important difference: the 7th note.

In diatonic Aeolian we had a minor 7th, but here we have a Major 7th. The 7th note is sharpened, hence mode 1 of the harmonic minor is called Aeolian #7.

In A it has the following notes: A, B, C, D, E, F, G#, and those are the notes we will use to play over the A drone note in the improvisation excerpt.

Harmonic minor mode 1 – Aeolian #7 audio example in A-> http://goo.gl/f62mgA

Harmonic Minor Mode 2 – Locrian #6

The second mode of the harmonic minor scale has a:

Root, minor 2nd, minor 3rd, Perfect 4th, diminished 5th, Major 6th, minor 7th.

If you compare the structure of this mode to the diatonic Locrian mode you will see it has the same interval structure but with one significant difference: diatonic Locrian has a minor 6th, and this one has a Major 6th, so that's why it's simply called Locrian #6.

Diatonic Locrian: 1 – b2 – b3 – 4 – b5 – **b6** – b7

Locrian #6: 1 – b2 – b3 – 4 – b5 – **6** – b7

This mode is sometimes also called Locrian natural because the 6th is no longer flattened.

In B, HMM 2 or Locrian #6, the notes are: **B, C, D, E, F, G#, A**.

In the improvisation excerpt, this mode will be played over A note, so in order to hear its characteristic sound we need to use A Locrian #6.

In A Locrian #6 the notes are: A, Bb, C, D, Eb, F#, G, and those are the notes we'll be using to improvise over A drone note. Note that this is a rare instance where we have to use both sharps and flats because of the rule in music theory we talked about earlier – the rule which says that alphabet letters should not be skipped when writing out the notes of a key.

Harmonic minor mode 2 – Locrian #6 audio example in A -> http://goo.gl/LY6Vav

Harmonic Minor Mode 3 – Ionian #5

The third HMM has a:

Root, Major 2nd, Major 3rd, Perfect 4th, Augmented 5th (which is enharmonically equivalent to a minor 6th)**, Major 6th, Major 7th.**

This mode is called Ionian #5 and it's easy to tell why – again, just compare its structure to the regular Ionian structure, the difference is shown in the name itself.

In C, its notes are: **C, D, E, F, G#, A, B**.

But as always, since we're playing over the A note in the improvisation excerpt we will use the A Ionian #5.

The notes for this mode in A are: **A, B, C#, D, E#** (enharmonically equivalent to F), **F#, G#**.

Harmonic minor mode 3 – Ionian #5 audio example in A -> http://goo.gl/UeyjgR

Harmonic Minor Mode 4 – Dorian #4

The fourth HMM has a:

Root, Major 2nd, minor 3rd, Augmented 4th, Perfect 5th, Major 6th, minor 7th.

Its notes in D, are: **D, E, F, G#, A, B, C**.

- Can you explain why is it called Dorian #4?

In A Dorian #4 the notes are: **A, B, C, D#, E, F#, G**, and these are the notes we'll be using to play over A note.

Harmonic minor mode 4 – Dorian #4 audio example in A -> http://goo.gl/3YbEBr

Harmonic Minor Mode 5 – Phrygian #3

The fifth HMM has a:

Root, minor 2nd, Major 3rd, Perfect 4th, Perfect 5th, minor 6th, minor 7th.

In E, its notes are: **E, F, G#, A, B, C**.

- Can you explain why is it called Phrygian #3?

In A Phrygian #3, the notes are: **A, Bb, C#, D, E, F, G**, and these are the notes we'll be using to play over A note.

Harmonic minor mode 5 – Phrygian #3 audio example in A -> http://goo.gl/zaHsHv

Harmonic Minor Mode 6 – Lydian #2

The sixth HM mode has a:

Root, Augmented 2nd (enharmonically equivalent to a minor 3rd)**, Major 3rd, Augmented 4th, Perfect 5th, Major 6th, Major 7th.**

In F, its notes are: **F, G#, A, B, C, D, E**.

- Can you explain why is it called Lydian #2?

In A Lydian #2, the notes are: **A, B#** (enharmonically equivalent to C), **C#, D#, E, F#, G#**, and these are the notes we'll be using to play over A note to showcase this mode.

Harmonic minor mode 6 – Lydian #2 audio example in A -> http://goo.gl/qiJKtq

Harmonic Minor Mode 7 – Mixolydian #1 or Super Locrian

Finally, the seventh HM mode has a:

Root, minor 2nd , minor 3rd, diminished 4th (enharmonically equivalent to a Major 3rd)**, diminished 5th, minor 6th, diminished 7th** (enharmonically equivalent to Major 6th)**.**

Its notes in G# are: **G#, A, B, C, D, E, F**.

G#(R) – S – A(m2) – T – B(m3) – S – C(dim4) – T – D(dim5) – T – E(m6) – S – F (dim7) – TS – G#(O)

This scale is the oddest so far and has different names.

1. It is sometimes called an **altered scale**, since it is the Major scale with each of the scale degrees flatted (altered). However, this is not the real altered scale since we have bb7. The altered scale is actually the seventh mode of the melodic minor scale and we'll get to that soon.
   Regular Major scale: 1 – 2 – 3 – 4 – 5 – 6 – 7.

   Harmonic minor mode 7: 1 – b2 – b3 – b4 – b5 – b6 – bb7.
2. It is also sometimes called **Super Locrian** which is a fancy name but that's because it is the same as diatonic Locrian, but goes one step further. Locrian has a Perfect 4th, while in Super Locrian that note is flattened (to a diminished 4th) and the b7 note is flattened once again.
   Diatonic Locrian: 1 – b2 – b3 – **4** – b5 – b6 – **b7**.

   Super Locrian: 1 – b2 – b3 – **b4** – b5 – b6 – **bb7**.
3. It is also sometimes called Mixolydian #1, but why?
   Let's take our G Major scale and G Mixolydian scale (whose parent Major scale is C), and list out their notes:

   G Major has: G(1) – A(2) – B(3) – C(4) – D(5) – E(6) – **F#(7)**

   G Mixolydian has: G(1) – A(2) – B(3) – C(4) – D(5) – E(6) – **F(b7)**

   Now the seventh mode of the harmonic minor scale in this context (when compared against G Mixolydian) looks like this:

   G Mixolydian #1: **G#(1)** – A(2) – B(3) – C(4) – D(5) – E(6) – **F(bb7)**

   The problem here is that there is one extra flat on the 7th, making it function as the Major 6th in this context.

So we have three different names for the same thing. It's important to understand each name and its context (what is it telling you?), because as we said, the names describe a mode's relationship to other scales. Knowing these relationships is what will help you with understanding and using modes in your playing. You can use any name that you like, just as long as you know how it's related to other scales and modes. In my opinion the best name to use here would be Super Locrian.

In A, the notes of this mode are: A, Bb, C, Db, Eb, F, Gb, and these are the notes we'll be using to play over A drone note in the backing track.

Harmonic minor mode 7 – Super Locrian audio example in A -> http://goo.gl/3u9yuv

Note that HM modes can have different names depending on their context; this is something that is open to interpretation. What I'm presenting here is the most logical way that these modes are (usually) named.

Harmonic Minor Modes Comparison Charts

MODES	NOTES	1 R	2 m2	3 M2	4 m3	5 M3	6 P4	7 Tritone	8 P5	9 m6	10 M6	11 m7	12 M7	Octave
	1st mode Aeolian #7 (Harmonic minor scale)	A		B	C		D		E	F			G#	A
	2nd mode Locrian #6	B	C		D		E	F			G#	A		B
	3rd mode Ionian #5	C		D		E	F			G#	A		B	C
	4th mode Dorian #4	D		E	F			G#	A		B	C		D
	5th mode Phrygian #3	E	F			G#	A		B	C		D		E
	6th mode Lydian #2	F			G#	A		B	C		D		E	F
	7th mode Myxolydian #1	G#	A		B	C		D		E	F			G#

Table 9: Harmonic minor modes in A.

And here’s a table showing all harmonic minor modes with their respective intervals and notes:

Aeolian #7 - Harmonic minor scale	R	M2	m3	P4	P5	m6	M7	Intervals
	1	**2**	**b3**	**4**	**5**	**b6**	**7**	Notes
Locrican #6	R	m2	m3	P4	dim5	M6	m7	Intervals
	1	**b2**	**b3**	**4**	**b5**	**6**	**b7**	Notes
Ionian #5	R	M2	M3	P4	Aug5	M6	M7	Intervals
	1	**2**	**3**	**4**	**#5**	**6**	**7**	Notes
Dorian #4	R	M2	m3	Aug4	P5	M6	m7	Intervals
	1	**2**	**b3**	**#4**	**5**	**6**	**b7**	Notes
Phrygian #3	R	m2	M3	P4	P5	m6	m7	Intervals
	1	**b2**	**3**	**4**	**5**	**b6**	**b7**	Notes
Lydian #2	R	Aug2	M3	Aug4	P5	M6	M7	Intervals
	1	**#2**	**3**	**#4**	**5**	**6**	**7**	Notes
Mixolydian #1 - Super Locrian	R	m2	m3	dim4	dim5	m6	dim7	Intervals
	1	**b2**	**b3**	**b4**	**b5**	**b6**	**bb7**	Notes

Table 10: Harmonic minor modes interval structure.

Melodic Minor Scale – How and Why Was It Derived from the Harmonic Minor Scale?

The harmonic minor scale and its modes open up the harmonic space beyond the diatonic scale. Knowing these seven scales is an important step in being able to improvise or compose chords or melodies in any situation, and they give you a broader, more delicate palette from which to paint. But they are still not exhaustive.

The melodic minor scale is to the harmonic minor scale what the harmonic minor scale is to the natural minor scale. It goes one step further. The harmonic minor scale came out of the desire to have a certain kind of resolution between the 7th and the root, and so one of the tones (the 7th of the minor scale) was raised to make it more like the Major scale.

The melodic minor scale comes out of a similar concern – the harmonic minor scale does a good job of giving the root a kind of magnetism, and there is a strong resolution from the 7th to the next root, but that has what is for some people an unwanted effect.

The diatonic structure is such that there is never more than a full step between any two notes of any of the modes, but in the harmonic minor modes, there is a step and a half between two of the notes (the minor 6th and the Major 7th). This is why the scales sound so exotic – our ears hear an uneven spacing in the structure of the scale itself.

This is sometimes a good thing, as in when you want to sound exotic, but sometimes you don't want to sound that way and you still want to play in a minor key, while having the resolution that the Major 7th note gives you. Or maybe you just want a sound that is non-diatonic but that isn't exotic in the same way that the modes of the harmonic minor scale are. Or perhaps you are in a situation where none of the modes of the harmonic minor or diatonic scales will fit. In all of these cases, you are probably reaching for the melodic minor scale.

The melodic minor scale is produced by taking the harmonic minor scale and correcting the minor 6th note so that there is no longer a step and half between the minor 6th and the Major 7th. Since there is only a half-step gap between the 5th and the 6th, this is possible in a way that results in, like the diatonic modes, there being never any more than a full step between any two notes.

The 6th note of the harmonic minor scale is raised by a half step, and a new scale is born: the melodic minor scale.

Melodic Minor Scale Structure

The notes of the melodic minor scale are:

Root, a Major 2nd, a minor 3rd, a Perfect 4th, a Perfect 5th, a Major 6th and a Major 7th.

And the structure looks like this:

R – **T** – M2 – **S** – m3 – **T** – P4 – **T** – P5 – **T** – M6 – **T** – M7 – **S** – R

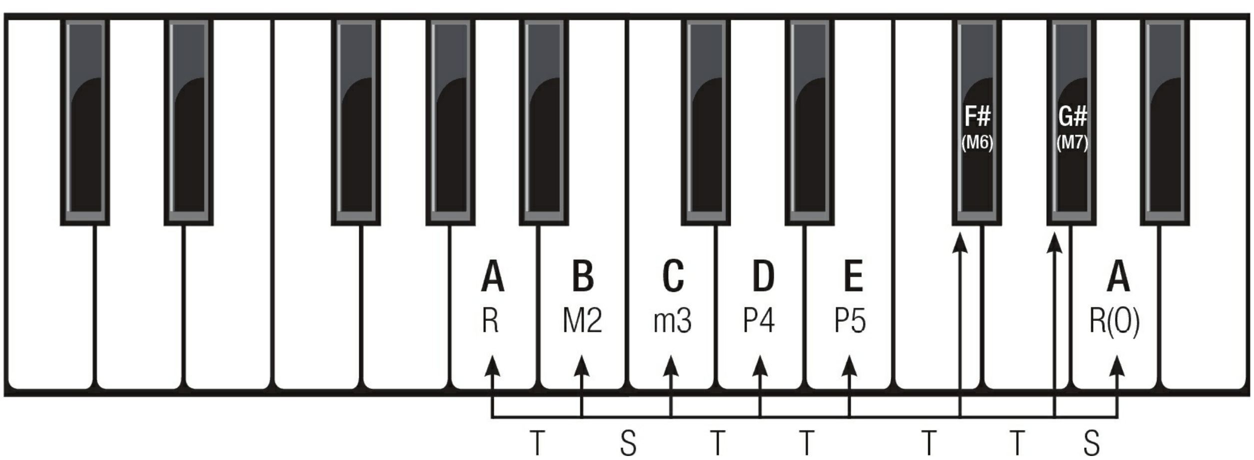


Figure 22: Melodic minor scale structure in A

As with the diatonic and harmonic minor modes, this structure defines a series of scales (modes), each with one of the seven notes as the root. Some of these scales are used widely in jazz, and their sound is, while not as exotic as the harmonic minor modes, still quite pronounced.

The Modes of the Melodic Minor Scale (with Audio Examples)

There are seven modes of the melodic minor scale. They are quite similar to the harmonic minor modes. These modes also can have different names (they don't have a standardized nomenclature), but they're presented here with the names from the diatonic modes they're essentially derived from.

For the diatonic modes we used C Major as the parent Major scale; the relative minor of that scale (Aeolian mode) is the A natural minor scale. Both the harmonic and melodic minor scales are derived from the natural minor scale, and that's why all audio examples for these scales and their modes are in A.

Melodic Minor Mode 1 – Dorian #7

The first mode (the regular melodic minor scale) has a:

Root, Major 2nd, minor 3rd, Perfect 4th, Perfect 5th, Major 6th, Major 7th.

In A, it has the following notes: **A, B, C, D, E, F#, G#**.

Why is it called Dorian #7? When you compare its interval structure to the diatonic modes you can see that diatonic Dorian mode has the most similar structure.

Diatonic Dorian: 1 – 2 – b3 – 4 – 5 – 6 – **b7**

Melodic minor mode 1: 1 – 2 – b3 – 4 – 5 – 6 – **7**

So all notes are the same (have the same interval functions) except that the melodic minor mode 1 has a Major 7th, and diatonic Dorian has a minor 7th. That's why this mode is called Dorian #7 – the 7th note is sharpened. Since this scale or mode is used quite a lot in jazz, it is also sometimes referred to as the **jazz minor scale**, or just simply the **melodic minor scale**.

We will play this mode/scale in A, and just like with the harmonic minor modes, we will use A drone note to play over in the improvisation part of the audio example. We already have the notes of the melodic minor mode 1 in A, as shown above.

Melodic minor mode 1 – Dorian #7 audio example in A -> http://goo.gl/NRFEp7

Melodic Minor Mode 2 – Phrygian #6

The second mode has a:

Root, minor 2nd, minor 3rd, Perfect 4th, Perfect 5th, Major 6th, minor 7th.

In B, its notes are: **B, C, D, E, F#, G#, A**.

The structure for this mode is: 1 – b2 – b3 – 4 – 5 – **6** – b7.

When you compare this structure to the Diatonic modes you can see that the most similar structure is that of the Phrygian mode: 1 – b2 – b3 – 4 – 5 – **b6** – b7.

So the second mode of the melodic minor scale is like the Phrygian diatonic mode, the only difference being that it has a Major 6th instead of a minor 6th. That's why this mode is called Phrygian #6.

To demonstrate the sound of this mode, since we're using A drone note, we'll use melodic minor mode 2 in A.

A Phrygian #6 notes are: **A, Bb, C, D, E, F#, G**.

Melodic minor mode 2 – Phrygian #6 audio example in A -> http://goo.gl/367PSE

Melodic Minor Mode 3 – Lydian #5

The third mode comprises a:

Root, Major 2nd, Major 3rd, Augmented 4th, Augmented 5th (enharmonically equivalent to a minor 6th), Major 6th, Major 7th.

In C, its notes are: **C, D, E, F#, G#, A, B**.

It has: 1 – 2 – 3 – #4 – #5 (same as b6) – 6 – 7.

Diatonic Lydian has the most similar structure to this, but in this case the 5th is sharpened; that's why this mode is called Lydian #5. In this same manner, try to figure out the names for the rest of the melodic minor modes.

In A, the notes of this mode are: **A, B, C#, D#, E#** (same as F), **F#, G#**.

These are the notes we'll be using in our audio example.

Melodic minor mode 3 – Lydian #5 audio example in A -> http://goo.gl/iL4SYR

Melodic Minor Mode 4 – Mixolydian #4

The fourth mode has a:

Root, Major 2nd, Major 3rd, Augmented 4th, Perfect 5th, Major 6th, minor 7th.

Its notes in D, are: **D, E, F#, G#, A, B, C**.

In A, Mixolydian #4 contains the notes: **A, B, C#, D#, E, F#, G**.

Melodic minor mode 4 – Mixolydian #4 audio example in A -> http://goo.gl/xkHiZ8

Melodic Minor Mode 5 – Aeolian #3

The fifth mode consists of a:

Root, Major 2nd, Major 3rd, Perfect 4th, Perfect 5th, minor 6th, minor 7th.

In E, its notes are: **E, F#, G#, A, B, C**.

In A, the notes of the of this mode are: **A, B, C#, D, E, F, G**.

Melodic minor mode 5 – Aeolian #3 audio example in A -> http://goo.gl/6NoSa6

Melodic Minor Mode 6 – Locrian #2

The sixth mode has a:

Root, Major 2nd, minor 3rd, Perfect 4th, diminished 5th, minor 6th and a minor 7th.

In F#, its notes are **F#, G#, A, B, C, D, E**.

In A, the notes of this mode are: **A, B, C, D, Eb, F, G**.

Melodic minor mode 6 – Locrian #2 audio example in A -> http://goo.gl/khYa9U

Melodic Minor Mode 7 – Ionian #1 – The Altered Scale

Finally, the seventh mode, as usual the most complicated one, has a:

Root, minor 2nd, minor 3rd, diminished 4th (enharmonically equivalent to a Major 3rd), diminished 5th (or tritone), minor 6th, minor 7th.

In G#, its notes are: **G#, A, B, C, D, E, F#**.

First of all, the structure of this mode is: 1 – b2 – b3 – **b4** (same as 3) – b5 – b6 – b7. When you compare this structure to the diatonic modes, you can see that it is most similar to the Locrian mode, which has the Perfect 4th: 1 – b2 – b3 – **4** – b5 – b6 – b7. We can technically call this mode 'Locrian b4', but there are some other options; as with the seventh mode of the harmonic minor there are a couple of ways to name this mode.

First, this mode can be called Super Locrian, but it is a little bit of an ambiguous name, especially because we've already used it to name the HMM 7, which has bb7, and MMM 7 has a b7. That is the only difference – one note a semitone apart, but still a significant difference. So Super Locrian is not a good name for this mode, but there is one name by which it is well known: *the altered scale*.

The altered scale, as the name suggests, is a scale which has all of the notes of the regular Major scale but is altered by one semitone.

Major scale: 1 – 2 – 3 – 4 – 5 – 6 – 7

Altered scale (MMM7): 1 – b2 – b3 – b4 – b5 – b6 – b7

Super Locrian (HMM7): 1 – b2 – b3 – b4 – b5 – b6 – bb7

So usually when someone talks about the altered scale, they are referring to the seventh mode of the melodic minor scale. Keep that in mind.

This scale can also be called Ionian #1, for the same reason the HMM 7 can be called Mixolydian #1.

Ionian mode structure (same as Major scale) is: 1 – 2 – 3 – 4 – 5 – 6 – 7.

MMM7 scale structure is: 1 – b2 – b3 – b4 – b5 – b6 – b7.

But since we're not talking about specific notes, we can also show the Ionian mode structure like this: b1 – b2 – b3 – b4 – b5 – b6 – b7. *This is still the Ionian mode* because the interval relationships between these notes remains the same – we've put a 'b' next to **all** of the notes. And since the MMM7 structure has '1' instead of 'b1' – or in other words, the 1st note is sharpened – we can call this mode Ionian #1.

This scale, like the seventh mode of harmonic minor, is useful in situations that call for an altered scale. In most other situations, however, it is not used.

In A, the notes of this scale are: **A, Bb, C, Db, Eb, F, G**.

Melodic minor mode 7 – The altered scale audio example in A -> http://goo.gl/qfqcju

Melodic Minor Scale Comparison Charts

MODES / NOTES	1 R	2 m2	3 M2	4 m3	5 M3	6 P4	7 Tritone	8 P5	9 m6	10 M6	11 m7	12 M7	Octave
1st mode Dorian #7 (Melodic minor scale)	A		B	C		D		E		F#		G#	A
2nd mode Phrygian #6	B	C		D		E		F#		G#	A		B
3rd mode Lydian #5	C		D		E		F#		G#	A		B	C
4th mode Mixolydian #4	D		E		F#		G#	A		B	C		D
5th mode Aeolian #3	E		F#		G#	A		B	C		D		E
6th mode Locrian #2	F#		G#	A		B	C		D		E		F#
7th mode Ionian #1	G#	A		B	C		D		E		F#		G#

Table 11: Melodic minor modes in A

Dorian #7 — Melodic minor scale	R	M2	m3	P4	P5	M6	M7	Intervals
	1	**2**	**b3**	**4**	**5**	**6**	**7**	Notes
Phrygian #6	R	m2	m3	P4	P5	M6	m7	Intervals
	1	**b2**	**b3**	**4**	**5**	**6**	**b7**	Notes
Lydian #5	R	M2	M3	Aug4	Aug5	M6	M7	Intervals
	1	**2**	**3**	**#4**	**#5**	**6**	**7**	Notes
Mixolydian #4	R	M2	M3	Aug4	P5	M6	m7	Intervals
	1	**2**	**3**	**#4**	**5**	**6**	**b7**	Notes
Aeolian #3	R	M2	M3	P4	P5	m6	m7	Intervals
	1	**2**	**3**	**4**	**5**	**b6**	**b7**	Notes
Locrian #2	R	M2	m3	P4	dim5	m6	m7	Intervals
	1	**2**	**b3**	**4**	**b5**	**b6**	**b7**	Notes
Ionian #1 — The Altered scale	R	m2	m3	dim4	dim5	m6	m7	Intervals
	1	**b2**	**b3**	**b4**	**b5**	**b6**	**b7**	Notes

Table 12: Melodic minor modes interval structure

Scale Overview – Scale Comparison Chart

Here are the scales that we've looked thus far. These charts will make it easier to see the similarities between scales, and how everything is derived from the Major scale, which again, is just one seven-note cutting of the chromatic scale.

SCALES / NOTES	1 R	2 m2	3 M2	4 m3	5 M3	6 P4	7 Tritone	8 P5	9 m6	10 M6	11 m7	12 M7	Octave
Chromatic	C	C#	D	D#	E	F	F#	G	G#	A	A#	B	C
Natural Major	C		D		E	F		G		A		B	C
Major Pentatonic	C		D		E			G		A			C
Natural Minor (6th mode of the Major Scale)	A		B	C		D		E	F		G		A
Minor pentatonic	A			C		D		E			G		A
Harmonic minor	A		B	C		D		E	F			G#	A
Melodic minor	A		B	C		D		E		F#		G#	A

Table 13: Scale comparison chart 1

Major scale	**1**	T	**2**	T	**3**	S	**4**	T	**5**	T	**6**	T	**7**	S	Octave
Natural minor scale	**1**	T	**2**	S	**b3**	T	**4**	T	**5**	S	**b6**	T	**b7**	T	O
Harmonic minor scale	**1**	T	**2**	S	**b3**	T	**4**	T	**5**	S	**b6**	TS	**7**	S	O
Melodic minor scale	**1**	T	**2**	S	**b3**	T	**4**	T	**5**	T	**6**	T	**7**	S	O
Minor Pentatonic scale	**1**		TS		**b3**	T	**4**	T	**5**		TS		**b7**	TS	O
Natural minor scale	**1**	T	**2**	S	**b3**	T	**4**	T	**5**	S	**b6**	T	**b7**	T	O
Major Pentatonic scale	**1**	T	**2**	T	**3**		TS		**5**	T	**6**		TS		O
Major scale	**1**	T	**2**	T	**3**	S	**4**	T	**5**	T	**6**	T	**7**	S	O

Table 14: Scale comparison chart 2

Table 14 is quite important because it summarizes the scales we've learned so far and shows how they are related to one another; they are different, yet quite similar.

Notice how both minor and Major pentatonic are just cut-outs of the natural minor and Major scales. Even so, *they still sound different*, because the intervals are different (especially because of that larger TS interval), and intervals are what music is made up of.

Study this chart, notice the differences, analyze it, and try to memorize it, it will serve you well.

Keys and Key Signatures

So far in this book we've mentioned keys in several instances, but let's explain more closely what it means when we say that something is in a particular key.

In virtually all cases, a piece of music is organized according to some scale – usually the Major or minor scale – with a root note as its center, or 'tonic.' This is called the key of the piece, and it most often takes the form of a note followed by the word 'Major' or 'minor', for instance, 'D Major' or 'Bb minor.' Since there are twelve notes, it means we have twelve possible keys at our disposal.

A key is like the harmonic center of a musical piece. Knowing the key of a song gives a musician a lot of information, since it tells you what scale the song is organized around. In the case of most rock, pop, blues and country music, knowing the key of the song is enough to tell an improvisor what notes will sound good over the chord changes of that song.

In the case of jazz, it is often more complicated than that, since a song in one key may move through various tonal or harmonic centers as the song progresses, thus requiring different scales to be played. In general, however, the key of a song gives a musician the most basic and important information about its harmonic framework. When we write the key of a song, we indicate the scale that the song is organized around.

As we previously said, a key consists of two things:

1. A tonic note
2. A set of chords that stem from the tonic note

We've already talked about the tonic note. It is our most stable note in a musical piece, it's where the home is. This note is also sometimes called the root note, depending on the context. The set of chords that come from the tonic note depend on what scale or modality we're in. We'll talk about this in the Chords section of this book.

The key also tells us how many sharpened or flattened notes are contained in that scale (for example, C Major contains no sharps or flats, but D Major contains two sharps: F# and C#). This is called a **key signature**.

The key signature is simply a measure of the sharps or flats in a key. Each distinct scale has its own key signature, and each key signature can indicate either a Major key (such as C Major) or the minor key that shares the same scale. (As we should know by now this is called a relative minor key.) The key signature is used in the music notation system at the beginning of the staff to indicate the key of the piece, and that's why it is very useful concept for musicians who use traditional musical notation.

How to Understand the Circle of Fifths (and the Circle of Fourths)

When you take a music theory course or you begin taking private lessons, one of the very first things you will receive is a diagram of a circle with lots of notes around it. It is for most people confusing, and for virtually all people, unusable until they learn what it really is and what it means.

That diagram is the circle of fifths. There is a lot that can be said about the circle of fifths, but in general it is a visual tool – **a way of arranging notes in intervals of perfect fifths**.

This is useful for many reasons. It describes the relationships between all of the possible notes you can play in a very particular way. It allows us to better understand chord progressions (more on this later) as well as the distance between any given keys. It also lists some features of each key that are useful when understanding the internal structure of those keys.

The most important feature of all is that the circle of fifths gives us an easy way to remember how many sharps or flats are in each diatonic key (and remember: in diatonic keys, there are either sharps or flats, but never both).

Beginning with C Major (relative A minor), which has no sharps or flats (or **‘accidentals’** as they are called), it is possible to move up or down by the interval of a Perfect 5th to determine what the other keys will look like and what their key signatures will be.

So the circle of fifths simply shows all keys arranged in fifths starting from C at the top because the key of C (Major) has no accidentals in it.

A fifth up from C is G, and the circle continues: **G** — up a fifth — **D** — up a fifth — **A** — up a fifth — **E** — up a fifth — **B** — up a fifth — **F#**.

Moving up the circle in this way adds one note with a ‘#’ in the key of G, two sharps in the key of D, three sharps in the key of A, etc.

F# sharp sits on the bottom of the circle (6 o’clock). We could go on ascending from F# to C#, G#, D#, A#, F, C and close the circle, but we usually start from C at the top and then either go left (descending) or right (ascending).

Starting from C again, we can descend the circle by moving counter-clockwise in fifths, this time using flats:

C — down a fifth **— F —** down a fifth **— Bb —** down a fifth **— Eb —** down a fifth **— Ab —** down a fifth **— Db —** down a fifth **— Gb** (same as F#) — down a fifth — **Cb** (or B) **— Fb (or E) —** down a fifth **— A,** and so on all the way down to **C**. *

*NOTE: It is important to clarify here something that confuses a lot of people. Since we’re descending on the circle of fifths, the notes are becoming lower in pitch by the interval of a perfect 5th. This means that if you move counter-clockwise, and the notes are **descending** in pitch, you’re still moving by an interval of perfect fifth. However, if you move counter-clockwise on the circle of fifths and the notes are **ascending** in pitch, then that is considered the **circle of fourths – a mirror reflection of the circle of fifths**. Some musicians prefer to think in terms of the circle of fourths because chord progressions tend to move more often in this way. In any case, here is the circle of fourths sequence:

C — up a fourth **— F —** up a fourth **— Bb —** up a fourth **— Eb —** up a fourth **— Ab**, etc.

A descending fifth is like an ascending fourth, only one octave apart. You can easily verify this by looking at the note circle shown in Figure 5. If you remember, the Perfect 5th interval is seven semitones and the Perfect 4th is five semitones, up or down from the starting note. All you have to do is to count the semitones up or down from any starting note. I encourage you to check this for yourself.

Coming back to the circle of fifths, moving counter-clockwise adds one note with a b in the key of F, two flat notes in the key of Bb, three flats in the key of Eb, and so on.

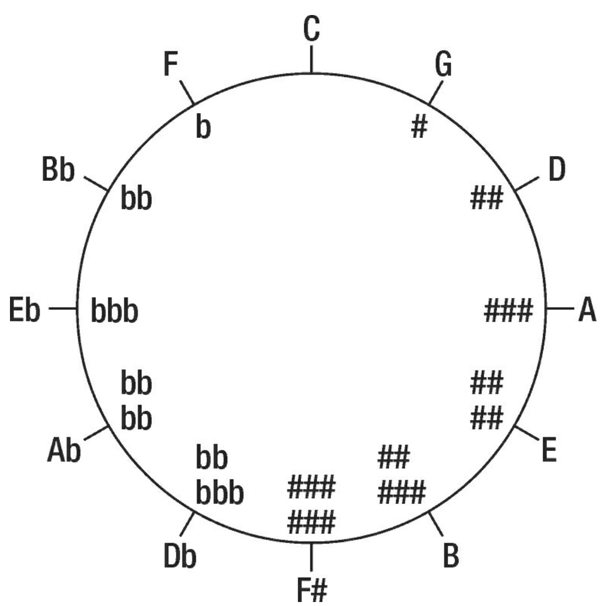


Figure 23: Circle of fifths in its basic form Sometimes the relative minor keys are added beneath each Major key (A minor for C Major, E minor for G Major, B minor for D Major, F# minor for A Major, and so on)

This special relationship between notes, by an interval of a fifth , is in many ways the foundation of harmonic movement. By listing the notes in ascending or descending fifths, a cycle is produced in which all of the notes are represented.

That cycle, depicted as a circle, tells us things about each of those notes when they are used to create keys, such as, for instance, what the structure of those keys is. Usually, this is understood in terms of Major and minor scales, and a relationship is established between relative Major and minor keys.

What’s most important is that arranging the keys in fifths makes it easy to see how keys relate to one another.

When it comes to reading and performing (sightreading) written music, it is very important to understand how these concepts (such as key signatures and the circle of fifths) work in theory and in practice. For an in-depth look at this check out *How to Read Music for Beginners*.

Part 3
Master the Chords

What is a Chord?

Some instruments are single-note instruments, capable of only playing one note at a time. Other instruments, however, like guitars and pianos, are capable of playing chords.

A chord, at its most basic, is simply a musical unit consisting of more than one note being played at the same time. In other words, it is the sound we get when we combine any two (or more) notes and play them at the same time.

Chords come from scales. In fact, they are made up from notes in a scale. Each scale implies a certain list of chords; once you have a scale in mind, it is easy to produce chords that are contained in that scale. We'll get to this soon.

Chords are, like scales, defined by a set of intervals relative to the root note. This is how chords are named – the name of a chord tells us what kind of notes it contains; it tells us what the root note is, and from which intervals that chord is made of. The interval structure of a chord – the way the notes in the chord relate back to its root note – is called the '**spelling**' of a chord, and if you know the name of the chord then you know, because of its spelling, the notes that are contained in it.

If we have a Major 7th chord, for instance, then by the end of this chapter you will learn that it consists of a root, a Major 3rd, a Perfect 5th and a Major 7th note (all relative to the root). This is the spelling of a Major 7th chord. If we assign this chord a specific root note, for example G note, then the name of this chord would be: G Major 7th; and if we then look at the G Major scale, we would know that the other notes in the chord, because of its spelling, are: G (R) B (M3) D (P5) F# (M7).

It is possible, simply by naming the intervals contained in the chord, to create highly complex chords (such as a *Major 13 flat 9* chord). These chords are most often used in jazz and they create sophisticated harmonic spaces. Their use is highly specialized, with certain chords only being played in very specific situations.

How Chords Are Built

Traditionally, chords are built from **intervals of thirds**. In other words, they consist of a root note and another note, or a series of notes above that root that ascend in thirds. To achieve such a structure, all that is required is to take a scale and count up from a root note by a third to get a chord note, and then for each new note in the chord count up by another third (to the fifth, the seventh, and so on).

Similar to scales, chords can be described by their **chord formulas**. Since chords are made up of notes of the scale they come from, their formula simply shows the notes of the scale that chord uses. If we have a '1 3 5 7' chord formula for example (which is the formula for a Major 7th chord), it simply means that this chord consists of the root (first scale degree), third, fifth and seventh scale degree. If we take a Major scale, and assign it a key, let's say the key of C, we can simply apply this formula to get the notes of the C Major 7th chord.

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

This is why the C Major 7th chord consists of the notes: C (Root – gives the chord its name), E (Major 3rd), G (Perfect 5th) and B (Major 7th). Chord formulas and chord spelling are very similar and useful concepts that give us a way of analyzing the chords. We'll explore this a lot more in further sections.

It is possible, and not uncommon, to alter chords that have been built by stacking thirds – by moving one or more of the notes up or down, by inverting the chords (rearranging their notes) so that a new chord is produced, or by adding a note from the scale you're working with to a pre-existing chord. It is also possible to create chords by stacking intervals other than thirds – for instance, fourths or fifths, although this is far less common. Generally speaking, however, chords are generated in the way we have described – by stacking thirds above a root note according to a particular scale.

Chord Types (Dyads, Triads, Quadads) and Chord Qualities

A chord is any sound produced when more than one note is played simultaneously. We categorize chords according to how many notes are contained in them, and though it is possible to talk about chords containing very many notes (up to twelve), the usual formulations contain two, three, or four notes. In jazz and some classical, chords with more than four notes occur with some frequency, but in general they are considered extensions of three or four-note chords.

Most often, chords consist of three or four distinct notes, although many times when we play a chord, some of these notes are repeated in various octaves resulting in more than three or four tones composing the chord. This is obvious, for example, if you play a basic chord on guitar that most beginners learn, such as E minor, and then analyze which notes you just played – even though you played all six strings, which means six notes, there are only three distinct notes in this chord, some of which are repeated on certain strings to get a fuller sounding chord.

The most common chords consist of three notes; these chords are called triads. In more complex harmonies, most chords contain at least four notes (in general these are called the 7th chords or quadads).

The most common chord types are categorized as follows:

1. **Dyads** – these are chords containing any two notes.
2. **Triads** – these are chords containing three distinct notes.
3. **Quadads** – these are chords containing four distinct notes.

In the case of triads (which are most used chord-types in rock, pop and other genres) and quadads, the chords are usually built of stacked thirds (as previously discussed).

In the case of dyads, however, **any interval can be used**. In fact, any chromatic interval (see Table 4) is also a dyad chord; so they can be any kind of Major, minor, Perfect, Augmented or diminished dyads. The most common dyads in rock are dyads produced by playing two notes a fifth apart – the Root and the Perfect 5th (sometimes followed by another root – an octave, on top). These are usually called '**power chords**,' and are commonly used by guitarists in rock and metal genres.

It is possible to play a chord consisting of only two notes (and even of only two tones) and also of more than four notes. It is not uncommon for a jazz musician to play chords consisting of five or six different notes, and piano players have the ability to play as many as ten distinct notes at one time. In most cases this is avoided because the more distinct notes are added to a chord the more they will clash with each other, and the chord will sound more and more dissonant. Most pop songs have very simple harmony consisting of simple chords with very few notes, whereas jazz is usually very advanced harmonically, with more complex chords.

Understanding Chord Qualities

In general, and particularly when talking about triads and quadads, chords have different flavors that characterize them. These flavors are usually called **chord qualities**, and they make the chords sound different, not in the terms of pitch, but in terms of the mood or the effect they produce.

For example, the most common chord qualities are Major and minor, and the difference between them is easy to recognize: Major chords are happy sounding, while minor chords are sad sounding. E Major sounds quite different to E minor, although not in the same way that E Major sounds different to F Major, where the chord quality is the same but the pitch of the root note is different by one semitone.

The ‘quality’ that a chord will have entirely depends on the interval structure (spelling) of that chord, and each chord, as we said, has a unique set of intervals and a formula that describes how it relates to its scale. In the next few sections we’ll go over each chord quality for triads and quadads. Note that when we say *‘chord quality’* we often exclude *‘quality’* and simply refer to it as a ‘chord’ – this just means that we haven’t assigned any of the twelve notes to the chord yet.

By the end of this chapter you will have a huge library of chords at your disposal and a more-than-solid chord foundation; and it will be easy to remember them all with the tricks I’ll show you.

Triad Chords

We’ll start with three-note chords first because they are the simplest and easiest to understand. They’re the most common chords today. It is worth repeating that generally, when we talk about triads, we are talking about those triads that are composed of two thirds (usually either Major 3rd or minor 3rd intervals) stacked on top of one another, or that are simple modifications of those stacked third triads.

Triad chords are as follows:

Major triads – these chords consist of a: root, a Major 3rd and a Perfect 5th. This means that they are composed of a root, a Major 3rd above that root and a minor 3rd above that second note. Notice here that the distance from a Major 3rd to a Perfect 5th is three semitones – which is a minor 3rd interval.

The chord formula for a major triad is: 1 3 5

In C, the C Major triad would be: C E G.

Minor triads – these are composed of a minor 3rd interval and a Major 3rd interval stacked on top of that (the inverse of the composition of Major triads).

That means they consist of a root, a minor 3rd and a Perfect 5th.

As for the minor triad chord formula: first we have a root, then we have a minor 3rd instead of a Major 3rd. These two intervals are one semitone apart, so that means in order to get the minor 3rd we just have to flatten the Major 3rd note by a semitone, so we simply write: b3. And then we have a Perfect 5th as usual. Also, note that the distance between the minor 3rd and Perfect 5th is four semitones, which is a Major 3rd interval.

So a minor triad chord formula is simply: 1 b3 5, and from our C Major chord consisting of notes C E G, we would get C minor with the notes C Eb G.

You can see here how only one note difference as little as one semitone apart changes the mood of the chord dramatically. It goes from happy sounding (Major) to sad sounding (minor). We can conclude that the 3rd in a chord is a very important note that makes a huge difference to its sound.

When it comes to triads, there are also:

Augmented triads – these are Major triads with a sharp 5th. That means they are built from two Major thirds stacked on top of one another and contain the notes: root, Major 3rd, Augmented 5th (same as minor 6th). Their sound is jarring (sometimes a good thing) and these are rarely played.

The augmented triad chord formula is: 1 3 #5.

#5 tells us that we simply have to raise the Perfect 5th note by one semitone.

As for the notes, C Augmented, or just Caug, would be: C E G#.

Diminished triads – these are minor triads with a flat 5th (tritone). They are composed of two minor thirds stacked on top of one another, which means they consist of a root, a minor 3rd and a diminished 5th.

The diminished chord formula is: 1 b3 b5, which tells us that we have to flatten both the 3rd and 5th note of the parent scale.

The C diminished chord, or just Cdim, would then be: C Eb Gb.

All of these four basic triads are composed of two intervals – Major and minor thirds stacked on top of one another in various permutations.

Suspended Chords

It is common, however, to alter those triads slightly and arrive at chords that are derived from stacked thirds, but that contain other intervals. This is done by altering the second note in those triads – the 3rd, whether it is a Major 3rd or a minor 3rd.

These new chords are called **suspensions**, and there are two types of them. First, there are suspended chords in which the 3rd is lowered to the 2nd. These are called suspended 2nd chords, or just sus2.

Suspended 2nd triads – If you begin with a Major or minor triad and lower the 3rd to a Major 2nd, then you will have a sus2 triad. It consists of a root, a Major 2nd and a Perfect 5th, and it is built from a Perfect 4th stacked on top of a Major 2nd.

The chord formula for a sus2 chord is: 1 2 5.

This means that the notes of Csus2 chord would be: C D G (we just take the 2nd note instead of the 3rd from the C major scale).

Suspended 4th triads – The second kind of suspended triad is one in which the 3rd is raised to a 4th (rather than lowered to a 2nd). These are called suspended 4th chords, and are commonly used in jazz as well as in rock and pop to add specific color to Major and minor triad progressions. Like sus2, the suspended 4th triad is neither Major nor minor.

Beginning with either a Major or minor triad, sus4s are built by raising the second note in the chord (the Major or minor 3rd) up to a perfect 4th. It is built from a Major 2nd interval stacked on top of a Perfect 4th (the opposite of sus2), and it is composed of a root, a Perfect 4th and a Perfect 5th.

The chord formula for a sus4 chord is: 1 4 5.

The notes of Csus4 chord would be: C F G.

This concludes all forms of triad chords... almost.

It is also possible to talk about **suspensions of diminished and augmented chords**, although these are very rarely used. In these cases, the suspended chords have the same qualities as before, only the 5th is either flattened (in the case of a suspension of a diminished chord) or sharpened (in the case of a suspension of an Augmented chord).

These chords are shown in the following way:

- dimsus4 (1 4 b5),
- dimsus2 (1 2 b5),
- augsus4 (1 4 #5),
- augsus2 (1 2 #5).

The dimsus4 is extremely dissonant because there is only a half-step difference between the Perfect 4th and diminished 5th.

Take a look at this table for a clear overview of all the chords so far:

Chords	Formulas			Notes in C
Major	1	3	5	C E G
Minor	1	b3	5	C Eb G
Augmented	1	3	#5	C E G#
Diminished	1	b3	b5	C Eb Gb
Suspended 2nd	1	2	5	C D G
Suspended 4th	1	4	5	C F G
Augsus 2	1	2	#5	C D G#
Dimsus 2	1	2	b5	C D Gb
Augsus 4	1	4	#5	C F G#
Dimsus 4	1	4	b5	C F Gb

Table 15: Triad chords

Chords	Notes											
	R	m2	M2	m3	M3	P4	dim5	P5	Aug5	M6	m7	M7
Major	R				M3			P5				
Minor	R			m3				P5				
Augmented	R				M3				Aug5			
Diminished	R			m3			dim5					
Suspended 2nd	R		M2					P5				
Suspended 4th	R					P4		P5				
Augsus 2	R		M2						Aug5			
Dimsus 2	R		M2				dim5					
Augsus 4	R					P4			Aug5			
Dimsus 4	R					P4	dim5					

Table 16: Triad chords interval structure

This concludes all triad chords. They are the most basic chords of the harmony built in thirds – known as **tertian harmony** – which the vast majority of chords we hear today is based on. They are not hard to learn and should be memorized.

7th Chords (Quadads)

More complicated than triads, because of an extra note, four-note chords, or quadads, can be explained simply as triads extended by another 3rd – usually to the 7th. That's why they're often called **7th chords**. Also, 7th chords generally contain four distinct notes, hence they're considered quadads.

Quadads are built in more different ways than triads (since there is an extra note, which means there are more possible combinations). In general, however, they are all different versions of the 7th chords (which consist of a root, a 3rd, a 5th, and a 7th).

Quadad harmony has more things going on – more notes clashing with each other; it is therefore more complex and sophisticated. Quadads are used widely across all genres, but especially in blues and jazz.

7th chords are as follows:

Major 7 – These chords have a Major 3rd interval, followed by a minor 3rd, which is followed by another Major 3rd on top. This means that they have a root, Major 3rd, Perfect 5th and a Major 7th (we've already seen this one at the beginning of this chapter).

Chord formula is: 1 3 5 7.

In the key of C, the notes of C Major7 chord, or just CMaj7, or even CM7, are C E G B.

Minor 7 – These chords are composed of a minor 3rd, followed by a Major 3rd, followed by another minor 3rd. So they have the following notes: root, minor 3rd, Perfect 5th and a minor 7th.

Chord formula is: 1 b3 5 b7.

In the key of C, C minor 7, or Cm7, would be: C Eb G Bb.

Dominant 7 – These chords sit somewhere between the previous two. They have a root, Major 3rd, Perfect 5th and a minor 7th. So Major 3rd is followed by two minor 3rd intervals. Even though they are very similar to Major and minor 7th chords, they sound different, often adding tension which tends to resolve in a chord progression.

Chord formula is: 1 3 5 b7.

C dominant 7, or just C7 (as it's usually written), has the notes: C E G Bb.

Minor 7b5 – This name may seem scary but it's actually just a minor 7th chord with a flat 5th. It is composed of a: root, minor 3rd, diminished 5th (tritone), and a minor 7th. This means they have a minor 3rd interval followed by another minor 3rd, which is followed by a Major 3rd (the opposite of the Dominant 7). These are very unique sounding chords, commonly used in jazz, sometimes in blues, but not as much in pop, rock or similar styles.

Chord formula is: 1 b3 b5 b7.

C minor 7b5, or Cm7b5, has the notes: C Eb Gb Bb.

Diminished 7 – Also called **full diminished**, these chords go one step further. They are composed only of stacked minor 3rd intervals, which is why they are called **symmetrical chords**. Their interval structure is always the same, no matter if you're ascending or descending in pitch. In practice, this means you can move these chords up or down by a minor 3rd (3 semitones) as much as you want, and the notes would remain the same, only in different order. Each note in this way can act as a root note. This is often used in playing to get a cool sounding sequences, and jazz players in particular like to exploit this idea. Any kind of chords that have the same intervals across all their notes are symmetrical. Augmented triads, for instance, made up of two stacked Major 3rd intervals are also symmetrical chords.

The sound of diminished 7 chords is jarring, dark and unstable, but also interesting and often used (carefully) for dramatic effect. Diminished 7 chords should not be mistaken with diminished triads, which are just called 'diminished.' They consist of a root, minor 3rd, diminished 5th, and Major 6th.

Chord formula is: 1 b3 b5 bb7*.

*NOTE: bb7 is a double flattened 7th, which means that it is the same as the 6th scale degree in practice.

C diminished 7, or Cdim7 for short, has the notes: C Eb Gb A.

Major 6 – These chords have a cool, distinctive sound and are used commonly in jazz, and occasionally in some other styles. They can be used to spice up a regular major triad, or as a substitute for a Major 7th, which can sometimes clash with the melody if it's playing the root note (because the 7th note in a Major 7th chord is only a semitone apart from the root). Their use is specialized and it is important to experiment and trust your ears on when it sounds good to use them.

They consist of a Major 3rd, followed by a minor 3rd, and then a Major 2nd interval (which is 2 semitones). They have the notes: root, Major 3rd, Perfect 5th, Major 6th.

Chord formula is: 1 3 5 6.

C Major 6, or just C6 would be: C E G A.

Minor 6 – finally, minor 6th quadads are the same as Major 6, except with a minor 3rd. They have a minor 3rd interval followed by a Major 3rd, which is then followed by a Major 2nd interval. They contain the notes: root, minor 3rd, Perfect 5th, Major 6th.

Chord formula is: 1 b3 5 6.

C minor 6, or Cm6, would be: C Eb G A.

Chords	Formulas				Notes in C
Major 7	1	3	5	7	C E G B
Dominant 7	1	3	5	b7	C E G Bb
minor 7	1	b3	5	b7	C Eb G Bb
minor 7b5	1	b3	b5	b7	C Eb Gb Bb
diminished 7	1	b3	b5	bb7	C Eb Gb A
Major 6	1	3	5	6	C E G A
minor 6	1	b3	5	6	C Eb G A

Table 17: Quadad chords

Chords	Notes											
	R	m2	M2	m3	M3	P4	dim5	P5	m6	M6	m7	M7
Major 7	R				M3			P5				M7
Dominant 7	R				M3			P5			m7	
minor7	R			m3				P5			m7	
minor 7b5	R			m3			dim5				m7	
diminished 7	R			m3						M6		
Major 6	R				M3			P5		M6		
minor 6	R			m3				P5		M6		

Table 18: Quadad chords interval structure

This concludes the main quadad chords. These of course are not all possible combinations of intervals that quadads can consist of, there are quite a few more you can make, for instance: a Dominant 7 chord with a flat 5th (1 3 b5 b7). These may or may not sound good in different situations, so always use your ear as a guide and remember the golden rule: ‘If it sounds good, it is good.’

Three Fundamental Chord Qualities

As we’ve seen, there are very many different chord qualities, but there is an easy way to categorize them all according to their sound and function in a chord progression. This also goes for the extended and altered chords we’re going to look at after this section.

In essence, there are **three fundamental chord qualities** that all other chords fall into. There are:

1. **Major** chords
2. **Minor** chords
3. **Dominant** chords

Here are some rules and guidelines to know which family a chord belongs to:

- If a chord has a Major 3rd and a Major 7th then it is definitely in the Major family. These chords are generally happy sounding, and generally speaking, their function is to provide stability in a Major key and give context for melodic direction in a chord progression.
- If a chord has a minor 3rd note in it, then it is considered a part of the minor family. These chords are generally sad sounding, the opposite of Major, and their function, generally speaking, is also to provide stability, but in a minor key.
- If a chord has a Major 3rd along with a minor 7th, then it is definitely in the Dominant family. Dominant chords are usually played as quadads – they are Major triads with the addition of a minor 7th. These chords are used in blues and many other genres – they create a lot of tension which tends to be resolved in a chord progression.

From these three basic chord qualities, all other chords can be attained. By altering the notes of those chords or adding notes to them (usually in the form of ‘extensions’ – thirds stacked on top of the chords), and then by subtracting other notes from the resulting chords, it is possible to generate every other chord that can be used. For all these reasons, many musicians, even in jazz, consider every chord a member of either the Major, minor or Dominant family.

The Complexity of Extended chords (9s, 11s and 13s)

Chords grow and evolve beyond an octave, and when they do so – when they contain a note which is a third up from the 7th (and therefore higher than the octave) – they are usually called extended chords. These chords are seen as simple extensions of triads and quadads (with quadads being the extensions of triads); and since these are generally built in thirds, the basic extensions of the 7th chords (1 3 5 7) are different variations of the:

9th chords or 9s (7s with a stacked third),

11th chords or 11s (9s with another stacked third),

13th chords or 13s (11s with another stacked third).

When extending chords, we first look at the scale and extend its notes beyond the octave. We can simply write this as:

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

The octave is the eighth note in a seven-note scale. So when a scale starts again at 1, we can write the number 8 instead, indicating that this is the note with which the scale starts again – only an octave higher. Then we just continue writing the numbers in order from there. This means the 9th note will be the same as the 2nd, the 10th will be the same as the 3rd, the 11th same as the 4th, the 13th same as the 6th, etc.

1	2	**3**	4	**5**	6	**7**	8	**9**	10	**11**	12	**13**	14

If we have our usual 1 3 5 7 chord, and extend it by a third, we would land on the 9th; if we extend that by another third we would get to the 11th, and if extend that by a third we would get to the 13th.

So the order in which the chords extend is:

Triads (1 3 5) -> 7th chords (most often as quadads) 1 3 5 7 -> 9's (1 3 5 7 9) -> 11's (1 3 5 7 9 11) -> 13's (1 3 5 7 9 11 13).

To sum up so far:

- Adding thirds to third-based triads gives us 7th chords. Because these chords (usually) contain four notes, they're now quadads. With triads, 7th chords form the foundation of the third-based (tertian) harmony. Seventh chords are not considered 'extended chords', but they are viewed as triad extensions.
- For a chord to be an *extended chord*, it has to contain the notes that are beyond the octave.
- Adding thirds to 7s gives us 9s. These can be five-note chords but usually some non-essential notes of a chord that don't affect the sound much are omitted. This also goes for 11s and 13s.
- Adding thirds to 9s gives us 11s.
- And adding thirds to 11s gives us 13s, which are now fully extended chords because they contain seven distinct notes.

It's important to know that in practice, not all chords are played, or voiced, with all of these notes being included – so it is possible to play a 7th chord for instance (which consists of a root, a 3rd, a 5th and a 7th) by playing only a root, a 3rd and a 7th, and leaving out the 5th. It is very common for notes to be left out of the chord in this way, and there are different reasons for doing so. Sometimes it is physically impossible to play all the notes in a chord, and sometimes leaving out the notes that are not crucial will make the chord sound clearer and more pronounced. Having too many notes in a chord makes it sound crowded, unclear, and confusing. So removing these non-essential notes and reducing the chord to a quadad (or even triad) is favorable because it makes the chord sound more focused, clearer, and simply better, because there are less notes clashing with one another. There are certain 'rules' about which notes can be left out of a chord and which cannot, we'll get to them in a bit.

Note that we stop at the 13th note because if we were to add another third to our extended chord, we would land on the 15th note, and this note is the same as the first note of the chord only two octaves higher. What this means is that stacking thirds after the 13th would only get us the same notes we had in our 1 3 5 7 chord. Since this wouldn't give us any new notes there is no point in extending any further.

Another important thing to know is that the **core part of the chord goes up to the 7**th **note**. There are many variations of these chords, as we've seen, and each has a name. Any further extensions beyond the 7th are handled and treated differently. This is done in a way so that **there are only three basic variations of each extended chord: Major, minor and Dominant.**

The extended chords are as follows:

Major 9 – these are very cool, dreamy sounding chords. They consist of a root, Major 3rd, Perfect 5th, Major 7th, **Major 9th (same note as the Major 2nd only an octave higher)**. They are composed of the same intervals as a Major 7 chord (Major 3rd – minor 3rd – Major 3rd), with another minor 3rd added on top.

Chord formula is: 1 3 5 7 9.

C Major 9, or CMaj9, would have the notes C E G B D, although the 5th note (G in this case) is often left out of this chord (as well as all other extended chords).

Minor 9 –These share the same intervals as minor 7 chords; we just have to add another Major 3rd on top.

They consist of a root, minor 3rd, Perfect 5th, minor 7th, Major 9th.

Chord formula is: 1 b3 5 b7 9.

C minor 9, or just Cm9, would be: C, Eb, G, Bb, D.

Dominant 9 – These chords are used often in funk (Dominant 9 is sometimes referred to as the 'funk chord'), and of course, jazz. Here, again, we're just adding an interval – a Major 3rd in this case – on top of a Dominant 7 chord (to get to the 9th from the minor 7th).

These chords consist of a root, Major 3rd, Perfect 5th, minor 7th and a Major 9th.

Chord formula is: 1 3 5 b7 9.

C dominant 9, or just C9, would be: C E G Bb D.

Personally, all 9s are some of my favorite chords to play on guitar.

Major 11 – These chords consist of a root, Major 3rd, Perfect 5th, Major 7th, Major 9th and **Perfect 11th (same as the Perfect 4th)**.

Chord formula is: 1 3 5 7 9 11.

CMaj11 would be: C E G B D F.

Minor 11 – These contain a root, minor 3rd, Perfect 5th, minor 7th, Major 9th, Perfect 11th.

Chord formula is: 1 b3 5 b7 9 11.

Cm11 would be: C Eb G Bb D F.

Dominant 11 – these contain a root, Major 3rd, Perfect 5th, minor 7th, Major 9th, Perfect 11th.

Chord formula is: 1 3 5 b7 9 11.

C11 would be: C E G Bb D F.

Because 11s are six-note chords, they can be very impractical and difficult to play, but they can be reduced to four-note chords simply by leaving out the 5th and the 9th, which are (usually) non-crucial notes for these chords.

Major 13 – These contain a root, Major 3rd, Perfect 5th, Major 7th, Major 9th, Perfect 11th, **Major 13th (same as Major 6th)**. That was a lot of notes.

Chord formula is: 1 3 5 7 9 11 13.

CMaj13 has the notes: C E G B D F A.

Minor 13 – contain a root, minor 3rd, Perfect 5th, minor 7th, Major 9th, Perfect 11th, Major 13th.

Chord formula is: 1 b3 5 b7 9 11 13.

Cm13 has the notes: C Eb G Bb D F A.

Dominant 13 – Lastly, these chords contain a root, Major 3rd, Perfect 5th, minor 7th, Major 9th, Perfect 11th, Major 13th.

Chord formula is: 1 3 5 b7 9 11 13.

C13 has the notes: C E G Bb D F A.

13s are often difficult chords to use and play. It’s like you’re playing a full scale as a chord. They occur with less frequency (and usually with one or more notes omitted), but when they do they can spice up any progression, sometimes with a startling effect.

Extended Chords		7th chord notes — Core part of the chord													Extended chord notes — Extended part of the chord											
		1	b2	2	b3	3	4	#4	5	b6	6	b7	7	8 (1)	b2	2	b3	3	4	#4	5	b6	6	b7	7	8
		R	m2	M2	m3	M3	P4	Aug4	P5	m6	M6	m7	M7	P8	m9	M9	m10	M10	P11	Aug11	P12	m13	M13	m14	M14	P15
9's	Major 9	R				M3			P5				M7			M9										
	minor 9	R			m3				P5			m7				M9										
	Dominant 9	R				M3			P5			m7				M9										
11's	Major 11	R				M3			P5				M7			M9			P11							
	minor 11	R			m3				P5			m7				M9			P11							
	Dominant 11	R				M3			P5			m7				M9			P11							
13's	Major 13	R				M3			P5				M7			M9			P11				M13			
	minor 13	R			m3				P5			m7				M9			P11				M13			
	Dominant 13	R				M3			P5			m7				M9			P11				M13			

Table 19: Extended chords interval structure with intervals listed in 2 octaves.*

* Note that after the first octave (P8), all intervals are the same only higher by an octave. These intervals that are larger than one octave are called **compound intervals**, and the 15th note (P15) is called a **Double Octave**. To get the size of the compound interval, you just add 7 to the original interval number.

Looking at Table 19 you can see how the 9th, 11th and 13th are 'fixed' to the Major 9th, Perfect 11th and Major 13th notes, no matter whether the extended chord is Major, minor or Dominant. Since extensions after the 7th are always these notes, we just call them 9th, 11th and 13th, without specifying the quality of the interval. If any of these extended notes are changed by a half-step up or down, then we have an **altered chord**. Those can really make the head hurt, but we'll deal with them in a separate section.

Rules for Leaving Out Notes in Extended Chords

As we've said, some of the notes in complex chords like 9s, 11s and 13s, could be (and are most often) omitted while still retaining the distinctive quality of a 9th, 11th or 13th chord. The following rules are more like guidelines and less like rules. You can really use any combination of notes, as long as it sounds good to you. In fact, **any rule in music can be broken if it sounds good**.

- The most important notes in a chord are its root, 3rd and 7th – these notes have to be present most of the time (although there is no 7th in a triad of course).
- Having said that, the 3rd can be excluded when there is some clashing between the notes. This creates a suspended type of chord.
- Strangely, the root note also doesn't have to be played in some circumstances. For instance, since the root is the lowest note in a chord, it can be left out in a band situation where you have a bass player or someone else who is playing the root. Otherwise, the chords sound better and less messy with it played.
- If you leave out the 7th, it will result in a different kind of chord, called an **added tone chord** (more on these in the next section).
- The 5th note in a chord can be left out most of the time, unless it is one of its characteristic notes.
- 9 chords should have: 1 3 7 9. The 5th note can be easily left out here.
- 13 chords should have at least: 1 3 7 13 – we can exclude the 5th, 9th and 11th.
- 11 chords should have at least: 1 3 7 11 – we can eliminate both the 5th and the 9th.

The Problem with 11s

Some 11 chords, namely Major 11 and Dominant 11, are special because the Perfect 11th note is an octave up from the Perfect 4th note, which means they are the same note (4+7=11). A Perfect 4th is a semitone up from the Major 3rd, and these chords contain both of those notes.

For example, C Dominant 11 contains the notes: C (R), **E** (M3), Bb (m7), **F** (P11), and we can see that the F note (P11) is only a semitone up from E (M3). Even though it's actually an octave and a semitone up from E, this can cause a clash between these two notes and produce an unpleasant sound.

This is often avoided by sharpening the 11th note, thus getting a Dominant#11 chord (1 3 b7 #11) or Major#11 chord (1 3 7 #11). Chords like these are called altered chords, which we've mentioned before.

Another way to avoid this would be to completely remove the 3rd, which creates a suspended chord because the 3rd has been replaced with the 11th. These chords could be named for example: Major7sus11 (1 5 7 11), and Dominant7sus11 (1 5 b7 11). There are different ways you can go about naming complicated chords such as these – always follow logic when doing so.

It should be also said that these kind of note clashes don't have to be avoided at all. If something sounds bad in theory, like in this example, it doesn't mean that it will sound bad when you play it on your instrument. As we said, the 'rules' can be broken if it sounds good in the right context.

Added Tone Chords – What's the Difference

In the last section we mentioned that the 7th can be left out of the chord, and this usually results in getting a different type of chord, called added tone chords. Added chords ('add' for short) are viewed as simple triads with one or more added notes. The notes that are added in this way are usually:

Major 2nd — **add2** (1 2 3 5) — R M2 M3 P5

Perfect 4th — **add4** (1 3 4 5) — R M3 P4 P5

Major 9th — **add9** (1 3 5 9) — R M3 P5 M9

Perfect 11th — **add11** (1 3 5 11) — R M3 P5 P11

Major 13th — **add13** (1 3 5 13) — R M3 P5 M13

Out of these chords the add9s are probably the most common. They are used often in pop and rock to spice up the regular triads; Cadd9 chord (C E G D) is the add chord that most beginners first learn on guitar because it's easy to play.

Add4 is a typical chord that should sound bad in theory because of the clash between M3 and P4, which are a semitone apart, but in reality this is one of the commonly used chords on guitar that sounds good, even though it shouldn't. Dadd4 chord (D F# G A) is particularly popular because of its convenient position on guitar. It does have some dissonance to it, but that can also be a good thing when we want it. Note that add4 and add11 are essentially the same chords but with a different note order or chord voicing. Add11 (Perfect 11th) is an octave up from add4 (Perfect 4th), and is positioned higher than the Perfect 5th in a chord. Chord voicings are explained in more detail in a separate section .

Notice how all these chords are different from the ones we've had so far. For example, an add9 chord is similar to a sus2 chord, because the Major 9th is the same note as the Major 2nd, only an octave higher. But added tone chords contain the 3rd, while suspended chords replace it with something else (most commonly with the 2nd or 4th). The same goes for sus4 and add11 chords.

In music theory, nomenclature for some concepts is not very consistent – different musicians may sometimes name the same thing differently. One such instance is when a Major 11 chord is sometimes incorrectly written as add11. This is wrong because added tone chords don't have the 7th, while regular Major extended chords do. This also happens with Major 9s and Major 13s, so don't let this confuse you if you see it – make sure to check the structure of a chord to know what you're dealing with.

Also, what sometimes causes some confusion is distinguishing any Major extended chord (9, 11 or 13) with a Dominant extended chord (9, 11 or 13); for example, C Major 13 and C13 – the former is a Major chord containing the Major 7th, while the latter is an abbreviation of a Dominant chord with the minor 7th.

Demystifying the Altered Chords

Altered chords are very complex chords that can have many different possibilities, definitions and ways of thinking about them. This is why they can be very confusing, difficult and inconsistent in the way different musicians and music theory professors interpret them. But they are well worth the effort because once you understand them you can really make up any chord you want and understand harmony better. Make sure you're comfortable with everything we've covered so far (especially with the extended chords), before trying to tackle the altered chords.

Let's simplify it at the beginning and say that altered chords are any extended chords that have one or more of their notes changed chromatically. Like the extended chords, they can also be simply Major, minor or Dominant. Their extensions are still the 9th, 11th or 13th, but in an altered chord these notes have been changed by a semitone, either up or down.

These changes are called *chromatic alterations* and they are: b9, #9, b11, #11, b13, #13. This is the way we write them down.

However, since there are three versions of altered chords (Major, minor or Dominant), not all these alterations make sense in each version. This is because of the different notes in the core part of the chord that each of these three qualities contain. If you remember, the core part of the chord is up to the 7th note, or in other words, the 7th chords are the core part of an extended chord. To understand all this and show which alterations are possible for which chord, let’s go over each version.

Major Chord Alterations

b9 and #9

The **Major 7** chord consists of the notes R M3 P5 M7. If we extend this chord to the Major 9th and alter this note so it is a semitone lower, meaning b9, we would get an altered chord with a name that we can simply write as: Major7b9, or Maj7b9*.

In C, the notes of the C Maj7b9 would be: C E G B Db.

> *Note that the altered chord names are traditionally written on the sheet with the alterations put in parentheses and superscripted next to a chord that is altered, like this: Major 7 (b9). It doesn’t really matter which way you choose to write it as long as it’s visible. Though if a chord has more than one alteration, which is possible, it is preferable to write them in the traditional way.

The b9 note is the minor 9th interval, which is the same note as the minor 2nd. This interval is only a semitone up from the root, and this causes a really dissonant sound. So b9 is a valid alteration for a Major type chord because it is a unique note.

But what if we alter the 9th by a semitone up (#9) in the Major 7th chord?

If you look at Table 19: Extended chords interval structure, you can see that the #9 is actually a minor 10th, which is the same note as the minor 3rd. Major chords contain the Major 3rd, so this produces a clash between the Major 3rd and the minor 3rd. All these chords can be many different things and interpreted in many ways depending on the harmony, and that’s why they’re complex.

You can write this as: Maj7#9.

C Maj7#9 has the notes: C E G B D#.

If you leave out the Major 3rd here, you would get a suspended chord that is not really suspended because it has the minor 3rd (minor 10th) – this would be a minor chord with a Major 7th note – the opposite of the Dominant 7 chord.

b11 and #11

Let’s see what would happen if we had a b11 in our Major 7 chord. First we extend this chord by two thirds: to the 9th, and then to the 11th. This would give us the Major 11 chord with the notes: R M3 P5 M7 M9 P11.

Again, if you look at Table 19 you can see that the Perfect 11th is the same note as the Perfect 4th. If we alter this note by a semitone down, we get the Major 10th, which is the same note as the Major 3rd. Since our unaltered Major 11 chord already contains the Major 3rd, there is no point in this particular alteration.

On the other side, #11 is the same as the Augmented 4th. That would give us a two-semitone clash between P4, Aug4 and P5; but in this case we would leave out the fifth.

How do we name this chord? We can’t name it Maj11b11 because that would be very confusing. What we can do is back down a third, to the 9th, and then write: Maj9#11. In this way we simply indicate that this is a Major 9th chord with the addition of a sharpened 11th note. In C, the notes of this chord would be: C E G B D F#.

b13 and #13

When it comes to the 13s, we extend the Major 7 chord to the Major 13 by adding three thirds. The Major 13 chord would then have the notes: R M3 P5 M7 M9 P11 M13.

If we lower the Major 13th note by a semitone (b13) we would get the minor 13th, which is the same note as the minor 6th – this is a unique note in the initial chord. We name this altered chord by backing down a third and then writing Maj11b13, or (traditionally) Maj11(b13). In C, the notes are: C E G B D F Ab.

The #13 would be the minor 14th, which is the same as the minor 7th note. This is also a unique note we can have in a Maj13 chord. The name of this altered chord would be Maj11#13. In C, the notes are: C E G B D F A#.

Altered chords		Core part of the chord				Extended part of the chord											
						m9	M9	m10	M10	P11	Aug11	P12	m13	M13	m14	M14	P15
Major type	b9	R	M3	P5	M7	b9											
	#9	R	M3	P5	M7			#9									
	#11	R	M3	P5	M7		M9				#11						
	b13	R	M3	P5	M7		M9			P11			b13				
	#13	R	M3	P5	M7		M9			P11					#13		

Table 20: Possible chromatic alterations for a Major type chord

Minor Chord Alterations

b9 and #9

The minor 7 chord consists of the notes: R m3 P5 m7. When we extend this chord to the 9th, and lower it by a semitone (b9), we get a minor 7 chord with a b9, so we write it: m7b9.

The b9 is a unique note in this chord because, if you remember, it is the same as the minor 2nd.

In C, the notes of this chord would be: C Eb G Bb Db.

If we raise the 9th by a semitone (#9), we get the minor 10th note, which is the same as the minor 3rd – this is already found in our unaltered chord. That's why there is no point in making this particular alteration.

b11 and #11

Extending the minor 7 chord to the minor 11 results in the notes: R m3 P5 m7 M9 P11. Lowering the 11th by a semitone (b11) gives us a Major 10th, which is the same note as the Major 3rd. Again, in order to name this chord, we back down a third, to the 9th, and call it: m9b11. This is another chord that contains both the Major 3rd (Major 10th actually) and the minor 3rd. The notes of Cm9b11 chord would be: C Eb G Bb D E.

Raising the 11th by a semitone (#11) gives us the Aug4th note. We call it simply m9#11. The notes of Cm9#11 would be: C Eb G Bb D F#.

b13 and #13

The minor 13 chord has the notes: R m3 P5 m7 M9 P11 M13. The first alteration is the b13, which is the minor 13th – equal to a minor 6th. The name of this chord then is m11b13. In C, the notes are: C Eb G Bb D F Ab.

The second alteration is the #13, which is equal to a minor 7th. But since we already have a minor 7th in the initial chord, there is no need for this alteration.

Altered chords		Core part of the chord				Extended part of the chord											
						m9	M9	m10	M10	P11	Aug11	P12	m13	M13	m14	M14	P15
Minor type	b9	R	m3	P5	m7	b9											
	b11	R	m3	P5	m7				b11								
	#11	R	m3	P5	m7		M9				#11						
	b13	R	m3	P5	m7		M9			P11			b13				

Table 21: Possible chromatic alterations for a minor type chord

Dominant Chord Alterations

Dominant chords are unique because the chromatic alterations are usually done on these types of chords. This is because these chords are designed for tension, which they add when they occur in a chord progression. The purpose of adding altered notes to a dominant chord is to provide even more tension, which then wants to resolve badly to a stable chord. It is for this reason that you will often see altered notes on a dominant type chord.

b9 and #9

The Dominant 7 chord consists of the notes: R M3 P5 m7.

The b9 note is equal to a minor 2nd. The name of this chord is 7b9. C7b9 would be: C E G Bb Db.

On the other side, a #9 on top of the Dominant 7 is special because it is one of the most popular altered chords used in funk, blues, rock and jazz. It is commonly referred to as the **Hendrix chord** (specifically E7#9 because of the open E string on guitar). The #9 is equal to a minor 3rd, and having this note in the chord along with a Major 3rd and minor 7th produces a really funky sound. In C, the notes of this chord are: C E G Bb Eb.

b11 and #11

The b11 as we know by now is equal to a Major 3rd. This note is already a part of the Dominant 7th chord.

The #11 is equal to an Augmented 4th note. The name of this altered chord would be: 9#11. In C, this chord would have the notes: C E G Bb D F#.

b13 and #13

Finally, the b13 in a chord gives us the minor 6th note. The name of this Dominant chord would be: 11b13. The notes in C are: C E G Bb D F Ab.

Raising the 13th by a semitone gives us the minor 7th, which is already in the Dominant chord.

Altered chords		Core part of the chord				Extended part of the chord											
						m9	M9	m10	M10	P11	Aug11	P12	m13	M13	m14	M14	P15
Dominant type	b9	R	M3	P5	m7	b9											
	#9	R	M3	P5	m7			#9									
	#11	R	M3	P5	m7		M9				#11						
	b13	R	M3	P5	m7		M9			P11			b13				

Table 22: Possible chromatic alterations for a Dominant type chord

To summarize:

- There is no b11 alteration for a Major type chord because that note is already a part of the chord.
- There are no #9 and #13 alterations on a minor type chord, and;
- There are no b11 and #13 alterations on a Dominant type chord, for the same reason.

Alteration Possibilities and the Use of b5 and #5

We can add any of the chromatic alterations to a 7th chord without having the usual extensions in it. For example, if we want to add the b13 to a minor 7 chord, we don’t have to extend it all the way to the 11th (and thus have the 9th and the 11th in there). We can simply add the b13 on top of the minor 7 chord – resulting in a m7b13 chord, with the notes: R m3 P5 m7 m13.

Another example: If we want to have a Dominant 7 chord with a #11, we don’t need to have a 9th in there. Just adding the #11 on top of the Dominant 7 chord would result in a 7#11 chord, with the notes: R M3 P5 m7 Aug11. Also, note that whenever there is no chord quality preceding the first number in the chord’s name, like in this case, always assume it is a Dominant chord.

We can also have more than one alteration in a chord, as long as they make sense. For example, Maj7b9#11b13. This chord name looks messy, so the usual way to write it on a sheet would be: Maj7(b9 #11 b13), which differentiates more clearly the core part of the chord – Maj7– and the alterations are put in parentheses.

On another note, you might sometimes see b5 and #5 as chord alterations. This is often done in jazz. The b5 is the same note as #11, and #5 is the same as b13. These are just different names for the same thing, the use of which mostly depends on the personal preference of the composer, arranger or a music theory professor you're speaking to. The rule of thumb, however, is that #11 is usually seen on a Major type chord, while b5 is seen on minor and Dominant type chords to stay consistent with the use of flats that occur in these chords. In other words, this is done to avoid having both sharps and flats when you list out the chord notes. For example, in a Cm7#11 chord, with the notes: C Eb G Bb F#, you could use b5 instead and name it Cm7b5. The notes of this chord would then be C Eb G Bb Gb. Same thing goes for #5 and b13.

Also, if a composer or arranger decides that a chord with these notes is traveling downwards to the next chord, they're going to write out a chord name with flats and use b5 and b13. Conversely, if a chord is traveling upwards they would most likely use sharps such as #5 and #11 to name a chord.

Lastly, the most common altered notes on a chord are: b9, #9, #11(b5) and b13 (#5). These mostly occur in jazz on Dominant type chords.

Borrowed Chords vs Altered Chords – Classical vs Jazz View

Remember when we said that altered chords can be difficult to grasp? Well, the reason is that there are basically two ways of looking at them: classical and jazz.

Earlier in this chapter we mentioned that each scale produces a set of chords, all built in thirds on each of its notes and organized around the root note of that scale, which is the key that those chords belong to. We will go over this in detail in the next few sections, but this is important to remember now because in the classical way of looking at the altered chords, any chord that has been altered so it contains one or more notes that are no longer part of the original scale – meaning that the chord no longer fits the key – is considered an altered chord.

A chord like this that sounds surprising and 'out of key' to a listener is also called a **borrowed chord** or non-diatonic chord. This is simply a chord that is borrowed from a parallel mode, hence the name. Parallel modes, if you remember, share the same key (same tonal center) but have different parent scales. This process of borrowing chords from a parallel mode is called **modal interchange** or **modal mixture**.

For example, we have a chord progression that is in the key of C Major:

Cmaj7 – Am7 – Fmaj7 – G7

Now let's change the F Major chord in the progression to an F minor, so that it is:

Cmaj7 – Am7 – Fm7 – G

We would still be predominantly in the key of C Major, but with one chord that belongs to C minor key instead, and that is the Fm7 chord. C Major and C minor are parallel modes, and thus we have simply borrowed a chord from a parallel Aeolian mode (natural minor scale), in this case C minor. This borrowed chord in the classical view is also considered an altered chord because the Major 3rd note of the F chord (F **A** C), has been lowered by a semitone to Ab, thus creating an altered F Major chord in the context of the original key.

In the more modern jazz view, altered chords are as we have described them so far. Here, the altered chords have different alterations that most of the time don't belong to the original key, but sometimes they do. For example, in our previous progression, we can alter the Fmaj7 so that it is:

Cmaj7 – Am7 – Fmaj7#11 – G7

This FMaj7#11 chord consists of the notes F A C E B, all of which are found in the key of C Major. In the classical view, this would not be considered as an altered chord, while in the modern jazz view this is definitely an altered chord. Keep in mind this distinction anytime you use altered chords.

Altered Harmony – How Altered Chords are Used and Where Do They Come From?

Remember our weird friend the altered scale? This scale, if you don't remember, is the seventh mode of the melodic minor scale. The altered scale is useful for many reasons and jazz players in particular like to use it to play more sophisticated chords and lead lines over those chords.

Chromatic alterations are most often done on a Dominant chord that resolves to the most stable chord in a chord progression. This chord in the context of chord functions in progressions (which we have yet to go over) is called **functioning dominant chord**. Because the purpose of this chord is to add tension, we often add even more tension and drama by altering notes. Resolving this altered Dominant chord to the next chord which is stable produces a very pleasant, 'coming home' type of sound.

You can also play lead lines over this altered Dominant chord, and use the altered scale specifically over that chord before it resolves. This will result in some very sophisticated lead lines that never sound ordinary – lines which jazz players often use in their solos.

So let's see how to build the relevant altered scale from a Dominant chord, let's say C7.

C7 chord has the notes:

C	E	Bb
R	3	b7

Now we're going to add all the altered notes that are possible for a Dominant 7 chord: b9, #9, b5 (same as #11), #5 (same as b13). Note that we exclude the 5th from the above chord (G in this case) because that is one of the notes we're going to alter with b5 and #5.

Now we have:

C	**Db**	**D#**	E	**Gb**	**G#**	Bb
R	**b9**	**#9**	3	**b5**	**#5**	b7

Now, the scale we got by adding the altered notes looks very messy. We will tidy it up using enharmonic equivalents so that we can arrange all the notes in alphabetical order:

C	**Db**	Eb	Fb	Gb	Ab	Bb
R	**b9**	#9	3	b5	#5	b7

What we have created now essentially is the C altered scale. Since this scale is the seventh mode of the melodic minor scale, we know that it is only a semitone below the parent melodic minor scale of this mode. This means that the parent melodic minor scale of an altered scale is found on its 2nd degree. In the key of C, that would be Db. So the parent melodic minor scale of C altered is Db melodic minor, and C altered scale is the seventh mode of Db melodic minor.

The parent melodic minor scale is very easy to figure out in this case – you just have to look one semitone above the root of a Dominant 7 chord to find it. For example, the parent melodic minor scale of G altered scale (built out of a G7 chord) is Ab melodic minor. Why would you want to do this? Well, this is very convenient because it is usually easier to think and visualize the scale in the context of a melodic minor, rather than an altered scale.

Note that this is only done in practice on Dominant type chords because they have a specific function in a progression, which is to build up tension right before it gets resolved.

Have you noticed which notes were left unchanged by the alterations we had above? It's the M3 (E) and b7 (Bb). If we left all notes unaltered we would get:

C	D	**E**	F	G	A	**Bb**
1	2	**3**	4	5	6	**b7**

Do you remember which scale this is?

It's the Mixolydian mode. It is also sometimes referred to as the **Dominant scale** because it contains the root, M3rd and m7, all of which are must-haves in a Dominant chord. What the altered scale essentially does is it alters all non-essential notes in a Dominant scale, except for 1, 3 and b7. That's why the altered scale works best and is most often used over Dominant chords.

Major and minor type altered chords have their uses too, but these are much rarer. They are used mostly to produce a more exotic, different color; sounds that spice up a progression in an interesting way, usually as 'borrowed chords' if they are out of key.

Chords Built in Fourths

Not all triads have to be built from stacked thirds. We've already seen that in the case of suspensions, in which there are other intervals – seconds and fourths – that are stacked on top of one another. It is even possible to build triads from the ground floor, basing them completely on an interval other than a third. Usually, this is done with fourths. In these cases, chords are built by stacking fourths – Perfect 4th, flat 4th, sharp 4th – in various ways to make triads or quadads.

The resulting chords – usually used in jazz and modern classical music – consist, in general, of roots, fourths, sevenths and tenths (1 4 7 10), and they have quite distinct sounds and serve quite distinct functions. C quadad built in fourths would be:

C	D	E	**F**	G	A	**B**	C	D	**E**	F	G	A	B	C
1	2	3	**4**	5	6	**7**	8	9	**10**	11	12	13	14	15

These chords can be used in place of or in addition to third-based chords to achieve a variety of effects, but that usually means moving into the realm of some very advanced harmony.

Let's now shift gears for a bit and explain in more detail chords' relationship to scales.

How Chords Come from Scales

As we know by now, chords come from scales. They are generated by scales and are literally made up of notes from the scale they come from. What this means is that a given scale will imply a certain list of chords, with those chords all being in the same key as that scale.

Chords that come from a Major (diatonic) scale are called **diatonic chords.** Each Major scale key (remember – twelve notes so twelve keys) has its own set of seven chords. All of those chords begin and are built on a different note of the scale.

Figuring out all the chords in a Major key is simple. Let's say we want to figure out all the chords that are in the key of C Major. First we number a C Major scale and go a little bit beyond an octave (up to the 13th):

1	2	3	4	5	6	7	8	9	10	11	12	13
C	D	E	F	G	A	B	C	D	E	F	G	A

Chords, as we know by now, are most often built in thirds, so we will simply begin by stacking thirds just as before. We will start by adding the 3rd and the 5th note on each scale degree.

This will result in getting *seven different sets of three notes*, and then we have to analyze what chord those notes make up. For example, the first note in C Major scale is C. When you add the 3rd and the 5th note to it, you get the notes: C E G. The second note in C Major is D; after adding the 3rd and the 5th (counting from D as the first note), you get: D F A, etc.

Scale degree	R	3	5
1	C	E	G
2	D	F	A
3	E	G	B
4	F	A	C
5	G	B	D
6	A	C	E
7	B	D	F

Table 23: Stacked thirds in C Major scale

Now we need to analyze these groups of three notes and see which chord quality they make up.

How to Analyze Diatonic Chords

1. The first group of notes we have is: C, E, G. When we have a group of notes like this and we want to figure out what chord it is, **we start by comparing the notes to the Major scale of the bottom/lowest note**. In this case (C E G) it's C, so we take a look at the C Major scale. We see that these notes are all found in the C Major scale – they're the 1st, 3rd and 5th notes. We know that chord which has a 1 3 5 chord formula is a Major chord, so this must be C Major chord. (Figuring out this chord is pretty obvious.)
2. The next group of notes is D, F, A. Again, we start by checking and comparing the notes to the Major scale of the bottom note. In this case it's D, so we check the D Major scale.

D (1)	E (2)	F# (3)	G (4)	A (5)	B (6)	C# (7)	D (8)

   We can see that D is the root note and A is the 5th note, but F – the 3rd note in our chord – is not found in a D Major scale. Instead we have F#. This tells us that our chord's note (F) is flattened by a semitone (a half-step down on the note circle). When we stack thirds (1 3 5) in a D Major scale, we get the notes of a D Major chord: D F# A, but since our 3rd note is F, it means that our chord formula sequence is actually: 1 b3 5. And what kind of chord has the formula 1 b3 5? The minor chord, of course. So this chord must be D minor.
3. The next group of notes is E, G, B. We check the E Major scale and repeat exactly the same process. In E Major the 1 3 5 notes are: E G# B. Since our 3rd is G, it means that, again, this note is flattened by a semitone, and the formula for E G B is: 1 b3 5. This tells us that the 3rd chord is another minor chord, and it's E minor (in the key of C Major).

I'll let you figure out the chord for the next three note groups: F A C; G B D; A C E. You just have to follow the same process as described for the first two note groups. If you have any trouble, a little bit further in this section there will be a complete list of all C Major scale chords so you can check to make sure you got it right.

I just want to explain the last group of three notes starting on the 7th degree of the C Major scale – B D F.

When we check the Major scale of the bottom note—

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

—we can see that both the 3rd (D) and the 5th (F) in our note group are a semitone lower than the 3rd and the 5th in the B Major scale. This means that instead of 1 3 5, we have 1 b3 b5.

Do you remember what type of chord has this kind of formula?

You've guessed it – it's a diminished one!

Assembling Diatonic Chords

To summarize what we have covered so far, here's a list of chords that we got by analyzing the notes:

Scale degree	R	3	5	Chord
1	C	E	G	C major
2	D	F	A	D minor
3	E	G	B	E minor
4	F	A	C	F major
5	G	B	D	G major
6	A	C	E	A minor
7	B	D	F	B diminished

Table 24: Diatonic chords in C Major scale

Each key of the Major scale produces three Major chords, three minor chords, and one diminished chord which starts on the 7th scale degree!

There is really only one difficulty with all this and it's that in the real world the notes are not always given in this correct triad order.

Sometimes a chord inversion is used (we will talk about those next) where the root note is not the lowest note in a chord.

For example, you may have notes F A D, and it might seem confusing to figure out the chord. However, this is simply the inversion (re-ordering) of D minor (D F A).

Here's another example: B G# E. Can you guess this chord? It's E Major, but with the reverse note order.

Recognizing these chords by their notes even when they're in an inversion is something you're going to become better at as you gain more experience playing and figuring stuff out by yourself.

A good place to start is to get used to the notes in common chords so that when you see one with a different note order you can instantly remember what chord that is.

Some common ones include: CEG (C chord), GBD (G), FAC (F), ACE (Am), EGB (Em), DF#A (D), AC#E (A), BD#F# (B), EG#B (E), BbDF (Bb), BDF# (Bm), DFA (Dm).

In more advanced harmony where more complex chords (with more notes) are used, it will be harder to do this because some notes can be left out. This can create a lot of confusion as to what type of chord it is, but there are methods to figure out even those, it's just a little bit more complicated.

Coming back to our scale chords, you have to remember that **every Major scale will produce this same sequence of chord qualities**.

Here is the Major scale triad chord sequence:

Maj	min	min	Maj	Maj	min	dim
I	ii	iii	IV	V	vi	vii

This sequence needs to be memorized. Each Major key will produce this same sequence of **triad** chords.

Note that scale degrees are usually written in Roman numerals. This is important because of the chord progressions we're going to talk about later.

The diatonic quadads chord sequence is similar, but with a little bit of difference in the chord qualities:

Maj7	min7	min7	Maj7	(Dom)7	min7	min7b5
I	ii	iii	IV	V	vi	vii

We know that these 7th quadads are the chords you get after adding another third on top of triad chords. You can easily figure out the diatonic quadads on your own and come up with the same chords as in this sequence. Just in case, if you need any help, let's do it together for the V chord (Dominant 7) and for the vii chord (min7b5), because we haven't had them in diatonic triads.

The Dominant 7 chord is the chord we get if stack the thirds starting from the 5th scale degree. In the case of C Major scale, the 5th degree is G, so we build our Dominant chord on top of this note. We take the 1st, 3rd, 5th and a 7th (four notes because it is a quadad chord), but starting from the G note. We get the notes: G, B, D and F. Then we check the G Major scale and see that G is the root, B is the Major 3rd, D is the Perfect 5th, but the 7th note is F#, and we have F. This means that the 7th note is flatted by a semitone, and what we have is the chord formula for a Dominant 7 chord: 1 3 5 b7.

In quadad form, min7b5 is the chord we get when we stack the thirds starting from the 7th Major scale degree. If we do this in the key of C Major we get the notes B, D, F and A. Then we check these notes against the B Major scale – B is the Root, D# the 3rd (we have D), F# is the 5th (we have F), and A# is the 7th (we have A). So all notes after the root have been flattened by a semitone. This means that the chord formula for this chord is: 1 b3 b5 and b7. In triad form, this is a diminished chord, but when we add another third on top it becomes min7b5.

(Note that our diminished 7th, or full diminished chord, with the formula: 1 b3 b5 bb7, is not a diatonic chord because it doesn't appear in this diatonic sequence of four-note chords.)

We can do this exact process to figure out the chords that are found in a minor scale, but we don't have to. We know that the minor scale is simply the 6th mode of a Major scale, so all we have to do is take the Major scale chord sequence and re-orient it so that we start from the **vi** chord.

By doing so we get the minor scale triad chord sequence:

min	dim	Maj	min	min	Maj	Maj
i	ii	III	iv	v	VI	VII

In the key of A minor (the 6th mode of C Major) that would be:

A min (i), B dim (ii), C Maj (III), D min (iv), E min (v), F Maj (VI), G Maj (VII).

You can apply this minor chord sequence to any natural minor scale and you would get the chords in that key.

The minor quadads sequence follows the same logic:

min7	min7b5	Maj7	min7	min7	Maj7	(Dom)7
i	ii	III	iv	v	VI	VII

Lastly, keep in mind that this is not the only way to assemble chords that sound good together, and very often improvisors and composers use chords that are not related diatonically or not generated by a diatonic scale, but it is one easy way to know and ensure that what you play will sound good.

Transposing from One Key to Another

The necessity to play in a bunch of different keys is not uncommon for a musician. Being able to change keys on the spot is a really useful skill to have for a variety of reasons – especially if you want to play chords on your instrument.

Often, the reason we do this is because we want to play in a key which better suits a singer's voice, or it might be just more convenient to play in a certain key depending on a situation. In any case, having this skill is quite useful and important, especially if you are playing in a band.

Luckily, since you now know the sequence of chords that each Major scale produces, switching from one key to another is very quick and easy.

If we have a chord sequence playing, for example: C — Am — F — G, we figure out that these are the I — vi — IV

— V chords of the C Major key.

If we want to switch keys to G, we first need to figure out the chords in the key of G, and then apply this chord progression:

1. G Major scale is: G, A, B, C, D, E, F#
2. After applying the formula: *Maj, min, min, Maj, Maj, min, dim*, we get the following chords:

   G Maj (I), A min (ii), B min (iii), C Maj (IV), D Maj (V), E minor (vi), F# dim (vii).
3. Then all we have to do is apply the I — vi — IV — V chord sequence to the key of G, and we get the chords: G — Em — C — D.

So what was C — Am — F — G in the key of C is now G — Em — C — D in the key of G.

This can be done in all keys and with any chord progression.

Chord Inversions and Chord Voicings

The arrangement of notes in a chord is called a **chord voicing**. It represents the order and the frequency in which the notes appear in a chord when we play it. By frequency, I mean how many times the notes are repeated in a chord that is played.

For example, an E Major triad consists of the notes E G# B. This is an example of a basic chord voicing. The notes are going from lower to higher in order, so that E – the root – is the lowest note, G# is the Major 3rd and higher in pitch than E, and B – the Perfect 5th – is the highest note in this voicing. However, sometimes we play a chord in which the order of the notes is different to this one, for example, E B G#. It may not be obvious at first that this is still an E Major triad, but with a different voicing. E (root) is still the lowest note, but now G# (Major 3rd) is the highest note.

This is often the case on guitar where a chord can have many different shapes and ways it can be played, each with a different chord voicing (and also different fingering choices). If we take our E Major triad again and play it on guitar as a basic open chord shape, we can see that the order of the notes played from lowest to highest is: E(R), B(P5), E(Octave), G# (M3), B(P5), E(Double Octave). This is an example of a chord voicing where E note appears three times (in three different octaves), B (P5) appears twice, and the G# (M3) appears only once.

We can see that one chord can have many different voicings, and the root is always the bass (lowest) note. But there are special cases when it’s not.

Most chords are third-based. The general form of a chord is such that it contains a root followed by a series of stacked thirds (Major or minor) that create the qualities of that chord. It is possible, however, to produce chords that don’t have this structure but are still based on thirds.

This is done by re-arranging the notes of a stacked third chord so that the lowest note in the chord – the bass note – is no longer the root note. (Usually that means the root note is contained elsewhere in the chord.) These chords are called ‘**Inversions**.’

Essentially, we can say that a chord inversion is the act of voicing a chord with a note other than the root as its lowest note.

The simplest inversions are triad inversions (because those are the simplest chords). For any triad, since there are three distinct notes, there are two distinct inversions that can be produced (in addition to the original chord, in which the root note is the bass note).

Major Triad Inversions

C Major triad contains the notes C, E and G. The C is the chord’s root and, most often, its bass note. In such a case, the chord is not in inversion.

1. The first inversion of the C Major triad contains the same notes, but now the E is the chord’s bass note. Most commonly the chord is played in the note order: E, G, C. This new chord, relative to its new bass note (E) contains a minor 3rd (G) and a minor 6th (C).
2. The second inversion of a C Major triad has G as its bass note. It is generally played G, C, E (in that order); and contains, relative to its bass note (G), a Perfect 4th (C) and a Major 6th (E).

Minor Triad Inversions

Minor triad inversions follow the same rules as Major triad inversions.

1. An A minor triad (A, C, E) in first inversion is generally played C, E, A; and contains (relative to C as the new bass): Major 3rd and a Major 6th. It’s interesting that this chord in inversion is actually C Major 6 (but without the 5th), with the notes C(R), E(M3), A(M6).
2. In second inversion, the chord is E, A, C; and relative to E it contains a Perfect 4th and a minor 6th.

These triad inversions – in the case of both Major and minor triads – have special names:

- The first inversion of a Major or minor triad is called a **‘6’ chord**. This is because, as we have seen, its bass note is the 3rd of the original triad and it contains, relative to the new bass note, a 3rd (Major 3rd in a minor chord inversion, and minor 3rd in a Major chord inversion) and a **6th** (Major 6th in a minor chord inversion and minor 6th in a Major chord inversion).
- The second inversion of a Major or minor triad is called a **‘6/4’ chord**, since this chord, whose bass note is a 5th, contains a **4th** and a **6th** above that bass note. This inversion essentially gives us a 6sus4 chord (R, P4, M6) in the case of a Major inversion, and Augmented sus4 triad (R, P4, Aug5 – same as m6) in the case of a minor inversion.

Inversions of Diminished and Augmented Chords

Here we have something interesting going on. Diminished chords are built only out of stacked minor thirds and Augmented chords are built out of stacked Major thirds. Because of that, diminished and Augmented chords are called **symmetrical chords**. The consequence of this is that inverting Augmented triads and full diminished chords result in more Augmented triads and full diminished chords.

In other words, a full diminished chord in inversion is just that same chord repeated up or down a minor 3rd interval (3 semitones). Likewise, an Augmented triad in inversion is just that same chord repeated up a Major 3rd (4 semitones).

Note that there are symmetrical scales too. Scales such as a diminished scale and whole tone scale have this kind of structure. In fact, the first scale we had in this book – the Chromatic scale – is also a symmetrical scale.

Inversions of 7ths and Extended Chords

It is possible to invert 7s and extended chords in a variety of ways to end up with harmonically complex chords. For any quadad, since there are four distinct notes, there are three distinct inversions (that follow the same logic as triad inversions) in which the root is not the lowest note, and it goes on as more notes are added.

Normal root position (1 3 5 7) – The root is the lowest note

1st inversion (3 5 7 1) – The 3rd is the bass note and the root is the highest note

2nd inversion (5 7 1 3) – The 5th is the bass note and the root is the second highest note

3rd inversion (7 1 3 5) – The 7th is the bass note and the root is the second lowest note

These chords, most often used in contemporary classical music and jazz, are useful for many reasons, most obviously as substitution chords.

Keep in mind that you can have any chord voicing, meaning any note order in a chord, but as long as the root is positioned as the lowest note then it is not considered an inversion.

How to Find Root Note Position in an Inverted Chord

Chord voicings are often arranged in a way so that just by looking at the notes it is far from obvious what chord it is. Luckily, there is an easy method to find out where the root note is in an already inverted voicing. The method is to simply rearrange the notes until they are stacked in thirds alphabetically. This works because the vast majority of chords are built in thirds.

Let’s say we have a chord voicing with the following notes (in order from lowest to highest): A, F#, A, D, F#, and we want to figure out where the root is and what chord this is.

1. First we recognize that there are only three distinct notes in this chord, so this must be a triad of some kind. We also disregard any #’s or b’s because we just want to figure out the thirds alphabetically.
2. Then we stack a third on top of each note, starting from the lowest, which in this case is A. A third up from A if we count alphabetically (A, B, C – 1, 2, 3) is the C note. We check if this note matches the note next to A in our chord. It doesn’t, since the next note is F#.
3. Then we move on to the next note – F#. We disregard the sharp; so a third up from F (F, G, A – 1, 2, 3) is A note. This is good because A matches the next note in our chord. This means that F# could be the starting note. Then we add a third up from A, which, again, is the C note, and it doesn’t match the next note, which is D. It seems that F# is not the root note.
4. Then we move on to D. A third up from D is F. It matches. We add a third to F, and get A note. Match again.

Since this is a triad it is enough to get two matches in row (for quadads you would need three matches). Now we just take back the sharps or flats to all notes that had them. In this case, only F had a sharp. The notes we got by rearranging them in thirds are: D F# A, and these are the notes of a D Major chord. Since A note was at the bottom as the lowest note, it means that this is the 2nd inversion of D Major chord.

This process is quite straightforward and you can use it anytime you’re unsure what chord you’re facing. When it comes to triads you just have to watch out for those suspensions (2nd and 4th). If any of the notes with a stacked third don’t match, try to count up **alphabetically** by a second and a fourth. For a sus2 chord, first find a note match with the stacked second and then with a stacked fourth note. For a sus4 chord first find a match with the stacked fourth and then with the stacked second note.

As the number of notes in a chord increases it gets progressively more difficult to figure out the chord, plus a chord can sometimes have several different names – the choice of which will often depend on the overall harmony you’re given.

Slash Chords

Slash chords are simply the method we use to notate inverted chords.

They appear as two letter names separated by a forward slash, for example:

Cmaj7/G

Here, the note on top left represents the chord, and the note on the bottom right represents the chord note that is in the bass as the lowest note. In this case, G is in the bass of the C Major7 chord. This chord has the notes: C(1), E(3), G(5), B(7), so what we have is the 2nd inversion of the CMaj7 chord.

In a band situation, the bass player usually covers the lowest note of slash chords, and then a chord player can just play a regular non-inverted chord.

Slash chords are not just used for notating inverted chords. They can have other uses as well.

One such instance is when we have a slash chord in which the bottom right note is not a part of the chord on the top left. For example, G/F# is telling us that we have to play a G Major triad on top of an F# note in the bass. This is usually regarded as bad notation practice because you don’t actually realize at first what chord it is that you’re playing in a chord progression. This limits your options as a performer, and makes it harder to make good decisions when it comes to voice leading and moving from one chord to the next.

Voice Leading

With all the chords we have seen so far you might wonder what the purpose of chord inversions is, and rightfully so. But there is one main reason why musicians use them, and it comes down to voice leading.

Voice leading is an older term that comes from choral music. This is the music written for choirs – a musical ensemble consisting of only singers. In this type of music, each voice type has a unique melody line, and the way this melody line moves and interacts with other voices in the choir is called voice leading.

What's interesting is that this translates to other concepts in music. For example, if instead of singers we had four different instruments each playing a unique melody line, those melodies – consisting of individual notes – would line up to create and outline chords. Voice leading would be the process by which those melodies move in harmony.

Voice leading also translates to playing chords on a single instrument. Here, it is all about how we connect chords together one after another to create smooth melodic lines for each note in a chord as it moves to the next chord.

Let's say we play a couple of four-note chords in a progression. We can think of each note as a separate melody line that moves as one chord changes to the next. The point of voice leading is to create melodic lines for each of the chord notes that are smooth, easy to play and good sounding, so that the overall chord progression sounds more appealing to our ears. In order to do this, we have to pay attention to what each of the chord notes are doing.

In the early days, composers noticed that moving between notes that are closer to each other sounds better. So generally, when composing or arranging harmony we want to avoid awkward intervals and jumps that are difficult to play and don't sound as good.

From this comes the main principle of voice leading which states that as the harmony changes, each voice (each chord note, for example) should **ideally move no more than one whole step up or down in pitch**. A note can remain the same between two chords, or it can move by a half-step or a whole step, but no more than that. This is considered good voice leading practice. This produces smooth sounding chord changes that are more melodic, and easier to play and listen to. A good analogy for this is the rhyming of the lyrics in a song – the words that rhyme are like the chord notes that move no more than a whole step as the chord harmony changes.

Let's say we have a very popular chord sequence, called the 12-Bar Blues. This sequence, consisting of only three chords – I, IV, and V in any key – is one of the most familiar sounding chord progressions. One of the main reasons this progression sounds so memorable is because of good voice leading. Let's analyze what the chord notes are doing as they change throughout the progression. We will do this in the key of E Major.

Chord I in the key of E Major is E, with the notes: E G# B

Chord IV is A, with the notes A C# E

Chord V is B, with the notes: B D# F#

In a 12-Bar Blues sequence, these chords move in the following way:

E – A – E – B – A – E – B – E.

(Note that these chords are played for different periods of time – we're just looking at the changes here).

In the first change (E to A), E note remains the same, G# goes a half-step up to A, and B moves by a whole step up to C#.

In the second change (A to E) it's all the same, just in reverse.

In the third change (E to B) E goes a half-step down to D# (it is also a whole step down from F#), G# goes a whole step down to F#, and B remains the same.

In the fourth change (B to A) B note moves a whole step down to A (it is also a whole step down from C#), D# moves a half-step down to C# (it is also a half-step down from E), and F# moves a whole tone back to E note.

In the second to last change (E to B) in this sequence, if we were to introduce an A note to a B chord, which is a minor 7th – thus getting the B7 chord (this is often done in on the V chord to provide stronger resolution to the I chord); A would resolve nicely on the final change (B to E) to G# and B notes in the E chord.

We can see that there isn't a single interval between the notes in these chords that is larger than one whole step. But what if we want to create descending or ascending bass lines (which is often done in voice leading), or to create specific melodies within the chords as they change; or even to have a **pedal note** – which is a single note played in one place that sustains consonantly and dissonantly throughout the chord progression? This is where chord inversions and different chord voicings come further into play.

In order to effectively voice lead, you often need to invert chords and use voicings that allow you to follow voice leading principles. For example, if you want to have a descending bass line, you can invert the chords so that the lowest note of each is no more than a whole step away from the bass note of the last played chord. Chord inversions can also be used if you want to remain in one position on your instrument and play all your chords there without jumping up or down with your hand. This is particularly useful for playing a pedal note – to do so you would need to invert all chords so that you remain in one position on your instrument throughout the progression.

For all these reasons, studying voice leading and inversions is incredibly useful to any musician, especially composers and arrangers.

Polychords

It is possible to combine chords to produce new chords. These are usually called polychords. Often, these chords are complex and difficult to play over, but they are useful to some improvisors and composers for a variety of reasons.

Polychords, as the name implies, represent two chords played at the same time, with one being played on top of the other. They are very similar to slash chords, but different in a few important ways.

Instead of being written with a forward slash, polychords are notated as a fraction, with one chord on top and the other on the bottom. The chord on the bottom is the lower part of the polychord. In other words, the top chord is played on top of the bottom chord.

Here’s how a notated polychord usually looks:

$$\frac{\text{Gmaj7}}{\text{Am}}$$

Here we have a G Major 7 chord played on top of A minor chord. When we list out their notes together:

$$\underbrace{\textbf{A(R), C(m3), E(P5),}}_{\textbf{Am}}\ \underbrace{\textbf{G(m7), B(M9), D(P11), F\#(M13).}}_{\textbf{Gmaj7}}$$

What we essentially get is the A minor13 chord, and this is because the notes of G Major 7 (G, B, D, F#), are the minor 7th, Major 9th, Perfect 11th and Major 13th in the key of A.

Let’s check out a harder example:

$$\frac{\text{G}}{\text{Dm}}$$

In this case we have a G Major chord played on top of D minor chord. Let’s list out the notes of both chords and analyze them.

Dm has the notes D F A, and GMaj has G B D. If we group them together we get D F A G B.

All the notes are stacked in thirds alphabetically (we leave out the last D because it is repeated), but A to G is a weird jump. We check the G note in the key of D Major (we always check the key of the bottom note) and see that it is the Perfect 4th. In extended chord harmony, a Perfect 4th an octave up becomes a Perfect 11th. B note in the key of D is a Major 6th, and that is equal to a Major 13th. What we have is: D as the root, F as the minor 3rd, A as the Perfect 5th, G as the Perfect 11th, and B as the Major 13th.

Since we have a minor triad, **no 7th**, and two added notes, this is an added tone chord with two added tones – you can also write it like this: Dm(add11 add13).

We can conclude that polychords are just a shorter way of writing long and complex extended chords of any kind – including the altered ones. This, however, can present a problem because when we see a polychord, we don’t know at first what kind of chord we’re really dealing with. In other words, we usually don’t know the relationship of the notes in the top chord to the key of the bottom chord, unless we analyze the notes. Like with the slash chords that have a non-chord bass note, using polychords like this makes it more difficult to figure out the harmony and make good decisions when playing.

Polychords make much more sense in the context of polytonal music where you have two or more tonal centers happening at the same time and you’re trying to create two separate harmonies. More on that later in the book.

Chord Progressions (Part 1)

A chord progression is, simply, a series of chords that is played together in

a musical way. Any song structure is based on a chord progression, and that progression takes the listener on a journey of tension and resolution.

Chord progressions have a form:

1. There is a chord (or chords) that is the center of the progression, called the **tonic**. This chord (or chords) is often played first and is always the center of gravity of the progression – everything else wants to resolve to the tonic in one way or another.
2. Then there is the part of the progression that moves away from the tonic, which involves playing one or more **‘subdominant’** chords.
3. And there is the part of the progression that moves back toward the tonic in which **‘dominant’** chords are played. These chords have the strongest pull to the tonic because they add lots of tension. The most basic unit of a chord progression is the **resolution**: the movement from one chord that is not a tonic chord to a tonic chord, establishing and resolving tension, creating movement and producing a harmonic direction.
   - A resolution like this – two chords, resolving to the tonic – is called a **cadence**.
   - A special instance of this is the movement from a Major chord built on the fifth degree of the scale to the tonic: a V-I (in a Major key) or V-i (in a minor key). If neither of those chords is an inversion, then the resolution is called a **Perfect cadence**, and it is the foundation of most of the basic chord progressions in Western music. Whether the progression is in a Major key (in which case the tonic chord is Major [I] and the diatonic chords of that key are indexed to the Major scale of that root), or in a minor key (in which case the tonic chord is minor [i] and the diatonic chords of that key are indexed to the minor scale of that root), the chord built on the fifth (the dominant chord) will be Major.

This is because, in order for the resolution from the V chord to the tonic to be strong, the 3rd of the V chord needs to be Major so it can resolve up to the 5th of the tonic chord. This may sound complicated but take some time with it.

Often, these dominant chords are played as 7th chords (Dominant 7th quadads), in which a minor 7th is added to a Major triad, thus adding more tension. Chord progressions are written (like chords) using Roman numerals with dashes in between each chord. Numerals for Major and Dominant chords are capitalized, while the minor ones aren’t.

Common Chord Progressions

There are several fairly common progressions that repeat song after song. The basic chord progression that makes use of cadences is a I-IV-V progression (which repeats), in which the Major IV chord acts as the subdominant, the Major V chord acts as the dominant, and the Major I chord acts as the tonic.

In the key of C for example, this progression I-IV-V would be: C — F — G.

Another common progression, especially in jazz, is a ii-V-I progression (in which the minor ii chord acts as the subdominant, the Major V chord acts as the dominant, and the Major I chord acts as the tonic).

In the key of C, the progression ii-V-I would be: D minor — G — C.

Chord progressions also include minor versions of those progressions: i-iv-v, and ii-v-i.

Most other common progressions in rock and pop music are variations (more or less) of I-IV-V, such as: I-IV-I-IV-V-IV-I.

Here’s a list of some very common chord progressions you can find in songs:

1. I — vi — IV — V
2. I — V — vi — IV
3. I — V — IV — V
4. I — IV — V

5. iii — vi — ii — V
6. I — IV — I — V
7. I — V — ii — IV
8. I — vi — ii — V
9. I — V — vi — iii
10. I — iii — IV — V

You can just pick a key and play any of these chord progressions and it will sound great.

More complicated progressions include, for example, iii-vi-ii-V-I (in which diatonic chords are played on the 3rd, 6th, 2nd, 5th and tonic of a Major key), I-vii-vi-V, and iii-vi-V-I, among others.

Notice that in all of these cases, movement is established away from some tonic chord (usually to some subdominant chord) and then, passing through a dominant chord (usually the V chord), a cadence is produced as the progression resolves back to the tonic.

Extending and Substituting Chord Progressions

A musical piece doesn't always need to follow a strict chord progression. Often there is some interesting stuff happening; non-diatonic chords being introduced, key changes, etc.

It is also possible to extend chord progressions by adding smaller progressions within the principle progression, often using temporary harmonic centers to multiply the overall number of chords.

One version of this is something used often in jazz, in which a Dominant 7th chord is used a fifth above some diatonic chord. A common version of this is to find a V7 chord used above the V of the tonic (this is a called a V7/V, or "five seven of five," chord).

Another very common trick is to simply alter the chord of a particular scale degree.

For example, instead of playing the usual minor (ii) in a progression, playing 'II 7' would mean that this chord has now turned into a Dominant 7th chord.

One example of such progression (common in jazz) would be:

I 7 — vi 7 — II 7 — V 7

Sometimes, chords are strung together that ascend or descend a scale diatonically (or chromatically) in order to move from one part of the chord structure to another. Between these two techniques – adding chords a fifth above existing chords and moving diatonically or chromatically – there is a huge variety of possibilities available to a composer or improvisor. Not all of these possibilities will sound good however – it's important to always let your ears guide you. It is also possible to substitute chords in order to vary a progression, repeating it differently to create a longer overall progression. The simplest form of this is to substitute one tonic, dominant or subdominant chord for another of the same family

- Diatonic chords that could act as tonic, and are therefore in the 'tonic family' are: 1st, 3rd and 6th chords.
- 2nd and 4th chords are both in the 'subdominant family.'
- 5th and 7th chords are both in the 'dominant family.'

It is also common in pop music (in Beatles songs in particular) to substitute a Major chord for a minor chord in a progression. This is often called **'The Beatles trick**.' This is a technique that comes to pop music by way of the blues, in which Major or Dominant chords are used on the I, IV and V, even though the song is in a minor key (since the minor pentatonic scale is the foundation of blues).

For example:

I — IV — iv — I

Moving Tonal Centers (Tonal Centers vs. Keys)

When we talk about extending progressions by establishing temporary harmonic centers, we are invoking the distinction between tonal centers and keys (or key centers). It is possible for a song to be in one key but have multiple tonal centers. In other words, I can revolve around C Major, and then C minor, and then B Major, but I might still be playing in the key of A Major if that is the trajectory of the progression in general (and if the song has not changed keys – known as ‘modulating’).

This is done most commonly in jazz, where a song that is written in a particular key will often move through many tonal centers, sometimes very quickly. For instance, John Coltrane famously had compositions that moved through as many as nine tonal centers in just a few bars.

What is Modulation and How is it Used?

Distinct from tonal centers are key centers. When a key is changed, we say that the song has modulated. In these cases, rather than a temporary harmonic center being established and then passed through (usually en route to the key of the song), the entire harmonic structure of the progression shifts up or down by some interval.

There are no hard and fast rules in pop or rock that govern the way modulation occurs, but in general it occurs at the beginning of a repetition of some progression and usually that entire repetition occurs in the new key. To smooth the transition, it is sometimes easy to replace the chord immediately preceding the modulation with a dominant chord from the new (modulated) key.

Modulations are common in pop music, country and rock, particularly at the end of a song, where a refrain may be repeated a full step above the original root. This is one simple, form of modulation – repeating a progression exactly as it was, only higher or lower.

Most often, this occurs up rather than down, and it usually occurs in half steps, whole steps, or a Major 3rd (two step) interval. The end of the *Titanic* theme song is an example of this sort of modulation.

Arpeggios

Chords are made up of different notes; we usually play these notes at the same time, but we can also play them individually, and when we do so, we are playing arpeggios. Arpeggios are simply the notes of a chord played one at a time, in any order, rather than all at the same time.

Arpeggios are similar to scales in a way because when we learn a scale we learn a bunch of notes that fit over a sequence of chords in some key. When we play these scale notes they will sound pleasant over those chords. On the other hand, when we learn arpeggios we learn a bunch of notes that usually fit over a single chord in a chord sequence. So generally we play arpeggios over a single chord in a chord progression, and we change arpeggios whenever a chord changes.

Arpeggios are very useful when we improvise a melody over a chord progression. We may use a particular scale for this progression and then if at any point a chord comes up that doesn’t fit the key of the chord progression, our scale notes would not fit over that chord and will sound unpleasant. In such an instance we can switch to playing arpeggios just for that single chord that doesn’t fit the key, and it will sound really good.

One such example would be if you had a progression, let’s say: i — VII — VI — V7 (which is a common progression used in flamenco music, also called an **Andalusian cadence**). In the key of Am the chords would be: Am — G — F — E7.

Here you can use the A minor scale to solo and it would fit perfectly over Am, G and F chords, but when E7 comes, just for that one chord you would switch to playing E Dominant 7 arpeggio – meaning the notes of E7 chord: E G# B D, in any combination.

This is a simple way to use arpeggios. The general tendency however is to gradually move on to thinking and playing more chordally – to treat each chord in a progression separately and play more chord notes in your solos. This way your solos will sound more appropriate, more melodic, more unique and less generic. Jazz players do this all the time.

If you think about it and analyze some of the most famous solos in history, for example those in songs like ‘Hotel California’, ‘Stairway to Heaven’ or ‘Sultans of Swing’, you will notice that one of the things that makes these solos so captivating is that the note choices are mostly arpeggios of the chords playing in the background.

Arpeggios are also used to outline the harmony of a song so you don't have to play chords in the usual sense (all notes at the same time). You can just pick out individual chord notes and play them as the progression moves, usually in a certain pattern. This will make it sound almost as if you're playing the chords, even though you're just playing their notes individually. Another good thing about arpeggios is that you can often get away with playing dissonant chords that would otherwise sound awful if all their notes were played at the same time.

In conclusion, learn how to use arpeggios on your instrument; learn where the notes are and how to find them quickly, learn cool rhythmic patterns by which you can play individual chord notes, and use them in your playing. When it comes to soloing and improvisation, study the chords you're playing over, analyze the context and the effect each note has over a chord that is playing. Notice how, by focusing more on the chord notes, your solos start to sound more enticing and captivating.

Part 4
All About the Rhythm

The Importance of Good Rhythm

Few things in music (and perhaps in life) are as important as rhythm. As so many jazz, funk and blues musicians know, it is possible to play virtually anything and have it sound good if you've got the groove, the swing, the feel, the vibe, the flow.

Developing rhythm is more than simply understanding the numbers – it is about putting hours in with your instrument, really becoming comfortable with it, perfecting your technique, establishing an internal clock, etc.

Some of this is nearly impossible to develop passively on your own, and so playing with other musicians (who have great rhythm skills) as often as possible, looping yourself (recording your playing), using your loops to practice over (this will help diagnose rhythmic problems) and playing to a metronome (especially when you are first learning some technique or pattern) are all important.

Playing slow and focusing on timing rather than on speed is also an important part of developing good rhythm. If you're playing slow you'll be exercising your timing, and if you're playing fast(er) your focus will be more on your speed. The catch is that great sounding speed playing and impressive technique are only developed through very slow and engaged repetition (you have to have the timing down first) and with gradual speed increases.

For all these reasons, understanding rhythm is a large part of music theory. This includes how time is divided in music, how a pulse functions, and how a musician can create and resolve tension or tell a story rhythmically. Understanding and internalizing these things may be the most important part of being a performer or composer, and it may also be the most rewarding aspect of your playing.

Understanding Time, Beat, Bar and Tempo

In music theory, the word '**time**' refers to the pulse or beat of the music and its time signature. The **beat** of the music is the most fundamental unit of time. It is what we tap our foot, nod our heads, or clap our hands to. It is defined by the time signature of a piece.

A '**bar**', also called a 'measure', is another fundamental unit that measures the time of a piece, against which note/beat divisions are understood. In other words, a bar is one complete cycle of the beats, and it is always defined by the time signature. Bars are a convenient way of keeping the music organized into smaller chunks.

Tempo is another crucial element in music. It describes the speed at which the beats happen – the pulse of the music. It is usually expressed in beats per minute, or BPM. It simply tells us the number of beats in one minute (for example 80 bpm means 80 beats per minute).

Knowing the time and tempo of a piece already tells you more or less how to play over it, it already makes the mood of the piece apparent. If you know nothing more about a piece going in, it is possible to improvise in careful, sophisticated and powerful ways, using your ear to guide your harmonic and melodic sense.

At the same time, if you do not understand the time of a piece, it is easy to get lost in the fray (whether you are playing a composed piece or improvising). Understanding time is of paramount importance.

Time Divisions

In music theory, time is divided mathematically according to simple ratios. This is true of time signatures, as we will see, and it is true of the way notes or beats are divided in general. We say that any note, held for some amount of time, has a particular value, and that value is expressed numerically. So this note value is simply a space of time in music with a particular length.

In music, there are notes with the following values:

- **Whole note** (a note held for the length of a standard bar in Common Time – more on this soon)
- **Half note** (held for half as long as a whole note)
- **Quarter note** (held for a quarter of a whole note, or half of the half note)
- **Eighth note** (an eighth of a whole note, or half of the quarter note)
- **Sixteenth note** (a sixteenth of a whole note, or half of the eighth note).

These are the most common note values. There are also notes that are longer than whole notes (but are rarely used):

- **Double whole notes** (held for the length of two bars in Common Time)
- **Longa** (a note held for the length of four bars in Common Time)
- **Maxima** (a note held for the length of eight bars in Common Time)

And there are notes that are shorter than 16ths. Those are:

- **32**nd **note** (a note with a value equal to half of the 16th note)
- **64**th **note** (half of 32nd)
- **128**th **note** (half of 64th)
- **256**th **note** (half of 128th)

It is not very common to encounter notes such as a longa or maxima, or notes any shorter than 16ths or 32nds, except for in compositions played at a slower tempo but with very fast runs.

At any point in a musical piece it is possible to play lots of notes (16ths and 32nds) that sound really fast while still keeping time and retaining the slow tempo of the piece (60 bpm or less). It is also possible to play only a few notes (whole and half notes for example) even though the tempo of the piece is really fast (120+ bpm). In both cases the tempo gives the overall subjective feel for the speed of the tune.

In addition to basic divisions, any of these notes can become a **dotted note** (a note with a simple dot ‘.’ next to it), which indicate that the length of the note is 1.5 times its normal length. For example:

- **Dotted whole note** is one whole note + one half notes (or three half notes).
- **Dotted half note** is one half note + one quarter note (or three quarter notes).
- **Dotted quarter note** is one quarter note + one eighth note (or three eighth notes).
- **Dotted eighth note** is one eighth note + one sixteenth note (or three 16ths).
- **Dotted sixteenth note** is one sixteenth note + one 32nd note, etc.

There are also n-tuplets, such as triplets and pentuplets (or quintuplets), in which a certain number of notes fit evenly into a given amount of time. Eighth note triplets, for instance, fit three notes in the time of two eighth notes (we’ll get to them in a bit).

Time Signatures Explained

The time signature, also called a metre or meter, describes the structure of a bar of music. It tells us the number of the beats in a bar, and the note values of each beat. In addition to the tempo of a piece, the time signature tells a musician more or less what the music will feel like rhythmically, which is very important.

Time signatures are expressed, as we have already seen, in terms of ratios, and they are connected to the note division ratios that we have already seen. The time signature is always located at the beginning of the musical staff. It is written as two numbers, one beneath the other.

The most common time signature in music today is 4/4 (also called **Common Time**).

The first number in this ratio (the top number if you're looking at the musical staff) tells us the number of divided notes in a bar, and it can be any number. (Note: this does not tell you how many notes will actually be in the measure, **only how many notes of a particular length would fit in the measure.**) So in 4/4 time the first 4 means that there are four beats/notes in one bar.

The second number (the bottom number if you're looking at the staff) tells us the note value of those divided notes. This second number, which can only be 2, 4, 8, 16, and so on, tells the performer the 'feel' or the pulse of the song (e.g. is it pulsed in eighth notes or in quarter notes?), and along with the first number, tells the performer how long each bar is with respect to that pulse.

In 4/4, the second 4 tells us that we're dealing with quarter notes.

4/4 Time

In essence, 4/4 time tells us there are four quarter notes in one bar. Here it is represented visually:

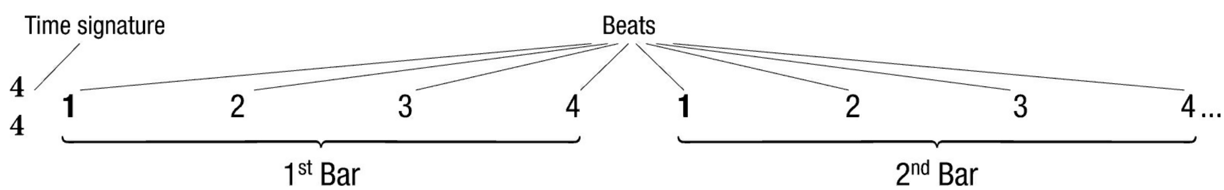


Figure 24: In this time signature the beats have the value of one quarter note.

We can also subdivide those beats into eighth notes:

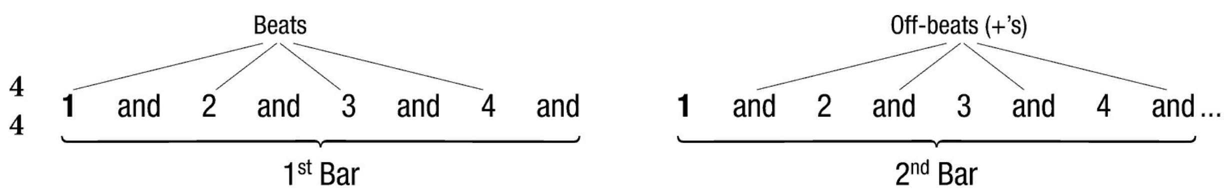


Figure 25: Here the beats are still quarter notes – we're just subdividing them by playing the 'ands' in between.

'**And**' or '**+**' is how we pronounce the off-beats – which are notes in-between the main beats.

And into sixteenth notes:

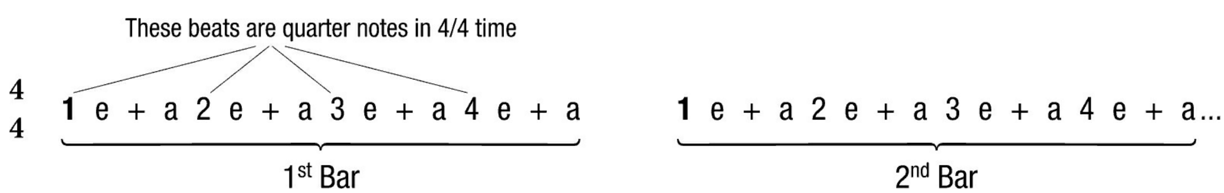


Figure 26: Sixteenth notes in 4/4

We have now subdivided the beat into four notes per beat, or sixteen notes per bar, in 4/4 time.

- **'e'** is how we pronounce the off-beat between the main beat and the following 'and'.

- **‘a’** is how we pronounce the off-beat between the ‘and’ and the following main beat.

So we read like this: *one ee and ah two ee and ah three ee and ah four ee and ah,* (new bar starts) *one ee and ah two ee and ah,* and so on.

To put this into practice and get a sense of it, here’s a very basic exercise. It starts off very simple but it can get as complex as you want.

You’ll need a metronome for this. There are free digital app versions online if you don’t have a physical one. First, choose a speed on the metronome, let’s say 60 bpm, and then play this exercise at an even tempo along with the metronome click (which represents the beat). You can simply clap your hands at first or make any percussive sound, or if you prefer you can play a single note or a chord on your instrument.

If possible, use a metronome that has ‘accent’ feature. The accent will indicate the start of each bar with a different ‘click’ sound. This will make it easier to understand bars. The metronome click is there to help you notice whenever you fall off the beat. You need to make sure you’re playing on the beat and really locking in with the metronome. The main benefit of the following practice is that it helps you understand how the beat is divided, and you learn how to feel the pulse and internalize time.

(I) First, here’s what you’re going to play:

1. **Whole notes** – Clap once on the first beat of each bar. Do this for up to 4 bars.
2. **Half notes** – Two claps per bar, one on beat 1 and the second on beat 3.
3. **Quarter notes** – Four claps per bar, one on every single beat (playing quarter notes). See fig 16.
4. **Eighth notes** – Eight claps per bar, one on every beat plus on the ‘ands’ which are the in-between notes. See fig 17.
5. **Sixteenth notes** – Sixteen claps per bar, which means four claps per every beat (playing sixteenth notes). See fig 18.

Play each of the rhythmic patterns for up to 4 bars.

(II) After you’ve played all the patterns you can alternate between them by making larger jumps. For example, in one bar you can play half notes, and in the next bar immediately switch to sixteenth notes, and go back and forth. Practice switching between whole notes, half notes, quarter notes, eighth notes and sixteenth notes, in any combination and at various tempos (especially the slow ones, <60 BPM, as they’re the hardest but the most beneficial to your timing), and make sure you keep the time by playing on the beat. That’s why the metronome is there.

(III) After you get comfortable with this, try to combine everything into a single bar. This is where common rhythmic patterns start to emerge.

Here are a few examples:

1. Play a quarter note (one clap on beat 1), then two eighth notes (two claps – one on beat 2 and the second on the ‘and’ after beat 2), four sixteenth notes (4 claps – one on beat 3, the second on ‘e’, the third on ‘and’, the fourth on ‘a’, and finally two eighth notes on beat 4.

   1 2 and 3 e and a 4 and … and repeat for four bars

2. Half note (beat 1 and 2), two eighth notes (beat 3), quarter note (beat 4).

1 (2) 3 and 4 … and repeat for four bars

(IV) Create at least two of your own rhythm patterns by combining the notes in the same way.

(V) Now you can start combining entire patterns across several bars. Play one exercised pattern in one bar, and in the second bar switch to another pattern. Play at least four different patterns over 4 bars.

This is only the beginning. There are many more ways to combine the notes, such as skipping the beats and playing on the off-beats (called syncopation), utilizing dotted notes, rests, triplets and other n-tuplets (more on this soon), polyrhythms and polymeters. In this way you can play pretty much anything rhythmically.

From these basics, we can also derive a few foundational rhythmic structures (some of which you’ve already learned) which are like the pieces of a puzzle. When you combine these pieces you can create virtually any rhythmic pattern you want. Once you learn these units you will be able to hear and recognize patterns with no effort, as well as improvise and create new patterns easily on the spot. You will learn about this soon.

Before that, let's see what happens in 6/8 time.

6/8 Time

6/8 is another very popular time signature. It tells the performer that there are six eighth notes in one bar, or six beats per measure. Unlike 4/4 which is a simple time, this is a compound time (more on this in the next section).

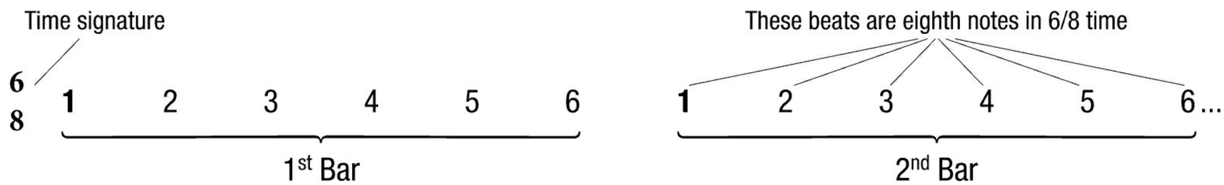


Figure 27: In this time signature a beat has the value of one eighth note

This time signature defines the bar in a different way. Now there are six beats (six evenly spaced metronome clicks in one bar), or six eighth notes in one bar. In other words, one beat is now an eighth note and there are six of them in a bar. This gives us the sense of the length of one bar and the overall feel of the pulse – it's pulsed in eighth notes.

How to Count in 6/8

Because of the different beat value, the notes are now counted in a different way.

An **eighth note** has the value of one beat and it is the basic unit for counting:

1 2 3 4 5 6, 1 2 3 4 5 6, 1 2 3 4 5 6, 1 2 3 4 5 6, etc.

(one two three four five six…)

If you play a note (or tap) on all six beats in a measure, you're playing eighth notes. As you try this you can count (say out loud) each of the beats. You can also accent beat 1 in each measure to get a better feel of where the bar starts and ends.

Dotted quarter note – We know that this note equals three eighth notes. Notes in 6/8 are grouped in two groups of three eighth notes, so you can count them easily with dotted quarter notes.

1 2 3 **4** 5 6, **1** 2 3 **4** 5 6, **1** 2 3 **4** 5 6, **1** 2 3 **4** 5 6, etc.

(**one** two three **four** five six…)

This means playing only on beats 1 and 4 as you count all the beats. So it would be something like: *Tap two three tap five six, Tap two three tap five six,* etc.

Dotted half note – This note has a value of three quarter notes, which is six eighth notes, and that fills up our bar in 6/8. In other words, a dotted half note now fills up the whole bar.

1 2 3 4 5 6, **1** 2 3 4 5 6, **1** 2 3 4 5 6, **1** 2 3 4 5 6. etc.

(**one** two three four five six…)

You can practice it by counting each beat but playing only on beat 1 of each bar.

Sixteenth notes in 6/8 – On the other side of the spectrum, we know that one eighth note can be divided into two sixteenth notes. So having sixteenth notes in 6/8 simply means adding the 'ands' between each beat:

1 and 2 and 3 and 4 and 5 and 6 and, etc.

(one and two and three and four and five and six and…)

32nd **notes in 6/8** – To divide even further is simple. We just add 'e' and 'a' like with the sixteenth notes in 4/4.

1 e and a 2 e and a 3 e and a 4 e and a 5 e and a 6 e and a

Simple, Compound and Complex Time Signatures

There are 3 common types of time signatures:

1. Simple
2. Compound
3. Complex

Simple time is the name given to musical time that is divisible by units of two. In other words, any time you are tempted to count “one two one two” you are dealing with simple time. This includes time signatures such as 4/4 and 2/4.

For example, take a 4/4 measure. The measure has four beats, and they are divided into two groups – each with a strong beat and a weak beat.

So the measure contains, in order, the following beats: *strong, weak, strong, weak*.

When we count the measure, and clap our hands to it, we clap or put an accent on the strong beats, and so the measure as a whole is divided into two parts. That makes 4/4 an example of simple time.

Compound time is the name given to music time that is divisible by three. Whenever you count to a piece “one two three one two three” you are counting to compound time. This includes time signatures such as 3/4 and 9/8.

Take for example 3/4 time. In 3/4, there are three beats in one measure — *Strong, weak, weak*.

When we count it, we count it in 3, like a waltz — 1, 2, 3; 1, 2, 3. This makes 3/4 an example of a compound time.

This also includes 6/8 time, which we’ve already looked at. Both 6/8 and 3/4 time are very similar. The main difference is that in 6/8 you are playing two groups of triplets, making it closer to 2/4 (where there are two quarter notes). There will also be a difference in strong and weak beats.

In 6/8 there are six beats: *Strong, weak, weak, strong, weak, weak*.

Unlike 3/4, in 6/8 measure the second strong beat (underscored) you can say is ‘less strong’ than the first strong beat.

In this sense, 3/4 is closer to 9/8, which has nine beats in one measure (three groups of three) with the first beat being the strongest: *Strong, weak, weak, strong, weak, weak, strong, weak, weak*.

Complex time is, simply, any time not divisible by 2 or 3. This includes time signatures such as 5/4, 7/4 or 7/8.

Take, as an example, 5/4. This time signature is often viewed as: *Strong, weak, weak, strong, weak*. This way it is divided into two parts: *Strong, weak, weak* (3/4), and *strong, weak* (2/4).

3/4 + 2/4 equals 5/4, which is why this is a complex time signature – it consists of two parts (two different time signatures), that are unequal, and the measure is counted first as a group of three and then as a group of two. The first number – 5 – is neither divisible by three nor two.

In 7/8, there are seven eighth notes usually subdivided into three parts: *Strong, weak, weak, strong, weak, strong, weak*. Again, this is complex time simply because it consists of three different time signatures (can you tell which ones?) that are unequal, and the first number (7) is not divisible by three nor two.

Musicians use different time signatures in all sorts of songs. Pop music is generally in 3, 4, or 6. Jazz players, classical composers, and math rock players use almost all of them at different times. Time signatures essentially, are just different ways that music arranges itself according to what is called for – sometimes you play an ascending triad, sometimes descending; sometimes you play in 4, sometimes in 7.

Triplets and n-Tuplets

Tuplets are a way of altering the way, temporarily, that a series of notes is counted. They are another way of subdividing the beat.

The simplest tuplet is a triplet, in which three notes are played in the time it would normally take to play two such notes. For instance, three quarter-note triplets (the most common tuplets) are equal in length/value to one half note. They take up two beats, whereas normally, two quarter notes would take up two beats.

3 half-note triplets = 4 quarter notes (or one whole note)

3 quarter-note triplets = 2 quarter notes (or one half note)

3 eighth-note triplets = 1 quarter note

3 sixteenth-note triplets = 1/2 quarter note (or one eighth note)

3 32nd-**note triplets** = ?

I'll let you figure out the last one.

Remember that one quarter note is one beat in 4/4. In this Common Time, one eighth note triplet is 33.3333…% of one beat, so three of those are equal to one quarter note; and the same goes for triplet note rests. The notes in tuplets are dispersed evenly over the beat(s) in question, effectively creating a temporary polyrhythm.

The most common tuplets are 3-tuplets or triplets, but there are also 5-tuplets (quintuplets), 6-tuplets (sextuplets), 7-tuplets (septuplets), 8-tuplets (octuplets), 9-tuplets (nonuplets), etc. These tuplets are usually harder to play and are less used mainly due to their oddness.

Polyrhythms and Polymeters

It is possible to create wildly complicated time signatures, and since a composer or improvisor can move between time signatures (using one for a number of bars and then changing it to something else), it is possible to create difficult, sophisticated rhythmic lattices (as in 'math rock,' some metal, and some jazz).

It is also worth noting that different time signatures can be stacked on top of one another. When this is done, either a polyrhythm or polymeter – something of an advanced concept – results.

Polyrhythms are two bars of the same length played at the same time, that have different time signatures (for instance, a bar of 3/4 and a bar of 7/4, which take up the same amount of time).

Polymeters work by combining two different time signatures so the length of each pulse is the same (resulting in bars of different lengths that cycle against each other in and out of phase).

Both polyrhythms and polymeters are used in modern metal and math rock, in modern jazz, in contemporary classical music, and in avant-garde improvisation.

Accents, Syncopations, Dynamics, Tempo Changes…

Once you know about the time of a piece, you need to know how to play with it. It is rarely possible to make something interesting happen if all you're doing is playing the exact pulse of the music. Sometimes notes are intentionally missed out and off-beats are played to produce a compelling rhythmic structure. This is where **syncopation** comes in.

Syncopation means simply playing in between the spaces that the time suggests (we've already seen this in the previous exercise). Playing for longer or shorter, taking rests, skipping beats, etc. This is the first step toward feeling and expressing the groove of a song (even if that song is loosely organized).

It is also possible to create n-tuplets, polyrhythms and polymeters on the fly. This takes more skill, and a great intuitive understanding of time, but the results are worth the work it takes to be able to execute them – any drummer will tell you that.

A player can adjust the speed or volume of the song, speeding up, slowing down (either by fitting more notes into the same space or by adjusting the tempo of the piece). This can be done compositionally or improvisationally.

Finally, a performer or composer can use dynamics (the volume of sound) to accent various parts of a measure. This is often done in funk, blues, and jazz to highlight parts of the measure that would otherwise fade into the background.

By drawing attention to dark parts of a measure, players can expose the groove of the song for all that it implies – all of the false starts and half-resolutions, the stutters, the hiccups, ghost notes; the things that make a groove groove.

Building Blocks of Rhythm – Create any Rhythm Pattern Easily (with Audio Examples)

As we've seen by now, the main unit of time is a beat and this beat has different values (or time lengths) as defined by the time signature. We've also seen that a beat can be subdivided in different ways. By combining these subdivisions, it is possible to create fundamental rhythmic units which, when combined, can create virtually any rhythmic pattern. With this arsenal of rhythms under your belt you will be able to more easily hear, recognize and play all common rhythms out there. You will also be able to use these blocks to create your own rhythmic patterns – and even improvise with them as you play.

For new guitar players, a very common issue is playing different strumming patterns. Those strumming patterns are just rhythm patterns that can be broken down into individual 'mini-patterns' or blocks of rhythm. In this section you will see how easy it is to use these blocks to create rhythm patterns (on any instrument) and combine them into complicated rhythmic structures. It is important to familiarize yourself with these fundamental patterns and simply become more aware when you're using each in your playing.

To help you do that I've provided audio examples for each of these rhythms so you can actually hear how they sound and practice along on your instrument. Each pattern is in Common Time, lasts for four bars, and is played on guitar using a pitched note – C4 or middle C (found on 5th fret G string) – at a slow tempo along with the metronome.

The following examples are divided into those without syncopation (easier) and with syncopation (harder). There will also be one exercise at the end of each section which will help put all this into perspective.

Looking at the most popular simple time signature – 4/4 – one beat is one quarter note, and there are eight basic ways to combine subdivisions that amount to the length of one beat. We'll start from there.

Note that the following rhythms are easier to write using traditional music notation. This book explains theory without notation, but you can find these examples written in musical notation in *How to Read Music for Beginners*, which is all about understanding that aspect of music.

1. The first rhythm unit is a simple **quarter note**. In a bar it looks like this:

   1 2 3 4

   Playing quarter notes in 4/4 is simple – it's just one tap on each beat. After hearing the pattern try to play along with each. Here's how this one sounds:

   Quarter notes audio example -> http://goo.gl/JrVHPW

2. **Eighth note** — one quarter note is divided into two eighth notes.

   1 and 2 and 3 and 4 and

   As we know by now, eighth notes are simply playing on the beats as well as on the 'ands' in between.

   Eighth notes audio example -> http://goo.gl/cTd87u

3. **Sixteenth notes** – one quarter note is subdivided into four sixteenth notes:

   1 e and a 2 e and a 3 e and a 4 e and a

   Now we introduce e's and a's to subdivide the beat into four. Note that 1,2,3,4 are the main beats (the ones played along with the metronome click) and anything in between is considered an off-beat.

   Sixteenth notes audio example -> http://goo.gl/5LLCSC

4. **Eighth and two sixteenths**

   This is where things start to get more interesting. We can mix sixteenth and eighth notes to fill out one beat. In a bar, this pattern is counted in the following way:

1 (e) and a 2 (e) and a 3 (e) and a 4 (e) and a

( ) – *Whenever something is in parentheses like this it simply means that it is not played on if you're tapping or clapping, or that the note played before is still sounding, if you're playing a pitched note. Likewise, if any of the elements are bold it means that they are played on*.

So now we play an eighth note which is then followed by two 16th notes (and a).

8th – 16th – 16th audio example -> http://goo.gl/R235EB

5. **Two sixteenths and one eighth**

The opposite of the previous example, we now have:

1 e and (a) 2 e and (a) 3 e and (a) 4 e and (a)

Here, two sixteenths (1 e) are immediately followed by an eighth note (and).

16th – 16th – 8th audio example -> http://goo.gl/wTXXuD

6. **Sixteenth, eighth and a sixteenth**

Maybe a little more difficult to grasp than the previous two, this pattern is counted like this:

1 e (and) a 2 e (and) a 3 e (and) a 4 e (and) a

A sixteenth (1) is immediately followed by an eighth note (e) and then we have another sixteenth note at the end (a).

16th – 8th – 16th audio example -> http://goo.gl/UNQiyh

7. **Dotted eighth and a sixteenth**

We are now adding dotted notes into the mix. A dotted eighth note, if you remember, is equal to three sixteenth notes, so it takes up 75% of the beat, and then we have a sixteenth note which is 25% percent of the beat (in 4/4).

1 (e) (and) a 2 (e) (and) a 3 (e) (and) a 4 (e) (and) a

A dotted eighth note (1) is followed by a sixteenth at the end (a). Both 'e' and 'and' are in parentheses so they are not played on because of the dotted eighth at the beginning.

8th – 16th audio example -> http://goo.gl/1EJMRz

8. **Sixteenth and a dotted eighth**

Same as the previous one, only in reverse:

1 e (and) (a) 2 e (and) (a) 3 e (and) (a) 4 e (and) (a)

Here, a sixteenth (1) is immediately followed by a dotted eighth (e) which covers the off-beats 'and' and'a'.

16th – 8th audio example -> http://goo.gl/TjsnsW

9. **Eighth note triplets**

Beside subdividing the beat into two eighth notes, or four sixteenth notes, we can also subdivide it into three evenly spaced eighth-note triplets (each one taking up 33.3333…% of the beat). We count them like this:

1 e a 2 e a 3 e a 4 e a

or

1 trip let 2 trip let 3 trip let 4 trip let

This pattern will be more difficult to get used to but is very well worth the effort. Practice switching between regular subdivisions in 2 or 4 and subdivisions in 3, within the same bar – this will do wonders for your sense of timing. Here's how eighth-note triplets sound:

8th-note triplets audio example -> http://goo.gl/hgKKPg

4-Bar Random Sequence Exercise 1

Here is a random sequence of the patterns shown so far combined together randomly across four bars.

4-Bar Sequence Exercise 1 audio example -> http://goo.gl/dLoj3s

Your challenge now is to listen to this sequence and work out which rhythm patterns (1-9) have been used in each of the bars, in order. This is a great exercise to develop your ear and the ability to hear, recognize and reproduce rhythmic patterns. The correct answer will be provided at the end of this book in the Cheat Sheet section. Use that only for comparing your answers.

Next, take any of the patterns shown and combine them in any way that you wish. Your task is to simply play with the patterns and come up with your own four-bar sequence.

Adding Syncopation

Going one step further, we will now add syncopation, which is denoted by rests. By incorporating rests into previous rhythmic blocks we get more fundamental rhythm units. Rests in music are spaces of time during which there is absolute silence – no note or percussive sound is being heard. There is a rest equivalent for all of the notes shown so far: whole note rest, half note rest, quarter note rest, etc. (We talk more about rests in *How to Read Music for Beginners*.) These examples are a little bit trickier to master, mainly because we may not be used to playing or accenting off-beats, but with some practice and patience they will present no problem.

10. **Syncopated eighth notes**

Here we have an eighth note rest followed by an eighth note. It can be counted like this:

|1| and |2| and |3| and |4| and

| | — these brackets serve to show a rested (not played) note. On a music sheet it would be shown as an eighth note rest. If we're clapping or tapping everything then you treat these brackets like the regular brackets: (); but if you're singing or playing a pitched note for these examples, then these spaces of time are silent.

You'll notice that this is a common reggae rhythm. Here's how it sounds:

Syncopated 8ths audio example -> http://goo.gl/yr7aqe

11. **Syncopated sixteenth notes**

Now we have a sixteenth note rest followed by three sixteenth notes:

|1| e and a |2| e and a |3| e and a |4| e and a

As with the previous pattern, all of the strong beats (1 2 3 4), which fall on the metronome click, are skipped. The trick is to feel this beat internally, and then play the off-beats (e and a).

Syncopated 16th notes audio example -> http://goo.gl/xFDo8m

12. **Eighth note rest and two sixteenths**

This pattern is sort of a combination of the previous two patterns. It is counted like this:

|1| |e| and a |2| |e| and a |3| |e| and a |4| |e| and a

The eighth note rest (50% of the beat) is followed by two sixteenth notes (another 50%).

8th note rest – 16th note – 16th note audio example -> http://goo.gl/Gyt2Hx

13. **Sixteenth note rest, sixteenth note, and an eighth note**

The opposite of the previous pattern. It is counted like this:

|1| e and (a) |2| e and (a) |3| e and (a) |4| e and (a)

Beat 1 is skipped (not heard or played), you play 'e' and 'and.' The 'and' is an eighth note so it is held for the duration of (a) if you're playing a pitched note. If you're clapping or tapping all this, then (a) is treated the same way as |1| — it's not played.

16th note rest – 16th note – 8th note audio example -> http://goo.gl/si5qG2

14. **Sixteenth note rest, eighth note and a sixteenth note**

A little bit trickier than the previous ones. We have a sixteenth note rest (25%) followed by an eighth note (50%) and a sixteenth note (25%). It is counted like this:

|1| e (and) a |2| e (and) a |3| e (and) a |4| e (and) a

'e' is an eighth note here and if you're playing a pitched note it needs to last until 'a.'

16th note rest – 8th note – 16th note audio example -> http://goo.gl/5FeUXG

15. **Dotted eighth note rest and a sixteenth note**

Now we have a dotted eighth note rest and a sixteenth note. So we're just playing on the last off-beat 'a.' It is counted like this:

|1| |e| |and| a |2| |e| |and| a |3| |e| |and| a |4| |e| |and| a

8th note rest – 16th note audio example -> http://goo.gl/owmMgr

16. **Sixteenth note rest and a dotted eighth**

The opposite of the previous one. Now a sixteenth rest is followed by a dotted eighth. It is counted like this:

|1| e (and) (a) |2| e (and) (a) |3| e (and) (a) |4| e (and) (a)

In this bar the 'e' note is held for 75% of the bar while 1, 2, 3 and 4 are not played or heard at all. If you're playing a note with a pitch on 'e' then this note is held for the duration of 'and' and 'a'(since it is a dotted eighth note).

16th note rest – 8th note audio example -> http://goo.gl/VfXfA4

17. **Syncopated eighth note triplets**

Here we have eighth-note triplets but with an eighth-note triplet rest on the main beats (1 2 3 4). It is counted like this:

|1| trip let |2| trip let |3| trip let |4| trip let

Note that like an eighth-note triplet, one eighth-note triplet rest is also 33.3333…% of the beat. In music notation and on the staff, an eighth-note triplet rest has the same symbol as the regular eighth-note rest but it is contained within brackets denoting triplets.

Also notice the subtle difference between this pattern, and patterns 12 and 13. Take note of how beat subdivisions are spaced out differently. This one sounds more like a waltz:

Syncopated 8th note triplets audio example -> http://goo.gl/1RWGze

4-Bar Random Sequence Exercise 2

Here's another random sequence of rhythms (or mini-patterns), this time including syncopation. As with Exercise 1, your task is to listen and figure out which rhythms are used in each bar. Again, you will find the correct answers in the Cheat Sheet section.

4-Bar Sequence Exercise 2 audio example -> http://goo.gl/3KwQ24

Note that the sequences in both Exercise 1 and Exercise 2 are not meant to be super-precise; and what's more, they're completely random, hence not very musical. This is done intentionally to make it less obvious and more difficult, and to show how you can recognize patterns and extract them from a random sequence of notes. This will greatly help with transcribing the rhythm (figuring it out by ear) of songs and other musical compositions.

After figuring this out, your task is to come up with your own four-bar sequence of patterns you like, but this time include some of the syncopated patterns you have learned.

Hopefully, you can now see that combining all these beat subdivisions is not difficult, and it provides great possibilities for what you can express rhythmically. All these patterns are fundamental and are used more or less often in practice, however they are not exhaustive – you can derive more mini-patterns using the subdivisions you learned, just like combining pieces of a puzzle. As an extra challenge you can try to come up with your own rhythm blocks.

Part 5
More Ways of Creating Movement in Music

Timbre/Tone

A composer or performer can use note selection to build and release tension, to create movement. They can also use, as we have seen, note duration – by manipulating time, they are able to achieve all manner of complications. There are, however, other ways of moving through musical space, other axes, other tools, other vehicles. One of these is timbre or tone color.

Timbre and tone refer not to the pitch of a sound, and not to its volume, but to what the sound sounds like. They are the character or the form of a sound, the color or quality of a sound.

Though they are often used interchangeably, ‘timbre’ and ‘tone’ are sometimes used to refer to different features of a sound’s color.

In these cases, the timbre of a sound is indexed to whatever instrument the sound is produced with – a violin’s A note is different from a saxophone’s A, and the difference between those two sounds is the timbre.

Tone, on the other hand, is the specific quality of the sound coming out of that instrument, affected by the composition of the instrument, the player’s technique, the amplification and any effects used.

In general, the timbre or the tone of a sound (and here we are imagining that those two things are the same) is one of the ways a composer or performer can control the way a piece of music feels. Tension is built and released by way of timbre just as much as by way of pitch or duration.

Dynamics

Dynamics refer to the volume of a sound, as well as to how that volume is expressed (does it come on quickly, does it linger, etc.).

The dynamic movement in a piece of music – getting louder getting softer, increasing or decreasing the sustain, attack or decay of the tones in that piece – contributes to the overall sense of drama and tension, the propagate musical movement, in just as profound a way as the timbre, duration and pitch of the sounds do.

Playing with dynamics and phrasing (the physical way in which a musical line is phrased/played) is intrinsically related to what many call ‘playing with the feel.’

Consonance and Dissonance

It is one thing to know how to make music sound good – sound nice, pleasing, easy to listen to. It is one thing to be able to play consonant music (music that sounds like a resolution, that tends toward reduced tension), but it is another to be able to truly create movement in a piece.

Real movement requires that, more often than not, dissonant sounds are made – that is, sounds that tend towards tension, sounds that are difficult, surprising, even harsh.

Making use of harmonic and melodic ideas that promote dissonance, playing on the rhythm of a song and using syncopation in unexpected ways, using timbre, tone and dynamics to create tension are all ways of helping to produce movement in music.

Drama

Music is a language, and a piece of music is a narrative. There is change; rising and falling action. There are climaxes. There is development. There are periods of tension and periods of release. There is drama.

It is necessary to use all the tools at your disposal to create whatever kind of drama you are aiming for. It is possible to create movement primarily through note selection, via moving and changing harmonic material, even perhaps abandoning harmonic structures altogether (as in some free improvisation and modern classical music).

But it is also possible to use time, tone, timbre and dynamics to tell a story, to move an audience by moving the sound – pushing air, pushing waves, pushing feelings... Moving, changing, dramatizing.

Extended Techniques

It is worth mentioning, briefly, that there are ways of creating drama that go beyond traditional techniques. It is always possible to play your instrument (or to compose for an instrument) in ways that are non-standard, that were never originally intended for that instrument.

A saxophone player can play artificially high or can produce rich harmonics, they can over-blow, they can breathe and whisper, they can speak or yell. A guitarist can use a bow, can play muted notes or harmonics, can scrape the strings (even using a tremolo bar is a kind of extended technique), can play drums on guitar (check out some Tommy Emmanuel drum solos) or guitar like piano. A piano player can insert objects into their strings, changing the timbre of their instrument. There are always possibilities.

In some forms of music, most notably avant-garde, experimental, and ‘free’ music, extended techniques are used to manipulate the story that a piece of music tells. But some of these techniques, such as tremolo bar use, effect use, and artificial harmonics are deeply a part of mainstream music, and no matter the music or the instrument you play, understanding extended techniques means having one more way of telling a story.

Part 6
Putting Musical Structures Together

The first step toward building theoretical mastery in music is learning your way around the ground floor – understanding the fundamental elements of music, the theoretical structures that we work with in music theory, and how those structures work together in basic ways. This, however, is only enough to get you to understand what music is made of, and not how music really works. Understanding music is more – infinitely more – than understanding the discrete elements that make it up. Music is a moving, living, pulsing body, and just like our bodies, its systems are irreducible to any set of simple elements.

The end game is more than understanding – it is mastery – and that comes from being able to manipulate musical structures, putting them to work and making them work for you in whatever way you like. That, however, is a long way off for most people who are learning music theory for the first time. A basic introduction is needed first, which more or less contains two parts:

1. A rundown of the foundational elements of music theory, its basic structures (covered up to this point);
2. A way to put those structures together in order to gain a greater understanding of what is happening in the actual, material act of music-making.

That second task is what this section is about: letting you in on some of the secrets of musical systems; showing you how musical elements and structures make sense together; and getting you ready for the next step, which is a broader perspective – a more advanced conversation about how to manipulate theoretical structures in your own playing and writing. The point of this section is not to get you the whole way there, only to get you moving in the right direction.

To that end, we will discuss, first, a broad distinction between improvisation and composition (with an eye toward thinking about how improvisers and composers use music theory), second, a general taxonomy of music theory (or at least of harmony as it is understood theoretically), and third, a set of musical ideas and structures that are indispensable in your journey toward theoretical mastery.

What is a Composition?

We practicing musicians take for granted so many theoretical objects, and none perhaps more than this one – composition. We assume that we know what it means to compose something, and that what we think of as composition is what everyone else thinks of as composition. We think there is an easy answer to the question ‘What is a composer?’ and that we know just how composers make use of music theory.

It’s worth beginning with something simple. What is composition? What does it mean to be a composer? At first glance, it looks like it’s just a matter of willful creation: to compose is to create intentionally. And so, composing music (being a composer) is just a matter of being someone who intentionally creates sound. That, however, doesn’t really cover it.

First, there is non-compositional music (such as improvisation), which is also, presumably, created intentionally. And second, there is sound that is created intentionally – such as honking a car horn – that we would never call music. So there has to be two things added to what we have already said: 1. that composers write things that are meant to be repeated, more or less exactly as they are written; and 2. that compositions are more than mere sound.

The first of these things is simple enough – compositions are repeatable, and at least at first blush this is what separates composers from improvisers. But the second thing – that composed music is more than mere sound – is a little more complicated.

And here is where music theory enters. Music, it is said, is not simply sound, but organized sound. And while this definition is in some cases too simple to be true, it serves here as a general guide. When we talk about the organization of sound in a musical sense, what we are talking about is theoretical structures – most basically, harmony, melody, and rhythm. These are the things that musicians create, and are not simply sounds. We create organizations and structural arrangements of sounds that are consonant or dissonant, that follow some melodic order (however complex) and that occur in time (most often of a regular pulse).

So this is what composers do – intentionally create repeatable musical structures. And those structures can be discussed, analyzed, and even generated by music theory.

Improvisation as Instantaneous Composition

If composition is the intentional creation of repeatable musical structures, then it should be easy enough to know how to think about improvisation. It should be the same thing, only now, rather than being repeatable, it is meant to be played only once.

But this is too easy. Surely, we can imagine a composer writing a piece that is only meant to be played once; and this wouldn't be improvisation. And all of this takes for granted the idea that the music that improvisers produce is the same thing – or more or less the same – as the music that composers compose.

Improvisation, in general, resists the kind of theoretical analysis that was designed for centuries for composition. This isn't because improvised music doesn't have harmony, melody, and rhythm, but because it uses those things differently than composition. The difference is all about time.

A composer has time – time to think, time to write, time to arrange and rearrange, edit and re-edit. And this changes the way they work with music theory. It's like painting a portrait from a picture, which will never change and never go away. Composers can work and rework the very same parts of a piece until what is left is a reflection of, in general, richly complex theoretical structures.

But an improviser does not have time. Improvisation is often said to be instantaneous composition, and while, as we are saying, it may be misleading to call it a kind of composition, it certainly is instantaneous. This means that the way an improviser works with theory is different. Rather than painting from a photo, they are painting from a brief memory – a quick image that passes by their mind. This means that they cannot pause and reflect on the way they're using theory; they simply have to use it, and they've got one chance to do so.

An improviser uses theory in shorthand and mnemonic devices. What we mean by that is that they have memorized various harmonic devices (and other theoretical structures) and they know how to use them, apply them, alter them, and combine them. Much of the theoretical work in improvisation is done behind the scenes and well beforehand – in the years or decades of practice and study. This means that theory for improvisation isn't quite the same animal as theory for composition. It consists of all the same structures, but its use is different.

Note Relativism

A rose may be a rose may be a rose, but a note is not a note. Not merely, that is.

There is so much more to an A440 than being a tone that sounds at 440 hertz. In music, what matters far more than a tone's absolute pitch is its relative value. What that means is that an A note may be different from one case to another. It may, and likely will, serve different functions each time. And that is what makes a note – its function, not its definition. Note relativism means that what a note is, what it really is, is something that relies on other notes, and that its value is always relative.

Let's take an example. Let's say I am playing in the key of E minor, and I play an A minor chord. The A of that A minor is serving multiple purposes: it is the 1 note of the chord I am playing, which is a minor chord; it is the bass note of that chord, against which all of the other notes I am playing are defined; and it is the fourth note in the E minor scale. All of these things define what that A is at that particular time.

But now imagine that I am playing in Bb Major, and I am playing a Dm7 chord. I am still playing an A, only now it is different. It is the 5 note of the chord I am playing, which is a min7 chord; it is not the bass note of that chord; and it is the seventh note in the Bb Major scale. It is entirely different and therefore its function in these musical structures is fundamentally different.

The point is that notes are relative, and that this is the foundational truth of harmony. To study music theory is not to study a system of immovable objects, but to study a system that is always in movement, that is changing and becoming new at each moment. That's one of the things that makes it so hard to be a music theorist – you are trying to capture something that fundamentally wants to elude capture.

In the process of learning theory, one of the most important things you can realize is that music is moving and that harmony is relative. Once you begin to see that notes are different depending on their changing functions, it will be easier to put yourself in the correct headspace.

How Chords Function in a Key

Every key has seven basic chords (one for each note in the scale). Each of these chords has a function. But for all seven of them, there are only three basic functions, only three basic groups: tonic, dominant, and subdominant.

- **Tonic chords** are the most stable and they establish a key. They are the ones that chord progressions move to in order to release tension. They are the first, third, and sixth degrees of whatever scale is at hand.
- **Dominant chords** are the most tense, and they want strongly to resolve to some tonic chord. Dominant chords are the farthest, harmonically, away from the tonic, but that means that they point back toward the tonic, and so their function is to lead the progression back to the key center. These are the fifth and seventh degrees of the scale, and any chords built on those degrees.
- **Subdominant chords** are the chords that establish movement away from the tonic and toward the dominant before the dominant chords want to resolve back to the tonic chords. Tonic chords establish a key, whereas subdominant chords move away from that key. These chords are tense, but not in the same way that dominant chords are, and they tend to move toward dominant chords (although they can also switch directions and move back toward tonic chords). These are the second and fourth degrees of the scale.

Let's take an example, using the key of C.

In C Major, and chords built from the C Major, E minor, or A minor triads are considered tonic chords. All these chords will establish the key center.

Any chords built on the D minor or F Major triads will move away from C Major as a tonic. These are the subdominant chords, and they are always on the second and fourth degrees of the scale.

Finally, any chords built on the G Major or B diminished triads are dominant chords. These are always on the fifth and seventh degrees of a scale. These chords will establish the most tension, but they will also point right back to tonic chords, since they want to resolve in that direction.

How Notes Function in a Chord

The notes of a chord function in predictable ways, just like the chords of a key. The basic structure of a chord at its simplest – the triad – is the most stable part of that chord, with the 1 and 5 notes being the most consonant. This is why it is possible to play nothing but power chords (also known as fifths) and sound good.

The 3 is a stable note in a chord, but not as stable as the 1 or 5. The 3 does, however, serve to determine whether the chord is Major or minor.

The first extension of a triad is a 7. This is the next most stable interval after the 3, and it also serves to color the chord and determine its family – Major, minor, Dominant.

The last three extensions – 9, 11, 13 – do not, in general, establish the foundation of that chord, nor do they determine whether it is a Major, minor, or Dominant chord. They are also far less stable than the 1, 3, 5, or 7 notes (those four are called ‘chord tones’ precisely because of their stability). These extensions do, however, color the chord in different directions – a minor 6th sounds quite different than a Major 6th, for instance.

Types of Harmony

Harmony is at once the most basic and the most advanced concept in music theory. It is the cornerstone of what we think about when we theorize, and it can be made to be more complex than most people expect. When we talk about harmony, we are talking about the way notes hang together, whether they are consonant or dissonant, and what sorts of structures they can be arranged into. We are also talking about all of that atemporally – outside of time. For harmony, it doesn’t matter how long notes are held, just that they are all hanging together in a structure.

Harmony can be either:

1. Tonal
2. Modal
3. Polytonal
4. Atonal

Here’s a brief overview of each.

Tonal Harmony

Most music in the West is what is called ‘tonal’ music, and it is in the province of tonal harmony. Tonal music is music that has a tonic, or a key center – a note that acts as the center of gravity for the piece or for the part of the piece you’re talking about. And tonal harmony makes sense of chords and scales relative to some key center or tonic. Tonal harmony can be either chordal, scalar or chromatic.

Chordal

Chordal music is music whose primary harmonic vehicle is the chord. We analyze it by analyzing the way chords move and interact with one another. The most basic unit in chordal music is the chord, and generally this means we are talking about triads and their relationships.

Scalar

Scalar music is music whose primary harmonic vehicle is the scale. We understand this music by analyzing the way that notes and chords are derived from the scales that contain them. The most basic unit of harmonic in scalar music is a scale rather than a chord, the latter being derived as a member of the former. This means that generally we are talking about some scale or mode (or a series of scales and modes) rather than a set of triads.

Chromatic

Chromatic music is similar in principle to scalar music, only the scale that is used is the 12-tone chromatic scale. This means, in theory, that the music is free to leave the space of tonality and move into atonal harmony (see atonal section below), but in practice it is often tied to some center of gravity.

Modal vs. Tonal Harmony

Tonal music, as we have said, is music in which there is a note that acts as the center of gravity. This can be chordal, scalar or chromatic, but in all of these cases, there is one note that weighs the music down at any one time. Modal music is different – it takes a scale or mode as a place to begin and treats all the notes in that scale as the points of gravity. In a sense, the entire scale is the ‘key’ or ‘tonic.’

Polytonality

Polytonal harmony can be either tonal or modal. In polytonality, more than one key center is established at a given time. This can occur tonally, as when more than one note is used as a center of gravity, or it can be done with modal harmony, when more than one mode is used at one time. In either case, the resulting harmony is complex and often quite dissonant.

Atonal Harmony

In atonal harmony, there is no key center. This music, popularized in the West in the 20th century by composers such as Arnold Schoenberg and Anton Webern, treats all twelve tones as though they were centers of gravity. Privilege is given to tones, not as they interact with some key center, but as they interact with one another. This music is often difficult to listen to, but some of it is quite beautiful.

Questions to Ponder

Now that we have begun to assemble the blocks of musical structures, it is time to move to the next step; the manipulation of those structures. This is what advanced music theory is – a way of thinking about the manipulation of musical structures. This is a never-ending process and will continue for the rest of your life.

While you begin this process, here are two things to think about: where harmony begins, and the depth of the chromatic scale.

Beginning with a Scale vs. Beginning with a Chord (at the Foundation).

One question that is worth mulling over is whether harmony begins with a chord or with a scale. In tonal harmony, we understand almost everything in terms of chords and their functions. But in modal harmony it is just the opposite – everything is cashed out in terms of scales and their functions. Sorting out this tangle will get you that much closer to mastery.

Chromatic Scale as Origin vs. Chromatic Scale as Extension

The chromatic scale can be a powerful tool if you allow it to be. It can be seen as the master set of all extensions – a chord or scale extending in every direction as far as it will go. But it can also be seen as the origin, the scale from which all others are cut. This way of seeing chromaticism is decidedly modal, and makes all music, in a sense, chromatic music. Again, figuring out how to think about this will help you as you move forward.

Part 7
Going Beyond the Foundations

For many beginning musicians, it is the hardest thing in the world just to wrap their heads around the foundations of music theory. Understanding the building blocks of harmony, melody, and rhythm (chords, scales, modes, arpeggios, rhythmic figures, melodic patterns, etc.) – these things can seem overwhelming. But as a student of music progresses (and that is what we all are: students of music, always learning) these things seem less and less foreign. Where once there was mystery and opacity there comes a sense of clarity.

Concepts such as modality, which seemed so strange at first, begin to seem obvious, less intellectually taxing; and as this occurs, the musician progresses. Their knowledge becomes easier and easier to apply, and it becomes easier and easier to think, to breathe, to emote on their instrument. The instrument itself no longer seems unwieldy, and it no longer appears merely as a medium through which expression occurs; instead it is that on and in which thoughts and feelings appear. Theory happens on one's instrument, directly, without any intermediary.

But as this occurs, as mastery begins to feel more and more attainable, new questions emerge. It is no longer enough to know, for instance, all 21 foundational seven-note scales. It becomes necessary to learn how to use those scales – how and when to play what, and where. It begins to seem obvious that those scales work together with the chords that are by now memorized, only it isn't clear how that occurs or why.

It begins to seem as though new chords need to be constructed, new combinations of melodic and harmonic patterns need to be derived, new ways of working with tonality need to be employed, and even new ways of conceiving of harmony need to be understood. Only it isn't at all clear what any of that means. When this starts to happen – when it is no longer enough to possess the building blocks, but rather to know how to construct things out of them – it is time for more education.

The content that lies ahead is for intermediate and advanced music theory students who already understand more or less what musicians are doing when they are playing. What this section will start to answer is:

- Why are they playing that way?
- How can we move forward and use the structures of harmony to establish new ways of playing?
- How can we understand more and more complex and subtle music?
- How can we become more complete musicians, better composers, richer improvisers?

And most importantly:

- How can we best use the knowledge we have already gained?
- How can we combine what we know and have practiced in new and exciting ways?
- How can we, perhaps, learn to move beyond the limits of what we already know, even to the point of breaking what we thought were steadfast rules in the process?

This is for intermediate and advanced players who want to learn to think differently about music, with a wider perspective.

While geared toward improvisation, it is certainly useful for the composing artist. While derived largely from the history of jazz from 1959 onward, it also provides suitable means for analyzing the harmonic structure of some of the most important classical pieces from the late 19th and early 20th centuries.

We will begin by discussing and revising chord progressions, understood as the activity and application of individual chords. We will then quickly move toward discussing the principles of chord substitutions and reharmonization before pausing for a lengthy conversation about improvising over chord progressions (including, but not limited to, the relationship between chords and scales and the chord-scale system of improvisation, now widely taught at universities such as Berkelee).

That will end the conversation about what is generally known as '**tonal harmony**', and the final chapters will be dedicated to understanding ways of moving beyond simple tonality – first, in terms of **modal harmony** as pioneered by Miles Davis in jazz and Debussy in classical music; and second, in terms of **atonal music** as pioneered by

Ornette Coleman.

Special treatment will be given to what is sometimes called '**free music**', which is a form of improvisation inspired most often by the modal harmony of late John Coltrane recordings and the atonal harmony of Ornette Coleman.

Finally, the chapter on atonality will close with a section on playing beyond traditional musical categories (by focusing on timbre, volume, speed, density, etc., rather than on harmony, melody, and rhythm) and a section on the spiritual aspects of modal and atonal music.

Few things can give more lasting joy than the sustained meditation on advanced music theory. Unlike basic theory, the world of advanced harmony is one of interpretation and creativity. There are no clear answers, and there are very few simple ways of understanding any of what we will discuss. Everything here exists in shades of perspective.

What I am presenting here is one way of understanding the progression beyond simple music theory; one way of thinking about how to move forward and beyond the same musical patterns you have been practicing for what likely seems like forever. This is the path to true creation, and it is paved with uncertainty. For that reason, it is sometimes hard to make sense of where to go, what to think. But if you allow yourself to become immersed in the stuff of advanced music theory, then you will be rewarded with a lifetime of rich creation. I invite you to put in the effort. It is worth it.

Chord Progressions (Part 2)

Chord progressions are the foundation of most tonal harmony. In jazz, for instance, it was not until the 50s that players began to move in modal, or even scalar ways. The way that people wrote and played was more or less entirely chordal. A chord progression, as stated before, is a series or system of chords that, in general, tends toward some tonic.

Chord progressions are simple things by nature. There are only a few basic progressions, which are then combined, moved around, and altered according to only a few basic rules. The foundation of every progression is a cycle: movement away from and back to the tonic, or center, of the key. This occurs most basically through cadences, of which the most foundational is the V7-I cadence, in which a Dominant 7th chord is played a fifth above the Major I chord, followed by the Major I chord itself. Minor versions of this cadence exist as well: V7-i. Though many types of cadences exist and do many different things, all of them share the structure of this basic one – they all build tension (in this case, the V7) and they all release that tension (in this case, the I).

A simple chord progression consists of a tonic chord, a subdominant chord, a dominant chord that follows the subdominant chord, and a tonic chord that resolves the dominant chord. Basic examples of this are the IV7-V7-I7 found in the blues and the ii-V-I found in jazz. Many variations exist, but more or less all of the time they follow the same structure.

Basic progressions are often extended according to a simple mechanism: The mathematical structure of a progression is used to get the progression from some chord to the first chord of whatever progression is being extended. This sounds complicated, but it's rather simple.

1. First, you begin with a progression – for instance, a ii-V-I in A Major. Those chords are Bm-E7-AMaj.
2. Then, a progression is chosen, from which we will borrow the mathematical structure. Let's say we use another ii-V-I. We use the structure of that progression (a fourth up and then a fifth down) to start on the iii of A Major and end on the ii, which will be the beginning of the first ii-V-I.
3. So the full progression will be iii-vi-ii-V-I, or C#m-F#m-Bm-E7-A Maj. More complex progressions such as this one can be further combined with other progressions by using it (or another progression) as the basis for extending progressions (just like the ii-V-I here was used as the basis for extending the progression we started with).

Additionally, progressions can be made much more complex by making use of **new tonal centers**. A ii-V-I progression can be played in A Major, followed immediately by a IV-vii-I in G Major, and so on. This establishes a new tonal center each time the progression is re-oriented, making improvising over these changes somewhat challenging. It is, however, common practice in jazz.

Finally, there is **chord substitution**. We have already touched on this, but we will be discussing it at length in the next section, using the idea to begin thinking about how to improvise with and over chord progressions. For now it is enough to say that chords can be exchanged for other chords in a progression. These new chords will serve the same harmonic function in the progression, but they will have different harmonic material in general (since they are different chords).

Perhaps the most basic example of chord substitution is *chord family substitution*, in which one chord from the same key is substituted for another chord from the same family (i.e. a tonic chord for a tonic chord, a dominant chord for a dominant chord). Another common chord substitution is *the tritone substitution*, in which a Dominant 7th chord is substituted a tritone away from the original Dominant 7th chord.

Chord Substitutions

When composers work with progressions, or when improvisers play over them, they are generally thinking in terms of chord substitutions. A chord substitution is when one chord is replaced by another, and it allows us to extend a progression indefinitely.

Chord substitutions are at once the easiest thing to think about and the most complicated. In the most basic sense, a chord substitution is a reharmonization, and since reharmonizations are the foundations of melodic variation, chord substitutions are the most basic way of generating new ideas (both on the fly and in a composition). But they can are be terribly complicated, and performing them improvisationally can be extremely challenging. When advanced players think about improvising with a chord progression, they are generally considering something to do with chord substitutions.

We have already said that a chord substitution happens when we replace one chord with another, different, chord that serves a similar function in the progression. One very basic way of doing this, as we have seen, is to replace a chord in a progression with another chord of the same family – a tonic for a tonic, a dominant for a dominant, a subdominant for a subdominant. But there are many other ways of substituting chords, some of which are much more advanced.

For each way of substituting a chord, there is an opportunity to both extend a progression compositionally (as we generate new progressions from an existing progression) and a way to reharmonize a substitution improvisationally (as we come up with new chords and melody lines to play over existing chord progressions).

Beyond chord family substitution, there are a few other basic ways to substitute chords. One of them we have already mentioned: tritone substitution. This is when a Dominant 7th chord is substituted a tritone away from an existing Dominant 7th chord.

There is no tritone substitution equivalent for Major and minor 7th chords, but there is something that works for those chords in a similar way: A minor triad or minor 7th can be substituted three half steps below a Major triad or Major 7th, and a Major triad or 7th can be substituted three half steps above a minor triad or 7th. This is sometimes called a *relative minor (or Major) substitution*, and it almost always works well.

Beyond those simple methods of substituting chords, there are almost limitless options. There are, however, a few basic rules. In essence, an easier way to show chord substitution methods is by dividing them into those that change and don’t change the chord’s root.

Not Changing the Root

Quality Addition

One easy way to substitute a chord is to simply alter that chord, keeping its bass note. This is not so much substitution as we commonly talk about it, but it is, strictly speaking, a way of replacing one chord with another.

The most basic way to alter a chord is through quality addition, in which the chord remains intact but is added to. A new quality is introduced. For instance, a Maj7 chord can become a Maj7#11 chord by adding a #11 note to it.

Quality Subtraction

Another easy way to alter a chord without, usually, changing its root is to subtract a quality from it. A min7 chord can become a minor triad, a 5 chord, or a min7 chord with the fifth omitted. If you are dealing with an extended chord, then you can always remove the extensions and end up with a 7th chord. Another example: a C7 can become a C9, or a C13 can become a Cadd13.

To summarize: the simplest kind of chord substitution is through quality addition and subtraction. In essence, qualities are added to or taken away from a chord, and the resulting chord is put in place of the original.

Quality Alteration

It is also possible to generate a new chord by altering the qualities that are already in it. Notes can be raised or lowered, usually by a half-step. A 13 chord can become a 9(#11)(13) by raising the 11, or a min9 can become a min7b9 by lowering the 9.

Family Alteration

The last way to change a chord without changing its root is to alter its family. In general, as stated before, there are three families of chords – Major chords, minor chords, Dominant chords.

You know which family you're dealing with by looking at the 3 and the 7:

- If the 3 is a b3, then it is a minor chord.
- If the 3 is a Major 3rd and the 7 is a Major 7th, then it is a Major chord.
- If the 3 is Major and the 7 is minor, then it is Dominant.
- If there is no 3 or no 7, then it is generally obvious by looking at the other notes in the chord (for instance, a min6 chord is minor).

- When it isn't clear, just think of the scale that includes that chord – if it has a Major 3rd and a minor 7th then it's a Dominant chord, etc.
- A Maj6 chord is the only time things get confusing – this can be either Major or Dominant, which just means you have more options when dealing with that chord. Something similar is sometimes true of stacked fourth chords, but that is for another day.
- When we alter the family of a chord, we change it from Major to minor, from minor to Dominant, or in any other way to move between families. The chord stays the same except for the notes that make it belong to a certain family. For instance, a min9 becomes a 9 or a Maj9. In those cases, the root and the 5 stay the same.

Changing the Root

Inversion

You don't always want the bass note of your chord to stay the same. Sometimes, the reason you're substituting is to create new bass movement. In these cases, you need to move the chord completely. The simplest way of doing this is to invert it. You end up with all the same notes, only in a different order and with a different bass note. Put the 3 on the bass end, for instance. This will give you an entirely new chord to work with. For example, a CMaj7 can become a Emb9.

It is worth pausing here for a moment. Between quality addition and subtraction, quality alteration, family alteration, and inversion, there is a vast array of possibilities. If you combine these techniques, you can generate almost limitless new chords to work with. And this is almost always going to sound good.

The general rule when working with chord substitutions is to make sure that the new chord has at least two notes that the old chord had. If you do that, you can't really go wrong. Even if you don't do that, there are plenty of cases where what you play will sound good.

It isn't altogether uncommon for players to add and alter multiple qualities, invert the resulting chord, and then subtract some qualities from that chord, ending up with a sub chord that is completely different from the original (having only one, or sometimes no notes in common with it). Doing this can still sound great, it just means you have to listen carefully and know when to reel it in and come back to the original progression. As always with theory, you have to use your ears as a guide.

Slash Chords

Similar in notation to inversions, slash chords are another great tool for chord substitution. Whereas the inversions are written like this – Am7/C – denoting in this case, C as the bass note, slash chords are written like this – Am7/Cm – denoting in this case that an Am7 chord is being combined with a Cm chord so that the Cm chord is on the 'bottom.'

This way of combining chords is important for polytonality, which we will be discussing again later. For now we can rest at saying that it is possible to add another chord to a pre-existing chord and end up with a chord substitution that is a slash chord. This is a way of altering a chord without adding, subtracting, or changing any of its qualities, although it can be combined with any of those techniques.

Tritone Substitution

A special kind of substitution is the tritone substitution. In this case, a Dominant chord is replaced by another Dominant chord a tritone away. For example, a C7 becomes an F#7.

Chord Progression Substitutions

Chord Addition

Rather than alter or add to an existing chord, it is possible to simply add chords to a progression to achieve a result similar to straightforward substitution. This is still a form of substitution, only it is a progression substitution rather than a chord-by-chord substitution.

The chord or chords that are added are generally ones that help bridge one chord to another, but it is also possible to add chords that serve their own distinct harmonic purposes and even temporarily change the key center of the song.

An example of a simple chord addition is as follows: given a iv-V-I in G Major, you can simply add a ii chord at the beginning, leading into the iv chord with another subdominant chord. Alternatively, you could add a tonic chord at the beginning – for instance, a vi chord. You could also choose to add a tritone sub between the V and the I, ending up with something like this: vi-iv-V7-bII7-I, playing the first four chords twice as quickly as originally written to be sure to take up the same amount of time.

Chord Subtraction

The opposite of chord addition, but cousin to it in principle, is chord subtraction. With subtraction, we again replace one progression (or section of a progression) with a new one. We can, if we choose, keep the chords unaltered, so that the only change we are making is that we are eliminating certain chords from the progression.

This is usually done so that the most important chords harmonically remain – the I and i chords, the V chords, etc. It is possible, however, to retain only subdominant chords and non-I tonic chords. This makes the progression far less stable and far more harmonically ambiguous, which is sometimes desirable as it leaves more to the listener's imagination and provides more room for interpretation on the part of a soloist.

Series Substitution

A special case of progression substitution is series substitution, in which a specific harmonic series or cycle is substituted for another, usually more common, series. For instance, there may be a longer, quicker, more complicated series that replaces a ii-V-I.

A famous example of this is the Coltrane cycle. In the Coltrane cycle, pioneered by John Coltrane on his *Giant Steps* album, a ii-V-I is replaced by a series that moves quickly through three tonal centers, each a Major third apart. For instance, a ii-V-I in C Major (Dm-G7-CMaj) is replaced with Dm-Eb7-AbMaj-B7-EMaj-G7-CMaj.

In that progression, the tonic chords are AbMaj, EMaj, and CMaj. These three tonal centers are cycled through quickly in the same time it takes normally to move through a ii-V-I in one tonal center. These types of progression substitutions are usually used to add complexity to a piece.

Modal Reduction

Modal reduction, pioneered by Miles Davis, is a special kind of chord subtraction in which all of the chords are subtracted except the ones needed to define the modal centers of the piece. A modal center is different to a tonal center in that, rather than identifying the root or tonic of a chord progression, it identifies the harmonic center of a scale.

So the chords Bm, DMaj, E7, and AMaj all share the same modal center, not because AMaj is the tonic chord, but because they all contain notes that are found in the A Major scale. In this case, those chords might all be eliminated except for the AMaj chord. Alternatively, if they were all eliminated except for the Bm, then the modal center would be the B minor scale or perhaps the B Dorian mode. In this way, reducing a progression modally can encourage the soloists to play and think in certain ways.

In a modal reduction, it is common for all of the chords except the I and V chords (and sometimes just the I chords) to be eliminated, so that what is left is simply a skeleton that can be filled in by a scale. The point here is not to create harmonic movement with a chord progression, which moves away from and back toward a tonic chord, but to allow the players a maximum amount of freedom within a particular key by establishing a modal center that can be filled in, changed, and stretched in a variety of ways.

This is the foundation of modal harmony, which will be discussed in further detail later. For now it is important only to know that by reducing a chord progression to its essential skeleton, a new kind of harmonic freedom and looseness can be achieved. This was the way of modal jazz in the 1950s, and it changed the way jazz players think about chords and solos.

Modal Substitution

Once you have established a progression as a series of modal centers rather than tonal centers, the possibilities for chord substitution open up dramatically. Modal substitution is a way of substituting one chord for another when both of those chords are contained in the same scale or mode.

There will be more to say about this later, in the chapter on modal harmony, but just now it is easy to see how this works in principle – one chord, for example a Cm7, is understood relative to some modal center, for instance D Phrygian, and so any chord contained in D Phrygian is allowable as a substitution chord for Cm7. Each time this happens, it is as though a modal center is being ‘cut’ and inverted – some notes of the scale are being eliminated and what is left is rearranged into a new chord.

The possibilities for reharmonization here are nearly endless, particularly when you start to consider the different ways a single progression can be harmonized modally (for instance, the Cm7 chord can be seen as part of C Phrygian or B Aeolian rather than D Phrygian).

Modal Interchange

Finally, there is modal interchange. This is not so much a technique for chord substitution as it is for modal center substitution, but the result is still that one chord or set of chords is replaced by another. What we mean by modal center substitution is that rather than using a new chord that shares the same modal center as the old one, we replace the modal center completely, even sometimes in a way that makes the music altogether dissonant, and then generate a chord based on that new modal center.

We will cover this again soon, but for now you can see the way that doing this opens up the harmony of a song completely to its limit. There is virtually nowhere you cannot go with interchange and modal substitution when they are combined.

Polytonal Substitutions

A polytonal substitution occurs when a chord or part of a chord from some other key center is used in a progression. This is often done by way of slash chords. For instance, a C7 becomes a C7/DMaj.

A Word on Chromaticism

Chromaticism is an important concept in modern composition and improvisation. It is essential to understanding both jazz and classical music from the second half of the 20th century and beyond. There are many applications of chromaticism, and we will speak of it again when we talk about improvising over a chord progression, but here, with respect to chord substitutions, it plays a role as well.

Chromaticism, simply and generally, is the introduction of the 12-tone scale into the harmony of a song, chord, scale, etc. In general, this means altering notes, scales, or chords by a half-step up or down.

- In the case of chord substitution, this can take the form of quality alteration in which one or more of the qualities of a diatonic chord are altered chromatically.
- In the case of chord addition, it can take the case of adding a chord a half-step above or below an existing chord.
- In the case of modal substitutions, you can sometimes move an entire chord (contained in the scale being used) up or down chromatically. This is a version of what is called ‘sliding,’ which will be discussed later.

Techniques such as modal interchange and chromaticism are ways of greatly extending the harmonic range of a song. Between these techniques lies virtually every choice you could ever make with the harmony of a piece. What is left is to understand the way that wide open chord substitutions can be used in the context of improvisation – how can we play with and over the chords of a song using these harmonic techniques?

More Substitution Examples

It is worth pausing for a moment and giving some examples of specific substitutions. This can be a difficult concept to master, but it is quite important, and examples will help you see how chords and even progressions are substituted in practice rather than simply in theory.

Each of the following examples takes this progression as its starting point:

Am7-D7-GMaj7-CMaj7-F#m7b5-B7-Em7.

Quality Addition and Alteration

The first kind of substitution – quality addition – is simple enough. Here, we take a chord or two (or more) from the progression and add qualities to them. Am7 becomes Am9, for instance. GMaj7 becomes, perhaps, GMaj11.

To alter the families of some of the chords, simply change the relevant qualities. CMaj7 becomes C7. B7 becomes Bm7, and so on.

Inversions

You may want to change the bass movement of the progression by altering the bass notes of one or more chords through inversion. This is not as difficult as it seems, in practice. It is just a matter of taking one of the notes in the chord that isn’t the root and putting it in the bass.

Beginning where we left off in the last example: Am9 becomes Am9/C, which is CMaj7add13, or if you like, CMaj13 (picking up a 9 and 11).

Tritone Substitution

To perform a tritone substitution, simply replace a Dominant chord with the same chord a tritone above or below it. B7 becomes F7.

Modal Substitution

Modal substitution can be a little tricky to figure out, but once you do it is as simple as the rest. First, you pick a scale – in this case, we will assume A Dorian. Then, you derive a chord from that scale – we might pick D7sus4 – and replace some chord in the progression with that one. A natural choice might be D7, but it can be any of them, for instance, the F#.

Polytonal Substitution

With polytonal substitution, we begin with the key of the song and then add another key, taking some of the notes of that new key and adding them to the progression.

Taking E minor as the key, we can add another key – G minor – and add notes from that key to the chords: Am becomes perhaps Amb9 (though the addition of a B flat), or maybe even Cm/Am, a polychord.

Chromatic substitution

To substitute chromatically, using all twelve tones, just take some notes from outside of the scale and add them to the progression.

GMaj7 becomes G#m9b5 (still containing, in this case, the B and D from the original chord, but adding G# and A#).

Series Substitution

To substitute with a series, replace perhaps the first ii-V7-I with some other series, maybe IV-V-I, iii-vi-ii-V-I, the Coltrane cycle, or some less common series such as iiim13-IV7b5-bii7-IMaj7.

Improvising Over Chord Progressions

Once you understand how to apply harmonic theory to extend and manipulate the harmony (the chord structure) of a piece, the next step is to learn to use those harmonic manipulations to generate melody lines in and over that piece. This can be done compositionally, but the way we are introducing it here is the way that jazz improvisers think about the issue; in terms of improvisation. Know that it is possible to apply all the same principles to composition.

Chord Tones

The foundation of traditional jazz improvisation (think bebop) is chord tones. Chord tones are, simply, the notes of a 7th chord. Each degree of a scale has a 7th chord attached to it, and each 7th chord has four chord tones (the four notes of that chord). These four notes, which will change depending on the chord you are playing over, are the basis of the melodies that you create over that chord. In the case of a 6th chord (or any other chord that doesn't contain a 7th), the chord tones are simply the notes of that chord.

Chord tones are used to create improvised or composed melodies over a set of chord changes. In pre-modal jazz in particular, the lines that are played in a song are tied directly to the movement of its chords – for each new chord, there is a new set of chord tones, and those are the notes that are used to create melodies. This is akin to arpeggiating the chords of a song as they pass in different ways to create novel melodies.

Joe Pass was known to have said 'when the chord changes, you change,' and that has always been the rule of (a certain kind of) jazz improvisation and composition, as well as a technique used by classical composers, rock players, country players, and virtually all modern Western musicians.

Arpeggiating the chords in a progression is the foundation of melody as we know it in the West, and it is responsible for everything from the most complex tonal jazz arrangements to the simplest, catchiest pop songs.

Playing the chord tones of 7th chords is the way jazz players understand the root of tonal improvisation. It is not the only technique they use, not at least all by itself, and certainly not in modern jazz (after Miles Davis), but it accounts for the basic understanding of single-note harmony in jazz.

Extensions

You may be thinking that chord-tone-based melodies seem too easy and simple, even to the point of being reductive. You may hear what Charlie Parker did, for instance, and recognize that he wasn't just focusing all his energy on four tones for each chord. There are many ways great players achieve color and variation, even if they are using the traditional method of improvisation that tells them to focus on chord tones. One of them is chord substitutions, which we will cover in further detail next. Another is chromaticism, which will be discussed further later in this chapter.

But maybe the simplest thing improvisers can do is play the extensions of whatever chord they are playing over. When you're assembling a chord, an extension is, as you likely know, any of the notes beyond the 7th that you get to by ascending some scale in thirds. In other words, they are the 9th, the 11th, the 13th, and their alterations.

By playing an extension, you are playing a note that isn't a chord tone but that is a tone in a chord of that same root that contains those chord tones. In other words, you are playing a note that is in an extended chord based on the same note that the 7th chord you are playing over is based on. There are multiple ways of doing this, each with different effects, but the general idea is the same – by opening up the extensions of a chord you allow yourself more melodic freedom and open the door to subtler and more complex harmonic colors. Bill Evans was a master of this.

One way of playing extensions is to use them to get from one chord tone to another. This is a more traditional way playing extensions, and it was used in jazz as early as the bop years. This way of using extensions treats them as tones to pass through rather than to land on, and so it still treats the chord tones as primitive. The other way of seeing and playing extensions is to open them up fully, allowing yourself to begin and end phrases on extensions.

This does away with the old method of treating chord tones as the essential building blocks of all melody, and it is decidedly modern (hitting its stride in the late 50s). Opening chord tones up completely was in many ways an invention of John Coltrane, and it led him in some respects to his modal and free jazz periods.

Using Substitutions in Single-Note Lines

Chord substitutions (subs for short) are a time-honored way of generating melodic variation. By reharmonizing a set of changes, the lead player has the ability to play new melodic ideas not allowed by the old chords. If, for instance, a CMaj7 is substituted for an Am7, then a player can choose to play the chord tones of the new CMaj7 chord. In this case, this gives them a B which was not available as a chord tone of the Am7 chord.

This is one of the ways to use a chord sub – as a means of extending the chord tones that you are allowed to play. Another way of using a chord sub in single-note playing is to assign some scale to the new chord and then play that scale (see chord scales below). For instance, if you substitute an B7 for a F7, then you can play an F Mixolydian (since the notes of the F7 chord are all found in that scale).

Chord substitutions are one way of breaking out of the bind of merely playing chord tones. They are not, however, the only way. Even in standard tonal harmony, there are other devices for achieving variation. But chord subs remain perhaps the most widely-used form of harmonic variation. They are simple in nature, though not always in concept – by reharmonizing a progression, we achieve what is effectively a new progression altogether, which then allows us to play in new ways by playing over the new progression as though it were the original one.

This must be done tastefully, and it is important to choose your subs well (since the wrong one can sound quite clanky over the rhythm section of your band), but when it is done well it does amazing work. With chords subs you can begin to sound like a professional improviser, right out of the gate.

Another lovely feature of substitutions is that the effect they have is hugely variable depending on what sub you choose. If you choose something very close to the original chord or very consonant within the key of the song, then the resulting melody will be very consonant. If, however, you choose a sub that creates more tension or muddies up the harmonic waters, then that will be your result.

Every player decides which subs to use and when, and that is part of what makes them so useful – chord subs are highly personal and become a part of your style, just as a particular tone or technique might. You can even begin to see substitutions as harmonic techniques, some of which you have mastered and, like all techniques, have added to your bag of tools.

Chord-Scales

When you are trying to move beyond chord tones and into a vaster, more wide open, even more ambiguous harmonic space, there are two basic ways of proceeding.

As we have seen, you can:

1. Play extensions of the chords in the progression, allowing you to move beyond the (usually) four chord tones of each chord.
2. You can substitute chords, allowing you to open new chord tones (and extensions) that were previously unavailable.

Both these methods, however, even when they are combined, represent only one way of moving beyond chord tones. They are both chordal in nature, by which I mean they both treat the chords of the progression as isolable, fundamental, immutable units, which can be altered, extended, and even substituted, but which are still the sole foundations for your melodic improvisation or composition.

This way of thinking about a chord progression is old (hundreds of years old in classical music and as old as the earliest bebop in jazz) and it is therefore time tested. But it is limiting. At its core, it consists of the idea that to play over a set of chords means basically arpeggiating those chords (playing chord tones) or their substitutions and extensions. And that is more or less the foundation of what we think of as melody, or at least it has been for most of the modern era.

There is, however, another way of seeing things. Rather than treating a chord as an immutable object, it is possible to see that chord as a member of something larger. In modal music, this means seeing it as nothing but a cutting of a larger scale, and often the chord indicates nothing but a particular scale or mode to be played (paying no attention to specific chord tones).

We will have more to say about pure modal harmony later, but even in tonal harmony (chord-based harmony) it is possible to move in this direction. It is possible to see a scale as part of a chord that is being written down or played. To use a scale in this way means getting past seeing a chord as a map that you have to follow and beginning to see it as an indicator of a larger harmonic structure.

Enter chord-scales. A chord-scale is a scale that is mapped to a chord (and a chord that is then mapped to a scale). Playing a chord-scale is a way of playing a chord by playing a larger harmonic structure (a scale, usually consisting of seven notes), and that means that it extends the harmony of the chord, but without thinking about an extension and not necessarily thinking about a substitution.

A chord-scale extends the harmony of a chord in any number of directions by finding a scale that includes all of the notes of the notated chord and then mapping that scale onto the chord, giving the player or composer all the notes of the scale to work with. The chord is no longer thought of in isolation, but is now part of something larger. The harmonic landscape is freer than in strict chordal harmony, since there are more notes to choose from at any given time. This allows for more melodic variation. Since there are multiple chord-scales available for most chords (due to the fact that most chords can 'fit' into the notes of more than one scale), there is even more variety.

Here's how it works:

- You come to a chord – an FMaj7 for instance. Rather than seeing the four notes of that chord (F, A, C, E) as the foundation for your melody line, you go in search of a chord-scale.
- You find a scale (or scales) that contains FMaj7. Even if we limit ourselves to scales whose root is F, there is more than one option. For instance, F Ionian (Major) contains those notes. F Lydian also contains them. The seventh mode of the harmonic minor scale, F Lydian #2, also contains those notes.
- You can also produce any number of synthetic scales by taking one of those three scales and altering the second, fourth, or sixth notes of them. You are left with multiple scales to choose from.
- You will, depending on how long you have to sit on this one chord, potentially play more than one of these scales. Assuming that you only have a beat or two, however, you will likely choose just one of those scales and use it to create a melody.

By doing that, you will have chosen a chord-scale, a unit formed by the mapping of, for instance, an F Lydian scale onto an FMaj7 chord. While you are on the FMaj7 chord, you can then play any of the notes of the F Lydian scale – F, G, A, B, C, D, E. And that's how it works.

The magic of chord-scales is most evident in two cases:

1. When the chords are moving quickly and you are thinking about chord tones, extensions, leading tones, and substitutions is made difficult (or impossible). In these cases, having memories of a few chord scales for each common chord makes playing through the changes breezy.
2. When the chords are moving slowly enough that it is possible to use more than one chord-scale over a single chord. In these cases, a tremendous amount of tonal variation can be achieved without ever having to do very much in the way of calculation.

In general, chord-scales are used on a chord-by-chord basis. The motto is still *'when the chord changes, you change,'* and that's why this is still considered a tonal harmonic technique (rather than modal). Its job is to assemble tones that define and extend a tonal point of gravity (the root of a chord), which along with other points of gravity defines a tonal center and therefore a key (just the same way a chord progression does). In this way, chord-scale playing is closer to bop harmony than it is to what came after it, but it is a modern way of thinking about that kind of harmony.

Though chord-scales are generally played chord by chord, it is possible to combine them with techniques such as modal substitution and modal reduction, which results in a harmonic space that is more ambiguous. In general, chord-scales play well with substitutions across the board, so it is a great idea to substitute a chord and then find a chord-scale to go along with the new chord. When you do this with something like modal reduction, you can end up with fewer chords and more time to play with the scales you are mapping onto those chords, which can begin to sound and feel more like modal music.

Chromaticism

When you have moved beyond pure chordal harmony and into the world of chord-scales, there is a sense of great freedom. It is as though you can open your lungs wide and take in the air. But you are still very much inside. There is a whole world outside your door that is available to you. Chromaticism is the way out that door.

Chromaticism, at its most basic, is simply the use of any of the notes in the chromatic scale. In general, it refers to:

1. Using the 12-tone chromatic scale to alter a chord or a scale to achieve some kind of variation.
2. It can also mean discarding chords and scales altogether to play as ‘outside’ as possible.

The first of these two uses is common in tonal music, and the second is common in atonal music. **Tonal chromaticism** is in some sense a less pure form of chromaticism than **atonal chromaticism** – in the way that it is still tied to a chord or scale that is more restrictive than the 12-tone scale. But that doesn’t mean it isn’t a powerful tool.

A rather conservative way to use chromaticism in tonal music is the way chromatics were used in bop. In the heyday of bebop, it was quite common to use a chromatic run to get from one place to another, in between arpeggios of chords. In a similar vein, a chromatic addition can be used as a passing or leading tone before or in between notes of an arpeggio or chord. This amounts to adding a note above or below (by a half-step) a note in the scale or chord you are using.

Bop players also made synthetic scales consisting of more than seven notes, now called bebop scales. These scales were designed to allow the player to play ascending or descending passages, and end up playing a chord tone on every strong beat while playing other notes, sometimes chromatic notes, in between them. They would often begin with a diatonic scale, such as a Major scale, and add one chromatic note in between two of the existing notes of that scale, such as between the Major 6th and Major 7th, or between the Major 2nd and Major 3rd.

It is possible to use some of these bebop techniques to achieve more ‘outside’ harmonic effects. Beginning with a chord sub, for instance, that already contains non-diatonic notes, and then altering or adding to that chord or its extensions chromatically, allows you to end up with an arpeggio that is far from intuitive but that may still sound great.

It is also a common practice to begin with a common chord-scale (a C Ionian mapped onto a CMaj chord for instance) and then add to and alter that chord-scale chromatically (perhaps flattening the 9th and adding a note between the 5th and 6th notes of the scale, ending up with a synthetic scale that ‘works’ with a CMaj chord but sounds quite exotic).

In general, few things in music are more powerful than the chromatic scale. It is so powerful that we have invented seven-note scales to restrain us and reign in the chromatic scale, in a way. It would be easy enough to say ‘play one of these twelve notes’ at every point in time, but most of us would be entirely lost by this. However, the judicious use of chromaticism to alter, add to, and even temporarily replace a chord or chord-scale can be the difference between staying indoors and feeling the fresh breeze.

Polytonality

A conclusion which we can draw so far is that tonal harmony itself can be:

1. Chordal
2. Scalar
3. Chromatic in nature

However, tonal harmony is limited by one foundational principle: there is one, and only one, tonal center at any given time. The music can move, and move quickly, from center of gravity to center of gravity, but at any one moment there is one point in harmonic space that commands your attention. That means that any note, and chord, any scale you play at that time will have more or less one set of defining characteristics (relative to whatever the tonal center is).

This is the case with all purely tonal music, and it has been the case with the vast majority of music in the West for hundreds of years. This is not necessarily a bad thing. But in the last 100 or so years, composers began to experiment with ways of moving outside of this one-key-at-a-time structure. And improvisers, particularly in jazz, began to do the same thing around the late 50s. This results in what is called ‘polytonality’, which is a way of saying that there is more than one, sometimes many, tonal centers happening at the same time. This is where it gets very advanced.

In polytonal music, a single note has more than one function at the same time. A chord or scale becomes quite a complicated matter. If you are playing in both A minor and C minor, then a C is both a minor 3rd and a root. An Am chord is both a i minor (in A minor) chord and a vi minor chord (in C minor). An A minor scale contains both diatonically consonant tones (in A min) and dissonant tones (in C min). Navigating such a space can be difficult, but it can result in some incredible subtle and beautiful music.

In order to achieve polytonality, sometimes a piece of music is written with chords being borrowed from more than one key. But if you are playing over a standard tonal piece of music, and you want to play polytonally, then there are a few things you can do.

- First, you can substitute slash chords for some or all of the original chords. As you do this, be sure to choose some triads from an entirely different key. When you play over your subs, you can choose to arpeggiate the chord from the original key, the chord from the new key, or the entire slash chord.
- You can also choose a chord-scale that suits both of those chords, or you can move between chord-scales that suit each of them. Where you choose to place your emphasis will determine how ‘out’ the music sounds. If you lean heavily on the original key, then the music will sound more consonant. If you lean away from it, it will sound more dissonant.
- You can also simply select chord-scales from chords that aren’t in the key your song is written in. This is achieved by subbing in a chord that has a root that isn’t contained in the key of the song, and then choosing some chord-scale on that root that contains multiple non-key tones. By moving between this chord-scale and a more standard chord-scale (that is in or close to the key of the song), or even by choosing more than two such scales and moving between them all, you achieve polytonality.

Polytonality is difficult to understand, especially if you are improvising and have to wrap your head around it quickly, but it can be practiced. You can practice injecting chords and scales from some second or third or fourth key into the melody you play over a chord progression. Begin slowly and with simple progressions that maintain their key center (such as a slow version of ‘Autumn Leaves’). Eventually, you will be used to the way it sounds and you will begin to add second (and more) key scales and chords without having to think about precisely which keys you are borrowing from. At that point it is a matter of hearing and feeling the movement of the music and knowing when to do it (and when not to).

Modal Harmony (Miles, Debussy, Pre-Common-Era Music)

Most of the music we now listen to, and have listened to since the modern era began in the West, has one thing in common – tonality. This music is tonal in nature – from classical to romantic, from rock to pop, from blues to jazz to country, and even including rap, hip hop, and R&B. We have seen what it means to be tonal: a particular tone (or sometimes set of tones) acts as the weighty center of the music. All the chords, scales and notes that are played or written in that piece take their harmonic function from that center, and all of them can be seen as either moving away from or moving toward that weight.

This is not, however, the only way for harmony to be organized. In modal music, the center of gravity that was a single note (a tonal center) is now replaced with a network of notes – a mode or scale. There are then, generally, seven notes, all acting as the weighty center (taken together) of the music. There is a key, and in some respects it can be said to center (on a scale), but there is no one note around which the harmony of the piece congeals.

The notes of the scale used as the harmonic foundation are all treated equally – none is seen as the tonic, with the others serving to build or release tension vis a vis that tonic. Instead, there are in a sense seven tonics, and the relationships between them emerge out of the specific intervals – the chords and the melodies – that the composer or improviser creates within that scale (or outside of it). The song is said to have a key, but the key is written as something like ‘A Dorian’ rather than ‘A minor,’ with ‘A’ in the modal sense only being there to indicate the scale being played and not necessarily the tonal root of the piece.

This is the basic idea of modal harmony, and it is as old as pre-modern European music (prior to the Baroque period and going back as far as Greek music and Gregorian chants) and much of the music that has historically come out of Asia and Africa. Modal harmony was revitalized at the turn of the 20th century by French composers such as Debussy and Ravel, and in jazz it was championed in the mid-to-late 50s by Miles Davis, John Coltrane, and Bill Evans (among others). Since the invention of modal jazz, modal harmony has been a ubiquitous part of rock, fusion, country, free and avant-garde music, and it has always been a feature of the blues. Few things in music are as powerful or as adaptable as modal harmony.

Modal Substitutions

We have already mentioned modal substitutions. These are part of the heart of modal music. When there is a chord progression, the traditional method for harmonic substitution is to alter, add to, and invert the existing chords, resulting in new chords that share important chord tones with the old ones. In this way, we are sure to end up with a set of changes that functions in the same way, or in much the same way, as the old one – functions, that is, tonally. This way of substituting chords is based on the function of a chord within tonal harmony (vis a vis a tonal center). The idea is that the new chord has a similar function as the old one.

There is, however, another way of going about substituting a chord. If, rather than seeing each chord as having a particular function with respect to a tonic, and each note of each chord having a particular function with respect to a root, we see instead all of the notes as being inside (or outside) of some scale or series of scales, then the game is different. We can now, since the chords are simply cuttings of a larger scale or mode, replace that chord with any other chord that is also a cutting from that same scale or mode. If we see an Am7 chord, and we assume for the time being that it is part of a G Dorian scale (or A Phrygian) then we can replace it with any chord also contained in that G Dorian scale (such as a Gm13sus4 chord).

The artistry of this sort of substitution is in two things:

1. The choice of modal center (the scale being used). At any given time, there are multiple scales that include the chord written down, either in isolation or including the chords around it in the progression, and so deciding which scales to use at that point in the progression is a matter of taste.
2. The choice of a chord to be used within that scale. In the example above, I chose a Gm13sus4 chord, but I could just as easily have chosen an FMaj11 chord, or any one of a number of other chords. Deciding which one to use is a matter of overall harmonic color, and is often done by listening to the melodic content of the

music as one chord moves to the next.

Modal Interchange

Modal substitution is the way in which a modal player or composer opens up the harmony of a song to allow for maximum harmonic freedom (and melodic variation). Playing single note lines over modal chords is as easy as playing any of the notes in the scale you have chosen at that time (and again involves a certain amount of artistry in making judicious decisions about which notes to select – Miles Davis was the master of this). But sometimes a player or composer wants even more flexibility. Enter modal interchange.

Modal interchange is a kind of substitution whereby the scale being used is swapped out for another scale – any other scale – with the same root. And since every seven-note scale has seven modes, each with their own roots, there are theoretically seven different notes for each scale that can be used to anchor a new set of scales. All you need to do is pick one of those roots and play a scale – any scale you choose – beginning with that note. Then, new chords can be introduced based on that new scale (and its available modes). Modal interchange was used to great effect by John Coltrane on the album *A Love Supreme*.

Chromatic Sliding

Miles Davis was known for a particular kind of scalar substitution in modal music. The technique is called 'sliding,' and it involves playing the exact scale you are using currently, only one half-step up or down, and then returning to the scale you were using. It is a useful technique for generating tension and creating novel melodic ideas.

Polymodality

What polytonal music is to tonal music, polymodal music is to modal music. Polymodality is the use of more than one scale at the same time to anchor the harmony of the piece. One example comes from John Coltrane: a scale (F Major for instance) is used as the modal center of an improvisation, but at the same time, two other scales a Major 3rd above and below that scale are also used (in this case, A Major and C# Major). The scales are all used to create melodies, sometimes one after another and sometimes within the same phrase. Chords are borrowed from all of the scales, resulting in a harmonic network that is complex and ambiguous.

Atonality

Finally, we arrive at atonal music. Atonal music can be seen as one of two things:

1. 1. The natural extension of tonal harmony, in which polytonality is taken to its limit;
2. 2. The most complete version of modal harmony, in which the 12-tone scale is the 'mode' being used.

In the first way of looking at it, atonality is the denial of tonality by way of its multiplication. 'Atonal' means 'without a key center,' but it is impossible to conceive of music that is without harmonic organization in the strictest sense. The limit of polytonality, however, approaches the lack of a key center by establishing so many small centers that the music never has a chance to congeal around a single tonic (or even a set of tonics).

The second way of seeing atonality is simpler – it is modal music in which all twelve tones are used to define the scale being used. In this model, atonal harmony simply treats all twelve tones equally and democratically, allowing relationships to emerge between them as the music progresses.

It is important to note that atonal does not mean without rules. There is such a thing as free music (to be discussed briefly) but, for instance, the through-composed atonal music of the early-to-mid 20th century (often called 'serialism' and pioneered by Schoenberg and Webern, among others) was as rule-governed as Baroque music. (And perhaps as mathematical as well!)

Chromatic Playing

The easiest way for most people to approach atonal playing and composing is to think of it through the chromatic scale. Seeing the chromatic scale as the foundation of the music (rather than any five or seven-note scale) is a way of treating all twelve tones democratically. What emerges out of a space such as this is very many smaller relationships between notes and chords – relationships that can be seen either as polytonal or as modal in the most absolute sense.

It is worth practicing this kind of playing, in which the harmony of the music is restrained only by one scale and includes all the notes of Western harmony. It may sound as though this sort of music is easier to compose or improvise, but doing so with any kind of lyricism requires great skill (and an impressive ear), and demands practice.

Ornette Coleman – Harmelodics

Ornette Coleman pioneered a way of playing chromatically that endures to this day. All twelve tones are treated equally, but rather than attempting to create harmonic structures out of those twelve tones in various combinations, the harmony is left entirely up to the melody. This is called harmelodics, and what it means is that the melodic function of a note or chord is what determines its harmonic value rather than, for instance its relationship within a chord or scale.

Rather than seeing harmony as something frozen in time (a relationship between tones in abstract collections of notes), harmelodics sees the relationship between notes in time, as they move up and down and are held for longer or shorter amounts of time, as part of those notes' harmonic function. Coleman was a fan of saying that harmelodics was all about treating the melody, harmony, and rhythm equally (rather than prioritizing harmony).

Free Harmony

In free music, things are unlike anywhere else. We have already said that atonal music does not mean music without rules, but in free music that's exactly what it means. There are, in fact, no rules at all in free harmony.

Every musical structure – from the *Moonlight Sonata* to the sounds of a trainyard – are allowed in. In a slightly more restricted version, free harmony means that any of the twelve notes can be played at any time without necessarily being concerned at all about their harmonic content.

Free music is so far removed from traditional notions of harmony that in fact most free musicians distance themselves from the 'jazz' name tag, insisting on being called 'free improvisers' instead. This is an extension beyond even the late modal music of Coltrane and the free jazz of Coleman. It is often influenced by those things (as well as by late Miles Davis and 20th century classical music) but it is not identical to any of them. Most practitioners of free music in its purest sense are also players of some other more traditional music, such as jazz, rock, or classical, but in the space of free improvisation those names mean relatively little (in theory).

Beyond Harmony, Melody, and Rhythm

Free music establishes a space in which traditional musical structures are no longer dominant. The composer or performer is allowed to move beyond harmony, melody, and rhythm and into other sonic territories. These include timbre, tone, volume, and musical density.

It is not uncommon for a free player (or any avant-garde or experimental musician who embraces this musical space) to think and feel those musical properties rather than concerning themselves at all with the traditional structures we are used to. This moves such composers and performers even further from the traditions of rock, jazz, and classical music and into new areas, which many listeners find difficult to encounter but some players find exceptionally rewarding.

Spirituality and Music Theory

It may seem strange to move beyond tonality, and even beyond harmony altogether. But there is a long tradition in avant-garde, experimental, and free music of lofty reasons for doing so. In the experimental classical tradition, for instance, as in much of the free improvisation since the 70s, music theory is tied directly to philosophy. Thinking about the metaphysical and other philosophical ramifications of playing music takes the place of thinking about harmony or melody, with some of these players and composers such as John Cage and Derek Bailey even publishing philosophical books and essays linking their work to deep philosophical themes.

There is another tradition, closely related, coming out of 60s jazz (from Ornette Coleman, Sun Ra, Cecil Taylor, John Coltrane, Pharaoh Saunders, and Albert Ayler). This tradition replaces music theory as it has been known for centuries with spiritual reflection and religious commitment.

These players, some of them at least, were well-known for seeing their music as direct lines to divinity, in much the same way that music functions in some mystical traditions outside the modern West. Contemporary spiritual atonal and free musicians have continued this tradition, often linking philosophy, spirituality, religion, and even scholarship directly to the practice and theory of their music. This means that for these players, the new music theory is intellectual and spiritual in nature (rather than mathematical).

Theory no longer appears on the page, and it no longer concerns itself with the sorts of things we have become accustomed to thinking about. This sort of theory is boundless, and points toward a future in which music will not live only on the page (did it ever?).

A Note from the Author

Thank you for reading this book. I hope you enjoyed reading it as much as I enjoyed putting it together.

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Remember to keep practicing and be disciplined, always work on expanding your knowledge and becoming the better you. Learn to enjoy the process, and everything that you do, even the simplest, smallest things. This will give you the results you want and it will lead to something truly great.

Wish you love and joy,

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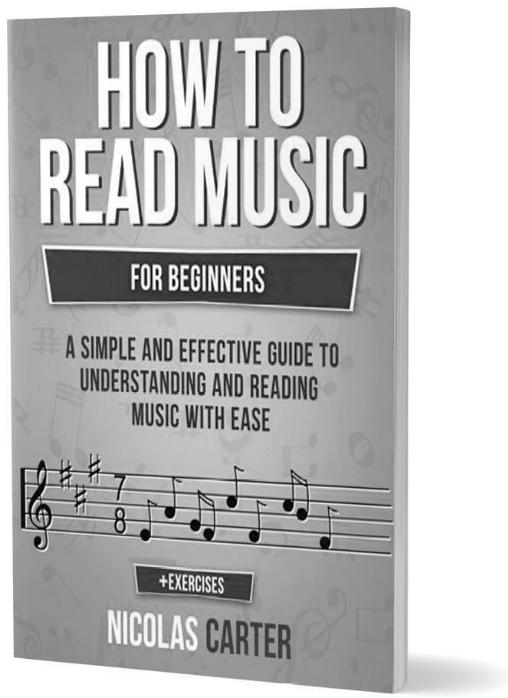

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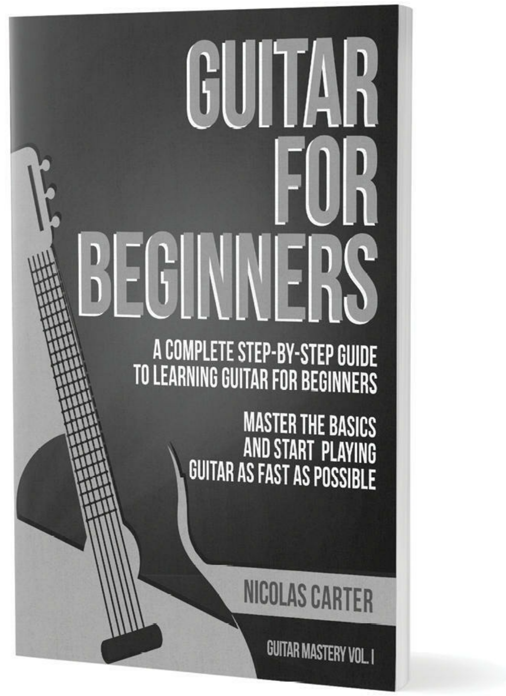

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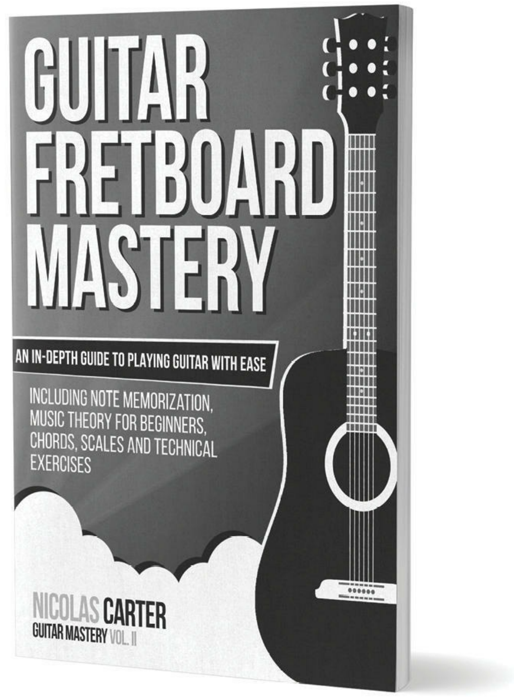

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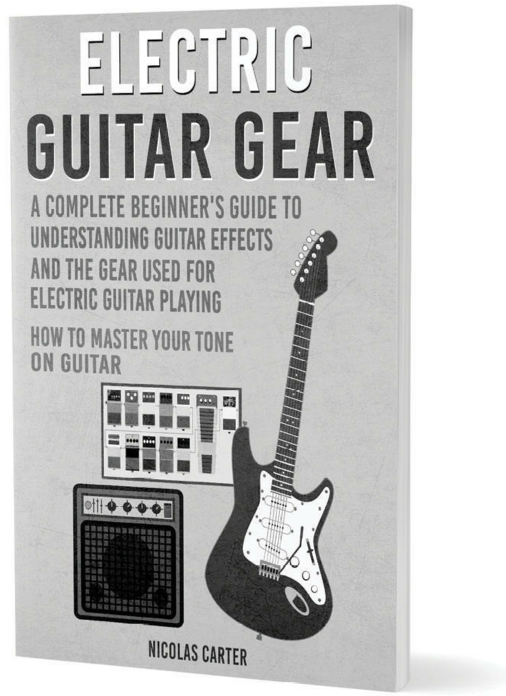

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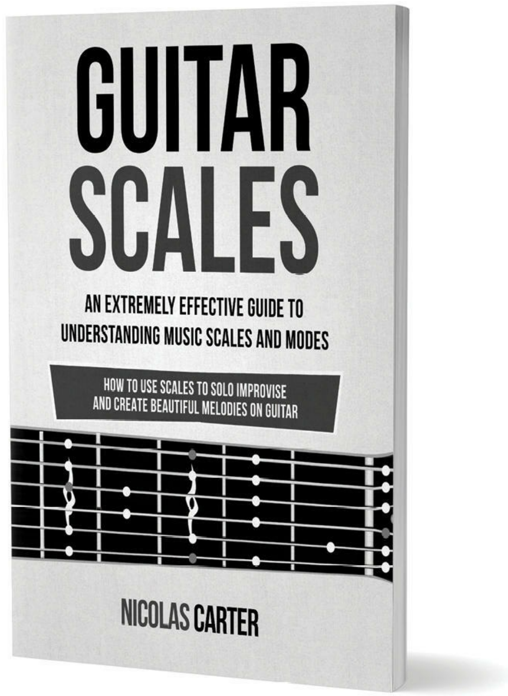

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Cheat Sheet

Major Scale in All Keys

KEY	T	T	S	T	T	T	S
1	2	3	4	5	6	7	8
C	D	E	F	G	A	B	C
G	A	B	C	D	E	F#	G
D	E	F#	G	A	B	C#	D
A	B	C#	D	E	F#	G#	A
E	F#	G#	A	B	C#	D#	E
B	C#	D#	E	F#	G#	A#	B
F	G	A	Bb	C	D	E	F
Bb	C	D	Eb	F	G	A	Bb
Eb	F	G	Ab	Bb	C	D	Eb
Ab	Bb	C	Db	Eb	F	G	Ab
Db	Eb	F	Gb	Ab	Bb	C	Db
Gb	Ab	Bb	Cb	Db	Eb	F	Gb
C#	D#	E#	F#	G#	A#	B#	C#
G#	A#	B#	C#	D#	E#	F##	G#
D#	E#	F##	G#	A#	B#	C##	D#
A#	B#	C##	D#	E#	F##	G##	A#
F#	G#	A#	B	C#	D#	E#	F#

Master the Intervals

E -> C (ascending) — minor 6th

E -> C (descending) — Major 3rd

D -> A# (ascending) — minor 6th

D -> Bb (descending) — Major 3rd

Gb -> Ab — minor 7th

PMS Exercise

1. G Dorian – PMS is F Major
2. F# Mixolydian – PMS is B Major
3. E Phrygian – PMS is C Major
4. A# Aeolian – PMS is C# Major
5. G Lydian – PMS is D Major
6. D Locrian – PMS is Eb Major
7. B Ionian – PMS is B Major
8. Db Mixolydian – PMS is Gb Major

4-Bar Sequence Exercise 1

Bar 1

1 and 2 e and (a) 3 e and (a) 4 e (and) a ;

8th – 8th – **16th** – 16th – 8th – **16th** – 16th – 8th – **16th** – 8th – 16th

Notes that fall on each beat (1 2 3 4) are bolded.

Bar 2

1 and 2 e and a 3 e and (a) 4 (e) and a ;

8th – 8th – **16th** – 16th – 16th – 16th – **16th** – 16th – 8th – **8th** – 16th – 16th ;

Bar 3

1 trip let 2 trip let 3 e and (a) 4 (e) and a ;

8th Triplets – **8th Triplets** – **16th** – 16th – 8th – **8th** – 16th – 16th ;

Bar 4

1 e and (a) 2 (e) and a 3 e (and) (a) 4 e (and) (a) ;

16th – 16th – 8th – **8th** – 16th – 16th – **16th** – 8th – **16th** – 8th ;

4-Bar Sequence Exercise 2

Bar 1

|1| |e| |and| a |2| |e| and a |3| trip let |4| |e| and a ;

8th rest – 16th – **8th rest** – 16th – 16th – **8th sync. triplets** – **8th rest** – 16th – 16th;

Bar 2

|1| and |2| e and a |3| e and (a) |4| |e| and a ;

8th rest – 8th – **16th rest** – 16th – 16th – 16th – **16th rest** – 16th – 8th – **8th rest** – 16th – 16th;

Bar 3

|1| trip let |2| trip let |3| e and (a) |4| |e| and a ;

8th sync. triplets – **8th sync. triplets** – **16th rest** – 16th – 8th – **8th rest** – 16th – 16th;

Bar 4

|1| e and (a) |2| |e| and a |3| |e| and (a) |4| e (and) (a) ;

16th rest – 16th – 8th – **8th rest** – 16th – 16th – **8th rest** – 8th – **16th rest** – 8th