Music Notation and Theory for Intelligent Beginners

by

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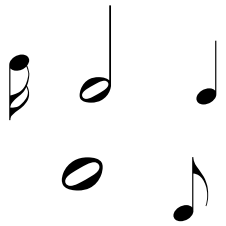
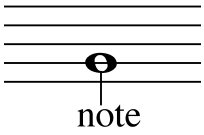
NOTES



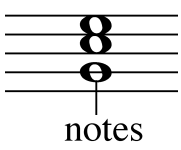
Some free-standing notes

One of the most basic elements in music is the **note.**

In written music, it might look like this:



Or this (if there are more than one):



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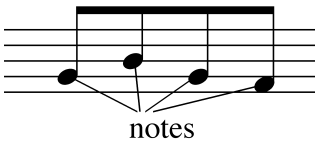
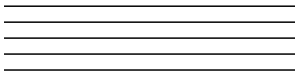


THE STAFF

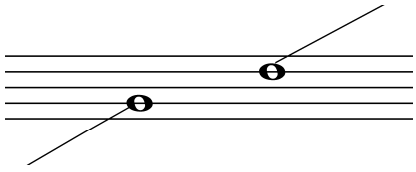
The five horizontal lines on which the notes sit are called a **staff.**

a staff with no notes on it



Each line or space on the staff is for its own note.

Notes represent sounds called **pitches.** Because music employs a set of pitches (ranging from low to high), the staff acts like a map for the notes--allowing us to hear, read or write them as:



Higher
(higher on the staff)

Lower
(lower on the staff)

We read the sequence of notes from left to right.

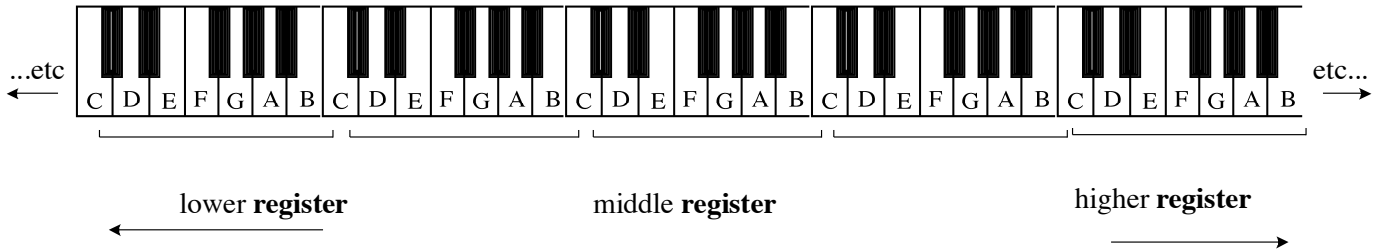
Another way to understand the idea of pitches being lower or higher is to compare it to bears and birds. A bear's voice is low-pitched, while the voice of a bird's is high (this explanation works well for children!). A less musically specific term for pitch is **frequency,** which is also referred to as low or high.

THE KEYBOARD

In Western music, pitches and notes are specific and have specific names. We use the first seven letters of our alphabet: **A** through **G**.

To see these notes in connection with a music making device, let's look at a standard keyboard:

A modern keyboard has a total of 88 keys (black and white combined) as opposed to the 60 in this illustration



each white key is a different note

Register refers to high or low pitch *range* and is more often a relative term.

Since there are obviously more than seven pitches on the keyboard, the **A** to **G** series repeats itself many times. Above we have **C** to **C** in brackets for reasons that will soon be obvious.

You will notice that the pattern made by the white and black keys also repeats with the series.

Because there are also more than seven combined lines and spaces on a staff, we can begin to see how a staff, or two staffs, could accommodate all these notes.

⟶ *N.B. in these examples we will see how music notation connects with the keyboard. It should be understood that this notation works with all instruments.*

CLEFS

The **clef,** a symbol that sits at the leftmost side of the staff, specifies which lines and spaces belong to which notes. In a sense, the clef calibrates or orients the staff to specific notes.

The three most common clefs are:

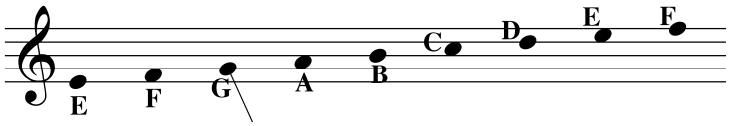
The **Treble** clef for high range notes 

The **Bass** clef for low range notes 

The **Alto** clef for middle range notes 

The Treble clef (also called the **G Clef** because it looks like a calligraphic "**G**") works as follows:

Notice that the curl of the clef circles the line that will be the note G (the 2nd line from the bottom).

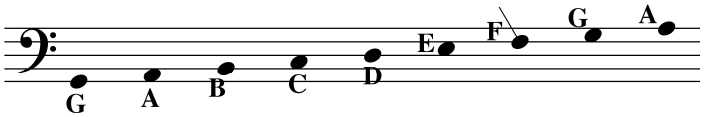


The G note on the G line

The Bass clef (also called the **F Clef** because it looks like an "**F**") works as follows:

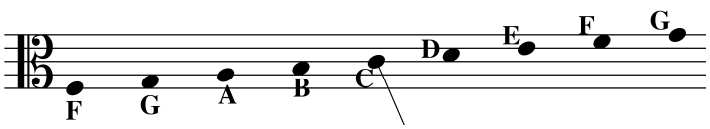
The two dots surround the line that will be the note F (the 4th line).

The F note on the F line



The Alto clef (also called the **C Clef**):

The two curls pinch the C line (the 3rd line).

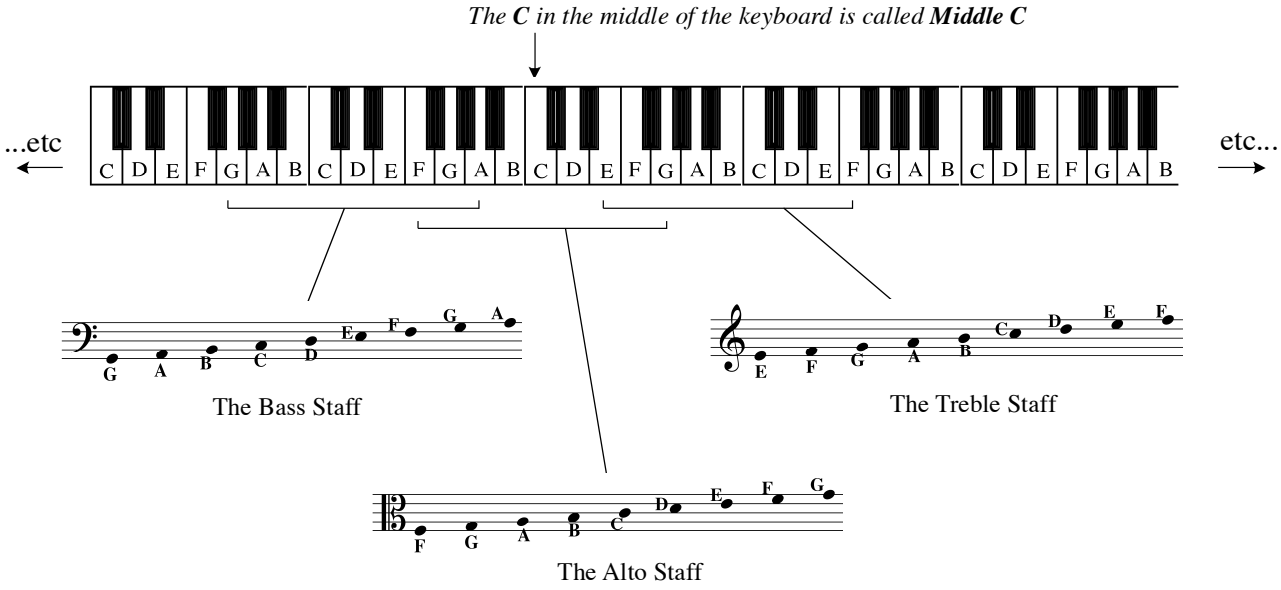


The C note on the C line

*Although it is important to know about the **Alto Clef**, we will spend more time talking about and working with the **Treble** and **Bass Clefs**.*

The staff itself is flexible with regard to which notes the lines and spaces represent. But once a clef is put on a staff (and we **always** put one on), the notes become assigned and fixed.

Here is how it works in relation to the keyboard:



The three staffs and the basic ranges they cover as seen on a keyboard

Again, notice that:

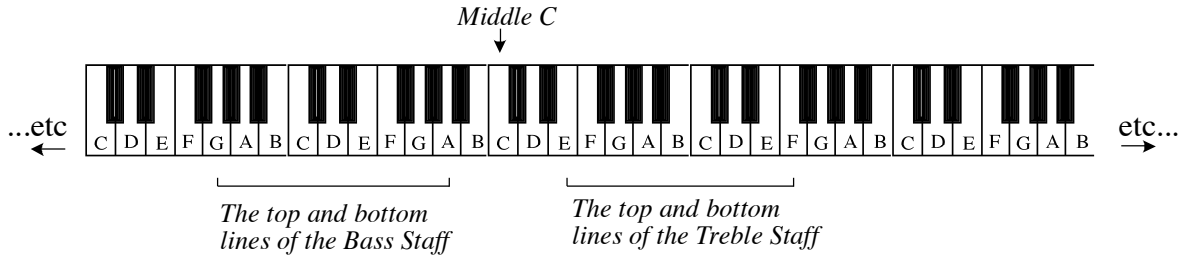
- the notes on the Bass Staff refer to the lower notes (below *Middle C*) on the keyboard
- the notes on the Alto Staff refer to the middle notes (surrounding *Middle C*) on the keyboard
- the notes on the Treble Staff refer to the higher notes (above *Middle C*) on the keyboard

REMEMBER: every instrument uses the staffs and clefs in the same way as the keyboard. Most instruments, however, do not have as wide a range as the keyboard. An instrument like the flute plays relatively higher notes (like the birds in our earlier analogy) so we say it has a "high range". Accordingly, the flute only reads from the treble staffs (and NOT the other staffs) because most of its playable notes fit nicely (in a visual sense) onto the treble staff. In fact, a regular flute cannot go as low as the top line of the bass staff, so the bass staff is useless for a flute player!

Likewise, a low-sounding instrument like the tuba only reads from the bass staff (and let's not forget our bear!). The range of notes on the treble staff are too high for what the tuba can play, so it has no use for the treble staff.

LEDGER LINES

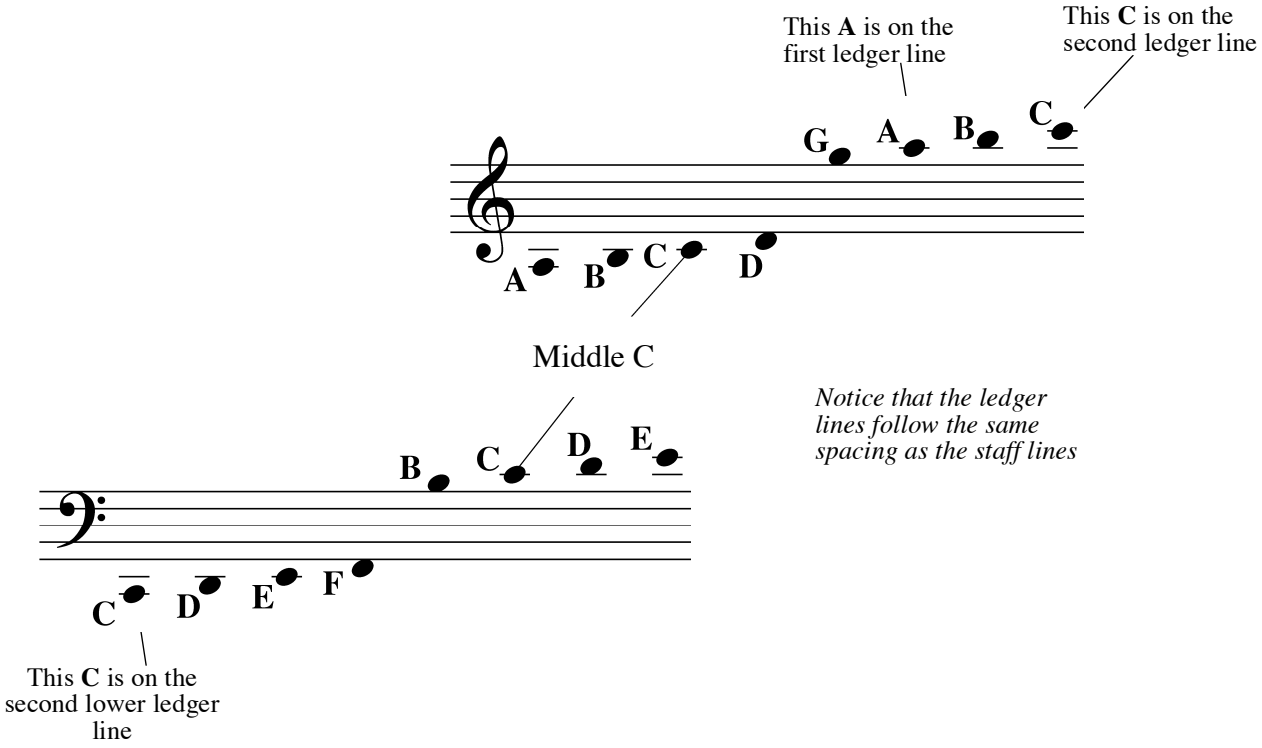
Often we need to write notes that are outside the range of the staff. Remember, the range between the treble and bass staffs is relatively narrow as compared to the possible range of the keyboard's 88 notes:



For situations where we need to go beyond the outer limits of either staff, we use short lines called **Ledger Lines** which are placed above or below that staff. In effect, ledger lines extend the range of the staff(s).

In the diagram below, we see upper and lower ledger lines in both the bass and treble staffs. Note that the first ledger line above the bass staff and the first ledger line below the treble staff represent the same **C** in the same register: **Middle C**.

The upper ledger lines of the bass staff and the lower ledger lines of the treble staff share the same notes. They overlap.

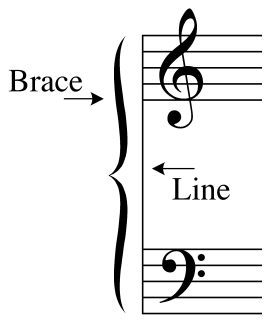


THE GRAND STAFF

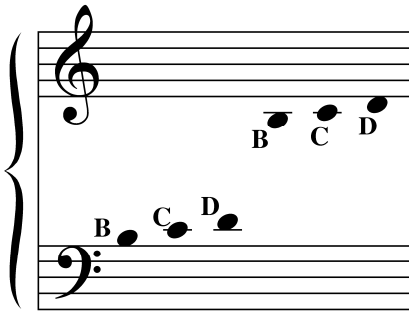
Pianists read from the Grand Staff!

Often it is necessary to use notes that are far above the bass staff or far below the treble staff, such as when we use a wide range insrument like the piano. Rather than use many, many ledger lines on one staff (which can be hard to count), we can combine two staffs at once to cover this wider range.

When we combine the bass and treble staffs into one larger staff, we connect them with a line and a brace on the left-hand side. This new concoction is appropriately called the **Grand Staff**.



The **Grand Staff**, which combines the bass and treble staffs.



These are the exact same notes on each staff!

Here we see how the middle notes overlap so that in certain cases, there would be two ways to write the same exact note on a grand staff.

ACCIDENTALS

C♯ D♯ F♯ G♯ A♯
D♭ E♭ G♭ A♭ B♭

Finally, we will investigate the black notes!

An **accidental** is a symbol that raises or lowers a note. In practice, this usually means raising or lowering a white note to the adjacent black note.

If we raise a note, we use a **sharp** sign: ♯. if we lower a note, we use a **flat** sign: ♭.
To cancel or deactivate a previous sharp or flat, we use a **natural** sign: ♮.

In music notation, the accidental sign is placed to the left of the notehead. When we speak or write about such notes, the words "flat", "sharp", or "natural" go after the note name.

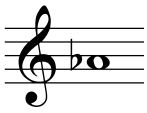
The three accidentals

♯ **Sharp**

♭ **Flat**

♮ **Natural**

A flat = A♭ =



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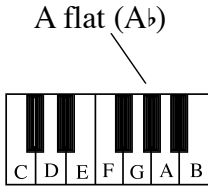
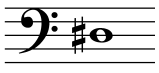


D sharp = D♯ =



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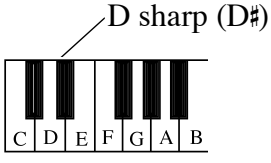
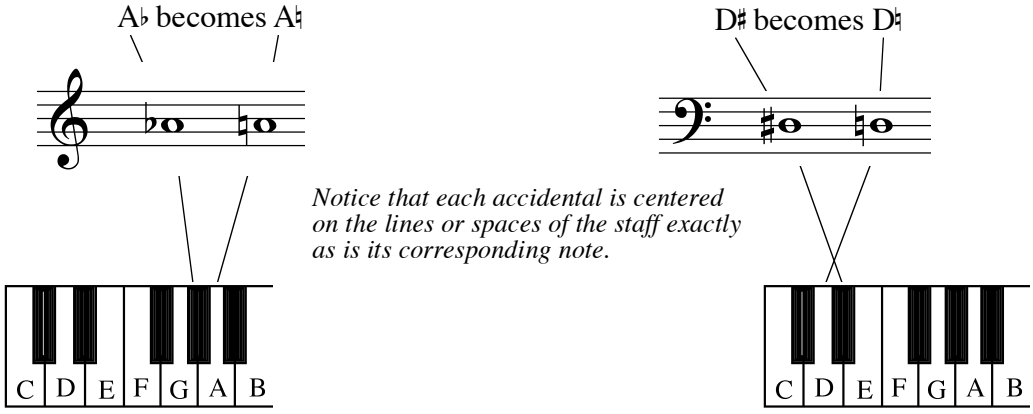


ACCIDENTALS continued

The Natural sign

To cancel an accidental with the natural sign:

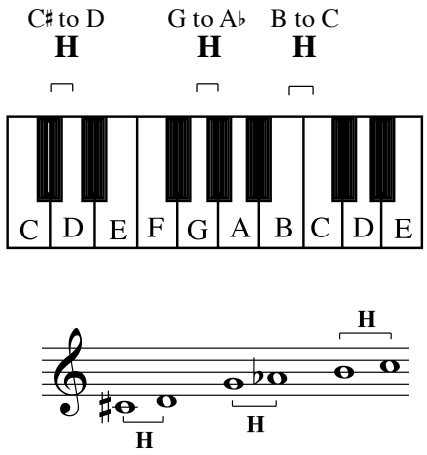


Notice that each accidental is centered on the lines or spaces of the staff exactly as is its corresponding note.

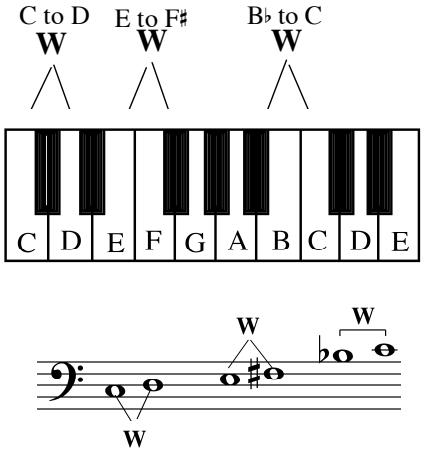
To put it another way, the natural sign changes the note in the opposite direction to that of the previous accidental. A natural raises a note that had been previously flat, or lowers a note that had been previously sharp.

SIMPLE INTERVALS: half step, whole step

An **interval** is a way of describing the distance between two notes. On the keyboard, it is the distance between two keys. While there are many ways to determine and label intervals, we will focus on the most basic elements: the **Half Step** (**H**) and the **Whole Step** (**W**).



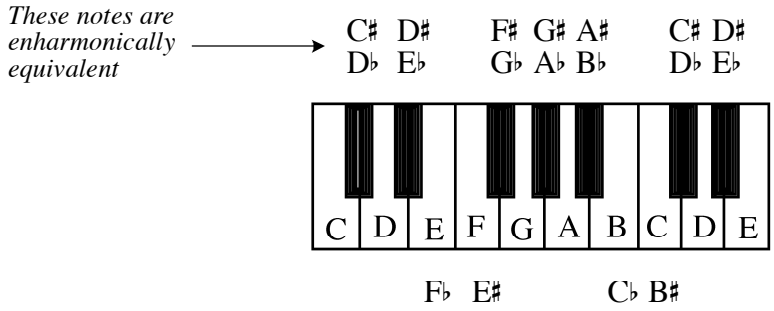
The distance from any key to the next on the keyboard, above or below, is a **half step**. This goes for white to black, black to white, and in two cases, white to white.



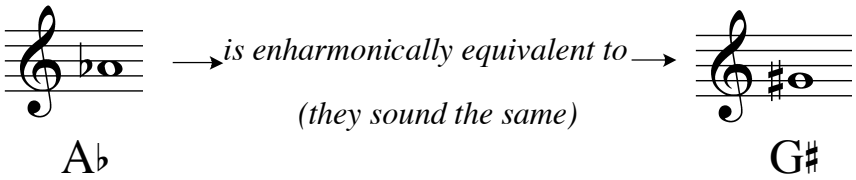
The distance from any key to the second key above or below is a whole step.

ENHARMONIC EQUIVALENCE

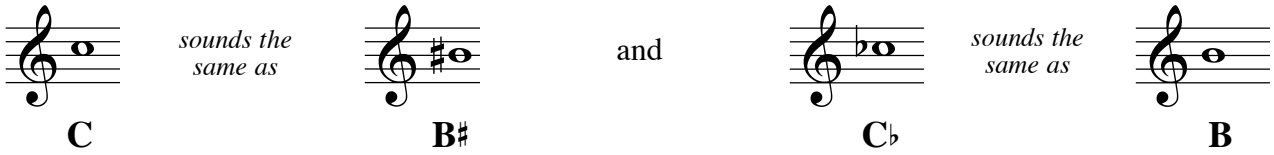
Combining our knowledge of half and whole steps with our knowledge of accidentals, we encounter a new idea: **Enharmonic Notes**:



The note a half step above **G** is **G♯**. But that black note is also a half step below **A**, so it is also **A♭**. Therefore, it is possible (and often) that one note can be referred to by two different names. Context will often be the determinating factor as to which is the more appropriate name. So **A♭** and **G♯** are **enharmonic** notes. We can also say that they are **enharmonically equivalent**: **A♭** is harmonically equivalent to **G♯**. To put it simply: THEY SOUND THE SAME.



Another enharmonic possibility on the keyboard is that we can apply an accidental to <u>any</u> note. So, strange as it seems, the note above **E** (normally called **F**) could also be **E sharp** (**E♯**). And the note below **F** (normally **E**) could also be called **F flat** (**F♭**). Similarly, this applies to the notes **B** and **C**, where **C** can be enharmonically named **B sharp** (**B♯**), and **B** can be enharmonically named **C flat** (**C♭**).

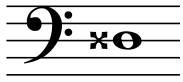


At first glance, it seems more complicated to have more than one note name for the same sounding pitch, but there will be situations where it will seem more logical to have a **B** sharp rather than a **C** natural.

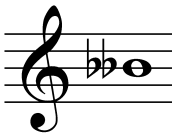
DOUBLE ACCIDENTALS

double sharp 𝄪 *double flat* 𝄫

To make matters even more complicated, it is also possible to have **double accidentals**. A double accidental raises or lowers a pitch by two half steps (or one step). A double flat looks like this: 𝄫 while a double sharp looks like this: 𝄪.

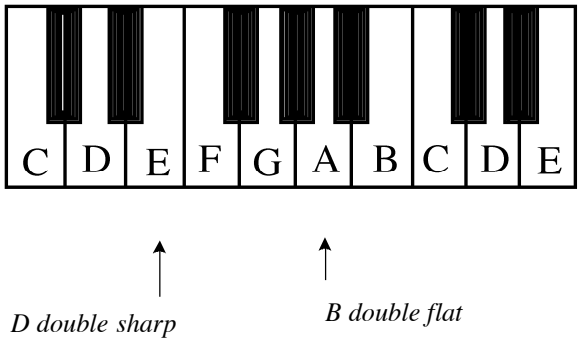


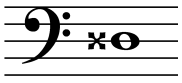
D double sharp



B double flat

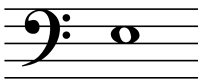
In terms of enharmonic equivalency, **D** double sharp is played and sounds like **E**.
B double flat is played and sounds like **A**.





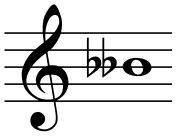
D double sharp

sounds the same as



E natural

and



B double flat

sounds the same as

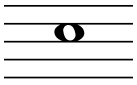
A natural

NOTE VALUES

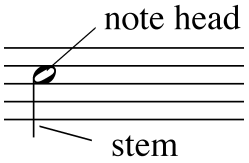
Since not all notes sound for the same length of time (some notes sound short or fast while others sound long and slow), we use **note values** to indicate the duration of a note.

Note values are expressed as relative lengths to one and other by a factor of two:

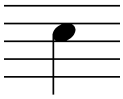
*A **whole note** is written as an open oval*



*A **half note** is an open oval with a stem attached to one side of it*



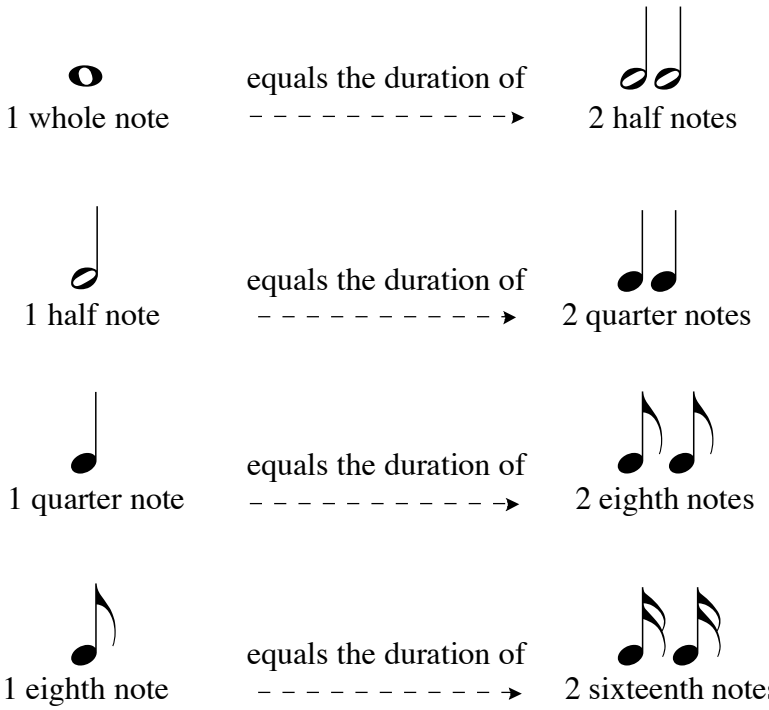
*A **quarter note** is a closed oval with a stem*



*An **eighth note** is a closed oval with a stem and a flag*

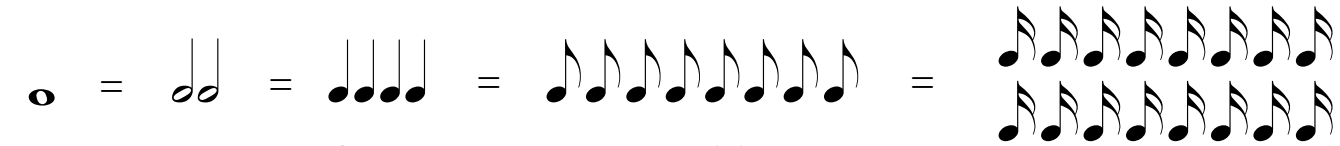
***Sixteenth notes** have two flags*

As their fraction-like names imply, the relative values (relative durations) of the notes are:



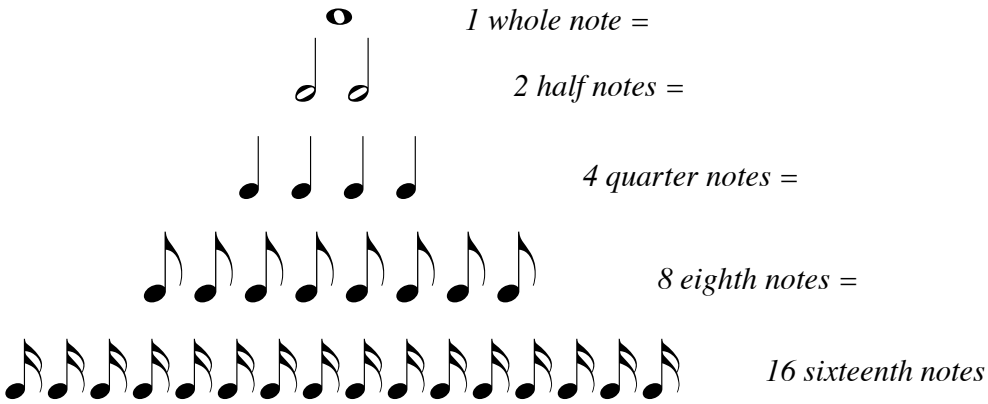
NOTE VALUES Contiued

Likewise:



Whole *Half* *Quarter* *Eighth* *Sixteenth*

Or



1 whole note =

2 half notes =

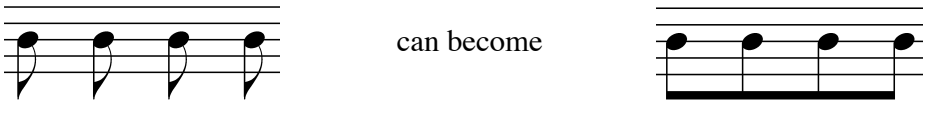
4 quarter notes =

8 eighth notes =

16 sixteenth notes

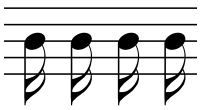
BEAMING

With eighth notes and sixteenth notes (and other small values that we will discuss later), two or more stems can be conveniently **beamed** together. This is a visually comfortable alternative to writing multiple flags. We just replace the flag(s) with a beam(s) at the end of the stems.

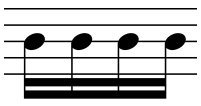


can become

The beamed stems can help represent a feeling of connectedness



can become

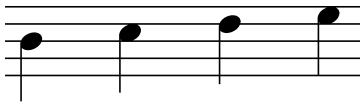


As usual, different contexts will dictate a better choice between these two possibilities.

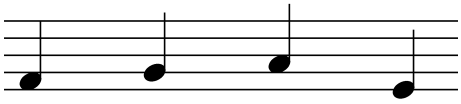
STEM DIRECTION

Now that we know what stems are and what they do, let's look at how we must draw them.

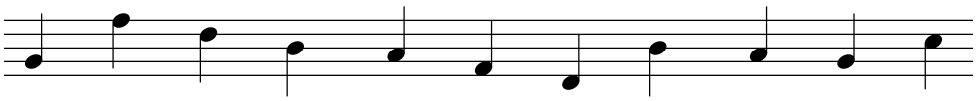
Stems extend downward and are on the left side of the note head when the note is on or above the third line of any staff.



Stems extend upward and are on the right side of the note head when the note is below the third line of any staff.

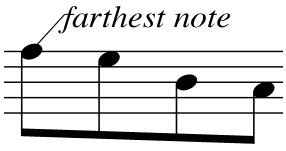


In order to see them in a more real context, here is a random mix of of up and down stems.

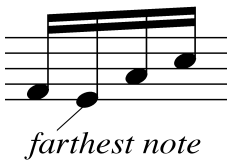


notice that the third line notes have their stems pointing downward

However, when notes are beamed together, such as with eighth and sixteenth notes, we consider all the notes joined by a given beam to act as one note. The note that is farthest from the middle line determines the overall stem direction.

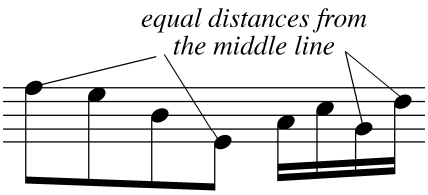


It is as if this "note" were above the middle line



Because the lowest note is below the middle line, the stems point up

And when the outermost notes are equidistant from the middle line, it is as if the "note" were on the middle line so the stems point downward.

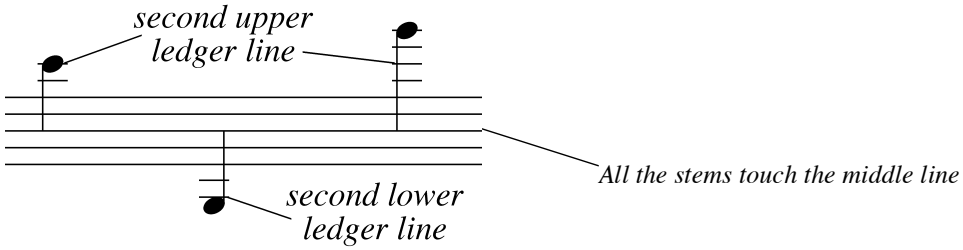


STEM LENGTH

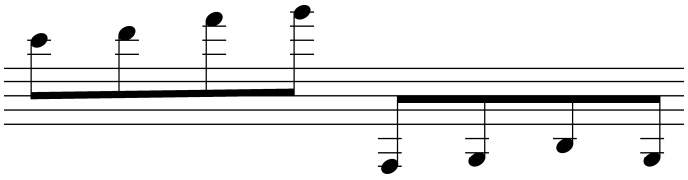
Here is another situation where we have to be sticklers about the rules. The length of the stem must be exactly long enough to reach up or down to the next line or space that represents the same note. For those of you who know the term, the stem must be an **octave** long.

BUT...

Once a note is on or above the second upper ledger line, or on or below the second lower ledger line, the stem must reach all the way to the middle line (making it longer than usual).



The same idea applies to beamed notes. We just need to make sure that the beam is thick enough so that it does not get confused with (or obscured by) the staff line.



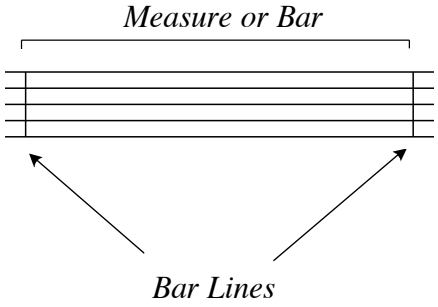
There is no way to get these thick beams confused with the staff line!

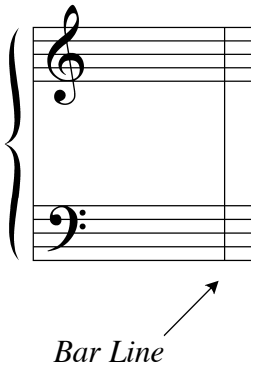
When multiple notes are beamed together, the stems should be *at least* an octave long (meaning that some of the stems *may* be longer). Not every scenario or combination of notes will be explored here. These are only some of the most basic stem direction examples.

MEASURE, BAR LINE

Music, and the music staff is usually divided into equal parts by vertical lines called **Bar Lines**. By equal, we mean equal in length of time. The space created by two bar lines is called either a **Measure** or a **Bar**. In jazz, classical, or rock music, either term is acceptable and interchangeable.

Bar lines go all the way through the staff. On the grand staff, the bar lines go through the *entire* staff.

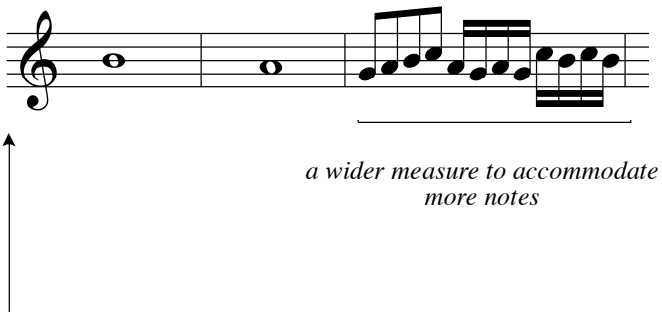




Notice that the bar line runs all the way through on the grand staff

(when we hear about a "12-bar blues" for example, it means that the song is 12 measures long, and then it repeats those 12 measures as many times as necessary)

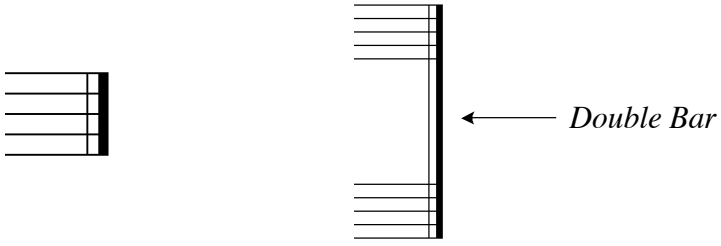
The distance between bar lines may vary depending on the number of notes:



Notice that the sums of the note values are the same in each measure. This reinforces the notion that each bar "measures" the same amount of time equally, regardless of how wide it is. Within each measure is an equal number of **beats**.

There is never a bar line at the beginning of a single staff (unlike the grand staff, which has the line).

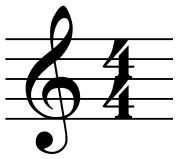
When a piece of music ends (or when a movement ends), the final bar line is a **Double Bar**: a thin line followed by a thicker line.



TIME SIGNATURE

Like a clef, a **Time Signature** goes at the left side of the staff, but to the right of the clef. It consists of two numbers arranged vertically.

A clef calibrates the notes on a staff. The **time signature** calibrates the beats in each measure.

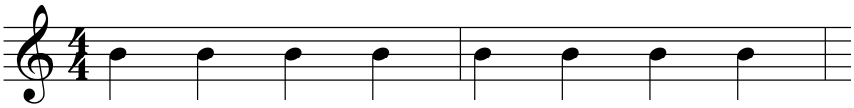


Unlike this clef, the time signature does not extend beyond the top and bottom lines of the staff

4 The upper number indicates how many **beats** (or **counts**, or **pulses**) are in each measure.

4 The lower number indicates which type of note value counts for one beat.

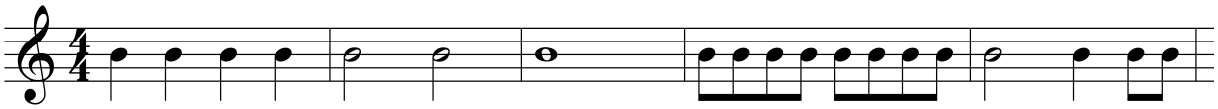
Four "beats" in each measure



In $\frac{4}{4}$ time, the quarter note (as in 1/4th) counts for one beat (we say "gets" the beat) and there are four beats per measure.

...again, 4 beats in the measure

The values could be mixed!

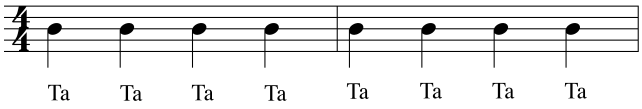


But two half notes equal four quarter notes, so two half notes could fit into a $\frac{4}{4}$ measure

One whole note fits into a "whole" $\frac{4}{4}$ measure because it is just as long as four quarter notes

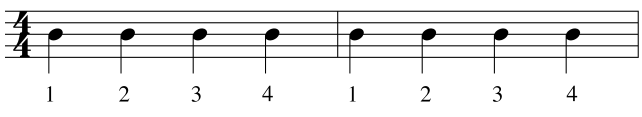
The same goes for eighth notes because <u>eight</u> fit into a $\frac{4}{4}$ measure

If we were to vocalize this idea, we could attach a "Ta" to each beat (quarter note) and "sing":



The attack of each "Ta" is perfectly even, like the even ticking of a clock.

...or we could use numbers (EVENLY!):

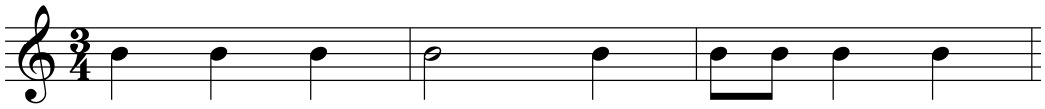


Notice that we start counting over when we cross the bar line.

TIME SIGNATURES Continued

The same time signature concept applies to other situations:

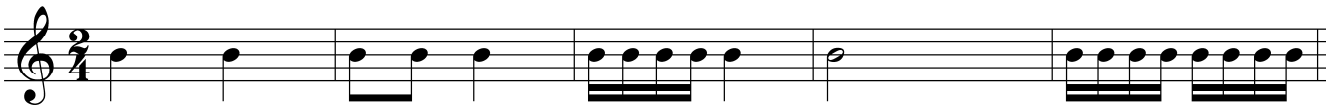
If we have a $\frac{3}{4}$ time signature, it means that there are three quarter notes per measure and that the quarter note gets the beat.



Three bars of $\frac{3}{4}$. The note values add up to three quarter notes in each bar.

(a whole note 𝅝 is too big to fit into a $\frac{3}{4}$ measure!)

If we have a $\frac{2}{4}$ time signature, there are two quarter notes per measure and the quarter note gets the beat.

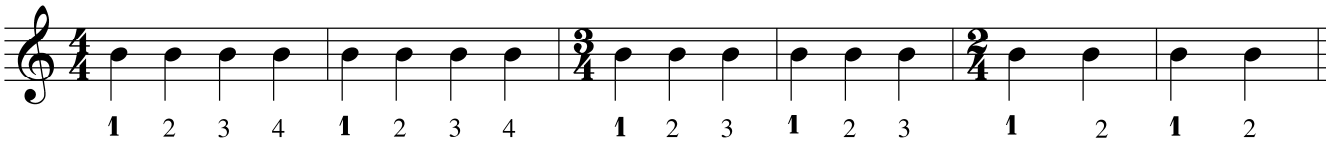


A mixture of notes values in $\frac{2}{4}$ time. Again, notice that the note values in each measure always add up to two quarter notes, even the 8 sixteenths at the far right.

While we will limit our discussion for the moment to the $\frac{4}{4}$, $\frac{3}{4}$ & $\frac{2}{4}$ time signatures, many time signatures are possible. Just remember that the bottom number symbolizes a note value, which is either 1, or a multiple of two (1, 2, 4, 8, 16, 32, 64). We rarely get to 64th notes, but they are theoretically possible. As far as the top number is concerned, it could be any odd or even number.

BEAT EMPHASIS

In classical music, the first beat of the measure in any time signature usually receives more emphasis than the other beats in the measure. We often use the word **Accented** to refer to something being emphasized.



The first beat of each measure is slightly accented

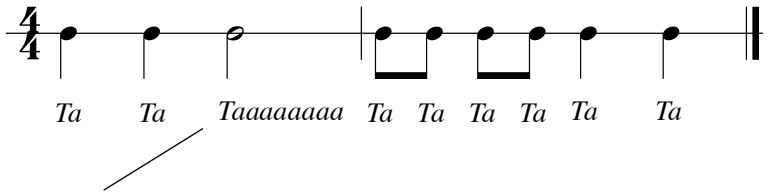
Hence the reason for different time signatures! Each time signature has its own rhthmic characteristic and feel. The relationship between the more and less emphasized beats (often called **strong** and **weak**) will vary depending on the time signature. Above, the strong (or accented) **1** is separated by a different number of weak beats according to the time signature.

PUTTING NOTES INTO PRACTICE

As we begin to apply notes and time signatures to performance practice, there are a few standard labels and methods with which to familiarize ourselves.

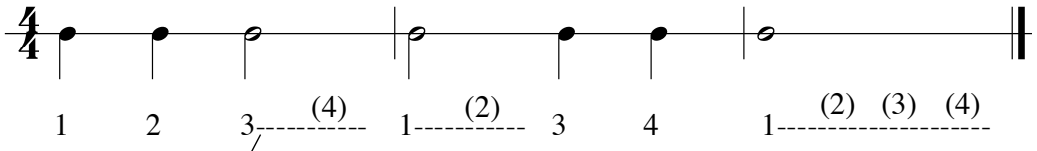
As seen earlier, we can sing rhythms by either the "Ta" methods or the counting method. Both approaches are useful, so it is recommended that all rhythm exercises be practiced <u>both</u> ways.

When we *Ta*, we reiterate the *Ta* for each new note value and we hold the *Ta* for the duration of the value:



The *Ta* is held for the full count of a half note (two beats)

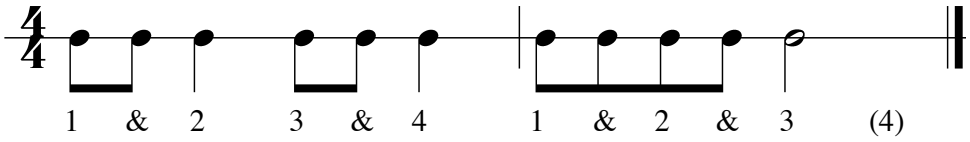
When we count, we only pronounce the number that corresponds to the note we attack:



The "threeee" holds for the full length of two quarter notes

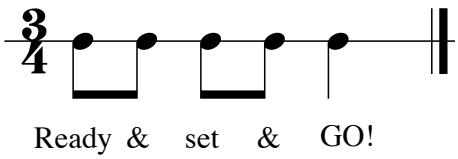
COUNTING EIGHTH NOTES

When an eighth note falls on the second half of a quarter beat (since there are *two* eighths per quarter), we say "**and**" ("**&**"):



We say that the second eighth (the "&") is the "**upbeat**" or the "**off beat**" because it sounds opposite the actual beat (or pulse) of the measure. To that end, the first eighth could be called the "**downbeat**" because it coincides with the pulse of the quarter note (which is also on the downbeat).

If we liken this to what happens at the start of a race, "ready and set and go!", *ready*, *set*, and *go* are the pulses (downbeats) of the phrase and the *and*s are the upbeats.

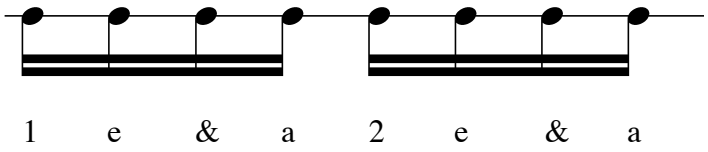


In fact, that phrase is purposely said in a steady and even rhythm so that the *GO* will predictably land on the third beat; allowing for everyone to start at the same time.

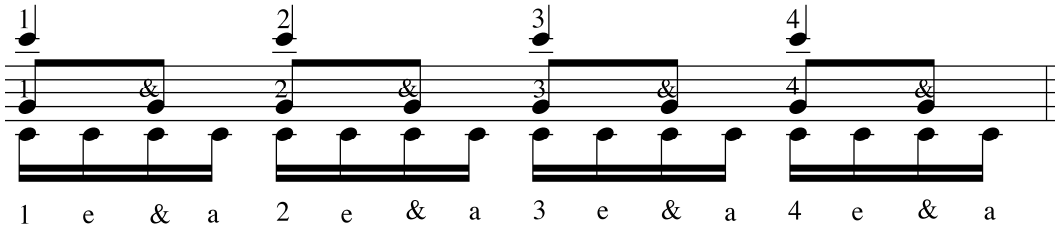
COUNTING SIXTEENTH NOTES

Sixteenth note counting follows the same principle as eighth note counting.

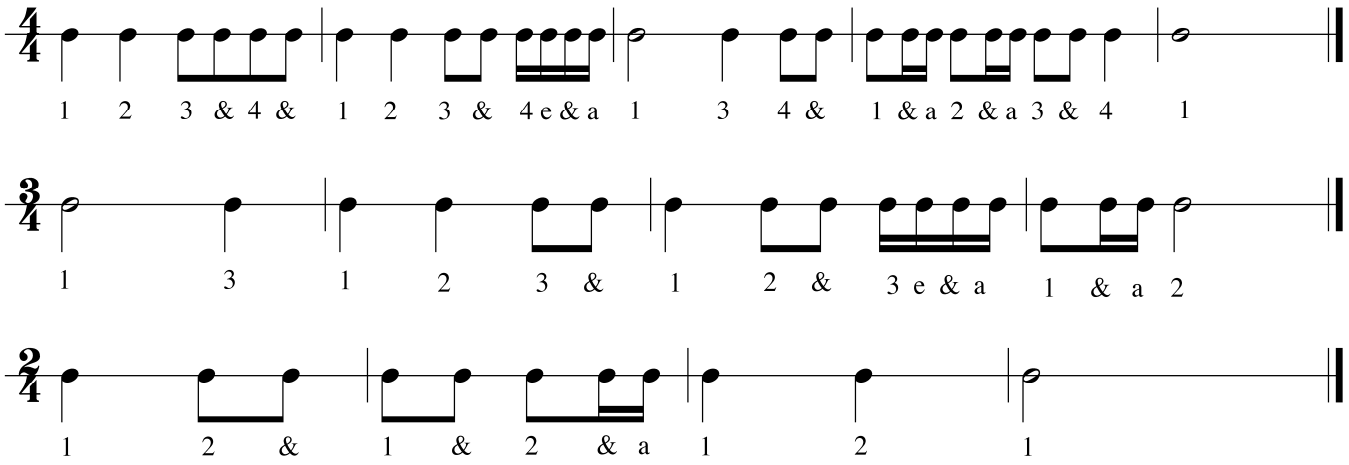
Because there are four sixteenth notes for every quarter note, (and two per every eighth), we need some more sounds to make the counting work: "*e*" and "*a*".



In relation to the quarter and eighth pulses, we can chart out a comparison:



Now that we have all the necessary components to perform basic note values in our three time sigantures, here are some examples illustrating the counting method:



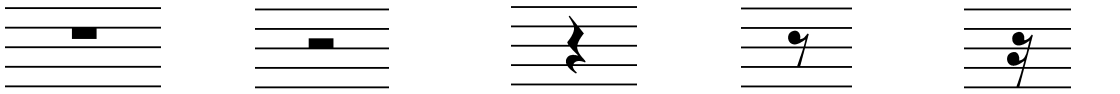
RESTS

Music is not music without silence. Spaces of silence in music are as important as pauses in speech and periods after sentences. And if not for any aesthetic reason, one of the most basic and ancient instruments (the voice) needs silences and rests to allow for the fundamental act of breathing.

Like note values, in fact, *exactly* like note values, there are rest values. We simply call them **rests**. We rest from playing, but NOT from counting. To put it another way, rests count the beats of silence.

Here they are:

Note the placement of each rest as it relates to the third space of the staff



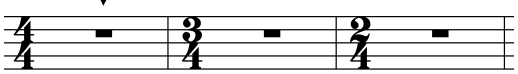
Whole Rest Half Rest Quarter Rest Eighth Rest Sixteenth Rest

There is an exception regarding the whole rest. In $\frac{4}{4}$ time, it represents a whole measure of rest (four beats). But the whole rest also represents a whole measure of rest in $\frac{3}{4}$ time (three beats) and $\frac{2}{4}$ time (two beats).

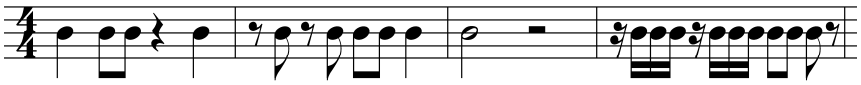
This exception is not exactly logical since it does correspond with its note values counterparts, but it is convenient and economical in that one symbol can accommodate more than one time signature.

This rule means that we do not use a two-beat half rest in $\frac{2}{4}$ time, nor do we use a three-beat combination of a half and a quarter rest in $\frac{3}{4}$ time to represent a whole measures of rest.

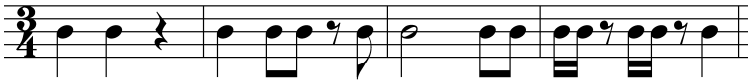
With the exception of the space that the time signature takes up, a whole rest is placed in the middle of the measure.



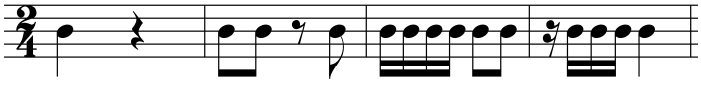
The whole rest represents a full measure of rest in any time signature, so the number of beats it represents changes according to the time signature



Here are some examples of rests and notes in action.



Do not try to sing or tap out these rhythms, they are too complicated. But take a moment to observe that the combination of rests and notes in each measure always adds up to a whole measure's worth of beats.



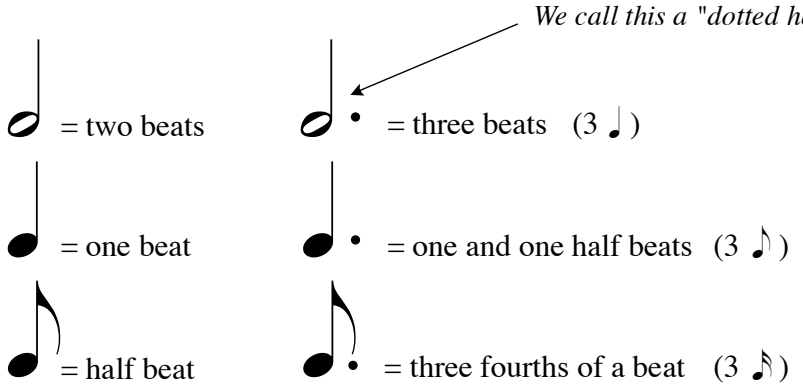
Also, notice that the largest possible rest value is always used (a quarter instead of two eighths, or a half instead of two quarters).

THE AUGMENTATION DOT

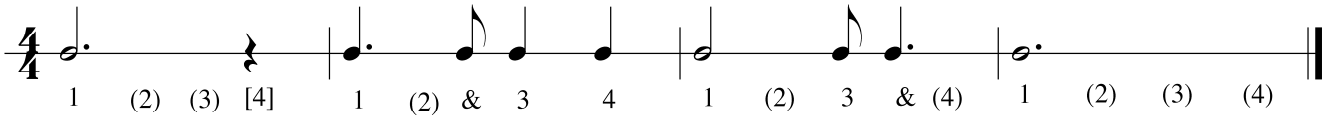
Once we have obtained a grasp of rests and note values, it will be easier to understand that some very basic durations are not notatable (yet!). For example, how would we notate a pitch for three beats in $\frac{4}{4}$ time, or in $\frac{3}{4}$ time for that matter? The factor-of-two relationships between note values leaves out odd numbers (except, of course, 1) and many even numbers of note values.

But when an **Augmentation dot** is placed after a note (of any note value), it *increases* (augments) the note's duration by half of the original value.

Examples:

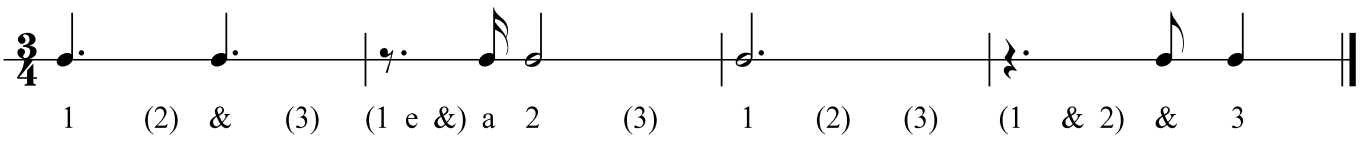


The dot functions the same for rests, *increasing* a rest's value by one half of the original value.



Oops! You can't have six beats in a $\frac{4}{4}$ measure!

Take the time to count the total values of notes and rests in each measure



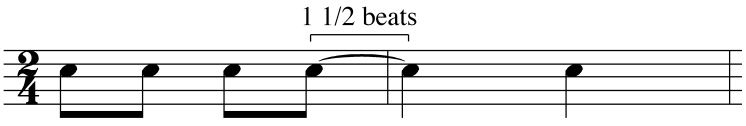
TIES

There is still one missing element in our note value scheme. Remember in the dot section there was an errant example of a dotted whole note in $\frac{4}{4}$ time? Since such a value (six beats) is not possible in a $\frac{4}{4}$ measure, how could we write a note that we wanted to sound for the duration of six beats?

A good answer (but not the right one for this section) would be to change the time signature to $\frac{6}{4}$ (but let's talk about that later). What we can also do is **tie** a note across the bar line.

Ta----------

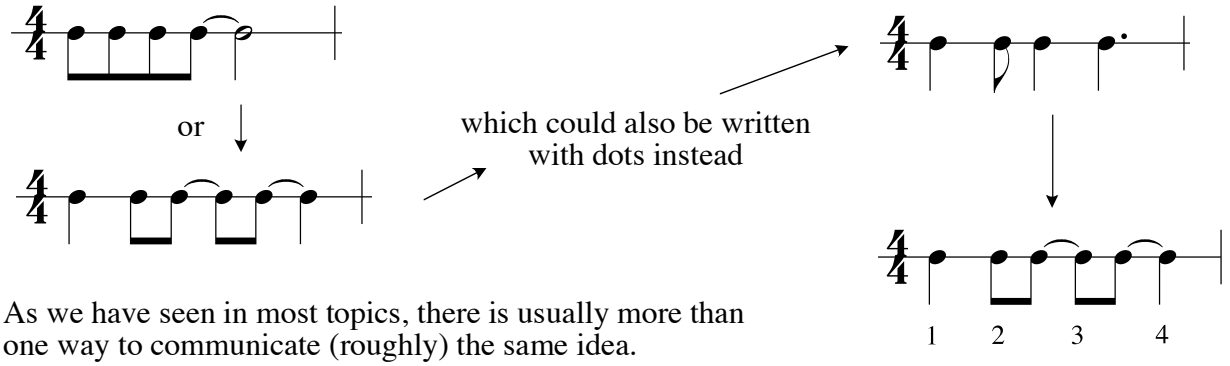
= a six beat duration: four in the first measure plus two in the second measure



Ta Ta Ta Ta---------- Ta

A tie only goes from note head to note head of the same note. The arc of the tie is always opposite the direction of the stem. Like above, if the stem points up (or if the stem *would* point up if the note were to have a tie), the arc of the tie is down, etc.

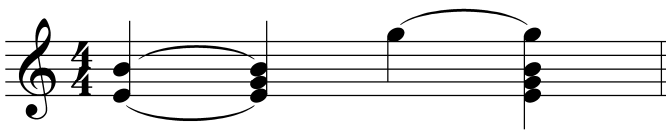
You will also encounter ties within a single measure. With single notes in the measure, it is less likely to occur, but it can happen when the "&" part of the beat begins the tie.



This way is more clear about showing where the qarter notes are, even if the attack doesn't fall on the pulse of the quarter note

As we have seen in most topics, there is usually more than one way to communicate (roughly) the same idea.

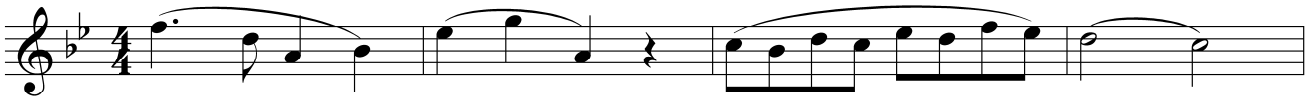
And in more complicated textures, we will see ties used within a single measure like so:



SLURS

A symbol that looks almost exactly like a tie is the **slur**. A slur tells us to connect two or more different notes as smoothly as possible. There should be no break or gap between any pitches under a slur. Of course, we can imagine what it sounds like when someone is *slurringhisorherwords* as opposed to when *each - word - is - pronounced - seperately*.

Notice that these notes are NOT tied since they are not the same notes



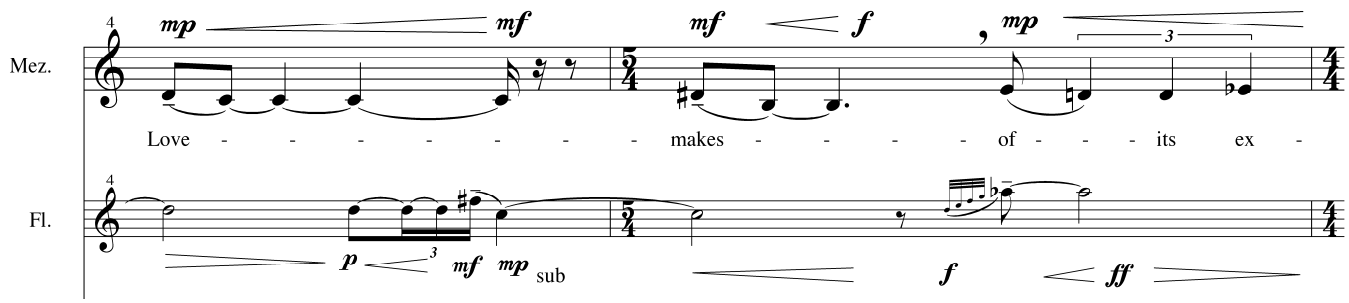
*The term for slurred playing is **Legato**, which is Italian for "smooth"*

Logically, the slur symbol has a particular instructive meaning for different instruments. For wind and brass instruments that get their sound from blown air, the symbol means to play the notes under the slur with a single breath. At the point where the slur ends, the flow of air will be broken and time permitting, the player might inhale. Such would be the case during the quarter beat rest in the above example, while the other slur breaks would probably be played with just a slight break in the air flow.

For string instruments that are bowed, the notes under the slur would all be played by one bow stroke. A new slur indicates that the bow stroke starts over and/or changes direction.

A pianist would allow for a contrast of connectedness and disconnectedness at the points where the slurs start over. A singer would probably approach the passage much like a wind or brass player for obvious reasons.

While not all the symbols are known to you in the excerpt below, the voice and flute ("Mez." and "Fl.") have notes that are both slurred and tied. The words "love" and "makes" are both initially slurred, then tied. The word "of" is just slurred. The flute also has a combination of ties and slurrs.

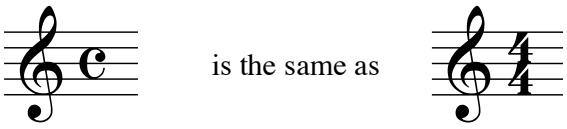


-from Kornfeld: *Love Expectancies*

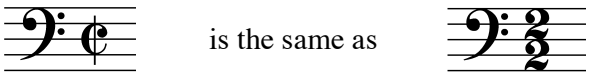
OTHER TIME SIGNATURES

Aside from the numbered system we use for indicating time signatures, there are two other symbols we encounter that represent time signatures:

In place of a $\frac{4}{4}$ time signature, we sometimes use a large **C** , which stands for **Common Time**.

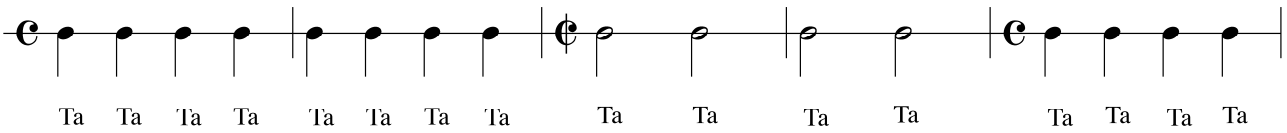


The reason for this substitute symbol is that in a piece, the speed of the pulse might momentarily double. To indicate this change, the **Cut Time** symbol ¢ would be used. Cut time, also called **Alla Breve** stands for $\frac{2}{2}$ (two beats per measure) time where the half note gets the beat.

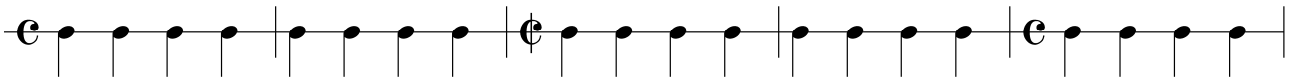


In context, when the time signature switched from **C** to ¢ , the actual speed of the pulse would not change; the speed of the note values would, however. So in cut time, which has the beat on the <u>half</u> note, a quarter note would be twice as fast as compared to $\frac{4}{4}$ time.

As confusing as it is, let's work through the example below:



Even though this example switches to cut time, the half notes are just as fast (and <u>not</u> twice as long) as the quarter notes in common time. In other words, the *tas* all happen at the exact same speed–as if the two measures of ¢ time were one measure of **C** time with quarter notes instead of half notes. In effect, everything sounds the same.

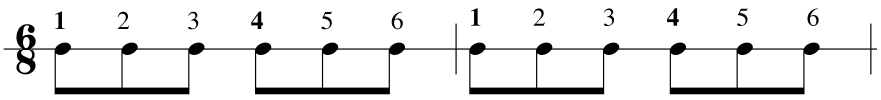


In this example, the quarter notes in the ¢ measures are twice as fast as the **C** quarter notes. They would sound like eighth notes in $\frac{4}{4}$ time.

The logic behind this system relates to an historical style that often sped up or slowed down its pulses by a factor of two. Rather than indicating in the music: "play twce as fast" or "twice as slow", this convenient system did the trick.

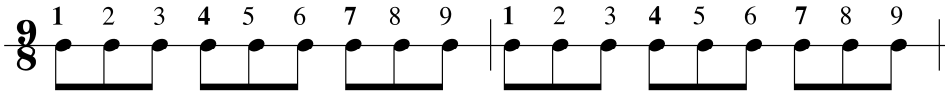
COMPOUND TIME SIGNATURES

Like common time, not all time signatures have the quarter note receiving the beat. As you would expect, the $\frac{6}{8}$ time signature has six beats per measure and the eighth note gets the beat. But there is something additional going on with the $\frac{6}{8}$ time. $\frac{6}{8}$ is considered to be a **Compound Time Signature**, meaning that within a $\frac{6}{8}$ measure, beats one and four receive an emphasis. Looking at it this way, there are two macro beats (1 & 4) for every six micro beats. The two larger beats are a compound of the six smaller beats. In a way, the rhythmic personality of a $\frac{6}{8}$ measure is similar to playing two $\frac{3}{4}$ measures at a fast tempo (speed). But $\frac{6}{8}$ is traditionally meant to be played fast and since eighth notes have the "natural" association of being faster (since they are twice as fast as quarter notes in general), it does make sense to have available a $\frac{6}{8}$ time signature.



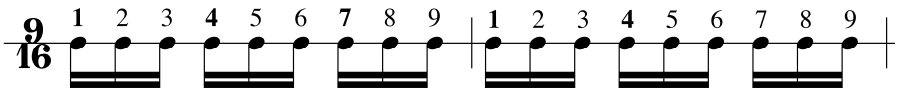
In this time signature, we can see beats 1 and 4 emphasized. Notice that the eighth notes are beamed to show the simultaneous macro beats.

Another compound time signature would be $\frac{9}{8}$.



Here, three beats and nine beats are compounded into a measure.

This could also be a compound time signature.

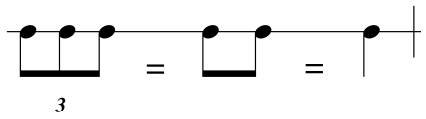


And since the micro beats are sixteenth notes, we would expect the speed of the beats to be on the faster side.

Generally speaking, compound times use eighth or sixteenth notes for the micro beats. The number of beats will be divisible by three: 6 ,9, 12

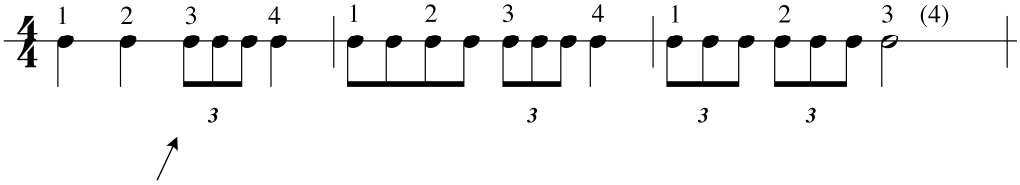
THE TRIPLET

The **Triplet** figure is a way of indicating that three notes should be played in the amount of time that two notes of the same note value would usually cover. Like a compound time, the triplet is a momentary way of compounding three notes into the space of two (making those notes faster).



These all take up the same amount of time

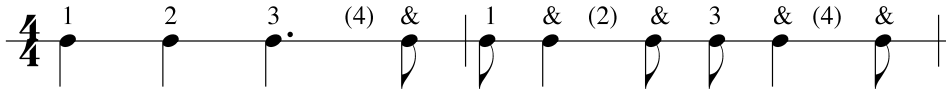
In context:

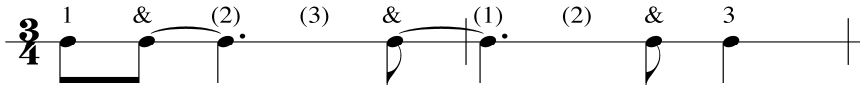


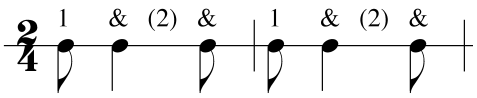
We beam the notes together that are to be part of the triplet. And we <u>always</u> put a "3" by the beam!

SYNCOPATION

When an attack falls on an up beat (the "&"), rather than on a down beat ("1", "2", etc.), we call it **Syncopation**.







Syncopation can be within a measure or across the bar line

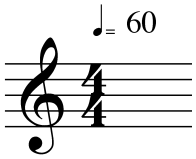
TEMPO I

In our time signature discussions, there has already been some mention of **Tempo**. Tempo ("time" in Italian) simply refers to the speed of the music or the speed of the pulse. Therefore the tempo can be slow, fast, or anywhere in between.

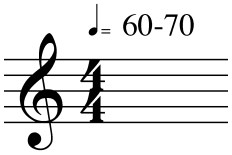
All written music should have some sort of tempo indication in as much as it has a clef and a time signature. The **Tempo Marking** goes above the staff and specifically above the time signature. Like time signatures and clefs, the tempo may change once or many times in a piece of music–it is not fixed.

There are two methods for indicating a tempo.

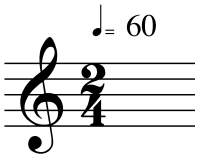
The more modern method translates the pulse into **Beats Per Minute** (BPM). If the time signature were in $\frac{4}{4}$ for example and the BPM were 60, the tempo indication at the beginning (above the staff and time signature) would be ♩= 60; meaning that the tempo or speed of the quarter note should be 60 beats per minute. Often a range will be given, allowing the tempo to be approximated.



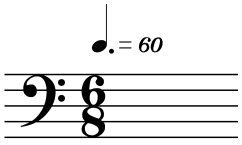
The tempo is 60 BPM



The tempo is between 60 and 70 BPM, which would be determined by the performer or conductor



The BPM is still 60 in this time signature



Three eighth notes move at 60 BPM, so one eighth note moves at 180 BPM (three times the speed of the dotted quarter since there are three eighths within the dotted quarter)

THE METRONOME

A **Metronome** is a mechanical or electronic device that clicks or beeps at the BPM you select. The tempos usually range from 40 to 220 BPM.

A tempo may be indicated with "M.M.=" rather than ♩= . "M.M." stands for *Maelzel Metronome*.

TEMPO II

The second, more traditional method of indicating a tempo simply uses Italian words to approximate the speed. More or less, the tempo marks correspond with a BPM range as follows:

Italian	**English**	**BPM**
Largo	Very, Very Slow	40-60
Larghetto	Very Slow	60-66
Adagio	Slow	66-76
Andante	Moving Along	76-108
Moderato	Moderately	108-120
Allegro	Quickly, Cheerfully	120-169
Presto	Fast	169-200
Prestissimo	Very Fast	200 +

Like the BPM marking, the Italian tempo mark goes above the time signature. To aid in precision, the *Moderato* term can be combined with another word such as *Allegro Moderato*: a bit slower than *Allegro*, but faster than *Moderato*. These terms pre-date the metronome, so there was not necessarily a fixed BPM range like the one provided above, just a unversally understood approximation. We can liken it to how colors are explained. We all know what purple is, in that it is different from red or blue, but within the context of "purple," there are many inflections and possibilitites for what may constitute "purple."

TEMPO CHANGES

Often a tempo will change gradually (unlike the change from 𝄵 to 𝄴). Gradual accelerations or deceleratons in tempo are indicated by:

Italian	**English**	**Abbreviation**
Accelerando	Gradually Accelerate	***Accel.***
Ritardando	Gradually Slow Down	***Rit.***

After an accelerando or ritardando, a new tempo mark is indicated (a target tempo) or the original tempo mark is re-stated to instruct the player to return to the starting tempo.

Another useful term is **Tempo Rubato** (literally "robbed tempo" in Italian) meaning that the pulse should be expressed unevenly, or not in a strict tempo. This looseness of tempo is often employed to enhance either a feeling of sentimentality and/or improvisation. Often solo music, like jazz piano for example, emphasizes a rubato style that can feel pensive, impulsive and introspective.

DYNAMICS

Just like having a tempo, music needs a volume indication. **Dynamic** signs indicate how loud or quiet the music should be. Like tempo marks, dynamic signs are taken from Italian.

The two dynamic pillars are:

Italian	**English**	**Sign**
Piano	Soft	***p***
Forte	Loud	***f***

The two modifiers are *Mezzo* ("Moderately" in Italian) as a prefix and "*issimo*" ("very") as a suffix and they work like this:

Pianissimo	***Piano***	***Mezzo Piano***	***Mezzo Forte***	***Forte***	***Fortissimo***
pp	***p***	***mp***	***mf***	***f***	***ff***

Quiet ⟶ Loud

The basic dynamic range

Dynamic signs are placed below a single staff and in between the two staffs of a grand staff.

Like gradual tempo changes, dynamics are even more likely to increase or decrease:

Italian	**English**	**Sign**
Crescendo (*Cresc.*)	Gradually Louder	"*Cresc.*-----" or 
Dimuendo (*Dim.*)	Gradually Softer	"*Dim.*-------" or 

} known as **Hairpins**

The dashes or the hairpin would be extended for the length of music that is to be affected. Like a tempo change, there could be a target dynamic sign at the end of the change.

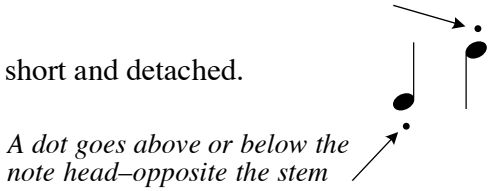
The words *Molto* (more) or *Poco* (less) could be added to indicate a larger or smaller change.

ARTICULATION

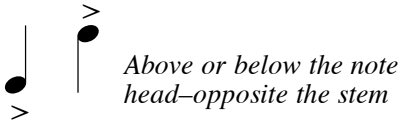
The way we make a note sound refers to its **Articulation**. While in a sense there is an infinite variety of articulations, there are a few particular articulations that have symbols.

One articulation with which we are already familiar is **Legato** playing. In that case, the notes were articulated as smoothly as possible. Other articulations include:

Staccato: the opposite of legato. Play the note short and detached.

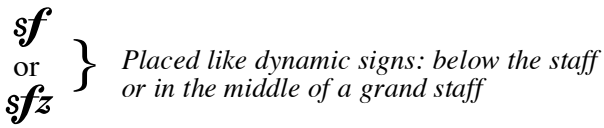


Accent: play the note louder, emphasized or accented.

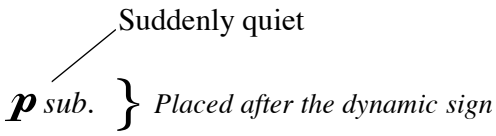


Tenuto: Hold the note for its full value and/or give a <u>slight</u> emphasis to the note.

Sforzando: A sudden, excited, stronger accent.



Subito: "suddenly" in Italian–refers to a sudden dynamic change.



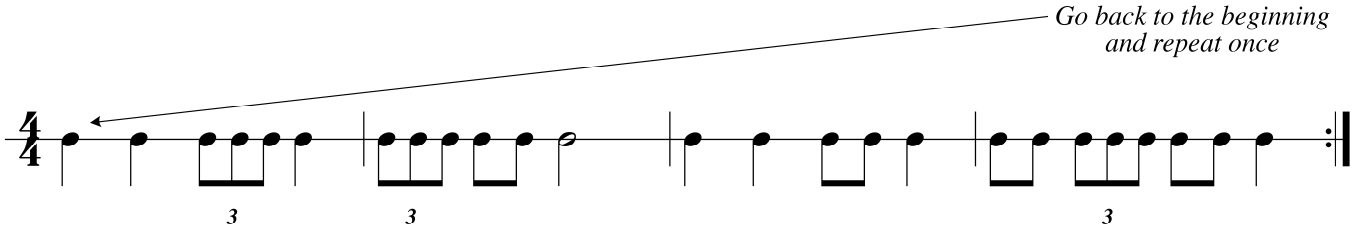
Fermata: Hold the note for approximately twice as long as its normal value. It is usually used at the end of a piece or at the end of a section.

ECONOMICAL DEVICES I

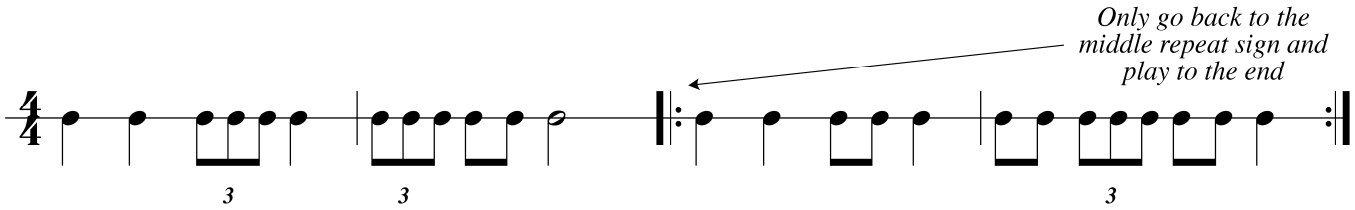
There are a few symbols that are used when larger passages of music literally repeat. Rather than writing out all the repeated music for a second time, different types of **Repeat Signs** can instruct us as to which part of the music should be repeated. Not only does this save space, paper and possible page turning, it can give us some insight as to the *form* of a piece–how it is conceptually put together.

REPEAT SIGNS

Two vertical dots before a double bar mean repeat the music up to that point.

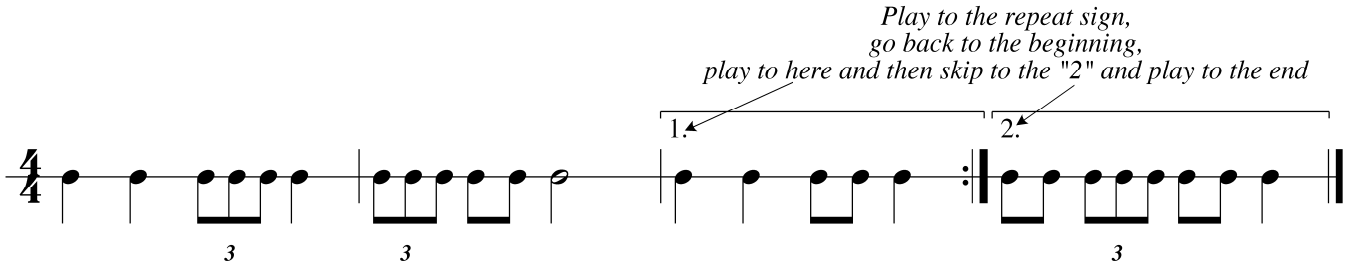


Repeat signs are also used in a pair to indicate that only a portion of a passage should be repeated.



FIRST & SECOND ENDINGS

Repeat signs are also used for **First and Second Endings** which have a portion repeated with a different ending after the second cycle.



ECONOMICAL DEVICES II

We can even get more complicated with these space saving devices by using some additional Italian words and symbols.

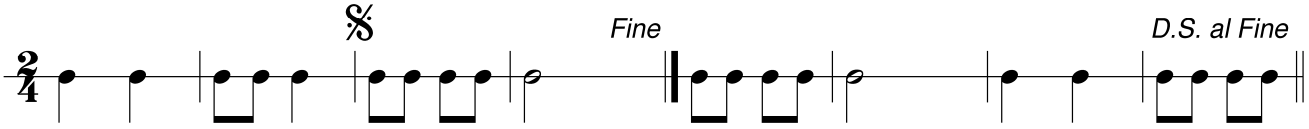
Italian	**English**	**Sign**
Da Capo	Repeat from the beginning (a.k.a. "take it from the top"). Capo means "head" in Italian.	***D.C.***
Dal Segno	Repeat from the sign: 𝄋 Segno means "sign" in Italian.	***D.S.***
Fine	The end.	***Fine***
Coda	An added ending. The coda symbol is used in pairs: at its first appearance (in the context of an already repeated passage) it means to skip to a section at the very end which would begin at the second appearance of the sign.	𝄌

EXAMPLES OF ECONOMICAL DEVICES

D.C. al Fine: repeat from the beginning and play only up to the *Fine*.

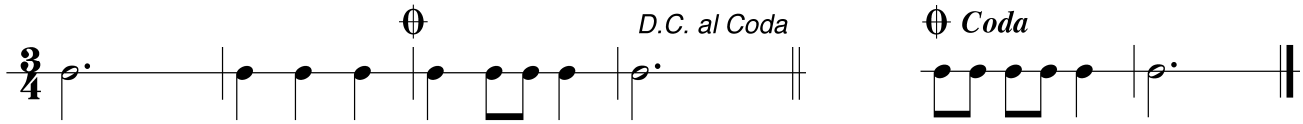
1. Play to the end (the double bar without the thicker line)
2. Return to the beginning
3. Play to the *Fine* (the "regular" double bar in the middle)

D.S. al Fine: repeat from the sign and play to the *Fine*.



1. Play to the end (*D.S. al Fin*e)
2. Return to the sign (𝄋)
3. Play to the *Fine*

D.C. al Coda: repeat from the beginning until the first coda sign, then skip to the second coda sign at the end.

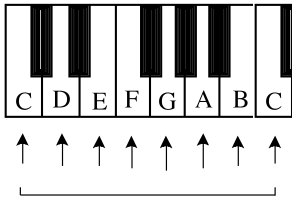


1. Play to the D.C. al Coda
2. Return to the beginning
3. Play to the first coda sign (𝄌)
4. Skip to the second coda sign (𝄌 Coda) and play to the end

THE MAJOR SCALE

A **major scale** is a selection of **eight** notes arranged in a particular order of half and whole steps. It is usually heard and recognized in ascending order. The **Major Scale** is one of the most fundamental musical entities and most music we know utilizes this scale (or the minor scale...stay tuned).

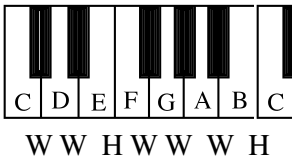
There is, as we should have come to expect, more than one way to understand how a major scale is put together. Before we look at the science of the scale, let's return to the keyboard. It is no coincidence that if we play from C up to the next C (i.e. the white keys) we will have played a C major scale. So the scale gets its particular name from its first note (called the **Tonic–**which is also the *last* note in the scale).



This is probably not the first time you have heard this sequence of notes

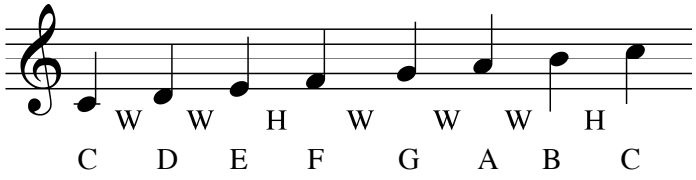
Once you familiarize yourself with this sound (ascending and descending), notice some important facts:

- With the exception of the tonic note, **each note name is used once and only once.**
- There is a particular arrangement of half (H) and whole (W) steps from one to the next: WWHWWWH



- Each note in the scale represents a different scale degree (1-8). The half steps are between degrees 3-4 and 7-8.

Here is how the ascending C Major scale looks in notated form:



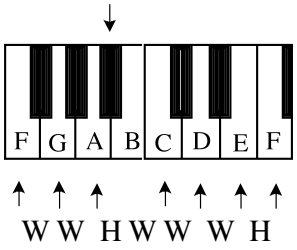
KEYS

Pieces of music tend to limit the number of scales they use similarly to how paintings may limit their colors. This means that the notes used in a song tend to be limited to the notes belonging to a particular scale. Instead of saying that a song is using a particular scale (and therefore a particular set of notes), we describe the song as being in a particular **Key**. The key has the same name as the primary scale used. The Beatles' *Let it Be* is in the key of C Major ("CM"), for example. Most of the notes in that song are from the C Major scale (with a few deviations). This is one example of the significance and applicability of the major scale...and why it is so important to understand.

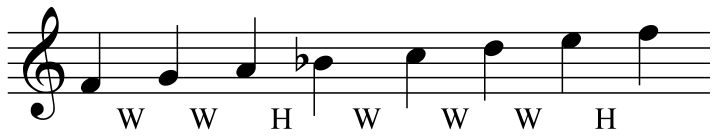
SCALES USING BLACK NOTES (FLATS)

You may have noticed that the C Major scale does not use any black notes. Since the scale actually existed first (chronologically), we might appreciate that the white notes were patterned after that scale. But a major scale can start from any other note (and have any note as the tonic). Since the major scale is based on a pattern of half and whole steps (and NOT simply a sequence of white notes), a major scale that has a different tonic than C Major will reqire the use of black notes (accidentals).

If we start a major scale from F and adhere to the WWHWWWH pattern, we get the following sequence:
F G A B♭ C D E (F)



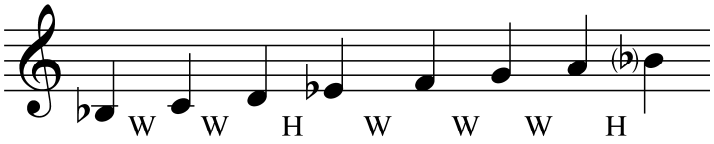
OR



One good question that may arise is: why is the black note in the above scale a B♭ and not an A♯? The answer is that a scale, for the sake of consistency and clarity, **uses each letter only once**. In the case of F Major, the A♮ was already used as the third note of the scale. The successive note (the fourth note in the scale), regardless of it being white or black, will be some kind of B (simply because B always follows A). So we can say that the FM scale has one flat note (B♭).

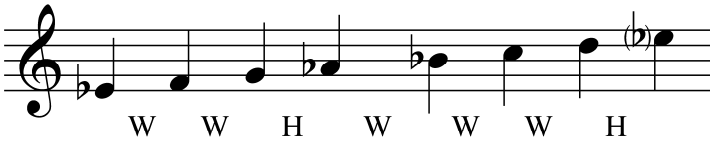
The scale that has two flat notes (we say "two flats") is B♭.

Notice that either ♮ or ♭, the notes successively fill in each line and space from B to B.



(Remember Enharmonic Equivalence? You could rename this scale A♯M and the notes would be A♯, B♯, C×, D♯, E♯, F×, G×, A♯ – which is more confusing than B♭, C, D, E♭,F, G, A– but we will return to this issue later. Don't think more about it now).

Notice that the scale with two flats (B♭M) has inherited the flat note (B♭) that was in the FM scale. It is as if the B♭M scale is the addition of one flat to the FM scale. The scale with three flats (E♭) will have the two flats from the B♭M scale, plus A♭.



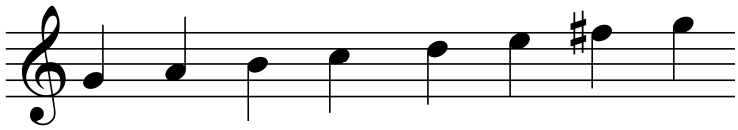
E♭ Major

Play these different scales. While they are different in some ways, they also sound the same because they follow the same <u>pattern</u> of half and whole steps. Each scale follows the same sequence of notes.

SCALES USING SHARPS

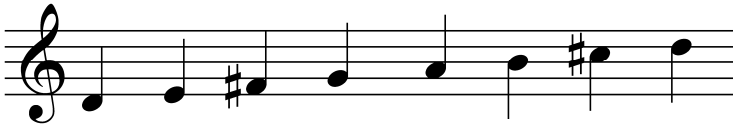
A major scale never mixes accidentals. Either there will be no accidentals (C Major only) or there will be only flats or only sharps.

The scale with one sharp is GM:

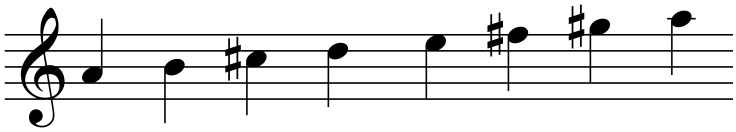


Like the "flat" scales, it follows the same WWHWWWH pattern.

The scale with two sharps is DM:



Three sharps, AM:



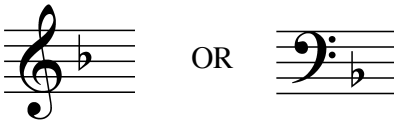
Notice that like the flat scales, each successive sharp scale incorporates the previous scales' accidentals.

KEY SIGNATURES

There is a more convenient way to write scales that takes into account the patterns we have noticed.

A **Key Signature** is like a time signature or a clef–it calibrates a scale and staff so that the half and whole steps (and therefore, the sharps or flats) go in the correct place. A key signature has the same name as the scale and sets the staff for the specific accidentals.

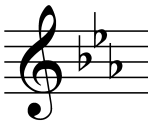
The F Major key signature looks like this:



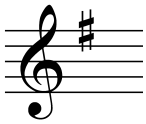
The accidental sits at the beginning of the staff on the note(s) (line or space) that are to be accidentals in the scale. A key signature accidental applies to **all** occurences of that note on **any** line or space.

The B♭M key signature

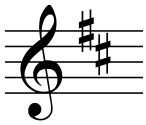
The E♭M key signature



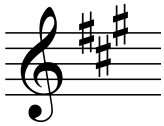
GM



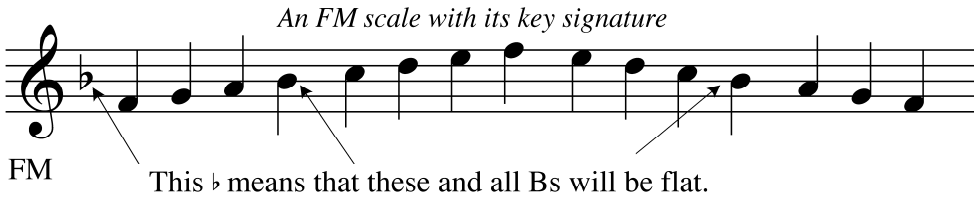
DM

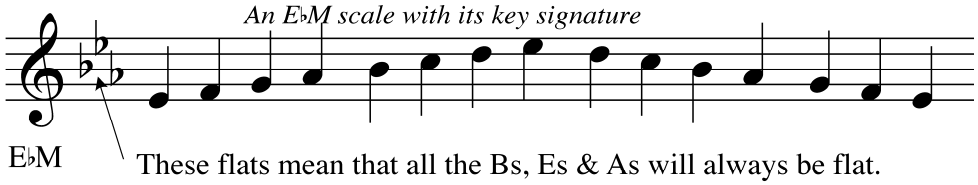


AM



Now we can write a scale like so:





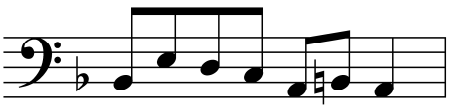
THE KEY

Beyond the designation of scales, the key signature establishes the music in a particular key. All the notes to be played will belong to a specific key. *Here Comes the Sun* (the Beatles again) is in the key of A Major, so the notation would contain an AM key signature (three sharps)–all Fs, Cs and Gs would be sharp.

And since real music is more complicated than a textbook explanation, there might be the occasional use of notes that are not in the AM key signature. In that case, an accidental will be added: a sharp, flat or natural (if it is one of the key signature notes that needs to be changed–like if we needed a B♭ in the key of CM for example).

ACCIDENTALS IN A KEY SIGNATURE

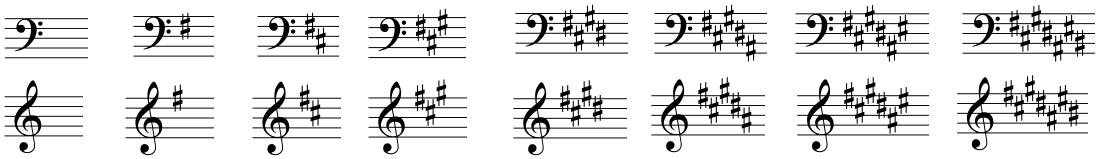
Accidentals can be added to, or taken away from a key signature:



If we are in the key of FM, but we need a B♮, we insert the accidental only where we want the change. In this example, the first B is ♭ and the second B is ♮.

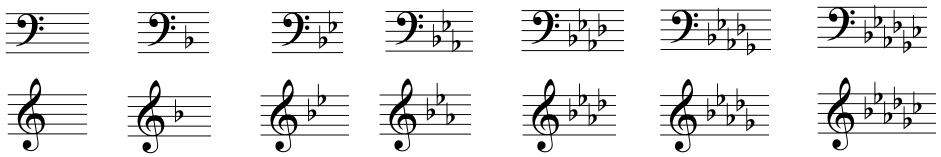
CIRCLE OF FIFTHS

There is a standard method by which we organize key signatures that shows how their sharps or flats increase incrementally. Recalling the sharp keys (GM with one sharp, DM with two, AM with three, etc.), we encountered them in a particular order where one sharp was added in each new key. The keys themselves were not adjacent (G is five notes above C, D is five above G and A is five above D). So for every five notes that we ascend, the key signature adds one sharp.



CM GM DM AM EM BM F♯M C♯M

Recalling the flat keys, the key signature added one flat for every four notes we ascended:



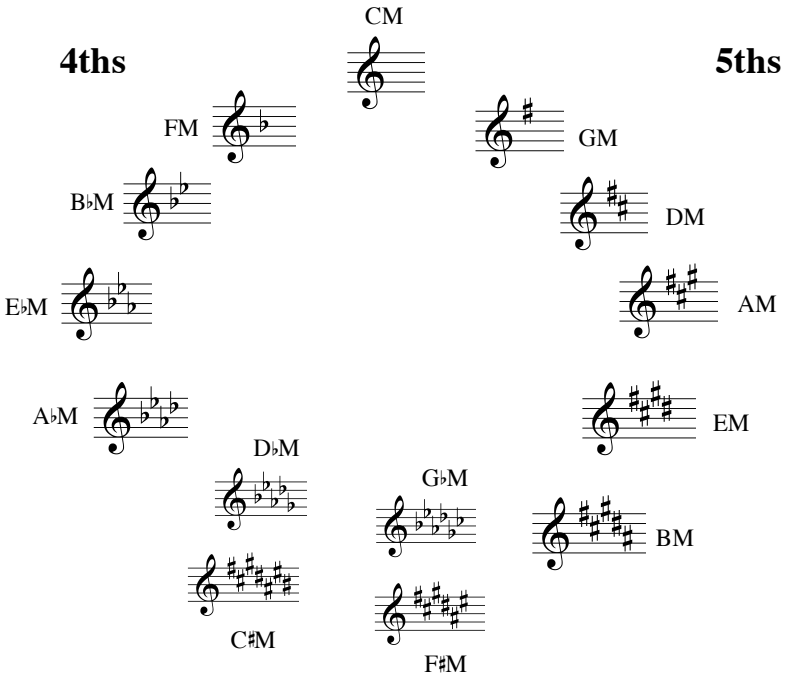
CM FM B♭M E♭M A♭M D♭M G♭M

CIRCLE OF FIFTHS CONTINUED

So the sharp key signatures increase in a sequence of five scalar notes (by "fifths") and the flat key signatures increase in a sequence of four notes (by "fourths").

After many sequences, not only does the key signature become heavy with sharps or flats, but the keys become enharmonically equivalent to different keys. C♭M (with seven flats) sounds the same as BM (only five sharps). C♯M (seven sharps) sounds the same as D♭M (five flats). So eventually the sequences of sharpes and flats overlap and it might make sense to choose the key signature that has fewer accidentals (in some cases) such as BM instead of C♭M. This phenomenon also speaks to the old proverb that there is more than one way to express the same musical idea.

The standard way of showing the relationship between the flat and sharp keys is to arrange them in a circle:



The Circle of Fifths

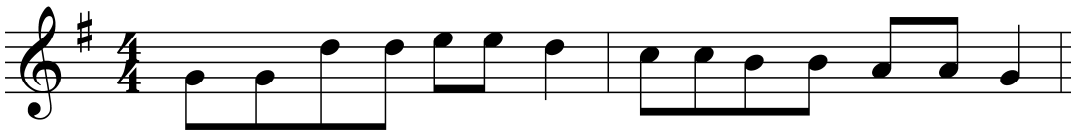
Following the circle clockwise, we see the sequence of increasing sharps keys (increases by fifths). Following the circle counter-clockwise, we see the sequence of increasing flat keys (by fourths). At the bottom of the circle, we see where the enharmonic keys overlap. This circle is conveniently called the **Circle of Fifths** (or **Fourths** in less formal cases).

*Notice that in writing the key signatures, there is a particular ordering of the accidentals such that they mostly fall in the center of the staff. This particular ordering in both clefs is the **only** standard way to write key signatures–get to know it.

One final and important observation about the circle of fifths (or fourths) is that going either clockwise or counter-clockwise, from one key to the next allows six out of seven notes to remain in common between those two keys. To put it another way, adjacent keys in the circle of 5ths have six out of seven (all but one) notes in common. These adjacent keys are considered "close" for this reason, even though the tonics of the keys are four or five notes apart from each other on a keyboard. For example, DM and AM have all but one note in common and are "close" even though A is five notes (seven half steps) above D on the keyboard.

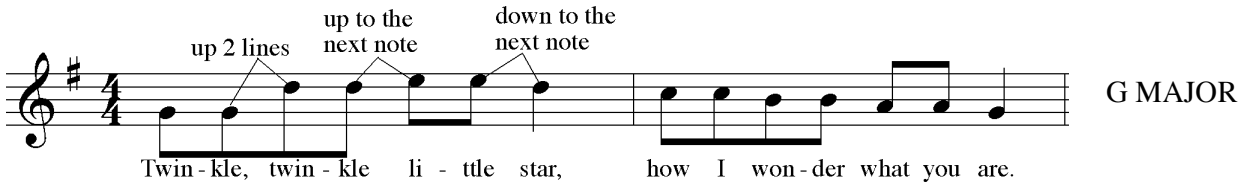
TRANSPOSITION

The idea of notes and music being in a key is very powerful. Remember how we heard that no matter what note a major scale started from, it sounded the same because the pattern from note to note was the same (which is the essence of the scale!)? This relationship means that the different scales are related by **Transposition**. When a group of notes (a scale or something else) moves up or down to a different starting note, but the distances between the notes stay the same (as is the case with different major scales), then the notes have been transposed [to maintain the same intervallic relationship between a group of notes]. Therefore, all the major scales are just transpositions of one and other. This means that a group of notes in one key can easily be transposed into another key with the help of a key signature.

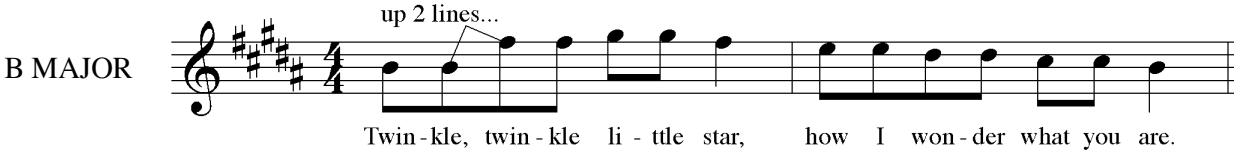


Twin - kle, twin - kle li - ttle star, how I won - der what you are.

This is *Twinkle, Twinkle Little Star* in G Major. To transpose it to another key (say BM), just write the BM key signature, pick the right starting note (the one in GM started on G conveniently enough, so the transposition in BM will start on B) and keep the distance between each note the same:



G MAJOR



B MAJOR

**Transposition is necessary when an instrument or a voice is not able to play all the notes in a given range.

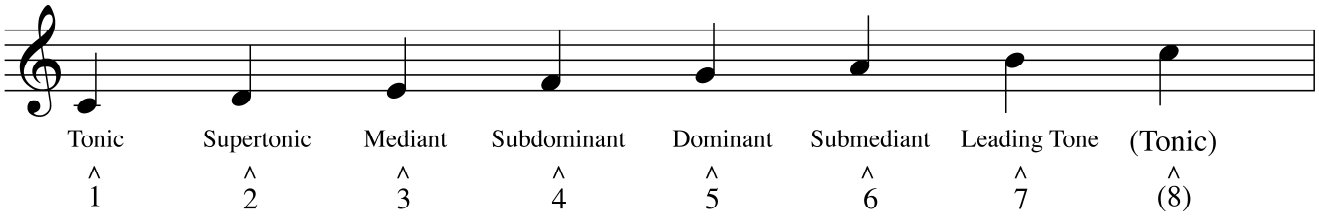
By transposing a piece, its range can accommodate the singer's or instrument's limited range.

SCALE DEGREES

When discussing scales there are two ways of naming their notes. If we refer to each note in the scale as a number, we are referring to **Degrees**: going from low to high (in pitch), we count from one to eight. Also, so that we do not get confused with other numerical labels, we usually put a little carrot above the number to ensure that we are decribing a scale degree. The third scale degree, for example, would be referred to as "$\hat{3}$".

NOTE NAMES

The other equally valid labeling system assigns a name to each scale degree which relates to functional aspects of the notes that we have yet to study. We have already learned the name of the first (and eighth) note: the Tonic. Here are all of them:

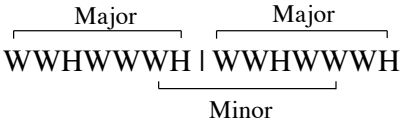


While all these notes deserve a lengthy discussion, we can assess that the tonic is significant because it carries the name of the scale. Another very important note is the seventh scale degree–the **Leading Tone**. It "leads" the scale back to the tonic–back home. If you play an ascending major scale and pause on the leading tone without going up to the tonic, the sound will feel very unfulfilled or incomplete. It is this feeling that prescribes the seventh scale degree as a "leading" or "directing" mechanism that pushes the music back to the tonic.

The leading tone is also important as we start to explore **Minor Scales**.....

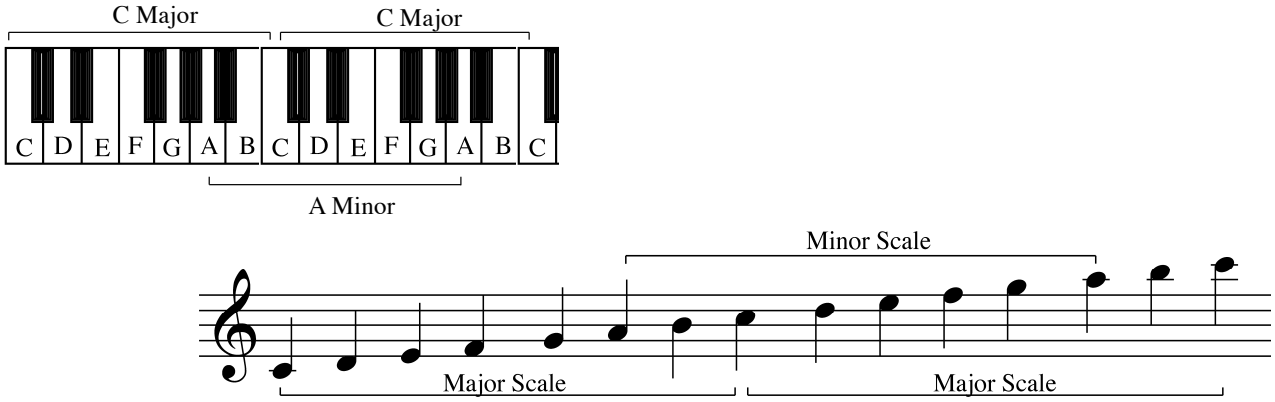
THE MINOR SCALE

Without getting into a study of intervals, it is enough to say that the major scale has a "happy" or "bright" quality. In contrast to that is another, related scale that, put simply, sounds "darker" and "sad": this is the **Minor Scale**. We can initially approach the minor scale much in the same way that we first did with the major scale via the keyboard: if we play from A to A (i.e. only the white notes). As expected, the minor scale has a different pattern of half and whole steps: WHWWHWW. In fact, this pattern is a displacement of the major scale pattern:



In a minor scale, the half steps are between scale degrees 2-3 and 5-6

Because of this relationship, we often, if not always, conceive of a minor scale as a derivation of a major scale. A minor scale starts and ends on the sixth scale degree of a major scale (the *submediant* note).



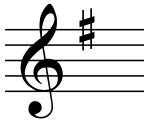
Play this A minor scale. Notice the different mood it projects. Also notice that the A minor scale uses the same notes as the C major scale (white notes only), but that the tonic is now A.

RELATIVE MINOR

Remember that what is the case for one scale is the case **for all**–which is the whole point of key signatures. If we can observe that the A minor scale is a derivation of the C major scale because both scales use the same notes, then we can predict that there is a minor scale within every major scale. This minor scale is called the **Relative Minor**. A minor is the relative minor of C major. The relative minor starts on the sixth degree (the submediant) of its relative major.

KEY SIGNATURES AND KEYS

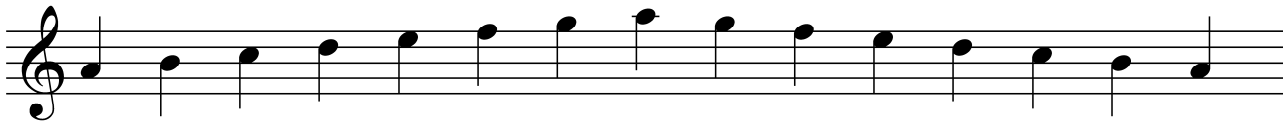
Now we can expand the applicability of the key signature. A key signature can represent a major or minor scale and therefore a major or minor key. The Beatle's *Eleanor Rigby*–clearly a "sad" sounding song–is in the key of E minor. Since E is the sixth scale degree of G major, the key signature for *Eleanor Rigby* would have one sharp:



The G major/E minor key signature

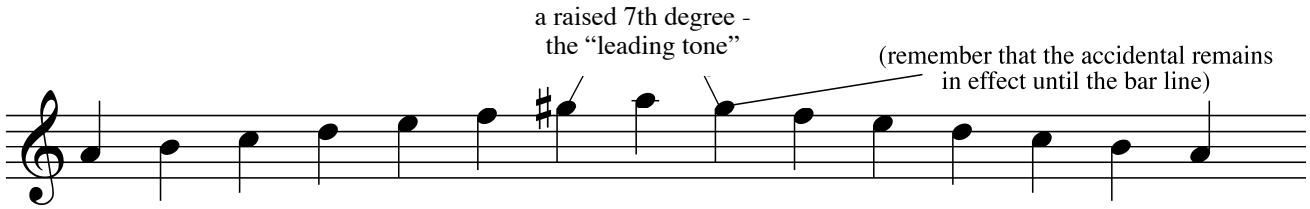
THE THREE MINOR SCALES

You will notice that the seventh note of the minor scale (G in the scale of A minor, for example) is a whole step below the tonic (A). Recall that the seventh note of the major scale is only a half step below its tonic and that we called that scale degree the *leading tone*. The important function of that leading tone is to bring the music back up to the tonic through the $\hat{7}$ to $\hat{8}$ half step motion. Because the minor scale does not normally have that "leading" half step from $\hat{7}$ to $\hat{8}$, two standard alterations exist which make the end of the minor scale imitate the leading tone quality of the major scale.



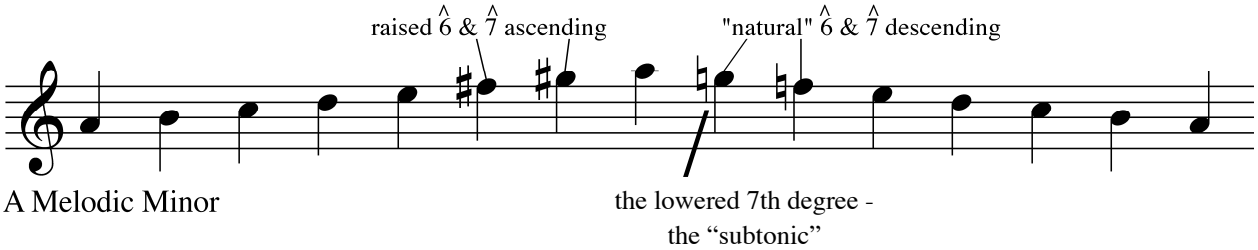
A Natural Minor

The **Natural Minor** scale is the one derived from the major scale–the **Relative Minor**.



A Harmonic Minor

The **Harmonic Minor** scale takes the natural minor scale and raises the seventh degree up a half step so that it is a half step below the tonic. It is a minor scale with a leading tone.



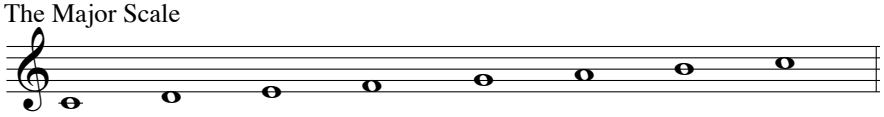
A Melodic Minor

The **Melodic Minor** is similar to the harmonic minor in that it raises both the seventh and sixth scale degrees by a half step. You will notice that the second half of this scale sounds very much like the major scale. Because convention dictates it, the alterations in the melodic minor are only in effect when the scale ascends. When it descends, the scale returns to the natural minor configuration.

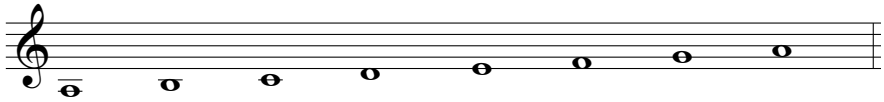
IT'S ALL IN THE SCALE

Once you have the pattern down, playing a major scale in any key is easy (and for the most part, easy on any instrument). Notating a scale is fairly easy as well, especially when you use a key signature. In fact, hearing and playing a scale is a trivial experience for most of us. We usually associate scales with the early phases of music lessons (which were probably a long time ago!) In this capacity, we might think of scales just serving as an exercise for the fingers and for hand/eye coordination. Scales also seem very fundamental, if not "natural" since the layout of a scale naturally fits onto the white notes on the piano (major: from C to C; minor: from A to A).

The Major Scale



Natural/Relative Minor Scale



Given all this, we sometimes forget the vast implication of these seven little notes. We've probably noticed that in most songs or pieces of music, literal scales are seldom heard, so it can be hard to see the powerful connection between what music does and what a scale does. What's the point? But a scale is not just an exercise for the fingers or for coordination. A scale is an exercise in, and a model for most western music. A scale represents a sense of beginning, departure, excursion and return. Moreover, it represents a specific kind of limitation of notes, or an exclusion of notes (7 out of 12 possible notes) which creates the sense of being in a key and of a hierarchy or order of notes. Try changing an A to an A flat in a C major scale and you will hear how disrupted this sense of key and order sounds. The particular arrangement of the notes in a scale provides a profound sense of order, continuity, cohesion and, above all else, a solid sense of direction, expectation and inevitability. These aspects of a scale are the same crucial aspects that go into the larger design and aesthetics of music in general.

CONTINUITY AND COHESION

While aesthetics ultimately dictate what one finds cohesive vs. chaotic, there are few ears that would dispute the "natural" sense of continuity we hear in a basic major scale. But behind the aesthetics are some concrete features of a scale that help us hear it as something portraying a sense of cohesion and continuity – it holds together. Although the properties listed below are very normal features of a scale, they should not be taken for granted as far as they serve as a microcosmic model for the larger macrocosm of music:

A scale:

- Covers the narrow range of only an octave
- Starts and ends on the same note
- Goes in a single direction–up or down, as opposed to switching directions once or many times
- Has spaces between its notes that are only whole or half steps – nothing larger
- Limits the number of notes to seven out of a possible twelve

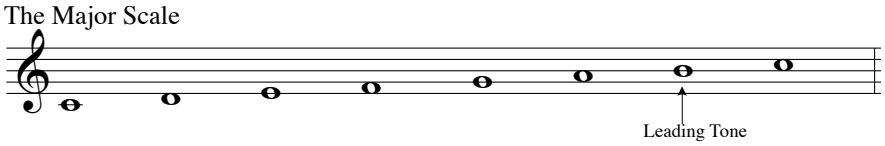
This limit prevents our ears from feeling over-saturated with too many different notes, like the way a recipe for any food dish limits its ingredients, which winds up defining the dish (by means of this limitation). Cookies would not be cookies if they also included mushrooms and tofu in their ingredients. This limitation of notes in a scale sets it apart from another scale that would include/exclude other notes. This helps us distinguish one key from another – by which notes are included or excluded.

MOTION: DIRECTION, EXPECTATION, INEVITABILITY AND GOAL

These four words can pretty much fall under the single aspect of motion. Music moves: the notes change or re-articulate, and this occurs within some kind of rhythmic context. But the way in which music moves is particular. When we look at a pond, or even a cup of water, we can conclude that even though the contained liquid is moving (at least the molecules are moving), it is in a contained or closed area that does not let the liquid move beyond the set parameter. When we think of a river, or of water running out of a faucet, we can understand that there is that added aspect of direction and flow to this same liquid. It starts somewhere and ends up somewhere else. With these images in mind we can appreciate that it is often the tendency of music to flow and move from one place to another (rather than sit still) with an expected sense of direction and destination (a goal). When we see water flowing down a mountain, we expect that it will inevitably end up in a body of water (the ocean or a lake) at a lower altitude. The motion in music is often thought of the same way; the notes will eventually end up in some predictable place, although we may not know the exact course they will take to arrive at that destination.

Although we have been referring to "music" in general, we can refer back to the simple scale to provide a model for the above-described aspects of motion:

- The continuity of the scale follows a single direction (up or down) and therefore offers no surprises in the direction of one note to the next
- The last note is the same as the first (but an octave away) and thus the last note is especially fulfilling as it rounds-off the process and arrives at a reasonable goal (the tonic note–the "home" note)
- In the more typical ascending scale, the second to last note (the 7th), the one that precedes the tonic is called–as we know– the *leading* tone. On a very basic level, when we hear this note come after the previous six notes, we inevitably feel what is to come next. This leading tone quite clearly leads our ears (and the notes) back to the tonic, back home. It is the "ahhh" before the "chooo" of a sneeze, or the set-up before the punch line. If you play a scale and stop short on the leading tone, it will feel very incomplete, tense and unfulfilling–like a sneeze that did not happen or a goal that was not reached.



In fact, it is this little leading tone, only a half step before the tonic, that contributes so much motion to a scale. This tone points the way for the music, providing a sense of direction, but of an inevitable, expected, upward direction to the particular tonic note. Once we reach the tonic, we very much feel like a destination (goal) has been suggested and then reached. We might even feel further "arrived" after we descend back down through the scale to the original tonic note: as if that which went up eventually came down.

We can even back up a bit further and consider the listening experience of a scale from the moment we leave the first note. We feel the line steadily rising to this high point of *leading tone tension* until the tension is released when the leading tone moves to the tonic, like when we finish drawing in a breath. The tension is further relieved when the scale descends back down to the original tonic, like the exhaling of that breath. These are the basic aspects of musical motion that we will revisit throughout the book.

INTERVALS

An interval is the distance between two notes: either one heard after the other (a melodic interval), or both heard at the same time (a harmonic interval). For convenience, we usually just refer to either kind as "interval." Intervals are so important (and always an initial part of a music theory curriculum) because so much of how we hear music is about the relationships *between* notes. These relationships are best described by the objective system of intervals. An interval has two components: a number (the distance) and a quality (major, minor, perfect, augmented, or diminished). Examples of intervals in context could be: *major 3rd*, *perfect 5th*, *augmented 6th*, etc.

NUMERIC COMPONENT

The numeric component of an interval is determined by merely counting through the number of notes in terms of their letter names. Because a note can form an interval with itself, the smallest interval is 1 (a "1st", but always called a *unison*). Following this system, we can say, for example, that the interval from middle C to middle C (the same C) is a unison. The interval from C up to D is a 2nd (just count C-D). From C up to E is a 3rd (just count C-D-E) and so on. C up to the next C is an 8th, but we more often refer to that interval as an *octave*.

QUALITY COMPONENT

In addition to their enumeration, intervals have a *quality*, which acts as a modifier to the specific number. There are two basic categories for the five possible qualities intervals can have: *Perfect* and *Imperfect*. Imperfect intervals will be either major or minor. We usually do not refer to intervals as "imperfect", but rather by their specific "major" or "minor" quality.

The same numeric intervals are always limited to the same qualities as follows:

PERFECT	**MAJOR or MINOR**
Unison (1st)	**2nd**
4th	**3rd**
5th	**6th**
8th	**7th**

These intervals are always restricted to these qualities

MAJOR/MINOR

The difference between major and minor is that of size. A major interval is a half step larger than a minor interval. Therefore a 3rd, for example, could be either major or minor. C up to E is a major 3rd, while C up to E flat is a minor third because it is a half step smaller than C to E. Similarly, C sharp up to E is also a minor third because it is a half step smaller that C to E.

AUGMENTED/DIMINISHED

When the size of any interval is expanded or shrunken by a half step beyond the perfect or imperfect (major/minor) parameters, the interval becomes augmented or diminished. A perfect 5th made smaller by a half step becomes a diminished 5th. A major 3rd made larger by a half step becomes an augmented 3rd, while a minor 3rd made a half step smaller becomes a diminished 3rd.

Here is how all the different qualities relate to one and other by size:

The arrow (↔) refers to a change in size by a half step:

Smaller ← Interval → Larger

1st, 4th, 5th, 8th

Diminished ↔ Perfect ↔ Augmented

2nd, 3rd, 6th, 7th

Diminished ↔ Minor ↔ Major ↔ Augmented

Here is the complete list of qualities with their abbreviations:

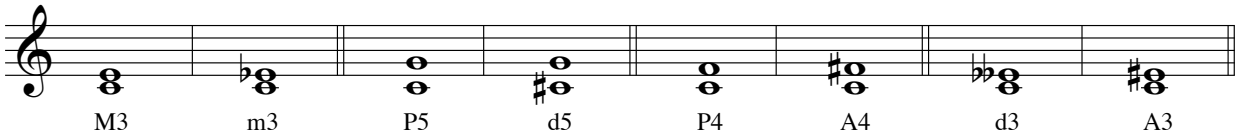
• Major ("M", "maj.")
• Minor ("m", "min.")
• Perfect ("P")
• Augmented ("A", "Aug", "+")
• Diminished ("d", "dim", " º")

Here are some specific examples and further clarification:

- A major interval made smaller by a half step is a minor interval. C up to E is a major 3rd while C up to E flat is a minor 3rd.
- A minor interval made larger by a half step is a major interval.
- A perfect interval made smaller by a half step is a diminished interval (and visa versa). C up to G is a perfect 5th while C sharp up to G is a diminished 5th.
- A perfect interval made larger by a half step is an augmented interval. C up to F is a perfect 4th while C up to F sharp is an augmented 4th.

In rare cases (meaning rarely encountered in real music, but theoretically possible):

- A minor interval made smaller by a half step is a diminished interval. C up to E flat is a minor 3rd while C up to E double flat is a diminished 3rd.
- A Major interval made larger by a half step is an augmented interval. C up to E is a major 3rd while C up to E sharp is an augmented 3rd.



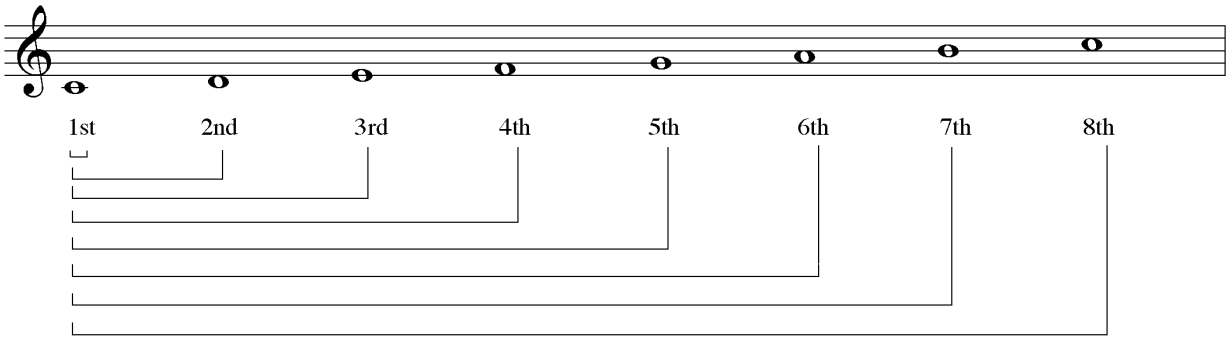
SPELLING INTERVALS

The numeric component of an interval has everything to do with its spelling (which notes are used) because the number is determined by counting through the note (letter) names. While not worrying about quality for a moment, we know enough to say that B up to E sharp is some kind of 4th (count B-C-D-E sharp). The sharp does not actually matter as far as the number is concerned. If the E were a flat instead of a sharp, the interval would still be a 4th (but with a different quality). But in as much as B up to E sharp is a 4th, B up to F is some kind of 5th. Even though E sharp and F are enharmonic (they sound the same), they *spell* the interval in question differently. So the sound of the 4th of B up to E sharp is the same as the sound of B up to F – they are just spelled differently.

MAJOR SCALE CONTEXT

There is more than one way to approach the construction and application of intervals. One elemental approach is to see and hear them in the context of the major scale.

Intervals share their numeric names with scale degrees. For example, the third note in a C scale (E) is an intervallic 3rd above the tonic, C. To put it more simply, E is a 3rd above C (count three notes: C-D-E). A is the sixth note in the C major scale, and therefore a 6th above C (again, count the notes C through A – six notes). So from C through to the next C (the C major scale), we get intervals numbered one through eight.



The notes in the C major scale form these intervals above the tonic (C)

INTERVALS IN THE SCALE

One way to get your head around some of the different qualities that intervals have, and to understand why there are different qualities, is to consider the intervals that are inherent to the basic major and minor scales as we measure those intervals above the tonic.

These numeric intervals have the following qualities in the **major** scale when measured *above* the tonic:

Unison: **P1 (or Perfect Prime: "PP")**
Major Second: **M2**
Major Third: **M3**
Perfect Fourth: **P4**
Perfect Fifth: **P5**
Major Sixth: **M6**
Major Seventh: **M7**
Perfect Octave: **P8**

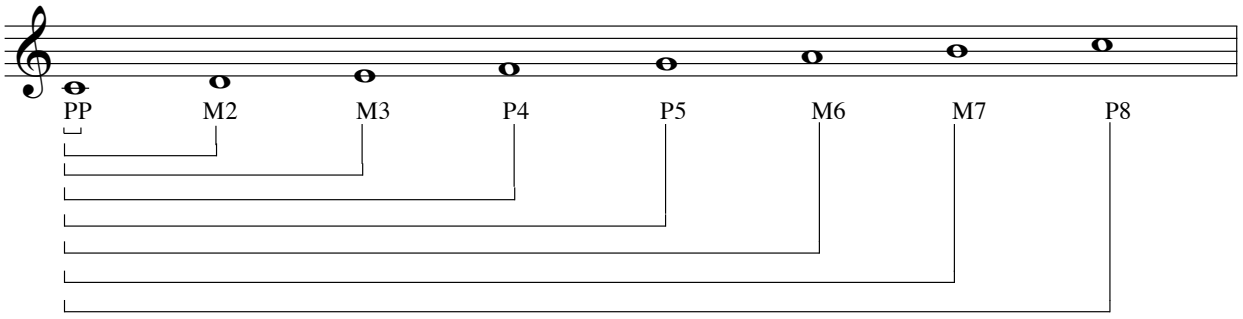
These numeric intervals have the following qualities in the **minor** scale when measured *above* the tonic:

Unison: **P1 (or Perfect Prime: "PP")**
Major Second: **M2**
Minor Third: **m3**
Perfect Fourth: **P4**
Perfect Fifth: **P5**
Minor Sixth: **m6**
Minor Seventh: **m7**
Perfect Octave: **P8**

In addition to these major and perfect qualities, there are the augmented and diminished qualities (found in other scales and in other relationships within the scales).

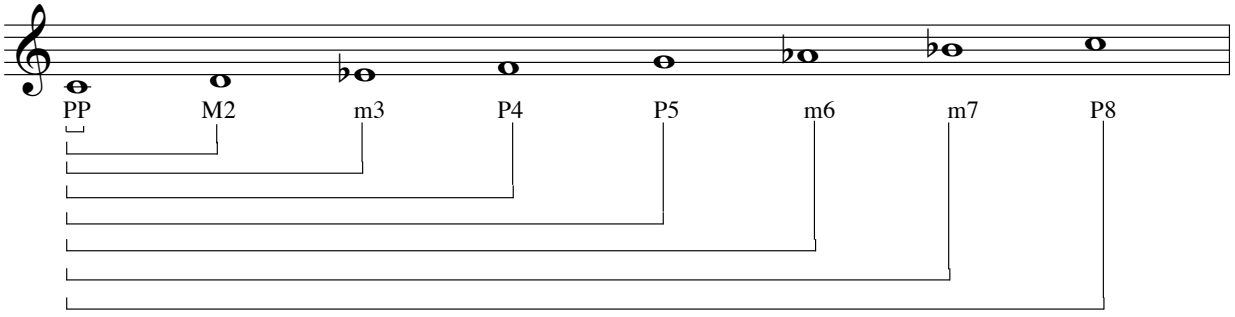
A quick comparison between the C major and C minor scales reveals that (except for the 2nd, which is major in both cases), the non-perfect intervals (3rd, 6th and 7th) are *major* in the major scale and *minor* in the minor scale. There are minor seconds in the scales (from E up to F, and B up to C in a C major scale, for example), but the tonic is never the lower note.

C Major Scale Qualities:



Intervals above the tonic in C major

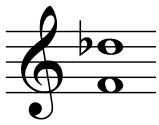
C Minor Scale Qualities:



Intervals above the tonic in C minor

This model works the same for all other major and minor scales.

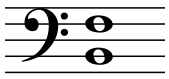
DETERMINING AN INTERVAL I – SCALE BASED METHOD



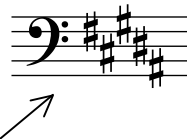
Given this interval, we can determine its size and quality by comparing it to a major scale whose tonic is the same as the bottom note of the interval. Determining the size is easy, just count the notes (the number of lines and spaces) without consideration of any accidentals. F up to D is six notes, so the interval is some kind of 6th. Since only 4ths, 5ths and octaves/unisons are "perfect", this interval's quality should either be *major* or *minor*. Now compare the top note of the interval to the corresponding sixth scale degree of the F major scale (since we refer to the scale that would begin from the bottom note of the particular interval). The sixth degree of the F major scale is D natural…and the sixth degree of any major scale is a major 6th interval from the tonic (major scale = major sixth interval). But here we have a D flat. This is a half step smaller (D natural *down* to D flat) than a major 6th. So the interval is a minor 6th. This process can be simplified by merely comparing the interval to the major key signature of the bottom note. If the notes match up, then the interval is one of the normally occurring intervals in that key.

Here is another one:

B up to F



BM Key Signature



Step 1: B up to F is five notes, so the interval is some kind of 5th
Step 2: Compare to a B major scale or key signature (shown above to the right)

- The fifth scale degree of B should be F sharp. In other words, the F in the key of B major is normally F sharp.
- Since the interval in question is an F natural, the interval is smaller by a half step. The normal perfect 5th (B up to F sharp) is made smaller by a half step into a *diminished* 5th.

Answer: B up to F is a diminished 5th.

Often we will see a symbol "5°" or "4°" used to represent that something is diminished instead of seeing "d5" or "d4".

DETERMINING AN INTERVAL II – HALF STEP METHOD

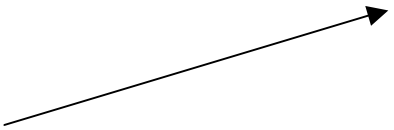
The other way of determining an interval is the half step method. Refer to the chart below which aligns the number of half steps in an interval with the enharmonic (sounding the same) intervals of that size. Above the half steps row are the major and minor scale degree points in alignment with their appropriate number of half steps. For example, the fifth scale degrees of both major and minor scales are seven half steps above their tonics.

Here is a simple procedure for determining an interval:

- Count the number of notes from the first to the second note of the interval (start from the top or bottom–it doesn't matter), which will determine the numeric component of the interval
- Then count the number of half steps between the notes, or compare the notes to how they might appear in the context of a major or minor scale
- However the half steps or the comparison lines up below will give you the interval

Maj. Scale Degree:	1		2		3	4		5		6		7	8		9
Min. Scale Degree:	1		2	3		4		5	6		7		8		9
No. of Half Steps:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

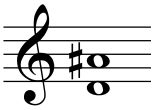
Interval Name:															
	PP	AP													
	d2	m2	M2	A2											
		d3	m3	M3	A3										
				d4	P4	A4									
						d5	P5	A5							
							d6	m6	M6	A6					
									d7	m7	M7	A7			
											d8	P8	A8		
													d9	m9	M9	A9



Key

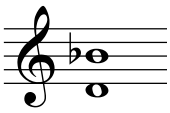
PP = "Perfect Prime" or Unison
d = Diminished
A = Augmented
m = Minor
M = Major

MORE EXAMPLES



For example: this interval counts five notes from D up to A sharp (remember, when we count the notes, we ignore any accidentals – we just count the letters). So D up to A (sharp) is five notes (D-E-F-G-A). The interval is therefore some kind of 5th.

Then we count the half steps from D up to A sharp: there are eight. Looking at the chart, eight half steps in the 5th column is an augmented 5th. We could also notice that the "normal" 5th in either the major or minor scale of D is an A natural (and therefore a perfect 5th). Since this A is sharped, it is a perfect 5th made a half step larger (eight half steps): an augmented 5th!

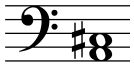
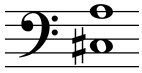


But if the notes were D and B flat, which are also eight half steps apart, the interval would be a minor 6th because D up to B (flat) is six notes (D-E-F-G-A-B). D up to B flat is also the "normal"/minor 6th in the scale of D minor (as shown by the chart). To put it another way, D up to B is the "normal" /major 6th in the D major scale. Since D up to B flat is a half step smaller, the major 6th is made a half step smaller into a minor 6th.

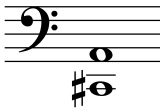
While these concepts can seem confusing, it is all terribly logical and usually just requires a little practice to perfect.

INVERSION

The process of inversion and inverting intervals is among the most fundamental components of music construction. The importance of knowing how to invert cannot be overemphasized, but it is a simple process. To invert an interval is simply to reverse the order of the notes while not changing the actual note names:

 A up to C♯ inverts to 

C♯ up to A

or 

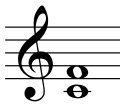
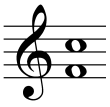
C♯ up to A in a lower octave

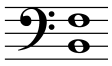
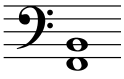
In either case, one of the two notes moved the distance of an octave so that it was on the other side of its counterpart note. The C sharp went down an octave or the A went up an octave. Either result represents an inversion of the original interval of A up to C sharp (a major 3rd). Note that either result above produces a minor 6th interval.

The inversion process is the same for any interval: either the bottom one transposes up an octave or the top one transposes down an octave. The transposition could also be two, three or however many octaves—as long as the notes switch positions.

It is an important process because so often music utilizes inversions to create variety and change (which contribute to the sense of motion and direction!). With inversion, we can take a collection of notes (melody, harmony, or both) and perhaps rearrange them without actually changing them. The rearrangement contributes to the need for change and motion within the music, while the unchanged notes contribute to the continuity and cohesion of the music.

OTHER EXAMPLES OF INVERSION

This interval of a P4:  becomes a P5 when inverted: 

This interval of a diminished 5th (5°):  becomes an augmented 4th when inverted: 

THE INVERSION PATTERN

Every so often there is a wonderful pattern that emerges as a result of music theory "rules." The most elegant seen so far is the circle of fifths. The inversion process also contains a set of perfectly predictable results that are extremely useful. For starters:

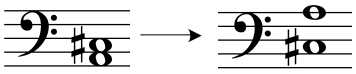
An interval and its inversion <u>always</u> add up to nine
(Interval + Inversion = 9)

AND…

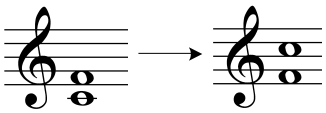
Major	*inverts to*	**Minor**
Minor	*inverts to*	**Major**
Augmented	*inverts to*	**Diminished**
Diminished	*inverts to*	**Augmented**
Perfect	*inverts to*	**perfect**

100% of the time!

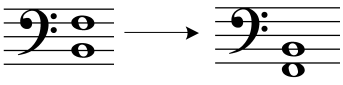
A major 3rd inverts to a minor 6th:



A P4th inverts to a P5th:



A diminished 5th inverts to an augmented 4th:



COMPOUND INTERVALS

A compound interval is any interval larger than an octave, or an interval (second through octave) with an octave added on to it–making it an octave *larger*. Compound intervals are just like ordinary intervals with respect to their qualitative and quantitative components (compounding an interval does not change it's quality). In fact, in most cases we consider compound intervals to be equivalent to their non-compound counterparts, even when the numbers appear different.

For example, a 10^{th} is like a compounded 3^{rd} (a third with an octave added to it), or a 12^{th} is like a compounded 5^{th} (a 5^{th} with an octave added to it). To add an octave to an interval, just add 7. In jazz, however, we do make distinctions between a 2^{nd} and a 9^{th} (a 9^{th} is a 2^{nd} with an octave added to it), a 4^{th} and an 11^{th} and a 6^{th} and a 13^{th}. But in general, the compound interval is the same as its smaller counterpart. A compound interval is similar to a doubled recipe: the proportions of the ingredients stay the same (as does the food's taste), but the overall portion has doubled.

Following through on the recipe metaphor however, we never *triple* the compounded interval. This means that if we take an interval like a 10^{th} and add another octave to it, we DO NOT NORMALLY refer to it as a 17^{th}. We still just call it a 10^{th} – a practical decision for sure. Because of this, the largest interval we will identify is the compounded octave, which we can call a 15^{th} (the octave, 8 with 7 added to it).

Here is a chart of all the compounded intervals we might encounter (remember that the issue of quality does not change in a compound situation: a compounded *major* 3^{rd} is a *major*10^{th}):

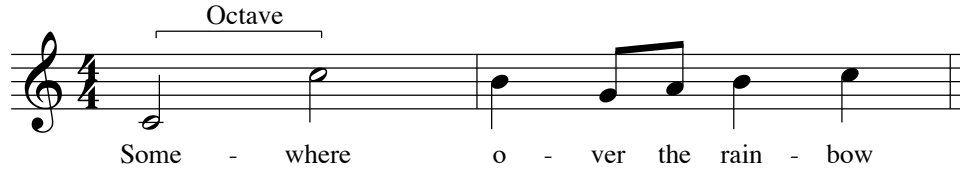
Interval	**Compounded**
2^{nd}	9^{th}
3^{rd}	10^{th}
4^{th}	11^{th}
5^{th}	12^{th}
6^{th}	13^{th}
7^{th}	14^{th} (not used)
octave	15^{th}

HEARING INTERVALS

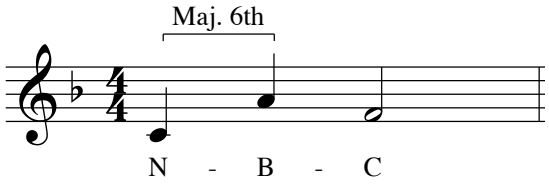
We do not realize how much we already know about music; it's just that we often do not have the musical name for that which we know. For example, there are so many songs, tunes and melodies in our heads, that we implicitly have their intervals in our heads as well. If we can attach an interval name to a portion of a melody that we can recognize and sing, we can consequently recognize and sing that interval.

Here are some examples:

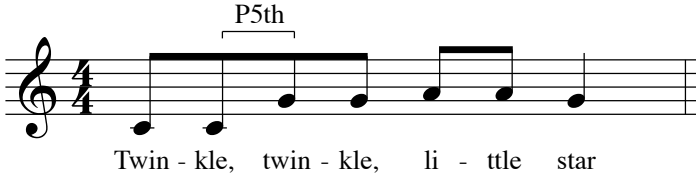
The Octave: ***Somewhere over the Rainbow***



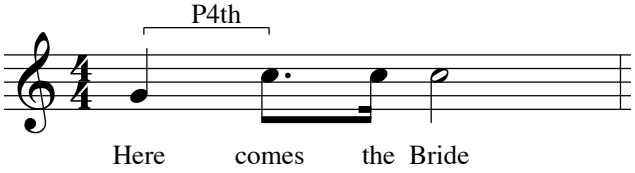
The Major Sixth: the *NBC* TV sound byte



The Perfect Fifth: ***Twinkle, Twinkle, Little Star***

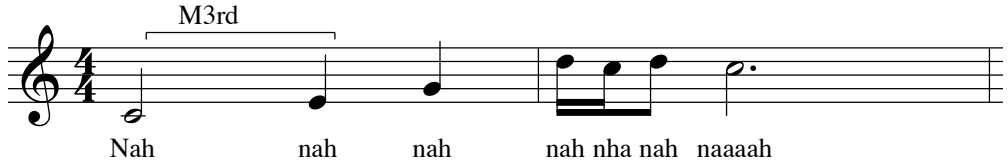


The Perfect Fourth: ***Here Comes the Bride***

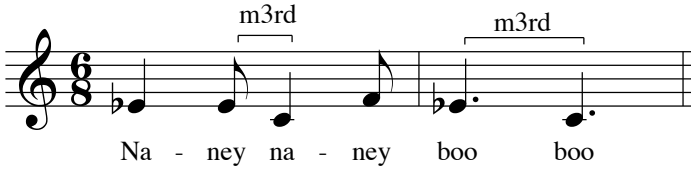


MORE EXAMPLES

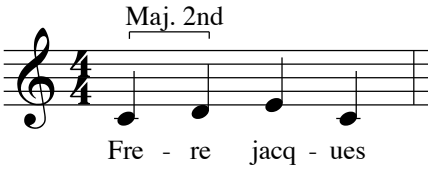
The Major Third: the "Nah Nah" part of *Hey Jude*



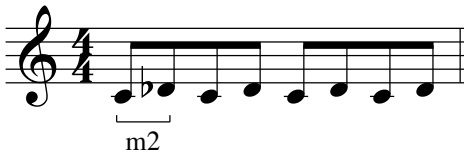
The Minor Third: *Nanny Nanny Boo Boo*



The Major Second: *Frére Jacques*



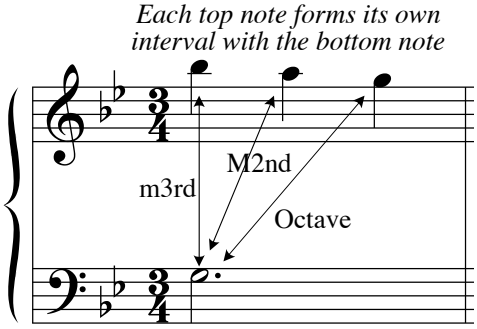
The Minor Second: *Jaws...*



IDENTIFYING INTERVALS IN A PIECE

Using an excerpt from a Bach minuet in G minor (on a separate page), try to identify the marked intervals. The piece is written in two *parts*, meaning that there are just two lines of music (the left hand and right hand for the keyboard – the bass and treble clefs). Since an interval measures the distance between two notes, we can identify intervals both melodically and harmonically. The *melodic* intervals are from one note to the next in the individual parts, while the *harmonic* intervals are those made where the notes from both parts sound together.

Some harmonic intervals will be compounded, but for our purposes we will ignore that fact to make things a little easier. The first harmonic interval in the piece is from a G below middle C up to a B flat above the staff. This interval is technically a minor 17th because it is 17 notes from *that* G to *that* B flat. But we will just abstractly consider it a *G up to a B flat,* and call it a minor 3rd. See the example blow for clarification of this labeling process.



Also notice that in the first measure there are three notes (B flat, A and G) in the top part and only one note (G) in the bottom part. Since the bottom note sounds for three beats, each top note forms its own harmonic interval against that lower G. The B flat forms a minor 3rd, the A forms a major 2nd and the G forms an octave.

While we could identify every single interval between every single melodic and harmonic relationship, just identify those intervals that are marked.

INTERVALS SUMMARY

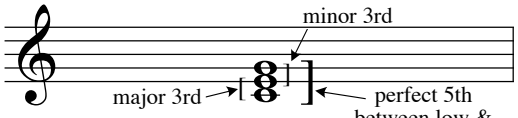
- An interval measures the distance between two notes
- This distance is specified by a number and a quality
- The numeric portion is always determined by the note names and how many notes are in between the two notes in question
- The five qualities are: Perfect, Major, Minor, Diminished & Augmented
- Unisons, 4^{ths}, 5^{ths} and Octaves (8ths) are assigned the *perfect* quality, with the possibility of them being augmented or diminished
- 2^{nds}, 3^{rds}, 6^{ths} and 7^{ths} (the *imperfects*) are assigned the *major/minor* qualities, with the less frequent possibility of them being augmented or diminished
- Intervals can be determined by associating them with a scale, and the intervals in that scale (in a major scale, all the intervals above the tonic will either be major or perfect – always!)
- Intervals can also be determined by counting the number of half steps between the notes
- Any interval can be inverted
- When inverting the numeric portion of the interval: the interval and its inversion always add up to nine
- When inverting qualities: major inverts to minor, and minor to major; diminished inverts to augmented, and augmented to diminished; perfect stays perfect when inverted
- A compound interval is anything larger than an octave, but usually treated the same as its non-compounded equivalent

TRIADS

Now that we know how to create and recognize intervals, we have the basis for understanding **harmony**–notes sounding (or at least being heard) at the same time. While the most basic harmonic element is the interval (two notes), we can go one step further and add a third, simultaneously-sounding note: now we have a chord. A chord with three notes (for our purposes) is called a **triad** ("tri" as in three notes). But these three notes are arranged in a particular way: in vertical 3rds (also called "stacked" 3rds).

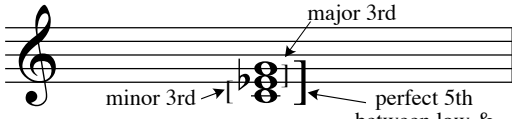
The four basic triads derive their different **qualities** from the four possible ways to arrange major and minor thirds. A triad could be **Major**, **Minor**, **Diminished** or **Augmented** (just like the interval qualities). ***PLEASE NOTE: A triad will always be named in terms of its root (the lowest note in the vertical arrangement of 3rds).*** The examples below are all different kinds of "C" triads.

Major: a major third with a minor third on top
(the interval from the bottom to top note is a perfect 5th)



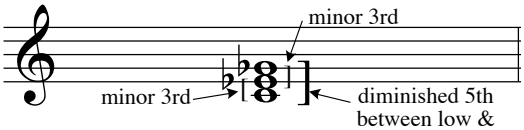
C major triad ("CM")

Minor: a minor third with a major third on top
(the interval from the bottom to top note is a perfect 5th)



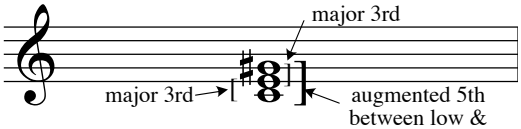
C minor triad ("cm")

Diminished: a minor third with another minor third on top
(the interval from the bottom to top note is a diminished 5th)



C diminished triad ("c°", "c dim.")

Augmented: a major third with another major third on top
(the interval from the bottom to top note is an augmented 5th)

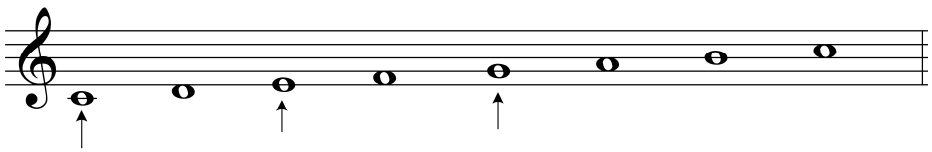


C augmented triad ("C Aug.", "C+")

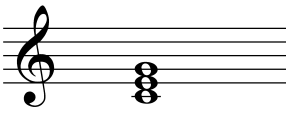
TRIADS IN THE SCALE

Like intervals, triads might be better-understood and/or appreciated when put into a context. We can see triads, like intervals, as something emerging from and belonging to a scale.

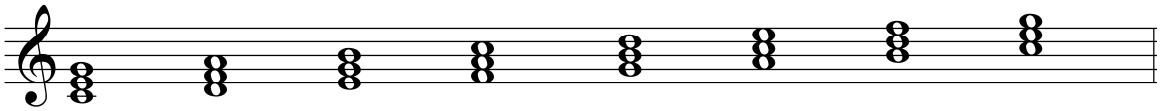
If we take a C major scale and play only the 1st, 3rd and 5th notes, which is every other note starting from the tonic, we get a C major triad (the intervallic sequence of a major 3rd plus a minor 3rd).



Playing these notes
(every other note in the scale,
or notes in thrids in the scale) gives us →



We can apply this procedure to any note in the scale: pick a note and then pick the notes that are a 3rd and a 5th above it (scalar notes), and we get a triad built from every note in the scale with these results:



C maj. D min. E min. F maj. G maj. A min. B dim. C maj.

- **The triads built from the 1st, 4th and 5th degrees of any major scale are major**
- **The triads built from the 2nd, 3rd and 6th degrees of any major scale are minor**
- **The triad built from the 7th degree of the major scale is diminished**

Scale Degree of Triad's Root	**Quality**
1, 4, 5	**Major**
2, 3, 6	**Minor**
7	**Diminished**

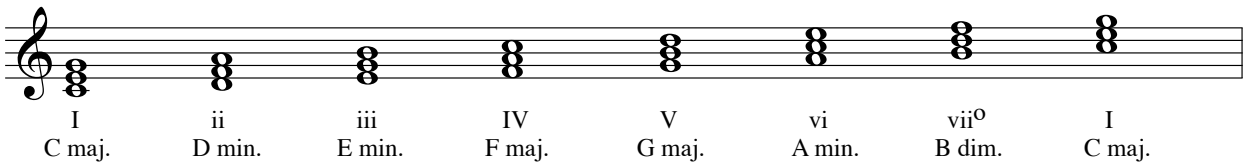
THE ROMAN NUMERAL SYSTEM

As a means of relating these different qualities to the different chords based on the seven scale degrees, a Roman numeral system is used. Upper case numbers represent major triads (I, IV, V), lower case numbers represent minor triads (ii, iii, vi), and a lower case number with the diminished symbol (^{o}) represents a diminished triad (vii^{o}). To represent an augmented triad, the upper case Roman numeral is followed by a "+" sign.

DIATONIC HARMONIZATION

The triads that come from a scale (in this case, the major scale) are called *diatonic* triads, meaning that they are made up of notes only from that particular scale. Another way to describe these triads is that they *harmonize* the scale (they turn a melodic scale into something with harmonic capabilities).

The particular order of major scale diatonic triads (from scale degrees 1 – 7)…



…is always the same, regardless of which major scale we use. This stands to reason; since the pattern of each major scale is identical, any resulting procedures (such as building triads) should also form identical patterns from one scale to the next.

So the order of triads in any major scale is:

I ii iii IV V vi vii^{o} (I)

MINOR KEY DIATONIC TRIADS

When we extract triads from the minor scale, the procedure is similar, but not exactly identical. On the most basic level, we can predict that the diatonic minor triads will be the same chords in the same order as the major diatonic triads, but shifted to a different starting point. This is so because the relative minor scale is just the result of starting and ending on the 6th scale degree of the major scale. So the diatonic triads of an A minor scale would be:

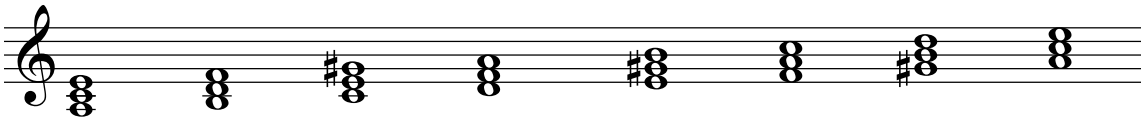
Natural Minor Triads

Notice that these are the same diatonic chords of C major. Only the roman numerals and their qualities have shifted over by three notes (or six, depending on which way you go) to accommodate the relative minor key of A.

There is, however, a special consideration for the minor key diatonic triads:

Recall that there are three types of minor scales: *natural*, *harmonic* and *melodic*. Because the harmonic and melodic minor scales use slightly different notes than the natural minor, the resulting triads will be slightly different. Here are the diatonic triads of a harmonic minor scale (with a raised 7th degree – a G sharp in the case of A minor):

Harmonic Minor Triads



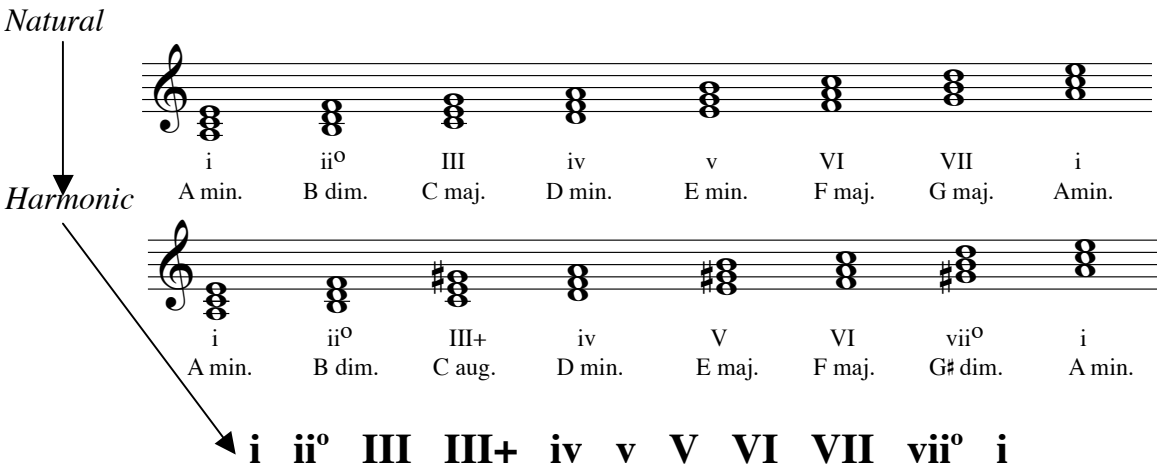
Compared with the natural minor triads, we see that the three chords that use the G natural/G sharp are different. Here is a side by side comparison:

Natural: **i ii° III iv v VI VII i**

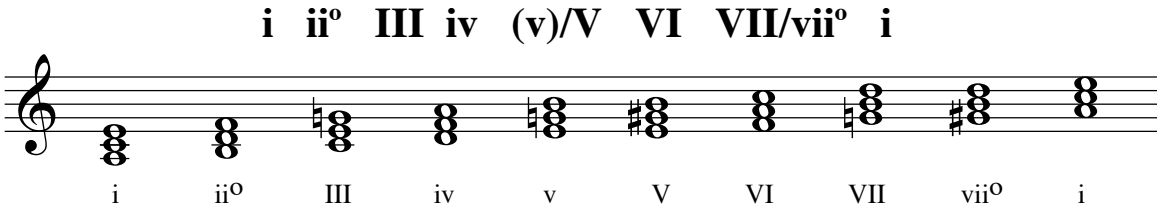
Harmonic: **i ii° III+ iv V VI vii° i**

We tend not to use the diatonic triads resulting from melodic minor (which would give us a few more triad options) because that scale is reserved for melodic, not harmonic purposes.

So the result of combining the natural and harmonic minor diatonic chords is:



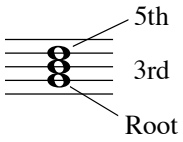
Of these possibilities, the III+ (augmented) chord is less-used, and the v (minor) chord is used in a very limited context (we mostly use the V major chord). The vii° and VII chords are equally used subject to context. The final list of the most used diatonic minor key triads is:



Notice that the V and vii° chords that came specifically from the harmonic minor scale now have, in terms of their scale degree numbers, the same qualities as their corresponding chords in a major key. This connection will become more relevant when we study chord progressions and cadences.

TRIAD TERMINOLOGY

The notes of a triad are called chord tones. Each chord tone is named in terms of its distance from the bottom note of the triad, which is called the root.

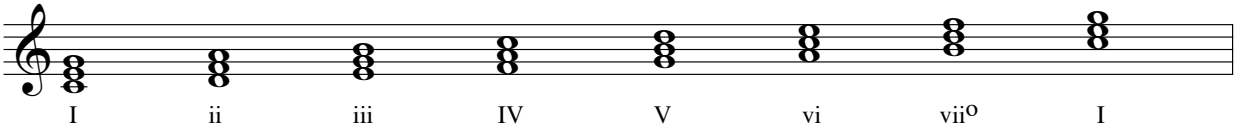


Regardless of what quality it is, or which scale degree it is built from, or which key it is in, we refer to the notes as the root, 3rd and 5th.

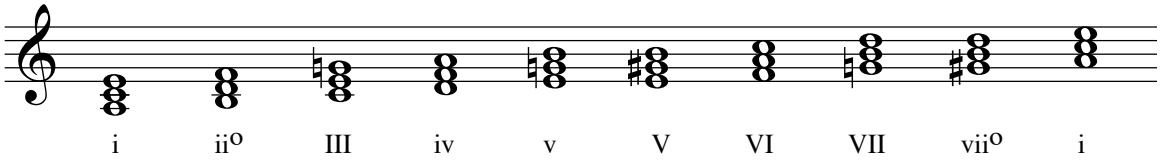
TRIADS SUMMARY

- Triads are three note chords whose notes are arranged in 3rds
- They are named after the bottom note, known as the root
- They come in four qualities: Major, Minor, Diminished and Augmented
- The particular arrangement of major and/or minor 3rds will determine the quality of the triad
- Triads can also be derived from a scale (like intervals) by selecting every other note in the scale, and any note in the scale can serve as the root
- Triads that we associate with a scale are called diatonic triads and they are enumerated with roman numerals I – VII (uppercase for major, lowercase for minor)
- The most often used minor key diatonic triads are a combination of the natural and harmonic minor scales with the most important use of the harmonic minor's V major chord

Major Scale Triads:



Minor Scale Triads:



TRIADS: CONTINUITY AND COHESION

The triad is a basic element in harmony, which is the experience of hearing multiple notes sounding together. Most western classical, pop, jazz and folk music is based off of this kind of harmony.

In recalling the issues of continuity and cohesion, it is worth noting that a big point has been made to understand triads as chords in a diatonic system, meaning that a particular group of triads can all be related to a **single** scale. Since a scale can be heard to represent a type of melodic continuity, a group of diatonic triads can be heard to represent a type of harmonic continuity. In context, then, a seemingly random collection of chords might be cohesively tied together by their relationship to a single scale. The chords CM, Am, Dm, GM are all diatonic to (a part of) the C major scale or the A minor scale.

Again, we can start to see and hear how at a level of harmony (multiple notes at once), music theory strives to explain how separate elements (the different chords) are potentially unified through a fundamental scale. Here, we can liken the notes of a scale as being specific ingredients for the more complicated chords that emerge from them. Understanding triads (and therefore, harmony) in this way serves well the basic ideas of *continuity and cohesion* previously mentioned. The other basic idea of *motion* will be taken up in the section on harmonic progressions later on.

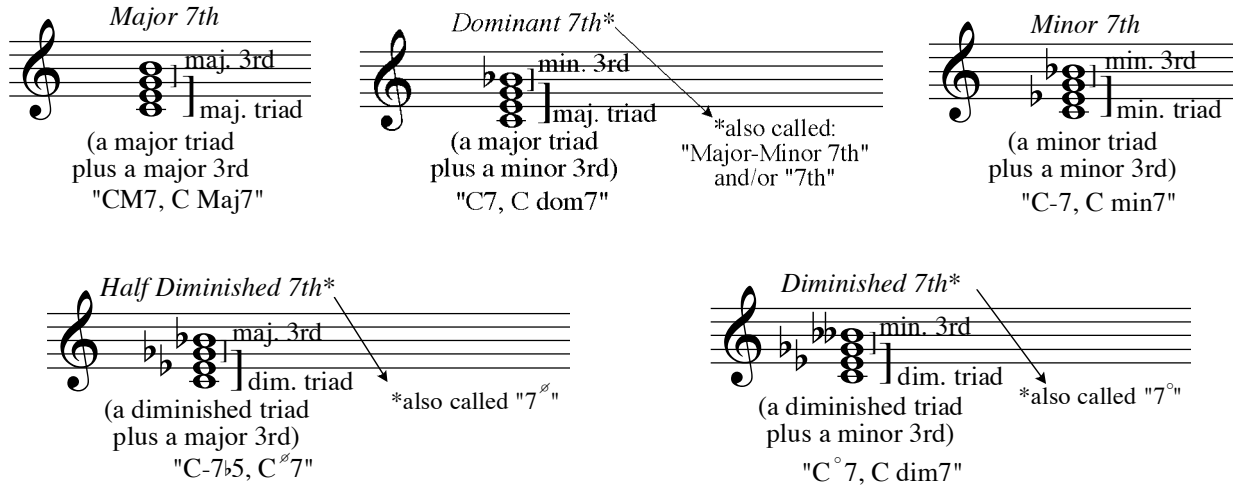
7TH CHORDS

The same process that brought about the three-note triad chord can be extended to make a four-note chord. The triad is formed by selecting every other note (three notes total) in a scale. If we add one more note through the same process (a third higher), we get a 7th chord. The top note (the last note added) is an intervallic 7th from the root (bottom note) of the chord.

Similar to the four qualities of the triads, there are five types of 7th chords:

Major, Minor, Dominant, Half Diminished and Diminished

Abstractly, the different qualities of the 7th chords can be determined by their interval contents:



*It is possible to have an **augmented** 7th chord (an augmented triad with a minor third on top), but it is most-often used in music after the Classical era.*

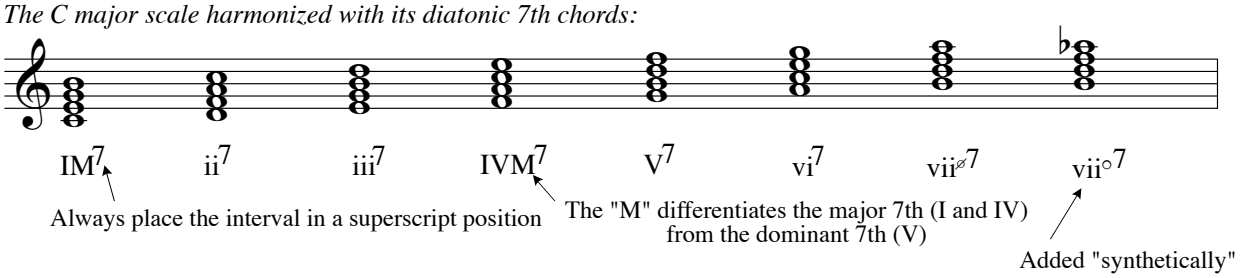
The superscript symbols for diminished and half diminished are:

***Diminished*:** **o**

***Half Diminished*:** ∅

In a diatonic context, the 7th chords are as follow**s:**

The C major scale harmonized with its diatonic 7th chords:

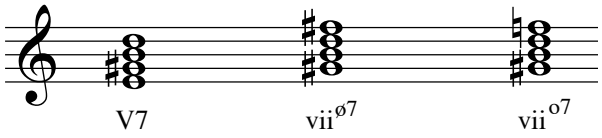


- The I^7 and IV^7 are major 7ths.
- The V^7 chord is a dominant 7th (built off of the 5th/dominant scale degree).
- The $vii^{ø}$ is a half diminished chord.
- The vii^{o} is not a literal diatonic chord because it has a non-scale tone (A flat in the case of C major), but we allow it the same way we allow similar variations in the minor key triads. In addition, you will notice that the diminished $vii^{o}7$ sounds very similar to the half diminished $vii^{ø}7$.

APPLICATION OF 7TH CHORDS

In more modern music, especially jazz, all the possible diatonic 7th chords are used quite often. In earlier music (such as from the classical period), the more often used 7th chords were limited to the V^7 (the dominant 7th) and the diminished vii^{o7} and half diminished $vii^{ø}$ 7ths (i.e. major and minor 7th chords were seldom used). This was the case for both the major and minor keys. In minor keys, like with their triads, the harmonic minor mode was often used when harmonizing certain chords that used the leading tone (limited to chords built off of the 5th and 7th scale degrees).

7th chords in the key of A minor



The three more-often used 7th chords as they appear in A minor. Like with the diatonic minor triads, these chords use the raised 7th scale degree (leading tone) that comes from the harmonic minor mode (the G sharp).

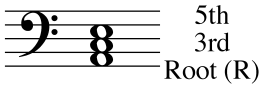
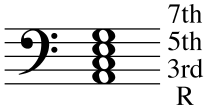
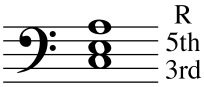
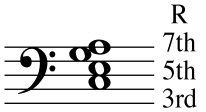
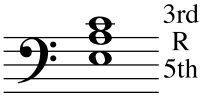
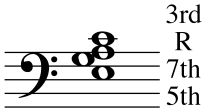
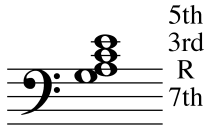
7TH CHORDS SUMMARY

- 7th chords are four-note chords
- They are essentially triads with another note added on top; this note is a 7th above the root note
- Like triads, the top note is either a major or minor 3rd above the note directly beneath it
- There are five 7th chord qualities: Major 7th, Minor 7th, Dominant 7th, Half diminished 7th and Diminished 7th (although there *are* other ways to arrange the major and minor 3rds)
- Also like triads, 7th chords can harmonize the major and minor scales
- When we notate 7th chords, we always include a superscript "7" to the right of the chord symbol (either a letter name, or a roman numeral)
- And also like triads, the seventh chords built off the 5th and 7th scale degrees of a minor key more often use the harmonic minor mode, which has the raised 7th in the scale
- Additionally, the chord built off the raised 7th scale degree in minor could be either a half diminished 7th chord or a diminished 7th chord
- The dominant, half diminished and diminished 7th chords are the ones most frequently used in classical style music, while jazz will regularly use the major and minor 7th chords as well

INVERTING CHORDS

The triads and 7th chords we have examined so far are called *root position* chords because the root of the chord is the lowest note. We call the bottom note the *bass* note. But the bass note of a chord and the root note of a chord are not always the same thing.

When we invert a chord (just like when we inverted intervals), we re-arrange the order of the notes while not actually changing the notes themselves. A step-by-step approach to this process looks like this:

Term	**Triad**		**7th Chord**
Root Position		The root is in the bass	
First Inversion		The root moves to the top (inverts), leaving the 3rd of the chord in the bass	
Second Inversion		The process repeats: the bass note (the 3rd) moves to the top, leaving the 5th as the new bass note	
Third Inversion	(only for 7th chords)	The process repeats: now the 7th of the chord is in the bass	

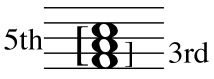
Note: all these inversions are in *closed position*, meaning that there is never more than an octave between the lowest and highest note.

In listening to these different inversions, notice that while there is something different-sounding about each chord, they moreover sound the same. It is as if each inversion is merely a different hue of the same color. In music theory terms, the same notes in any order or arrangement will always make the same harmony (since harmony is not defined by the vertical order of the notes), although each unique arrangement of the notes will have its own, unique harmonic "hue".

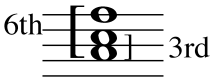
FIGURED BASS NOTATION

Figured bass notation uses numbers to describe the inversion of a triad or 7th chord. While we have already acquired a logical set of names for describing all the possible inversions of chords (*root position*, *1st inversion*, *2nd inversion*, and *3rd inversion* in 7th chord cases), the numeric system of figured bass is much more concise and scientific. The numbers in figured bass notation refer to harmonic intervals above the bass note of any chord in any ***closed*** inversion.

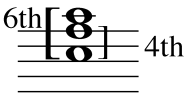
The three notes of a triad form two different intervals above the bass note. These intervals change as the inversion of the triad changes. (We will forgo the major or minor qualities of the intervals since those are inherently defined by the governing scale).



Root pos. triad

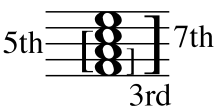


1st inv. triad

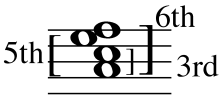


2nd inv. triad

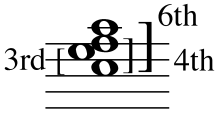
The same idea holds true for 7th chords, except there is one additional interval since there is one additional note.



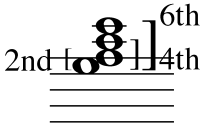
Root pos. 7th chord



1st inv. 7th chord



2nd inv. 7th chord



3rd inv. 7th chord

By vertically listing the intervals above the bass note of a chord from bottom to top, we thereby know the chord's inversion, if any. This chart lists all the inversions and intervals as we would see them in figured bass notation:

Inversion	*Triad Fig. Bass*	*7th Chord Fig. Bass*	*Bass Note*
Root	5 3	7 5 3	Root in bass
1st	6 3	6 5 3	3rd in bass
2nd	6 4	6 4 3	5th in bass
3rd	N/A	6 4 2	7th in bass

FIGURED BASS NOTATION II

This chart is a simplified version of the same figured bass notation. It eliminates any unnecessary numbers. This is the notation that we actually use.

Inversion	*Triad Fig. Bass*	*7th Chord Fig Bass*	*Bass Note*
Root	(no numbers)	7	Root
1st	6	6 5	3rd
2nd	6 4	4 3	5th
3rd	N/A	4 2	7th

These numbers would be superscript and to the right of the Roman numeral. For example, if we were trying to describe a V triad in its three possible inversions, it would look like so:

Root position: V

1st inversion: V^{6}

2nd inversion: V^{6}_{4}

If we were trying to describe a V 7th chord in its four possible inversions, it would look like this:

Root position: V^{7}

1st inversion: V^{6}_{5}

2nd inversion: V^{4}_{3}

3rd inversion: V^{4}_{2}

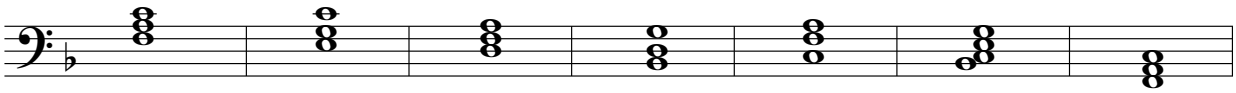
APPLICATION OF FIGURED BASS NOTATION TO HARMONIC ANALYSIS

Figured bass notation was used in the Baroque era (late 17th – mid. 18th centuries) as a shorthand system for notating chords that a keyboardist should play (usually when accompanying other instruments or voices). Currently, theorists use this system to analyze music, which, when combined with the Roman numeral labeling system, is extremely helpful for understanding how composers approached harmony (chords). Since harmony is a fundamental element of western music, having an organized system for labeling and analyzing chords is essential if we are to draw any consistent conclusions.

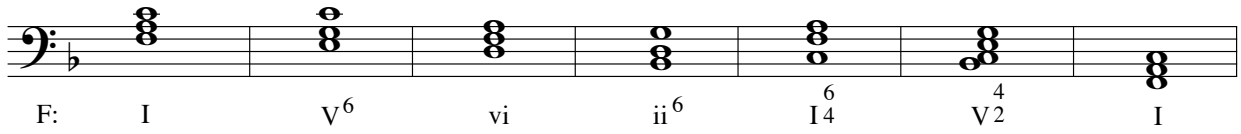
Labeling the harmonic component of a musical texture involves three things:

- Determining the key
- Determining the chords within the key
- Determining the inversions of the chords

Here is a basic harmonic progression (a series of chords):



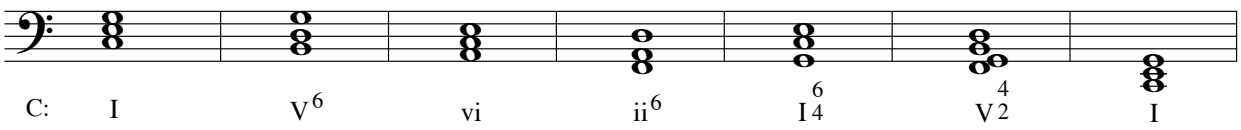
Here is how it looks with a complete harmonic analysis:



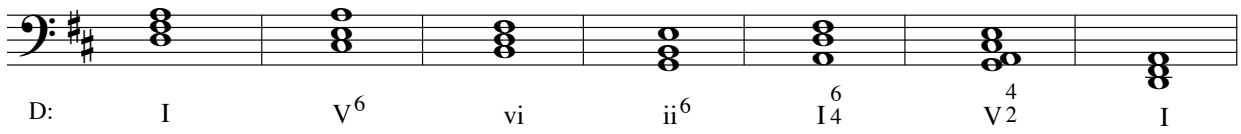
- The name of the key is placed below the clef (uppercase for major, lowercase for minor). We know that this is in the key of F major and not D minor because the first and last chords are F major chords.
- The Roman numerals are placed directly below the chords.
- The inversions of the chords are described via the figured bass notation.

Now we can understand this progression in a very absolute way. Of the many advantages of this system of analysis, one is that of transposition into another key. By simply following the Roman numerals and figured bass notation, the chord progression could be transposed into any key.

Here is the same progression transposed to C major. Notice that except for the key, the analysis does not change:



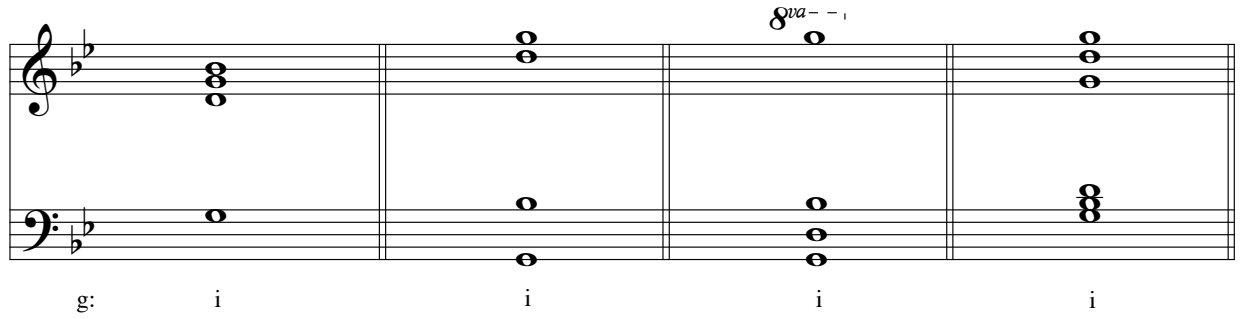
And here it is in D major:



POSITION OF THE UPPER NOTES IN FIGURED BASS NOTATION

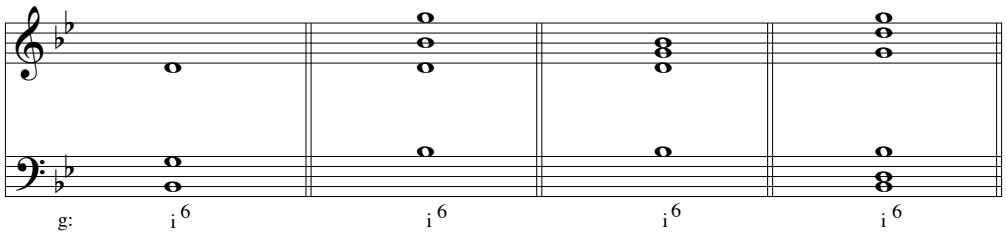
The basic realization and analysis that we have seen so far has been with *closed position chords* (where the upper notes above the bass are an octave or less above the bass note). Actual chords in applied figured bass, however, often have their upper notes in any order and at any distance from the bass note. And often, one or more of the upper notes will double the bass note or another note in the chord in a different octave. This means that the only thing we need to know about a figured bass chord is which note is on the bottom – in the bass.

These are all root position versions of a **i** chord in G minor (a G minor triad):



Regardless of the order or range of the upper notes, these are all the same chord in that they are all the same *harmony* with the same note in the bass.

These are all first inversions of the **i** chord in G minor (and therefore, the same harmony):



The only thing that matters in the writing or analysis of harmony in figured bass is which note of the chord is on the bottom, and that all the notes above it (however many and in whatever order) fulfill the notes of the chord. This is so because with harmony, we are primarily concerned with the collection of the notes sounding together and not with the order in which they are arranged. (But of course, the order is important for other reasons). The vertical order of the notes does not change the essence of the harmony because it is still just the same small collection of notes. Certainly we hear a difference between the different inversions and the placement and number of notes in a chord, but even if you have three *E*s, two *G*s and a *C* (in any order), it is still a C major triad. A pizza, even with extra sauce and extra cheese, is still a pizza.

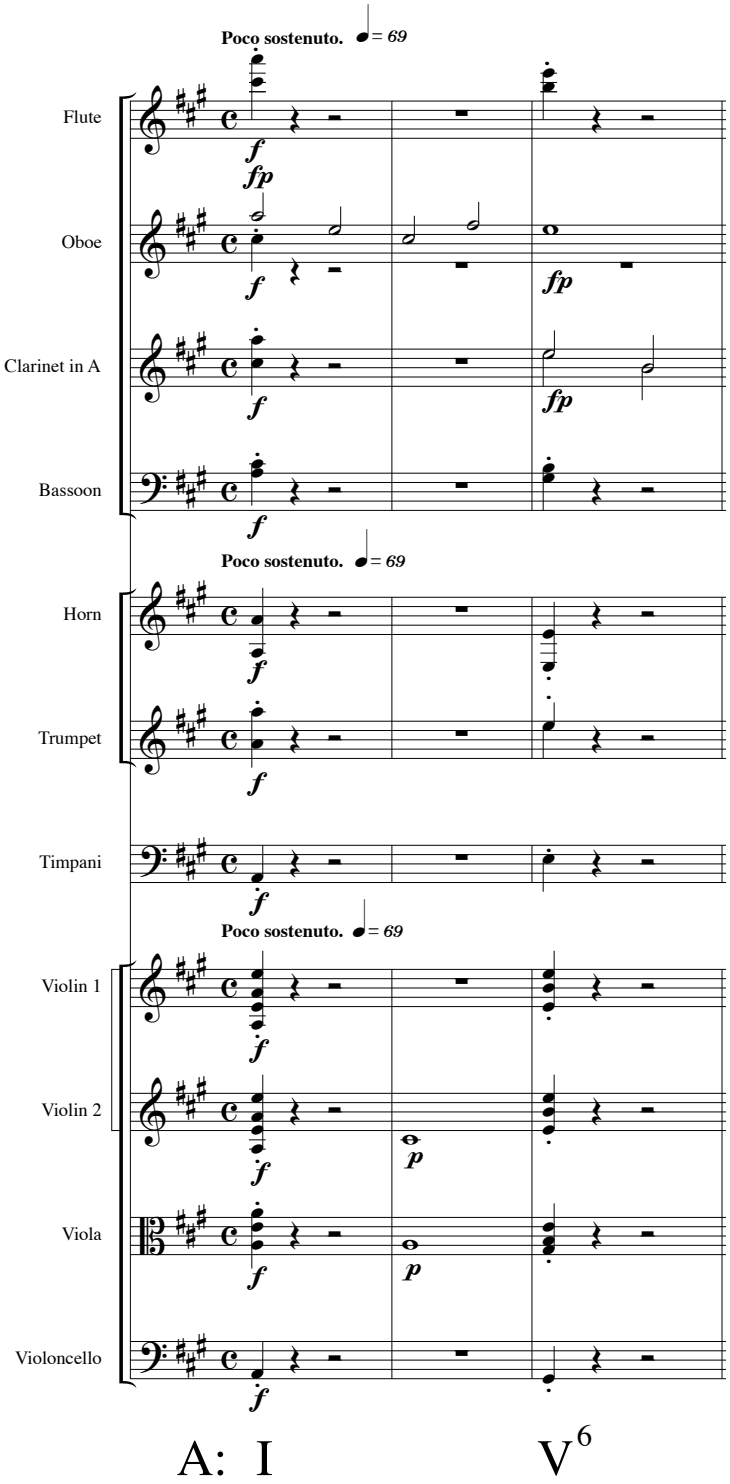
VOICING A CHORD

When interpreting figured bass notation, one has a lot of freedom in arranging the upper notes as long as they fulfill the required harmony. The way in which the notes are arranged and/or disbursed is called *voicing*. A chord could be closely or widely voiced. The way a performer or composer voiced a figured bass chord was up to his or her discretion.

This principle is important as we consider both analysis and composition. Whether the musical texture is a piano score, chorale setting or a whole stack of different instruments in a symphony, the notes might merely form a simple I or V harmony, for example. Understanding the notes in this way allows an analyst or composer to maintain an abstract, general concept of what the music is doing (fulfilling a typical harmony) while the particular voicing, instrumentation and rhythm let that harmony operate in a way specific to the piece at hand. Especially in analysis, one thing we do is determine the harmony at any given moment in a piece. In doing so, we abstract or reduce the unique elements to something very general.

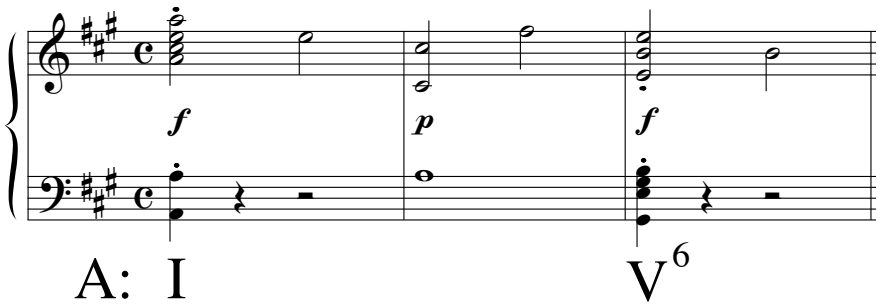
The following excerpt is from Beethoven's 7th symphony. It is an excellent example of how some simple harmonies within a complex texture can be completely described with figured bass notation. This excerpt is really only two triads… Some of the most delicious recipes use just the simplest of ingredients.

The first three bars of Beethoven's 7th symphony:



While Beethoven very carefully chose which instruments would play which notes, the resulting chords are still very basic (I and V^6). In fact, we might surmise that Beethoven conceived of the chords *first*, and *then* laid them out (voiced and orchestrated them) in an orchestra setting.

Here are the same three bars re-scored for the piano. Some doubled notes have been eliminated to accommodate the limited range capabilities of 10 fingers, but the notes of the I and V^6 chords, especially the inversions, are the same:



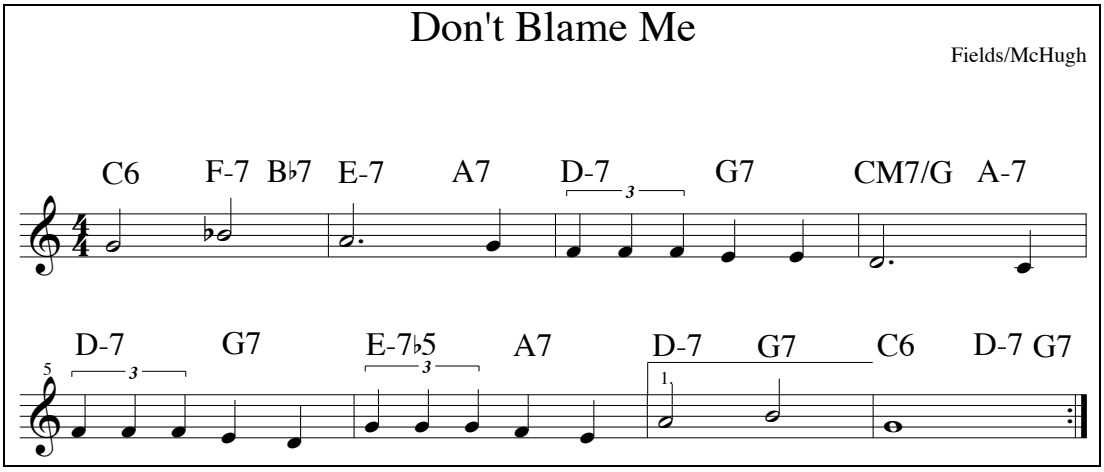
Now we can compare two very different musical textures (the orchestra and the piano) and see how on a harmonic level, they are identical. This is one of the results of figured bass conception and notation.

CONTINUITY AND MOTION

In returning for a moment to the ongoing themes of continuity and motion that we hope to have our study of music theory address, the concept and use of figured bass supports and enhances these perspectives. Chord inversions and/or figured bass (really the same thing, but with different terminology) show us how a single chord can be expressed in a multitude of ways through different inversions and through different voicings. Through this practice, a single or small number of harmonies can be re-used in many incarnations that offer both a sense of change and freshness (motion), while remaining cohesive to a larger, more basic structure of familiar chords (continuity). The main idea of a piece might just be a simple chord progression over and over again (such as *Pachelbel's Canon*, or in a 12-bar blues), but the way that progression uses inversions and voicings each time through can give it both variety (motion) and cohesion (continuity).

INVERSIONS IN A CONTEMPORARY CONTEXT

We may also find yet another way of presenting inversions in the more contemporary context of rock, pop, or jazz, where a chart is used. Charts usually just use a treble staff (for the melody) and chord names and symbols (not Roman numerals). Here are the first eight bars of *Don't Blame Me* in typical chart format:



Without wondering about the specific jazz notation that we have not covered, notice in the 4th bar that the chord is "CM7/G", which we call "C major seven over G". This is exactly the same as a second inversion CM7 chord. Instead of writing the name of the inversion or the figured bass symbol, the actual notes are used in combination with the "over" slash. Jazz and pop song books will use this method for notating the chords rather than the Roman numeral/figured bass method. Even if complete notation is provided (such as in piano books, or guitar books that use tablature), these types of chord symbols are also included. Whatever note is to the right of the slash is the note to be played in the bass of the chord. If it were written "CM7/E" (C over E), then we would understand the chord to be in first inversion. Inverted chords notated like this are sometimes called "slash chords".

CADENCES AND PHRASES

A *cadence* is where the music reaches some kind of goal – often accompanied by a rhythmic pause. There are four basic types of cadences and each is defined by its specific use of harmony. The music between cadences is called a *phrase*. Cadences separate phrases and act very much like grammatical periods while musical phrases are like grammatical sentences. These devices are important in musical structure because they divide the music into smaller, bite-sized, manageable pieces. Imagine how difficult it would be to communicate if we only spoke or wrote in run-on sentences, or if our phone numbers and social security numbers were un-hyphonated. Humans generally have an easier time digesting things in small doses.

The four basic types of cadences are differentiated by the following types of harmonic motion:

Authentic: Dominant (V, V^7 or vii^o) to Tonic (I or i) harmonic motion: the strongest type of cadence because it returns (re-stabilizes) the music back to the home (tonic) chord. Subtle degrees of strength can be determined by the inversion of the chords (root position is the strongest) or the melodic scale degree (the root is the strongest). **$V/V^7/vii^o \rightarrow I/i$**

Plagal: Subdominant (IV or iv) to Tonic (I or i) harmonic motion: strong because it goes to the tonic, but not as strong as the authentic cadence because the motion is "less progressive" (down by a 4th) and because there is no leading tone in the IV/iv chord. **IV/iv → I/i**

Half: Non-dominant (i.e. just about anything) to Dominant (only V/V^7) harmonic motion: strong, but inconclusive because it stops on the chord (V/V^7) that inherently wants to resolve to the tonic (I/i). In this case, it doesn't resolve there. **$X \rightarrow V/V^7$**

Deceptive: Dominant (only V/V^7) to vi/VI harmonic motion: weak because the expected tonic resolution is withheld. It creates the feeling that we need to hear more music, especially the withheld tonic. **V/V7 → vi/VI**

THE PERIOD

A musical paragraph is called a *period*. A period is a collection of phrases with the last phrase having the strongest (most conclusive) authentic cadence. Like the "bite-sized" notion behind cadences and phrases, the organization of a period helps to serve the larger sense of direction in music. By structuring cadences so that the weaker ones come first, the music is apt to feel like it is gradually unfolding and building up (*moving*) towards a more conclusive goal. In this sense, a period is a macrocosmic example of how scales and progressions operate: having a sense of logical motion that works towards an inevitable goal.

The number of phrases in a period can vary, but for our basic purpose, we will assume that there are four per period.

Here is a basic example of a four-phrase period (remember that a phrase ends with a cadence):

~~~~~~~~~phrase 1~~~~~~~~ plagal cadence (IV→I)
~~~~~~~~~phrase 2~~~~~~~~ half cadence (X→V)
~~~~~~~~~phrase 3~~~~~~~~ deceptive cadence (V^7→vi)
~~~~~~~~~phrase 4~~~~~~~~ authentic cadence (V→I)

While not all four-phrase periods need to be structured this way (with these exact cadences), here we have a nice logical sequence of events:

- The 1st phrase ends on the tonic, but it is a slightly weak because of the plagal cadence
- The 2nd phrase ends conclusively on the V chord, but the overall structure is not stable or conclusive because the cadence is on the V instead of the I
- The 3rd phrase is also inclusive because of the deceptive harmonic motion; we want to hear the I chord after the V^7 chord, but the substituting vi chord is not ultimately fulfilling
- The 4th phrase sounds the most conclusive because of the authentic cadence: this cadence brings the structure of all four phrases back to a sense of maximum stability and the period is rounded-off nicely.

RHYTHM IN CADENCES

A cadence will usually complete itself on a rhythmically strong beat, which is the first beat of a measure. Nearly as strong (and an additional possible point for a cadence) is the beginning of the second half of a measure that can be divided into two equal parts: beat 3 of a four-four measure, or beat 4 of a six-eight measure, for example.

CADENCE, PHRASE, PERIOD SUMMARY

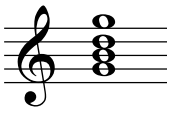
- A cadence signifies a pause or stop in the music
- A phrase is the music between cadences
- There are four kinds of cadences as characterized by their harmonic activity
  - Authentic: Dominant (V, V7, or vii^{o}) to Tonic (I or i)
  - Plagal: Subdominant (IV or iv) to Tonic (I or i)
  - Half: Non-dominant to Dominant (V)
  - Deceptive: Dominant (V) to vi/VI
- Groups of phrases and cadences can be organized into a period, where the last phrase has the strongest (most conclusive) authentic cadence

MELODIC ASPECTS OF CADENCES

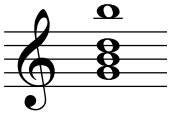
We have yet to study the rules of melody writing, but we can incorporate certain basic aspects of melody into our understanding of cadences. For now, we will understand melody note to be the top (highest) note in a given moment of music. We tend to hear the melody note more than the other notes in a chord. In a cadence, the melody note will be one of the notes that makes up the chord. For example, if the final chord in a cadence were a G major triad, the melody note would be either a G, B or D. If the chord were a G dominant 7th, there could additionally be an F in the melody.

In a cadence, the overall strength or stability of a chord can be varied based on which note is in the melody and also by which inversion the chord is in (root position is the strongest).

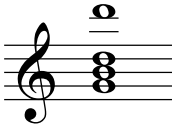
This GM chord:



is slightly more stable than this one:



or this one:



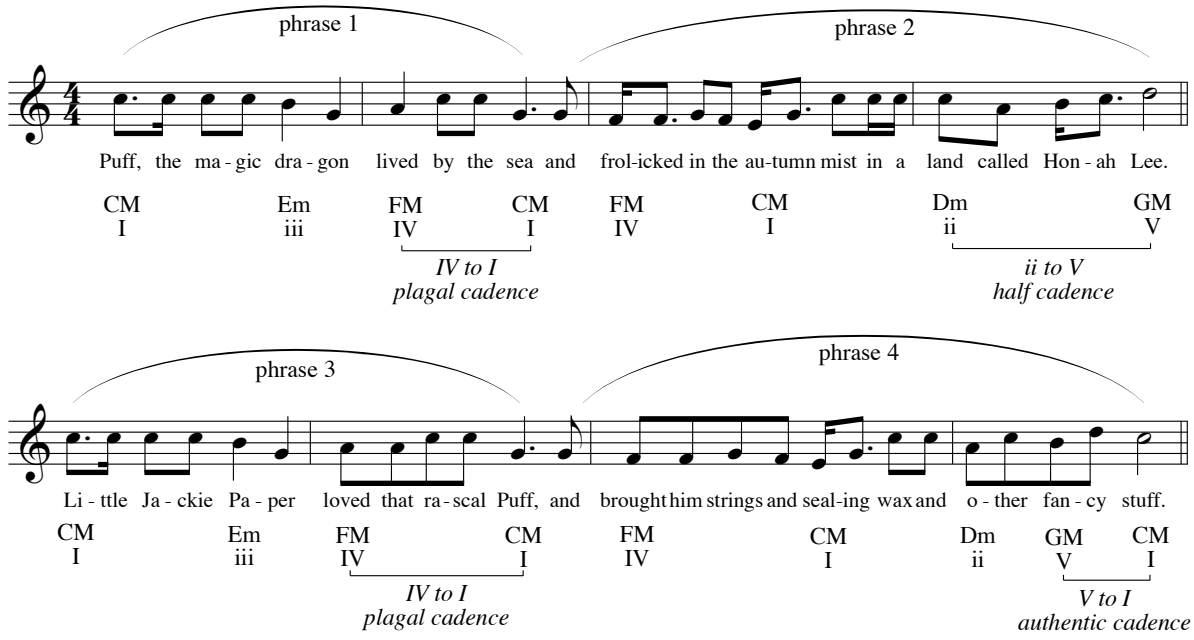
because the root note of the chord is also in the melody.

While this is a subtle distinction, composers were aware of these differences and used them in determining the long range build-up or diminution of cadences in a piece. We will see how this principle is effective even in *Puff the Magic Dragon*.

ANALYSIS OF CADENCES AND PHRASES

In context, when we analyze phrases and cadences, along with their melodic components, we see that they often follow a larger structure that allows the strongest cadence to come at the end of a series of phrases (like the final idea at the end of a written paragraph).

Puff The Magic Dragon makes for a good example of how this practice is utilized:



This is the standard way to label an analysis

- The first phrase is conclusive because of the plagal cadence, but not completely conclusive, so we feel that there is a reason for more music to follow. Also, the melody note is cadencing on the 5th (G) of the I chord (as opposed to the root C). This slightly weakens the stability of the I chord.
- The second phrase is nicely inconclusive because it ends with a half cadence. We are left with the feeling that more music must follow so that we can eventually have a strong cadence on the tonic (I).
- The third phrase is identical to the first: conclusive, but not too much.
- The fourth and final phrase is perfectly conclusive (the end of the paragraph, as it were!). The cadence is authentic and even the melody note is on the root (C) of the tonic chord, which delivers a maximum feeling of completion and stability.

MELODIES AND VOICE LEADING

On a basic level, we often separate music into two components as far as pitches are concerned. *Harmony*, as we have learned, deals with multiple pitches heard at the same time. *Melody*, the other component, consists of single pitches heard one at a time (one after the other). In addition, these single pitches will incorporate a rhythmic component, meaning that the length of the note values might vary. In its traditional manifestation, however, a melody will be primarily concerned with *voice leading*.

Voice leading is the way in which a melody is guided so that from one note to the next, the line is very singable and user-friendly for the voice. The term *voice leading* originated from the practice of writing vocal music, especially in the context of it being choral music in the church. In this sense, the melody (the voice) was led from note to note in a manner that was "natural" for the voice. An extreme example of a "natural" melody line would be something along the line of a children's song: *Mary Had a Little Lamb*, or *Three Blind Mice*, where the lines do not cover a very wide range, skip registers very much, or make large leaps.

CONJUNCT AND DISJUNCT MOTION

This type of approach to voice leading did not just mean that a melody would move in simple, small steps (the easiest thing for the voice to do). Good traditional voice leading was careful to combine certain kinds of leaps with smaller stepwise/scale-like melodic motion. The terms for these two basic types of melodic motion are *conjunt* (small, stepwise) and *disjunct* (leaping, non-scalar). Good voice leading, then, carefully combines conjunct and disjunct melodic motion. This makes the line smooth and un-jagged, but with enough variety in its overall contour to keep it interesting and engaging. *Mary Had a Little Lamb*, for example, is not that interesting because it has no leaps in it (no disjunct motion). *Three Blind Mice* is a little more elaborate because the second part of the tune has a nice, conspicuous leap in it (of a perfect 4^{th}).

VOICE LEADING "RULES"

The aesthetic ideal of typical (read "good") voice leading was to create a line that was singable, forward-moving, directed, and with variety incorporated into it. Simple melody/voice lines, like the kind we would find in a portion of a renaissance choral piece, or a Bach adhered to a number of rules or tendencies that served this model. These rules and tendencies helped ensure that these ideals were fulfilled.

Here is a list of very basic rules for diatonic voice leading. Remember that the "rules" of traditional voice leading were just an elaborate scheme of tendencies that were used over and over again, which established a long-standing "classical" stylistic consistency. These tendencies ensured that the melody lines were easy to sing and that they had a sense of continuity (not choppy or leap-heavy), direction (logical motion), variety and contour.

Beginning: Begin on the tonic or dominant (5^{th}) and usually on a strong beat

Ending: End on the tonic (on a strong beat), which should be immediately preceded by the leading tone (even in minor) or the supertonic (the 2^{nd} scale degree); this allows for a smooth, gentle finish

Key: Limited to the diatonic notes of a particular key (for now…)

Shape: Usually arch shaped with a single, high climax note on a strong beat

Range: Maximum of a 10^{th}, minimum of a 5^{th} per phrase

Leaps: Large leaps should be preceded and followed by motion in the opposite direction of the leap, except at the very beginning, where the leap need not be preceded by stepwise motion–basically, the leap makes a gap in the texture, then the gap gets filled in

Note Values: Mostly quarter notes with longer values reserved for the beginning or end areas (long note values in the middle will impede the needed sense of motion)

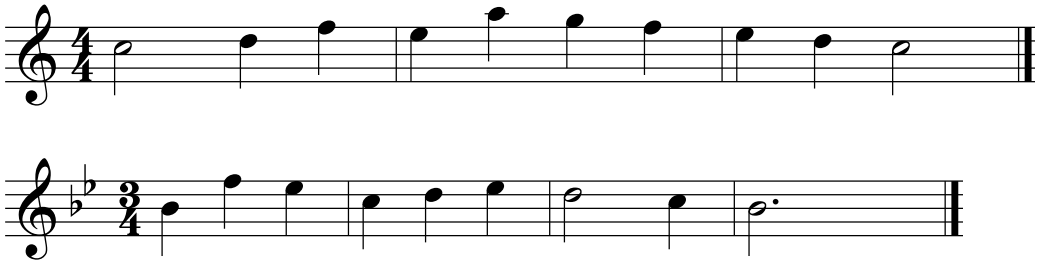
Variety: The line should mostly consist of conjunct motion (steps) with some disjunct motion (leaps) to add variety

Repetition: Avoid repeating tones or groups of tones which could hinder the sense of forward-motion

Length: For the time being (and for the sake of convenience), melodies (i.e. a melodic phrase) should average three or four measures in length

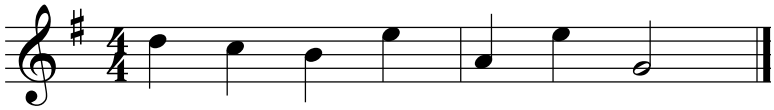
VOICE LEADING EXAMPLES

These first two short examples below represent typical, good voice leading:

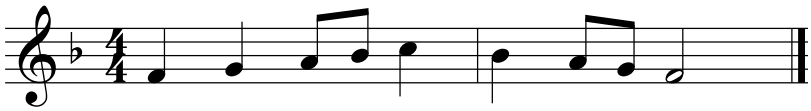


- Each has a interesting arch-like shape, a single climax note and a good balance of conjunct and disjunct motion that provides variety

These next two shorter examples have many errors and do not serve the ideals of good voice leading:



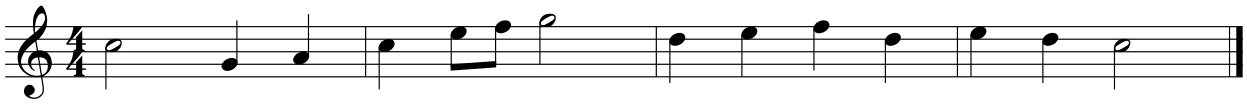
- The above line has two climax notes, too many leaps in a row (a choppy line) and a very rough finish in the final large leap from the E down to the G



- This melody has a smooth shape and a good climax, but there is no variety of direction and not a single leap

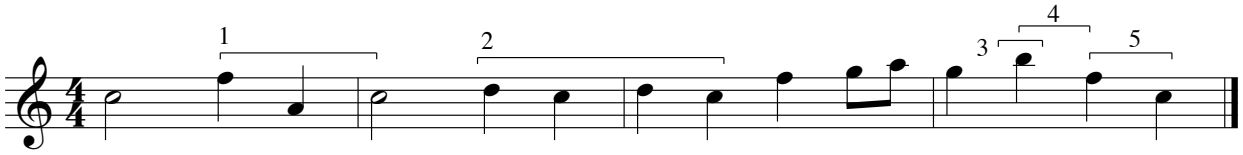
MORE EXAMPLES

Below is a longer, perfectly fine example of good voice leading:



- The line has a nice arch shape, but with some variety-providing changes of direction
- There is a balance of conjunct and disjunct motion
- There is a single climax note
- All the large leaps are properly prepared and resolved
- While there is a longer note value in the middle, there is only one and it serves to divide the larger phrase into two "sub-phrases"

Below is a melody full of errors:



1. There are two leaps in a row without any preparation or resolution: this disrupts the sense of flow and continuity
2. A group of tones (D, C) is immediately repeated, which impedes the sense of forward motion
3. The climax note is the leading tone, which makes the line feel like it should continue upward to the tonic
4. The leap from the B down to the F is an augmented 4th (a forbidden leap – just listen to it!)
5. There is a large leap to the last note, which makes for a somewhat harsh, bumpy landing

COMBINING MELODY AND HARMONY

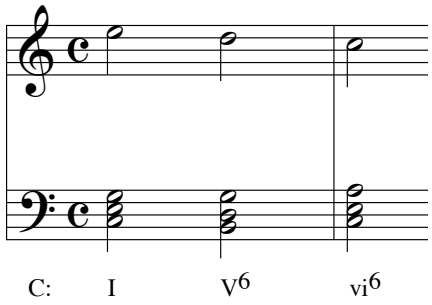
While anything is possible in music, there are certain basic rules and practices that help the combination of chords and melodies sound cohesive. Generally speaking, the melody is in the highest register and the harmony is in the lower register.

CHORD TONES & NON-CHORD TONES

When combining melody and harmony, the melody notes fall into two categories: *chord tones* and *non-chord tones*. A chord tone is a melody note that is in the chord above which it is sounding (but in a higher register). A non-chord tone is a melody note that is not a part of the chord above which it is sounding.

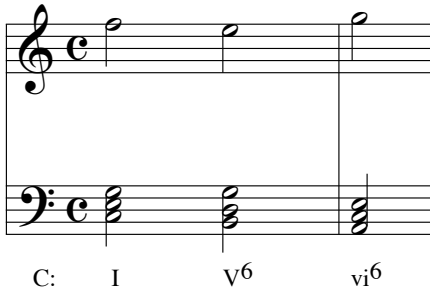
These melody notes are chord tones because they are notes that are also a part of the harmony that supports them below. The result is a very cohesive blend between the melody and harmony.

Chord Tones



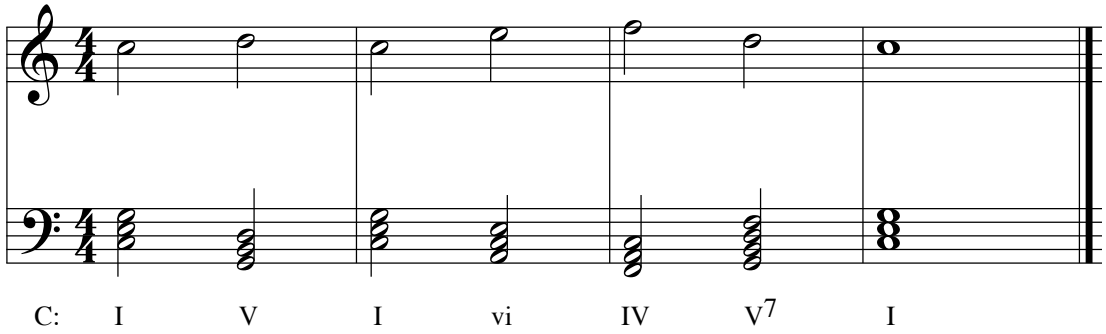
These melody notes (below) are non-chord tones because they are not a part of their corresponding harmonies. The result is a bit of a clash between the melody and harmony (a *dissonance*). While this dissonance may or may not sound "ugly", the overall blend of the non-chord tone and the harmony creates a potentially less stylistically-typical sound. While non-chord tones are a normal and effective part of traditional melody/harmony combining, their placement is limited and controlled.

Non-Chord Tones



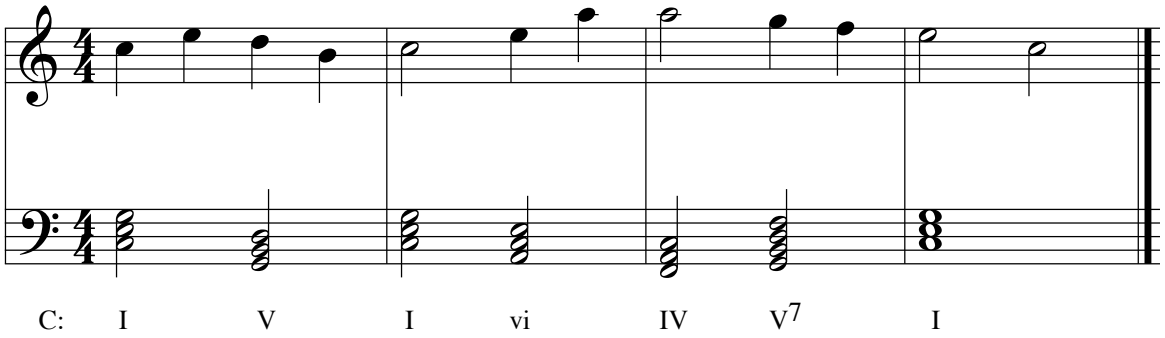
COMBINING MELODY AND HARMONY – THE PROCESS

Our first attempt at combining melody with harmony will limit itself to only chord tones in the melody. Given a harmonic progression, a basic chord tone melody might fit like so (remember that in addition to being limited to the few momentary notes of the harmony, the melody should as best as possible follow all of the voice leading rules discussed earlier):



Never mind for now that each chord is in root position

Since the melody notes can move faster than the underlying harmony, we can try to insert some quarter note chord tones over the same half note-paced progression:



TYPES OF NON-CHORD TONES

As defined earlier, a non-chord tone (N.C.T.) is a note that is not a part of the momentary harmony supporting it. There are many kinds of N.C.T.s and we will explore just a few.

The most important thing to appreciate about N.C.T.s is that in conjunction with the chords with which they sound, they create to a greater or lesser degree, a *dissonance* (or something *less cohesive*). In traditional music, dissonance usually needs to be followed by resolution (recall the leading tone of a scale resolving up to the tonic; to have not resolved the leading tone creates a strong feeling of discomfort). When we describe the different N.C.T.s, we define some by the way in which they resolve. Other N.C.T.s we define by how they are approached. But most importantly, a N.C.T. is a dissonance that resolves by moving to a chord tone:

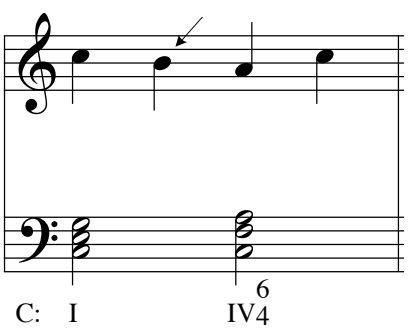
Here is a summary and brief description of the N.C.T.s that we will explore:

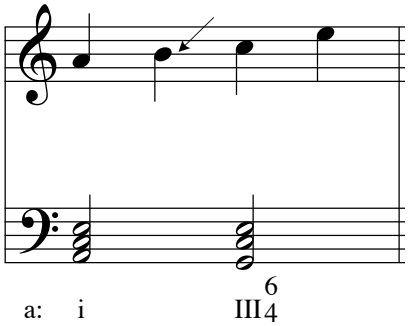
Name	**Approached by**	**Left by (in order to resolve)**
Passing Tone (P.T.)	Step	Step in the same direction
Neighbor Tone (N.T.)	Step	Step in the opposite direction (back to the previous chord tone)
Suspension (Susp.)	Same tone (tied over)	Step down

PASSING TONE

The passing tone is one of the most basic and common type of non-chord tone. It more often falls on a weaker beat (not the first beat of a measure) and is <u>always</u> approached and left by step in the same direction. This means that notes before and after the passing tone are usually chord tones. It also means that all the notes are moving in the same direction (either up or down).

This is a N.C.T. passing tone (the B on the second beat) because it does not belong in the C chord below it. Notice that the notes before and after it are chord tones in their respective chords. Also notice that the notes are connected by step (no leaps) and that all three are moving in the same direction.

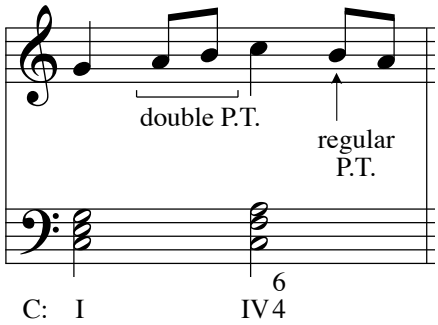




Here is an upward moving passing tone.

<u>The Double Passing Tone</u>

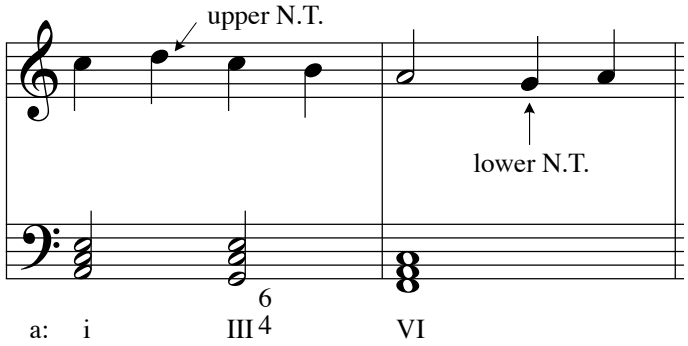
Depending on the rhythm, the particular chords, and the melody notes, there could be two non-chord tone passing tones in a row. They still follow the rules of being approached and left by step in the same direction.



NEIGHBOR TONE

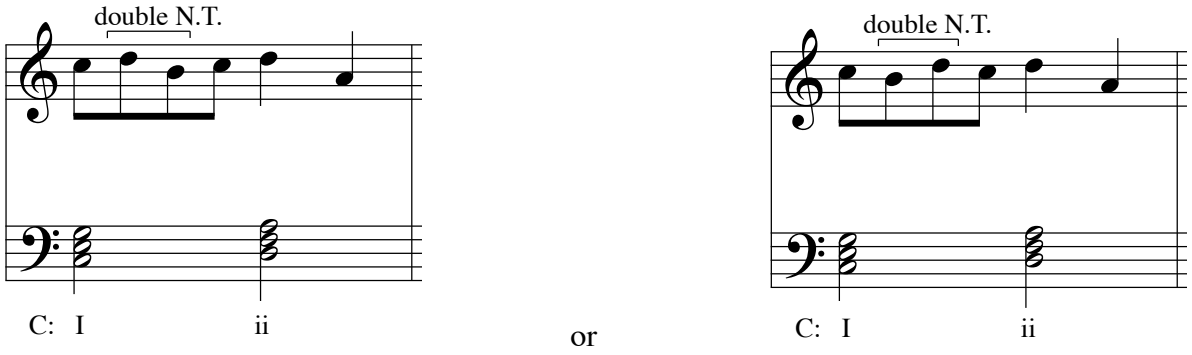
Very much like the passing tone (and as equally popular), the neighbor tone is approached and left by step, but this time in the opposite direction. The neighbor returns to the same note that preceded it.

In each case, the neighbor tone is a step above or below the tone that precedes and follows it. In this sense the neighbor tone acts as an <u>ornament</u> to the tone before and after it.



<u>Double Neighbor Tone</u>

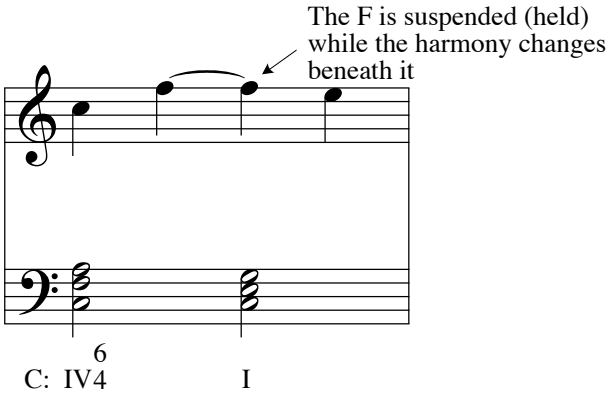
Also like the double passing tone, we have a double neighbor (two notes). This event puts tones both above and below the (or below and above) the tone that is being ornamented.



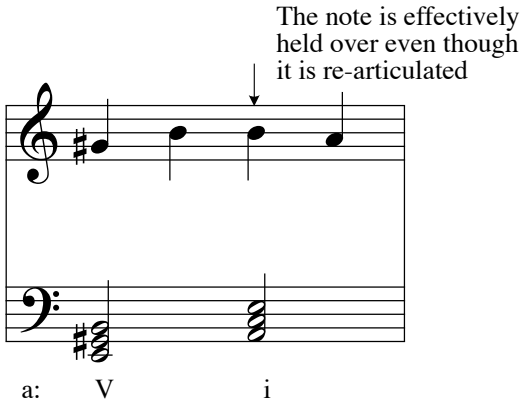
In each of these examples, the tone being ornamented is the C

SUSPENSION

The suspension is a more complex non-chord tone, but very beautiful. A suspended note is a chord tone within an initial harmony that lingers while the underlying harmony changes. This held-over note then resolves into a chord tone of the new chord by moving down by step. This can happen in many combinations.



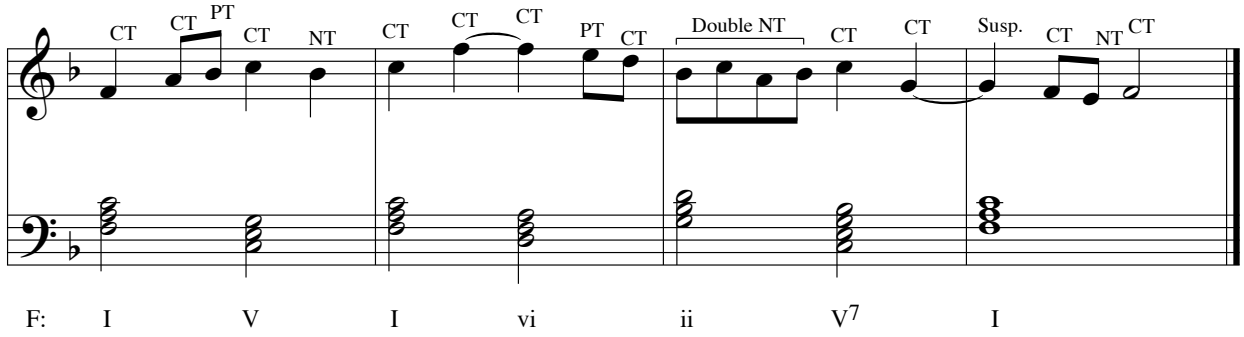
In less-frequent cases, the suspended note re-articulates:



COMBINING MELODY AND HARMONY – SUMMARY

- Basic melodies consist of chord tones (C.T.)
- The note values of the melody can be faster or slower than the note values of the changing harmonies
- Most melodies incorporate non-chord tones (N.C.T.)
- A non-chord tone creates some sense of dissonance against the harmony with which it is sounding; in order to alleviate this dissonance, the N.C.T. resolves into a subsequent C.T.
- While there are many N.C.T.s, the three we explored are:
  - Passing Tone/Double Passing Tone: approached by step, left by step in the same direction
  - Neighbor Tone/Double Neighbor Tone: approached by step, left by step in the opposite direction
  - Suspension: approached by the same tone, resolved by stepping down

Here is an example of a melody that incorporates all the chord tone and non-chord tone practices we have so far covered. Each note is analyzed in terms of one of these tones:



Notice that the more dissonant non-chord tones fall on either weak beats, or at least after the articulation (initial sounding) of a chord. To put it another way, the chord tone always articulates with a chord articulation (beats 1 or 3), if not more often. The single exception to this tendency is the suspension in the last measure; a suspension is always held over while a new chord articulates.

MODULATION

Modulation is when the music changes from one key to another key. So far, all the examples we have studied are in a single key. There are many ways that keys might change, and any key can change to any other key. In classical music, modulation was a given. In fact, a piece might modulate many times to many different keys in any combination of major and/or minor, although it would inevitably return to its original key. That is why when we say a symphony or a sonata is in A major, we know for sure that first and last parts (sections, movements) will be in A major, and that the inner sections or movements will likely be in another key or keys.

In the classical idiom, initial modulations tended to be to *close keys.* A close key referred to a key that was close in terms of the circle of fifths, and/or in terms of a relative major/minor relationship. For example, a piece in A minor might modulate to C major (its relative major) or to E minor (one clockwise key away in the circle of fifths). A piece in C major would probably modulate to G major (one key clockwise), F major (one key counter-clockwise), or A minor (the relative minor).

Modulations to close keys allowed for both contrast and continuity. The mere change of key provides a strong *contrast* since the whole center of gravity in a piece changes when the key changes (the degree to which we feel the change depends on the distance of the new key). Contrast was important in as much as it is important to have a *verse* section and a *chorus* section in a pop, or even punk song; it serves the larger purpose of change and motion (direction, inevitability, goal, etc.) – it mixes things up a bit.

But the fact that the modulated-to key was close allowed for a new key that had a lot of notes in common with the initial key: *continuity.* If we compare even the keys of A minor and C major, they sound very different from one and other (contrast), even though they have the exact same notes (except for the G sharp in the A harmonic minor mode). Therefore, while these keys clearly differ, the transformation from one to the next is also smooth because they have so many notes in common. The relationship between the two keys can make sense in terms of *continuity* because of how much they have in common.

Consider this food analogy. When we have egg roles as an appetizer, followed by hot and sour soup, then chow mien, and a fortune cookie for dessert, we can be fairly sure that we are eating a Chinese-restaurant-style meal. If we had garlic bread, pasta, marinara sauce and Chianti wine, chances are we would be eating off on an Italian menu. In each case, each course of the meal is representative of the larger style if food. Compared to music, the meal as a whole is like a large piece of music. Each course of the meal represents a different modulation, or different section in a different key. We feel some level of cohesion from course to course within each style of cooking because the ingredients (and the way they are prepared) are closely related within each style (like closely related keys). But we also enjoy the contrast of the different courses that makes up the whole meal because we place a high value on variety and change. The multi-course meal is a series of events that share a larger thematic connection, like chapters in a book or scenes in a play…or keys, themes and movements in a piece of music.

BASIC EXAMPLES OF MODULATION

There are many ways that a piece might change keys. One of the more basic types of modulation is called *common chord modulation*. Keys that are closely related also have chords that overlap.

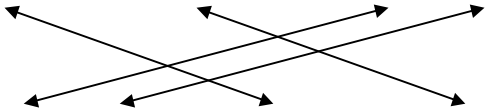
Here are the diatonic triads of CM and GM:

C: CM (I) Dm (ii) Em (iii) FM (IV) GM (V) Am (vi) B dim. (vii^o)

G: GM (I) Am (ii) Bm (iii) CM (IV) DM (V) Em (vi) F dim. (vii^o)

Between these two keys, four chords overlap: CM, Em, GM and Am.

C: CM (I) Dm (ii) Em (iii) FM (IV) GM (V) Am (vi) B dim. (vii^o)



G: GM (I) Am (ii) Bm (iii) CM (IV) DM (V) Em (vi) F dim. (vii^o)

Although these chords function differently in each key, the absolute chords are identical. The implication of this phenomenon is that these chords can act as pivot chords in going from one key to the next (C to G or G to C). As pivot chords, they ease the sense of transition from key to key.

C: I IV V I vi

G: ii V I

In the above example, the pivot chord (Am) from C to G is the vi chord in C, which is also the ii chord in G.

Here is a possible modulation from A minor to C major where both the i and iv (am and Dm) chords are pivot chords:

a: i ii° V i iv
C: vi ii V I

When a chord progression is moving forward, we are not necessarily aware that it has modulated via pivot chords. We are only sure that the modulation has taken place after the pivot chords have definitely led to the tonic chord in the new key.

In the above two previous examples (shown again, below), it is only at the sound of the I chords in the new keys, that we know for sure a modulation has occurred. This key change is then confirmed as the new keys settle around the new notes and new tonics.

By this point (the cadence to G) we are sure that a modulation has taken place

C: I IV V I vi
G: ii V I

By this point (the cadence to C) we are sure that a modulation has taken place

a: i ii° V i iv
C: vi ii V I

TONAL IMPLICATIONS OF MODULATION

Another important feature of modulation is that the act of changing keys actually serves the larger goal of reinforcing the initial key. As was mentioned earlier, most "classical" style pieces are wont to modulate. This act of changing keys represents a departure or contrast, and helps with the music's sense of motion and adventure. But music that modulates *away* from a key will eventually modulate *back* to that original key by the conclusion of the section or piece, which provides cohesion (**this should remind you of how a scale starts and ends on its tonic!!**). The contrast provided by the modulations sheds a stronger light on the original, cohesive key. This is not necessarily the case in more recent music that has grown out of the classical tradition, but it is still the case for most pop and jazz songs.

With the original key acting like a bookend to the music as a result of the in-between modulations, a hierarchy (or a center of gravity) is established. Looking back at our initial discussion about the scale, we can draw some meaningful connections to modulation. Recall that the scale can be heard to represent a home-away-home feeling as it goes from the tonic, to the other notes, and eventually back to the tonic. Likewise, the *home key* of a larger piece is like the *tonic* of a scale. In the larger piece, the sense of motion, drama, tension and adventure is provided by the key changes, but the beginning and end are the anchors; they are *home*.

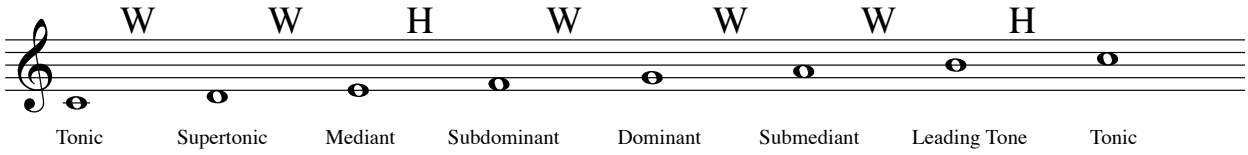
This way of structuring music deepens the feeling of what it means to be in a key. When we use the term "tonal" music, we are (generally speaking) referring to music that is based on major or minor scales. When a larger piece modulates through different keys to establish a *hierarchy* of keys, the idea of tonality takes on another dimension. The different keys relate to one another the way notes in a scale, chords in a progression, or phrases and cadences in a period relate. The place you first leave, and the final goal, is always home.

REVIEW:
THE MAJOR SCALE AND THREE MINOR SCALES

MAJOR SCALE

The major scale is constructed by arranging eight notes in the following order of whole and half steps: WWHWWWH. The C major scale uses the notes C-D-E-F-G-A-B-C (the white notes on a piano). This pattern can be initiated from any note (which will require a mix of white and black notes). For any scale, every letter will be used only once.

Below is the C Major scale:

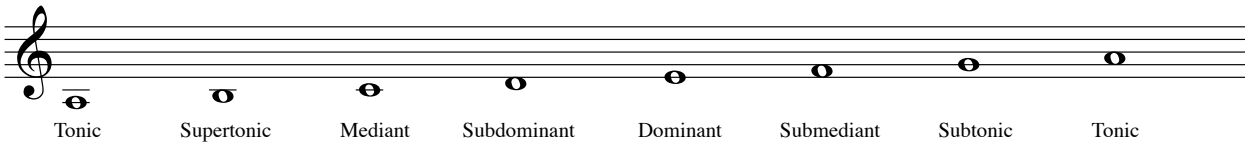


Each scale degree has its own name

NATURAL/RELATIVE MINOR SCALE

The natural minor form "naturally" gets its notes from the major scale: it begins on what would be the 6th scale degree of the major scale (the submediant) and then follows those same notes in the same order (A-B-C-D-E-F-G-A). This is how the A minor scale gets all of its notes from the C major scale, since the note A is the 6th note in a C major scale. Just as A minor is the *relative minor* to C major, C major is the *relative major* of A minor: it goes both ways.

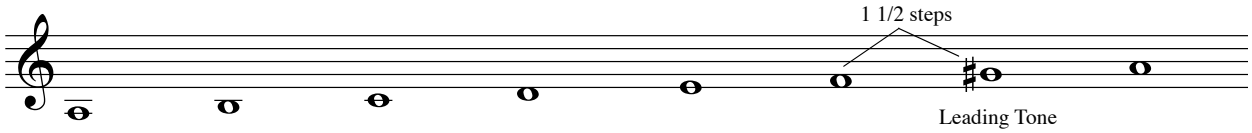
Natural/Relative Minor Scale



HARMONIC MINOR FORM

The harmonic minor form is a modification of natural minor and is more common in contemporary tonal music. The 7th degree of a harmonic minor scale is raised (compared to the natural minor's 7th) in both ascending and descending directions. The raised 7th degree creates an all-important leading tone where there would otherwise not be one. The raised 7th also creates a conspicuous 1 1/2 step gap between the 6th and 7th scale degrees.

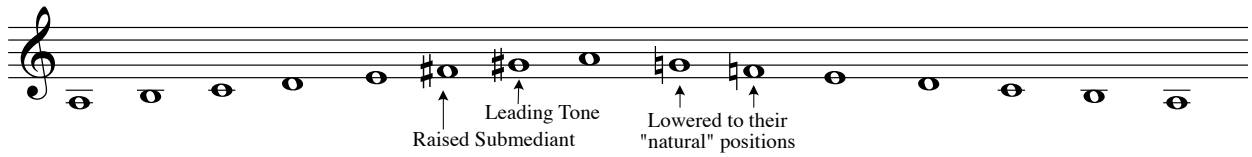
Harmonic Minor Scale



MELODIC MINOR FORM

Because the leading tone was considered so important, the 7th scale degree in minor (the sub tonic) was raised a half step to become a leading tone (a half step below the tonic), which formed harmonic minor. For some, however, the skip of a step and a half from the 6th to the raised 7th scale degrees was felt to be too unpleasant for ears that were not accustomed to such jumps in a scale. To compensate, the 6th scale degree was also raised a half step. Since the leading tone was not necessary for the descending portion of the scale, the 6th and 7th scale degrees were returned (lowered) to their natural minor places when the scale descended.

Melodic Minor Scale



REVIEW: KEYS AND KEY SIGNATURES:

KEY

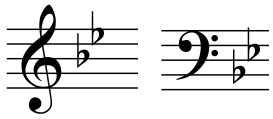
Most music is in a key. By this we mean that a song, a piece of music, etc. uses only (or mostly, for our purposes) the notes of a single scale. The Beatles' *Let It Be* is in the key of C major, meaning that most of the notes in the song are from the C major scale.

And since real music is more complicated that a textbook explanation, a piece in C major might occasionally use notes that are not in the C major key signature. In that case, an accidental will be added: a sharp, flat or natural (to alter the natural, flat or sharp note(s) of a particular key signature–like if we needed a B flat in the key of C major, for example).

More importantly, we can feel that a piece is in a key (or that it gravitates towards a particular key) because, like a scale, the notes are of a limited set. This limitation creates a sense of continuity and cohesion (as it did in the scale) throughout the piece. Even when *Let It Be* uses non C major notes (and it does) that's fine since the majority of notes are from the C major scale and these notes are arranged hierarchically to suggest C major (as opposed to A minor, which uses the same notes). It is like when cookies have a few nuts in them. With or without the nuts, we know that we are eating cookies (because the cookie still represents a very limited set of ingredients that are mixed together in a certain way). The nuts just add an extra little something to the basic idea of the cookie.

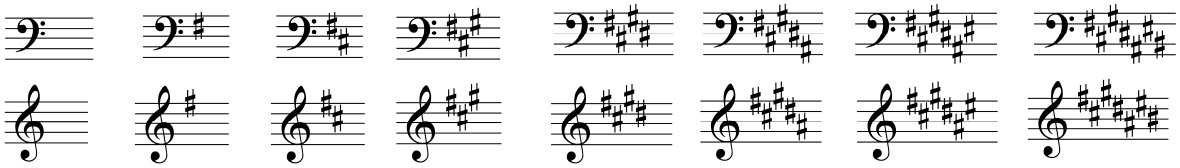
KEY SIGNATURE

Scales other than C major or A minor will obviously use either sharp or flat accidentals to maintain their patterns. Since most music that we will be dealing with operates within the parameters of a key, and a key is defined by a particular scale, a key signature quickly and globally indicates what key the music is in (and, of course, what scale is being used). The key signature shows which sharps and flats should be used to maintain the notes of the key-defining scale. In effect, it recalibrates the staff so that the notes that need the accidentals will always have them without manually placing the accidentals in front of the notes each time they need to appear. The key signature puts the accidentals at the beginning of each staff, just to the right of the clef. The note(s) which have the accidental in the key will carry that accidental wherever the note appears, in any register (until or unless a natural sign is used to momentarily change that note).

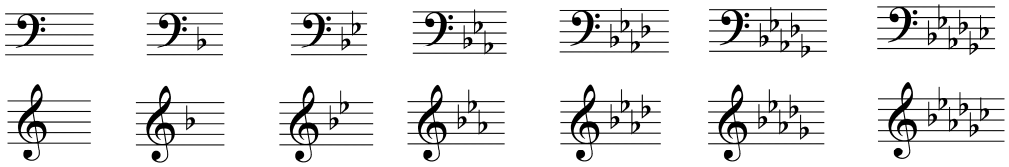


The B♭ scale has two flats: B♭ and E♭. Likewise, the key of B♭ has two flats. The key signature adjusts or calibrates the staff so that the notes of the Bb scale will be the default notes.

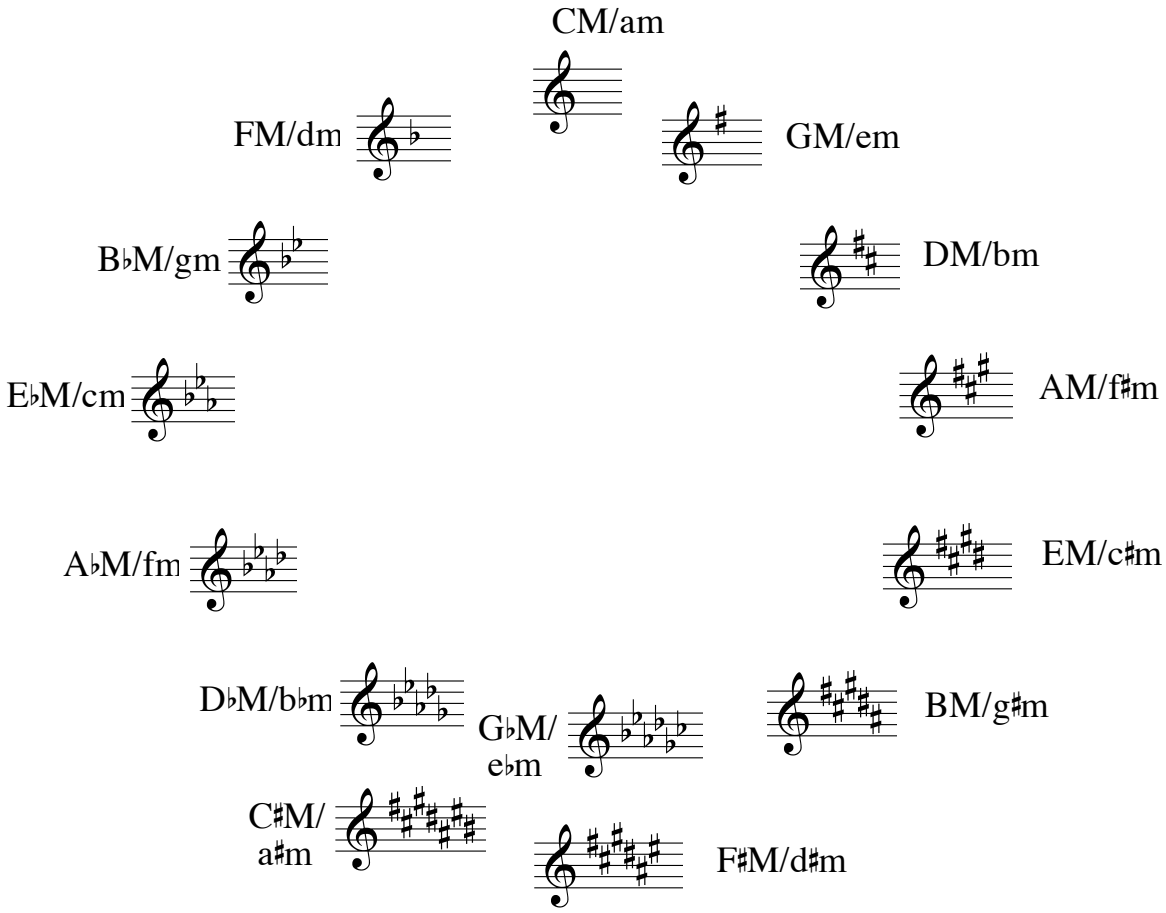
Sharp Key Signatures:



Flat Key Signatures:

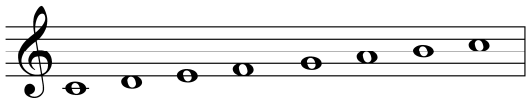


REFERENCE
THE CIRCLE OF 5THS/KEY SIGNATURES



REFERENCE – MAJOR SCALES

CM



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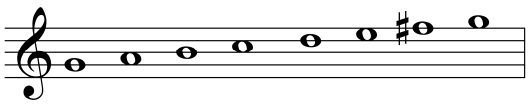

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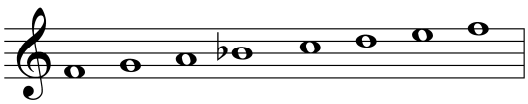

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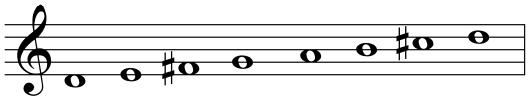
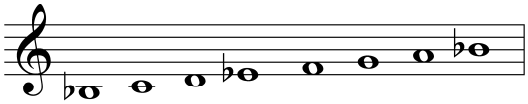


B♭M



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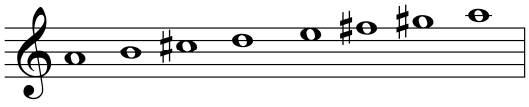

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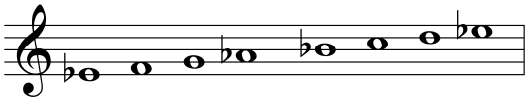
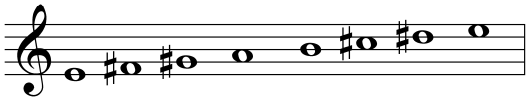
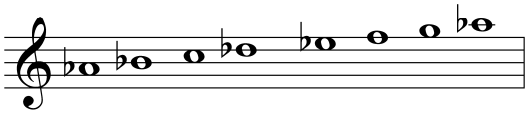


EM



A♭M



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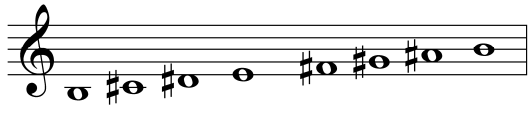
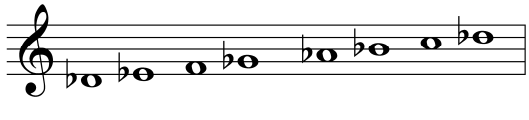
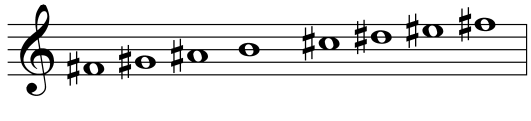


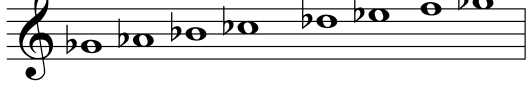
D♭M



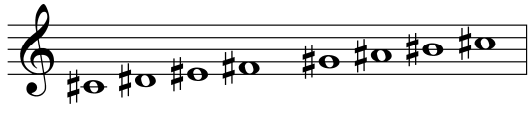
F♯M



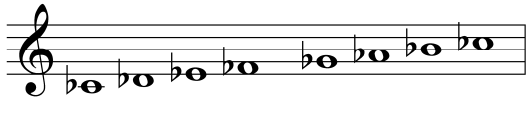
G♭M



C♯M



C♭M



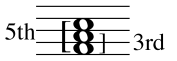
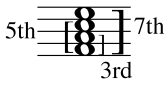
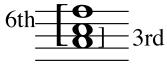
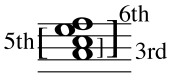
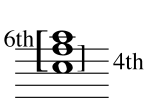
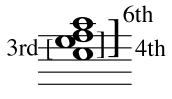
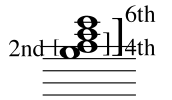
REFERENCE
INTERVALS & FIGURED BASS

Maj. Scale Degree:	1		2		3	4		5		6		7	8		9
Min. Scale Degree:	1		2	3		4		5	6		7		8		9
No. of Half Steps:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Interval Name:																
	PP	AP														
	d2	m2	M2	A2												
		d3	m3	M3	A3											
				d4	P4	A4										
						d5	P5	A5								
							d6	m6	M6	A6						
									d7	m7	M7	A7				
											d8	P8	A8			
												d9	m9	M9	A9	

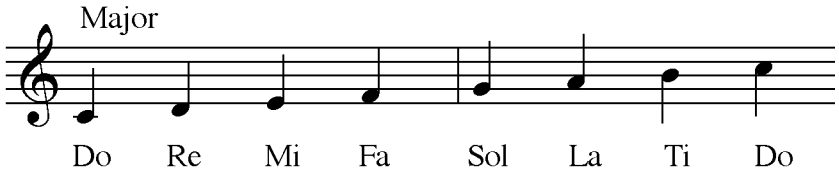
PP = "Perfect Prime" = Unison
d = Diminished
A = Augmented
m = Minor
M = Major

Inversion	*Triad Fig. Bass*	*7th Chord Fig Bass*	*Bass Note*
Root	(no numbers)	7	Root
1st	6	6 5	3rd
2nd	6 4	4 3	5th
3rd	N/A	4 2	7th

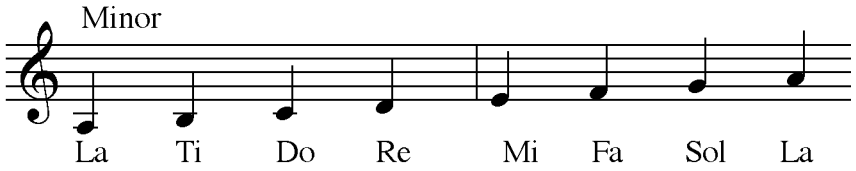
Inversion	**Triads**	**Fig. Bass**	**7th Chords**	**Fig. Bass**
Root		(no numbers)		7
1st inv.		6		6 5
2nd inv.		6 4		4 3
3rd inv.	N/A			4 2

SOLFEGE

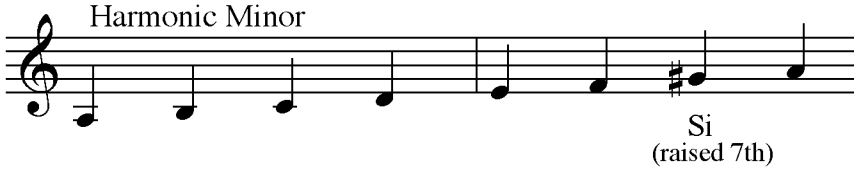
Each member of the scale can be assigned a *solfege* syllable. Major scale degree 1 (the tonic) is "Do", degree 2 is "Re" and so on.



In the minor mode, scale degree 1 (the tonic) starts on "La" and follows the same order as established in major. When comparing the relative minor to its parent major scale, the solfege syllables represent the exact same notes. Here is A minor. Notice that La is still A and Do is still C:



When a note needs to be chromatically raised a half step, an "i" (sounde like "eee") is added to the end of the solfege syllable, such as in harmonic minor with its raised 7th:



This represents a *Fixed-Do System*: Do is always the tonic of ANY major scale and La is always the tonic of ANY minor scale.