Music Theory Textbook (Part One)

For MUSIC 220 at Manhattan College, Fall 2025

Version 1.16 created 8/23/25 by Dave Smey

Preface: Welcome to our textbook!

This collection of 26 short chapters is going to be our textbook for Fundamentals of Music Theory at Manhattan College. Writing my own materials has been a somewhat weird thing to do which sometimes has its shortcomings, but I think it is the right way to go for our theory class.

We will refer back to this book all semester long. You don't have to bring it to class, but I'll remind you to read up on the latest concepts before you try each homework assignment.

While this volume is perhaps not yet as polished as a "real" textbook, there are a few advantages to writing my own stuff. Obviously it is being provided to you at no additional cost, and you can go to our class website at https://davesmey.com and download a digital version to carry around on any device you want. Since I license it under the Creative Commons framework you can even give copies to anyone you want - just don't sell it or take my name off of it.

And, as you'll see, I can do a lot of things that you'll never see in an expensive commercial text. I can write in my own voice, make jokes, express uncertainty, and explain things the same way I do in class. I can use lots of "white space" so that things look organized and clear. Our book will keep evolving from semester to semester, so if you see any errors (like typos, garbled sentences, examples that don't match their captions, etc.) let me know and I will fix them!

If you decide that you don't want to put 100% of your trust in this homebrew text from your professor, that's OK too. Here are a few additional texts that you might want to acquire for additional reference. I am listing each title in its most recent version, but often the smart play is to buy a used copy online in a slightly older edition.

Duckworth, William. *A Creative Approach to Music Fundamentals*. 11th ed. Boston: Cengage Learning, 2013.

This one used to be the official text for the course, and it will take you through the first two-thirds of the semester or so. As we get to more "advanced" topics, though, you might need a more advanced text. If you really want to invest in your theory library I'd also recommend

Kostka, Stefan M. and Byron Almén. *Tonal Harmony: With an Introduction to Post-Tonal Music*. 9th edition. New York, NY: McGraw-Hill Education, 2023.

(The authors for earlier editions of this textbook were Stefan Kostka and Dorothy Payne.)

But regardless, whether you buy more books or not, I hope you get a lot out of this semester's course. Let's get started!

Table of Contents (for part one)

1. Reading the Staff / 1
2. Rhythmic Basics I / 6
3. Solfège Syllables / 13
4. Piano Keyboard / 15
5. Whole Steps and Half Steps / 19
6. Sharps and Flats / 21
7. Rhythmic Basics II / 24
8. Scales I / 27
9. Key Signatures, Circle of Fifths / 29
10. 6/8 Time / 36
11. Minor Scales / 38
12. The “Fancy” Note Names / 42
13. Triads / 44
14. Intervals / 50
15. Diatonic Triads + Roman Numerals / 59
16. Triad Inversions / 62

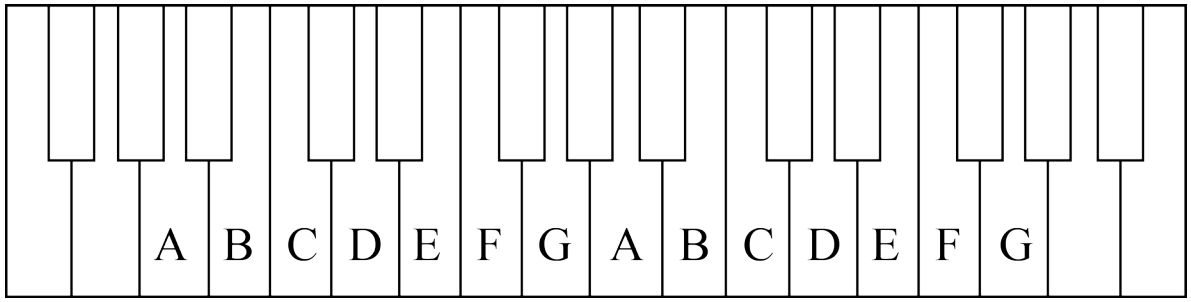
The Very Beginning: Reading the Staves

To get started reading music, you need to understand the “note names” we use to refer to pitches.

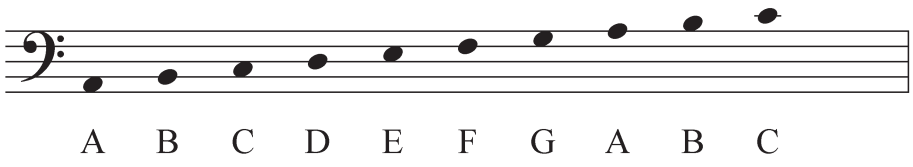
The note names in English begin with the letter A and proceed up to G. After G they repeat, so the note above G is A (and the note below A is G.)

... E F G **A B C D E F G** A B C ...

These letter names correspond to the white keys on the piano.

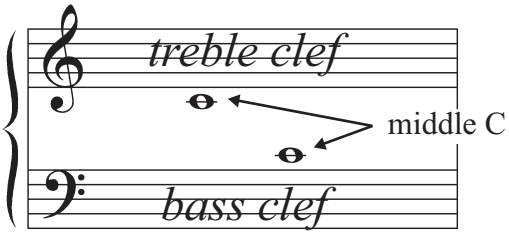


In written music the notes alternate between the lines and spaces on the staff, like so:



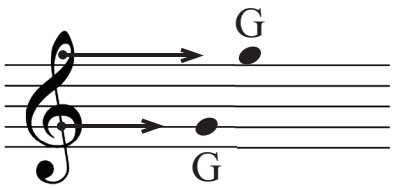
The Grand Staff

Piano music is usually written on the grand staff, a combination of treble clef and bass clef. The space in the middle is home to "middle C." (Middle C is, unsurprisingly, the C that's in the middle of the average piano keyboard, and it is pretty much the center of useful musical sounds.)



Treble Clef

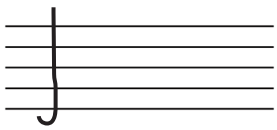
On the far left of each staff there is a fancy-looking symbol called a clef. It tells you what the lines on the staff mean.



The treble clef is also known as the "G Clef." It draws loopy circles around two different G's.

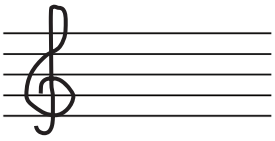
Making your own is easy in three steps.

1) Go up the center.



2) Loop around the top.

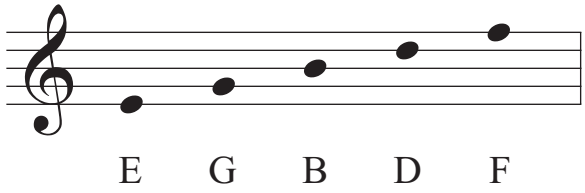
3) Make a big loop from bottom line to middle line.



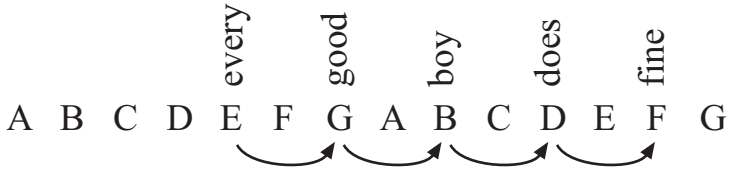
Memorizing the Lines and Spaces

People like to memorize the lines and spaces on the staff with little mnemonics.

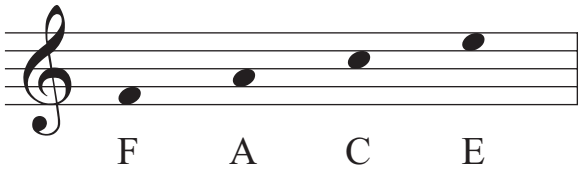
To remember the lines on the treble staff people say “Every Good Boy Does Fine” or “Every Good Boy Deserves Fudge.”



Remember, in hitting all the lines we are skipping over every other note, or making *thirds*.

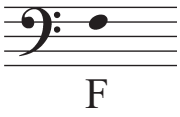


The spaces in the treble clef spell FACE

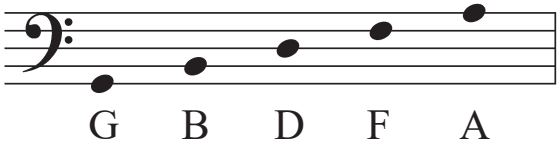


Bass Clef

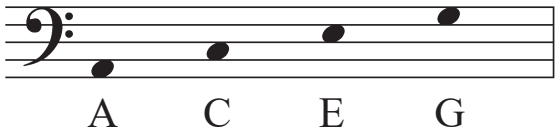
Bass clef puts two dots around the note F.



The lines in the bass clef are “Good Boys Do Fine Always.” If you are tired of all of this good boy stuff you could also say “Great Big Dragons Fly Around” or “Good Burritos Don’t Fall Apart.”

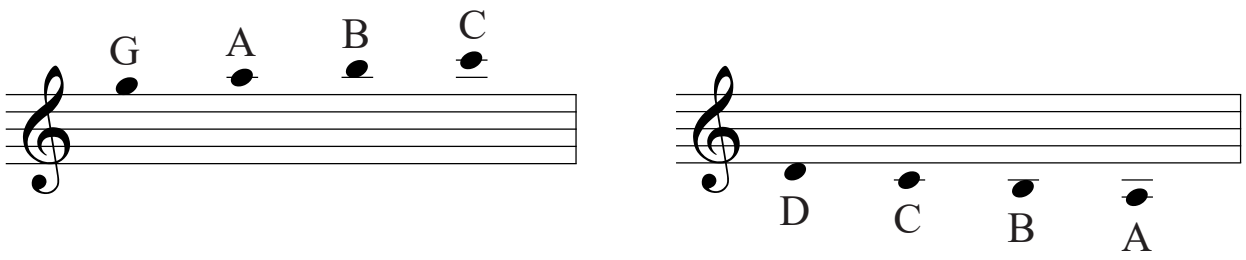


And the spaces are “All Cows Eat Grass.”



Ledger Lines

Every now and then you need to indicate notes that are just beyond the boundaries of our traditional staff and clefs. For these pitches you will need **ledger lines**. These are just extensions of the staff with short, temporary lines. They follow the same pattern as the regular staff, going line / space / line / space as you count up or down.



Theoretically there is no limit to the number of ledger lines you might stack up, but I would say that three is the practical limit. More than that will become too annoying to read.

Beyond the Mnemonics

As you begin to study music, you really don't want to have to stop and count up "every good boy..." with each new note. You've got to learn to read the staff as naturally as you can read words.

Doing practice drills on a computer can help - we will have a special web page that links to some computer programs and apps that I like.

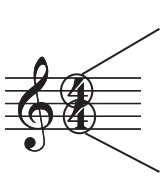
Also, I've got a special handout for practice called "Level Up!" that starts off easy, focusing at first on only a few notes in the staff. By making the task simple and gradually increasing in difficulty I think one can master this somewhat tedious skill.

Chapter 2: Rhythmic Basics (Part One)
Rhythms in 4/4

Meter

The *time signature* (or metric signature) appears at the beginning of a piece. It tells you how many beats will be in each measure. This is not just technical information - the *meter* (i.e. the number of beats per measure) determines the overall "groove" of the piece. It is one of the most obvious things you can pick up just by listening.

The time signature includes two bits of information:



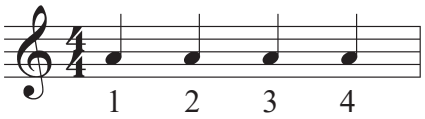
number of beats per measure

which "note value" gets the beat. For now, we'll assume that the quarter note is getting the beat (which is the most common case, and it's what it says here.) We'll discuss other possibilities later.

Note Values (and Counting)

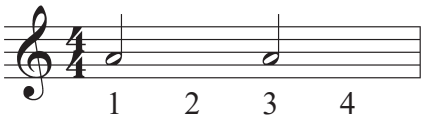
Usually, the *quarter note* is worth one beat.  = 1 beat

If we saw a measure full of quarter notes, we might write the beats below the staff, like so:



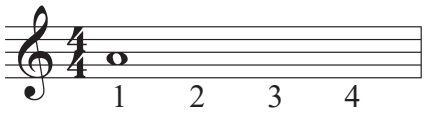
And we'd "count it out" by simply saying "one, two, three, four."

The *half note* is usually worth two beats.  = 2 beats



We would count it by saying one and three loudly, but maybe also mentioning the two and four - like "one, (two), three, (four)."

A *whole note* is usually worth four beats. 𝅝 = 4 beats



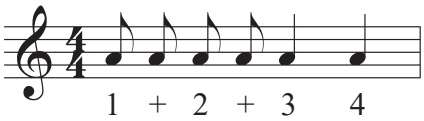
There are also rhythmic values that are worth a fraction of a beat.

Eighth Notes

An eighth note is half the value of a quarter note. 𝅘𝅥𝅮 = 1/2 of a beat

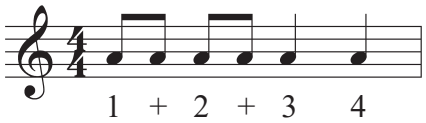
(Or in other words, it moves twice as fast as the quarter.)

When you see eighth notes on the staff, you add a plus between the beats....



...and you'd count this out by saying "one and two and three, four."

A single eighth note has a "flag" that hangs down from it, as in the measure above. However, the notes are often connected together with beams, like in the following example:

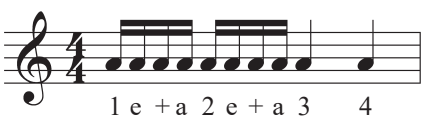


We'll talk more about the beams later!

Sixteenth Notes

A sixteenth note is a quarter of the value of a quarter note. 𝅘𝅥𝅯 = 1/4 of a beat

When we see sixteenth notes, we can insert "e" and "a" into the beats...



and we could say "one *eeh* and *uh* two *eeh* and *uh* three, four"

Rests

Rests indicate silence, rather than sound. Each note value has a corresponding rest.

quarter-note rest 

half-note rest

whole-note rest

eighth-note rest 

sixteenth-note rest 

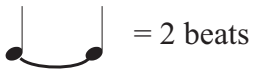
Drawing your rests

The quarter-note rest is terribly difficult to draw the way it appears in professional music. Most people just make a kind of squiggle, like so:

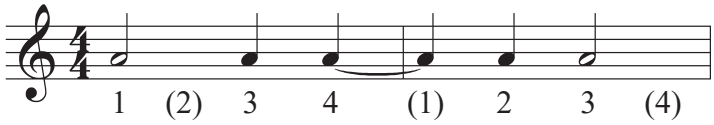
With the eighth and sixteenth-note rests, the “flag” from the note simply attaches to a diagonal line.

Ties, Beams, and "Showing the Beat"

A *tie* connects two notes together, creating one long note that is the sum of both.



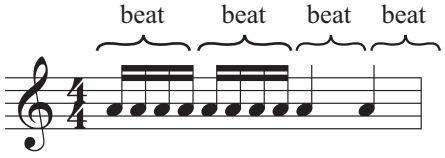
This is useful when you have a long note that hangs over from one measure into the next. When this occurs you must break it up into parts and use a tie to connect them.



Tying the note over into the next measure is a form of "showing the beat." The whole passage is easier to read because we can see that the note continues at the beginning of the next measure.

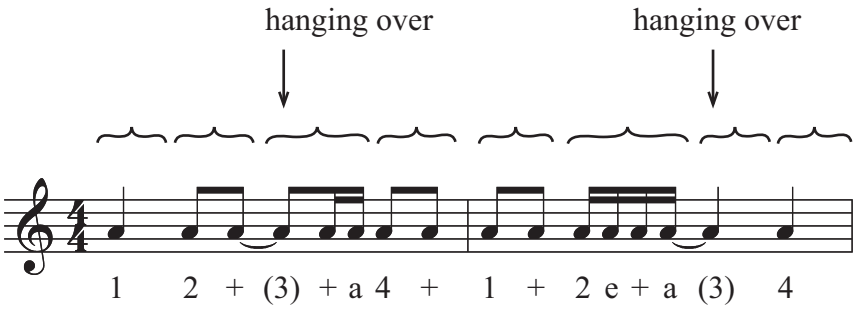
When you are working with the subdivisions of the beat (the "eehs", "ands" and "uhs"), you also must take care to visually separate each beat. We've already seen that a beam simply connects consecutive notes together visually - it doesn't change how they sound.

We beam notes within the beat together, but separate them from the notes in the next beat. This makes is easy to scan the measure and see where the beats are.



Note how there is a break in the beams where the second beat starts.

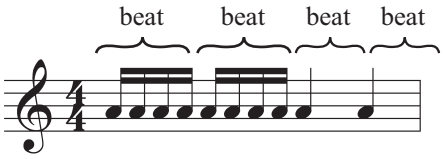
When you have notes that "hang over" from one beat to the next, you should break them into parts and tie them together.



Notes that hang over the beat are *syncopated*, and they can be tricky to understand and execute.

Eighth and Sixteenth Combos - the "Grasshopper" and "Telephone" Figures

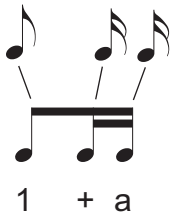
We've already talked about how you beam together sixteenth notes that fall within a beat.



There will also be occasions in which one beat contains a mixture of eighth notes and sixteenths. Let's look at two possibilities.

When an eighth note is followed by two sixteenths, you would count it as "1, + a" and you would draw it with one beam that goes all the way across and a second line that connects only the sixteenths.

The word "grasshopper" is a useful verbal cue that can remind you how to execute this figure.



If the two sixteenths come first, that's the "telephone" figure. It is counted "1 e +" and drawn with the two lines at the beginning.

Beaming these mixed figures is confusing at first for a lot of students, but if you learn them like they are words it will become easier to just drop them into place when needed.

Ways to Practice Rhythms

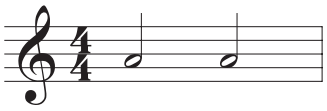
There are a variety of ways you can execute rhythmic passages for practice.

1) Tapping a beat + executing the rhythm.

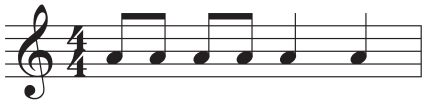
This is probably the best method for beginners. Many people like to tap the beat with a hand or foot while they perform the written rhythm orally, by saying “ta ta taaa.” Two-handed tapping (one on the beat, one on the rhythm) or simultaneous foor-tapping and clapping are also possible.

2) Counting out loud

The simplest way to count out loud is to say all four beats, with extra empasis on beats where there is a written rhythmic value. Only add subdivisions (the “eehs” “ands” and “uhs”) as needed. So if you saw this:



You could count “one! (two) three! (four).” And this:

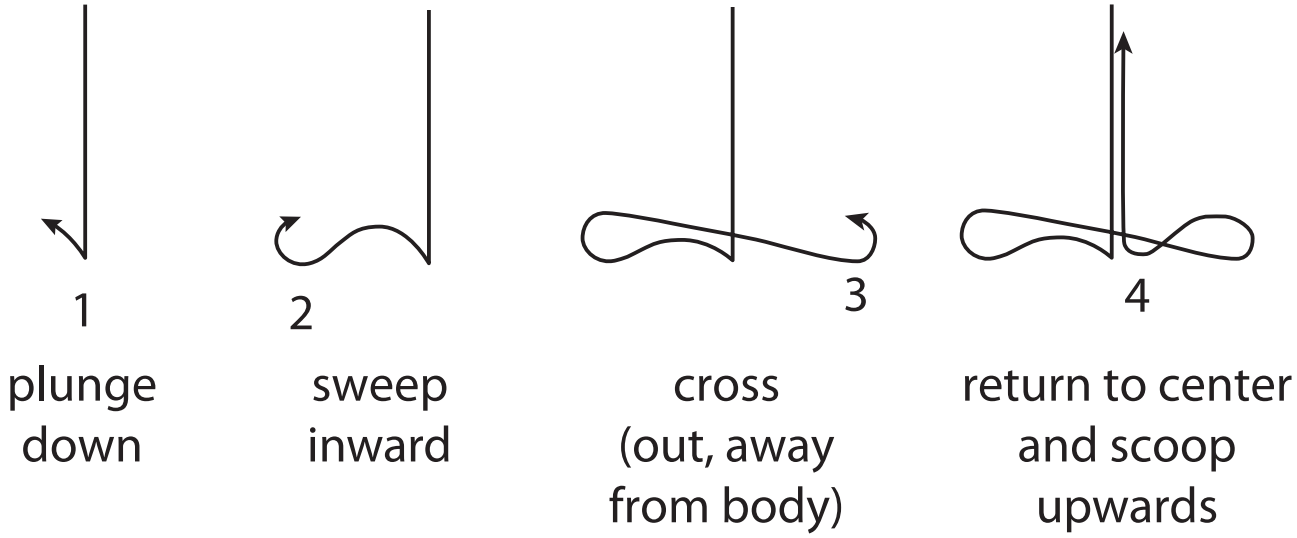


would be “one and two and three, four!” (all loud.)

3) Conducting and saying "ta"

Perhaps the most sophisticated and musical way to practice your rhythms is to conduct with one hand while you say the rhythm on a neutral sound like "taaaa." This will surely feel awkward and uncomfortable at first, but with practice it becomes automatic and easy! Often there is a sense that your arm is counting *for* you, and you can sometimes figure out rhythms by looking at your pattern and noting what position you are in.

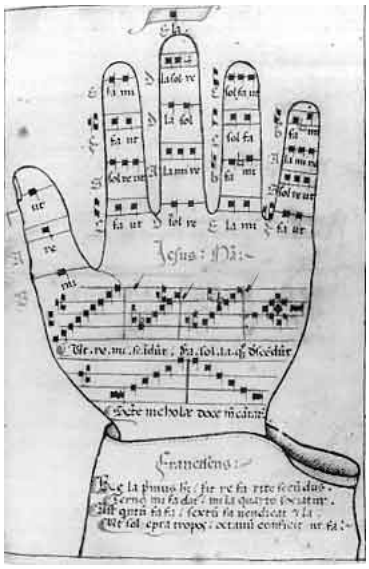
Here is the conducting pattern for 4/4, which makes a sort of upside-down T. Practice this motion at different speeds before you try reciting a specific rhythm.



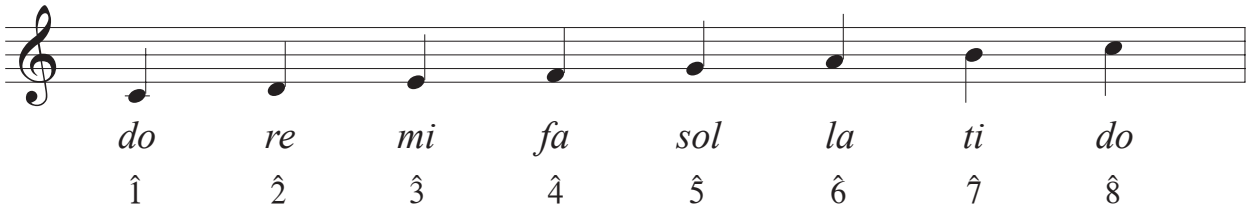
Chapter 3: Singing Melodies with the Solfège Syllables

Another major skill we are going to work on in this class is *sight-singing*, the practice of looking at a melody, imagining what it sounds like, and singing it out loud. We'll use a system of naming the notes in the scale as an aide to figuring out what things sound like -- these are the solfège syllables.

Solfège syllables have been in use since the Middle Ages. One influential proponent of this method was Guido d'Arezzo (ca. 992-1033). He famously mapped the syllables to the joints in the hand, so that he could point to his hand to illustrate how a melody would go.



The Guidonian hand was pretty complicated, in part because there were only six syllables and you could match them to different parts of the scale. Happily, our contemporary system is a lot simpler. If we see a melody in C major, we'll name the notes in the scale like so:



(The numbers with carets are another way to indicate scale-degrees. Our text will frequently refer to î 2̂ 3̂ and so on.)

The European System ("Fixed do")

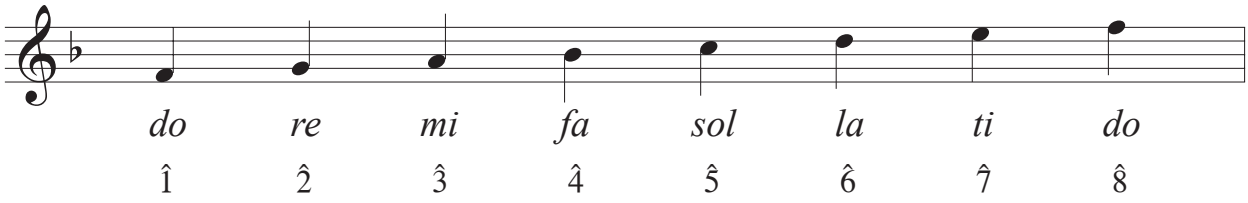
You may know that in many languages the solfège syllables are simply the names of the notes - instead of saying "A, B, C..." and so on many people say "la, si, do..." These folks are using a fixed do system in which "do" always means C, no matter what the context.

We are going to use an American variant of solfège which I will explain on the next page...

Movable Do

Since we already have names for the notes, many American educators apply solfège syllables in a slightly different way - they want *the same part of the scale* to always have *the same name*.

For instance, say we are working on a melody in F major. F is the beginning and end of the scale, and it is the "home note" that we keep returning to. In this context we'll call F *do* and the rest of the notes in the scale will fall into place like this:



(Of course, we haven't even gotten into scales and key signatures, so there's no need to worry about movable do just yet. We'll start out with a bunch of melodies in C major.)

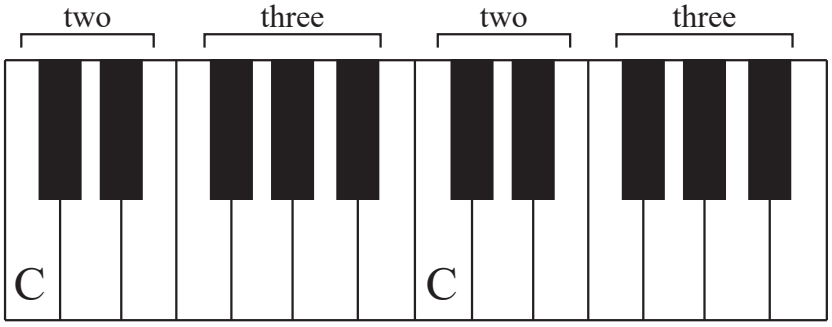
Chapter 4: Meet the Piano Keyboard

"Why should I learn about the piano?" you might ask. There are a few good reasons! It's extremely useful for understanding musical space - the notes are laid out in a sort of grid that is very easy to understand, and there is a clear division between white and black keys which tells you a lot about how our musical notation system works.

Also, it's the ultimate instrument for understanding how notes combine to make harmonies. With a full two-handed technique you can mimic the texture of a chorus or orchestra -- this is why most Classical composers have used the piano as their main compositional tool.

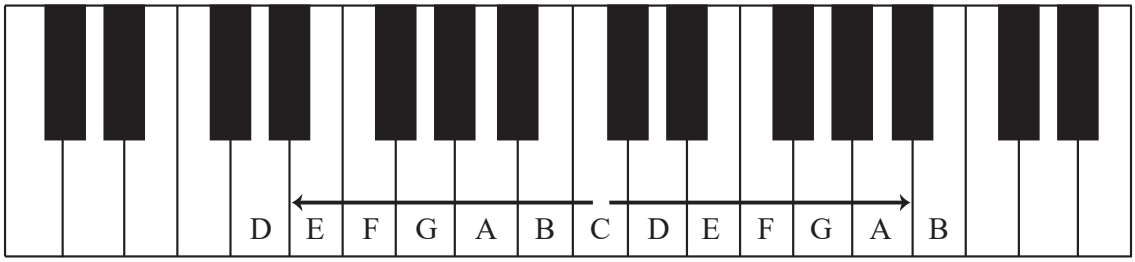
Getting Oriented

The first note you want to find is probably middle C. Most beginning piano methods start with music in the key of C major, and so this will be your most useful reference point. To find C, look at your black keys first. They have an alternating pattern of two and three keys grouped closely together. Find a group of two keys, and play the white note immediately to the left of it. That's a C!



There are probably multiple Cs on your keyboard instrument. A standard 88-key piano has eight of them. Middle C should (unsurprisingly) be in the center. It will probably sound like a perfectly "medium" note to you, neither low nor high.

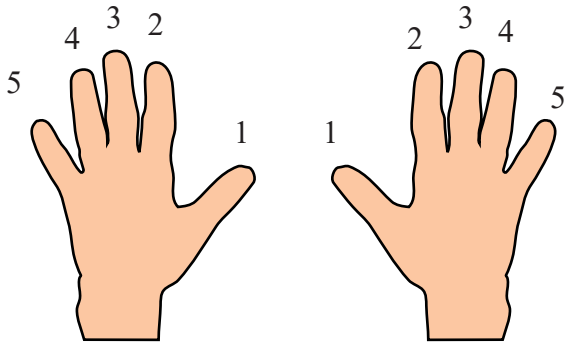
The white keys on the piano correspond to the plain letter names we use to name notes. You can count up or down from C and find all of the other tones.

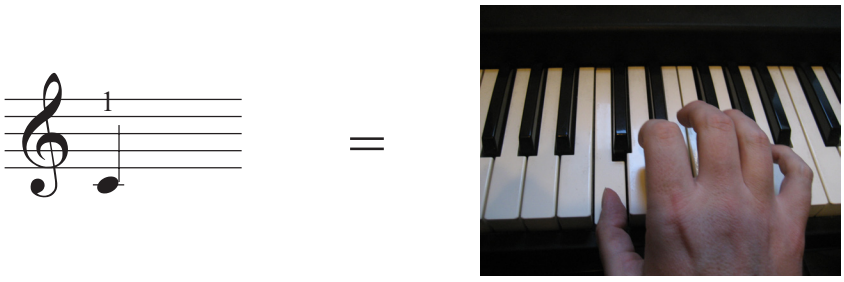


In the beginning we'll stick to the key of C major, which uses only these white notes.

Fingering

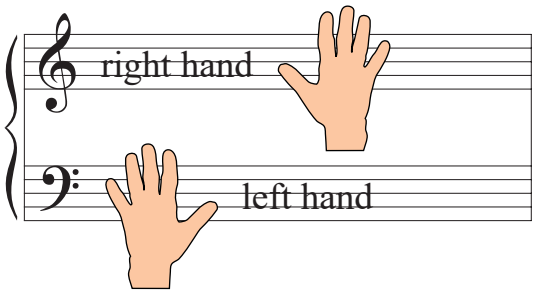
If you are going to actually play the piano, you need to understand the concept of fingering. There are times when it really makes sense to pay attention to how your hand moves while you play. Pianists use a number system to refer to the different fingers - the thumb of each hand is 1 and the pinky is 5. When you see a little number above a note, it means "play this note with this finger."





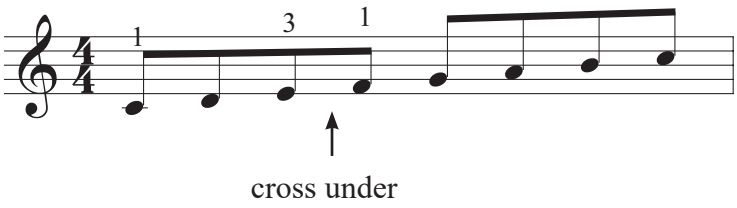
(You will also want to write your own fingerings in the music to remember the best way to play it.)

In general the music in the top staff is usually played with the right hand, and the bottom staff is played with the left.

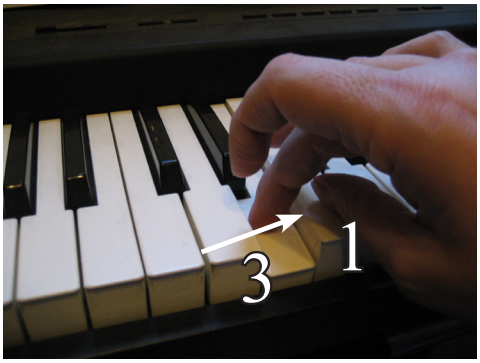


You usually want to keep your hand in a relaxed shape that covers about five white keys (one for each finger.) But sometimes a melody continues for more than five notes - what do you do then? Sometimes you will need to cross fingers over or under each other in order to continue the line and make a smooth connection.

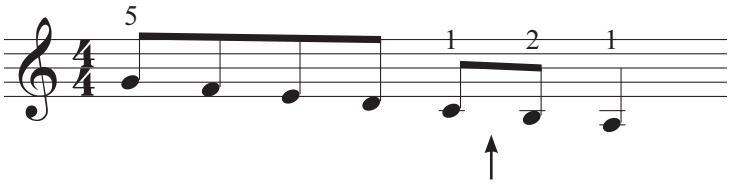
In order to play this scale I'd cross my thumb under my third finger.



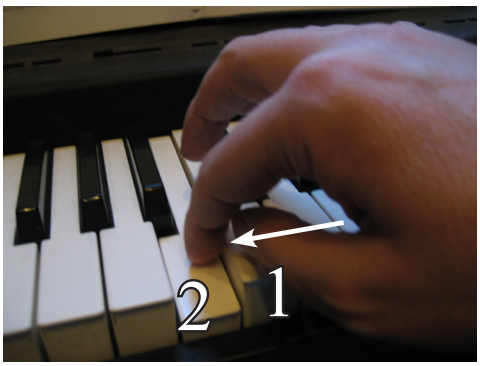
cross under



And to play this descending line I'd cross one finger over my thumb.

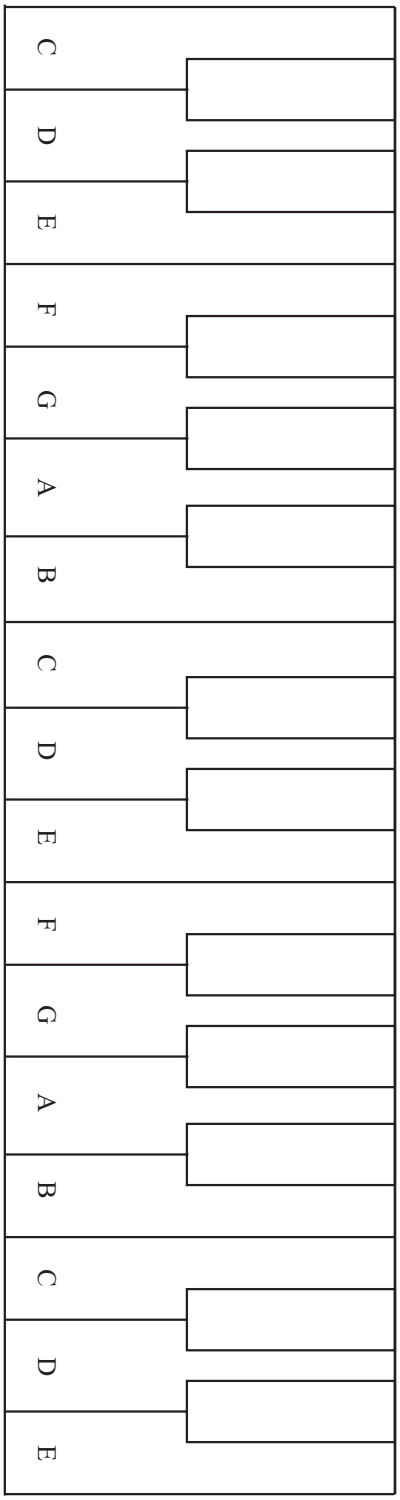


cross over



But, if you use a beginner's piano method you'll probably start with easy pieces that don't require a lot of fancy fingering.

Here is a paper piano that you can use for reference.



Chapter 5: Whole Steps and Half Steps

It it time to define two small musical *intervals*, the whole step and the half step. In general, we use intervals to describe the distance between two notes. Whole steps and half steps are (almost) the two smallest intervals you can make, and we are going to talk about them quite a bit in the next few chapters.

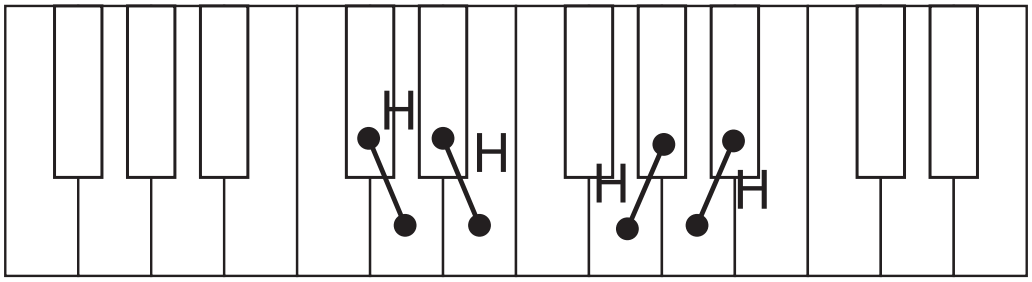
(The actual smallest interval would be the *unison*, which is the distance between a note and another copy of that note, on the same pitch. I will leave it to you to decide whether that counts.)

These two notes are both G's, and their distance apart is a unison.

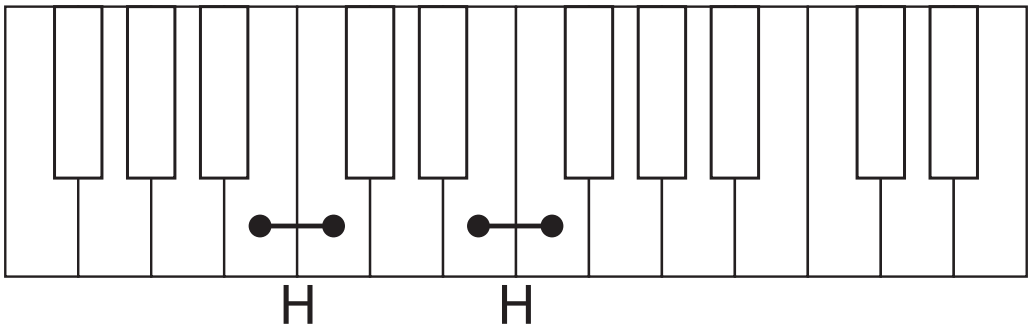
Half Steps

Let us tackle the half step (or "semitone") first. For now, we will say that any two keys that touch each other on the piano are a half step apart. One half step will usually take you from a white key to a black key, or vice versa.

some half steps



Also, there are two spots in the piano keyboard where the white keys touch each other directly, with no black key in between. They are also a half step apart.

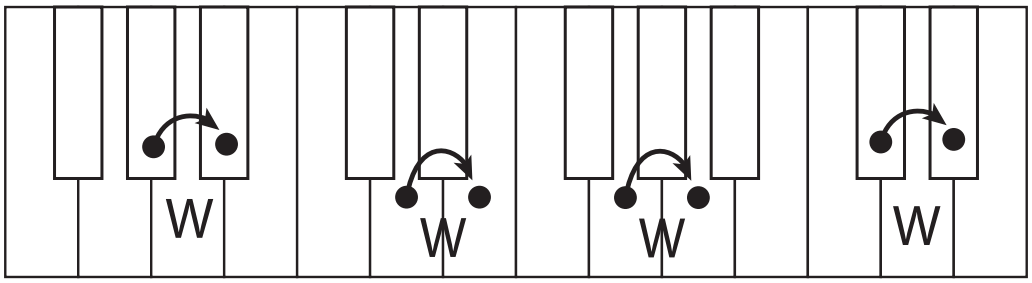


(It may appear that *all* of the white keys "touch each other," but this is an illusion! The intervening black key means that they are more than a half step apart. ☺)

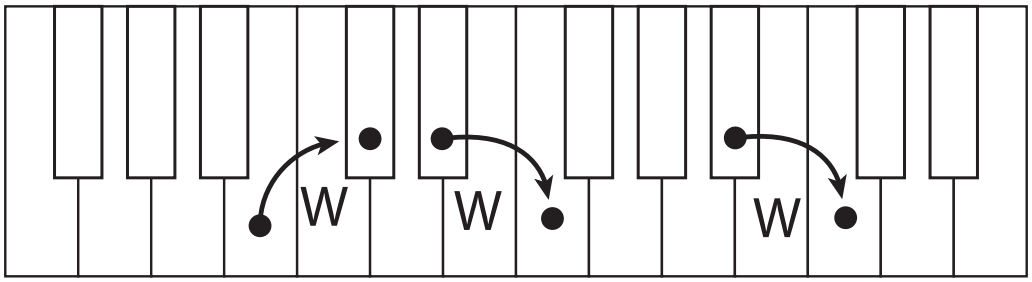
Whole Steps

A whole step (or "whole tone") is equivalent to two half steps. On the piano, this will usually carry you from one white key to another or one black key to other, skipping over the key in between.

some whole steps



The places on the keyboard where two white notes touch each other create a slightly awkward zone where you have to count your whole steps carefully.

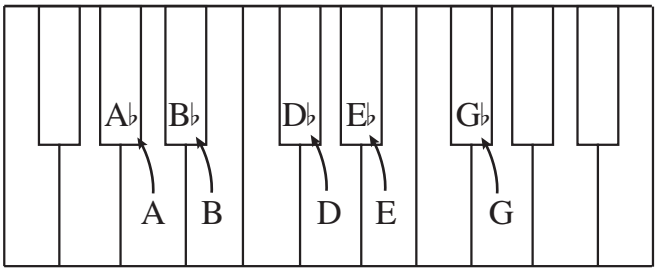


Chapter 6: Accidentals
(The Sharps and Flats)

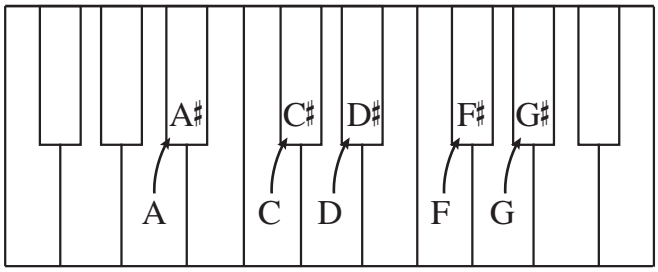
Up until now we've only named the "plain" notes that correspond to the white keys on the piano, but you are probably aware that the majority of music also uses sharps and flats. These modifications to our basic pitch notation are called *accidentals*.

The way accidentals work is pretty simple. Sharps push a note up, and flats pull it down. So when you add a sharp or flat to a note, it simply means the note a half-step higher or lower than the "plain" version. On the piano, this will frequently mean the black key to the right or left of the usual white key.

making flats



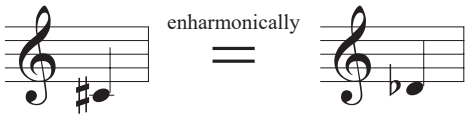
making sharps



Enharmonic Equivalence

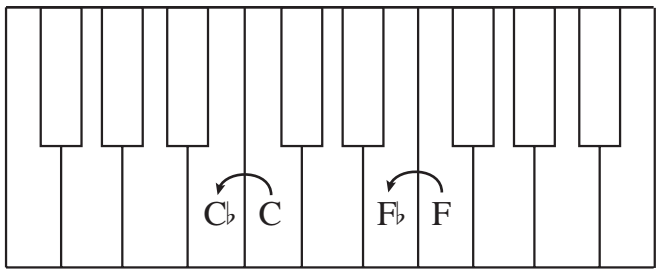
You might notice, however, that you can approach a black key from either the right or the left -- this means that the same key can have more than one name.

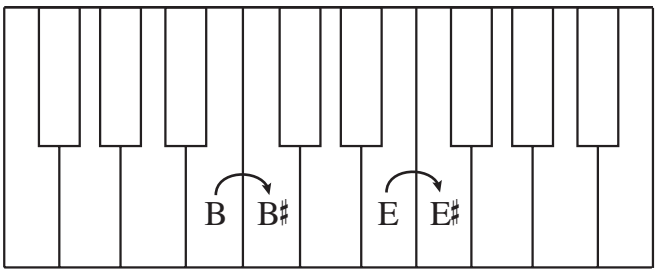
The note between C and D, for example, could be called either C sharp or D flat. We say that C sharp and D flat are *enharmonically equivalent*.



We'll learn later that it matters which one you choose! You need to "spell" your chords and scales correctly, and picking C sharp when you need a D flat can be like spelling the word "car" with a K.

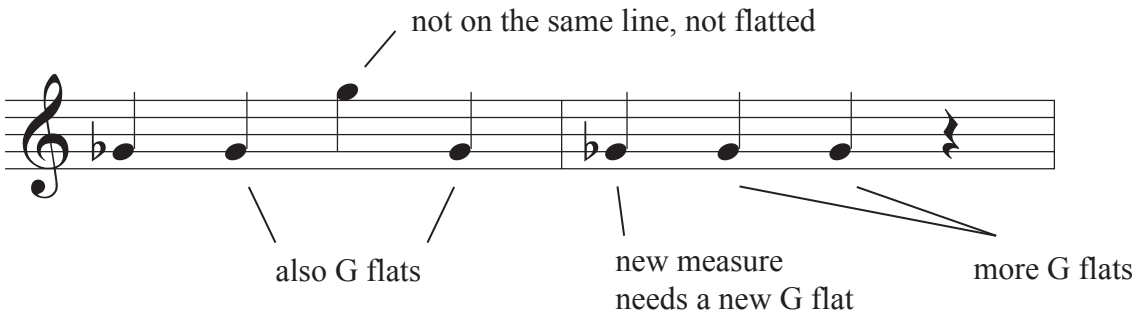
The black-key notes aren't the only ones that have more than one enharmonic equivalent - white notes have more than one name as well. Believe it or not, there is such a thing as C flat, F flat, B sharp and E sharp. These are relatively rare, but they do come up for various reasons.





Notation

When you are drawing notes on the staff, you put the accidental before the note. It will have an effect on all the notes that follow in that measure as well, so if you apply a flat to your first G, all subsequent G's will also be flatted. (This only applies to the notes on the same line or space, however.)



When we speak or write about the notes, however, we always mention the accidental after the note, not before. We say and write G flat or G♭.

The Natural Sign

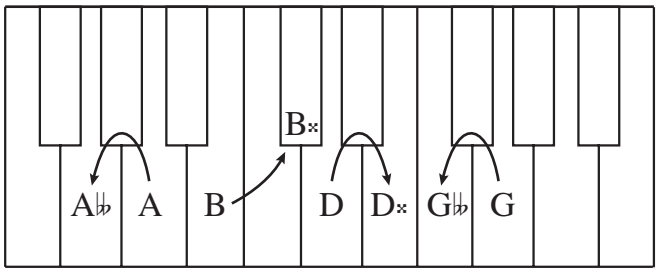
The natural sign indicates the "plain" letter name. This is useful when you've had an accidental earlier in the measure and you want to undo it. So, if you've had a G-flat earlier and you want plain G, you'd indicate that by notating G natural. (Also, it's much more correct to say "G natural" rather than "plain G!")

Double Flats and Double Sharps

Double flats and double sharps alter a note so that it is either two half steps higher or lower.

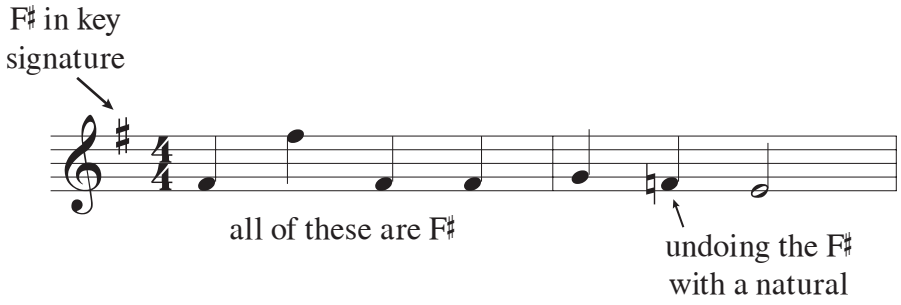
The double flat is written exactly the way you'd expect... 𝄫 ...but the double sharp looks more like a small X. 𝄪

Thus the white notes have enharmonic equivalents that can be made with double flats or sharps.



Key Signatures

Key signatures appear at the beginning of a piece, and they are usually repeated at the beginning of each line in the sheet music. They consist of one or more accidentals floating without any notes attached to them. These flats or sharps affect every note in the entire piece, unless they are undone with naturals. Unlike normal accidentals that you attach to notes, they also affect the same letter name in different octaves - so, for instance, if your key signature has an F sharp in it is means that all kinds of F's will now be F sharps, not just those on that top line.



Chapter 7 - Rhythm, Part II
The Dot and 3/4 Time

In this chapter we are going to continue to speak as though we are in 4/4, 3/4, or any other signature with a 4 on the bottom. These are meters in which the quarter note gets one beat.


Quarter note gets the beat.

One Dot = Increase by 50%

Any kind of note or rest can be appended with a dot. This increases the rhythmic value by 50%.


1 beat + 50% = 1 1/2 beats

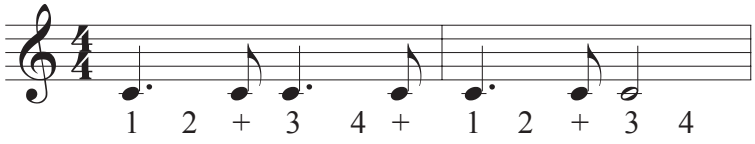

1/2 beat + 50% = 3/4 beat


2 beats + 50% = 3 beats

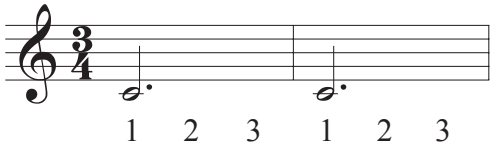

1/4 beat + 50% = 3/8 beat


4 beats + 50% = 6 beats

In 4/4 the dot is frequently used to make the "heartbeat rhythm."



...and in 3/4 time we'll use dotted half notes to fill up the measures.



The Double Dot

But that's not all! You can actually add another dot which increases the note by an additional 25% (or 50% of the 50%). Theoretically there is no limit to the number of dots you could add in this way, though the rhythmic value of such creations would quickly become very difficult to figure out.


1 beat + 50% + 25% = 1 3/4 beats

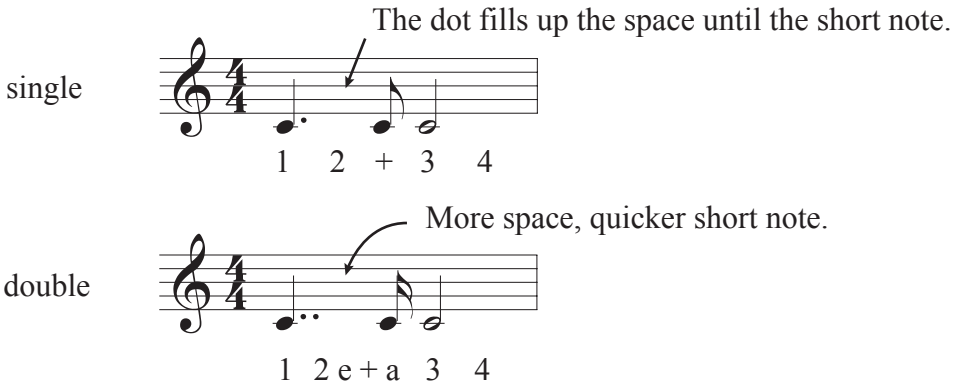

1/2 beat + 50% + 25% = 7/8 beat


2 beats + 50% + 25% = 3 1/2 beats


1/4 beat + 50% + 25% = 13/16 beat

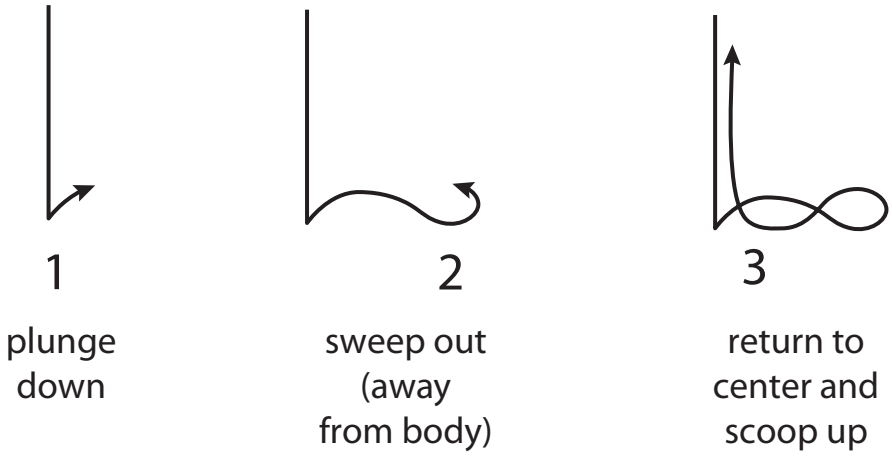

4 beats + 50% + 25% = 7 beats

The double dot is often used to take the heartbeat rhythm and exaggerate it, so that the pickup note is even shorter.

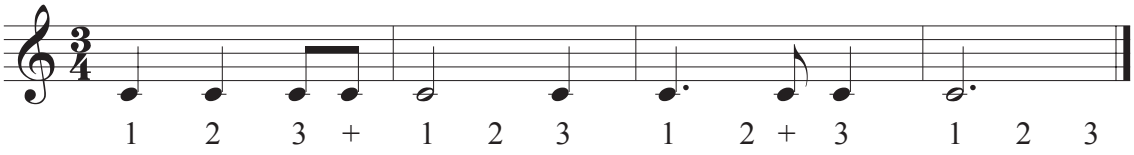


Triple Meter

Triple meter (or 3/4) is pretty simple. Instead of counting four beats per measure, we count three (as in a waltz.) If you want to conduct in 3/4, you mostly just edit out one beat from the pattern. This makes a sort of triangle shape.

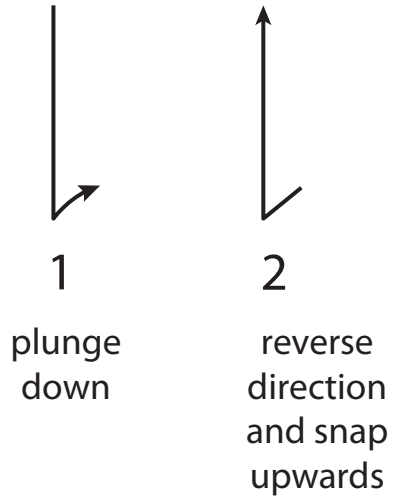


Counting out measures in three is also straightforward.

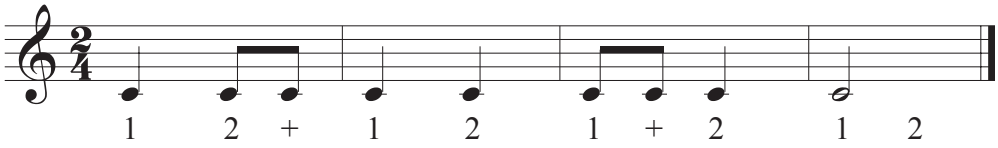


Duple Meter

Duple meter, or 2/4, is sort of an abbreviated 4/4. We conduct it in a J shape.



...and we count it how you might expect.



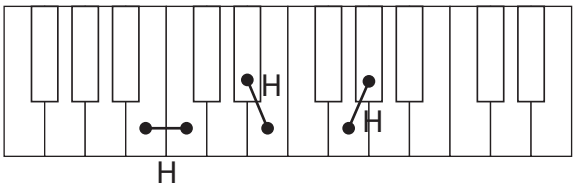
Chapter 8: Scales I
Building Step-By-Step

There are two basic ways to understand your scales. In this lesson we'll think of the intervallic shape of the scale (in other words, the pattern of whole steps and half steps), and we'll carefully build them one note at a time. I sometimes like to call this the "inchworm" method.

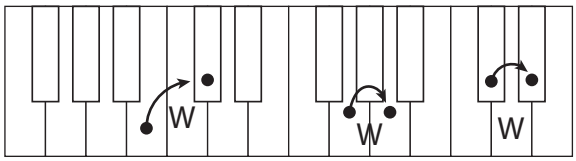
In our next lesson we'll start learning key signatures, which take a sort of inventory of the sharps and flats that appear in the scale. A good musician can think about scales both ways, with one method double-checking the other!

Half Steps and Whole Steps

We discussed this on pp. 18-19, but let's review.
A *half step* is the distance between any two adjacent piano keys.



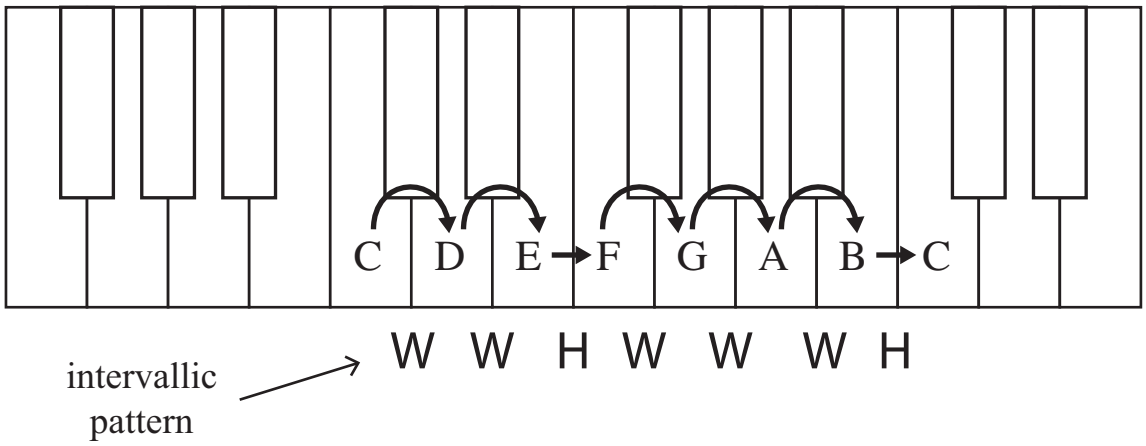
A *whole step* is two half steps.



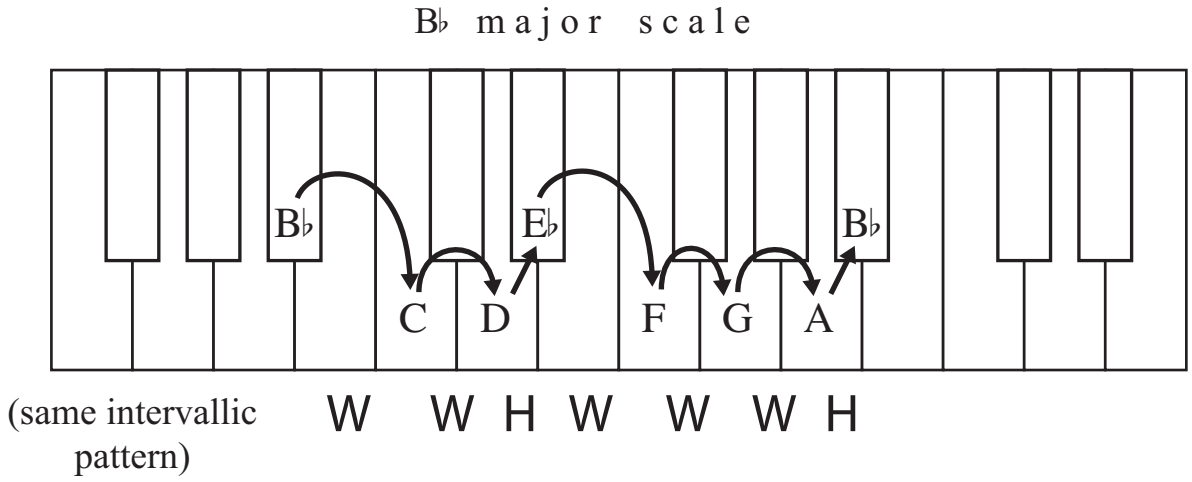
The Major Scale Pattern

Maybe you already know that the C major scale is all the white notes on the piano from C to C. We can look at it and see the pattern of whole and half steps that all major scales make. You need to memorize this sequence! We can write it down as WWHWWWH, and it rolls off the tongue in a fairly appealing and easy-to-remember way - "whole whole half, whole whole whole half."

C major scale



So if you want to build a major scale on a note other than C, you can pick your starting note and carefully build the WWHWWWH pattern. Here's a B♭ major scale.



Scales must hit every letter

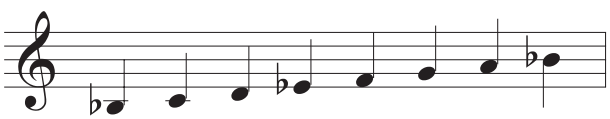
Major and minor scales proceed sequentially through our musical alphabet. No letter is used twice and no letter is skipped over. For major scales you will use only sharps or flats, never both.

CORRECT	B♭	C	D	E♭	F	G	A	B♭
INCORRECT	B♭	C	D	D♯	F	G	A	B♭

two D's, no E

On the staff the notes should proceed through every line and space.

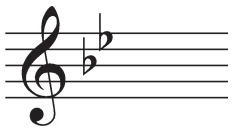
YES



NO

Chapter 9 - Key Signatures and the Circle of Fifths

The key signature is a set of sharps or flats that you put at the beginning of each musical staff. I'll show the key signature for B♭ major below. It means "every B note that follows is really a B♭, and every E note is really E♭."



You can learn to write out scales quickly and easily by memorizing key signatures. Let's imagine that you've constructed a B♭ major scale using the WWHWWWH pattern, and you write it in letter names like so:

B♭ C D E♭ F G A B♭

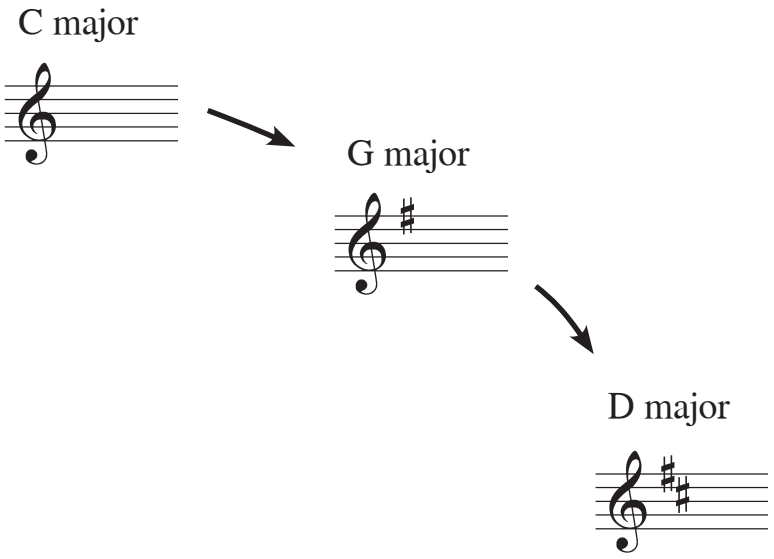
You can use your knowledge of the B♭ major signature to double-check your work. You'd say "I know the scale should have B♭ and E♭ in it, so that looks correct!"

The Circle of Fifths

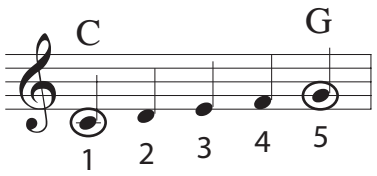
People learn their key signatures by memorizing the circle of fifths. This is a map of all possible keys, organized in a clock-like circle with twelve positions. We'll just start the top part of it on this page.

At the twelve o'clock position, you put C major. It has no sharps or flats.

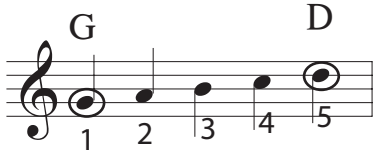
As we travel clockwise, we'll add sharps to each key. The first key gets one sharp, the next one gets two, and so on. (I'll explain exactly which sharps we are adding in a second.)



Each new key is a perfect fifth higher than the previous one. That means that if you start in C major and count up the first five steps, you'll arrive in G major, which is the next stop in the circle.



Then, if you start in G major and count up five steps, you'll get to D.



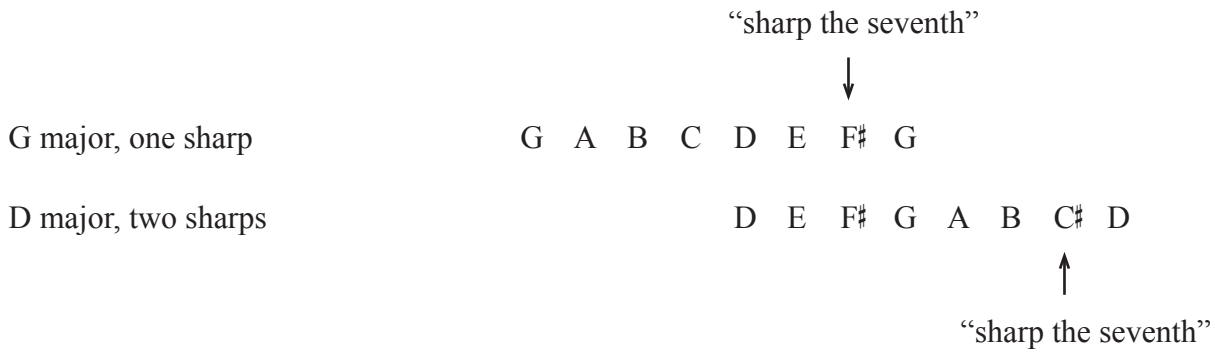
And so on! I don't think you should worry too much about counting up in fifths - most people just memorize the order of the circle with the understanding that the keys are all the same distance apart.

Adding Sharps

So, which sharps are we adding? What's the pattern?

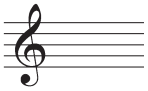
With each key, you keep all the sharps from the previous key. Plus, you raise the seventh scale-degree in the new key.

So, for instance, when you move from G (which has one sharp, F♯) to D major (two sharps) you keep that F♯ and you add the seventh degree, C♯. You can keep doing this with every step around the circle until you've accumulated as many sharps as possible. (That would be C♯ major, which is like C major with all seven notes sharped.)

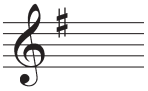


Here is the entire sharp side of the circle.

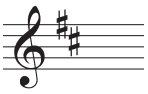
C major



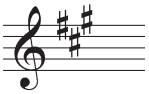
G major



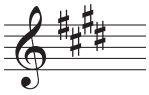
D major



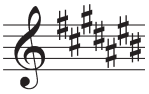
A major



E major

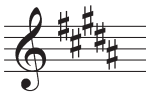


C♯ major



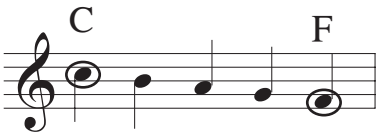
F♯ major

B major

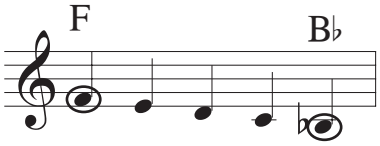


Building the Flat Side

In order to build the flat side we are going to go down in fifths. So first we climb down in C major and get to F.



In F major, we can count down and get to B♭. Because we are using F major we arrive on B♭, not B. Actually measuring each fifth down is really kind of complicated. Like I've said, most people just memorize the order of scales in the circle.



With each step in the circle we will add a flat to the fourth scale degree. F major is our first flat key, and its fourth note is B♭. Then, to make B♭ major, we need a flat on its fourth tone (E♭).

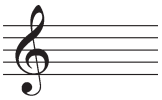
"flat the fourth"

F major, one flat — F G A B♭ C D E F

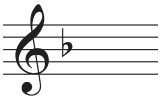
B-flat major, two flats — B♭ C D E♭ F G A B♭

"flat the fourth"

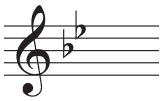
C major



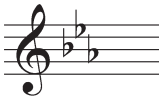
F major



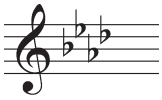
B♭ major



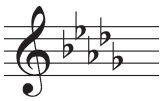
E♭ major



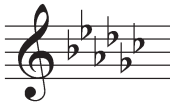
A♭ major



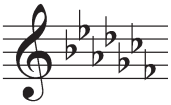
D♭ major



G♭ major

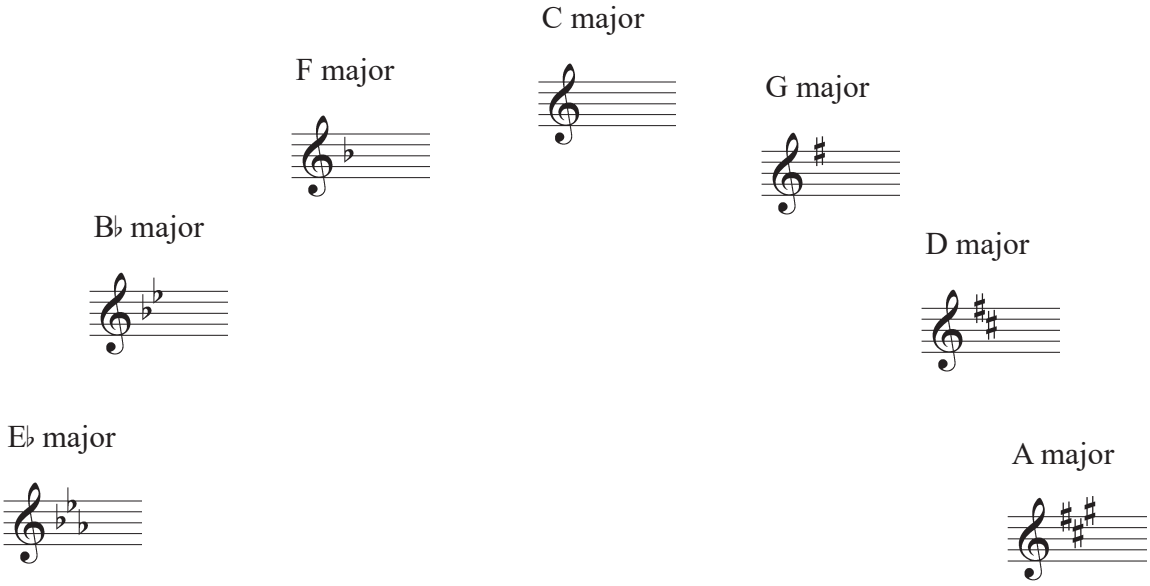


C♭ major



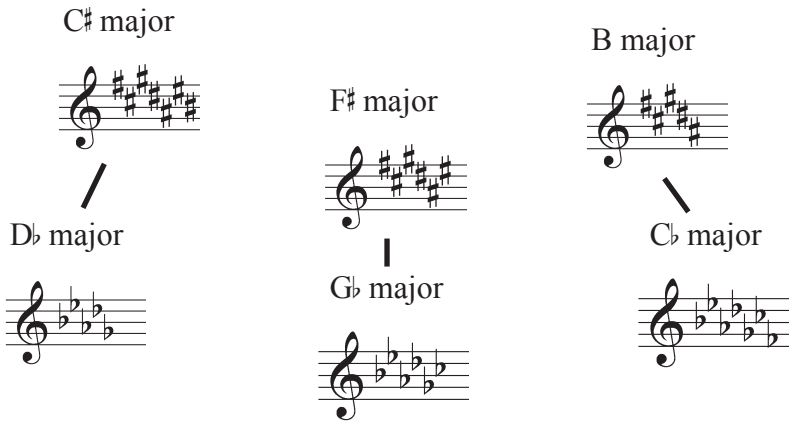
The “Easy” Keys

In the beginning I recommend that you memorize the top half of the circle, from three flats to three sharps. You need to know what key is in each position, how many sharps and flats it has, and what those specific accidentals are.



Enharmonically-Related Keys

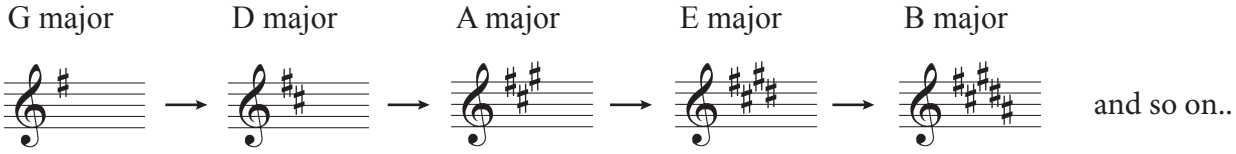
Now, I told you there were 12 positions in the circle, like a clock, and yet you may have noticed that both the sharp side and the flat side curl around past six o’clock. There are a few overlapping keys! These are *enharmonically related*, meaning that they are drawn differently on the staff but played on the same keys of the piano. So, we’ll need to make our circle more like an overlapping spiral, and fill in both the sharp version and the flat version of these keys.



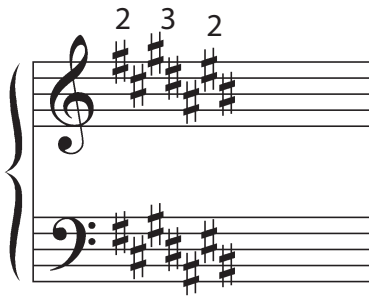
The Order and Placement of Sharps in the Key Signature

When you write a key signature, you are supposed to always list the accidentals in the same order and in the same place on the staff. You can think of the sharps and flats as two long sequences that you have to memorize - each key simply rolls out one more sharp or one more flat in the series.

The sequence of sharps, for instance, is F♯ C♯ G♯ D♯ A♯ E♯ B♯. As we go around the circle we roll out this sequence one at a time.



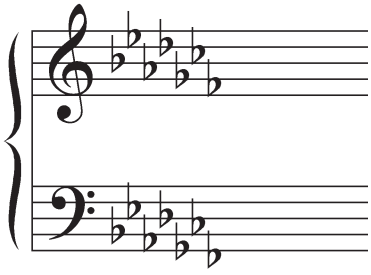
If you study the signature for C♯ major you see that you are supposed to distribute these in a 2-3-2 pattern in both the treble and bass clefs.



The Order and Placement of Flats

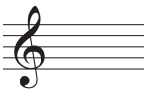
The order of flats is B♭ E♭ A♭ D♭ G♭ C♭ F♭. Some enterprising students have noticed that it is the reverse of the sharps pattern.

The key signature for C♭ major shows that the flats are supposed to be placed in a simple zigzag.

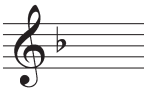


Here is the whole circle, for your reference.

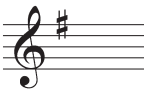
C major



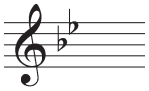
F major



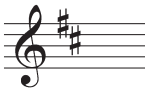
G major



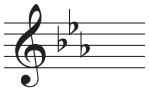
B♭ major



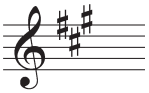
D major



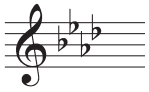
E♭ major



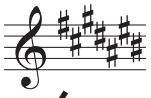
A major



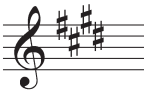
A♭ major



C♯ major

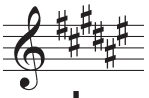


E major

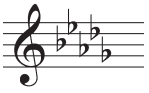


B major

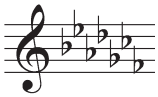
F♯ major



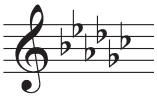
D♭ major



C♭ major



G♭ major



Chapter 10 - 6/8 Time

When we were first introduced to the idea of meter, I said that the bottom number in our time signatures indicated what kind of note would get the beat. Up until now, every meter signature you've seen has had a four on the bottom, meaning that the basic unit of time is the quarter note.


1/4 note gets the beat

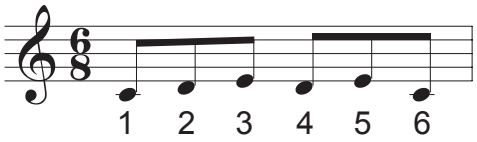
This is true for "simple" meters. However, we now going to consider what is called a "compound" meter, where things are somewhat different. Specifically, I want to look at 6/8, the most common compound meter.


1/8 note gets the beat?

The eight on the bottom of the time signature implies that eighth notes should get the beat. This, however, is a lie! Or, at least, it's not the whole truth.

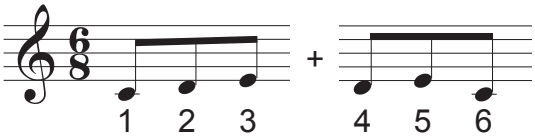
Counting it slowly, in six

If we are going very slowly in 6/8, it is possible to count out six beats, just like you would expect, with a count for each eighth note.



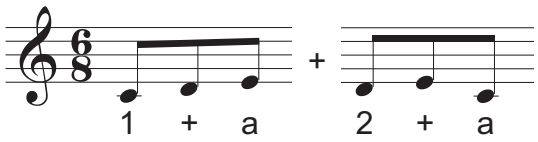
Counting in two

However, in 6/8 there is a sense that the measure also breaks into two halves.



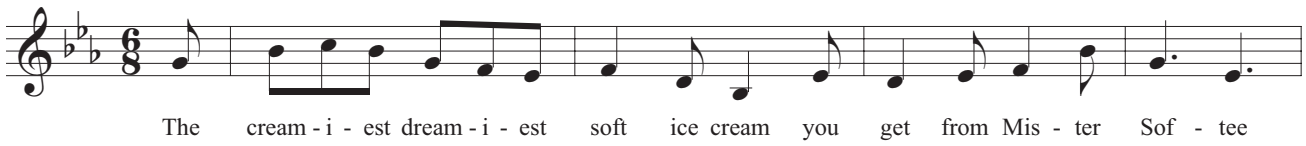
These halves are usually felt as the real beats in 6/8 -- it's like 2/4 that's been subdivided into groups of three, or triplets.

We could re-number these beats as 1 and 2, and subdivide the triplet parts with "+ a"



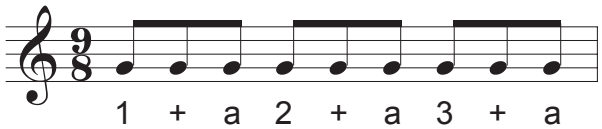
(This "1 + a" system will only work as long as we have no values shorter than an eighth note. If sixteenth notes are introduced into the mix we'll get into trouble!)

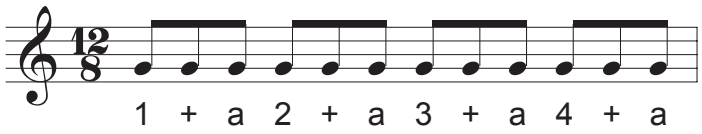
If you think about it I bet you can come up with a lot of music that has this triplet feeling - for instance, the “Mr. Softee” theme that blares from ice cream trucks throughout New York City begins in 6/8.



Other options - 9/8 and 12/8

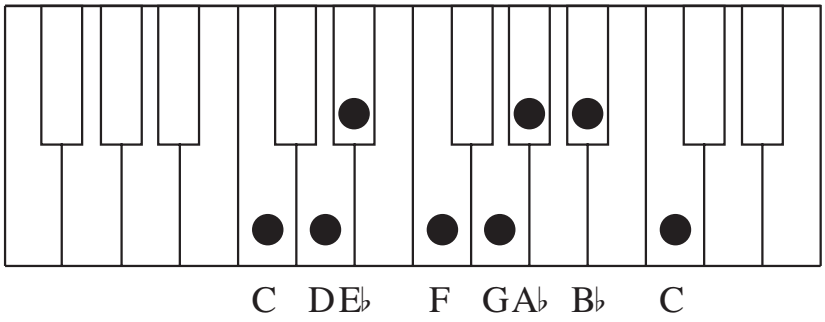
We said that 6/8 is like a 2/4 that has been broken into triplet-like beats. We can have a triplety 3/4 and 4/4 as well. 9/8 is a three-beat measure made of triplets, and 12/8 is a four-beat measure.





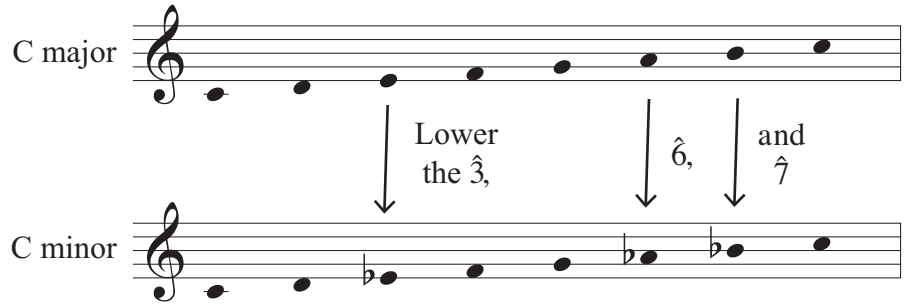
Chapter 11 - Minor Scales

It is time to delve into the dark and mysterious world of the minor scale. Here's C "natural" minor drawn on the piano keyboard:

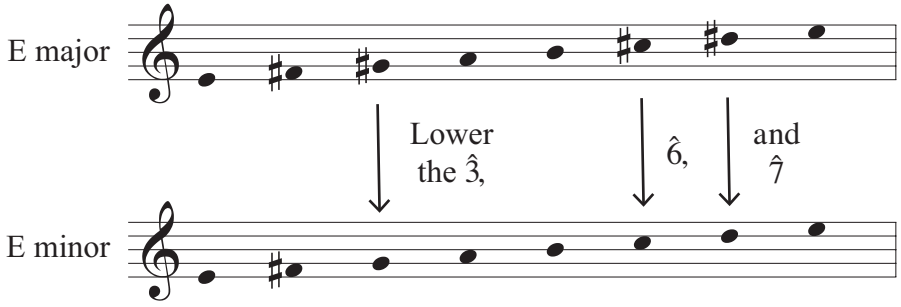


You could learn the shape of the scale by memorizing another sequence of step-sizes -- in this case it would be "WHWWHWW." However, I don't think that's the best approach to building minor scales. The pattern is hard to memorize and we'll just have to alter it when we get into the three "flavors" of minor.

In my opinion it is easiest to learn the minor scale as a transformation of the major. Start with a major scale and then lower the third, sixth, and seventh scale degrees.



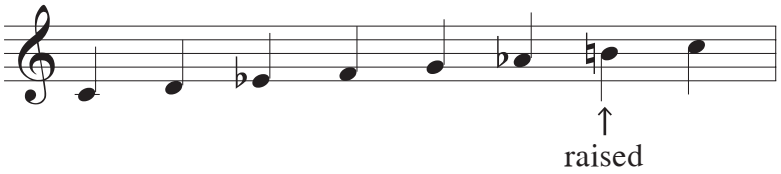
If the major version has notes with no accidentals, we'll add flats. But if the major version has sharps, we'll simply take the sharps away.



The minor scale that we've learned thus far is called the **natural minor**, and you should think of it as the standard, referential version of the minor scale. However, there are two variants that are traditionally taught in theory class.

Harmonic minor

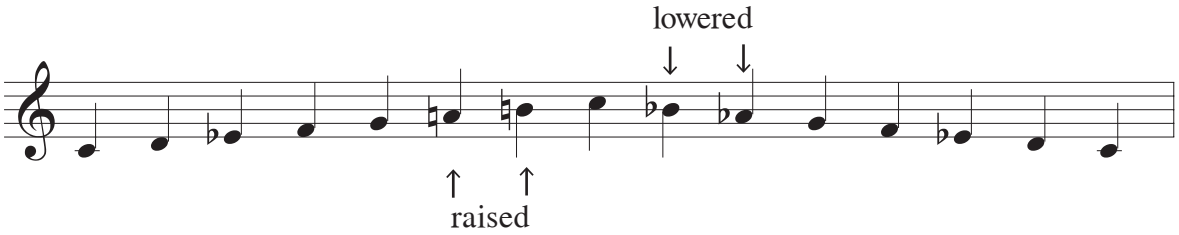
There are certain situations where you don't want your seventh scale-degree (or "leading tone") to be a whole step below the top of the scale. You want it to be closer, a half-step below, like in the major scale. In the harmonic minor scale you raise the seventh scale-degree back up, and it leaves a funny gap between $\hat{6}$ and $\hat{7}$.



Here I marked my B with a natural sign to draw attention to the fact that it is not flatted. It's probably a good idea to do that with all of these altered scale degrees.

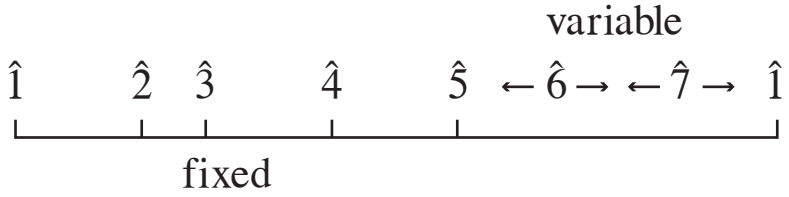
Melodic minor

Melodic minor is different when it is ascending and when it is descending. When it is going up, the sixth and seventh scale degrees are raised, as if it were a major scale. On the way down, however, the sixth and seventh are lowered, like with the natural minor.



The TRUTH about these variants

I guess it is a little useful to practice these other versions of the minor scale. The reason we study them is that the minor scale isn't really as fixed and stable as the major. You should really think of the sixth and seventh scale degrees as somewhat slippery and variable -- we'll raise them to be like the major scale in some situations and leave them lowered in others.



Key Signatures and the Relative Minor

It turns out that major and minor scales lock together in a certain pattern. A minor, for instance, uses all white notes just like C major, only it starts on A.

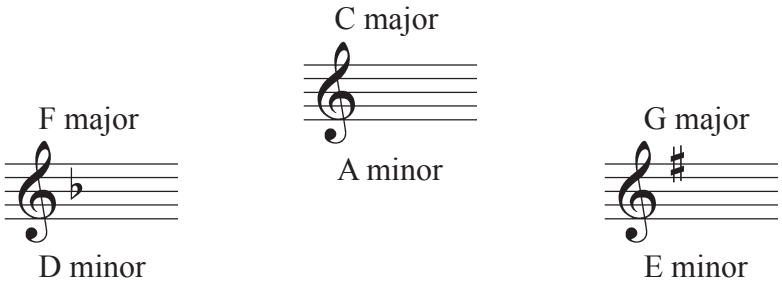
A minor A B C D E F G A

C major C D E F G A B C

If you start on a major key and count down (from the top) to the sixth scale degree, you've found the starting point of that key's "relative minor."

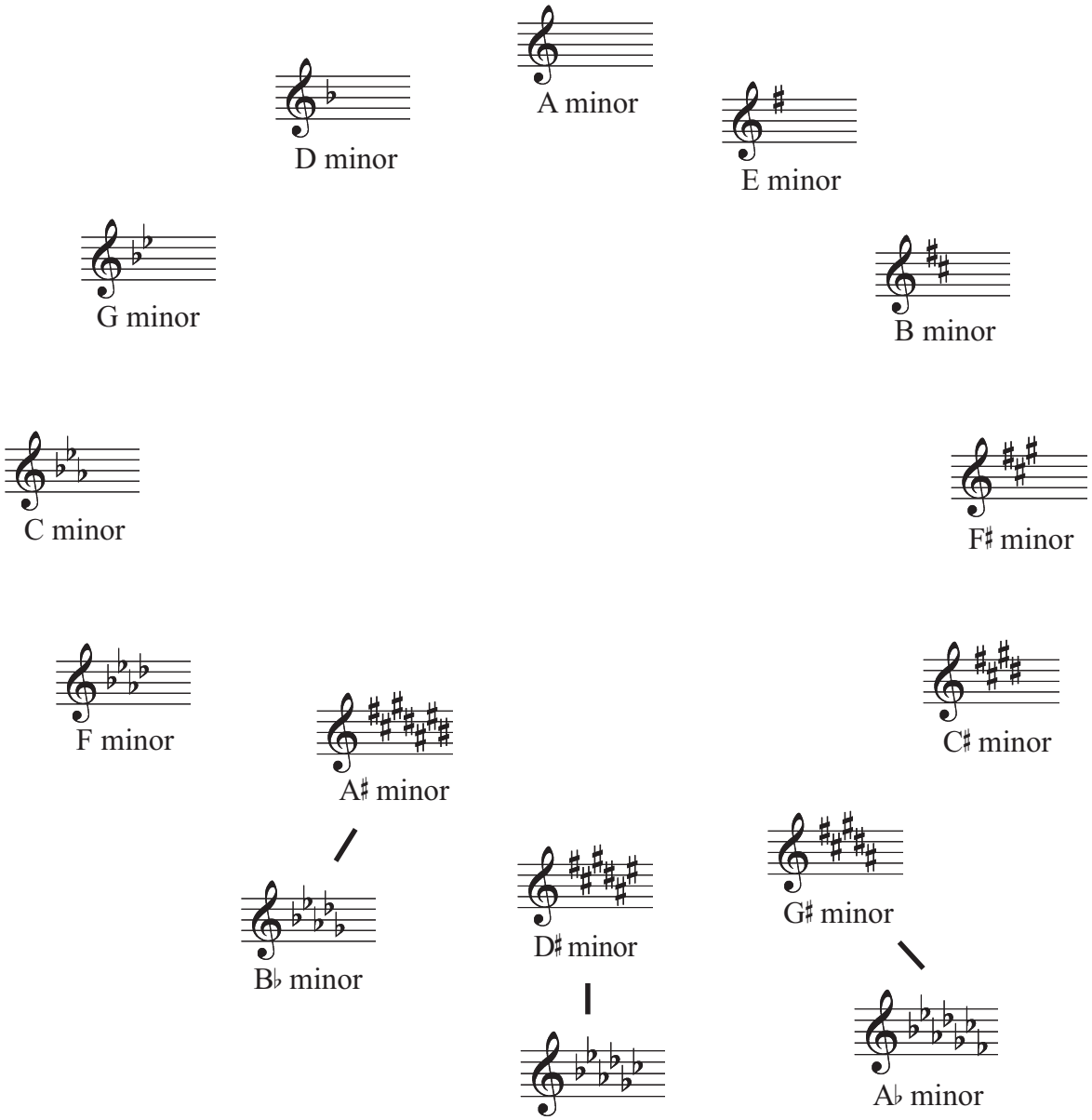
You can also start by thinking of a minor scale and then counting up a minor third to the relative major.

Thus, every key signature on our circle of fifths can serve double duty. It not only represents a major key, but a minor key as well. I'll fill out the very top of the circle here with both the major and minor key labels.



See if you can construct a circle of fifths with all of the relative minors! Note how the minor keys are also related by fifths, just like the majors.

...and here is a complete minor circle of fifths, for your reference.

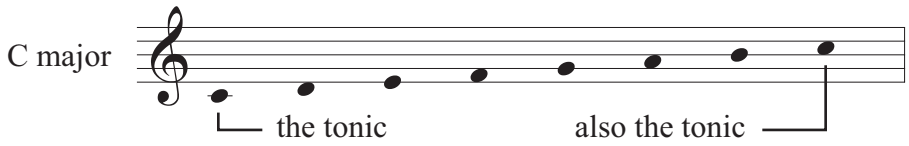


Chapter 12 - The Fancy Note Names

Up until this point we've referred to the notes in the scale mostly with scale-degree numbers, like $\hat{1}$ $\hat{2}$ $\hat{3}$ and so on. The different parts of the scale have other traditional names, as well, and it is time we learned them.

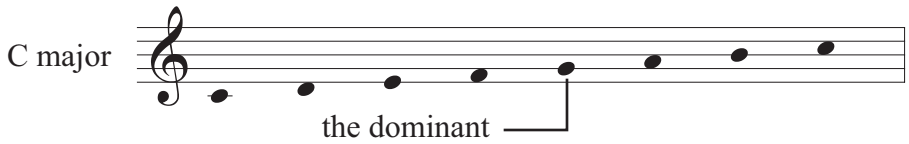
$\hat{1}$, the tonic

The bottom and top of the scale are known as the tonic, and this is the most important tone in the key. It is not only our starting point and the name of the scale, but it is the "home note," the most stable and grounded-sounding pitch. Most simple melodies end on the tonic - it is like the period at the end of a sentence.



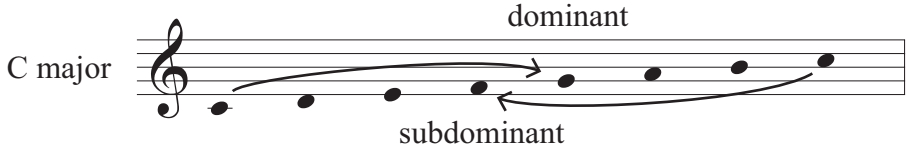
$\hat{5}$, the dominant

Next to the tonic, the dominant is our next-most stable reference point. When working by ear it can be easy to confuse the two tones, because they have a similar quality.



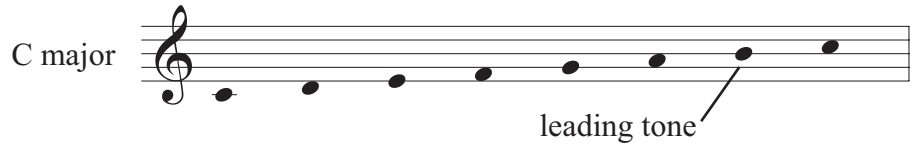
$\hat{4}$, the subdominant

It may seems obvious that the subdominant is so-called because it is a step below the dominant. However, some would argue that in calling it a subdominant we are actually counting a fifth down from the tonic, just as the dominant is a fifth up.

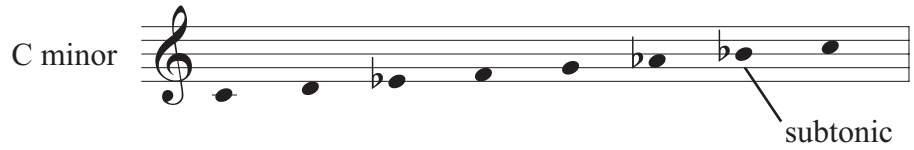


$\hat{7}$, the leading tone

The note just below the tonic is called the leading tone, because it wants to connect to tonic in a "ti-do" figure.

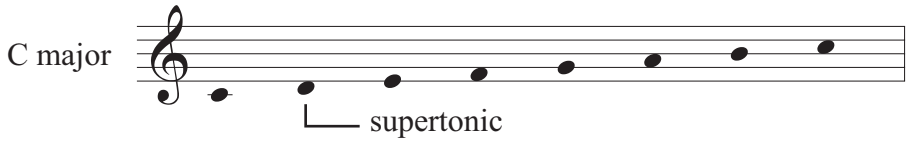


Note that it has to be a half-step below tonic in order to be a proper leading tone - if it is a whole step below (as in a natural minor scale) we call it the **subtonic**.



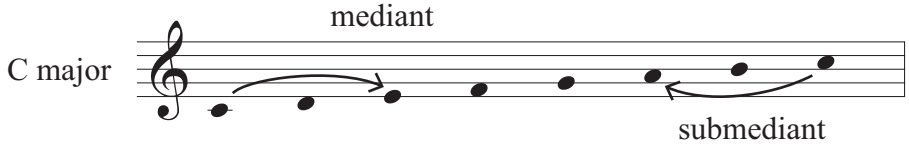
$\hat{2}$, the supertonic

This is just the note above the tonic.



$\hat{3}$ and $\hat{6}$, mediant and submediant

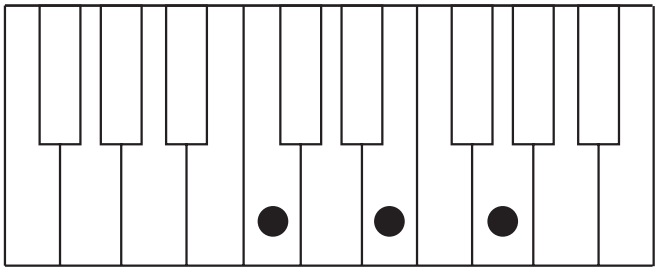
That just leaves the third and sixth scale degrees. We'll climb up to $\hat{3}$ and call that the mediant, and climb the same distance down to $\hat{6}$ and call it the submediant.



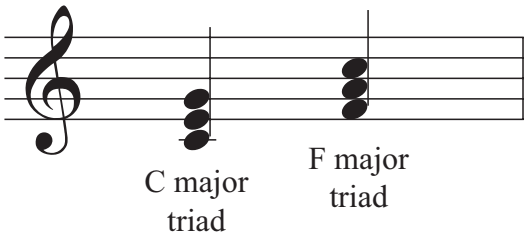
Chapter 13 - Triads

You are probably aware that most music involves **chords**, combinations of notes that stack up into a nice blended sound. The most common type of chord in tonal music is the **triad**, a configuration of three notes in a familiar pattern.

In their simplest form these triads make a "gapped" shape, hitting every other note in the scale. On the piano this fits comfortably under one hand, and it makes a line-line-line or space-space-space figure on the musical staff.

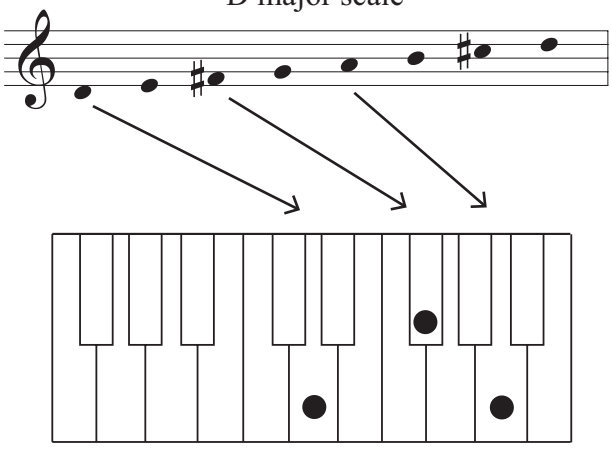


C major triad



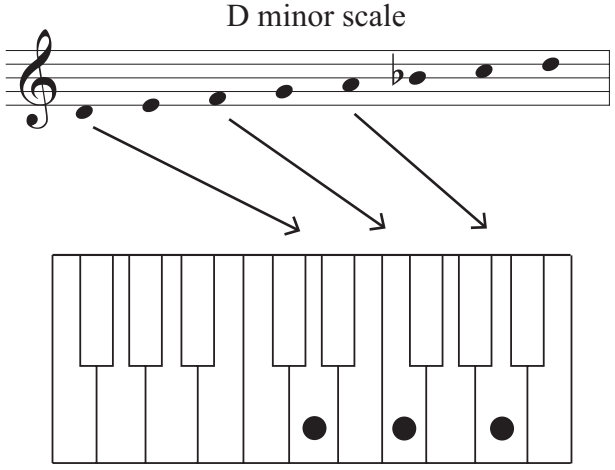
So, the fastest way to make some common triads would be to think of of one of our scales, either major or minor. Grab the $\hat{1}$, $\hat{3}$, and $\hat{5}$ of that scale and boom, you've made the corresponding triad. We call these notes the *root*, *third*, and *fifth* of the triad.

D major scale



$\hat{1}$, $\hat{3}$, and $\hat{5}$ make a D major triad

D minor scale



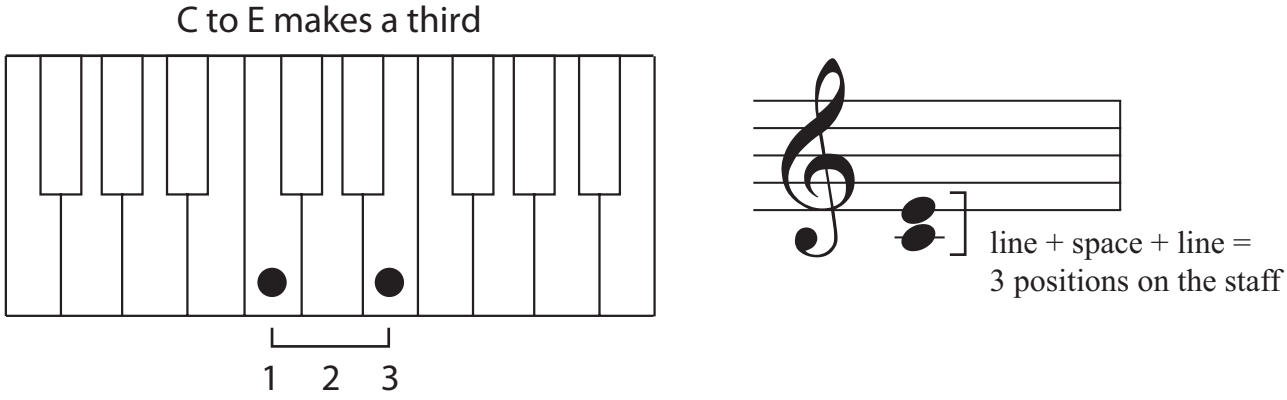
$\hat{1}$, $\hat{3}$, and $\hat{5}$ make a D minor triad

So that's a quick and easy method for making a few triads, but it's not enough! There are some that do not correspond to the beginning of a familiar scale. We need to learn how to construct all possible triads.

In order to do that, we need to learn the **intervallic shapes** of the four different kinds of triad.

Thirds

Triads are made of *thirds*. A third is so-called because it extends over three notes of the scale, and it takes up three positions in the musical staff.



Major Thirds

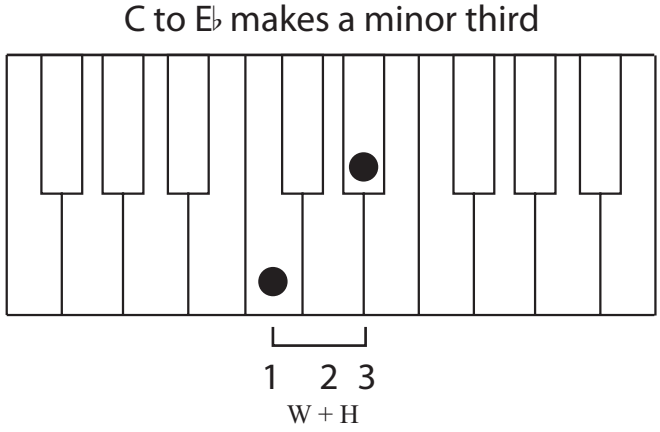
C to E is a **major third**. It spans the first three notes of the C major scale and it is the bottom part of a C major triad.

The precise size of a major third could be described as **two whole steps** or **four half steps**.

Minor Thirds

Now let's imagine that we are generating a C minor triad, from the C minor scale. Our first two notes will be C and E♭, and the interval will be a little smaller.

The precise size of a minor third could be described as **whole step plus half step** or **three half steps**.

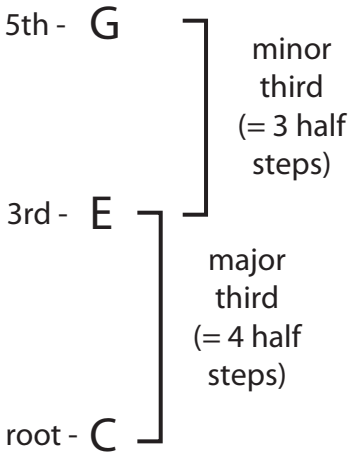


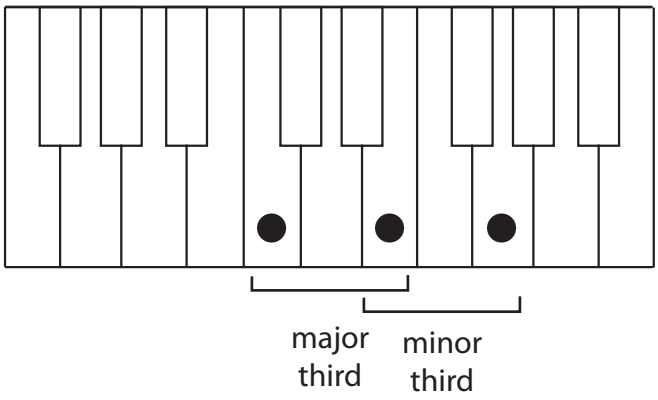
Major Triads

Of course the triad involves two thirds, stacked on top of one another.

The major triad has a major third on the bottom (between the root and the third) and a minor third on top (between the third and the fifth.)

C major triad

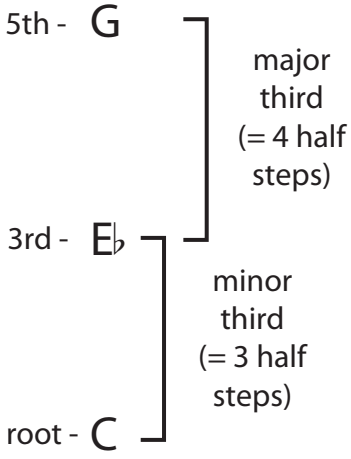


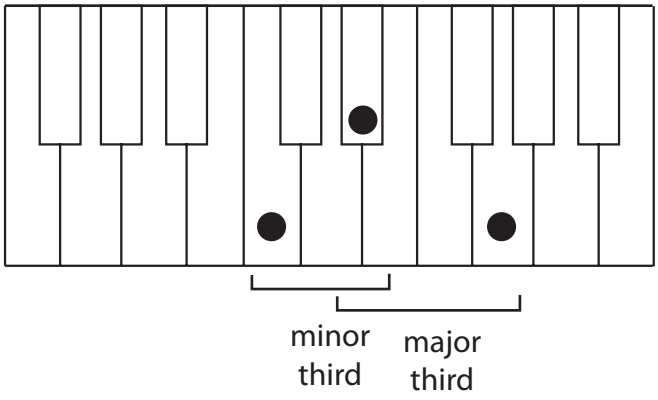


Minor Triads

The minor triad has a minor third on the bottom (from root to third) and a major third on top (from third to fifth).

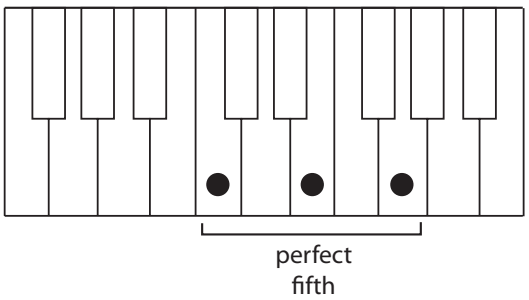
C minor triad



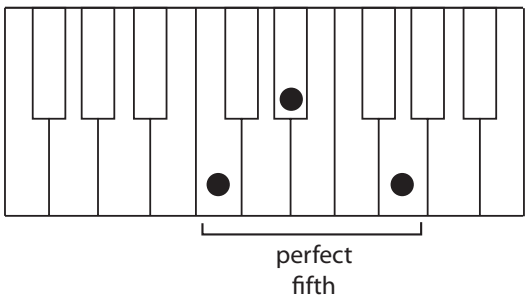


For either the major or the minor the distance from bottom to top will be an interval called a **perfect fifth**. It should span a total of 7 half steps. At this stage you probably don't need to worry about the fifth - if you make your thirds correctly it should work out this way every time.

C major



C minor

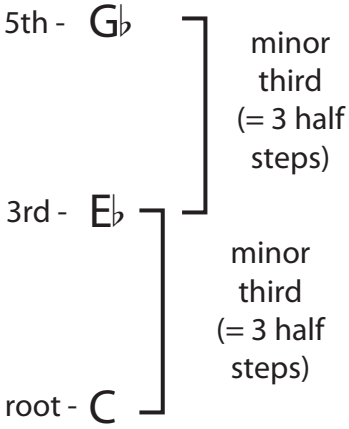


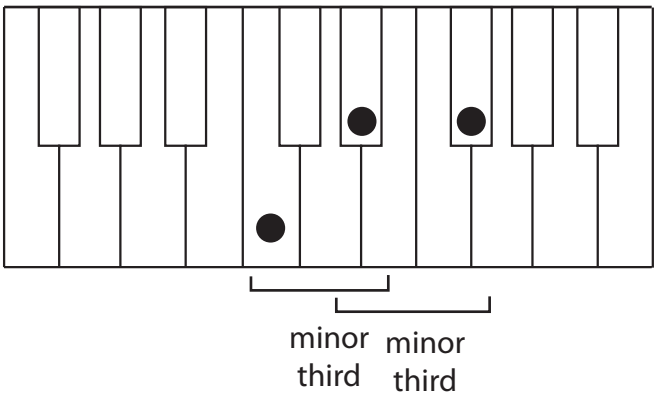
Diminished and Augmented Triads

There are two more kinds of triad that are a little less common.

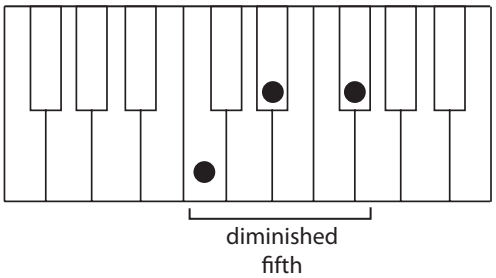
The **diminished triad** stacks two minor thirds on top of each other.

C diminished triad

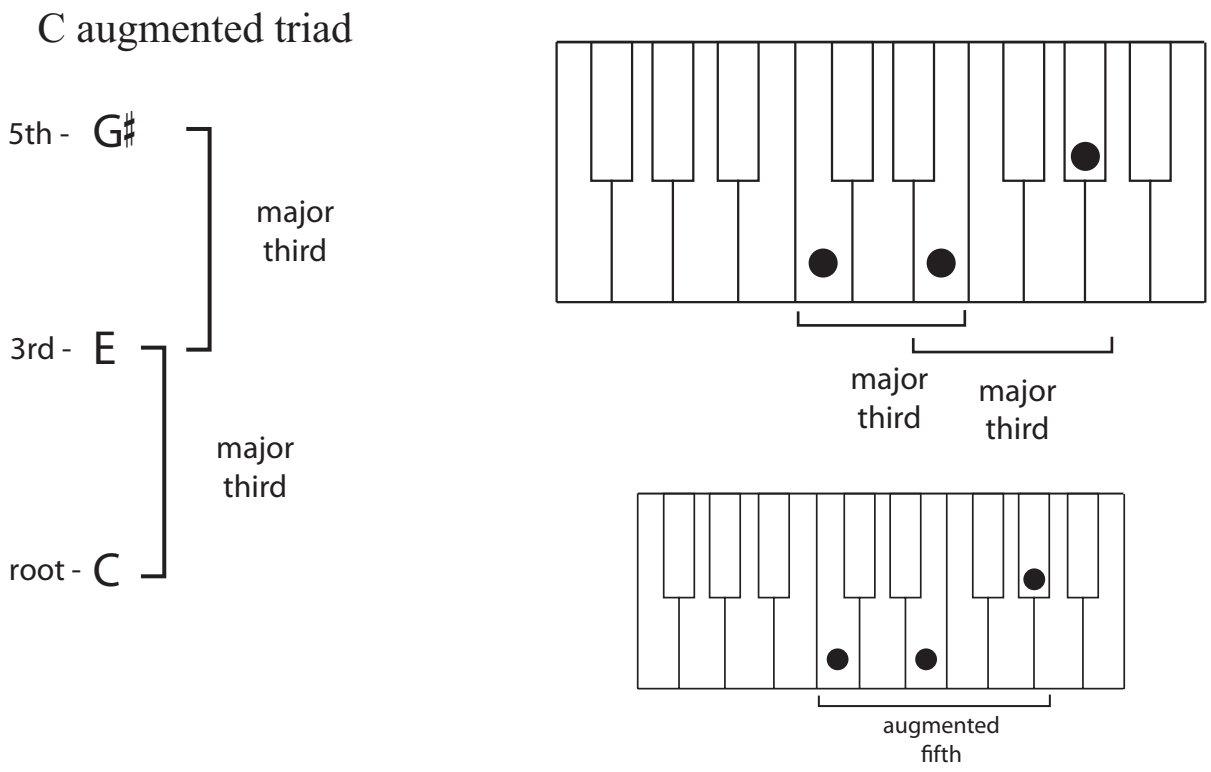




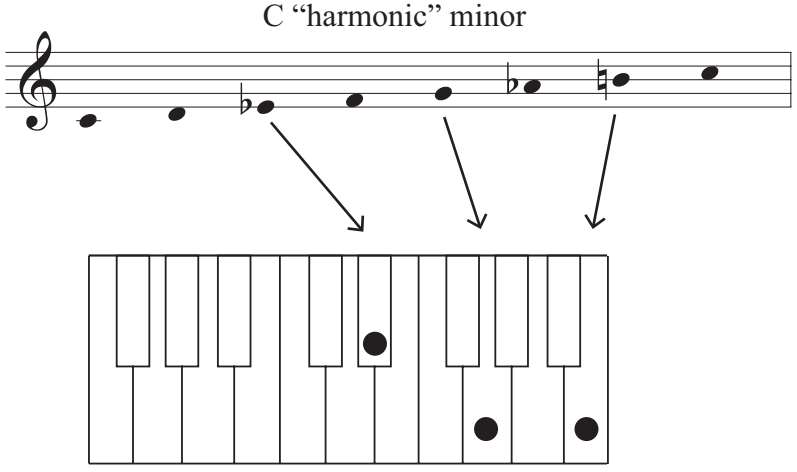
The outside interval will be a **diminished fifth**, which spans 6 half steps. Unlike the perfect fifth which is super stable, the diminished fifth is fairly dissonant and unstable, and it gives the diminished triad a tense and unstable sound.



Augmented triads stack two major thirds. The outside interval will be an **augmented fifth** (= 8 half steps).



Interestingly, the augmented triad isn't very dissonant, but it is pretty rare in tonal music. Perhaps this is because it is impossible to make one with the notes from a major or natural minor scale. The only way we can make an augmented triad from one of our scales is to combine $\hat{3}$, $\hat{5}$ and $\hat{7}$ from the harmonic minor.

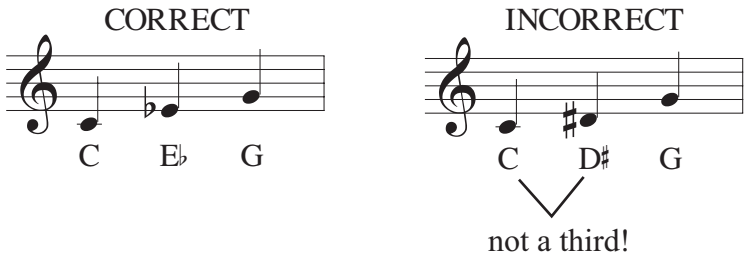


$\hat{3}$, $\hat{5}$, and $\hat{7}$ make E♭ augmented triad

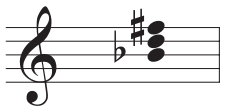
Spelling Rules for Triads

Make sure you are always "skipping over" a letter name as you go from note to note. This will make the familiar gapped shape with thirds that we've been talking about.

Spelling a C minor triad



Also, we will *almost never* mix sharps and flats in any of these triads.



Based on everything we've learned so far, there is only one exception! B♭ augmented has a B♭ on the bottom and an F♯ on top.

Chapter 14 - Intervals

Some people would start your theory education by teaching you how to make every kind of interval, right off the bat. This seems reasonable, since everything else we want to make (like scales and chords) are made of intervals, so we might as well start with these elemental units and build from there.

However, since we've put off the subject for this long, you can tell that I don't quite agree. The ability to jump an arbitrary distance from note to note requires an intimate knowledge of musical space. By working on familiar structures like scales and triads, we've built up that knowledge. Now we are ready!

An **interval** refers to the distance between two notes.

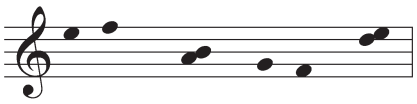
The distance between note-names or staff lines

In the most basic sense intervals are referred to by how many note-names they span or how many positions on the staff they take up. "Seconds" move from one note-name to the next one, "thirds" cover three note names and three positions on the staff, "fourths" span four, and so on.

B♭ → B♭

The distance of a note to the same note should maybe be called a "first." Except you don't say first, you call it a "*unison*"

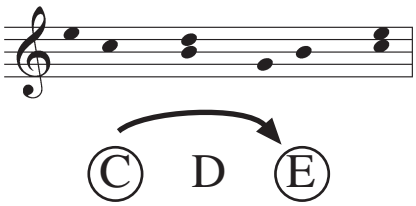
(a bunch of seconds)



C → D

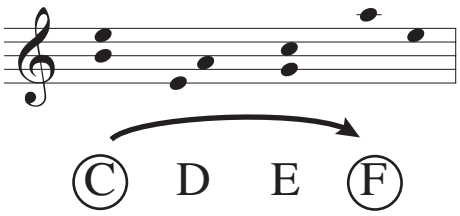
The distance from one note to the next name or staff line is a *second*. Often we say "step" instead of second.

(a bunch of thirds)



Skipping over one note makes a *third*.

(a bunch of fourths)



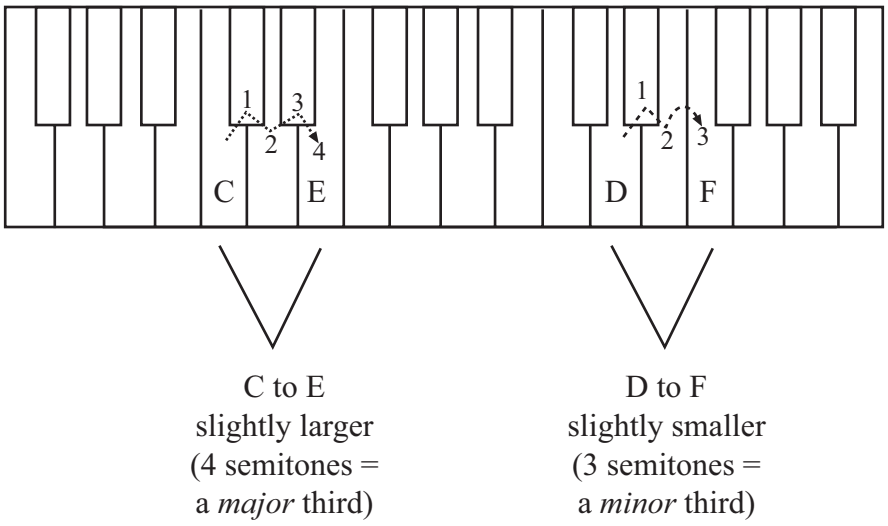
A *fourth* spans four letter-names in total.

and so on...

The **qualities** of intervals - major + minor, augmented + diminished

Most of the time these generic interval names (like third, fourth and fifth) aren't specific enough for our needs. We need to be able to specify the exact size and sound of these intervals by indicating their **quality**.

For instance, we are already aware that thirds can come in two different sizes. C to E makes a larger size called a *major* third. It sounds relatively bright and happy, and it is four half steps across. D to F, however, makes a smaller interval called a *minor* third. It sounds a bit cooler and darker, and it is only three half steps in size.



C to E
slightly larger
(4 semitones =
a *major* third)

D to F
slightly smaller
(3 semitones =
a *minor* third)

The Perfect Intervals

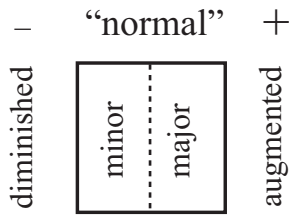
For the perfect intervals (the unison, fourth, fifth, and octave), there is one size that is the considered the normal or most common size. We refer to that as the "perfect" interval. If you make the interval a half-step bigger than normal it is "augmented," whereas a half-step smaller than normal is "diminished."

Perfect Intervals: Unison, 4th, 5th, Octave

The Imperfect Intervals

The other intervals (2nd, 3rd, 6th, and 7th) are imperfect. Rather than one normal size, they've got a larger version (major) and a smaller one (minor). The major and minor intervals are both very common, but occasionally a major interval is "stretched" even larger, making it augmented, or a minor interval is made smaller or diminished.

Imperfect Intervals: 2nd, 3rd, 6th, 7th



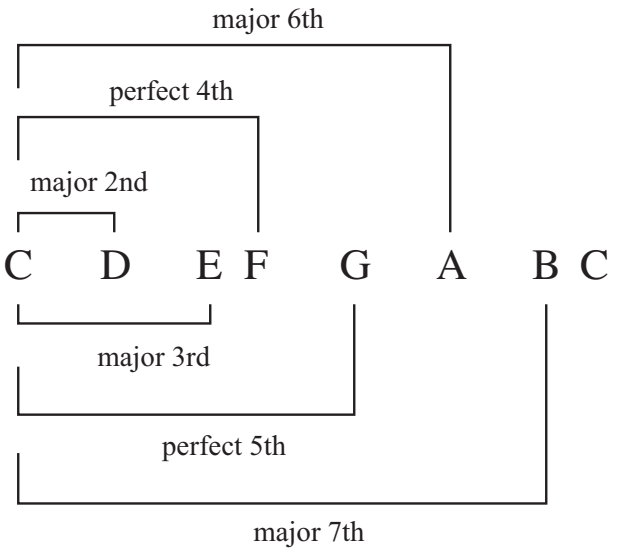
Figuring the size of intervals

I suspect the average musician uses several different ways to calculate the size of intervals.

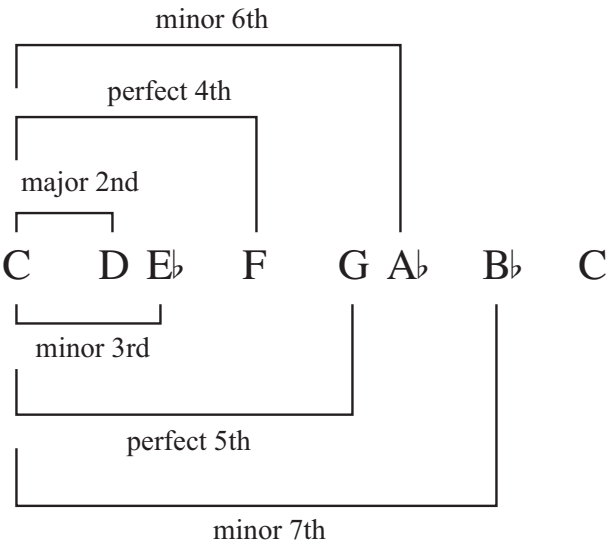
Size in semitones: The simplest and most efficient way to define an interval is to count how many half-steps or semitones are in it. We saw this in action on the previous page when we noted that a minor third has 3 semitones and a major third has 4. This works well for small intervals, but of course it will become annoying to count up, say, 9 semitones on your piano keyboard.

Scalar segments: An alternative to counting all semitones is to think of the interval as part of a scale. If you imagine that the bottom note in an interval is actually the beginning of a scale, the major scale provides all of the major intervals, and the minor scale provides most of the minor ones.

Intervals in the major scale



Intervals in the natural minor scale

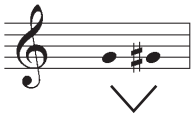


Guide to small intervals

We've got all we need to start making smaller intervals. Here's a guide to the more common ones.

Unison

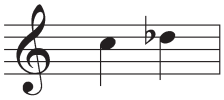
As I've mentioned, this is the distance from one note to the same note. It is theoretically possible to have "augmented unisons" or "diminished unisons," but a more commonsense approach would simply be to call those half steps or semitones.



"aug unison"
(half step)

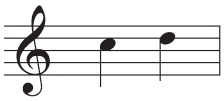
Minor 2nd

a.k.a. half step, semitone



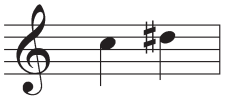
Major 2nd

a.k.a. whole step



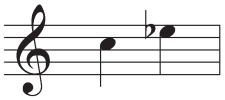
Augmented 2nd

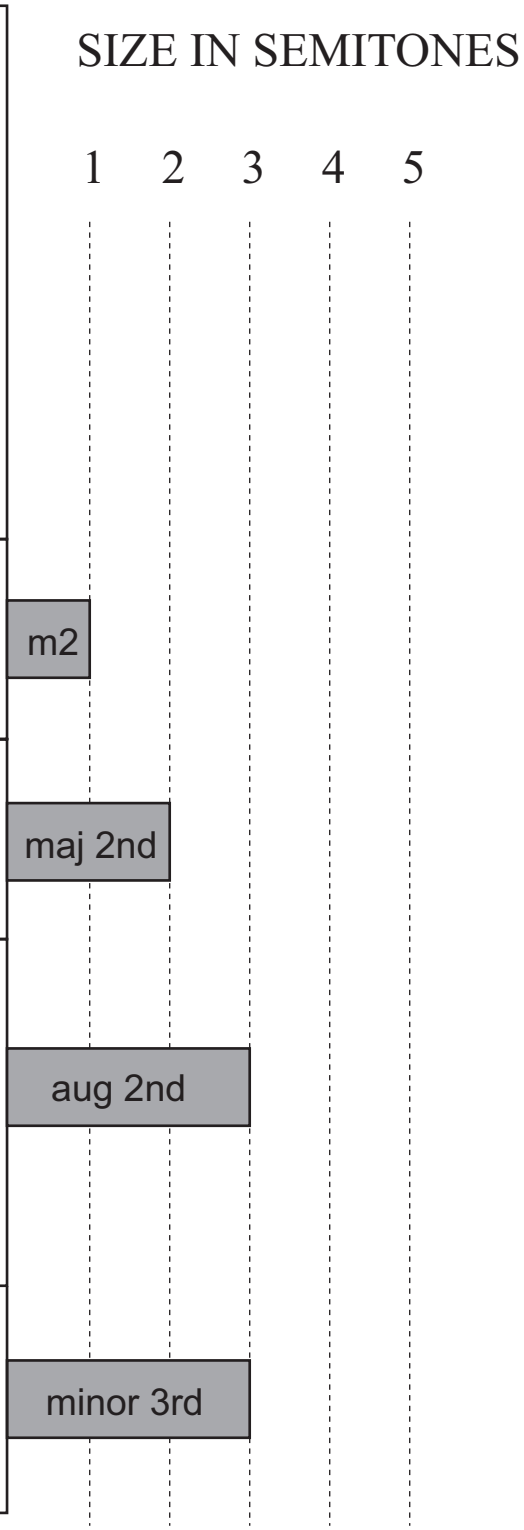
This "special" interval is actually somewhat common. It occurs in the harmonic minor scale. It's the same size as a minor 3rd, 3 semitones.



Minor 3rd

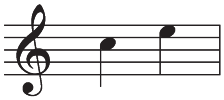
3 semitones, or W+H. Found in the first three notes of the minor scale.





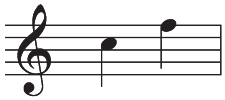
Major 3rd

4 semitones, or W+W. Found in the first three notes of the major scale.



Perfect 4th

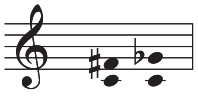
5 semitones, or W+W+H. Found in all scales.



Augmented 4th / Diminished 5th / Tritone

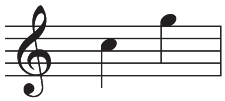
The interval that spans 6 semitones is famous because it is somewhat difficult to sing. It falls between the P4th and P5th, and it is also known as the "tritone" because it could be built W+W+W. (In reality, though, you will probably think of it in other ways most of the time.)

This is one situation where the way you spell the interval is crucial. (See more on the "enharmonic error" on the next page.) Starting with a P4th and "stretching" it produces an augmented 4th (say, C-F♯), whereas starting with a P5th and shrinking it would make a diminished 5th (C-G♭). Note how they look different on the staff:

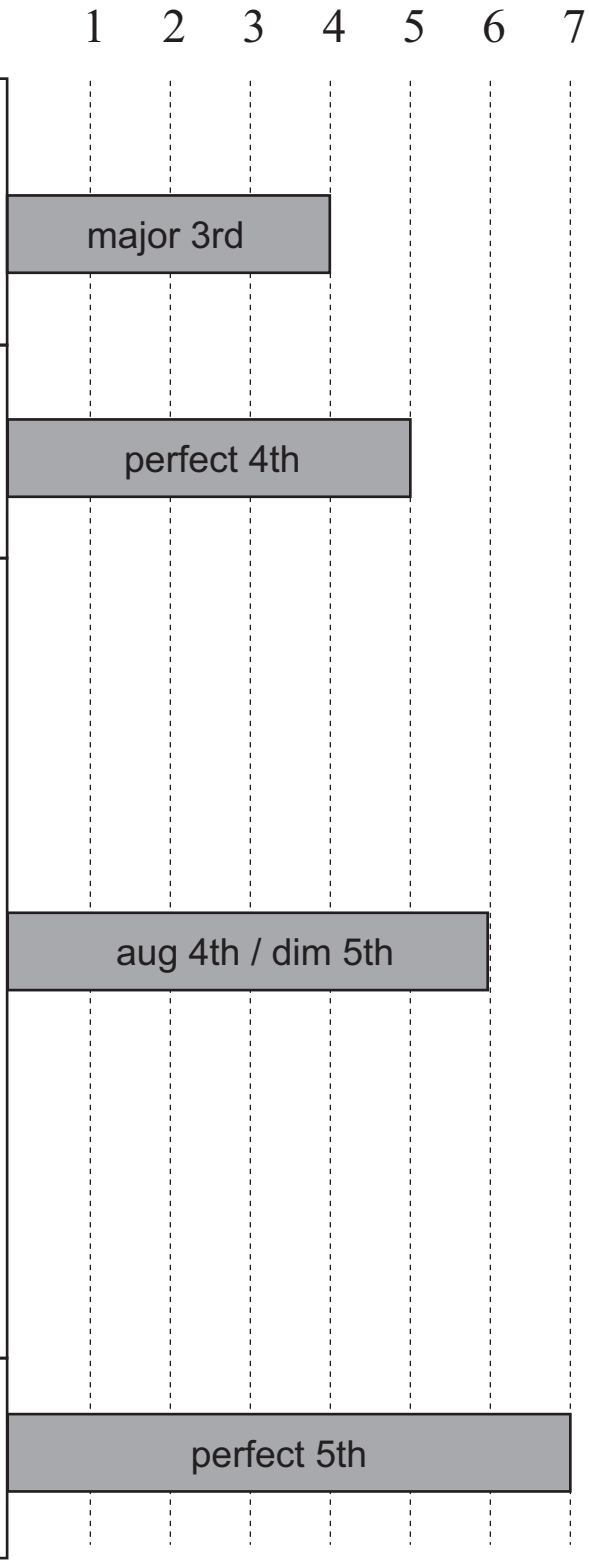


Perfect 5th

7 semitones, or W+W+H+W. Found in all scales.



SIZE IN SEMITONES



Enharmonic errors

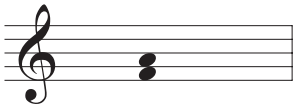
When two differently-spelled notes land on the same key on the piano we say that they are "enharmonically equivalent." C♯ and D♭ are a good example - they are both played on the same black key.

It's possible to spell *different intervals* that are *the same size*. I've already mentioned that the augmented second and the minor third are the same size, as are the augmented fourth and diminished fifth. The bad news is that enharmonically equivalent intervals are not considered interchangeable in tonal theory -- they imply very different contexts (different scales, different melodic continuation, etc.) Some theorists would even argue that they are tuned differently on instruments other than the piano. Thus, if I ask for an augmented fourth and you write a diminished fifth I will probably say that you've made "an enharmonic error," or, if I'm feeling cranky, "that's not a fourth!"

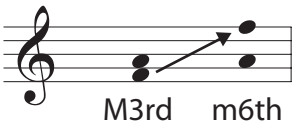
Avoid this error by paying attention to the very beginning of this chapter. Remember that augmented fourths all look a certain way on the staff and skip a certain number of note-names. Diminshed fifths look bigger on the staff, even though they are the same size on the piano.

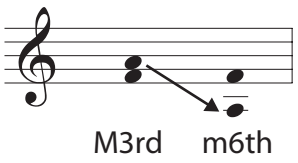
Inverting your intervals

Imagine you've got a major third from F up to A, like so:

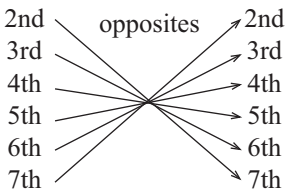


What would happen if the F on the bottom was sent up an octave, so that it's on top? Or what if we took the A from the top and put it down to the bottom? These repositionings happen all of the time in music, and we refer to it as "inversion." When we invert an interval in this way we are flipping the notes around into a new configuration.





It is easy to predict what an interval will turn into if inverted. First, you must learn which intervals are "opposites" of each other. If you want, you can remember that the numbers add up to nine, though I think it's more intuitive to just memorize them like so:



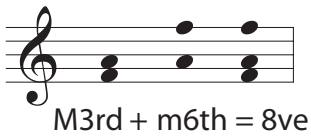
Also, the qualities of inverted intervals will be opposite. Major becomes minor, augmented becomes diminished (but perfect intervals remain perfect.)

major ⟷ minor

augmented ⟷ diminished

perfect ⟷ perfect

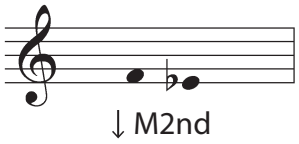
You could think of the interval and its inversion as two parts that would add up to an octave.



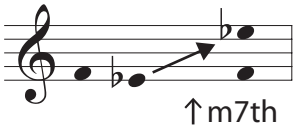
Making larger intervals - using the inversions

Knowing your inversional equivalents is very useful for making larger intervals. It can be confusing to count up a minor 7th (= 10 semitones) from a particular note. Thus, it is useful to know that "any interval up is the same as its inversion down." While it may be hard to think of a m7th up, it is very easy to think of a M2nd down.

Say you are asked to build a minor 7th up from F. First, calculate the inverted interval (major 2nd) down.

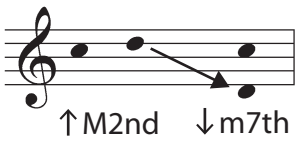


Then, flip that note around so that it's on top.



This is especially useful when you need to make a larger interval that descends from your starting note.

Say you need to make a minor 7th down from C. You can start with a major 2nd up, to D, then flip it around.



Thinking of large intervals as 5th + small interval

Yet one more trick you could use to make large intervals is to count up from the perfect fifth. I definitely do this when dealing with 6ths, since they are just a 5th plus a 2nd. So here is a table that shows you one more way you can think of the large intervals.

minor 6th = perfect 5th + minor 2nd
major 6th = perfect 5th + major 2nd
minor 7th = perfect 5th + minor 3rd
major 7th = perfect 5th + major 3rd

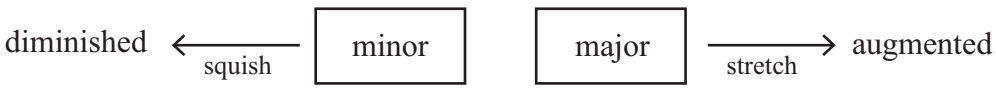
Augmented and diminished intervals as "stretched" and "squished"

Augmented and diminished intervals are perhaps the most tricky to spell. I like to start with a more common interval and "stretch" or "squish" until I get the augmented or diminished version.

First, you've got to remember how these intervals relate to "normal" perfect and imperfect ones.

Perfect Intervals: Unison, 4th, 5th, and Octave

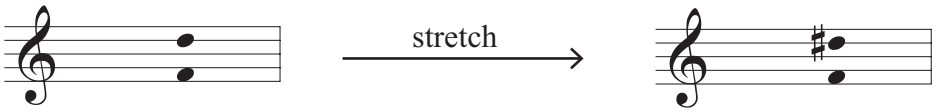
Imperfect Intervals: 2nds, 3rds, 6ths and 7ths



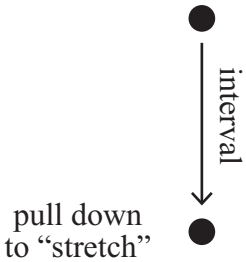
Now, say you were asked to create a somewhat unusual interval, an augmented sixth ascending from F.

First you could start with a major sixth...

... then raise the top note an extra half step for an augmented 6th.

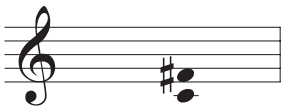


Be careful when making descending intervals, though. You need to push the notes the opposite way in order to "stretch" or "squish"!



So if you are making a descending diminished fifth from C, create a perfect fifth down and then squish it upwards.

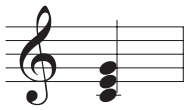
Also, remember you can check your work by inverting. A diminished interval will invert to an augmented one, and vice versa. If you flip that diminished F♯-C around it makes an augmented fouth, so we know we did it correctly.



Chapter 15: Diatonic Triads and Roman Numerals

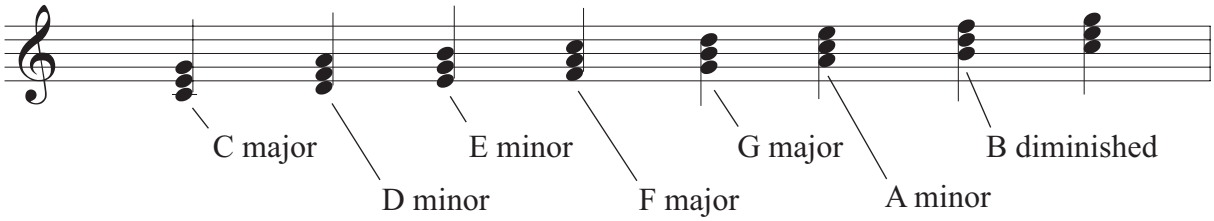
When we speak of **diatonic** triads we mean the chords that fit into the key you are working in. They draw from the notes in the scale and tend to sound fairly "normal" and "typical." The opposite of diatonic would be **chromatic** - chromatic chords use tones from outside of the scale, and those will tend to have a more complex or surprising effect. Eventually (in Theory II) we will get to play with chromatic chords, but first we need to learn how to make more typical progressions that stay in the key.

So imagine we are working in C major. You probably already know that the C major triad uses scale-degrees $\hat{1}$, $\hat{3}$ and $\hat{5}$, and that simple melodies in C tend to emphasize the tones in this triad.



c major triad

Now let's imagine that we take that triad shape and just push it up the scale. We'll make a D minor triad, an E minor, F major, and so on. We even get one diminished triad, on B.



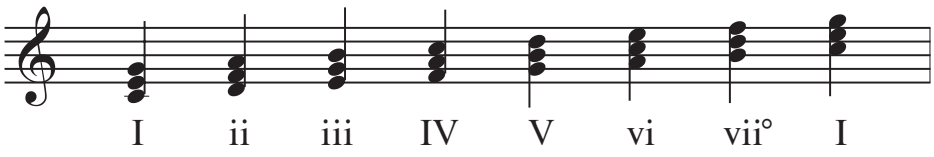
These are our diatonic triads in the key of C major. We will refer to these with some roman numerals, and we'll follow a few conventions to remind ourselves which ones are major, minor, or diminished.

Major triads (I, IV and V) get uppercase roman numerals.

Minor triads (ii, iii, and vi) get lowercase roman numerals.

Our diminished triad (vii°) is lowercase with a little circle after it.

This pattern holds true for all major scales. For reference I'll lay out the diatonic triads in C major with the roman numerals.



(Not every theory text uses this uppercase and lowercase convention - some indicate all triads in uppercase.)

(Also, we can use our "fancy names" for these triads. I is the tonic triad, V is the dominant, etc.)

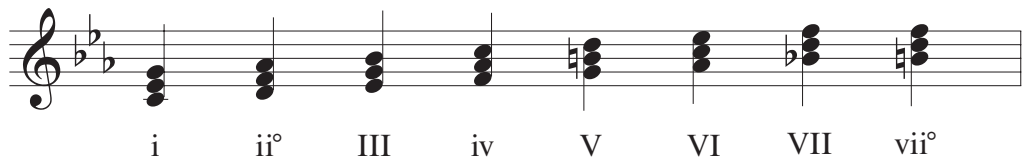
Minor Keys

Hopefully you remember that the minor scale is a little more complicated than major. We've already learned three different versions (natural, harmonic and melodic), which differ in their $\hat{6}$ and $\hat{7}$ scale degrees.

Most of our diatonic triads in minor can be derived from the natural minor scale, but a few draw on the raised leading-tone of the so-called harmonic minor.

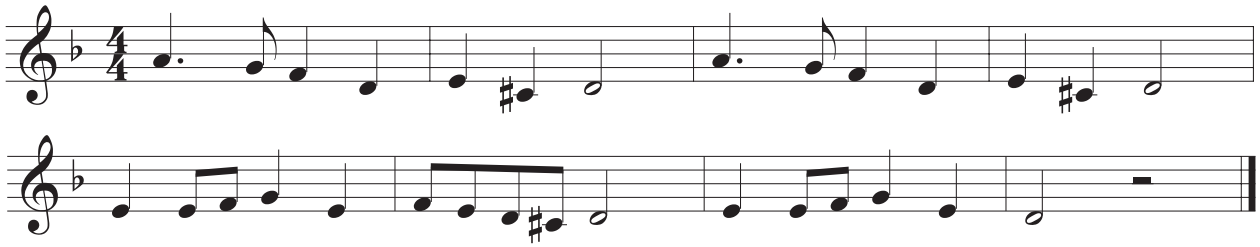
A set of triads for C minor

Let's start by laying out a set of chords for C minor. I'll put the three flats in the key signature, but the B♭ will be raised and lowered for a few different triads. Raising the leading-tone up to B♮ makes a major V and diminished vii°, as if we were borrowing them from C major.

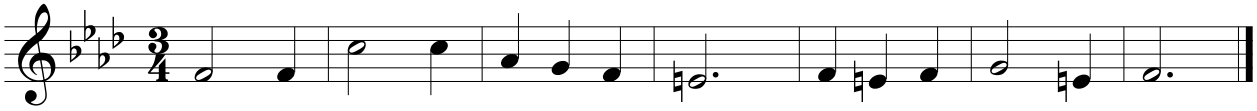


Dealing with the raised leading tone

The raised scale-degree $\hat{7}$ from harmonic minor is usually added to music on a measure-by-measure basis. It's not in the key signature! Here is an example from our melodies anthology which I composed in D minor. Note all of the added C♯'s which give me the sound I want. If I were playing along at the piano I would use a major V chord (A C♯ E) to harmonize a lot of these places that emphasize C♯.



If you are writing in a very "flatty" key (three flats or more) you may have to add naturals into the music to "unflat" your leading tone. Here is an anthology melody in F minor which adds a few E♮'s.

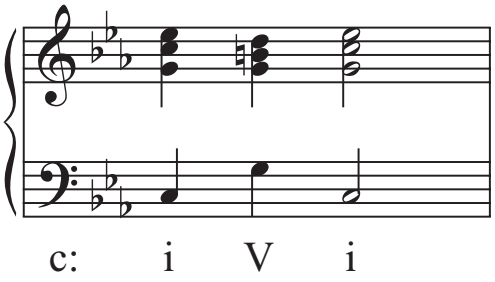


Making the Major V

When we practice our roman numerals in minor I'll often set up a key signature that takes care of all of the typical sharps or flats. If a major V is called for, however, you'll have to add a sharp or a natural sign to make it a major triad.

question *answer!*

Later, when we work on piano progressions I'll frequently remind you to raise your leading tone whenever you build a V in minor.

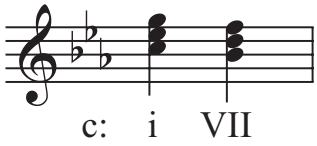


Using a major V in minor keys is a very common sound. It happens frequently in classical music, traditional folk styles, jazz, early rock n' roll, etc. See if you can play the i-V-i progression shown above with and without the B♮ in there. You'll hear that a i-v-i with G minor (G B♭ D) sounds unusual, maybe a bit "cold" or "Medieval."

More recent rock and pop music tends to avoid the V chord altogether in favor of more fresh-sounding progressions, so major V and minor v are both somewhat rare in minor keys. For the purposes of our studies I will treat major V as though it is always the correct option.

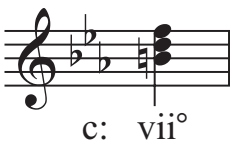
Using VII

If you build a triad on the unraised version of $\hat{7}$ in minor you get a major triad. This is also known as "the subtonic," and in class I may simply call it "major VII." Rock music loves the subtonic, and you may see it in classical music as a remote chord deep in the progression.



Using vii°

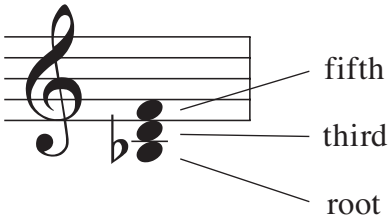
If you build on the raised leading tone, however, you'll produce a diminished triad. We call this harmony the "leading-tone triad" or just "diminshed vii°." This modification is very common in classical music, but rare in other styles. We will practice it a little bit - remember that if I ask for a vii° in minor you need to *start by raising your leading tone*.



Chapter 16: Triad Inversions

Up until now we've been building our triads in **root position**. We start with the root of the triad, then add a third, and finish with a fifth on top.

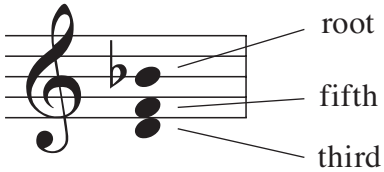
B♭ major triad in root position



However, this isn't the only way we can do it. There are two ways to flip around or invert the triad to make different shapes. These will have slightly different sounds.

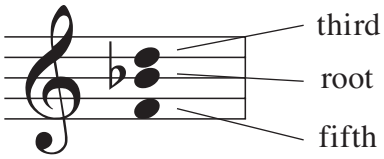
First inversion starts with the third on the bottom..

B♭ major triad in first inversion



...and **second inversion** starts with the fifth on the bottom..

B♭ major triad in second inversion

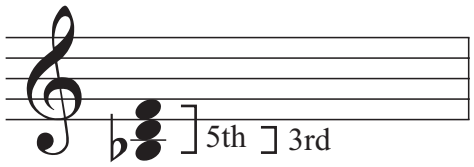


$\frac{5}{3}$, $\frac{6}{3}$, and $\frac{6}{4}$ shapes

For reasons that I hope will make sense later, I am also going to use a second set of terms to refer to our chord inversions. These come from a tradition called figured bass that originates around the year 1600. Figured bass terminology still has an influence on how we analyze classical music in the present day.

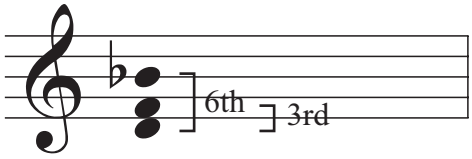
Root position = a $\frac{5}{3}$ shape.

We can call our root-position triad a $\frac{5}{3}$ shape, because the little stack of notes makes a fifth and a third. We pronounce this notation as "a five-three shape."



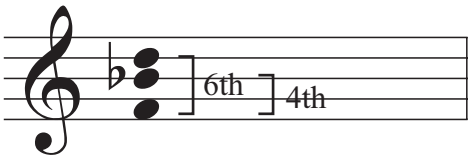
First inversion = a $\frac{6}{3}$ shape.

Our triad in first inversion is a $\frac{6}{3}$ shape, because the distance from bottom to top is a 6th, and bottom-to-middle is a 3rd.



Second inversion = a $\frac{6}{4}$ shape.

Finally, second inversion is a $\frac{6}{4}$ shape, because bottom-to-top is a sixth and bottom-to-middle is a fourth.

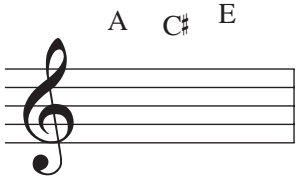


Practicing your inversions

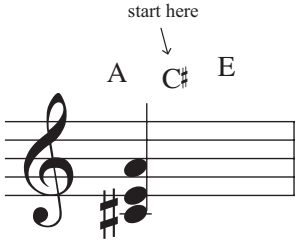
These inversions will probably be pretty easy to make on paper. One useful trick in the beginning will be to sketch the letter-names of the triad above the staff, and then select from those as we stack up our notes.

So, for instance, if I ask you to "make an A major triad in first inversion" you could...

1) Sketch out the letter names in the triad above the staff.

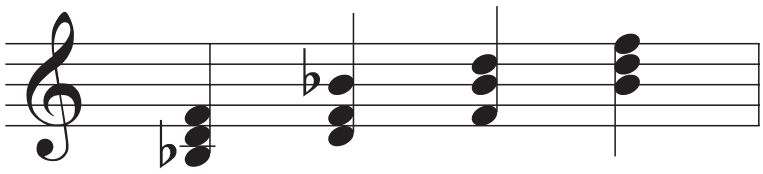


2) Select from those notes and stack them up, starting with C♯.

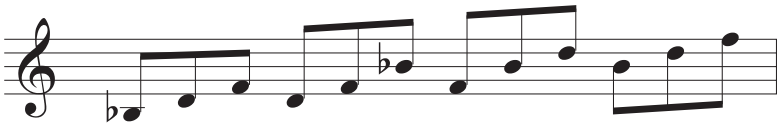


On the piano

However, we also want to practice these at the keyboard, to get comfortable grabbing the different inversions quickly and reliably. To do this, we'll make a pattern that cycles from root position through the inversions and back to root position. Here is the pattern for B-flat major:



When we play those block chords we will just pick up our hand and move it from inversion to inversion. However, we could also roll through all of it in a smooth motion called arpeggiation. Here is an arpeggiated pattern all notated out.



Actually executing such an arpeggio smoothly can be very tricky, especially for a beginning pianist! Planning out your fingering for each arpeggio can help.