The Language of Music
Music Theory for Non-Majors

By

Danny Beard
The University of Southern Mississippi

First edition, uploaded November 19, 2020

Dedication

This collection of Lessons is dedicated to my mother, my first and best teacher, who sacrificed so much for my sister and me. Thank you for your love, support and unending encouragement.

Special Thanks

I would like to thank the University of Southern Mississippi Libraries and the Provost Office for supporting this project through the Open Textbook Initiative. Thank you, especially, Josh Cromwell and Kathryn New for you help.

Table of Contents

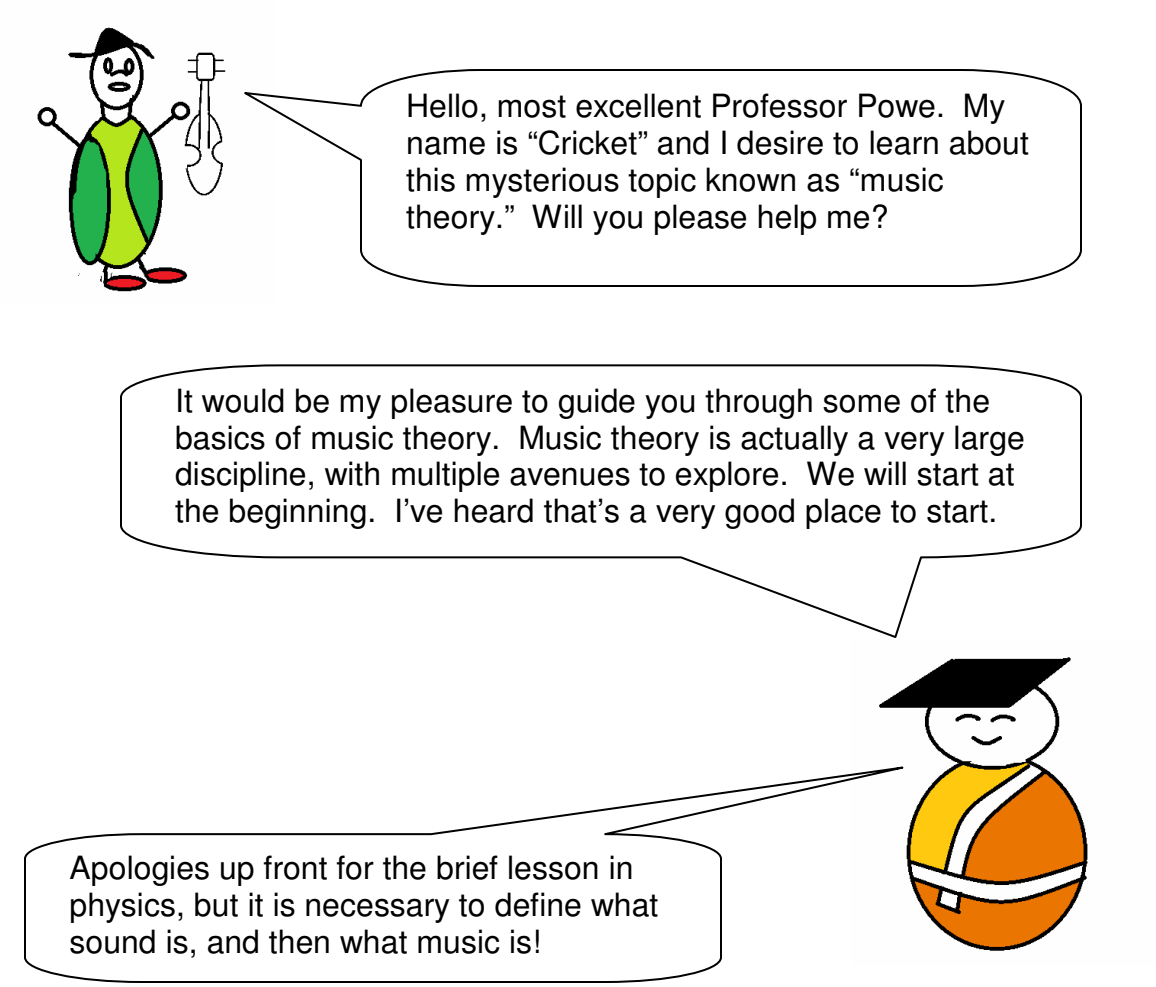
Overture

Welcome to the realm of music theory. Many students THINK this is a difficult topic, but in reality, it isn't that hard. It is, as the title implies, somewhat like learning a new language with its own alphabet and grammar.

You will notice that there are two characters who have question and answer sessions throughout the book. This is in homage to *Gradus ad Parnassum,* by Johann Joseph Fux (1660-1741.) In his book, Fux used the teaching methods of Socrates to impart knowledge to "future" composers such as Haydn, Mozart, Beethoven and Schubert. If you are a fan of 1970's rerun, you might also see similarities to the TV show, "Kung Fu." Many of the questions that "Cricket" asks of "Professor Powe" are the same questions that students have asked me over the years in my music theory courses. You might have the same questions!

Good luck as you begin your study of this new language. Feel free to contact me at r.beard@usm.edu if you have any questions—questions that Cricket did not ask!—or if you notice typos or errors.

Lesson 1: What is Sound?



Sounds are created when a force is applied to an object in a manner that causes vibrations in air, water, wood, metal and other substances. The force could be the proverbial tree falling in the woods, a hammer striking a nail, air crossing an open bottle or car tires sliding against the friction of asphalt. These vibrations create patterns of high pressure and low pressure in air (called compressions and rarefactions in physics) to occur in the air molecules, and the pressure changes are detected by our ears, which then convert to electrical impulses that our brain translates into sounds.

Sound is a Pressure Wave

Sounds have a number of properties that need to be addressed because they will impact our definition of “music.”

Frequency: Frequency is the number of compressions and rarefactions that occur in one second. For music, this defines “pitch.” A low pitched sound, like a

truck horn, has relatively low number of compressions per second, where as a high pitched sound, like a bird singing, will have a relatively high number of compressions per second. The unit of measurement for frequency is *Hertz*, the number of vibrations, or cycles, per second. You may have heard someone say "A=440." This means the pitch labeled as "A" has 440 vibrations, or cycles, per second.

Amplitude: Amplitude basically equates to volume. It is dependent on the amount of force that is applied to the object. In music, volume levels are called **dynamics.** Historically, Italian terms are used to indicate dynamics to the performer. The table below shows the Italian term, its abbreviation and the English equivalent. The table is organized softest at the top to loudest at the bottom.

	Italian Term	Abbreviation	English Equivalent
Soft	*pianissimo*	*pp*	Very soft (quiet)
	piano	*p*	Soft
	mezzopiano	*mp*	Moderately soft
	mezzoforte	*mf*	Moderately strong
	forte	*f*	Strong (loud)
Loud	*fortissimo*	*ff*	Very strong (loud)

Duration: Duration is the length of time that the vibrations, or sound, continue. Symbols that indicate duration to musicians are covered in Lesson 3.

Lesson 2: What is music?

There are many intellectual definitions of music, most of which contain references to organization of sounds, ability to evoke emotion, a form of art or self-expression, and the like. While I was a member of the Sky Ryders Drum and Bugle Corp from Hutchinson, KS, our brass instructor, John Simpson, used to say that "music is a contrast of sounds and silences." That seems to be a very practical definition to me!

(Yeah, that's me. It's a screenshot from the PBS broadcast of the 1983 Drum Corps Internationals Championships!)

There are a number of "elements" of music, including pitch, rhythm, harmony, form, texture and timbre.

Pitch: Pitch is how high or low a sound is, as mentioned before. It is related to the frequency of the sound. Frequency is measured in "Hertz" and is the number of vibrations per second.

Rhythm: For practical purposes, rhythm is the articulation of sounds as a function of time. That is, you may create a rhythm pattern by tapping the table once every second, or two taps per second spaced evenly, or one tap every three seconds…You get the idea.

(Alert: If you don't have math anxiety, you can think of reading music like reading a graph on the XY Coordinate System. Pitch will be on the vertical Y-axis, and rhythm, or time in music, will be along the horizontal X-axis.)

Harmony: Harmony is the relationship created by producing musical sounds simultaneous. Most people call this "chords."

Form: Form is the higher level organization of a song. Think of "Jingle Bells" for example. You should notice that there is a verse (*Dashing through the snow…*),

followed by a chorus (*Jingle bells, jingle bells…*) followed by another verse (*A day or two ago…*) followed by the same chorus, then 2 more verses each followed by the same chorus. This could be called a "verse-chorus" type of form.

Texture: Texture is the relationship between the various sounds being produced. Hymns and chorales are called **homophonic** texture. Vocal music of the 1400's and 1500's is often **polyphonic** texture. **Melody with accompaniment** is often the texture of pop songs.

Timbre: Timbre is a word that describes the tone color of a sound, or stated differently, how one musical instrument sounds different from another.

This course will focus mainly on pitch, rhythm and harmony, with a cursory discussion of form, and just references to texture and timbre.

Lesson 3: Symbols of Music Notation

We need to remember that music is a contrast of ***sounds*** and ***silences***, and not really a piece of paper with lines, dots and squiggles printed on it. But, it is this piece of paper that is used to tell musicians what sounds to make, how to make the sounds, and when to make them.

For sounds, symbols called “notes” are used. Notice that this is sort of a pyramid. The whole note at the top of the pyramid divides equally into two half notes. A half note divides equally into two quarter notes. Each quarter note divides into two eighth notes. And so forth…

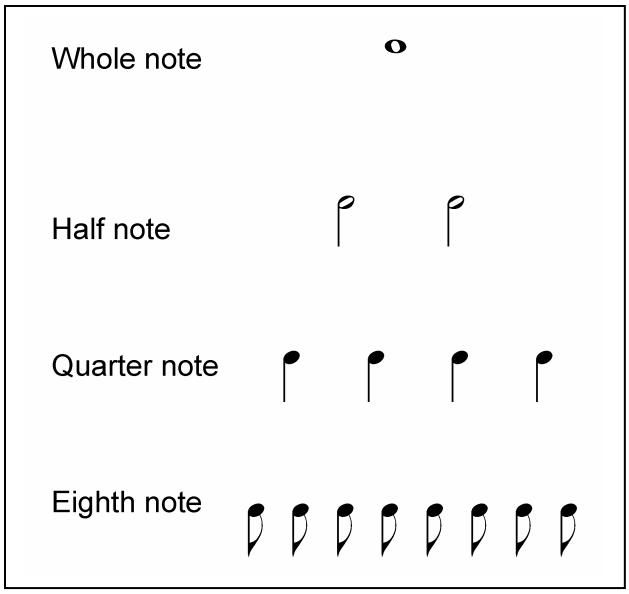


Figure. Music Notation Pyramid.

An eighth note would divide into two sixteenth notes. Can you guess what a “sixteen note,” which is not shown in the chart, would look like?

The “parts” of a note are identified as shown below.

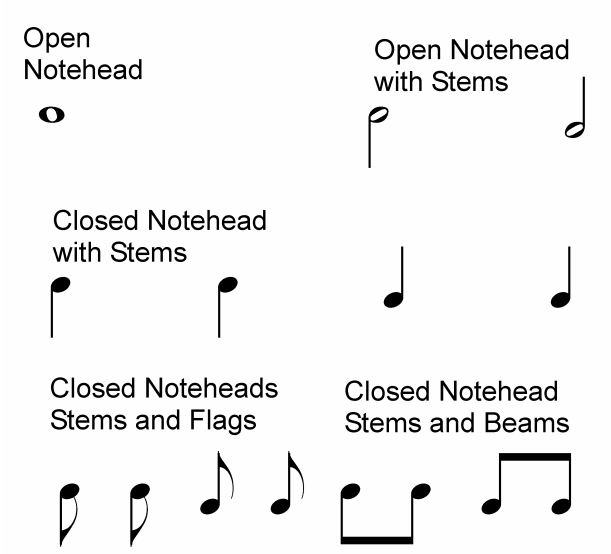
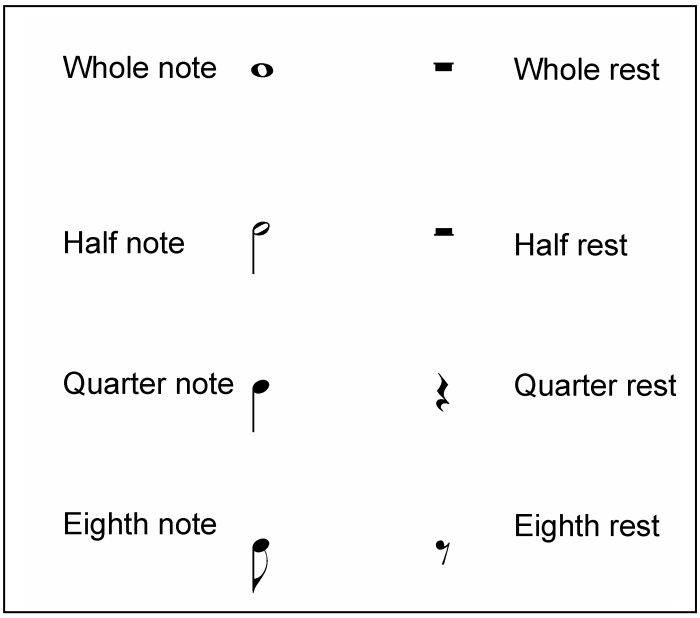


Figure. “Parts” of Notation Symbols

There is a “notehead” which will be open for whole notes and half notes, or closed for all the others. There is a “stem” on all but the whole note. In the pyramid above, all the stems are pointing down, but be aware that the stems can also point up from the notehead. Stems that point down should always be on the left side of the notehead whereas stems that point up will be on the right side. If flags are attached for eighth notes or sixteenth notes, the flag always “flies toward the right.” You might imagine a west wind blowing the flag always toward the east.

Eighth notes and sixteenth notes can also be “beamed” together as shown below. The beams make it easier for performers to read the music quickly.

For silences, symbols called “rests” are used. Each note value has a corresponding rest value.



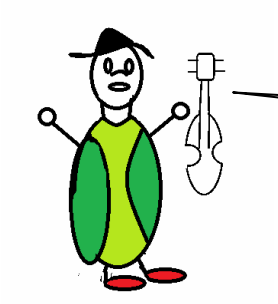
The whole rest and half rest look very similar. In staff notation, which is covered in Lesson 9, the whole rest “hangs” from the fourth line of the staff. The half rest “sits” on top of the third line. Elementary school teachers sometimes tell their students to think of these rests as a hat. If you are staying somewhere for a long time—as with a whole rest—you will remove your hat and “hang” it on a hat rack. If you are staying a shorter time—like a half rest—you might leave your hat “sitting” on your head.

Sound, Music and Symbols Name _____

Please answer the following questions.

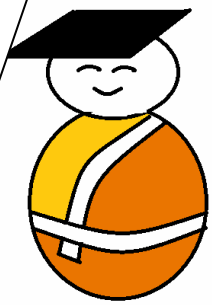
1. How is sound created?
2. True or False: Sounds can only be heard in air.
3. Regarding sound, areas of high pressure are called _____.
4. Regarding sound, areas of low pressure are called _____.
5. _____ is the number of vibrations per second for sound.
6. Volume, or amplitude, is called _____in musical terms.
7. The three musical elements this course will focus on are _____, _____ and _____.
8. Symbols for musical sounds are called _____.
9. Symbols for silence in music are called _____.
10. The stem is on the _____ side of the notehead if the stem points up.
11. A flag attached to a stem will always be on the _____ side of the stem.

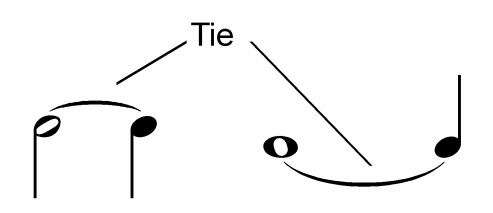
Lesson 4, Dots and Ties

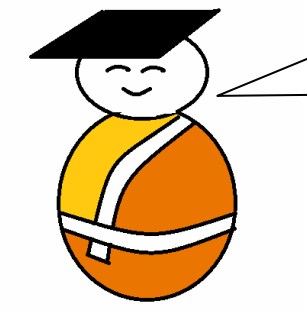


But Professor Powe, having completed Lesson 3, I am ***still*** confused. How can I make a sound last for a length of time that is NOT on these tables?

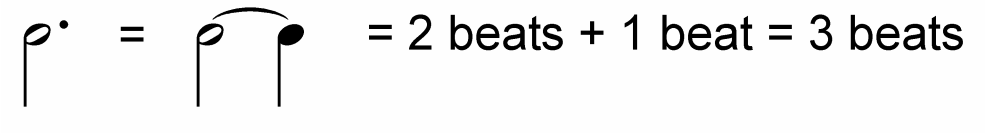
No need to be confused, Cricket. There are two ways to create additional lengths of notes. One way is with a "tie." A tie is like a plus sign in math where the values are simply added together to create one longer sound. You could also think of it like adding links to make a longer chain.

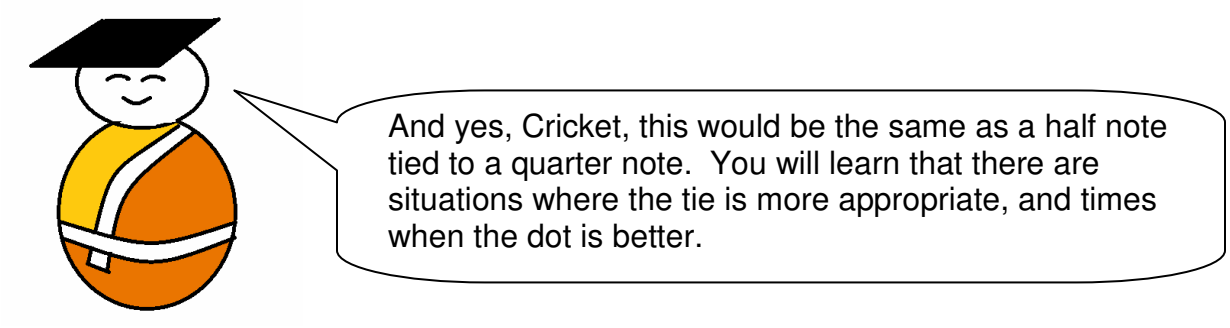






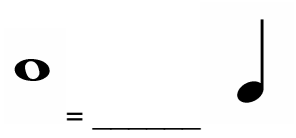
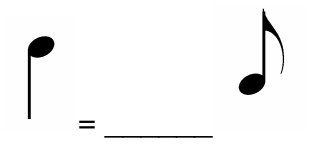
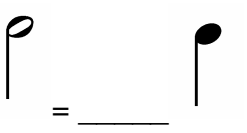
Another way is with a "dot." A dot adds half of the original value back to the note. So, if we assume a half note is equal to 2, then a dotted half note equals 3. That is, 2 + (half of 2) = 3

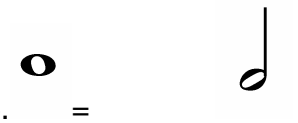
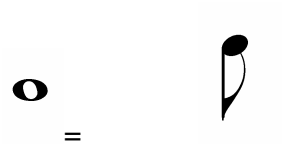
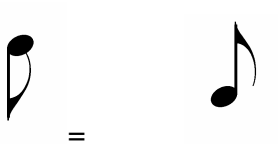

= 2 beats + 1 beat = 3 beats

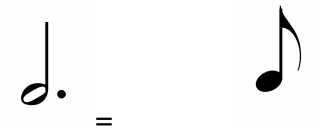
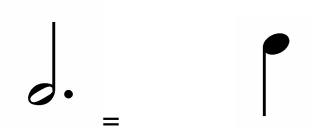
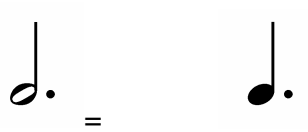

And yes, Cricket, this would be the same as a half note tied to a quarter note. You will learn that there are situations where the tie is more appropriate, and times when the dot is better.

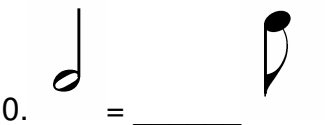
Duration Exercises Name _____

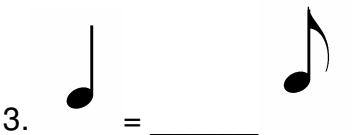
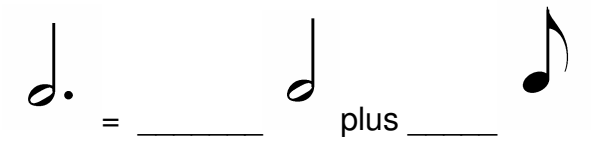
Please fill in the blank with the number that will correctly complete the equation.

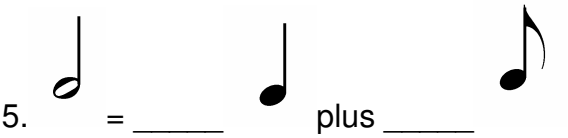
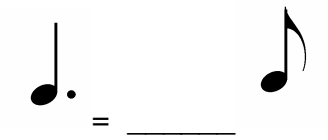
1.  = _____ 2.  = _____ 3.  = _____

4.  = _____ 5.  = _____ 6.  = _____

7.  = _____ 8.  = _____ 9.  = _____

10.  = _____ 11.  = _____ 12.  = _____

13.  = _____ 14.  plus _____

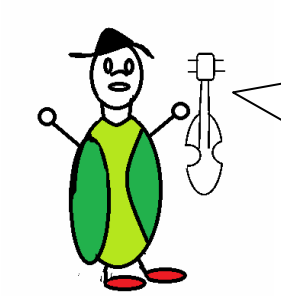
15.  = _____ plus _____ 16.  = _____

Lesson 5, Tempo

You may have noticed that when you were listening to a song, you started to tap your foot. Or maybe when out dancing, you've noticed some songs are "fast" and some are "slow." The tapping of your foot represents the "pulse" or "beat" of the song. The number of pulses per minute is called the "tempo."

In the old days, composers used words, usually Italian, to designate tempo to the performer. Composers today will often use a "metronome marking" instead, or in addition to the Italian terms. A metronome is a device that creates a steady ticking sound, somewhat like a clock. Unlike a clock which clicks one beat per second, musicians are able to change the tempo of a metronome to match the composer's indications. The table below shows some of the common Italian terms and their approximate metronome equivalents.

ITALIAN TERM	ENGLISH EQUIVALENT	METRONOME MARKING
Grave	VERY Slow	40 beats per minute
Adagio	Slow	54 beats per minute
Andante	"Walking speed"	72 beats per minute
Moderato	Moderate (duh!)	88 beats per minute
Allegretto	Brisk	104 beats per minute
Allegro	Fast	120 beats per minute
Vivace	Very Fast	144 beats per minute



Professor, I have yet another question. Some of the most famous composers of all time were German speaking, Bach (1685-1750), Mozart (1756-1791) and Beethoven (1770-1827). Why, then, are the terms in Italian?

And I have yet another answer. The Italian composers of the 17th century, like Arcangelo Corelli (1653-1713), became famous for instrumental music, and, of course, they used Italian terms. As their published music spread north, so did their Italian terminology.

Lesson 6, Meter

Like poetry, music also has “meter.” In poetry, this is the organization of accented (strong) and unaccented (weak) syllables. In music, it is the organization of strong and weak beats, or pulses, that helps determine meter.

These tunes below are called **“duple meter”** because a strong beat occurs every second beat. Sing (or speak) them.

She sells sea shells down by the sea-shore.

S w S w S (w w) S w
1 2 1 2 1 2 1 2

Joy to the world, the Lord is come!

S w S w S w S
1 2 1 2 1 2 1

These tunes below are called **“triple meter”** because a strong beat occurs every third beat. Sing (or speak) them.

Oh Say can you see, by the dawn’s ear-ly light

w S w w S w w S w w S
1 2 3 1 (2) 3 1 2 3 1

My coun-try tis of thee, sweet land of li-ber-ty, of thee I sing

S w w S w w S w w S w w S w w S
1 2 3 1 (2) 3 1 2 3 1 (2) 3 1 2 3 1

The USM Alma Mater, below, is in a **“quadruple meter”** because a strong beat occurs every fourth beat.

We sing to thee our Al-ma Ma-ter, U S M our prais-es be

w S w w w S w w w S w w w S w w
1 2 3 4 1 2 3 4 1 2 3 4 1 (2) 3-4

Note: It is sometimes difficult to hear the difference between a duple and a quadruple meter song.

Most band marches (compositions by composers such as John Philip Sousa or Henry Fillmore, or many school fight songs) are often in duple meter. Waltzes and several other (old) dance forms, like minuets, are in triple meter. Most pop songs and jazz tunes are quadruple meter.

In music notation, a **barline** is used to separate music into **measures** or **bars**. The barline is simply a vertical line before each strong beat. The strong beat is labeled “1.” Below, barlines have been added before beat “1” in each of the

earlier tunes. (You might think of barlines as similar to mile markers on the interstate, or yardlines on a football field.) Barlines and measures make music easier to read and perform. A **double barline** is used to indicate the end of a song.

Joy to the | world, the | Lord is | come!
S w | S w | S w |S
1 2 | 1 2 | 1 2 | 1

Oh | Say can you | see, by the | dawn's ear-ly | light
w | S w w | S w w | S w w | S
|1 2 3 | 1 (2) 3 | 1 2 3 | 1

We | sing to thee our | Al-ma Ma-ter, | U S M our | prais-es be
w | S w w w | S w w w | S w w w | S w w
|1 2 3 4 |1 2 3 4 | 1 2 3 4 |1 (2) 3-4

Please list some songs that are duple, triple and quadruple meter:

Duple meter:

_____

_____

_____

Triple meter:

_____

_____

_____

Quadruple meter:

_____

_____

_____

Lesson 7, Simple Meter and Time Signature

Simple Meter

In addition to labeling meters as duple, triple or quadruple, meter in music is also categorized as “simple meter” or “compound meter.” In this lesson, simple meter will be discussed.

The most important feature that describes a simple meter is the fact that the beat is evenly divided into two equal parts. Consider “Jingle Bells” again.

Jin-gle Bells, Jin-gle Bells, Jin-gle all the way…

More than likely, as you sang “Jingle Bells” you probably tapped your foot on “Jin” then “Bells” (both times), then on “Jin” “all” and “way”. These syllables represent the beat, whereas “-gle” and “the” are the half beat.

The pyramid of notes in Lesson 3 shows this. Each note value divides equally into 2 of the notes just below. So, the whole note divides into 2 half notes, 2 quarter notes divide into 2 eighth notes. This means that any of these note values can be a “beat” and the level below it can be the subdivided beat.

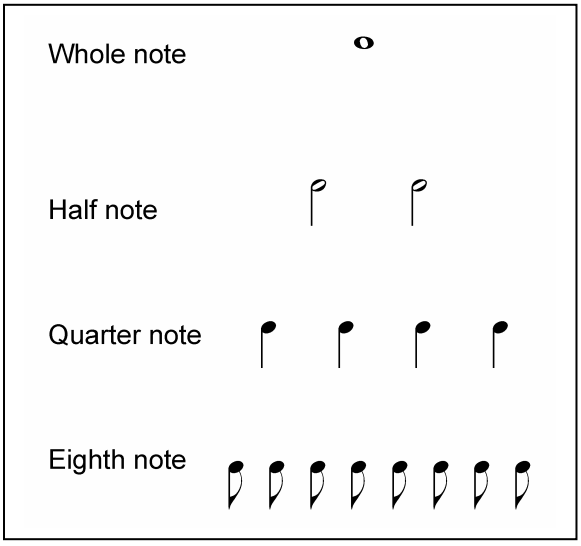


Figure. Music Notation Pyramid

Here is the rhythm from “Jingle Bells.” Notice that the word “*bells”* is a quarter note, twice as long as the eighth notes for “*jin”* and *“gle.”*

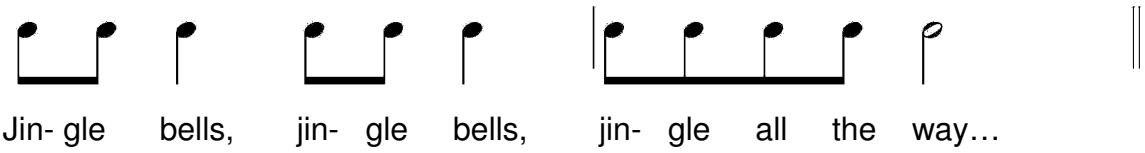


Figure. Rhythm of *Jingle Bells*

Time Signature

A time signature is used to indicate to the musician how the beats in music are organized, and therefore, how the music is to be played and accented. You will find time signatures to the right of the clef and key signature in the staff. (All covered soon!) It looks much like a fraction, but in reality, there is no horizontal line between the numbers. In simple meters, the top number always tells the number of beats per measure (that is, duple, triple or quadruple) and the bottom number tells what note value receives one beat. *For simple meters, the top number will always be 2, 3 or 4*, whereas the bottom can be any of the beat values.

The time signature below tells the musician there are 3 beats in a measure (triple meter), and the quarter note receives one beat. Since the pyramid shows eighth notes are below the quarter note, then the quarter note beat divides into 2 eighth notes.

$$\frac{3}{4}$$

The time signature below tells the musician there are 4 beats in a measure (quadruple meter), and the half note receives one beat. Since the pyramid shows that quarter notes are below the half note, then the half note beat divides into 2 quarter notes.

$$\frac{4}{2}$$

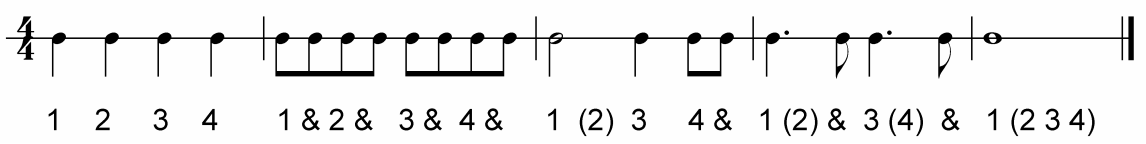
The table below shows several of the more common simple meter time signatures, what note value gets one beat, and what note value is the divided beat.

	Time Signature	Beat Value	Divided Beat
Duple	$\frac{2}{2}$ or ¢		
	$\frac{2}{4}$		
Triple	$\frac{3}{2}$		
	$\frac{3}{4}$		
Quadruple	$\frac{4}{2}$		
	$\frac{4}{4}$ or C		

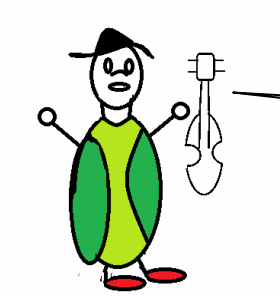
$\frac{2}{2}$ is frequently called “cut time” with the symbol ¢.

$\frac{4}{4}$ is sometimes called “common time” because it is, well, so common! It may have the symbol C.

Systems of counting have been developed over the centuries to help musicians perform rhythms more accurately. For simple meters, each beat is assigned its number within the measure, and the division of each beat is labeled “&”. (Yes, “and.”) The examples below should help clarify.

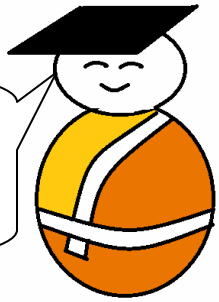


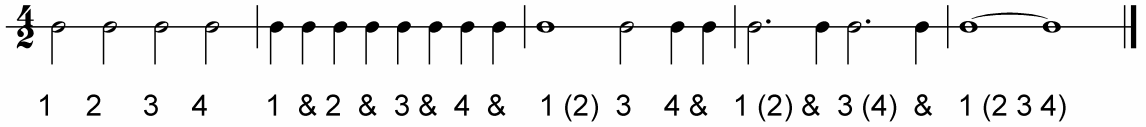
In this example, the meter is 4/4. As a reminder, this means there are 4 beats in each measure, and the quarter note receives one beat. Since the quarter note is the beat, it is labeled with the number. Eighth notes represent the divided beat. Not every eighth note is labeled as "&" only those that fall on the "off beat." Those that fall on the beat continue to be labeled with the beat number. The numbers in parentheses are not "spoken" or performed, but should be kept in the back of your mind to keep the pulse consistent.

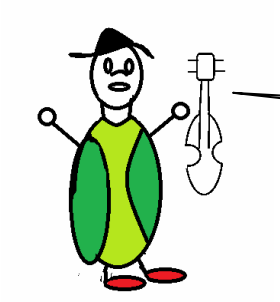


Please forgive my naivety, Patient Professor, but if I write the time signature as 4/2 and double the size of all the notes, won't the music sound the same?

Again, you have impressed me with your keen observations. You are correct, if the tempo of the pulse is the same. The above rhythm could be notated as shown below, and would still sound the same.

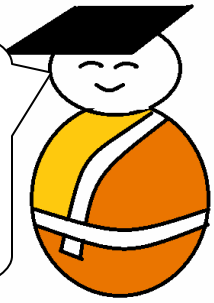




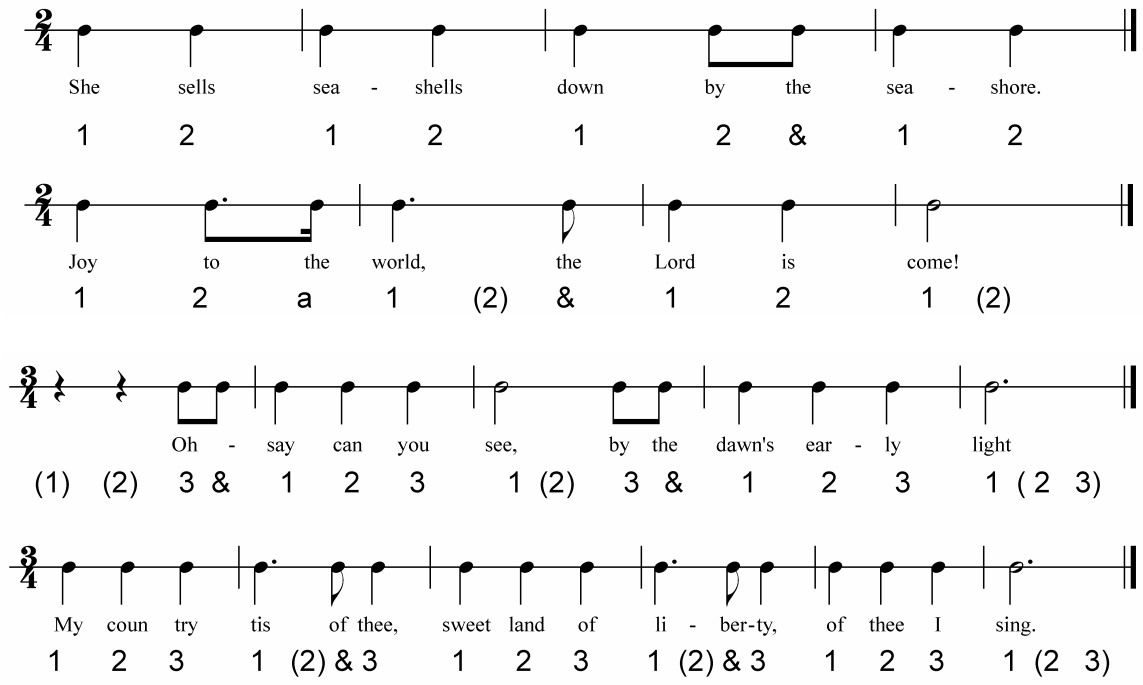


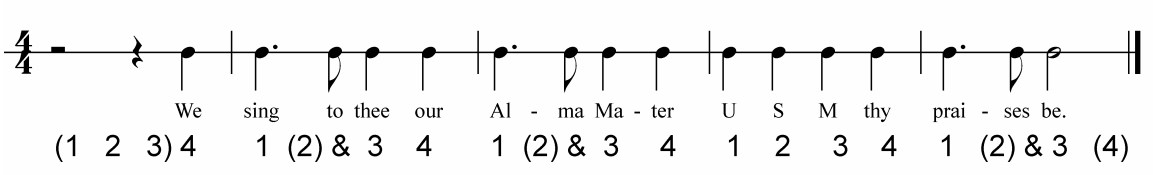
Ah yes, I am enlightened, but, may I ask, why do composers use so many time signature? It seems unnecessary and most confusing.

Before the metronome was invented, composers would use differing time signatures to indicate tempo, in addition to using the Italian terms. Performers knew that a composition in 2/2 time was typically performed at a faster tempo that one in 2/4 time, though both are duple meter time signatures.



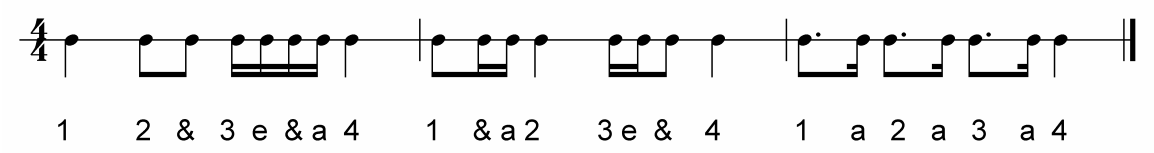
Below are the actual rhythms, with counting, for each of the tunes from Lesson 6.





Notice that the lyrics and music for “The Star Spangled Banner” and “Alma Mater” for Southern Miss do not start of beat 1 of a measure. When music begins like this, the notes before the first barline are called “pick-up notes,” or if you prefer to impress your friends and family at your next barbeque, they are also called “anacrusis.” It was customary that if a composition had pick-up notes at the beginning, the last measure was shortened by the same amount so that the music seemed balanced. That tradition is not always followed by modern composers.

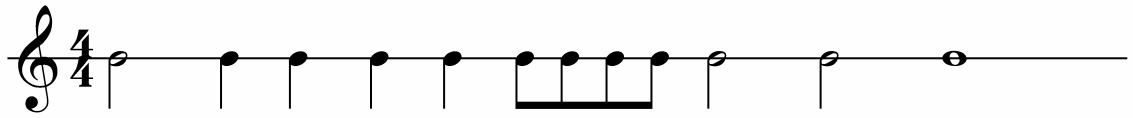
“Joy to the World” has “dotted eighth-sixteenth note” figures. An eighth note will divide into two sixteenth notes. Syllables for counting with sixteenth notes are shown here.



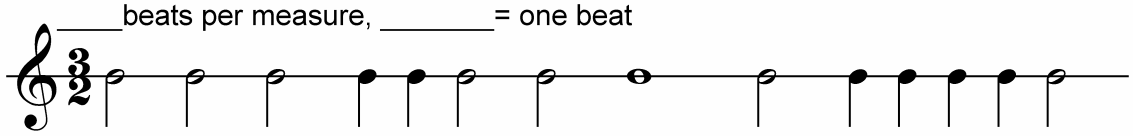
Barlines and Counting (1) Name _____

For each of the following, first determine the number of beats per measure and the note value that equals one beat both indicated by the time signature. Then add barlines in the correct locations (don't forget a double barline at the end) and write the counting below the notes.

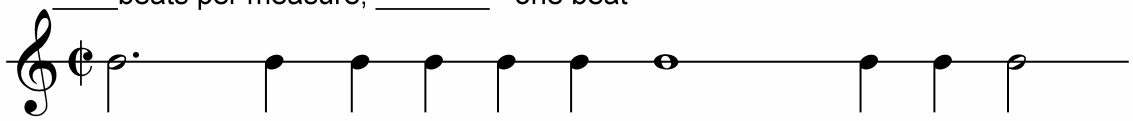
____beats per measure, _____= one beat



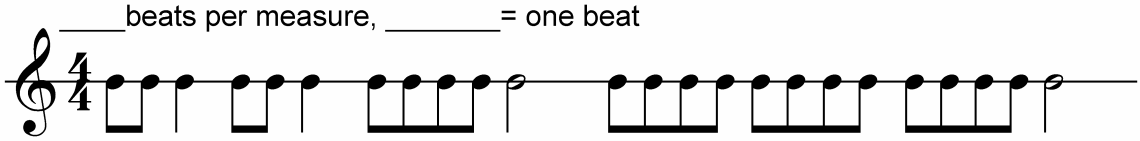
____beats per measure, _____= one beat



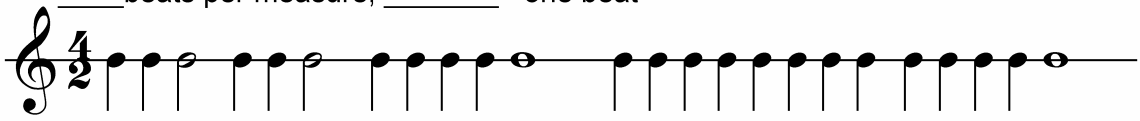
____beats per measure, _____= one beat



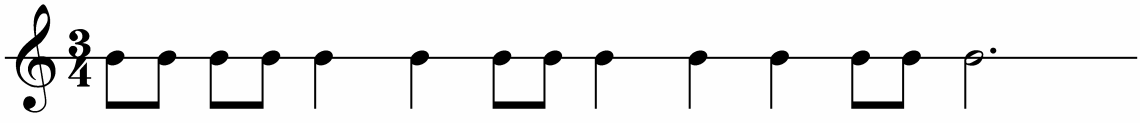
____beats per measure, _____= one beat



____beats per measure, _____= one beat



____beats per measure, _____= one beat

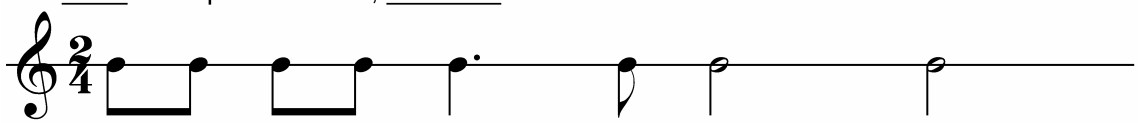


Barlines and Counting (2) Name _____

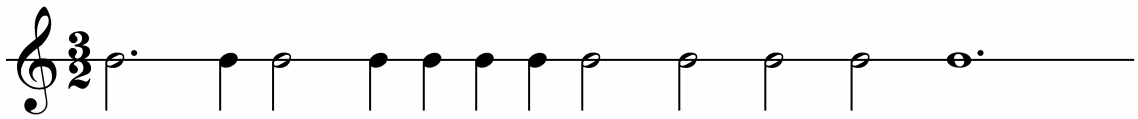
For each of the following, first determine the number of beats per measure and the note value that equals one beat both indicated by the time signature. Then add barlines in the correct locations (don't forget a double barline at the end) and write the counting below the notes.

____beats per measure, _____= one beat

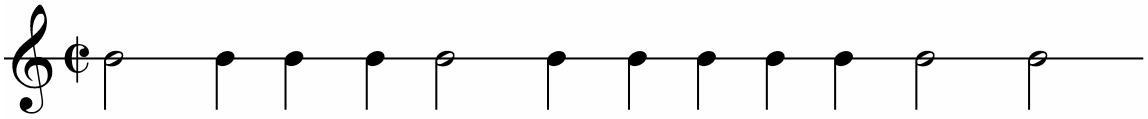
____beats per measure, _____= one beat



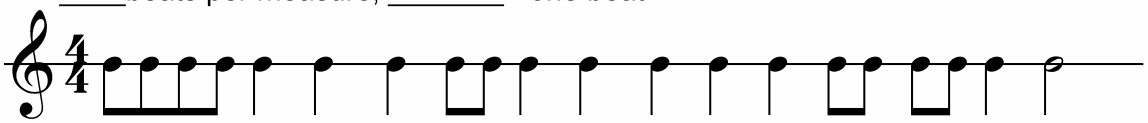
____beats per measure, _____= one beat



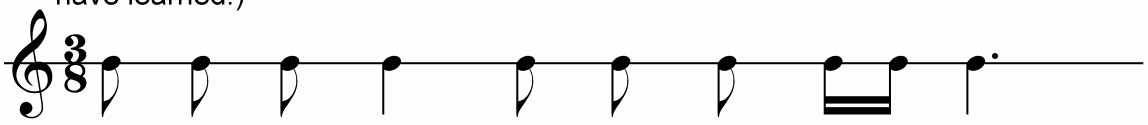
____beats per measure, _____= one beat



____beats per measure, _____= one beat

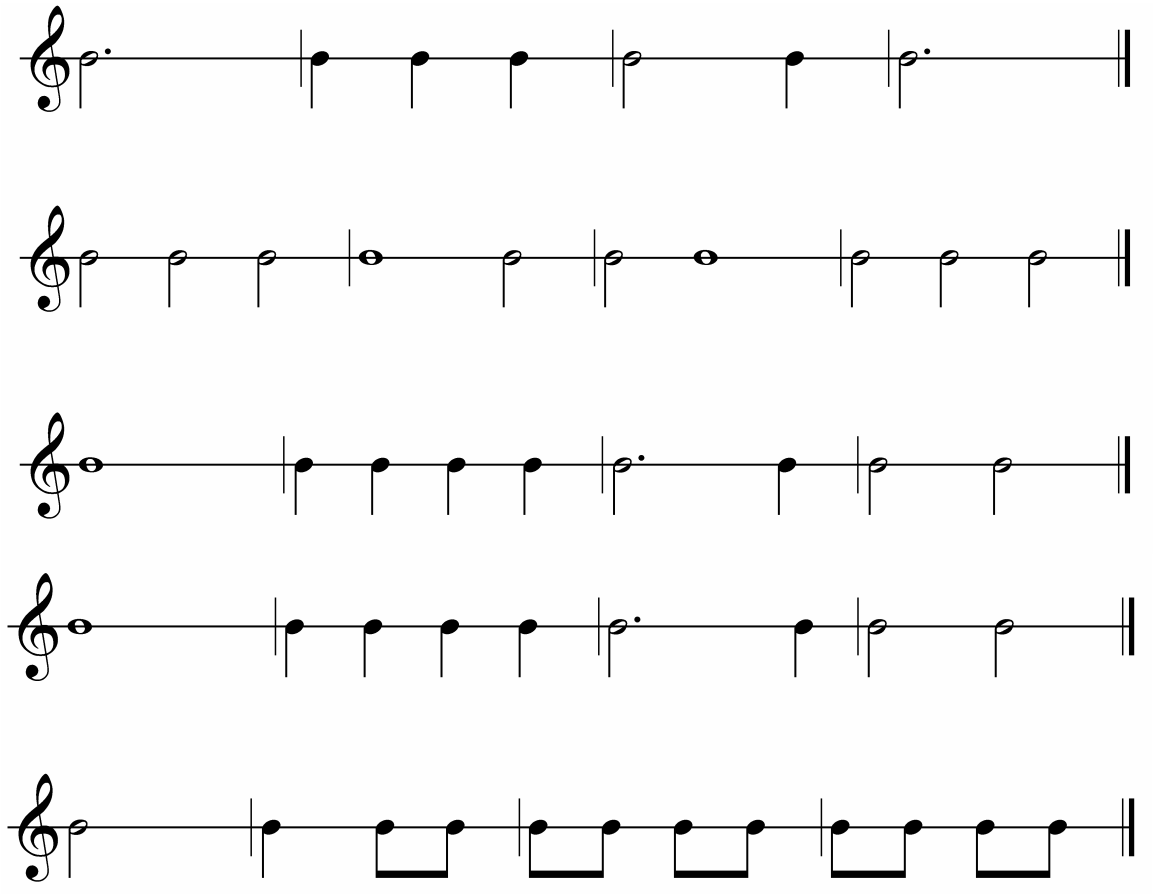


____beats per measure, _____= one beat (You can do this! Use what you have learned.)



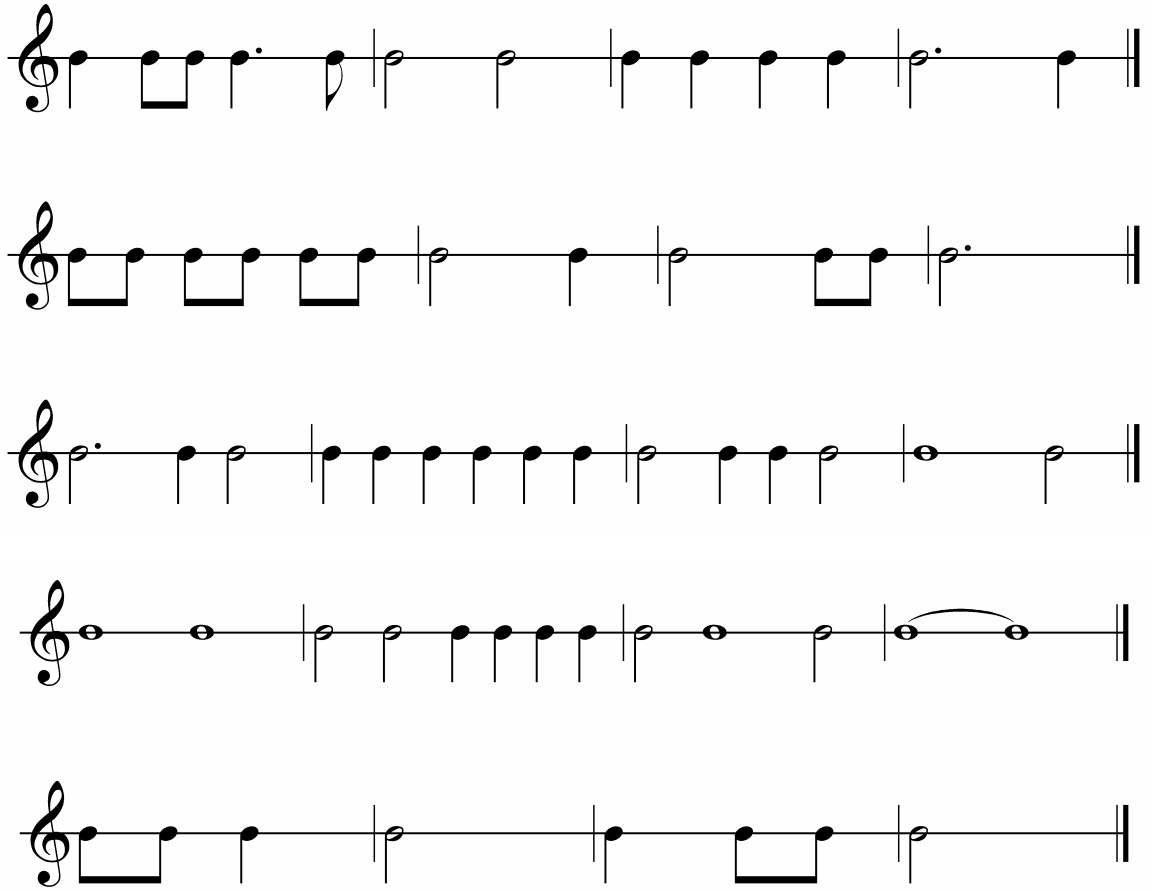
Time Signatures (1) Name _____

Determine the best time signature, then write the counting below.



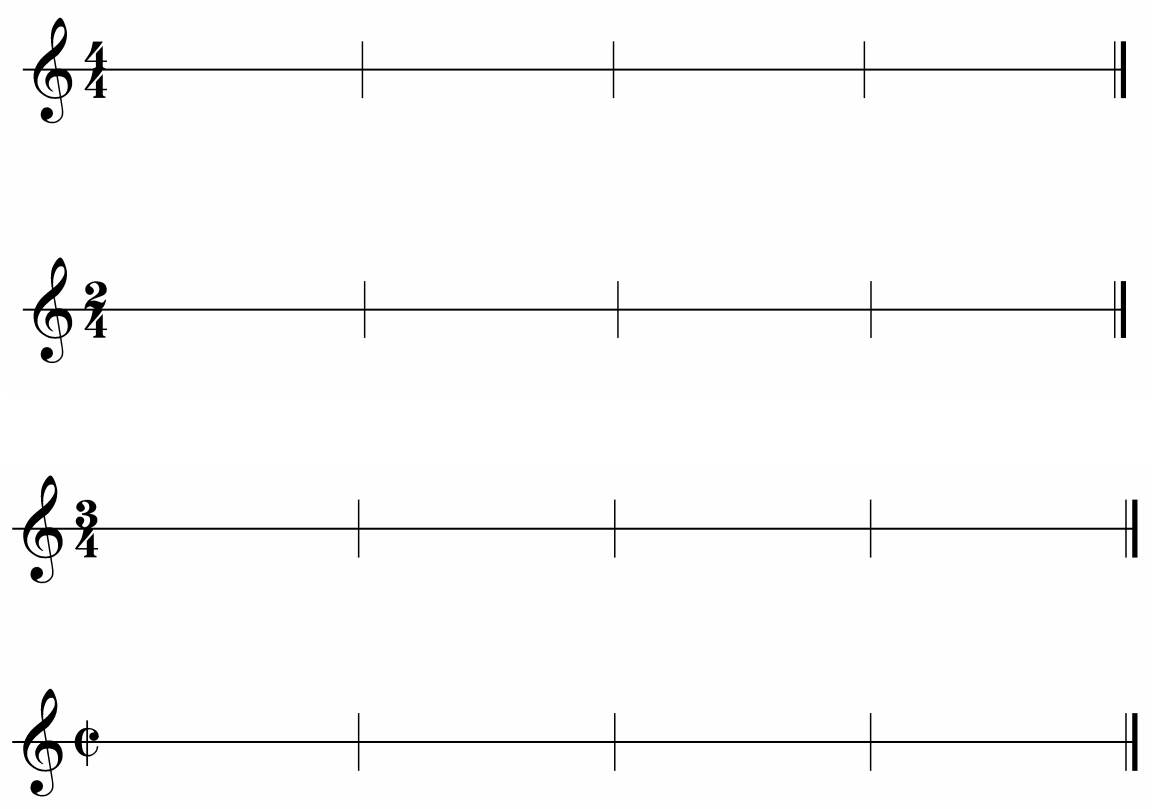
Time Signatures (2) Name _____

Determine the best time signature, then write the counting below.

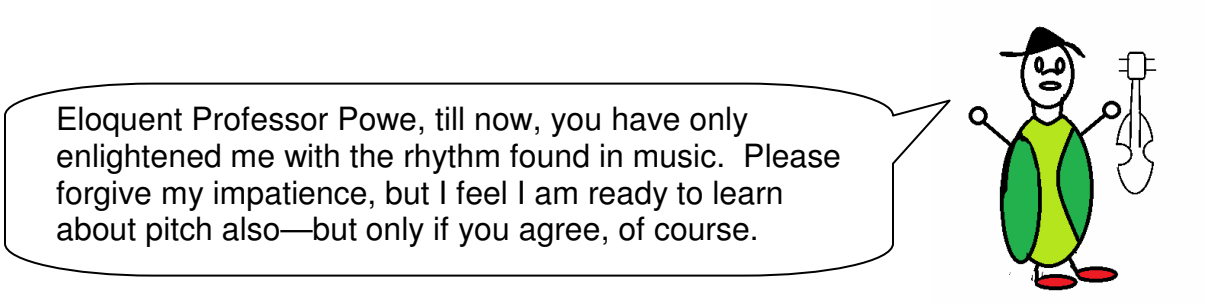


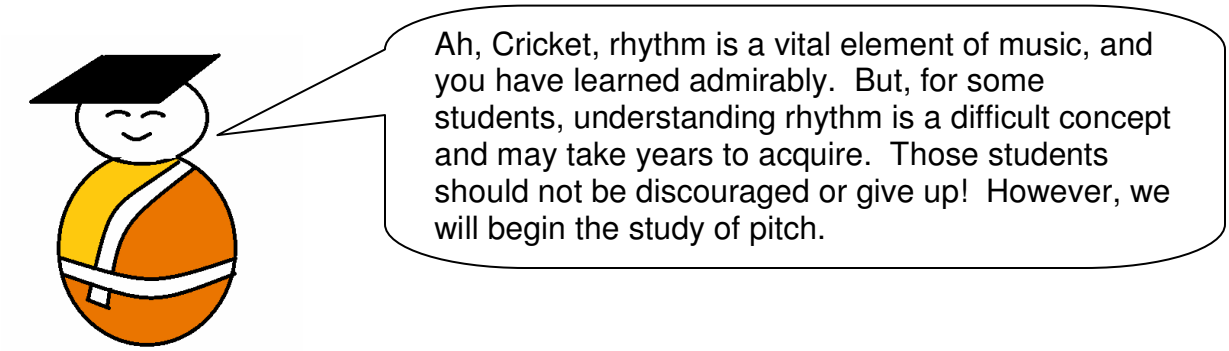
Composing Rhythms (1) Name _____

Compose your own rhythms in the following time signatures. Be creative, but don't go too crazy! Include counting.



Lesson 8, Pitch and the Piano





The piano is possibly the best tool for understanding pitch.

Figure. Photo of a Piano

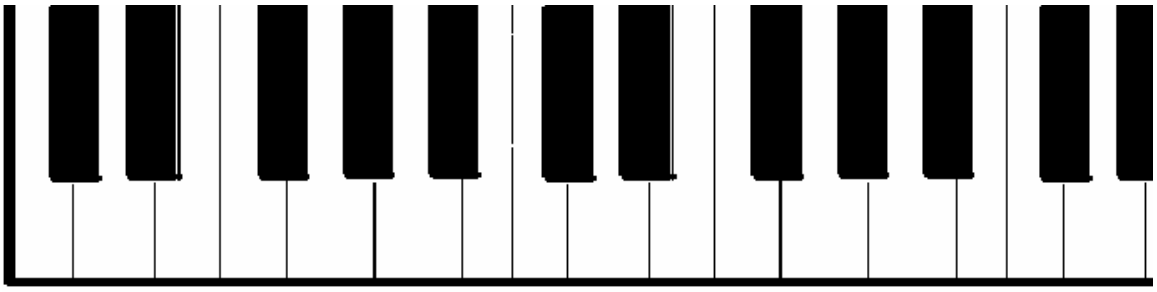


Figure. Portion of a piano keyboard

Notice that there is a clear pattern in the organization of the keys of the piano. The easiest patterns to see are the groupings of 2 black keys, separated by a white key, and the groupings of 3 black keys with white keys in between. You should also notice that there are 2 white keys that separate the 2-black key groups from the 3-black key groups.

Pitch in music is identified with the first seven letters of the alphabet, A-B-C-D-E-F-G. Look closely at the portion of the keyboard below. The white key to the left of the 2-black key grouping is called "C." Moving to the right, each white key is labeled with the next letter in the alphabet until "G" is reached, then it starts over at "A." Repeat ad nauseum!

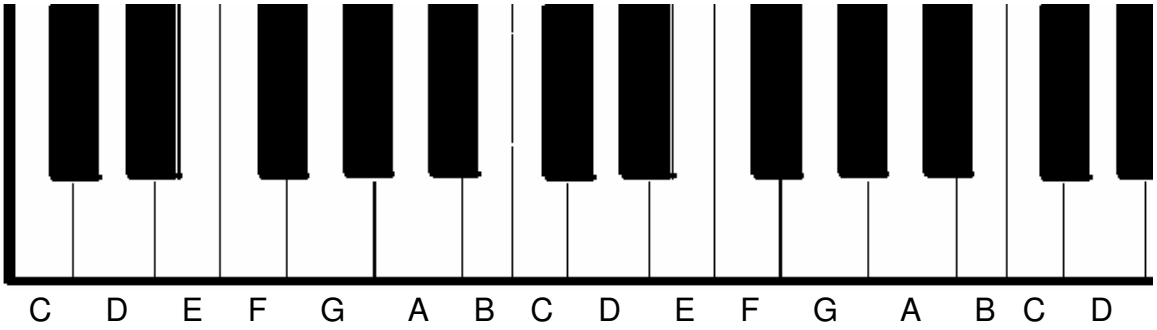
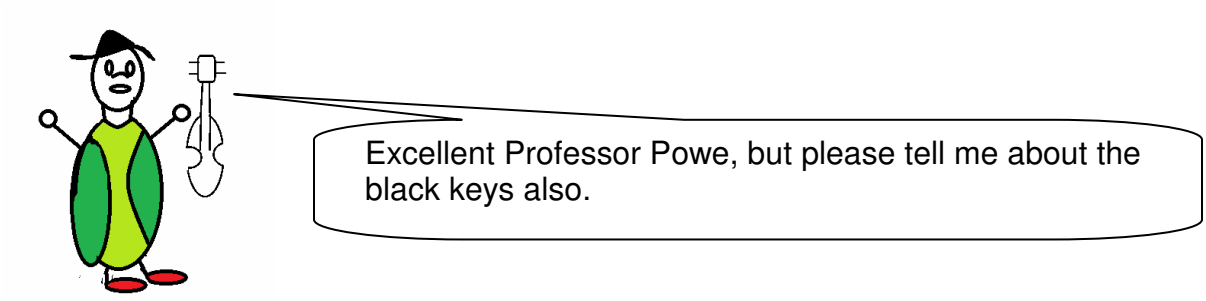
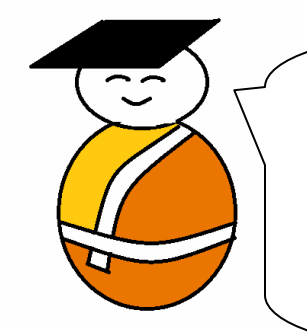


Figure. Letter Names of the keys on a Piano

Low pitches—those with low frequencies—are to the left on the keyboard. As you move to the right, the frequency increases and the pitches get higher.





The black keys are simple to understand, but slightly more complicated because additional information is required. Look at the picture below. Can you see that the keys are numbered and not labeled with letters? If you move from any key to the next number (+/- 1) that distance is called a "half step." Cricket, can you determine what moving +/- 2 numbers will be called?

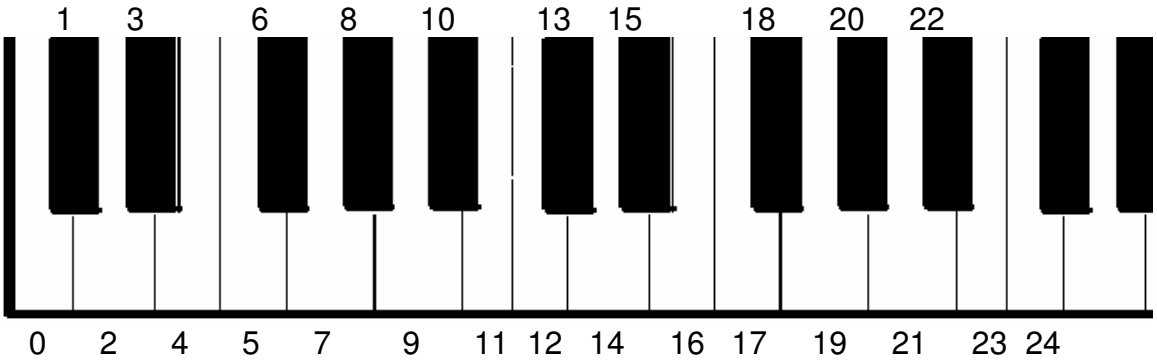
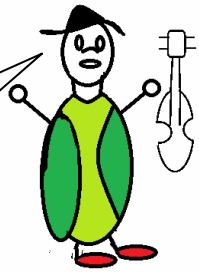
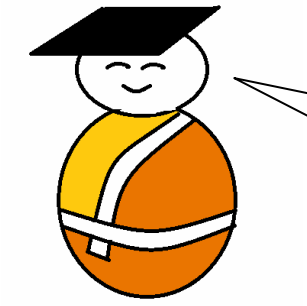


Figure. Keys Numbered on the Piano

Eminent Professor, since 2 half notes make a whole note, I might deduce that two half steps would be called a "whole step."



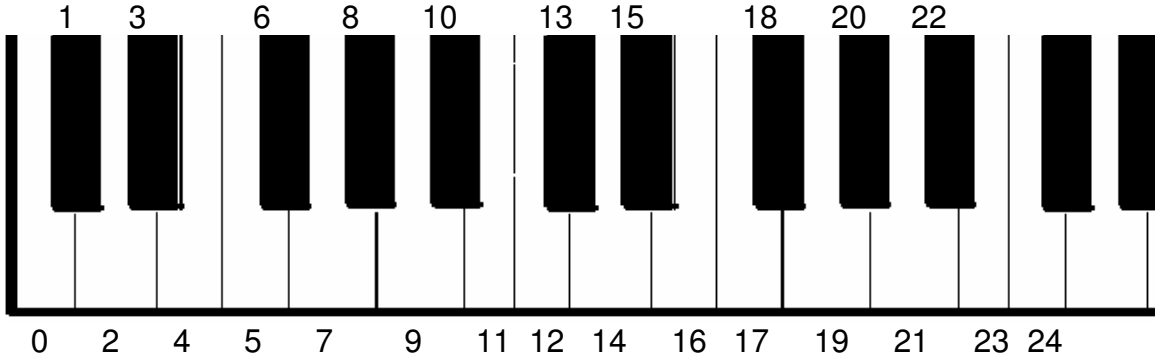


Ah Cricket, you have deduced correctly! Isn't understanding music easy?

An **Accidental** is a symbol that is used to indicate that a letter-named pitch has been changed (altered). See the table below.

Accidental	Symbol	Impact
Sharp	♯o	Raises a pitch by one half step
Flat	♭o	Lowers a pitch by one half step
Natural	♮o	"Undoes" a sharp or flat, so it can either raise or lower a pitch
Double Sharp	𝄪o	Raises a pitch by two half steps
Double Flat	𝄫o	Lowers a pitch by two half steps

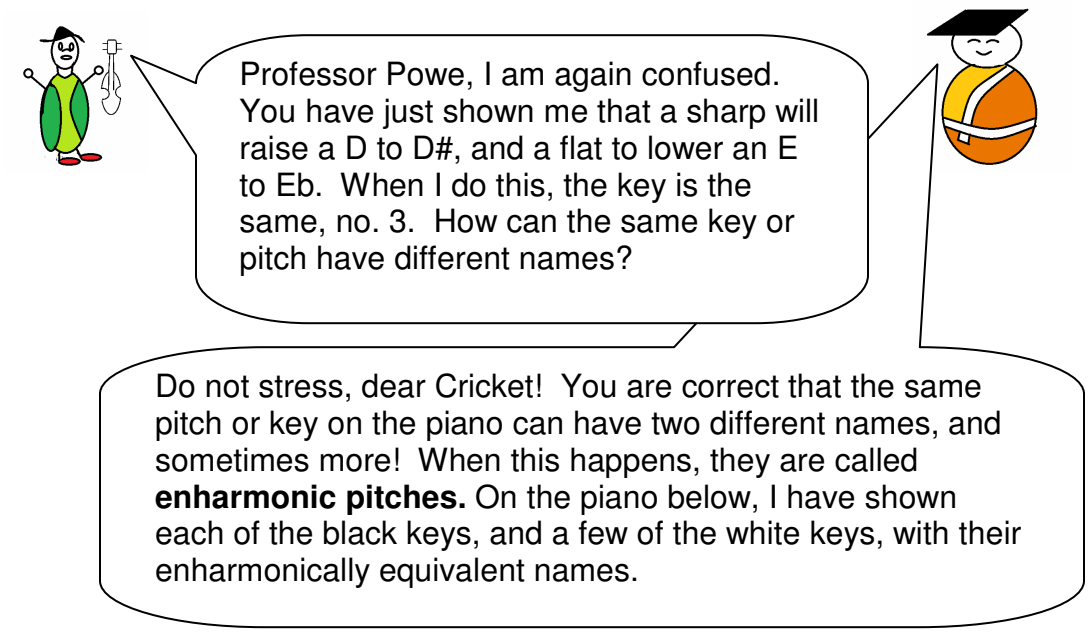
Start with the pitch D, labeled as "2" on the keyboard below. If we add +1 to it, we get "3." We have in essence raised the pitch by one half step. A "sharp" is used to indicate this, so the new pitch (no. 3) is D#, pronounced "D-sharp."

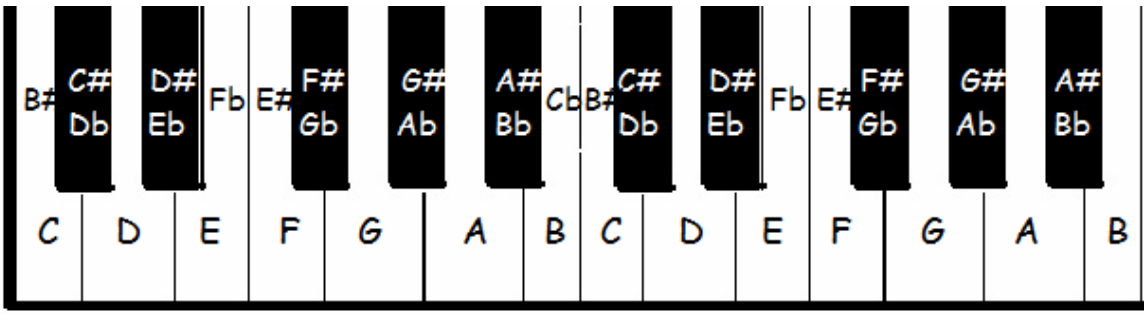


If we start with the pitch E, labeled as "4" and subtract 1 from it, we again land on the pitch labeled "3." Since the starting pitch was E, and we lowered it by one half step, the new pitch is called "Eb" pronounced "E-flat." A flat symbol is used to lower a pitch by one half step.

A natural sign is used to "undo" an accidental, and can therefore raise or lower a pitch depending on the context. The need for a natural sign will make a little more sense after the Lesson on Key Signatures.

Alert: When you write pitches with accidentals in prose, or speak about pitches, the letter name comes first followed by the accidental, like D# or D-sharp. But when a pitch is altered in music notation, the accidental is always on the left of the notehead.





There are also double sharps and double flats, which raise or lower a pitch by 2 half steps respectively. (You might guess that Dbb is enharmonically equivalent to C.)

Lesson 9: Octave Designation

You probably noticed that there are many C's on the piano, and many D's, and so on. As a composer, band director or choir conductor, you might need to communicate to someone about a specific C, not just "any ol' C." You can do this with an **octave designation.** The C in approximately the middle of the piano, and usually just below the manufacturer's name, is "middle C," and labeled C4 in this system. Andrew is playing C4, Middle C, in the picture below. (If you are talking about "any ol' C," the correct term is **pitch class.** "Pitch class C" would be any C, regardless of octave.)

Figure. Photo of a Piano with Andrew Playing "Middle C," AKA, C4

The lowest C on the piano is labeled C1, and all letters up to the next C also take the “1” label. (The three pitches below C1 take “0” (zero) as their octave designation.) At the next C to the right of C1, the label changes to C2. The highest C on a piano, in fact, the highest key on the piano, is C8. This system of labeling octave designation originated with the advent of MIDI.

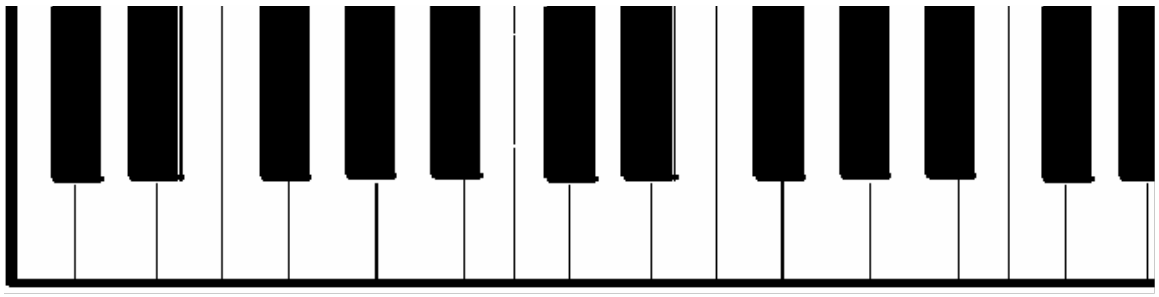
Figure. Piano showing Octave Designations at all C’s

This book will not emphasize this feature too much, but it is important to be aware that it exists.

Octave Designation on a Piano

Name _____

The piano keyboard below has one key labeled as C4. Please identify the requested keys using letter names with octave designation.



___ ___ ___ ____ C4 ___ __ __

Lesson 10: The Staff

In Lesson 2, it was mentioned that music notation is similar to the X-Y coordinate system. (My dissertation, "Contour Modeling by Multiple Linear Regression of the Nineteen Piano Sonatas by Mozart," plotted music as polynomial equations and graphs in the X-Y coordinate system. I actually won a prize for this research. Pretty cool, huh?) Luckily, music is not notated on an XY plot, but on a **staff.** A staff is comprised of five parallel lines and the 4 spaces between them.

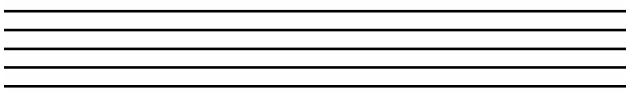


Figure. Staff, Five Lines and the Four Spaces

Lines are numbered from the bottom to top, kind of like floors on a building. Spaces are also numbered from the bottom to top.

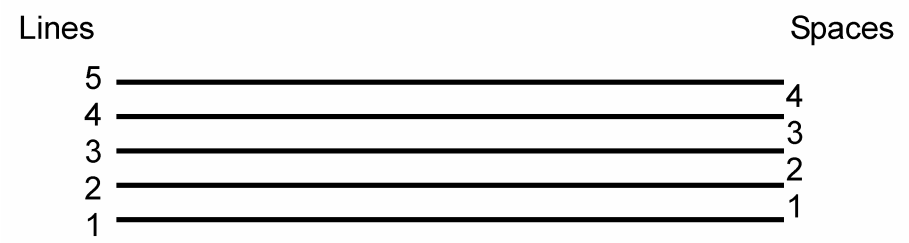
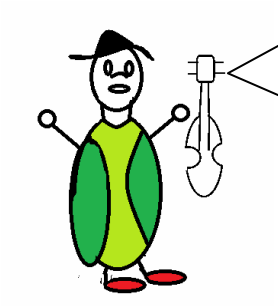


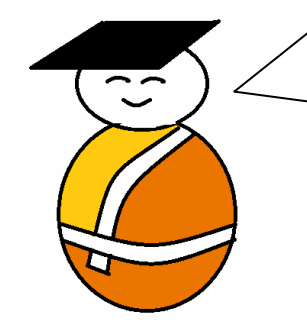
Figure. Lines and Spaces Numbered

You might be interested to know that music was not always notated on a 5-line staff. Around the year 800, there was simply a series of "squiggles" (actually called *neumes*) that were used as a memory-aid to represent relative changes in pitch. ("lubilate deo universa terra" in neumes) The performer, would follow the general shape of the neumes in performance. Eventually, a single line was added, then for a while, a 4-line staff was popular, and over time, the standard became a 5-line staff. But, even today, some instruments—mainly percussion instruments—will still use a single line staff.

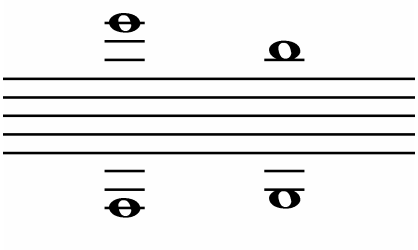
Lesson 11: Introduction to Clefs



Eloquent Professor, once more, I have become confused. A staff has only 5 lines and 4 spaces—a total of only 9 unique locations—how can it be used to represent the 88 pitches found on a piano, or even those pitches audible only to blue whales or dogs?



Again Cricket, your observations have been excellent and are leading you to comprehension! The 5 lines of the staff can be expanded by using **ledger lines.** These are short lines that look like dashes that can be added above or below the staff. As many as necessary can be added. Simply add as many ledger lines—and therefore letter names—above, or below, the staff as necessary.



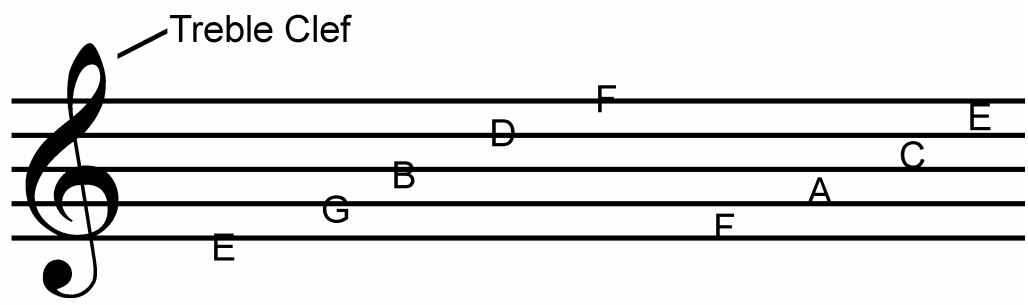
The first vertical pair of pitches are said to be “three ledger lines above the staff” and “three ledger lines below the staff.” The higher pitch in the second pair is “two spaces above the staff” and the lower pitch is “three spaces below the staff.”

More important is a symbol called a **clef.** A clef defines the pitches that a staff will show. There are four clefs—Treble Clef, Bass Clef, Alto Clef and Tenor Clef—but we will focus mainly on treble and bass clefs since they are most commonly used.

Lesson 12: The Treble Clef

The **treble clef** is used for female voices, for higher pitched instruments, such as flutes, oboes, clarinets, saxes, trumpets and violins, and for the right hand for piano music. It is also called the **G Clef** because it circles the line for the pitch G. (G4 to be exact, using "octave designation" from Lesson 8.) If you use your imagination, you might be able to see that the clef looks something like a stylized G.

The treble clef defines the lines (from bottom to top, remember) as E, G, B, D, F, and the spaces as F, A, C, E.



Some people like to use sentences or acronyms to help remember them. For lines, "*Every Good Boy Does Fine*" has been used frequently. Obviously—I hope—"*FACE*" has been used for the spaces.

The example below shows pitches associated with the treble clef including their octave designations. The primary points here are to see where C4 (middle C) is on the treble clef staff and to notice that the octave number changes each time the next C is reached.

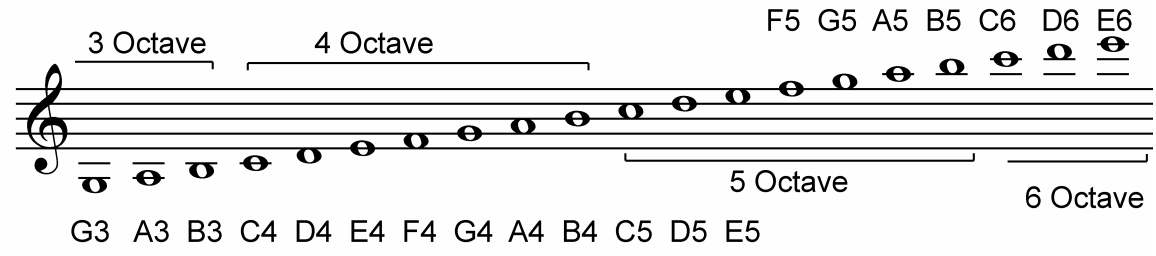
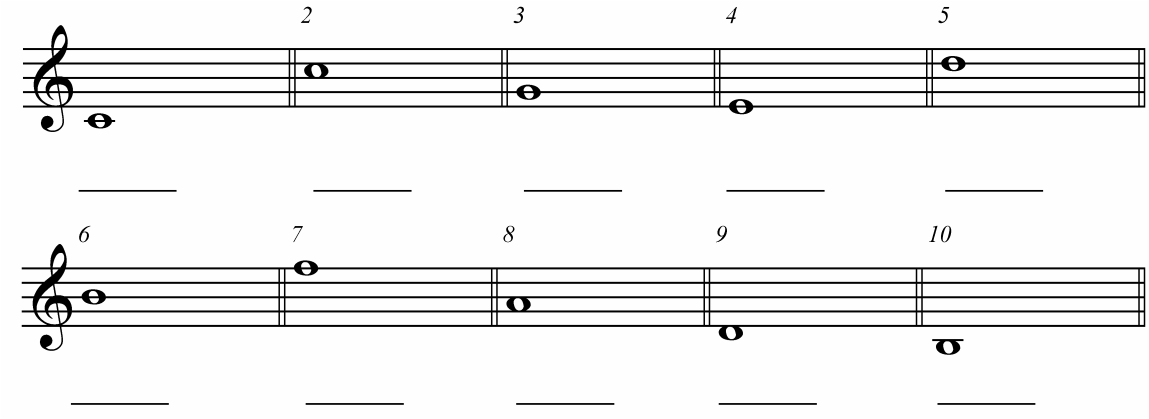


Figure. Octave Designation on Treble Clef

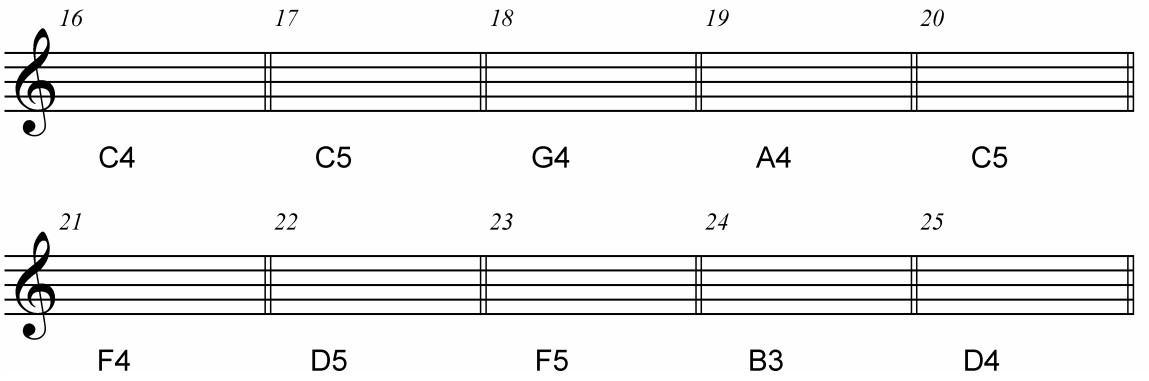
Refer to the picture of the piano with octave designations and compare where C4 and C5 are on the treble clef staff with where they are on the piano.

Figure. Piano showing Octave Designations at all C's

For these practice exercises, please identify the pitches according to letter name and octave designation



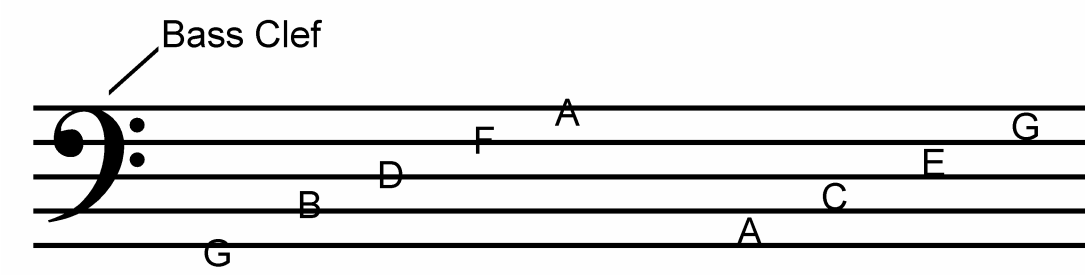
For these practice exercises, please place the pitch on the correct line or space according to its octave designation.



Lesson 13: The Bass Clef

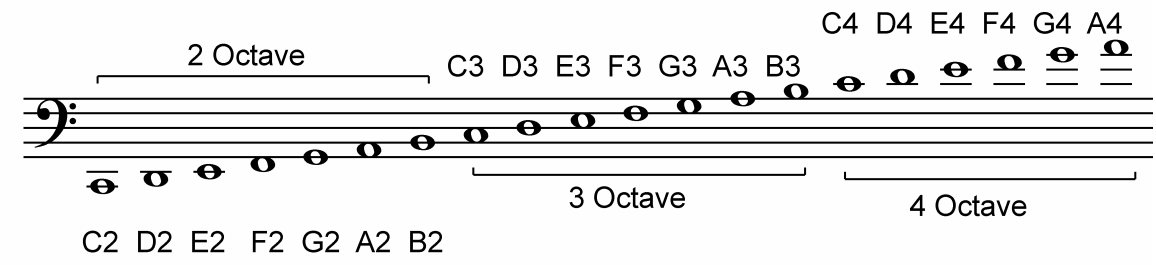
The **bass clef** is used for male voices, instruments that play lower pitches, like bassoons, trombones, tubas, cellos and double basses, and for the left hand of piano music. It is also called the **F Clef** because the two dots surround the line for the pitch F. (F3 to be exact, using "octave designation" from Lesson 8.) Some people say it looks like an "F", but personally, I don't see it!

The bass clef defines the lines (from bottom to top, remember) as G, B, D, F, A, and the spaces as A, C, E, G.



Some people use "*Good Boys Do Fine Always*" for the lines, and "*All Cows Eat Grass*" for the spaces.

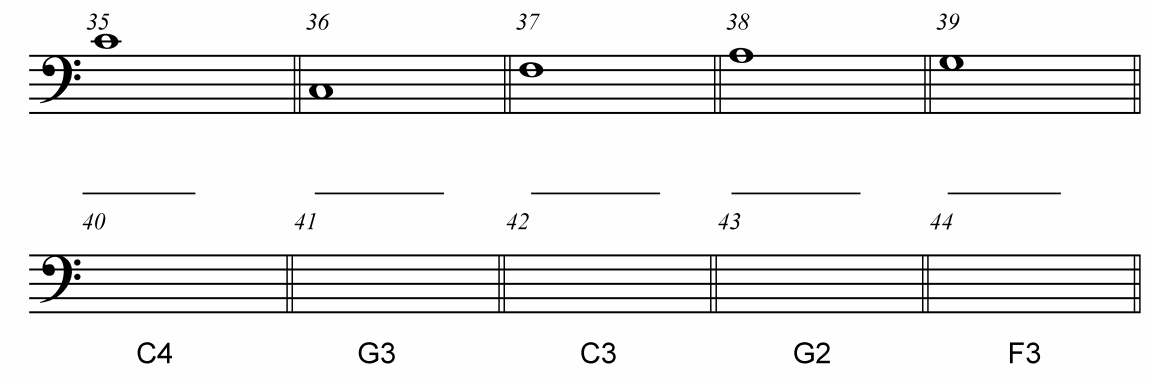
Here are the pitches typically used on bass clef with their octave designations. Notice that the pitches in the 3 and 4 Octaves in bass clef are the same pitches as the 3 and 4 Octaves on treble clef. If you were to play these pitches on the piano, you would play the same key. (Notice C4, middle C!)



Refer to the picture of the piano with octave designations and compare where C3 and C4 are on the bass clef staff with where they are on the piano.

Figure. Piano showing Octave Designations at all C's

Here are a few practice exercises to identify a few pitches and place a few on the bass clef according to octave designation.



Lesson 14: The Alto and Tenor Clefs, AKA, the Moveable C Clef

There is one other clef symbol that is used mainly for orchestral music or music for string quartets. (A string quartet is a small "chamber ensemble" made of two violins, one viola and one cello.) This clef is generically called the **Moveable C Clef.**

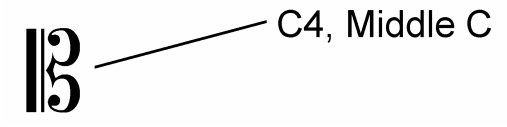


Figure. The Moveable C Clef

The line (or rarely the space) where the curves come together defines where the pitch C4 is located. (Remember this simple fact, as it might come up on a test!) It is called "moveable" because it was placed anywhere on the staff that the composer thought was convenient. This clef was used historically for many instruments and voice parts. This course will not emphasize the moveable C clef, but it is reasonable to expect that you might come across one in your future so a little discussion and practice will be helpful.

Today, the **Alto Clef** is used by the viola, and sometimes by the bassoon, cello or trombone. The curves come together on line 3, so that is defined as the pitch C4.

Figure. Lines and Spaces on the Alto Clef

The **Tenor Clef** is used sometimes by the bassoon, cello or trombone. (Ironically, it is rarely used by the male voice part called "tenor.") The curves come together on the fourth line, so that pitch is C4.

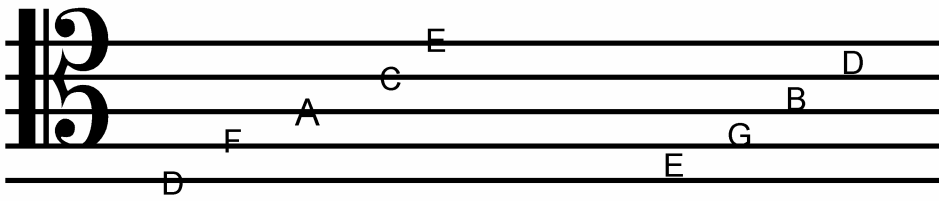
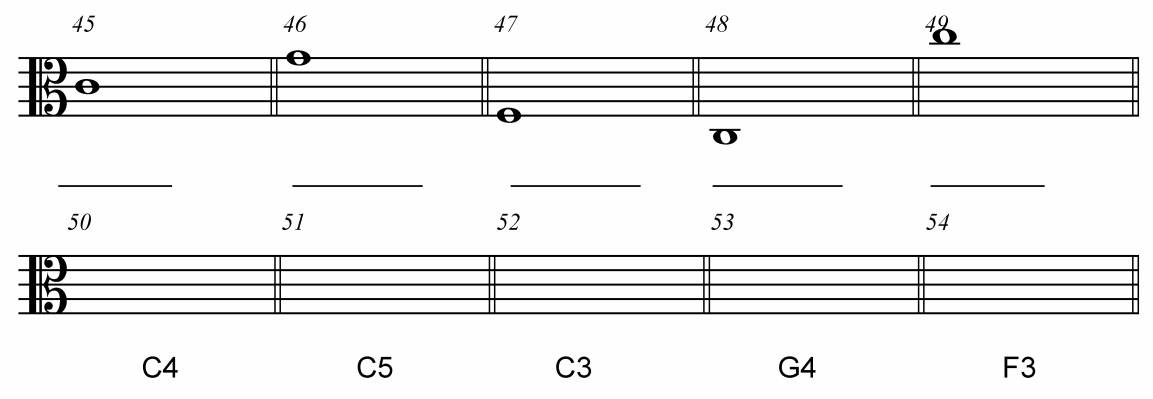


Figure. Lines and Spaces on the Tenor Clef

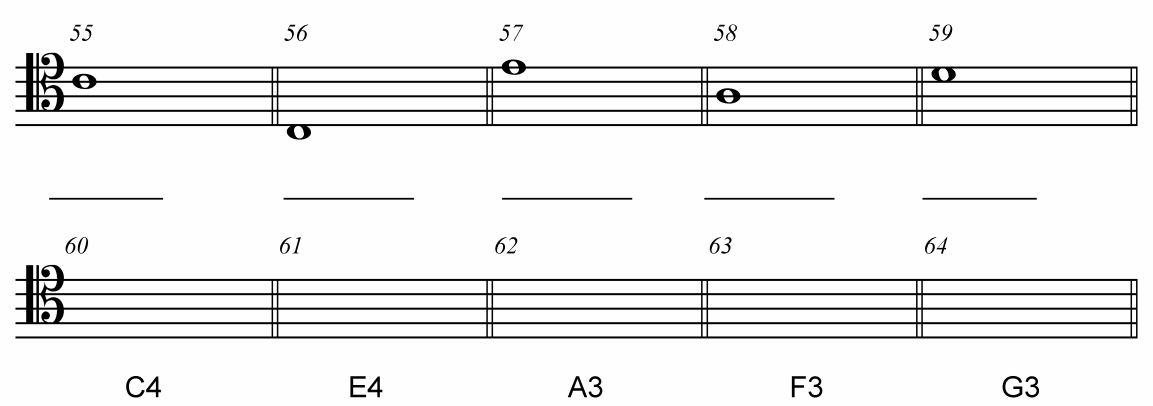
Remember, C4 is "middle C" as shown in the earlier picture of the piano. It is the same C4, middle C, as on treble and bass clefs.

Here are a few practice exercises for alto and tenor clefs.

Alto Clef

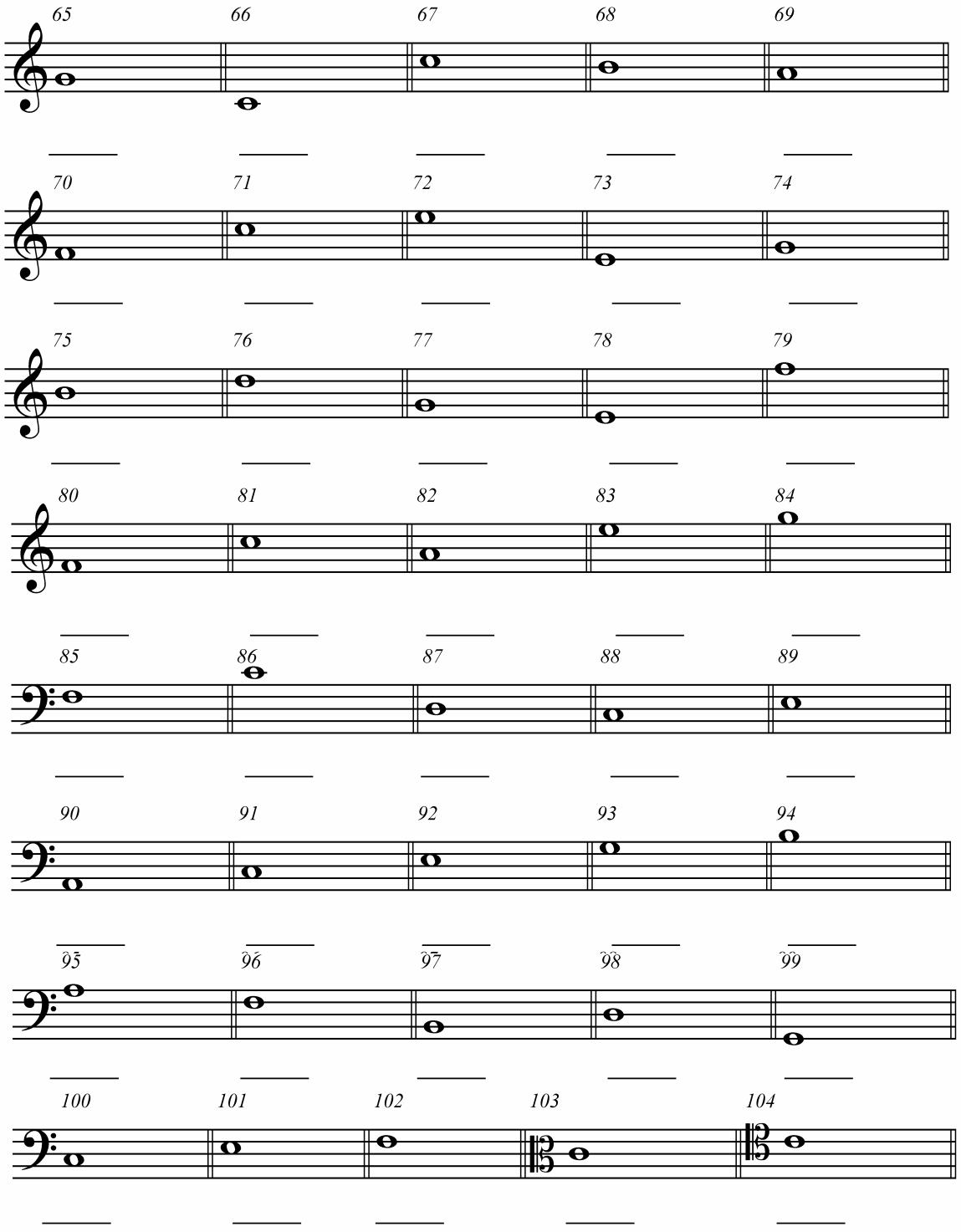


Tenor Clef



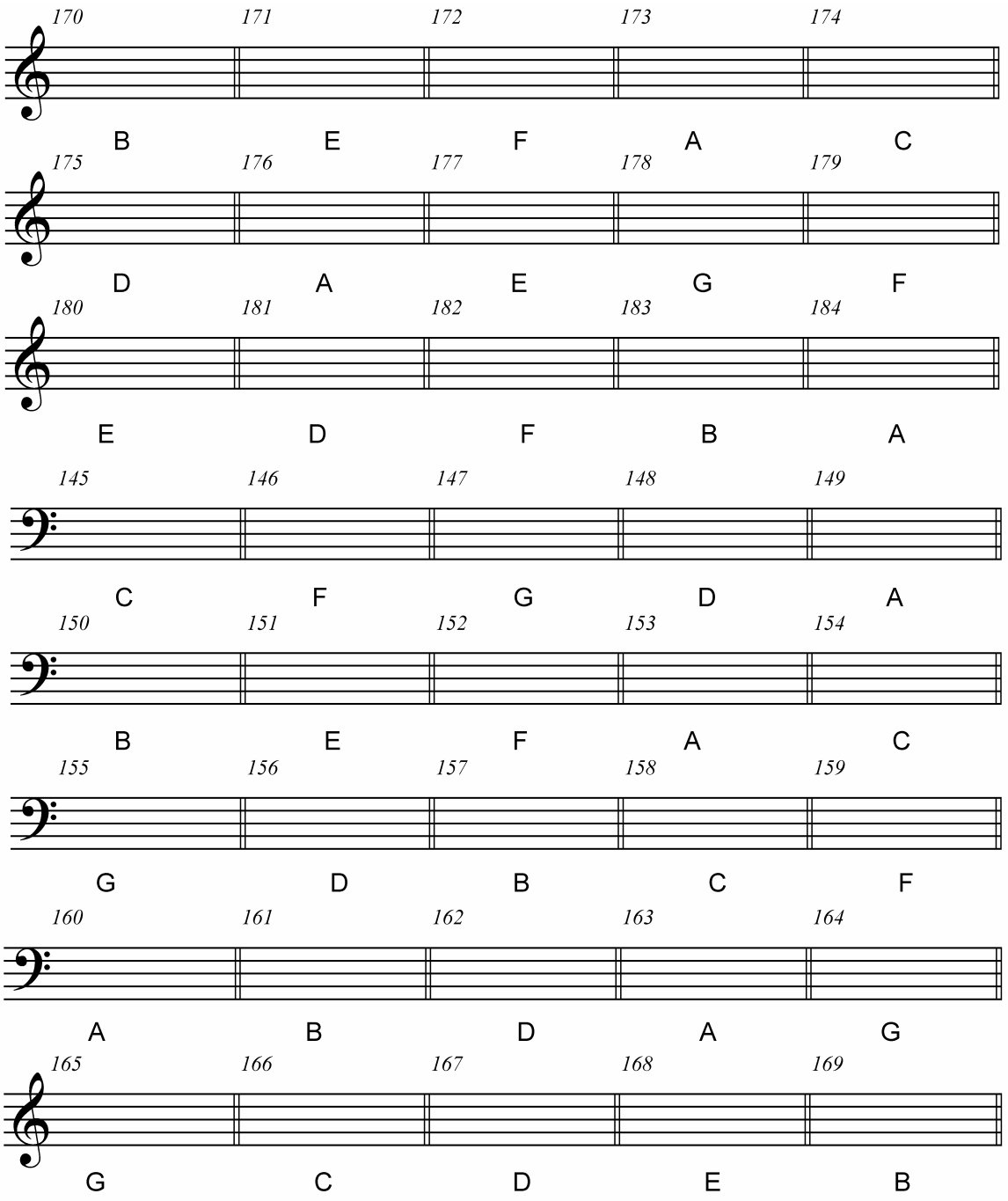
Identifying Pitches (1) Name _____

Please identify the following pitches. You are NOT required to give octave designation, though you may if you like.



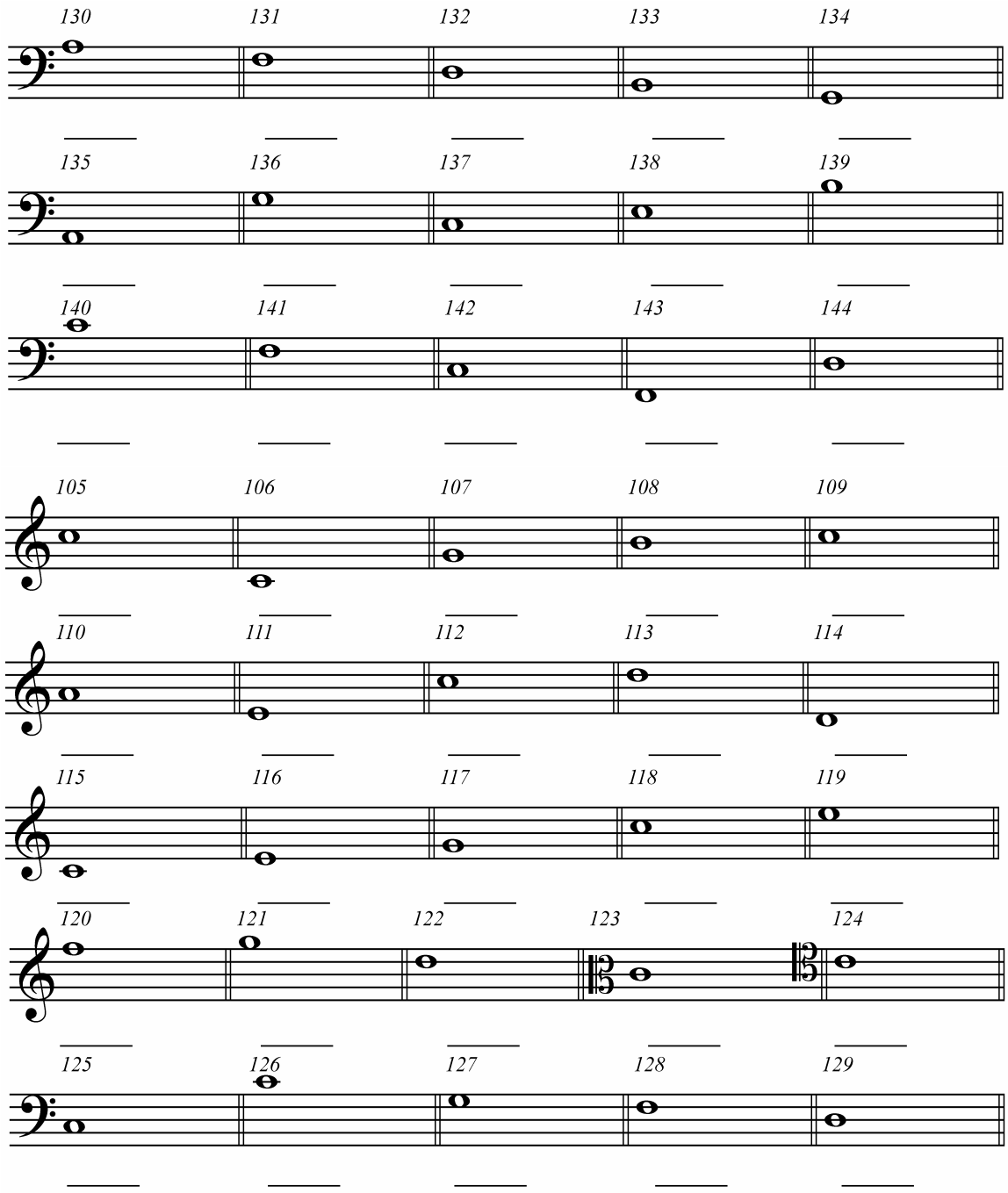
Placing Pitches (1) Name _____

Please place the indicated pitches on the staff. (Since there are only 7 letters, please use different octaves occasionally.)



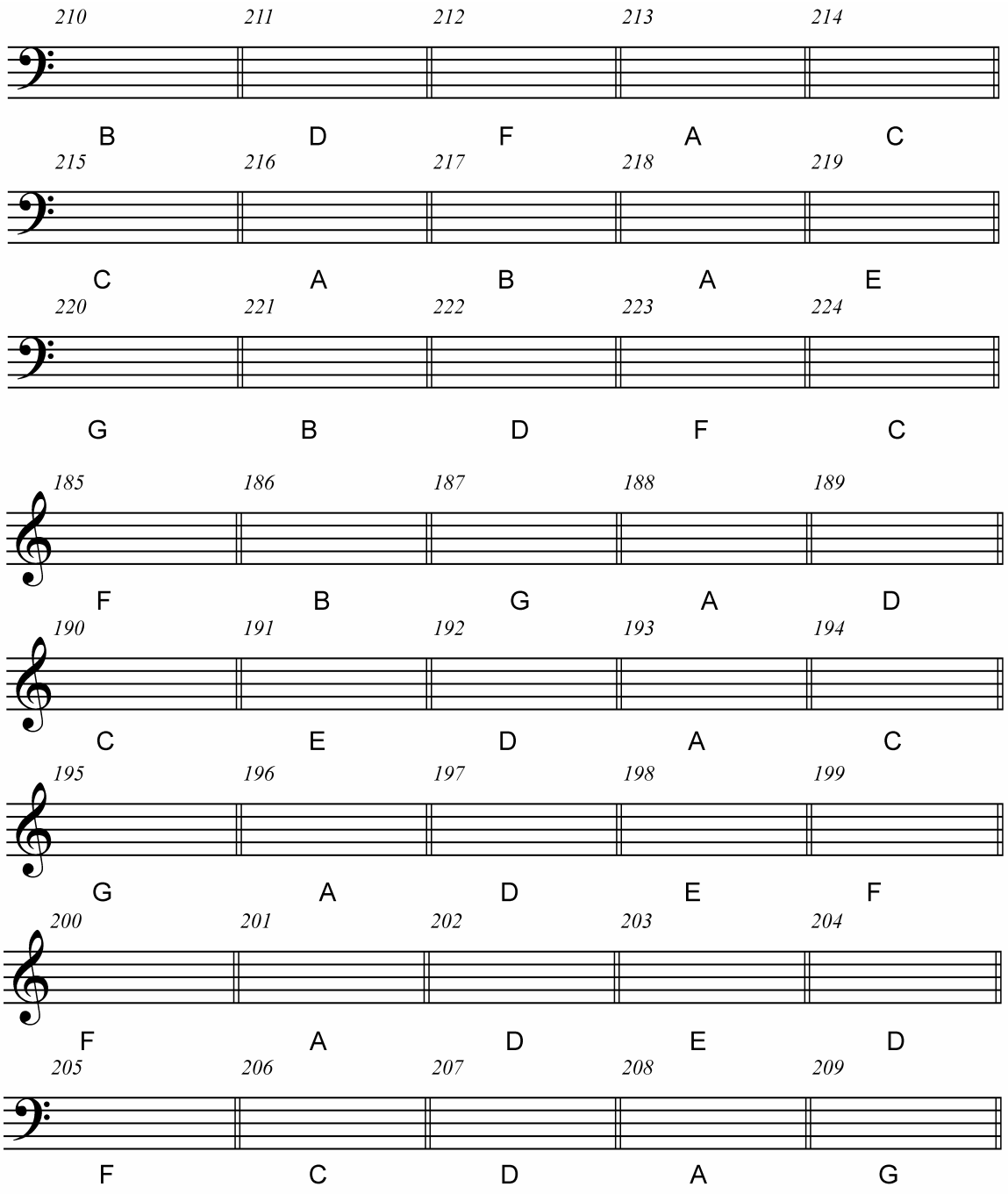
Identifying Pitches (2) Name _____

Please identify the following pitches. You are NOT required to give octave designation, though you may if you like.



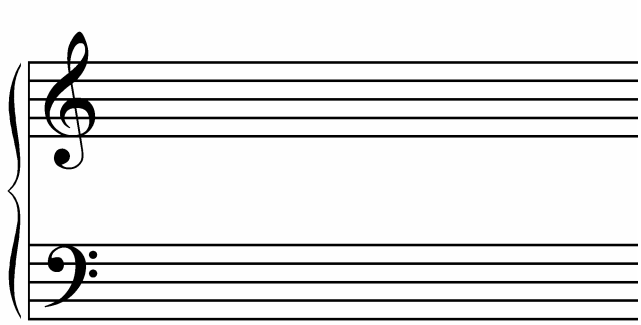
Placing Pitches (2) Name _____

Please place the indicated pitches on the staff. (Since there are only 7 letters, please use different octaves occasionally.)

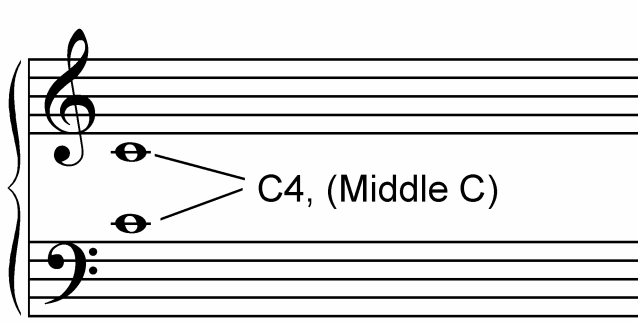


Lesson 15: Grand Staff and Open Score

A **grand staff** (sometimes called a **great staff**) is shown below. It is very often used for piano music and for choir music, but it can be used for other musical groups also. Most common, it is 2 staffs (staves) connected by a vertical barline and a brace or bracket on the left. There will usually be a treble clef on the upper staff and a bass clef on the lower staff, though any combination is theoretically possible.



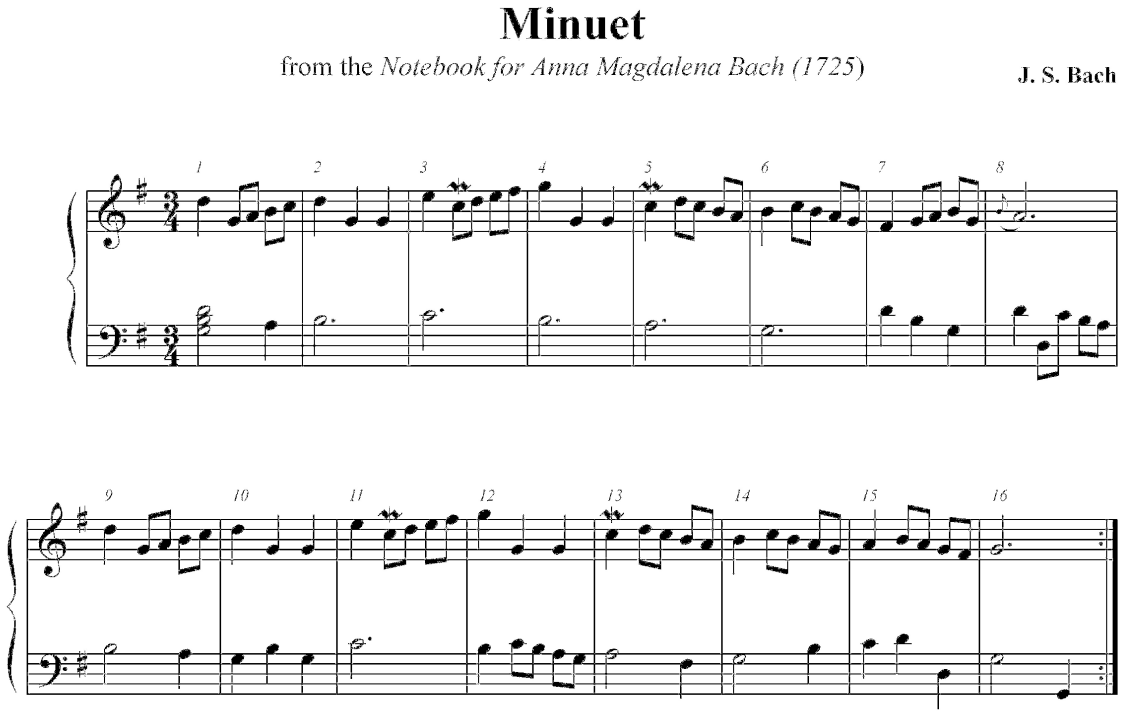
Very important to notice is that pitch one ledger line below the treble clef is the exact same pitch as one ledger line above the bass clef. This is a good link between the two clefs.



Don't be confused; pitches that are aligned vertically on the grand staff should be performed simultaneously. You *do not* read the treble clef staff across and then go down to the bass clef staff and read it.

Below is the first half of Johann Sebastian Bach's (1685-1750) Minuet in G major. The music in the treble clef would be played by the pianist's right hand, and the music in the bass clef would be played by the left hand. At the very beginning, the pianist would play four pitches at the same time. The dots attached to the barline in measure 16 are called a **repeat sign**. ("m. 16" is an acceptable way to abbreviate "measure 16," for future reference.) They tell the pianist to go back to

the beginning and “play it again, Sam.” (This is not really a quote from the movie, *Casa Blanca*, but most people think it is.)



An extension of a grand staff is the **open score,** or **full score.** This is the music that the orchestra conductor or band director will usually use to lead an ensemble. It shows the music that each individual instrument is playing. A full score will have as many staffs as necessary using the most appropriate clefs. The BEST conductors are able to see and read every part at the same time! Don’t be misled, orchestra is not the only ensemble that uses a full score. Jazz bands and pop groups of all types do also.

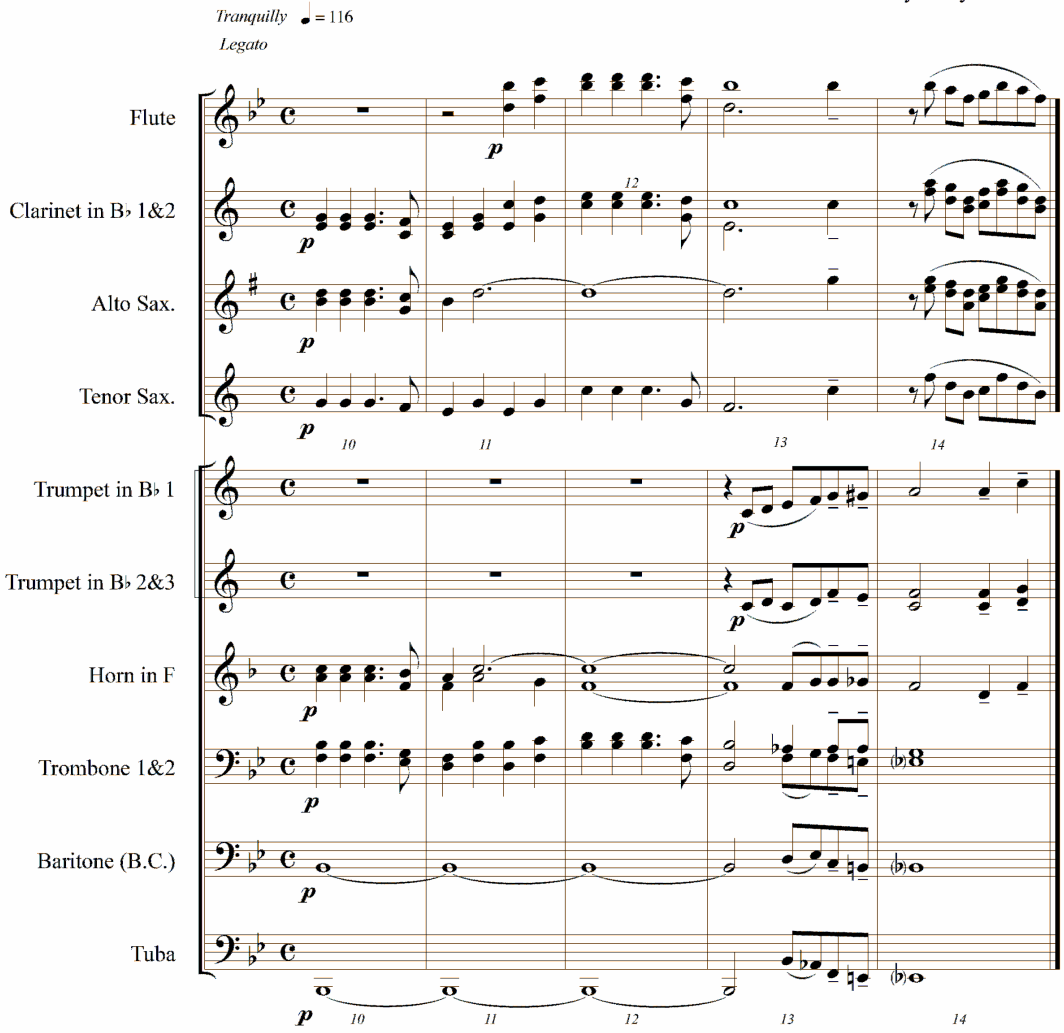
Below is an excerpt from the conductor’s score for Larry Kerchner’s arrangement of “Battle Hymn of the Republic.” He wrote this arrangement originally for the 1984 Trooper’s Drum and Bugle Corps from Casper, Wyoming. The Pride of Mississippi Marching Band at the University of Southern Mississippi has been playing it in the pregame show for decades.

Score

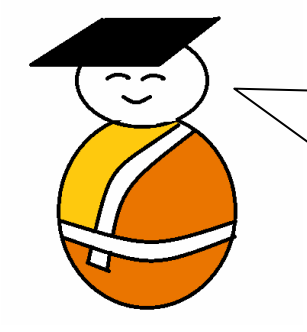
BATTLE HYMN

(Excerpt)

Arr. by Larry Kerchner

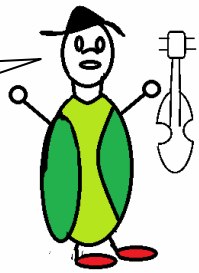


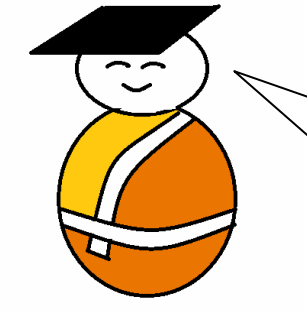
Lesson 16: Major Scales



Cricket, the lesson you are about to learn is possibly the most important, most vital, most critical single topic for understanding music. This topic is **SCALES**. In some way or another, everything that you will study from now on will be related to scales. You must learn and understand scales thoroughly to be successful!

Oh most wise Professor, I will put my best effort into this lesson! I hope it is not too difficult.

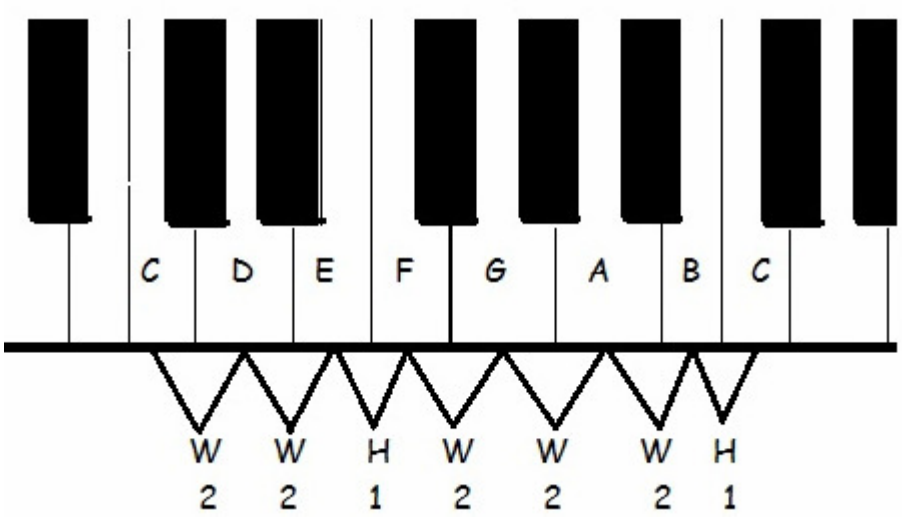


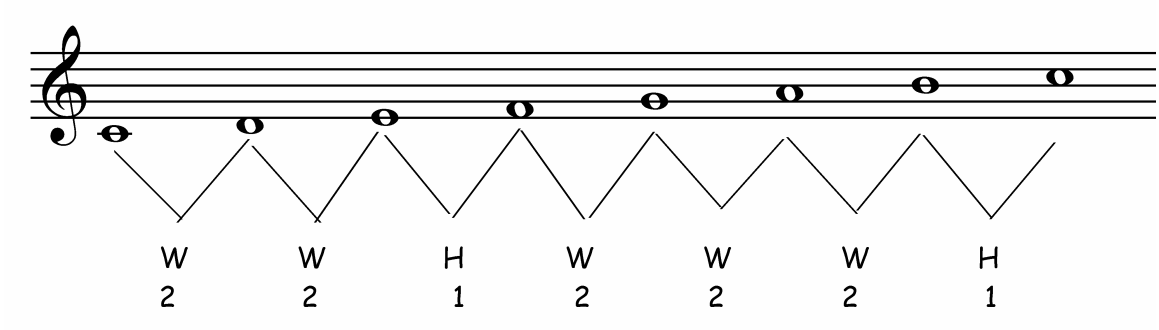


Do not worry, Cricket; scales are not really difficult to understand, but they truly are very important! *Scales are the foundation for key signatures, intervals, triads and even melodies with harmony.* Scales are essential for most of the music you are probably familiar with!

Simply stated, a scale is a musical pattern, usually stepwise, that can be duplicated beginning on any pitch. There is a multitude of types of scales—chromatic, whole tone, octatonic, blues, church modes—but this course will focus first on the major scale, and then later on the three versions of the minor scale.

Below is an example of a **major scale,** (the C major scale) first shown on the piano, then in staff notation on the treble clef.





Notice the following characteristics that are common to all major scales.

1. There are eight pitches in the scale. The lowest pitch and the highest pitch have the same letter name (and accidental, if applicable), but an octave apart. (Recall from Lesson 9 that the upper pitch and lower pitch would be the same "pitch class.")

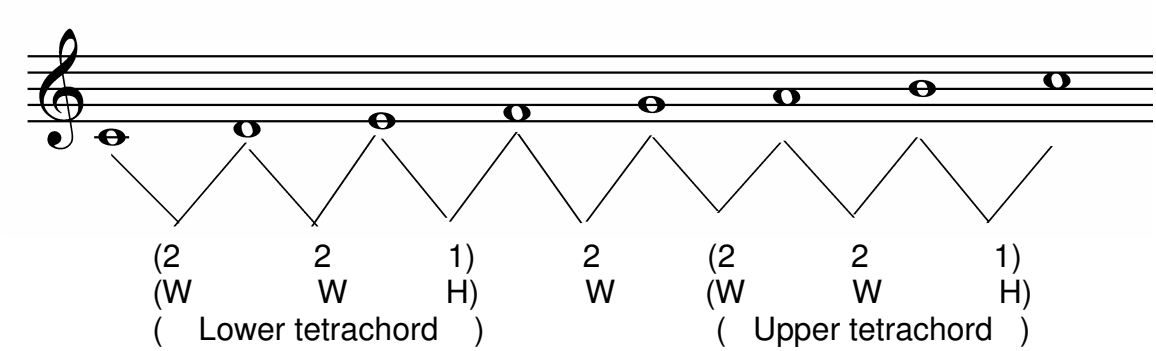
2. No lines or spaces are skipped, and none are used twice. Similarly, no letter names are skipped or used twice.

3. The pattern of whole steps and half steps between the pitches will always be like this if it is a major scale. (Recall Lesson 7 which discusses half steps and whole steps, and the fact that 2 half steps equals a whole step. In the figure, a half step is indicated both as "H" and as "1." The whole step is indicated as "W" and as "2.")

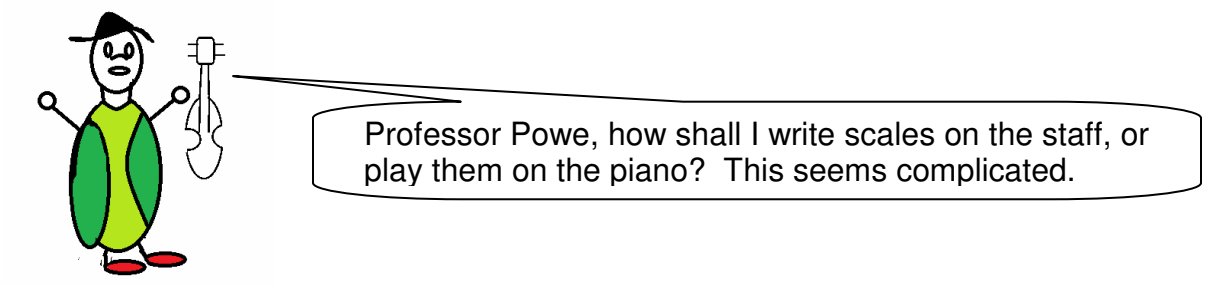
W—W—H—W—W—W—H or 2—2—1—2---2—2—1

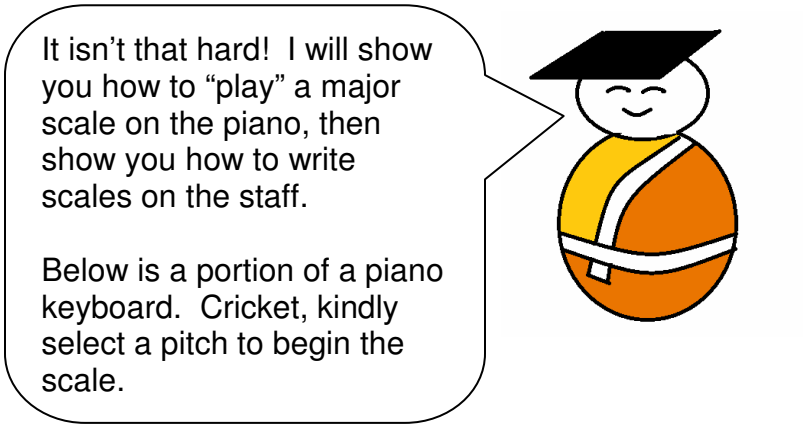
Yes, you should memorize this pattern!

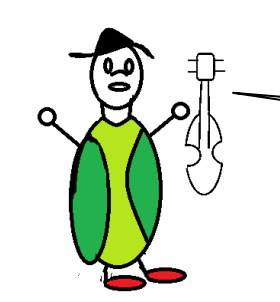
If you feel this pattern if too complicated to memorize, think of it in smaller chunks. In reality, it is one simple pattern called a **tetrachord** (Greek origins, meaning "four sounds") that is repeated. The pattern for a major tetrachord (remember, this is only 4 pitches) is 2 2 1, or W W H. There will be two major tetrachords is a major scale (a lower tetrachord and an upper tetrachord) separated by a whole step.



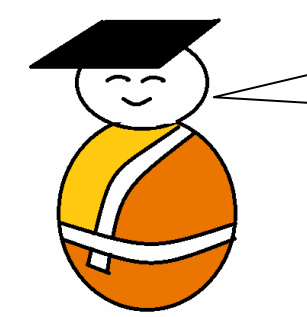
Different types of scales, such as natural minor or octatonic, will have different patterns. It is the unique pattern, and therefore the unique sound, that distinguishes each scale from the others.







I have a friend named “Danny,” so I choose D as the first pitch.



D is an excellent choice. To write scales correctly, you must remember the difference between a half step and a whole step. That’s in Lesson 7 if you need to review.

The pattern for a major scale will always be:

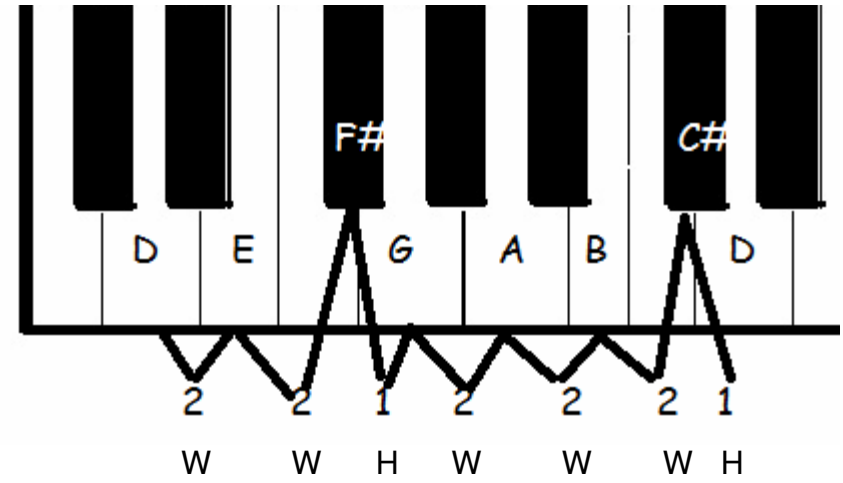
W W H W W W H

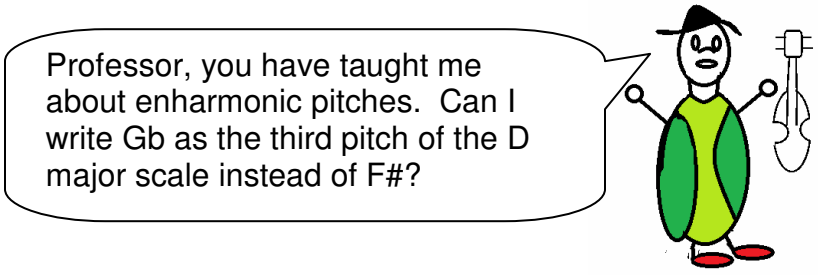
Or, using the number of half steps…

2 2 1 2 2 2 1

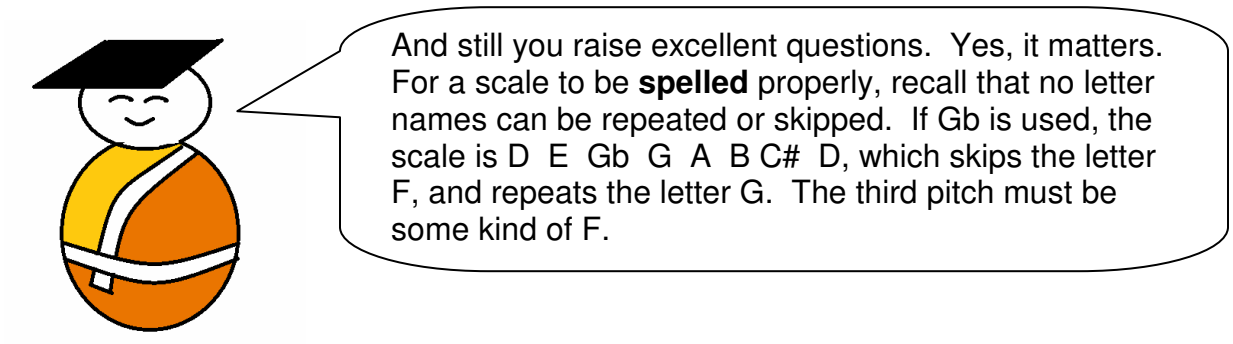
Either way is exactly the same. Besides, to move a whole step (W) you still need to think “2” half steps.

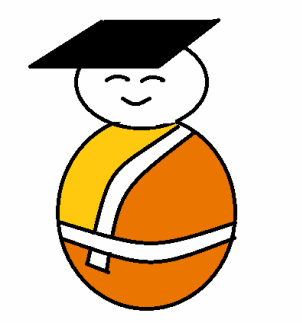
If you start of D, and ascend in pitch by going to the right one whole step (2 half steps), the next pitch is E. Ascend another whole step (2) to F#. Ascend a half step (1) to G, then whole step (2) to A, a whole step (2) to B, a whole step to C#, then the final half step (1) brings us back to D.


F#
C#
D
E
G
A
B
D
2
2
1
2
2
2
1
W
W
H
W
W
W
H


Professor, you have taught me about enharmonic pitches. Can I write Gb as the third pitch of the D major scale instead of F#?

:


And still you raise excellent questions. Yes, it matters. For a scale to be **spelled** properly, recall that no letter names can be repeated or skipped. If Gb is used, the scale is D E Gb G A B C# D, which skips the letter F, and repeats the letter G. The third pitch must be some kind of F.



To write a major scale on the staff starting on any pitch:

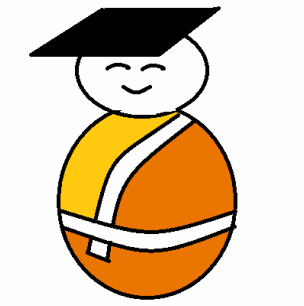
1. Place the starting pitch on the staff with an appropriate clef.

2. Fill in all the lines and spaces until the same letter name pitch (pitch class) is reached an octave above. Be certain that the upper starting pitch has the same accidental as the lower starting pitch. Do not skip any lines or spaces (or letter names) and do not duplicate any lines or spaces (or letter names.)

3. Remind yourself of the pattern "W W H W W W H" or "2212221" by placing the pattern under or above the pitches.

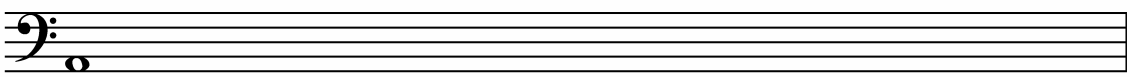
4. Add accidentals starting from the bottom and work your way UP until all pitches are corrected.

You should memorize and learn how to apply this 4-step procedure to build a major scale beginning on any pitch.

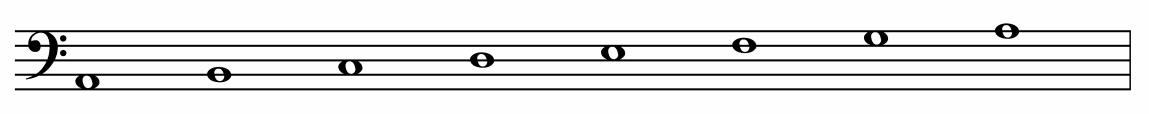


Try another scale, this time, on the staff. How about the A major scale?

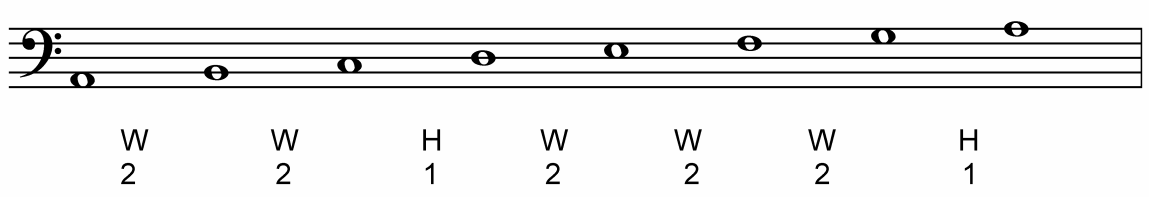
1. Here is the pitch A2 placed on the bass clef.



2. All pitches are placed on the staff until A3 is reached, skipping no lines or spaces, not duplicating any lines or spaces, and therefore not skipping or doubling any letter names.

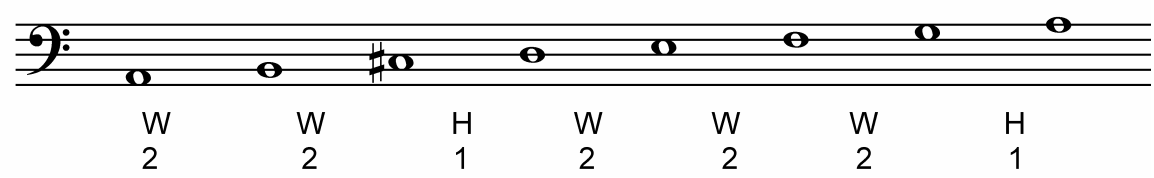


3. Since this is a major scale—“A major scale” get it?—the pattern is W W H W W W H or 2212221. These are placed between the appropriate pitches.

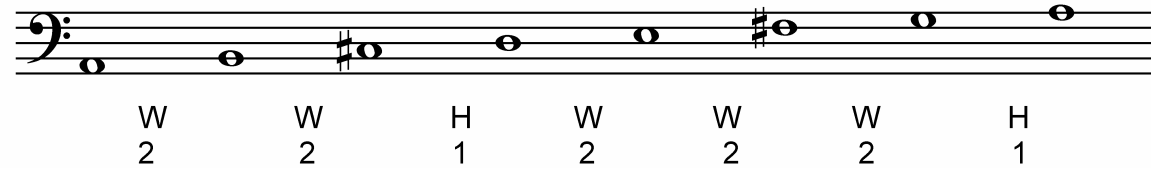


4. Adjacent pitches are checked to see that the pattern is followed, working from the bottom up.

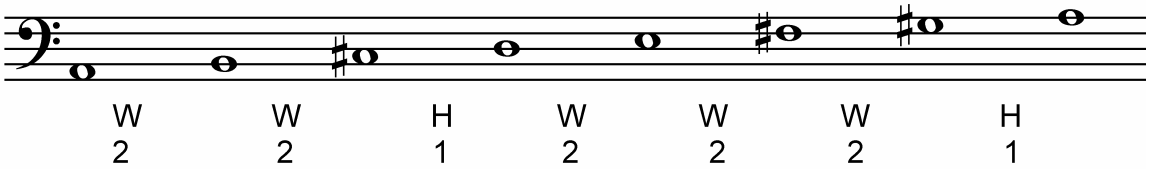
A2 to B2 is whole step, so no accidental is added to B. But B2 to C3 is only a half step, so to correct that, C3 is raised with a sharp to C#3, which is now a whole step above B.



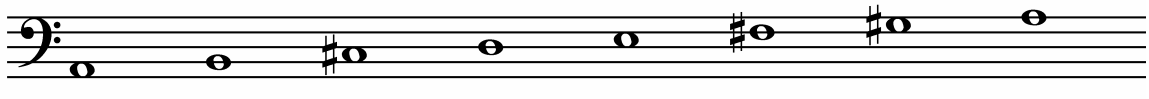
C#3 to D3 is a correct half step, and D3 to E3 is a correct whole step, so no accidentals are needed. But, E3 to F3 is only a half step, so to make a whole step, F3 is raised to F#3.



F#3 to G3 is only a half step, so again, the G3 is raised to G#3 making it a whole step. Now, if all is correct, G#3 to A3 will be a half step, and so it is. If this last interval is correct, the likelihood of everything else being correct is very high!



And the A major scale:

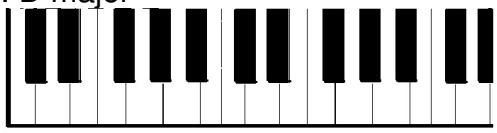


Though this scale and the D major scale both required sharps, there are just as many major scales that require flats. Don’t assume you will always need to add sharps.

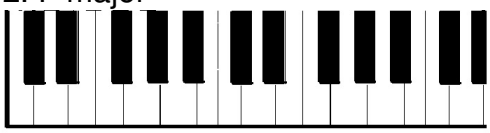
Scales on Piano Keyboard Name _____

On each piano keyboard below, please mark the keys that would play the indicated major scale. The tonic pitch is marked for you.

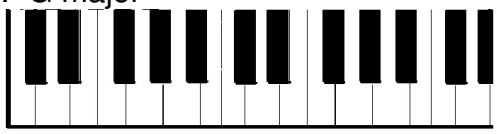
1. D major



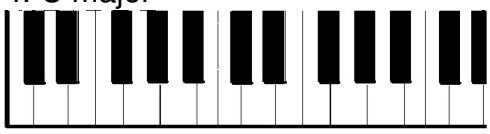
2. F major



3. G major

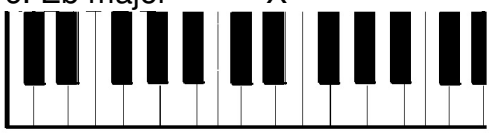


4. C major

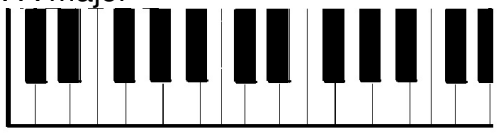


5. Bb major

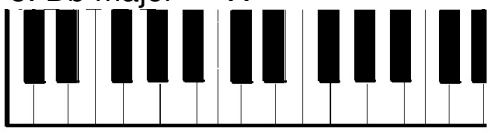
6. Eb major



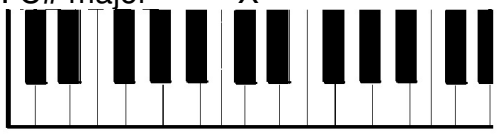
7. A major



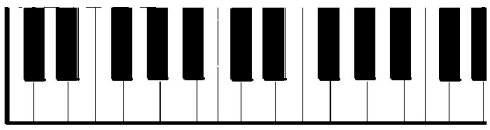
8. Db major



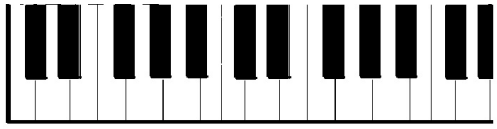
9. C# major



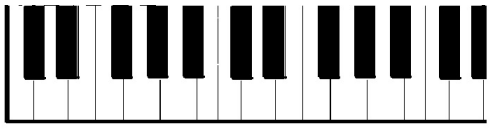
10. F#



11. E

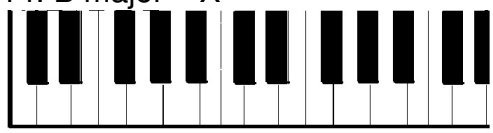


12. Gb



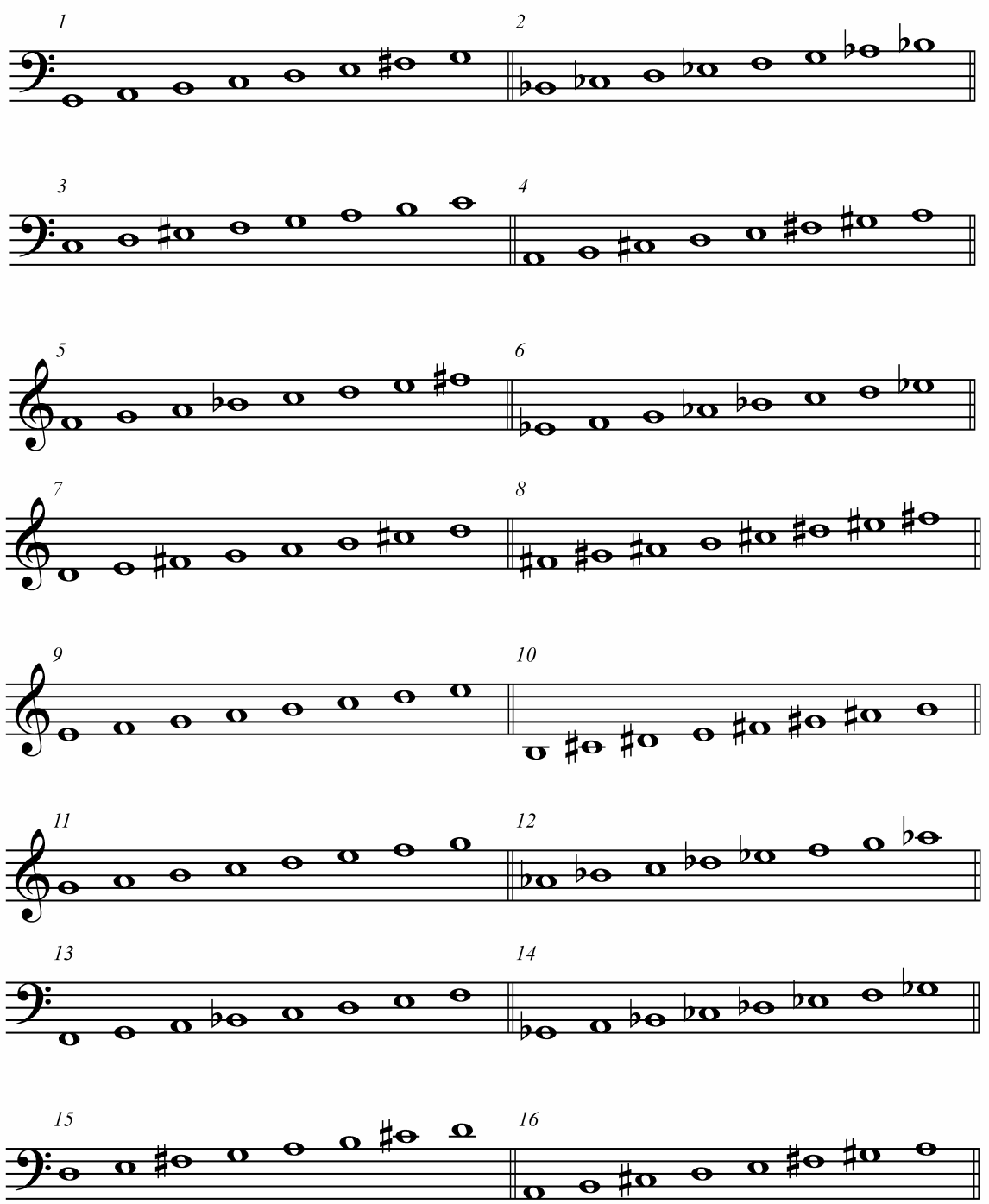
13. Cb major

14. B major



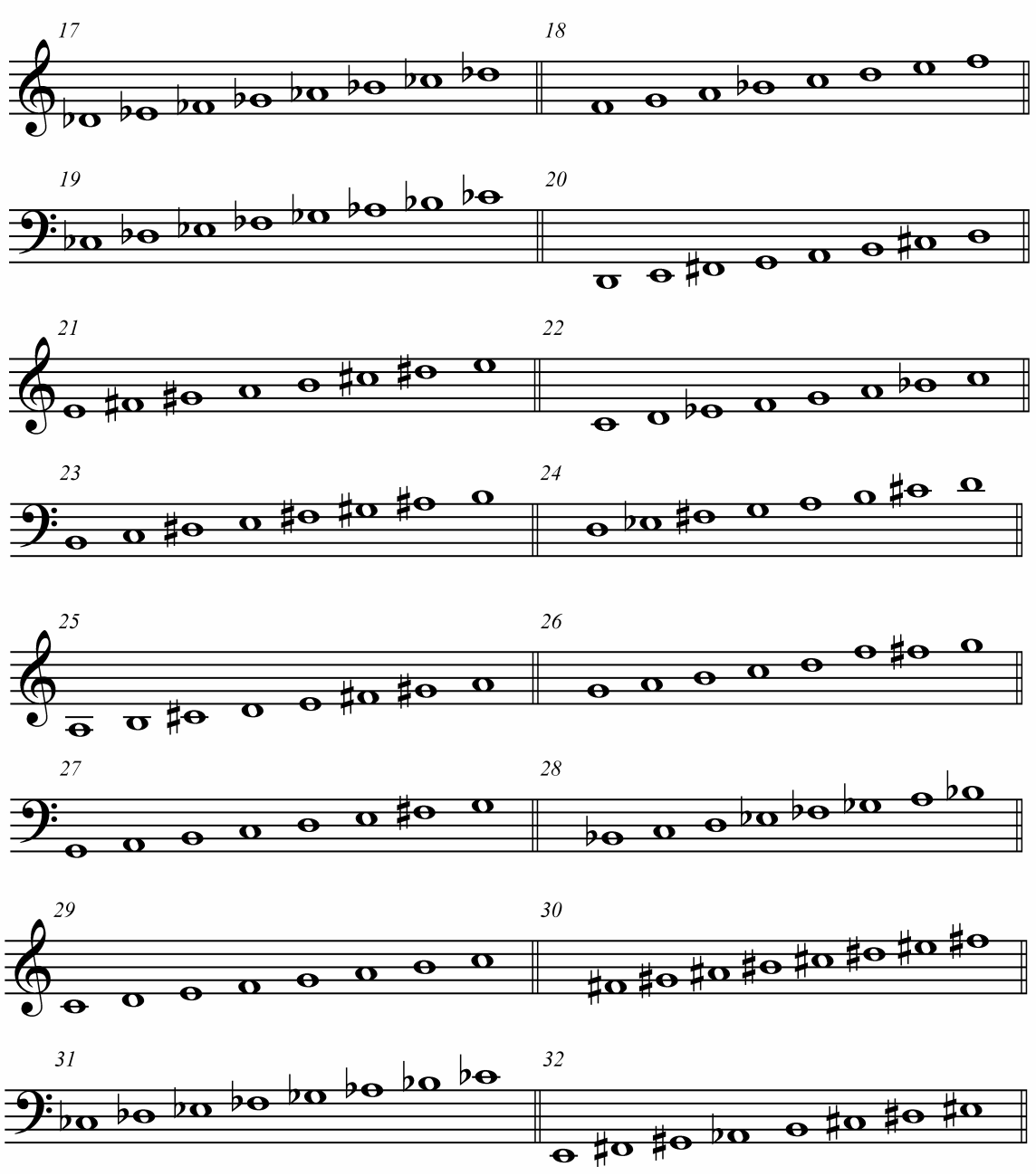
ID Major Scales (1) Name _____

In the exercises below, some of the scales are correctly written major scales, and some are not. Write “Major” or “Wrong” next to the measure number. To do this, write the pattern, W W H W W W H, or 2212221 in the scale and see if the pattern is correctly matched by the pitches.



ID Major Scales (2) Name _____

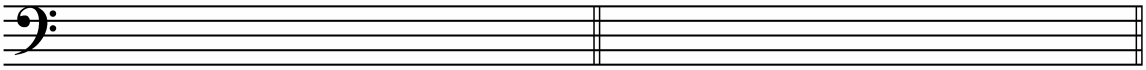
In the exercises below, some of the scales are correctly written major scales, and some are not. Write “Major” or “Wrong” next to the measure number. To do this, write the pattern, W W H W W W H, or 2212221 in the scale and see if the pattern is correctly matched by the pitches.



Writing Scales (1) Name _____

Please write the indicated scale on the given staff.

33

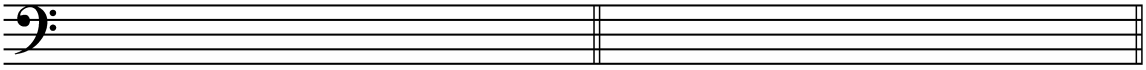


D major

34

Ab major

35

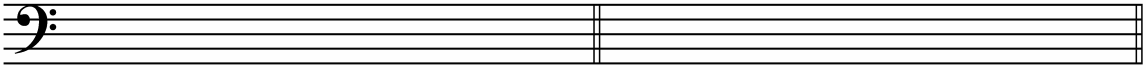


Eb major

36

C major

37

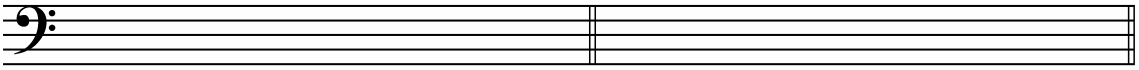


F major

38

G major

39

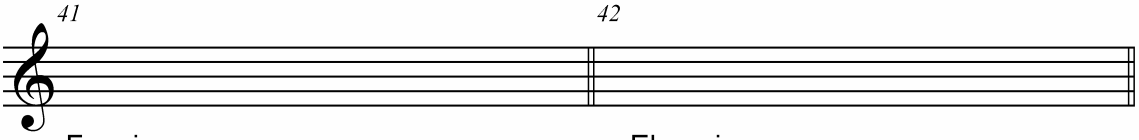


Bb major

40

A major

41

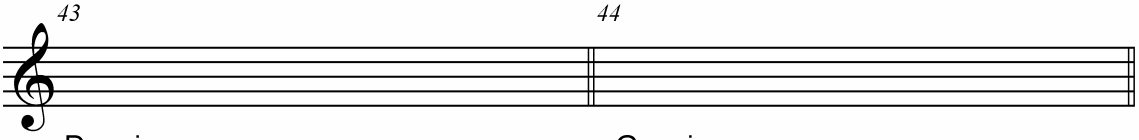


F major

42

Eb major

43

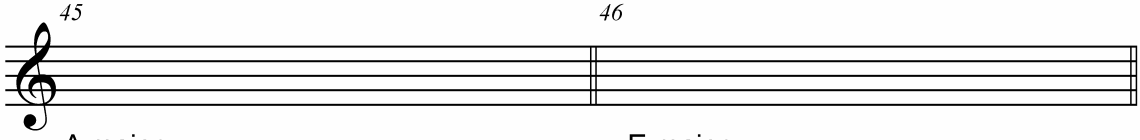


D major

44

G major

45

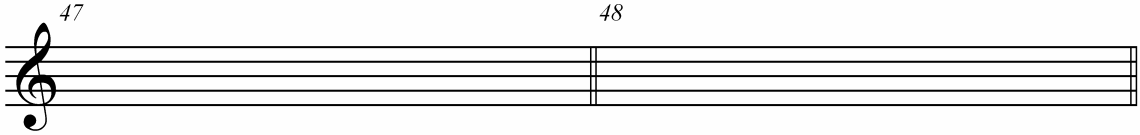


A major

46

E major

47



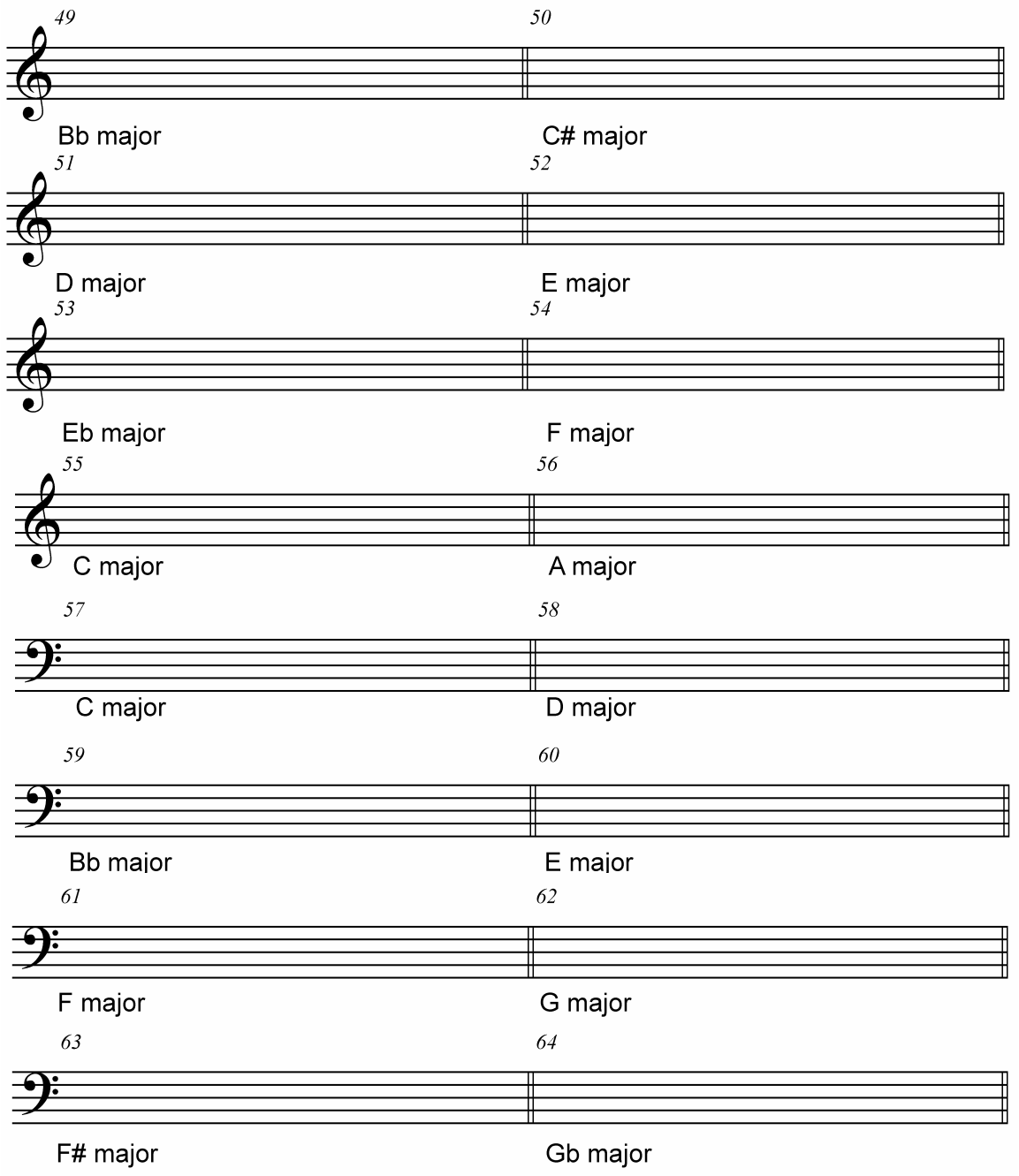
C major

48

Cb major

Writing Scales (2) Name _____

Please write the indicated scale on the given staff.



Lesson 17: Scale Degrees, Solfege and Formal Names

The pitches of a major scale are often labeled in several different, and basically interchangeable, ways. The Figure below shows three of them. **Yes, this is another item that you should memorize!**

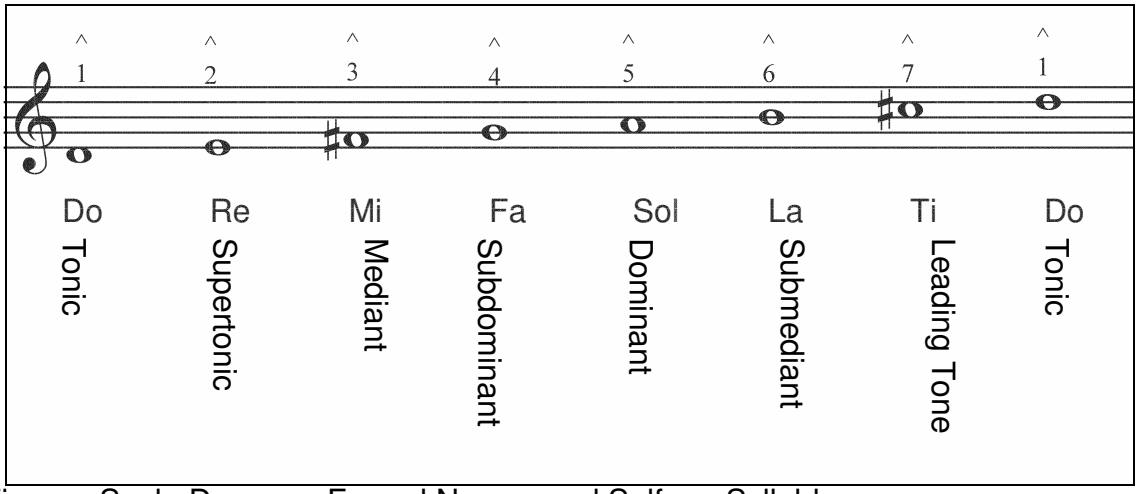


Figure. Scale Degrees, Formal Names and Solfege Syllables

The "roof top," "pointy birthday hat" or officially called a "caret" above the number is used to indicate "**scale degree**" as a number. In the D major scale that Cricket wrote earlier, scale degree 4 would be the pitch G because it is the fourth pitch in the scale.

(There are times when the top pitch may be called scale degree 8, but most of the time, calling it scale degree 1 is best.)

If you have ever watched "The Sound of Music" you are probably already familiar with "**solfege**" because of the song, "Do Re Mi." (You remember, "Doe, a deer, a female deer. Ray, a drop of golden sun…") These syllables make singing scales easier than using the letter names of the pitches or even scale degree numbers.

On a historical note, Rogers and Hammerstein did not "invent" solfege for "The Sound of Music." This concept was actually developed by a monk named Guido of Arezzo about 1000 years ago! He used a familiar hymn—familiar for the time, anyway—where each phrase started on the next higher scale degree. The syllables used as Do Re Mi come from the first syllables of the first words of each phrase of the Latin text from the chant "Hymn to St. John, the Baptist." (In Guido's version, "Ut" was the first syllable; "Do" replaced it in the early 1600's because it sounded better for singing!)

Below are the first six phrases of "Hymn to St. John, the Baptist." The first syllable of each phrase is capitalized to emphasize the origins of the modern solfege syllables, and maybe explain some of the odd spelling!

UT queant laxis	So that (we) are able, with no restrictions
REsonare fibris	to resound from our innermost being
MI-ra gestrorum	of Your wonderful deeds,
FA-muli tuoroum	for Your service,
SOL-ve polluti	remove the corruption
LA-bii reatum	of guilty lips

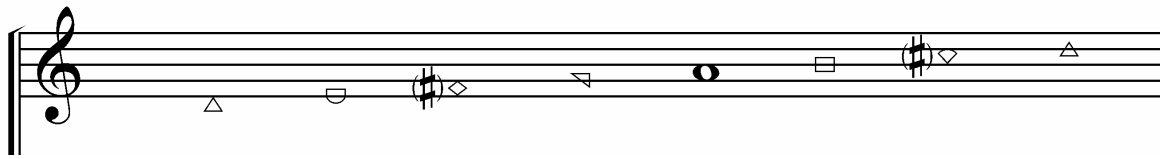
Figure: First Phrases of “Hymn to St. John, the Baptist” (approximate translation by D. Beard)

Guido did some other interesting things as a musician, including what is known as the “Guidonian Hand.” If you want to geek-out for a bit, I’d suggest googling his name. It really is pretty cool!

Equally, if not more important for communicating about scale degrees are the **formal names.** These labels are used when discussing the “function” of triads, which will be in a later lesson.

To speak of the pitch G in the D major scale as “scale degree 4,” “fa” or “subdominant” are all correct and normal ways to communicate with other musicians.

Scale degree numbers, solfege and formal names are not the only methods used for labeling and identifying pitches within a scale. One other way is called “**shapenotes**.” Each scale degree has its own shape. Singers trained to read shapenotes know that the “sideways right triangle” is always scale degree 4, or fa, and that the “diamond” will always be scale degree 3, or mi.



The use of shapenote notation is not really that common, but it is used in some church hymnals.

No, you do not need to learn shapenotes for this class, but you do need to memorize the scale degrees, formal names and solfege syllables.

Scale Degrees, Solfege, And Formal Names

Name _____

Please answer the following questions.

1. In the C major scale, what letter is the Dominant pitch? _____
2. What is the solfege syllable the equals scale degree 2? _____
3. Scale degree _____ is the same as the Dominant pitch.
4. Tonic is scale degree _____.
5. Tonic is what solfege syllable? _____
6. Fa is what scale degree? _____
7. The leading tone is which scale degree? _____
8. Subdominant is what scale degree? _____
9. Which formal name comes first in an ascending major scale, Submediant or Mediant?
10. True/False: Rogers and Hammerstein were the inventors of solfege.

Lesson 18: Major Key Signatures

Look at the following tune:

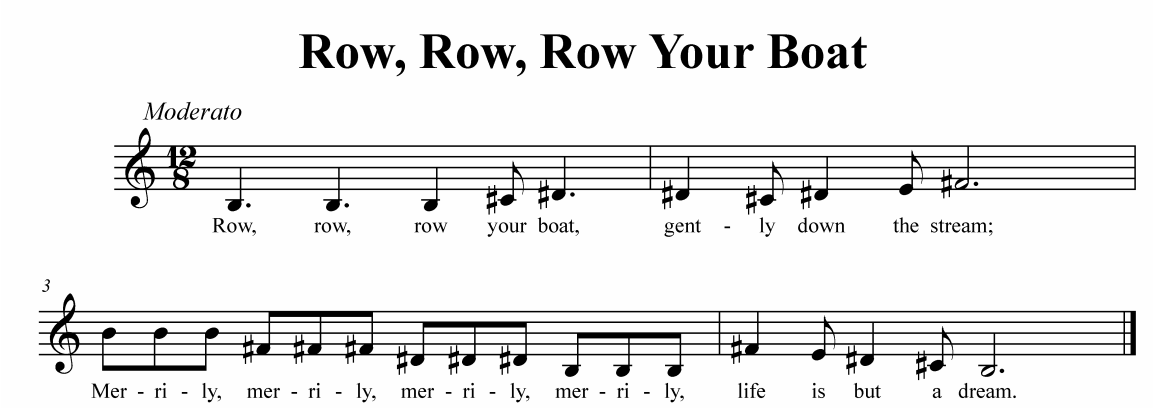


Figure: Row, Row, Row Your Boat

Notice that it is a little difficult to read because of all the accidentals. To avoid this, a **key signature** can be used. A key signature is an arrangement of sharps or flats placed between the clef and the meter signature. It indicates to the performer which pitches will be raised or lowered throughout the composition. In "Row, Row Row Your Boat," a key signature could be used instead of accidentals on many of the pitches.

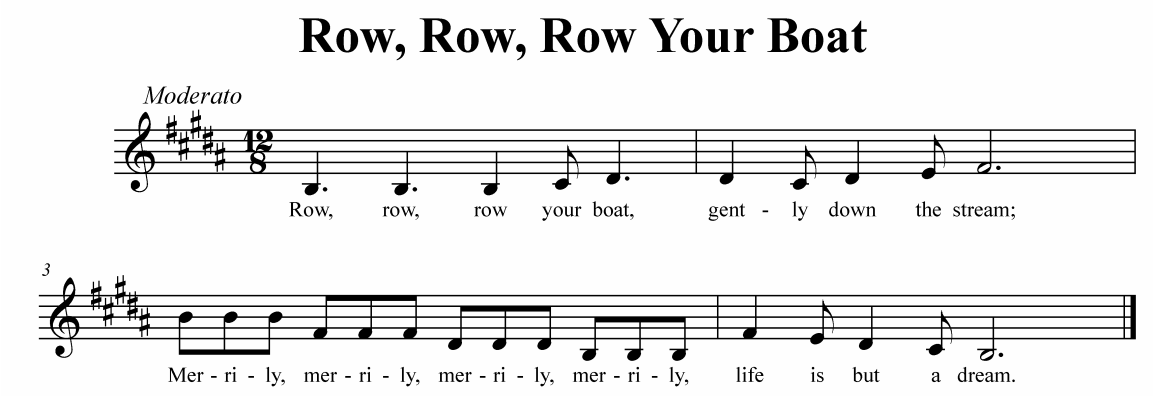


Figure: Row, Row, Row Your Boat, Key Signature

[Before continuing the discussion of key signatures, notice that "Row, Row, Row Your Boat" is in a **compound quadruple** meter signature. Do you see the tempo indicator?]

When a key signature is used, every pitch with the same letter name in affected. This key signature contains F#, C#, G#, D# and A#. Every pitch that is an F, C, G, D or A will be raised by a half step and performed as F#, C#, G#, D# and A#. This is regardless of octave, despite the fact that the # is on the fifth line, F#5. (See, the octave designation does come in handy sometimes!)

In addition to this, and actually more important from a music theory point of view, the key signature tells the musician what scale the composition is based on, or stated slightly differently, what **key** or **tonal center** the composition is based on.

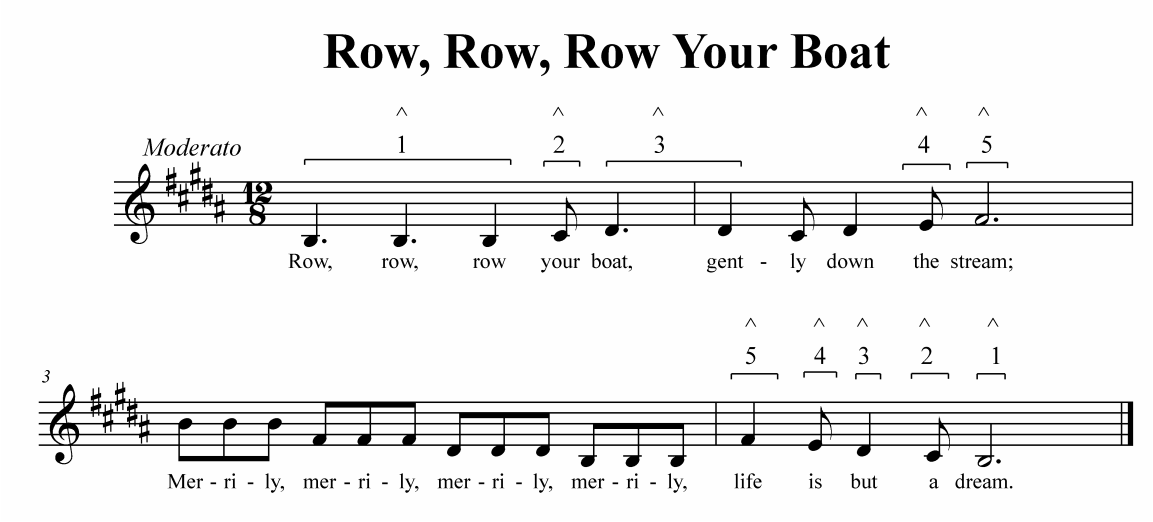
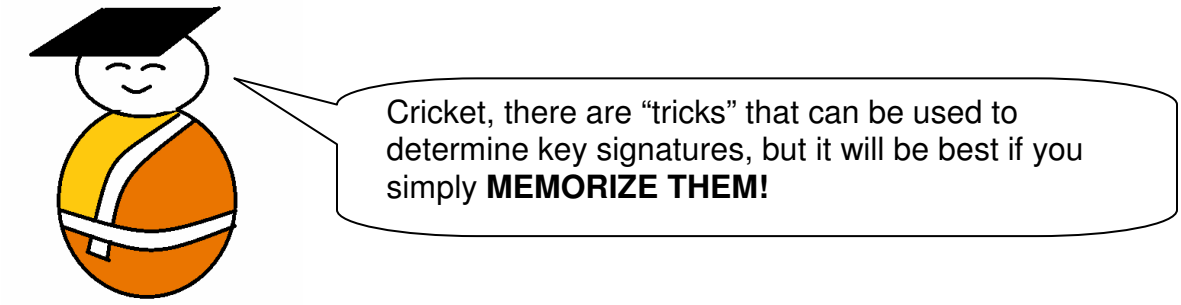
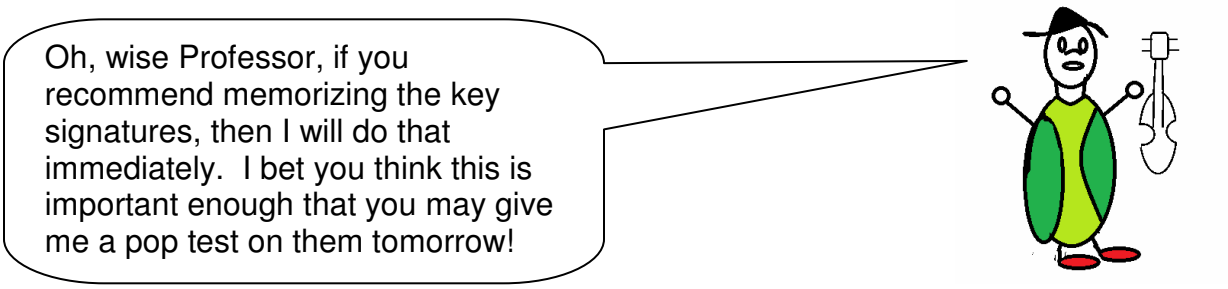
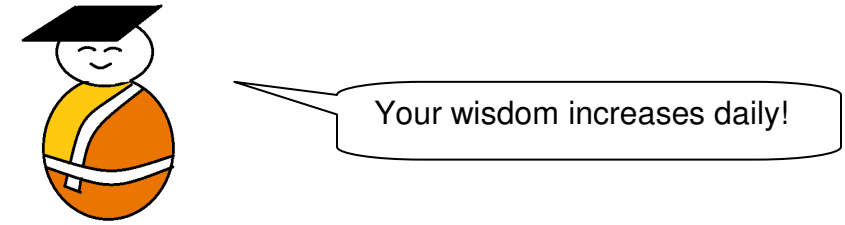


Figure: Row, Row, Row Your Boat, Scale Degrees Highlighted

Here, pitches are bracketed with scale degree numbers placed above. You may notice that B-C#-D#-E-F# are the first five pitches of the B major scale. The tune ends with the same five pitches descending. It seems logical to say this melody is based on the B-major scale, or that it is **in the key of B,** or that the **tonal center is B.** (Get it—scale degree 1 is also called "tonic" which is the "tonal center?") The key signature actually tells us this information. And you are about to find out how!







The order of accidentals in a key signature will ALWAYS be consistent. The order does not change, and the location on the staff (clef dependent) does not change. Musicians "expect" the key signatures to look the same all the time so that they don't have to work extra to determine which pitches are altered.

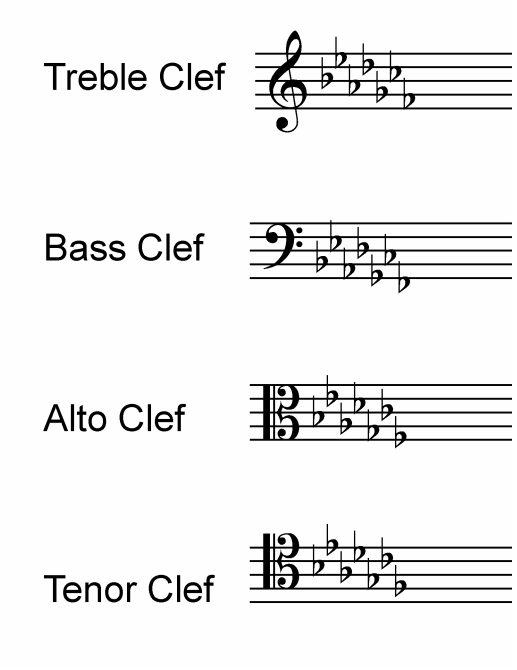
The order of the flats in a key signature will always be:

B E A D G C F

(That is, B-flat, E-flat, A-flat, etc.)

To help remember the order, you may notice the first four spell BEAD, like thrown at Mardi Gras, and the last three, GCF, is often used in math classes for "Greatest Common Factor." Some people make up sentences to help them remember, like, "Battles End And Down Goes Charles' Father." Or, make up your own, like, "Bald Eagles And Dogs Go Chasing Footballs."

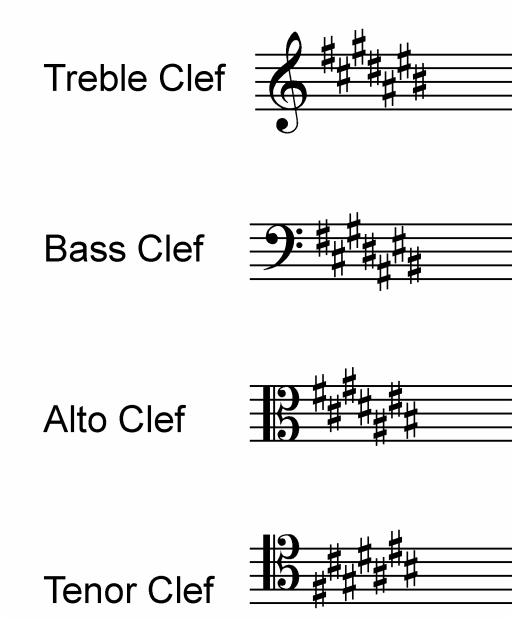
The location of all seven flats, on all four clefs, is shown below. If less than seven are needed, simply stop adding them! The location will be the same.



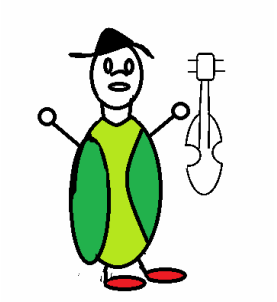
Similar to the order of the flats, the order of the sharps in a key signature will also always be the same, and that is:

F C G D A E B

(That is, F-sharp, C-sharp, etc.)



You should note that the placement of sharps on tenor clef LOOKS different from the other clefs, but the order is still F# C# G# D# A# E# B#!

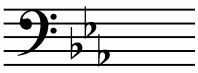


Professor! I don't know if anyone has ever noticed, but the order of the sharps is simply the reverse of the order of the flats!

Incredible insight! You are correct. If you memorize the accidentals in one direction, say flats, then you have in essence memorized the order of the sharps also!

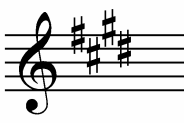
Flats→B E A D G C F←Sharps

Until you have memorized the key signatures, there are "tricks" to determine the major key from the key signature. If the key signature contains flats, *the next to the last flat in the series is the name of the key*. In the Figure below, the key signature has three flats, Bb, Eb, and Ab. E-flat is the next to the last flat, so E-flat is the name of the key and the first note of the major scale with that key signature.



E-flat Major

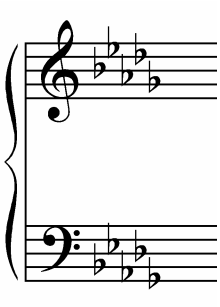
To determine keys with sharps in the key signature, it helps to be fluent with scales. *The last sharp in the key signature is the "leading tone" which is a half step below the tonic pitch, or the name of the key.* If there are four sharps, F#, C#, G#, D#, then the last sharp is D# and a half step higher is "E" which is the major scale with four sharps. D# is the leading tone in the E major scale.



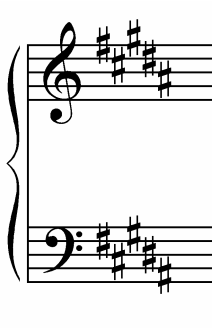
E major

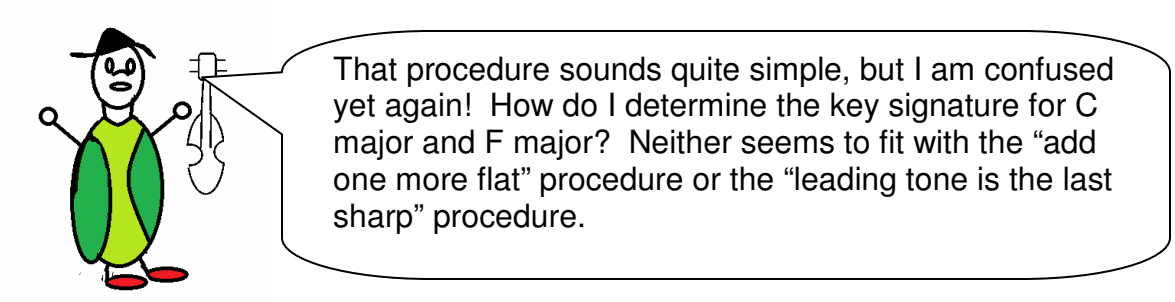
If you haven't memorized the key signatures yet and are asked to give the number of flats or sharps given the name of the key, the process is essentially reversed.

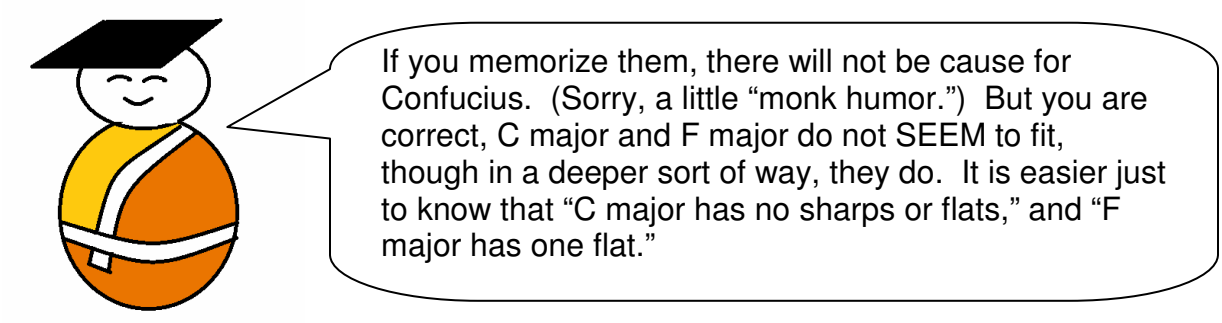
A key with "flat" in its name will have one extra flat added beyond the name. So, for Db major, Db is the fourth flat in the series, Bb-Eb-Ab-Db, add one more flat, Gb. The key signature will have five flats, one more than the name of the key.



The name of a sharp key will represent (of course) the tonic pitch, scale degree 1, so move down a half step—be certain to change letter names—to the leading tone. That pitch will be the last sharp in the key signature. B major has A# as the leading tone, so A# is the last sharp in the series. F#-C#-G#-D#-A#, five total sharps in the key of B major.







Below are all the major key signatures with the scales or keys they represent. Notice the number of accidentals in each scale (don’t count the accidental on the tonic pitch twice) and see that it matches the number in the key signature.

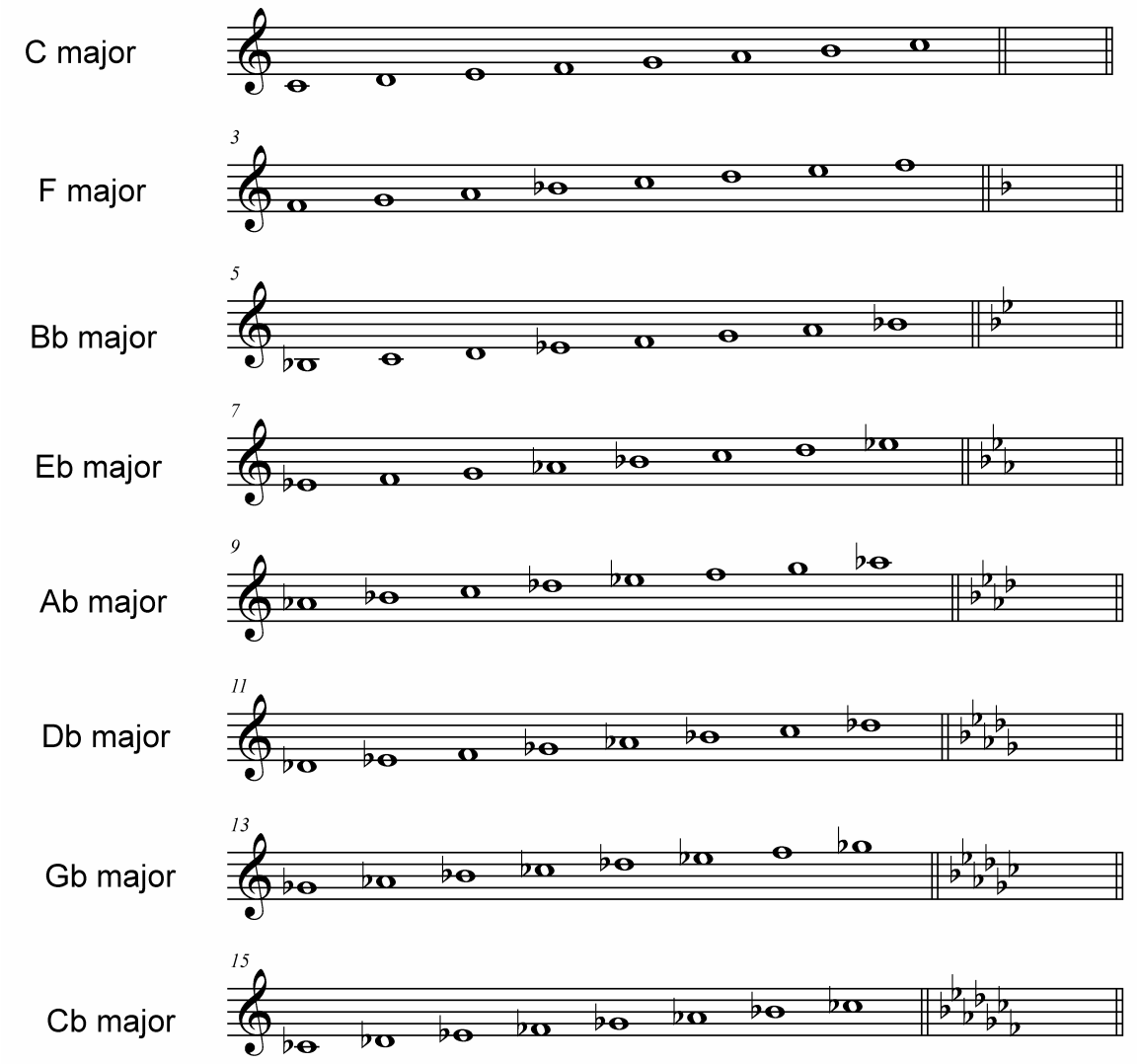


Figure: All scales with flats with the corresponding Key Signature

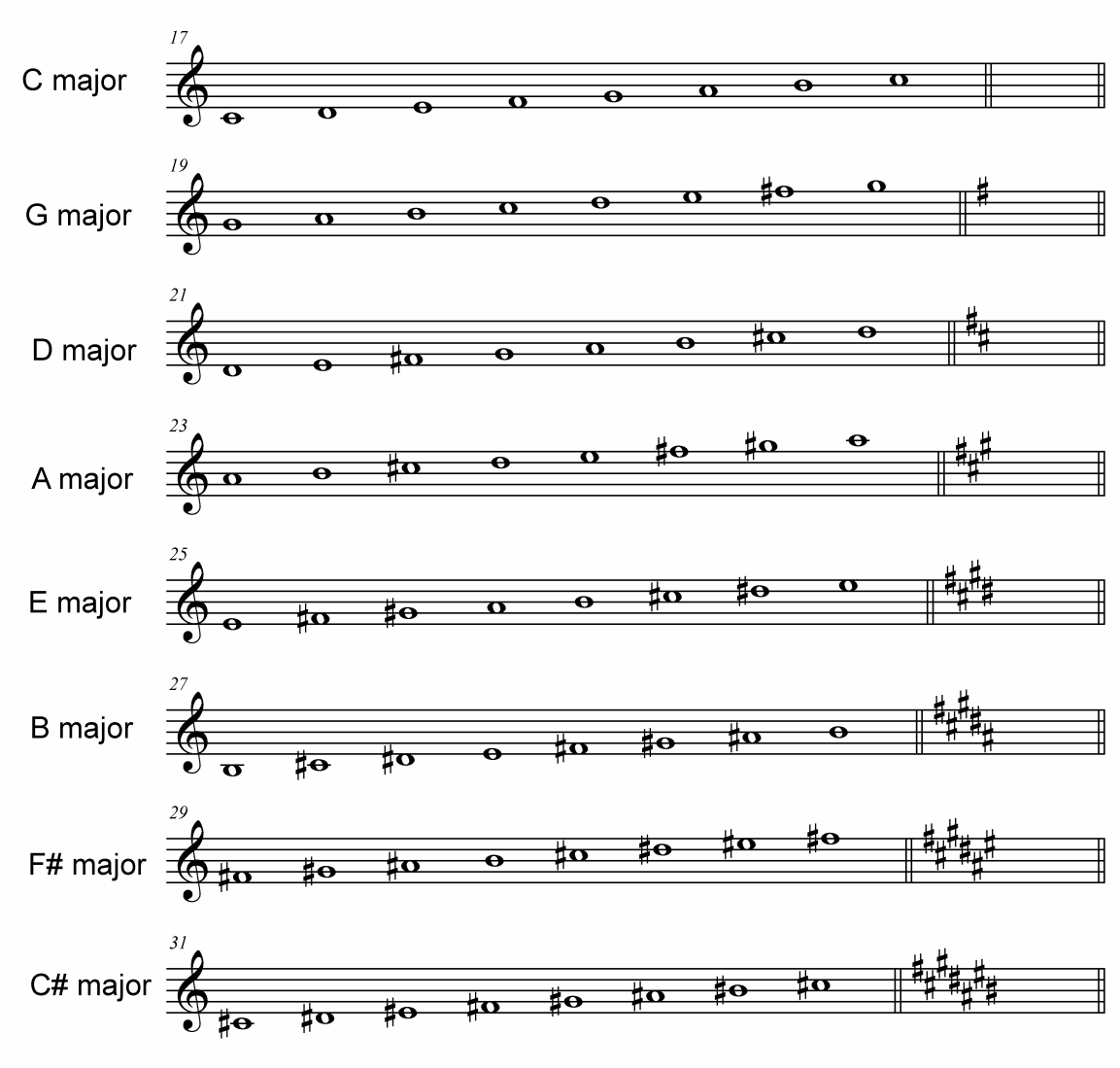


Figure: All scales with flats with the corresponding Key Signature

(Exercises for Key Signatures will be after Lesson 19, The Circle of Fifths.)

Lesson 19: Circle of fifths/fourths

The **Circle of Fifths** is an extremely useful tool for learning key signatures. It also shows many other relationships in music that are beyond the scope of this book. Thinking of the circle of fifths as a clock face, C major is shown at 12 o'clock. C major scale has no accidentals. If you ascend 5 steps in the C major scale, you will land on G. The key signature for G major is shown at 1 o'clock, with one sharp. That process repeats. Using the G major scale, ascend 5 steps and land on D. The key for D major has 2 sharps. And continue repeating…

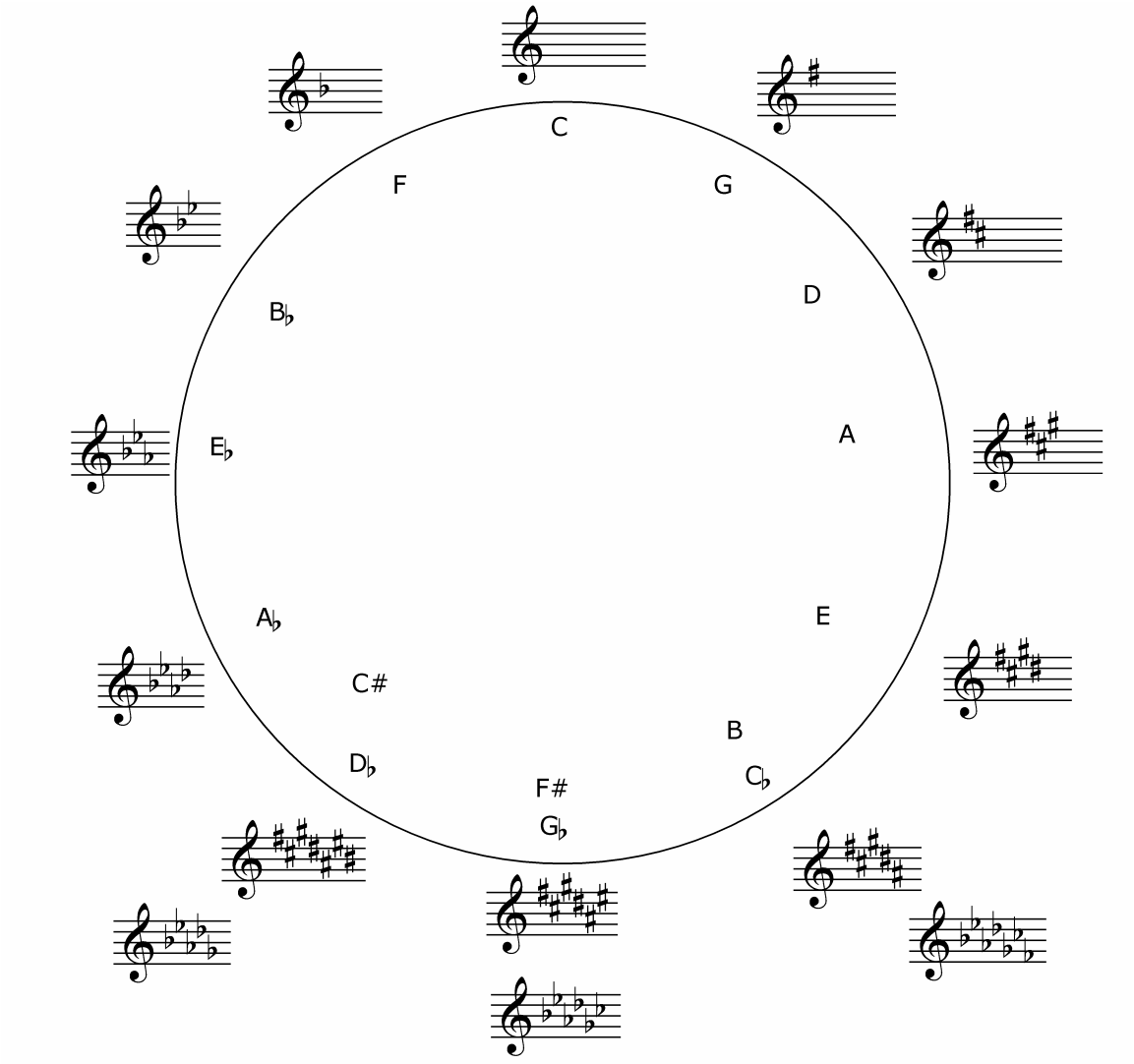


Figure: Circle of Fifths

One of many interesting facts about the circle of fifths is that it is indeed a circle. Notice at the 5, 6 and 7 o'clock hours, two different keys are listed. You should also notice that these keys (pitches) are enharmonically equivalent. Thus, at 5, 6

and 7 o'clock, the circle transforms from sharps to flats by using enharmonic equivalency. By the time F major is reached at the 11 o'clock position, you can go up 5 steps in the scale and return to C major, the original starting point!

Another interesting feature is the order of the flats and the order of the sharps are shown in the circle of fifths also. Notice if you start at Bb (the first flat) the next key signature in the flat direction is Eb, which is the second flat. The pattern continues exactly with the order of flats learned in Lesson 17.

The sharps are also shown, though the "sharp" is missing. If you start at F, and take away a flat—which is the same musically as adding a sharp—the next key is C. Yes, the second sharp. Add another sharp, and the key is G, the third sharp. And the pattern continues.

(Note: Most theory books have historically shown the sharp keys at 1, 2, 3…o'clock, and the flat keys at 11,10, 9…o'clock. Many jazz musicians prefer what may be called the **circle of fourths,** shown below, where the flats are at 1, 2, 3…o'clock and the sharps are at 11, 10, 9…o'clock. You might call this the circle of *descending* fifths. For me, I prefer the circle of fourths. Music has forward sounding chord changes when moving from C to F to Bb, etc, and since my wristwatch shows forward motion in time as clockwise, it just makes more sense to me.)

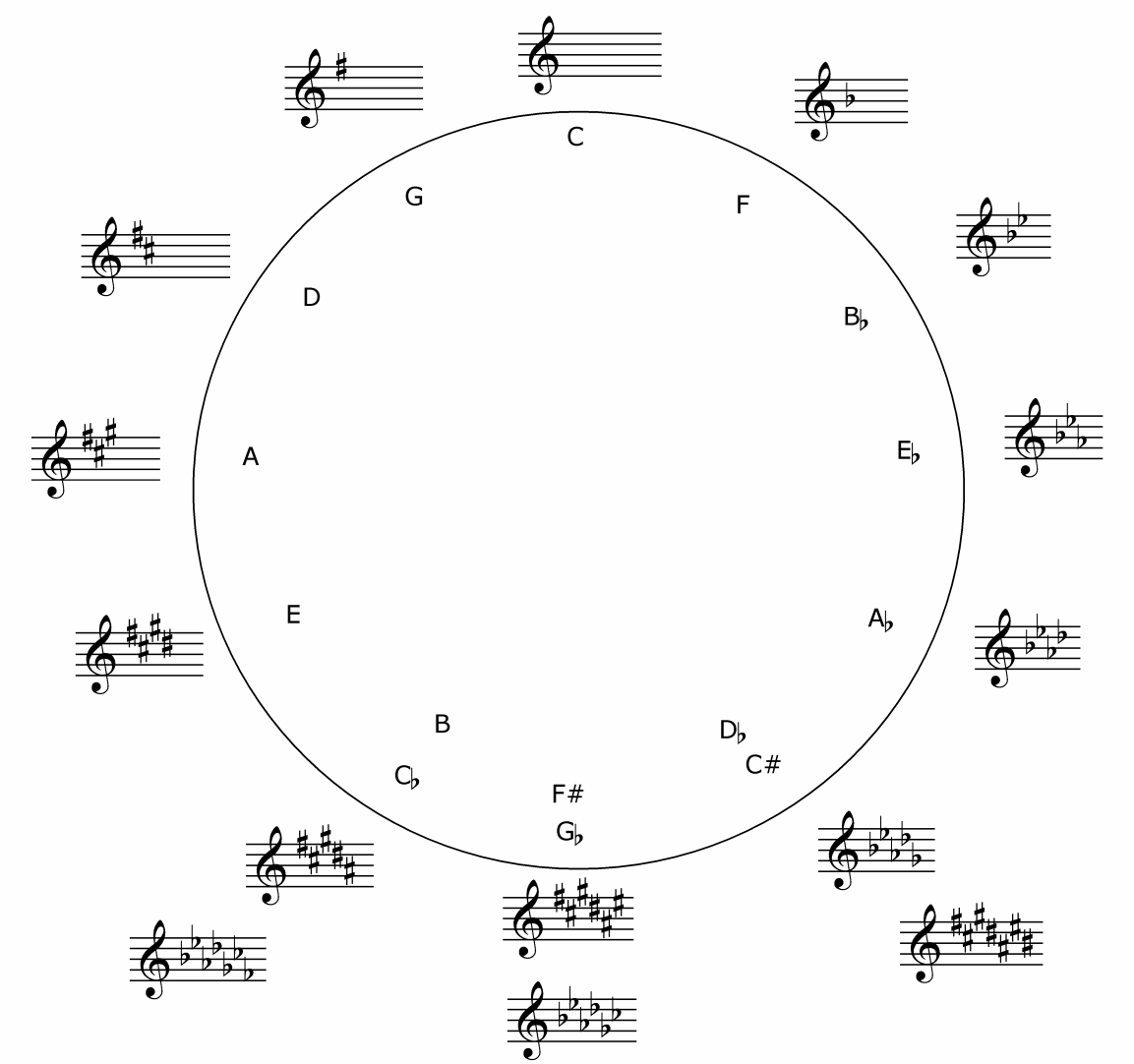
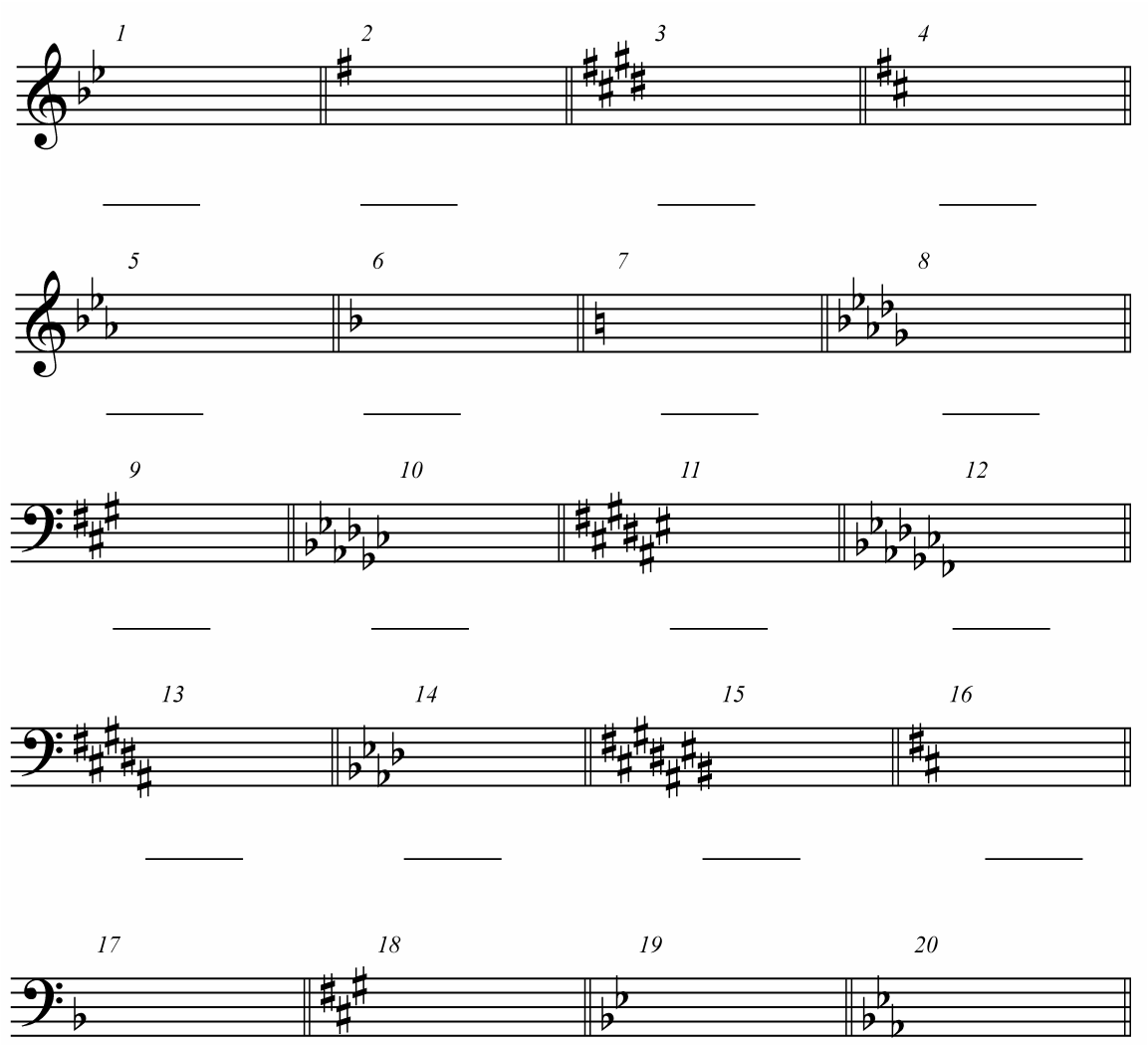


Figure: Circle of Fourths (Descending Fifths)

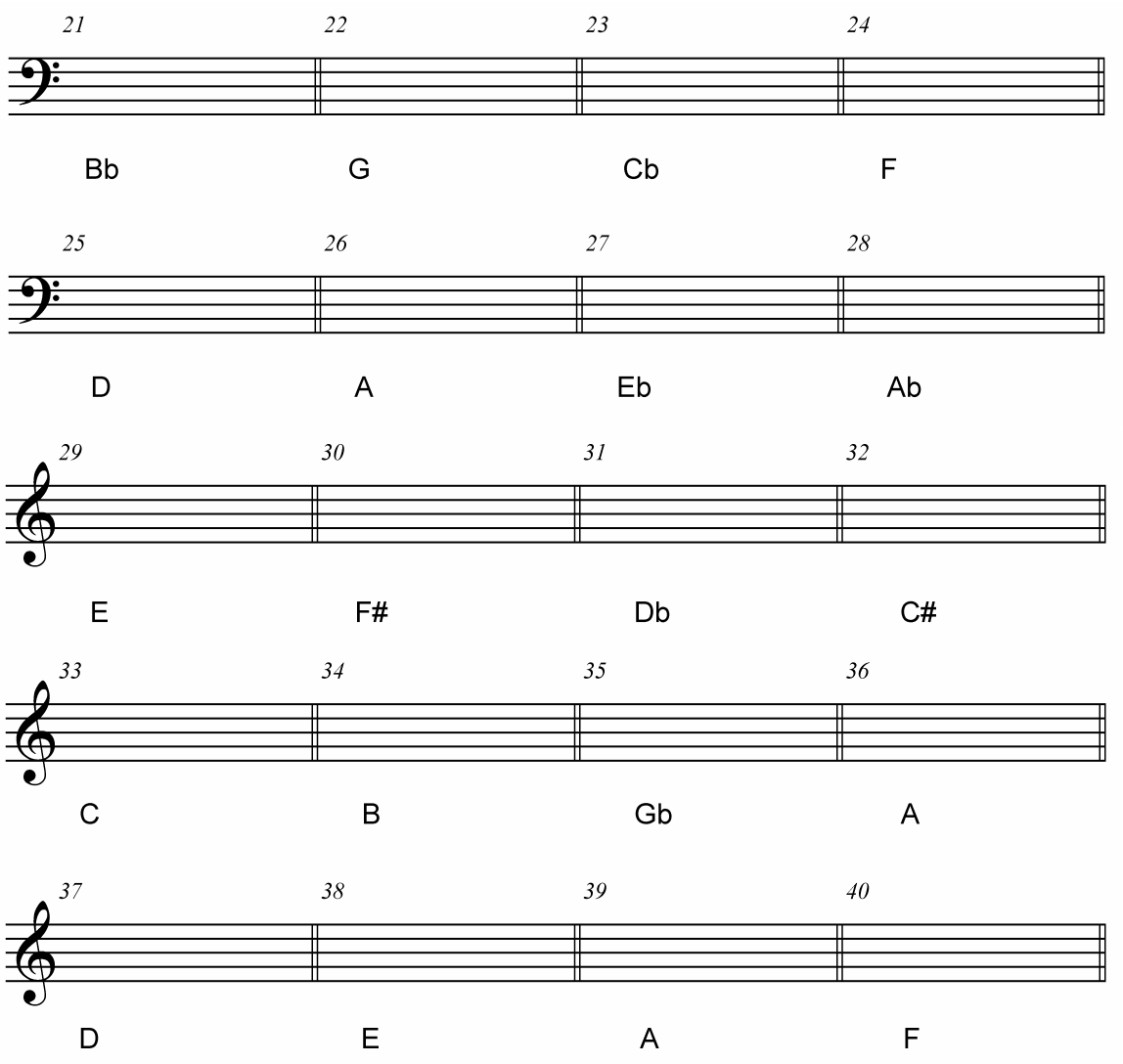
Identifying Key Signatures (1) Name _____

Please identify the following major key signatures.



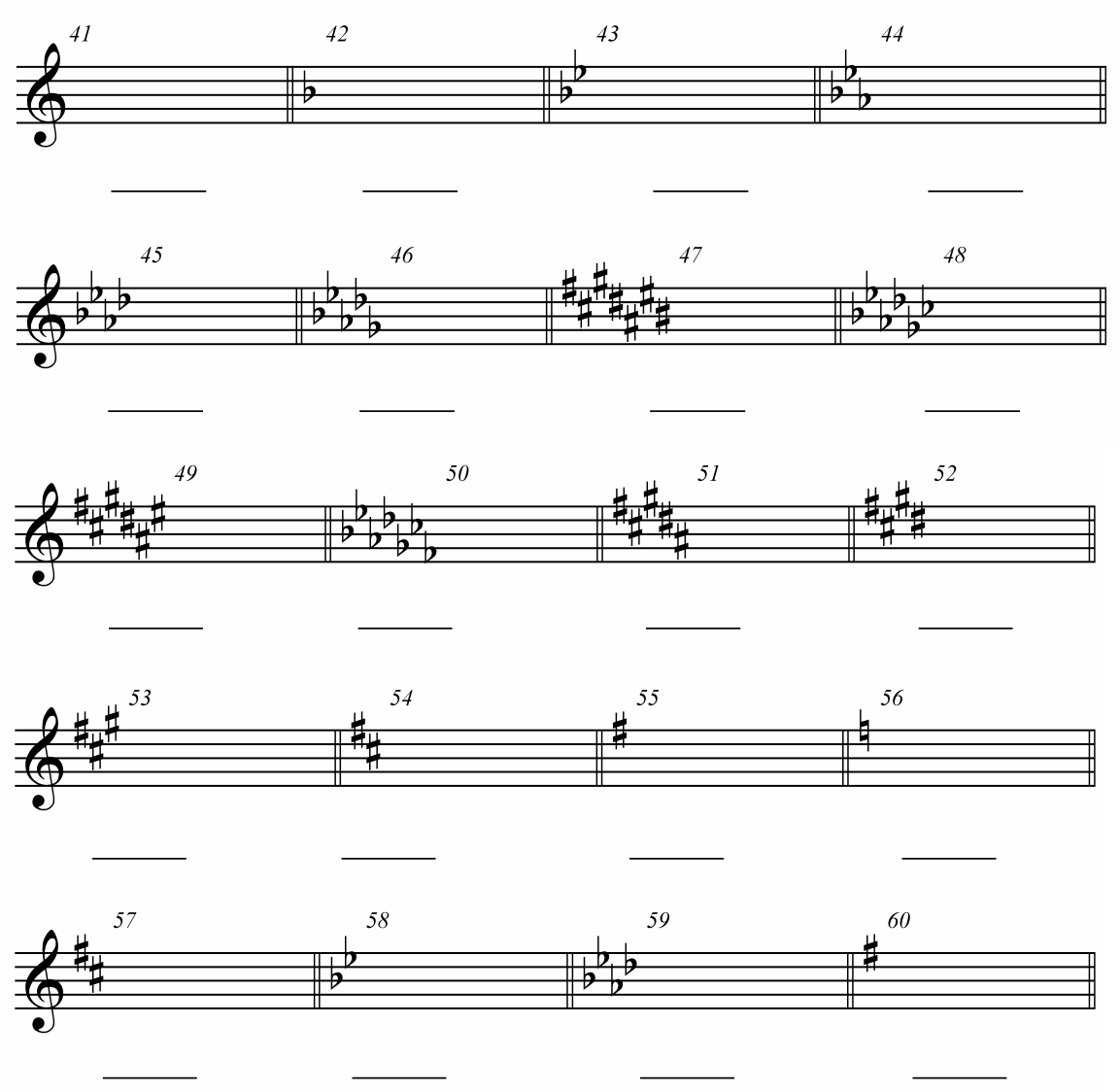
Writing Key Signatures (1) Name _____

Please write the following major key signatures.



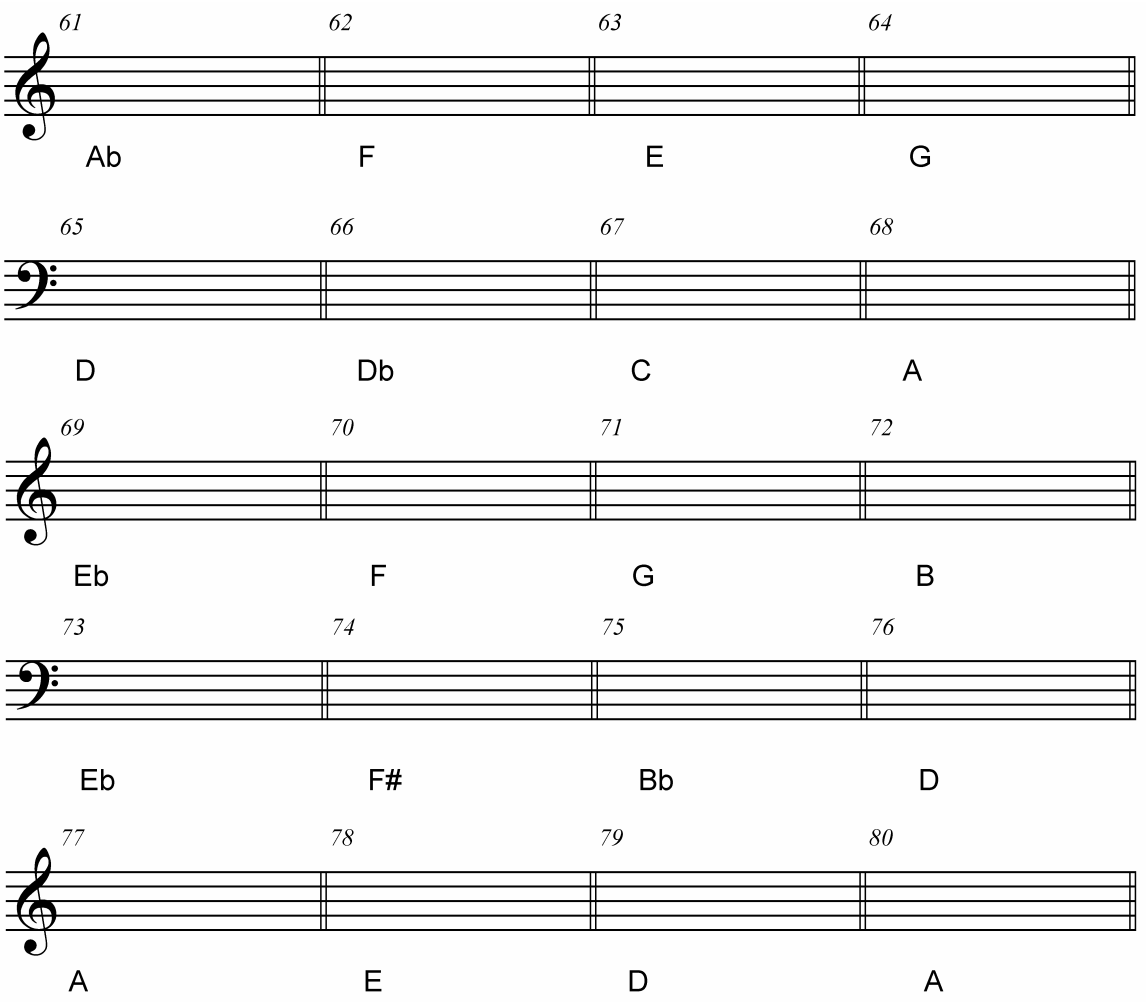
Identifying Key Signatures (2) Name _____

Please identify the following major key signatures.



Writing Key Signatures (2) Name _____

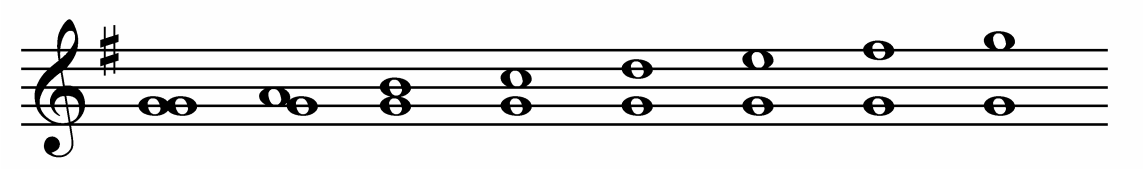
Please write the following major key signatures.



Lesson 20: Intervals

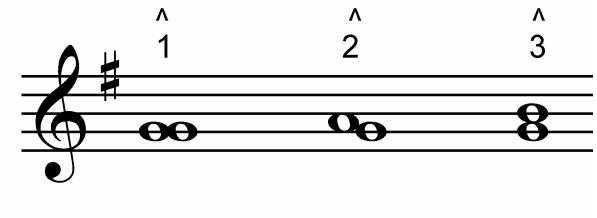
An interval is a spacing or distance between two things. It may be a time span, like the arrival and departure of an airline flight, or a distance, like mile markers on the interstate. In music, the term **interval** is used to identify the difference between two pitches. Harmonic intervals occur if the pitches are sounded simultaneously. Intervals are said to be melodic when they are sounded sequentially, as in a melody.

Intervals are defined by two traits, **Quantity** and **Quality.** Look at the example below. It shows the G major scale with an "extra" G4 sounding under each pitch of the scale. (The intervals created here are harmonic since they would be played at the same time.)

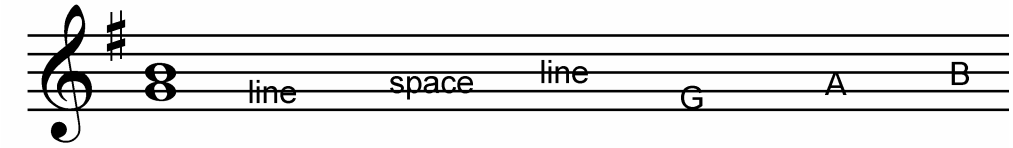


Understanding **quantity** is pretty simple. If the lower pitch is always considered tonic, then the quantity of the interval is simply the scale degree number. Another way to determine quantity is to count the letter names of all pitches from the lower pitch to the upper pitch, inclusive of both. Similarly, counting all lines and spaces, inclusively, will also give the correct quantity.

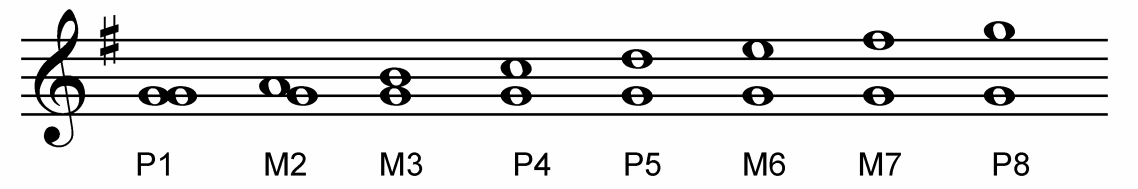
What is the quantity of the interval from G to B? B is scale degree 3 in the G major scale, so the interval is called a "third."

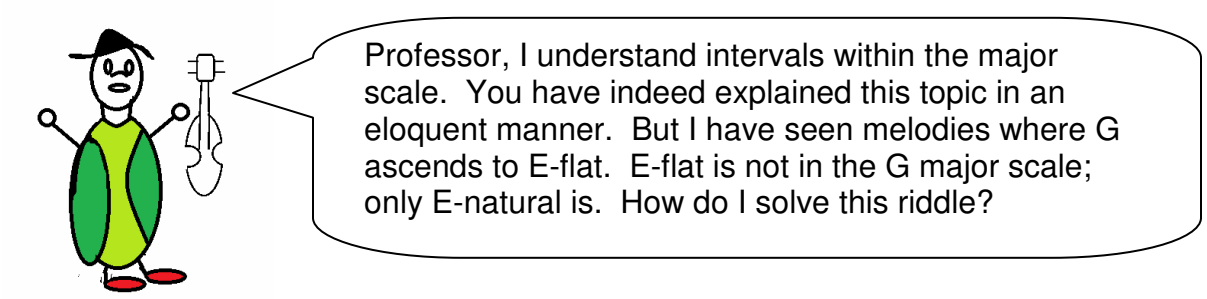


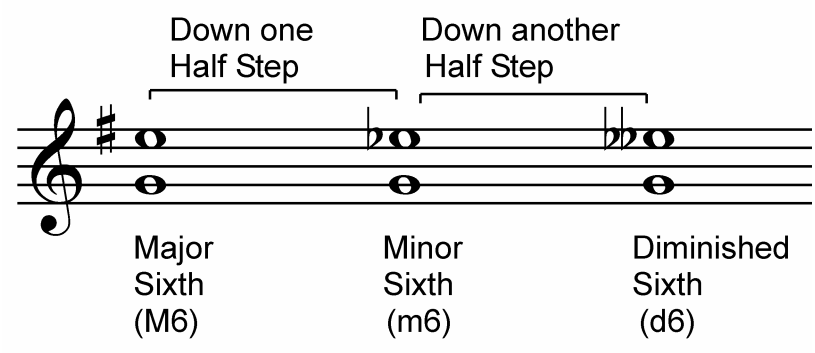
"G to A to B" is 3 letters, so the interval is called a "third." Or "line, space, line" equals 3 staff locations, so the interval is called a "third."

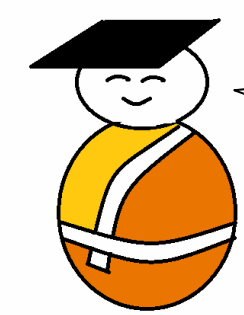


Quality is a bit more complicated. Notice that some intervals are labeled **P** for **Perfect** and others **M** for **Major**. You should see that unisons ("ones"), fourths, fifths and octaves are perfect, and that seconds, thirds, sixths and sevenths are major. Other qualities for these quantities will be discussed very shortly, but knowing this is a great starting point.

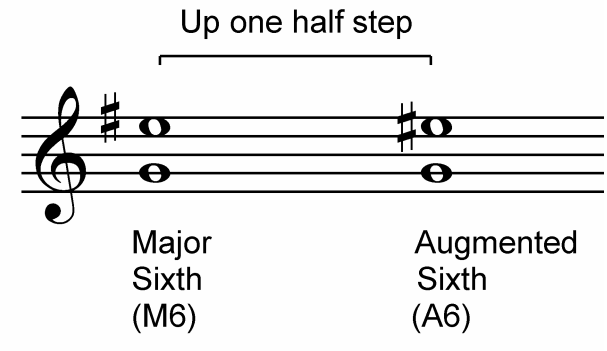


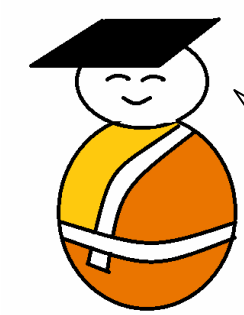






If we return to the major interval, but increase its size by one half step, the quality of the interval is now said to be **augmented.**

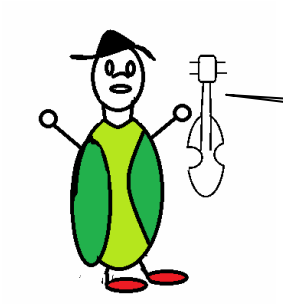




This pattern of starting with a major interval and decreasing its size by one half step to get a minor interval, then decreasing the size of the minor interval to get a diminished interval, or starting with a major interval and increasing it to get an augmented interval works for ANY MAJOR interval—seconds, thirds, sixths or sevenths (and even the compound versions of these, which will be a later topic!)

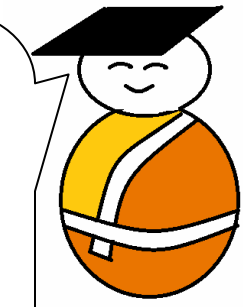
Major Interval + half step = Augmented
Major Interval – half step = Minor
Minor Interval – half step = Diminished

-half step -half step +half step
Diminished ←----------Minor←----------**Major**----------→Augmented

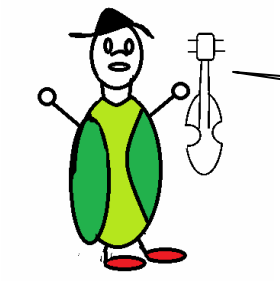


Wow that is easy to understand. Does the same procedure work for perfect intervals?

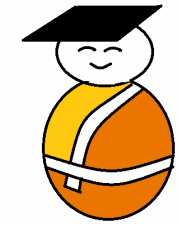
Yet again, you have amazed me with your insight and growing wisdom. The procedure is similar, but the results are slightly different. Perfect intervals can be increased by one half step to become **augmented**, or decreased by one half step to become **diminished**.



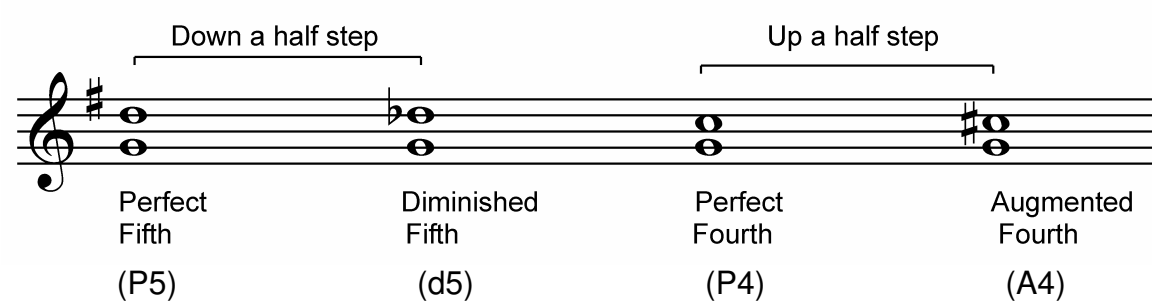
Seconds, thirds, sixths and sevenths will only be major, minor, augmented or diminished (NEVER perfect.) Unisons, fourths, fifths and octaves will only be perfect, augmented or diminished (NEVER major or minor.)



That sounds like a great “trick question” that theory teachers could surprise students with!



You again prove your wisdom continually increases!



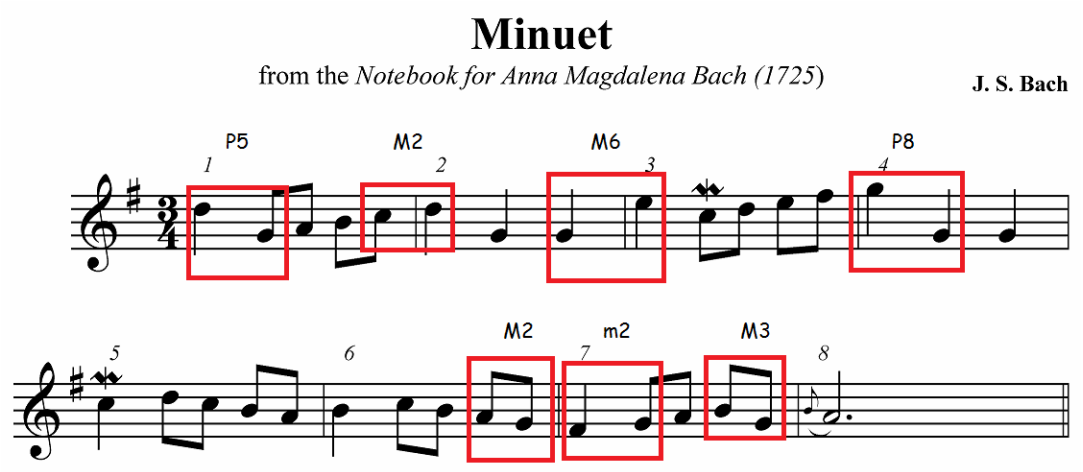
Perfect Interval – half step = Diminished
Perfect Interval + half step = Augmented

-half step +half step
Diminished ←----------**Perfect**----------→Augmented

Though these labels have already been used in this lesson, note that the normal convention for labeling intervals is:

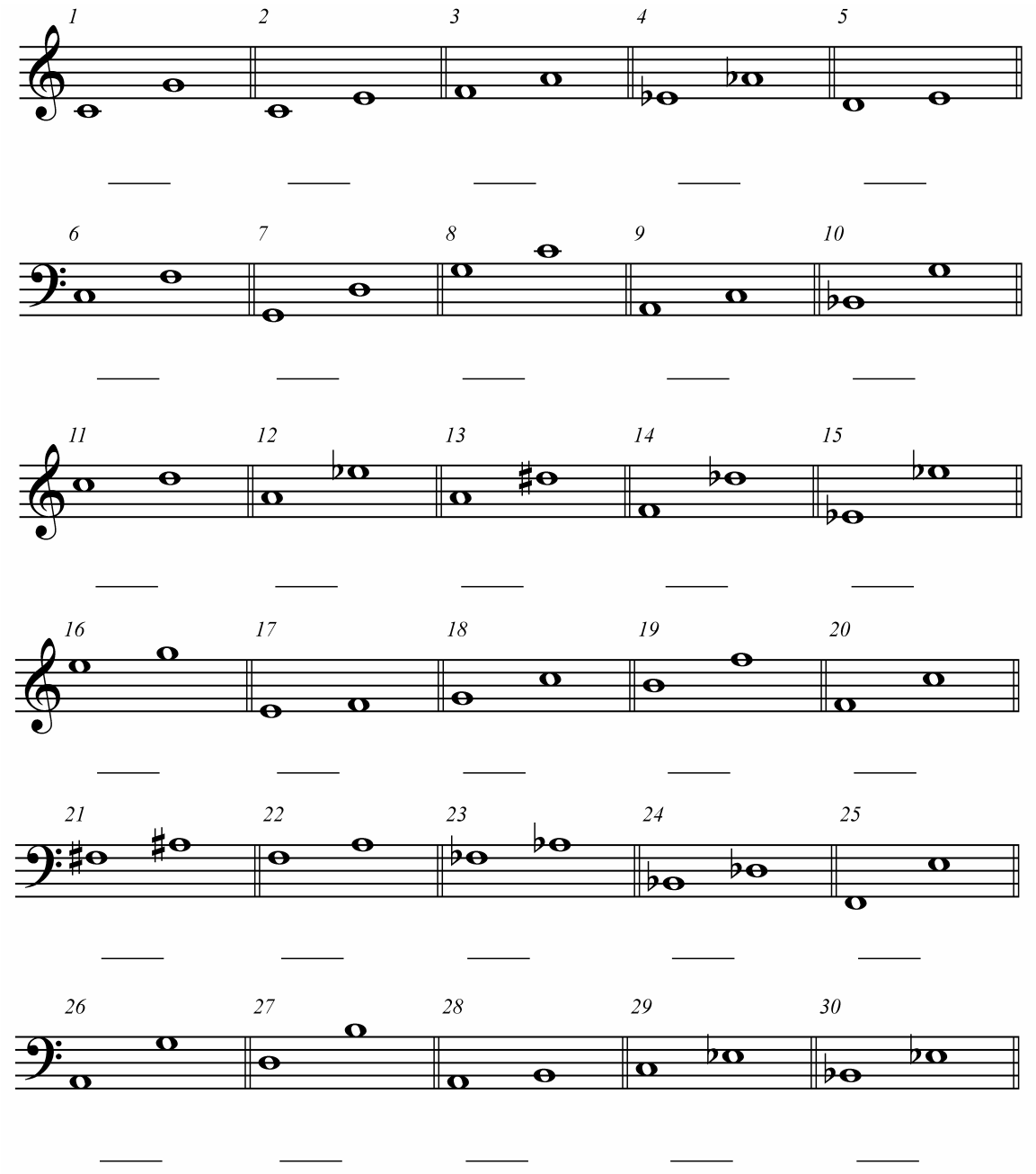
- Major intervals—capital "M" plus the quantity: M2 or M6
- Minor intervals—lower case "m" plus the quantity: m3 or m7
- Perfect intervals—capital "P" with the quantity: P5 or P8
- Diminished intervals—lower case "d" with the quantity: d3 or d5
- Augmented intervals—capital "A" with the quantity: A4 or A6

Below is the melody (right hand) of Bach's Minuet in G that was shown in Lesson 15. Selected melodic intervals are labeled. Would you be able to determine these intervals? Remember, always start with the lower pitch as tonic, not the name of the key!



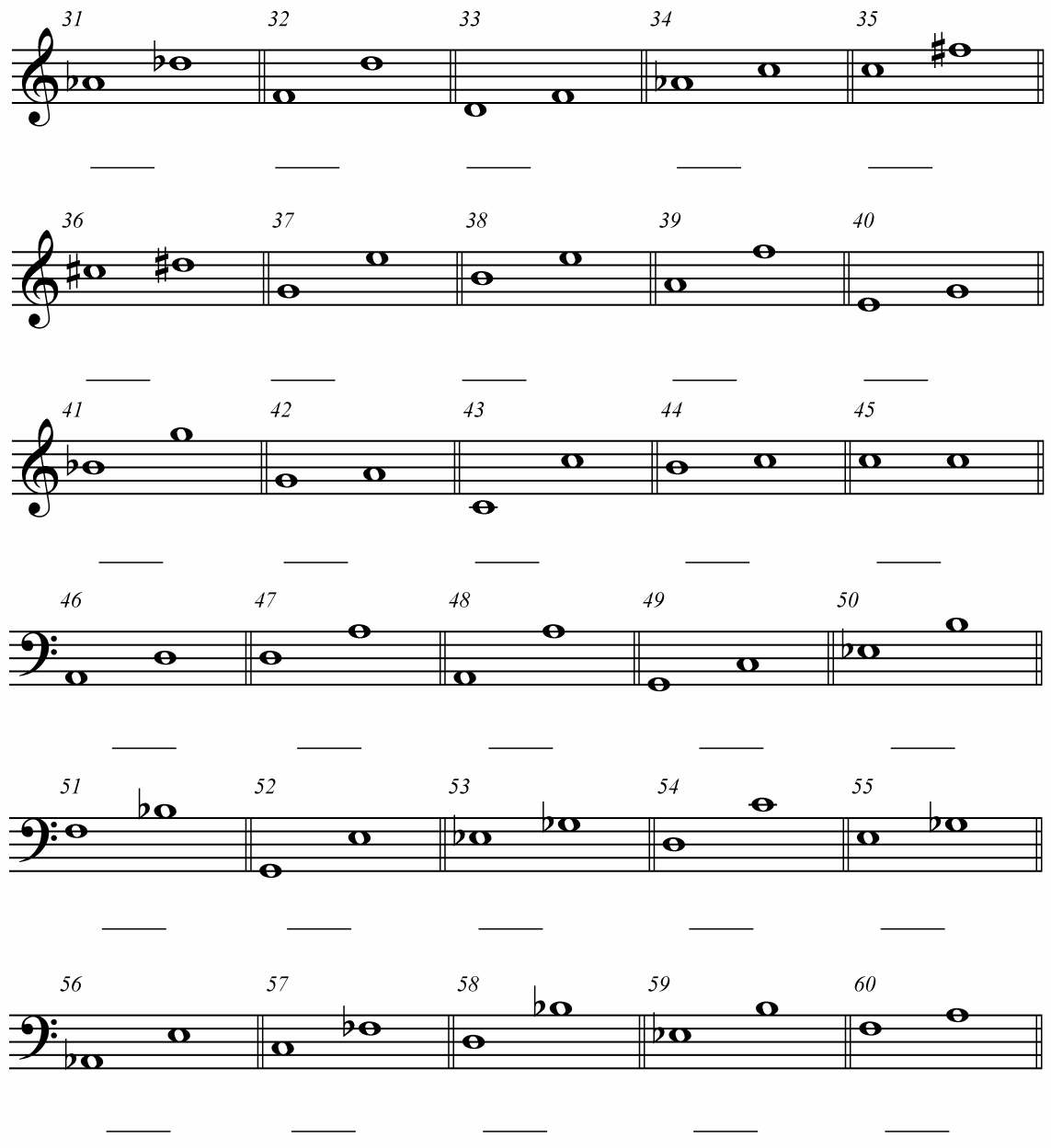
Identifying Intervals (1) Name _____

Please identify the following intervals.



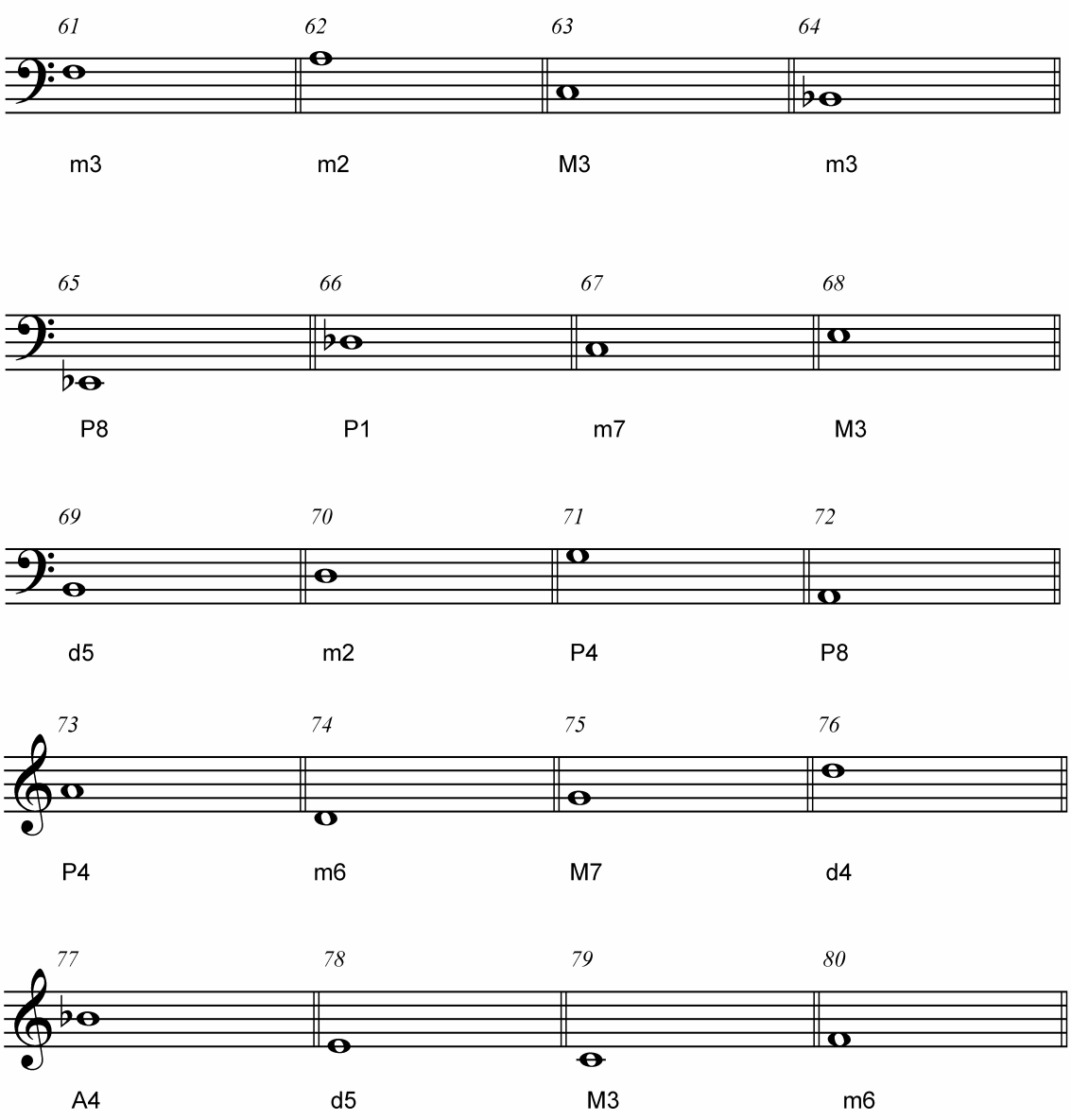
Identifying Intervals (2) Name _____

Please identify the following intervals.



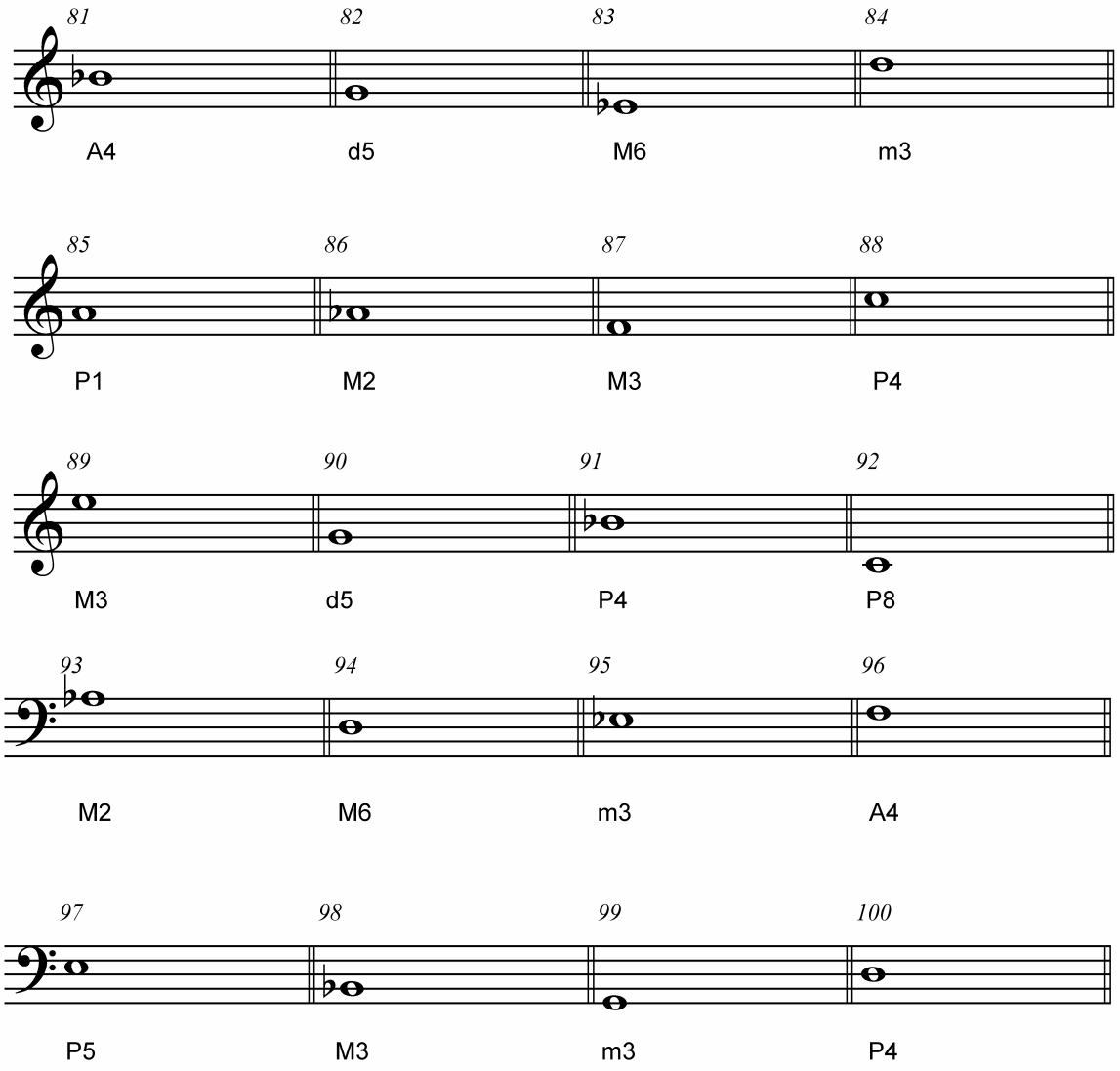
Writing Intervals (1) Name _____

Please write the following intervals from the given pitch.

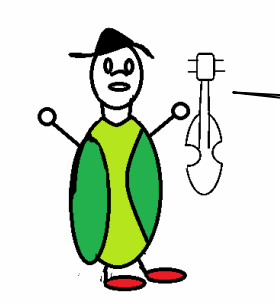


Writing Intervals (2) Name _____

Please write the following intervals from the given pitch.

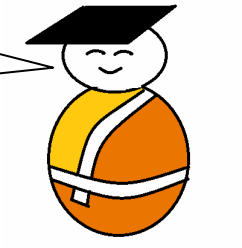


Lesson 21: Consonance and Dissonance



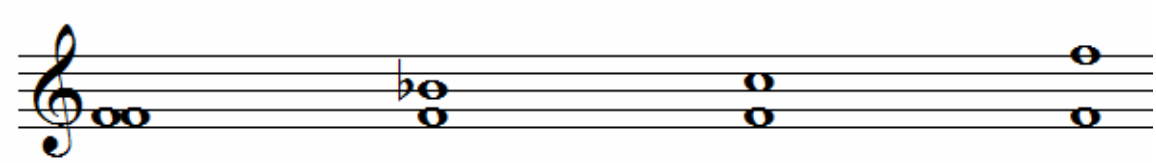
Dear Professor, may I inquire why some pitches sound unpleasant to me when played together, while others are most pleasing?

Yes, Cricket, you may. Your ears perceive what is known to musicians as “dissonance” and “consonance.”



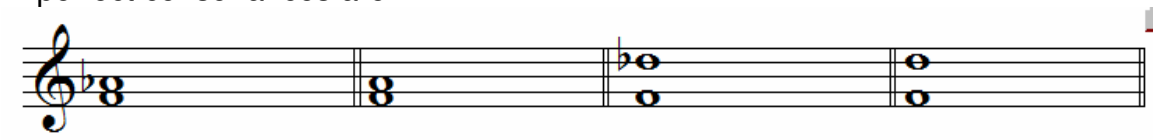
The simultaneous sounding of pitches that is “pleasant” to many listeners is called **consonance**. There are two categories of consonances, Perfect Consonance and Imperfect Consonance.

Intervals that are called perfect consonances are:



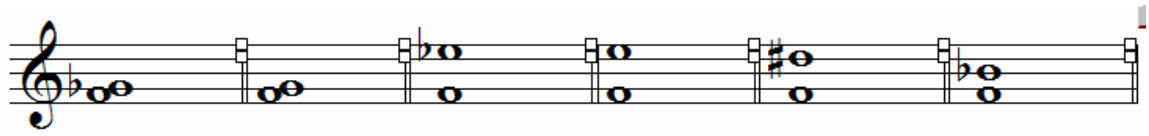
Perfect Unison Perfect Fourth Perfect Fifth Perfect Octave

Imperfect consonances are:



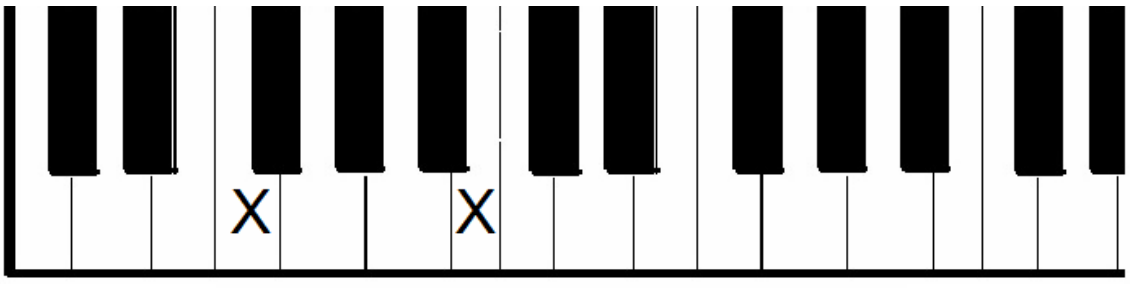
Minor thirds Major thirds Minor sixths Major sixths

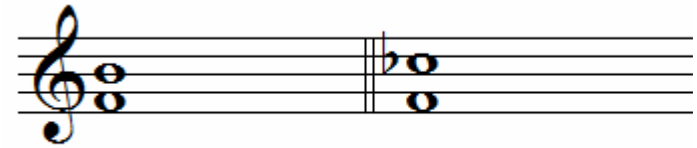
The pitches that seem to create tension, clash or “unpleasant” sounds as Cricket describes are usually considered **dissonance.** (Beware though, just as “beauty is in the eye of the beholder,” highly dissonant music is pleasant to many listeners’ ears.) Dissonant intervals are:



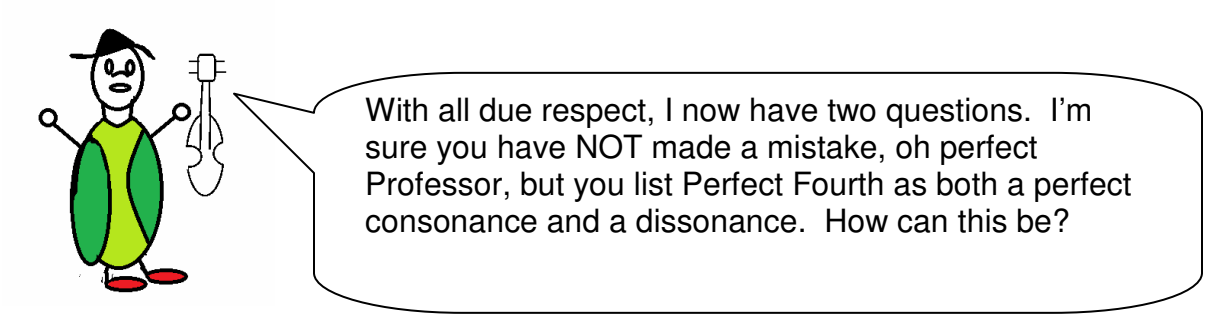
m2 M2 m7 M7 A6 P4

NOTE: The “tritone” is a very important dissonant interval. Depending on the spelling, it can be either A4 or d5.

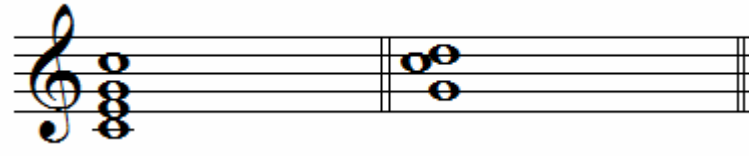




A4 d5

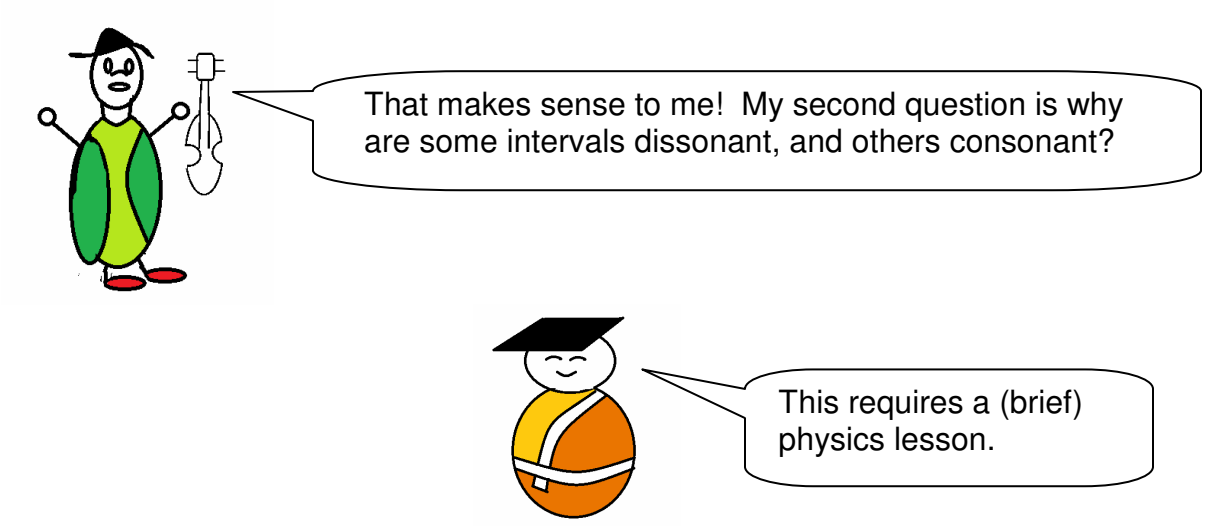


The perfect fourth is an odd interval from this point of view. It is indeed considered a perfect consonance, EXCEPT when it is sounding against the lowest pitch in a chord. (Chords, also known as Triads, come soon.) The P4 has a very unstable, dare I say dissonant, sound in this context and feels to most listeners that some sort of resolution is required. Otherwise, if seems very stable.



Ex. A Ex. B

In both cases, the G4 to C5 is a perfect fourth. The perfect fourth in Ex. A sounds stable, but the perfect fourth in Ex. B, is very unstable.



Think of waves at the beach with peaks and valleys. When two waves are occurring together, sometimes the peaks and valleys will act to intensify each other. When the frequencies intensify each other, it is called constructive interference. Other times, the peaks and valleys may cancel each other. This is called destructive interference. (Have you ever played jump rope and had trouble getting the rope to go just right because the other person wasn't cooperating?) Consonant intervals are created by constructive interference, whereas dissonant sounds are created by destructive interference.

End of Physics Lesson!

In addition to intervals being dissonant, sometimes instruments or singers will be "out of tune." This is essentially the same as dissonance, but usually it isn't done on purpose and is considered "bad musicianship." Out of tune SHOULD be corrected by the musicians, but modern music producers can "auto tune" and correct poor intonation electronically in the mixing studio.

Consonance and Dissonance Name_____

Please answer the following questions.

1. Intervals that are considered perfect consonances are:

2. Major thirds, minor thirds, major sixths and minor sixth are called _____.

3. Dissonant intervals are minor seconds, major seconds, minor sevenths, major sevenths, any intervals with _____ or _____as a quality, plus the _____.

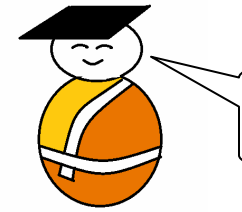
4. The perfect fourth is considered dissonant when it is sounded again the _____.

5. The _____ is a very important dissonance.

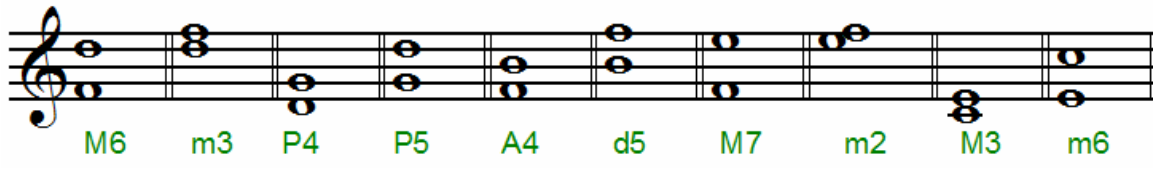
Lesson 22: Inverting Intervals

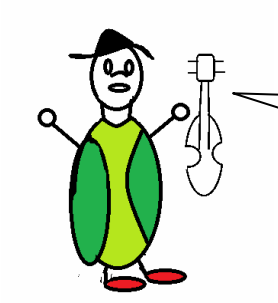
When something is inverted it is turned upside down, or maybe, so that the bottom is on the top.

Intervals can be inverted also! The skill to recognize intervals by quality and quantity is essential to a deeper understanding of music. But, sometimes the number of intervals seems overwhelming, or some are “awkward” because the lower pitch is not a “normal” starting pitch for a major scale, like G#.

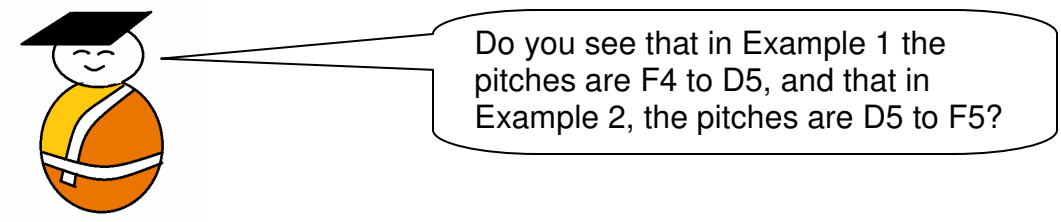


Cricket, observe the following example and see if you notice a pattern.





Eminent Professor, other than each pair of intervals having some of the same pitches, I have to confess that I do not see a pattern.

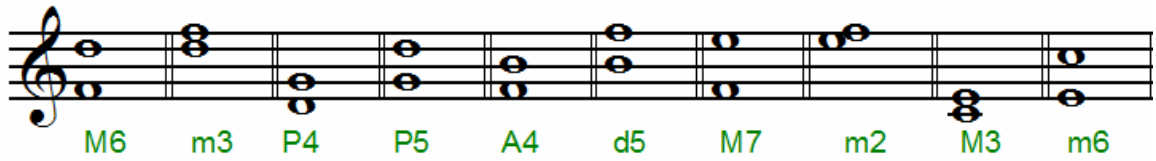


The significance is a "complicated" interval can often be transformed into an "easier to understand" or identify interval by inverting it. Plainly stated, when the lower pitch is moved up an octave, thus becoming the upper pitch, or vice versa, the upper pitch is moved down an octave to become the lower pitch, the interval is said to be "inverted."

There are two pretty cool things that happen when intervals are inverted. The first has to do with quality and the second involves quantity.

Major intervals invert and become minor intervals.
Minor intervals invert and become major intervals.
Augmented intervals invert and become diminished intervals.
Diminished intervals invert and become augmented intervals.
Perfect intervals remain perfect intervals upon inverting.

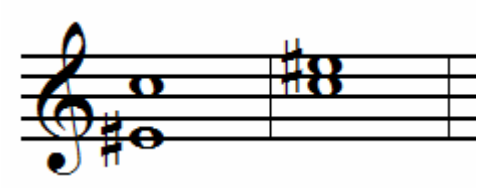
And, the sum of the quantities always equals 9!



Notice that the M6 inverted to become m3, (major became minor) and 6 + 3 = 9.
P4 inverted to P5, (perfect remained perfect) and 4 + 5 = 9.

I think you get the picture!

These facts can make identifying an interval such as the one below much easier.

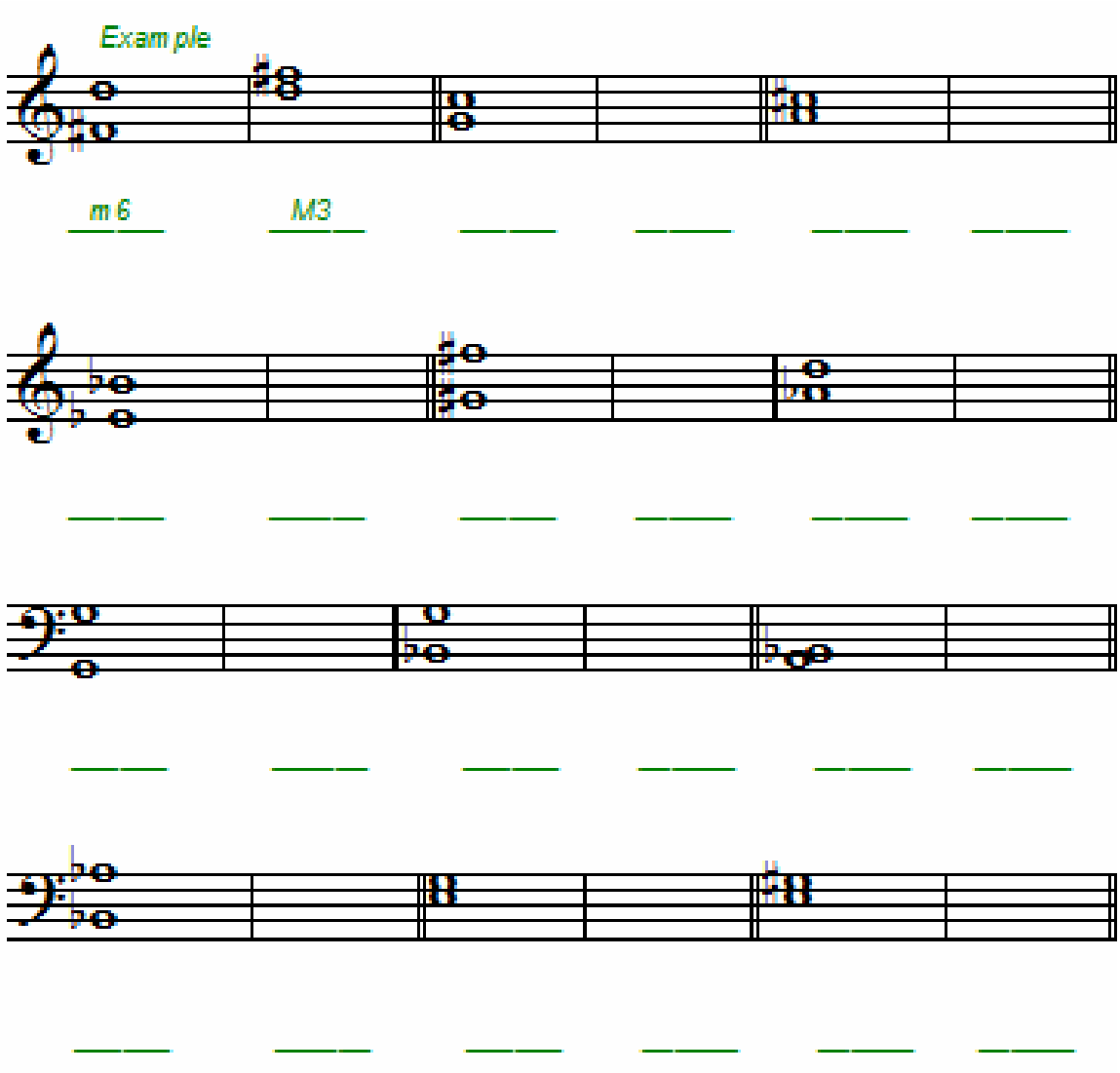


Interval??? Invert!!!

Nobody wants to deal with the E# major scale; at least no one I know! But if we invert, C becomes the lower pitch, and the C major scale is very easy to work with. C to E (natural) is a M3. Since the upper pitch is a half step higher than the major third, the interval is identified as an augmented third. (A3) Since augmented intervals will invert to become diminished, and 3 + X = 9, (sorry for the algebra), the original interval is identified as a diminished sixth. (d6)

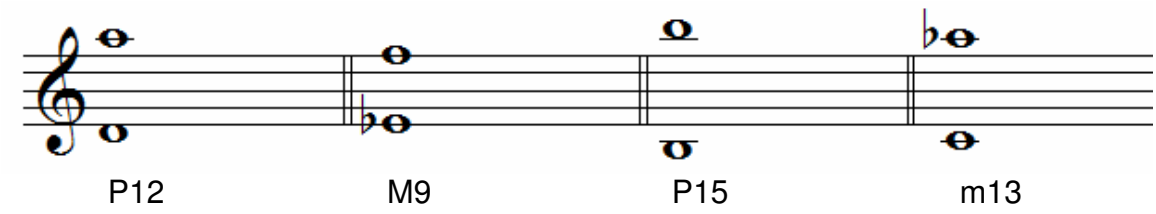
Inverting Intervals Name_____

Please identify the first interval, then invert it and identify the inversion. Note that it might be easier to identify the inverted interval first!

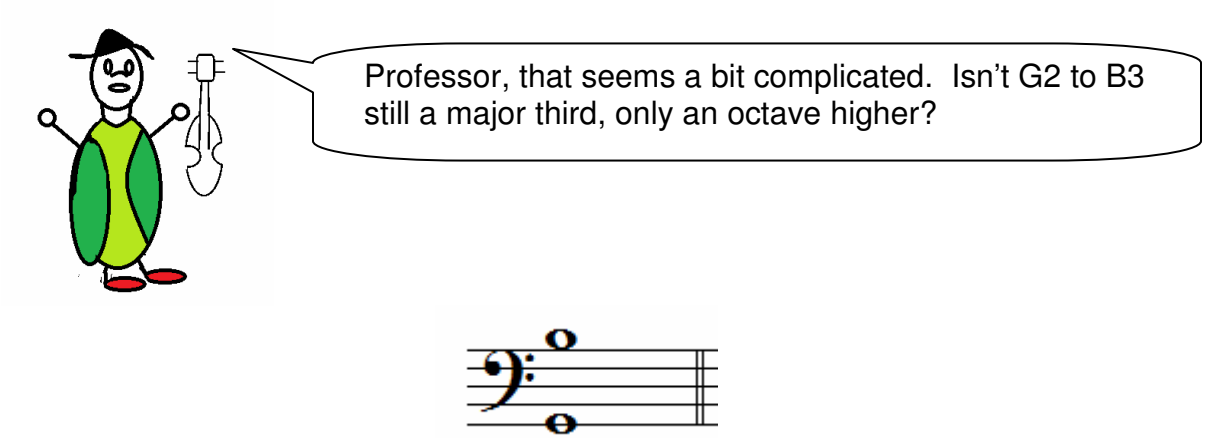


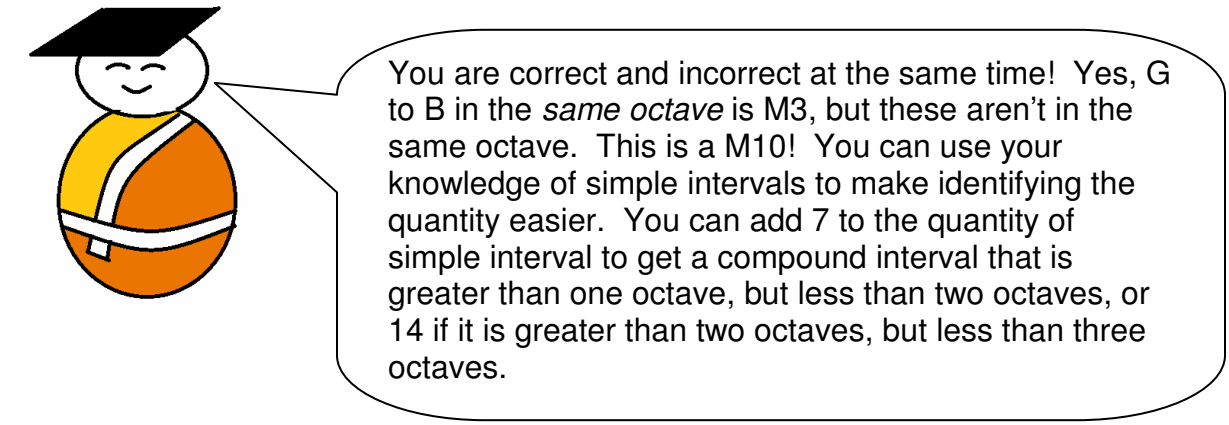
Lesson 23, Compound Intervals

Look at the following Examples. Unlike the intervals considered in Lessons 20-22, these are greater than an octave. Intervals that have quantity of 8 or smaller—like those in Lessons 20-22—are theoretically called **simple intervals.** Intervals that have quantity of 9 or greater (larger than an octave) are called **compound intervals.**

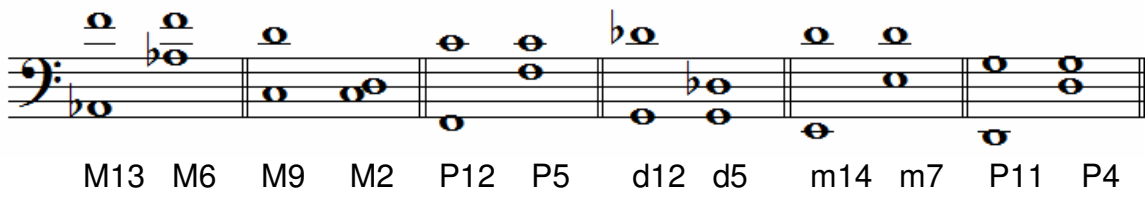


Compound intervals can be identified in the same manner as simple intervals, that is, by counting lines and spaces, or by counting letter names, for the quantity. To determine the quality, check if the upper pitch is contained in the major scale starting on the lower pitch, if it is, it will be major or perfect, if not, determine how many half steps, and in what direction, it is altered to determine if it is minor, diminished or augmented. The only real difference is the quantity will be 9 or higher.





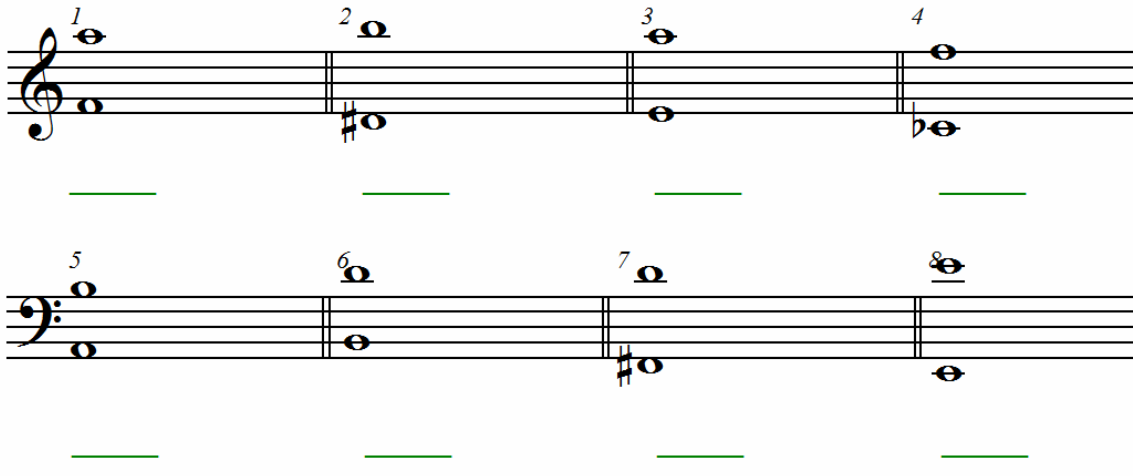
In the examples below, the compound interval is shown first, then its simple interval equivalent. Though the compound interval is not theoretically the same as the simple counterpart, in reality, they will be treated the same—most of the time!



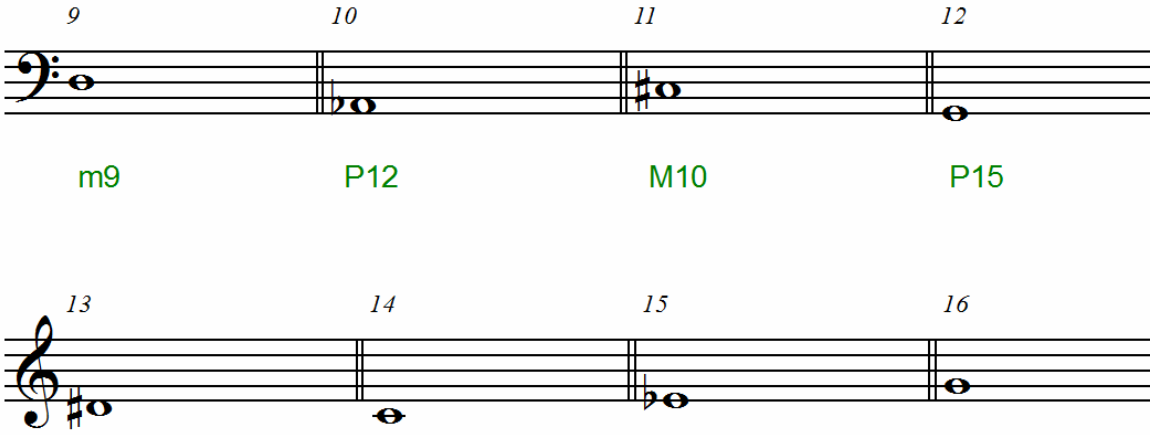
Note that the quality did not change, only the quantity is different by 7.

Easy!

Please identify the following compound intervals.



Please write the compound interval above the given pitch.



m9 P12 M10 P15

m13 M13 A11 m10

Lesson 24, Triads

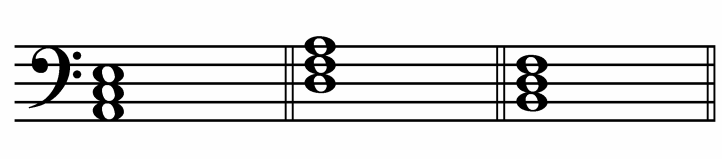
A **triad** is group of three pitches that "belong together." The three pitches might be sounded simultaneously as a single "chord," or they might be played one at a time in an *arpeggio,* the Italian word which means "broken chord."

For this course, a triad will be three pitches that are stacked in thirds. Just as scales and intervals are used to create melodies, triads will be used to supply the harmony that supports these melodies.

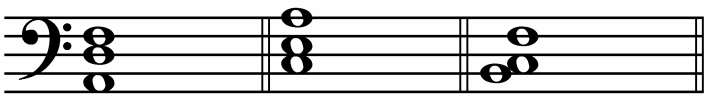
When a triad is in **root position,** it resembles a snowman.

The pitches will be stacked on three ascending lines, or three ascending spaces on the staff.

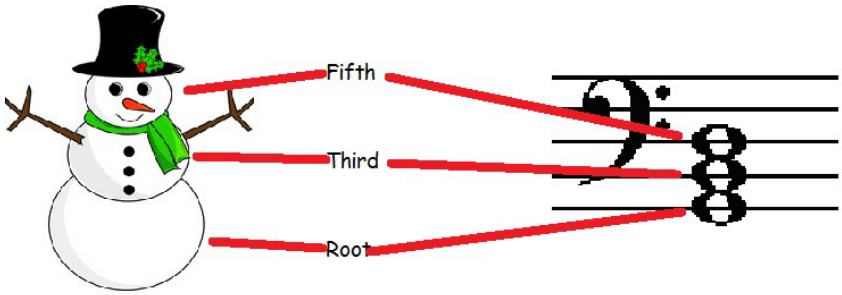
The triads below are in root position.



The triads below are NOT in root position. Notice that the first is "space, line, line." The second is "space, space, line" and that the third is "line, space, line"

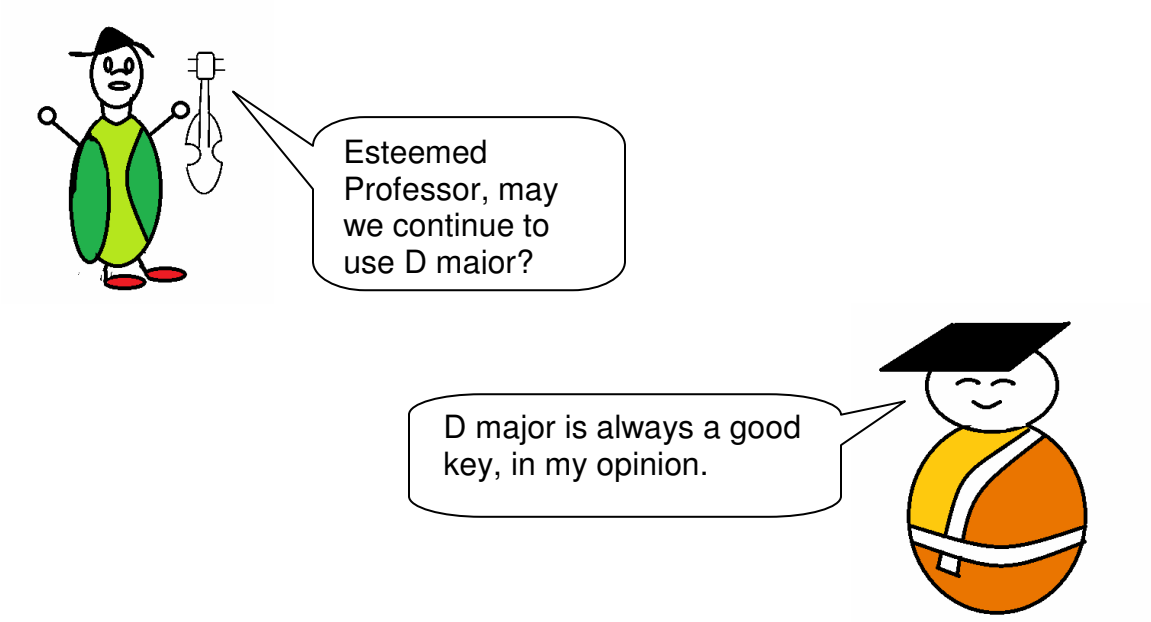


When the triad is written in root position, the lowest pitch is called the **root,** (abbreviated "r") and is the foundation of the rest of the triad. The next pitch up is called the **third**, (abbreviated "3") since it is the interval of a third higher than the root. The upper pitch is called the **fifth** (abbreviated "5") because it is a fifth above the root.



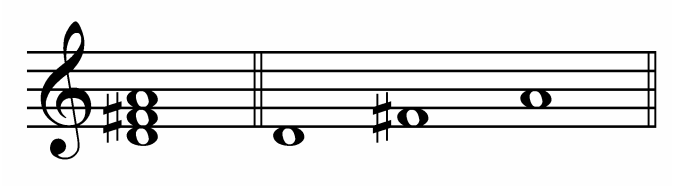
The M3 and m3 are the only thirds used to build triads. Using these, four qualities of triads are possible: major, minor, diminished and augmented. All can be found in music, but in reality, the augmented triad is quite rare.

The major triad will be discussed first. How to build, or how to identify, the major triad will be shown in two ways. The first will be based on your knowledge of major scales, and may be more "practical" when the pitch of the root can be found on the circle of fifths. The second method relies on knowledge of intervals, and is more "theoretical" in that following these procedures will work whether the root is on the circle or not.



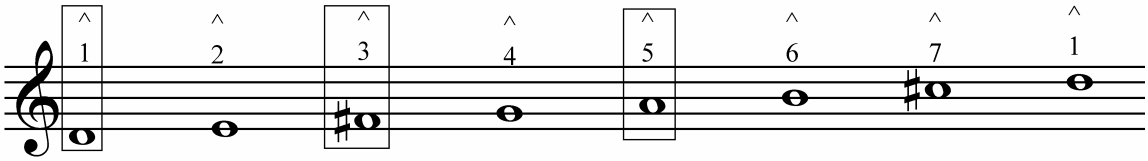
Major Triad

The D major triad is shown below. It is shown vertically with the pitches sounding together, and as an *arpeggio,* where the pitches are sounded one at a time.



Vertically Arpeggiated

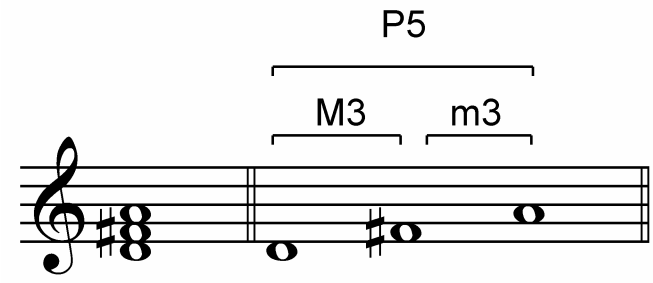
The D major scale is shown below with scale degrees for using the “practical method.” Practically speaking—ha, ha!—if we extract scale degrees 1, 3 and 5, the D major triad is built. It’s kind of convenient that the root is scale degree 1, the third is scale degree 3 and the fifth is scale degree 5.



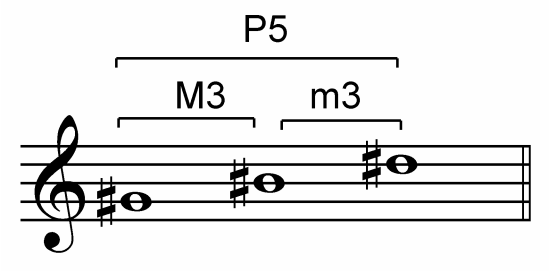
If you have memorized the major scales, then this method will work to spell many major triads (15 to be exact.) And this method can be the first step in spelling the other qualities of triads to be discussed a little later.

But, what if the root is NOT one of the “normal” pitches of the circle of fifths? That’s where the “theoretical” method comes into play.

All major triads have a major third between the root and third, plus a minor third between the third and fifth. The interval from the root to the fifth will always be a perfect fifth for major triads. (Major third on bottom, minor third on top, perfect fifth for outer voices.)

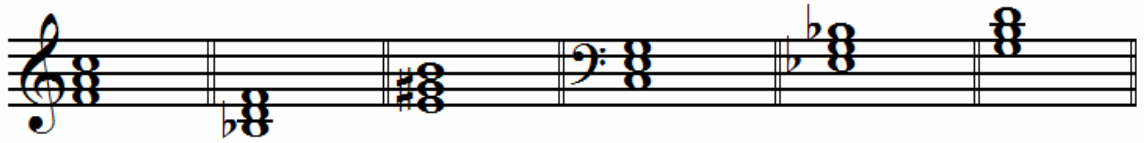


D major is shown above, but if the root was G#--not one of the “normal” pitches in the circle of fifths—then we can use the intervals to correctly construct a major triad.



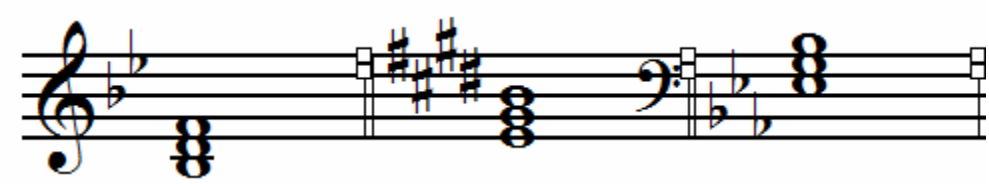
G# major triad

Here are examples of several major triads.



F major Bb major E major C major Eb major G major

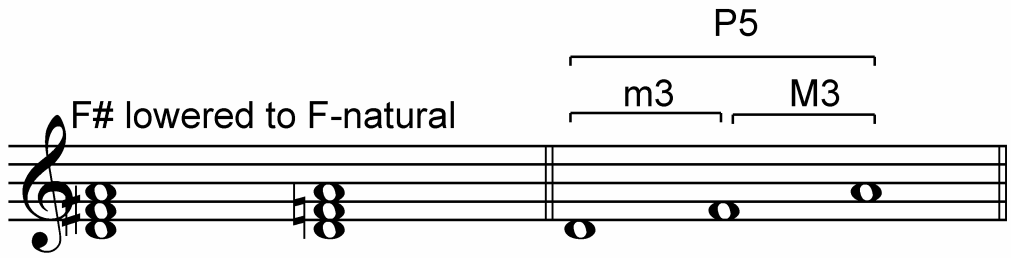
Remember, key signatures can be used so that each altered pitch would not need an accidental.



Bb major E major Eb major

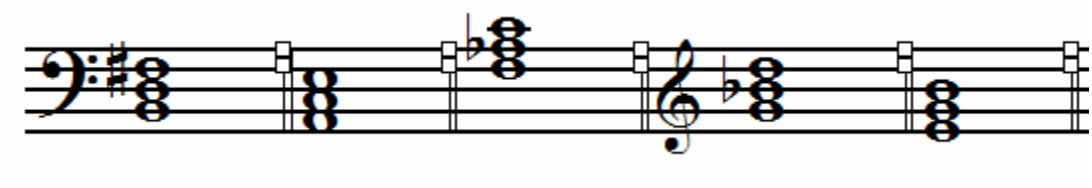
Minor Triad

Consider now the D minor triad. Start with the “practical” method and first build the D major triad. Then, simply lower the third of the major triad by a half step (add a flat, or remove a sharp by adding a natural sign) then the major triad is magically converted into a minor triad!



For the theoretical method, the minor triad has a minor third between the root and third, plus a major third between the third and fifth. A perfect fifth will be between the root and the fifth.

Below are some examples of minor triads.

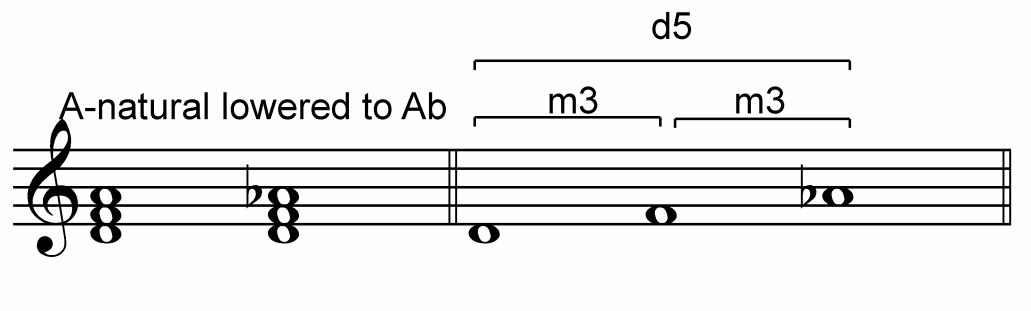


B minor A minor F minor G minor E minor

Both the major triad and the minor triad are very stable sounds because of the perfect fifth that exists between the root and fifth.

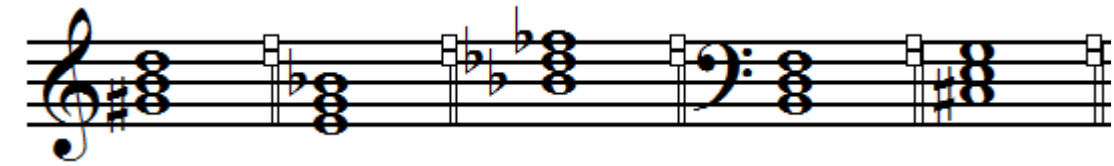
Diminished Triad

To build a diminished triad, first build the major triad, then convert the major triad into a minor triad, then using the minor triad, lower the fifth by a half step. This creates a diminished triad.



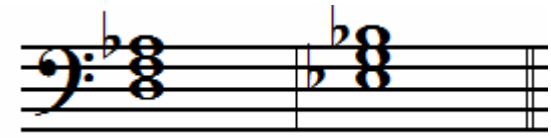
Theoretically, the diminished triad has a minor third between the root and third, and a minor third between the third and the fifth. The resulting fifth between the outer voices is a diminished fifth, thus its name. You can think of the diminished triad as two minor thirds stacked on top of each other.

Here are some examples of diminished triads.

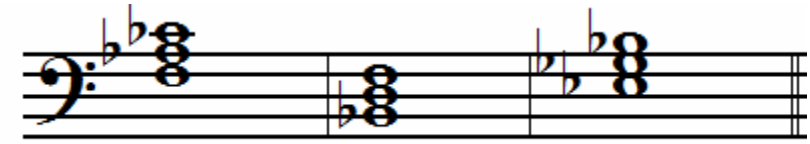


G# dim E dim Bb dim B dim C# dim

The diminished fifth makes this triad unstable, and gives it the feel that something more stable, like a major or minor triad, should follow it.



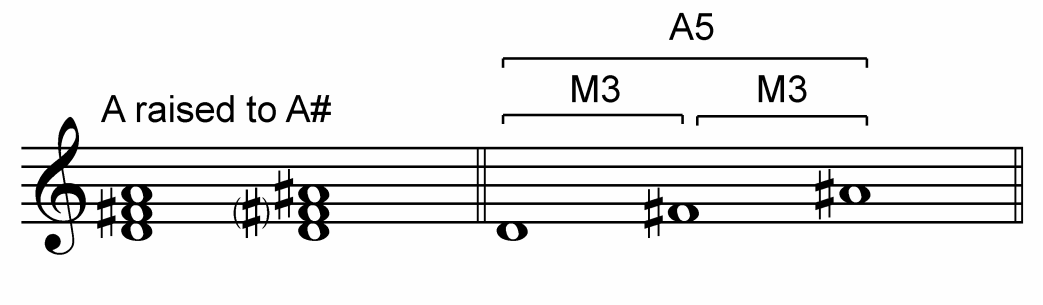
D dim Eb major



F dim Bb major Eb minor

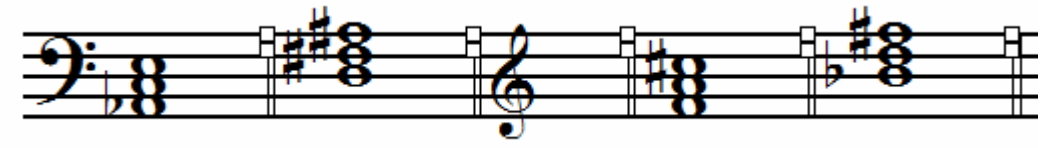
Augmented Triad

Returning to the major triad, if the fifth is raised by a half step, an augmented triad is created.



The augmented triad has a major third between the root and third, and another major third between the third and fifth. The resulting fifth is augmented. (Can you guess why it is called “augmented triad?”) Most people think of augmented triads as two major thirds stacked together.

Below are some examples of augmented triads.

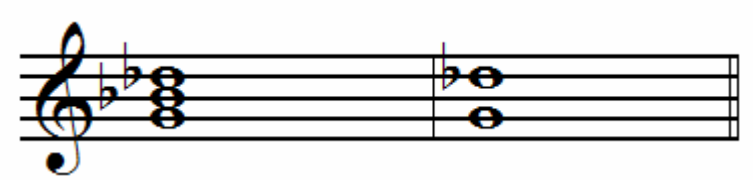


Ab Aug D Aug F Aug Bb Aug

The Bb augmented triad was included because it may be the only triad that has a flat, and natural and a sharp!

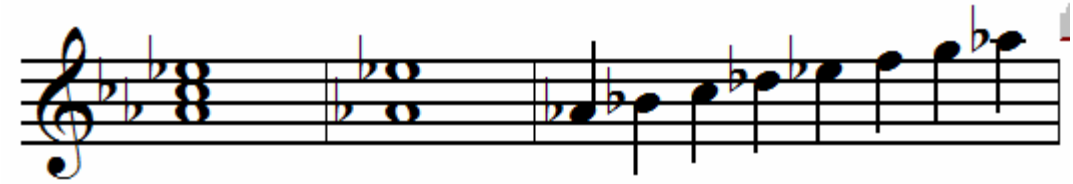
Mentioned already is the fact that augmented triads are rarely found in music. Like diminished triads, augmented triads are also unstable.

To identify the quality of a *root position triad*, you might first consider the quality of the fifth. (If the triad is not in root position, AKA, snowman position, mentally reorder the pitches so that they are all on lines or all on spaces.) If the fifth is diminished, you can safely assume the triad is a diminished triad. If it is augmented, it is safe to say it is augmented.



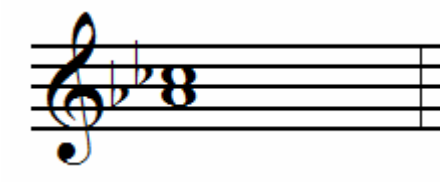
Triad Quality?? Diminished fifth, so diminished triad

If the fifth is a perfect fifth, then you must determine the quality of the interval from the root to the third. If it is a major third, then the triad is major. If it is a minor third, the triad is minor. Using the "practical" method, if all three pitches are in the major scale starting on the root, it will be a major triad.



Triad quality??? P5? Yes! Cb NOT in Ab major scale! Minor triad

You could also approach this by first determining the perfect fifth, then determining that Ab to Cb is a minor third. A minor third and a perfect fifth are the formula for a minor triad.



Minor third (combined with the Perfect fifth shown above) is a minor triad.

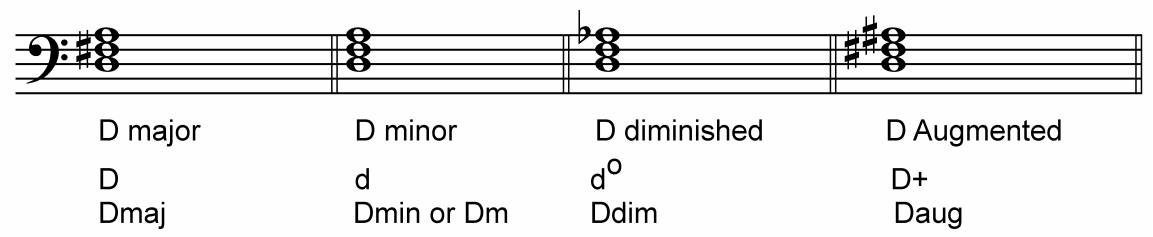
When labeling the quality of triads, use the following:

M for major
m for minor (with handwritten answers, please place a bar over the m to indicate lower case.)

$\overline{m}$ = minor

d, or ^{o} for diminished. (I actually prefer to write “dim.”)
A or + for augmented. (Aug.)

Triads can also be labeled by using the root as shown below.

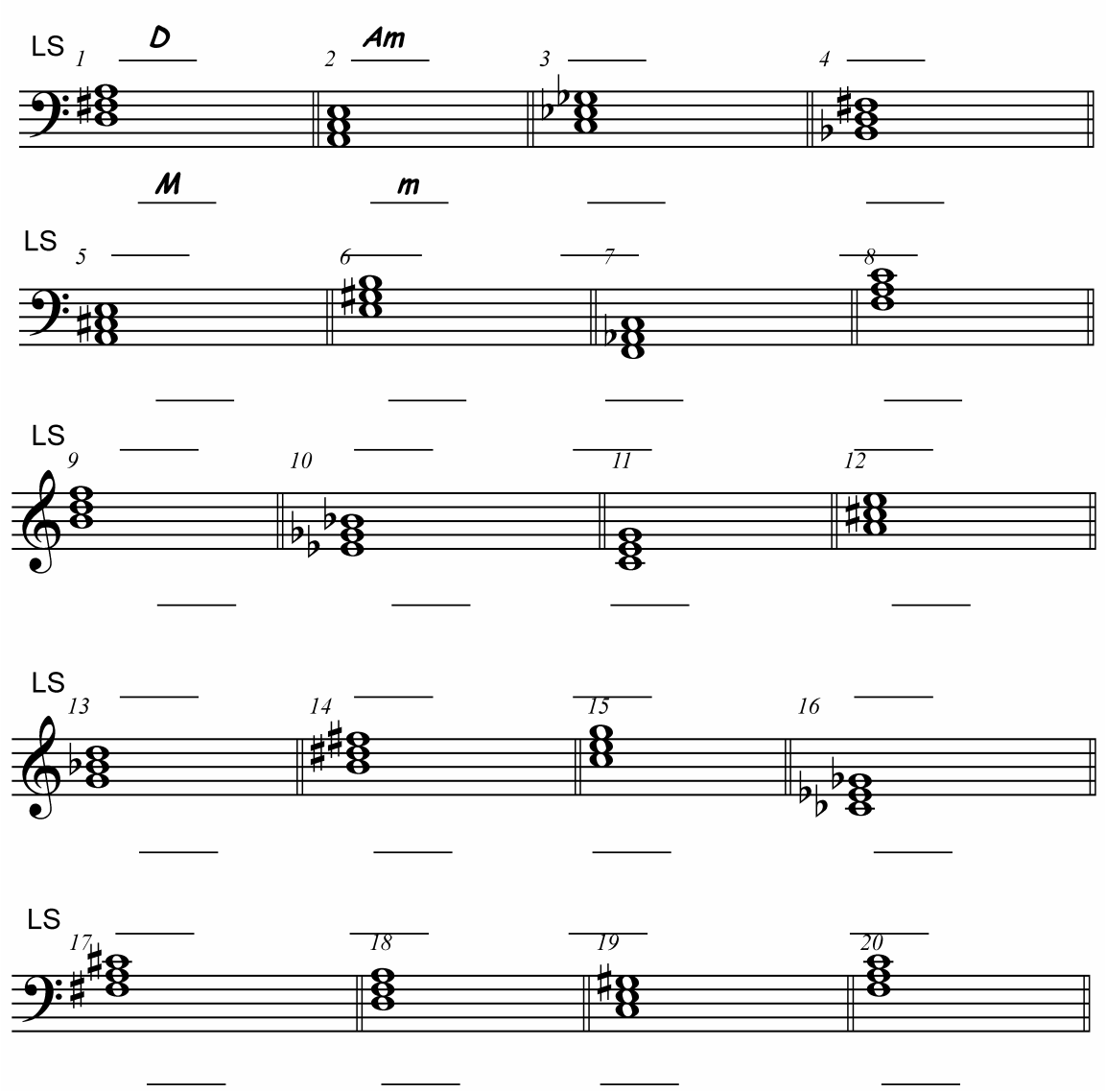


D means “D major triad.”
d, Dm or Dmin means “D minor triad.”
d^{o}, Ddim means “D diminished triad”
D+, Daug means “D augmented triad.”

This type of labeling is also called “Lead Sheet Symbols” which will be discussed more in Lesson 28. As will be mentioned then, but worth stating now, lead sheet notation is not completely standardized. There may be variations depending on the composer, editor, copyist, genre of music…

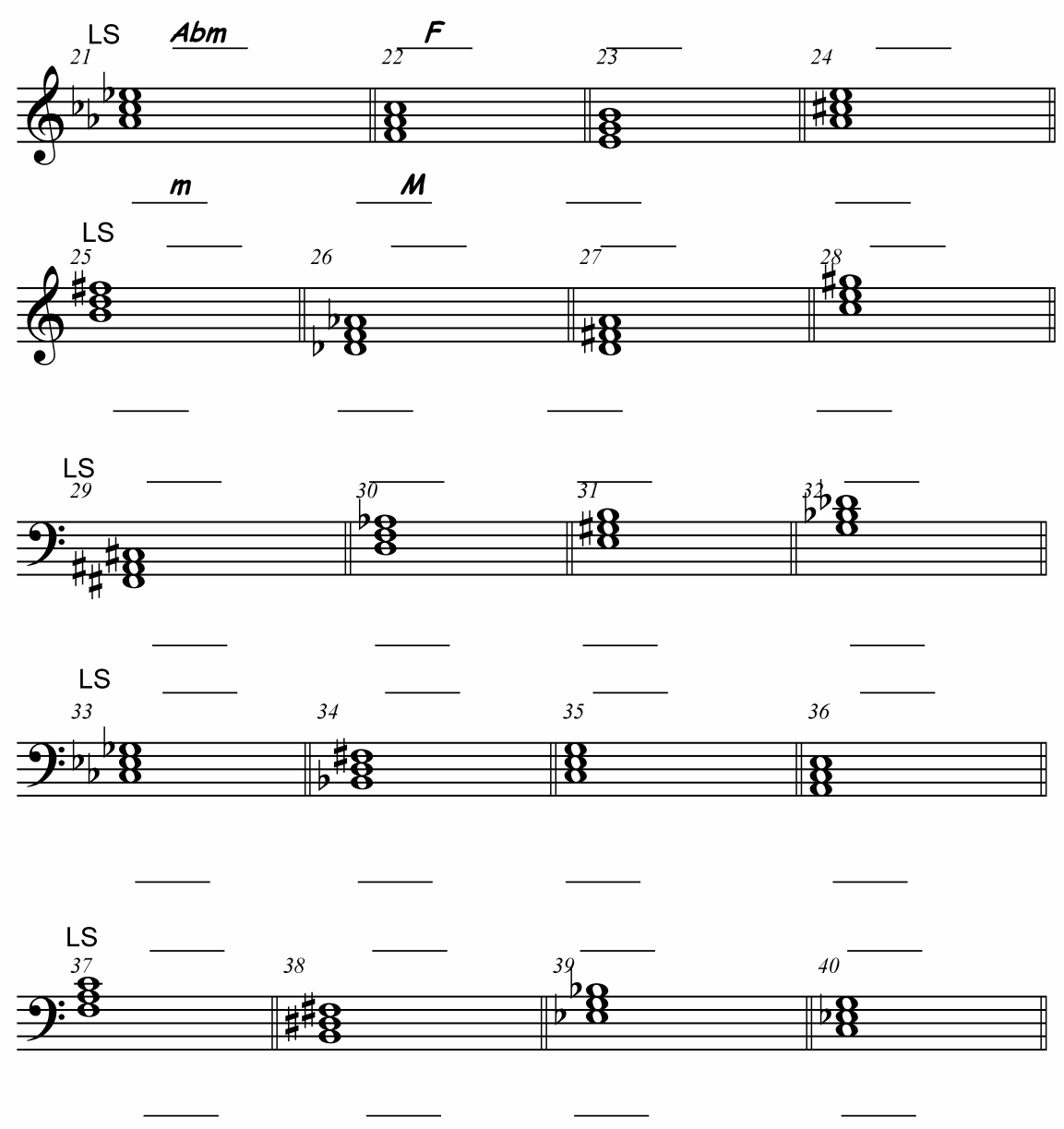
Identifying Triads (1) Name _____

Please identify the following triads in two ways. First, place the lead sheet symbol above the staff, and second, ID the quality below the staff. Two have been completed as examples.



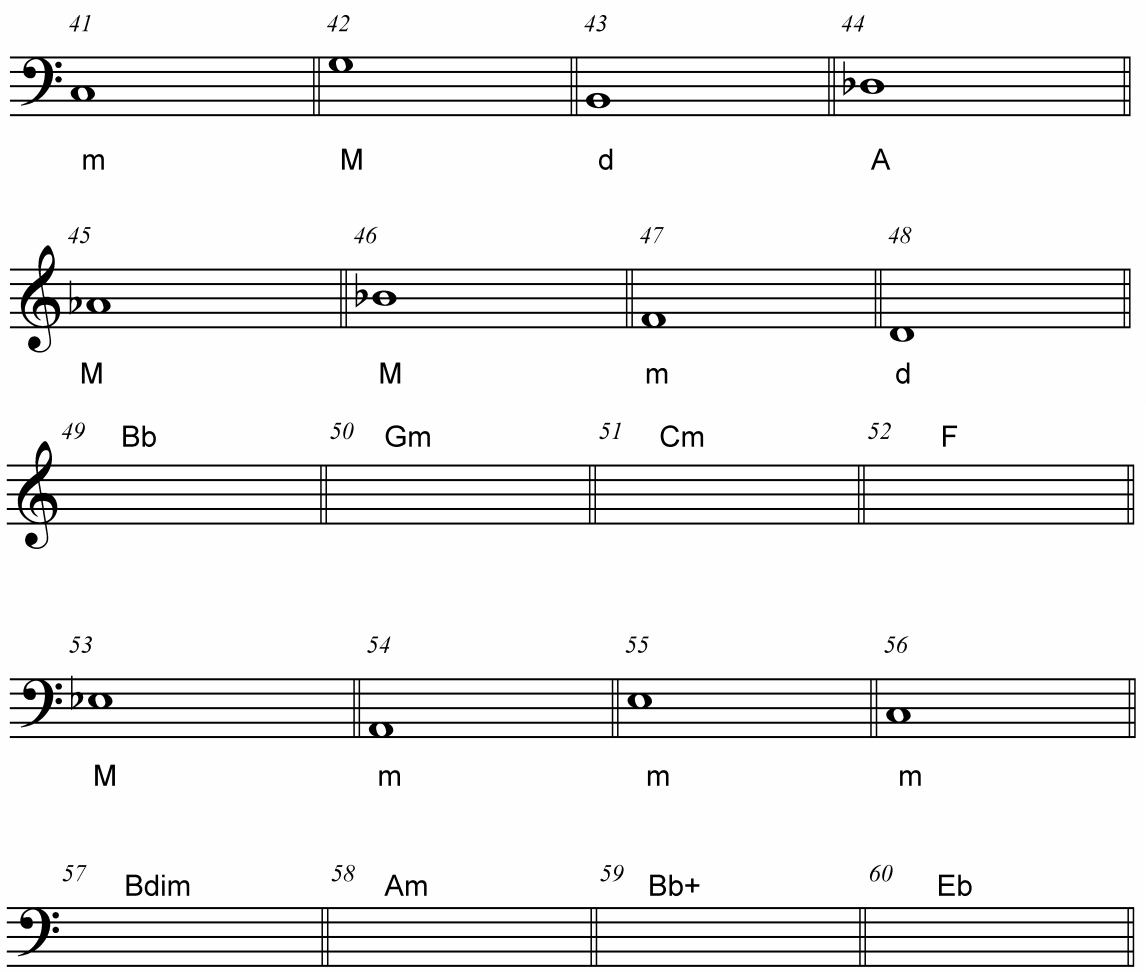
Identifying Triads (2) Name _____

Please identify the following triads in two ways. First, place the lead sheet symbol above the staff, and second, ID the quality below the staff. Two have been completed as examples.



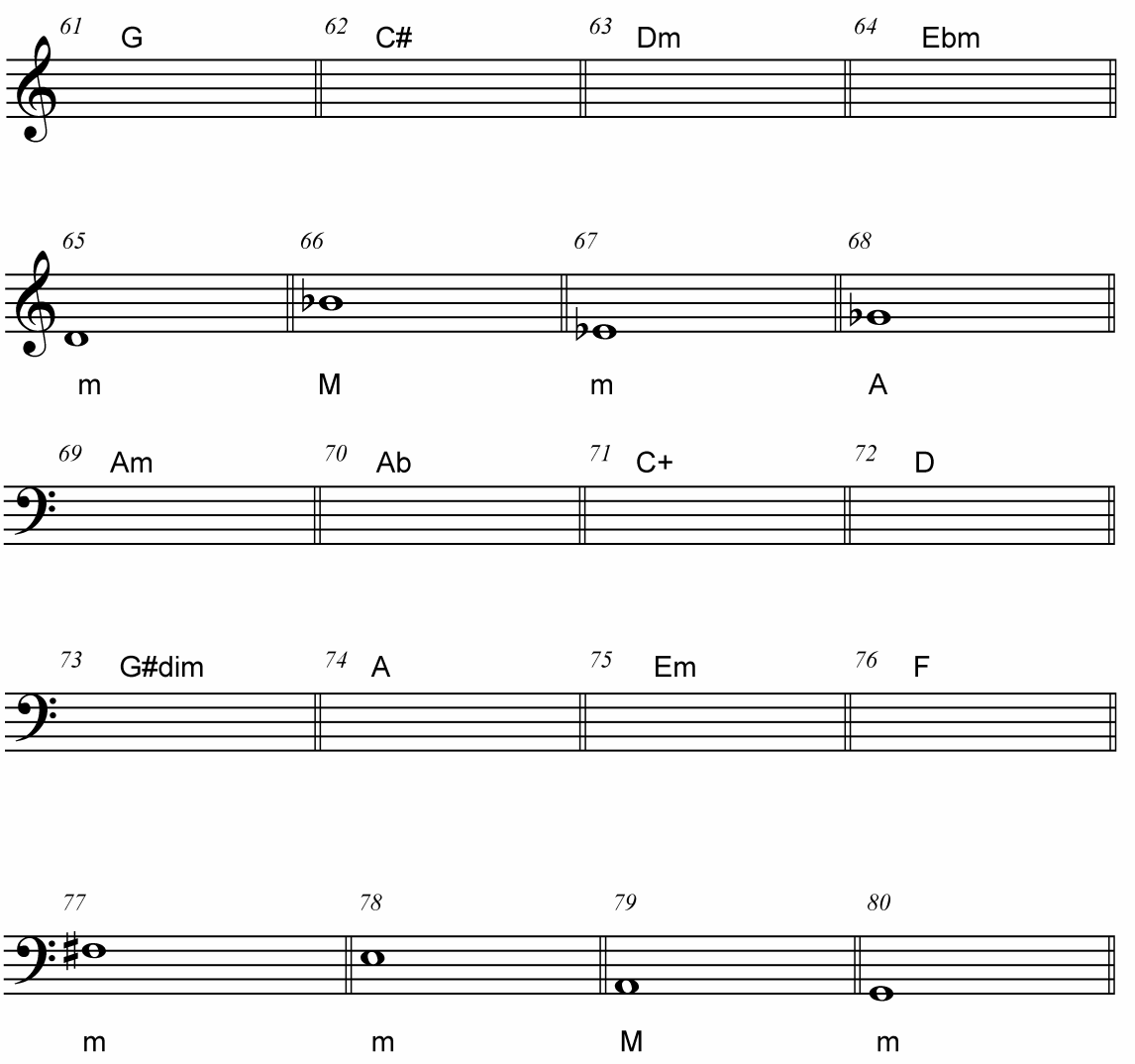
Writing Triads (1) Name _____

Please write the indicated triad given either the lead sheet symbol or the root and quality.

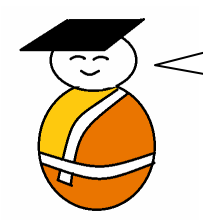


Writing Triads (2) Name _____

Please write the indicated triad given either the lead sheet symbol or the root and quality.

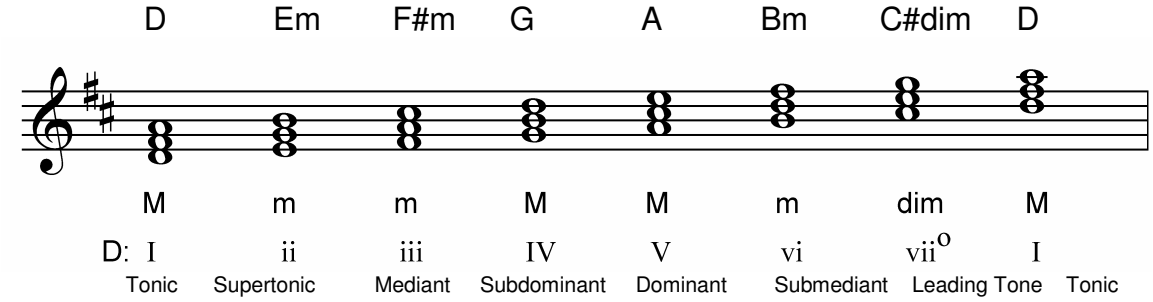


Lesson 25: Roman Numerals



Cricket, you have gained a thorough knowledge of triads. It is time to put that knowledge into practice. We will begin the study of harmony by first learning of Roman numerals.

As with several other Lessons, this Lesson will begin with the major scale. Below is the D major scale with a triad built over each scale degree.

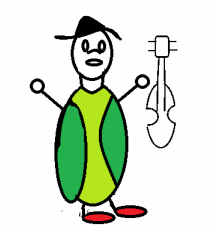


Notice these features:

The formal names of the scale degrees that were learned in Lesson 17 are the same names as the triads built on the scale degree. These names are important as they will be used frequently during the study of harmonic progression. Lead sheet symbols that were introduced in Lesson 24 are shown above the triads, and reflect both the root of the triad and the quality.

The quality of the triads is shown. For all major scales, whether it is D major, F# major or Bb major, this organization will always be the same.

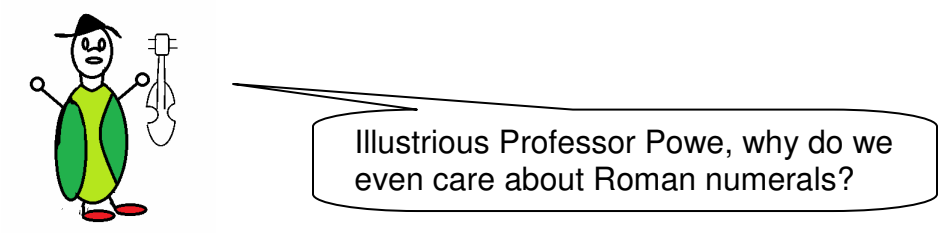
Major (I), minor (ii), minor (iii), Major (IV), Major (V), minor (vi), diminished (viio), then return to Major (I).

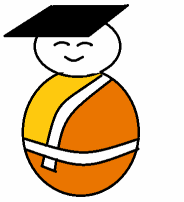


Professor, this is another good opportunity for me to memorize!

The key is shown followed by a colon, followed by the Roman numerals. The scale degree is reflected by the Roman numeral, whereas the quality of the triad is reflected by major triads being capital Roman numerals, minor triads are lower

case, and diminished triads are lower case with the “diminished symbol” (or “degree symbol” if you think “temperature”) attached to it. Major scales do not have augmented triads, but for completeness, the Roman numeral would be capital with a plus sign attached. (III+, for example)

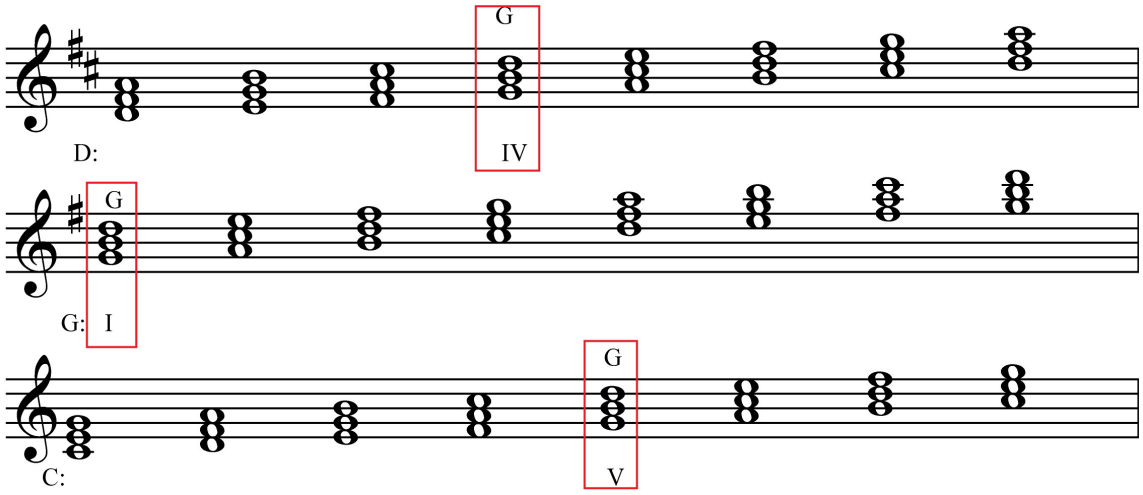




The formal names and the Roman numerals both describe a triad’s **function** within a key. To say a chord is “IV” or that it has “subdominant” function is interchangeable. Harmonic function and harmonic progression will be covered in the next Lesson.

Generally speaking, Roman numerals may not seem challenging, and in reality they aren’t! Well, they aren’t if you learn the qualities of the triads for each scale degree AND are fluent in thinking in scales and keys. If you have become rusty on scales, please review Lessons 16, 17 and 18.

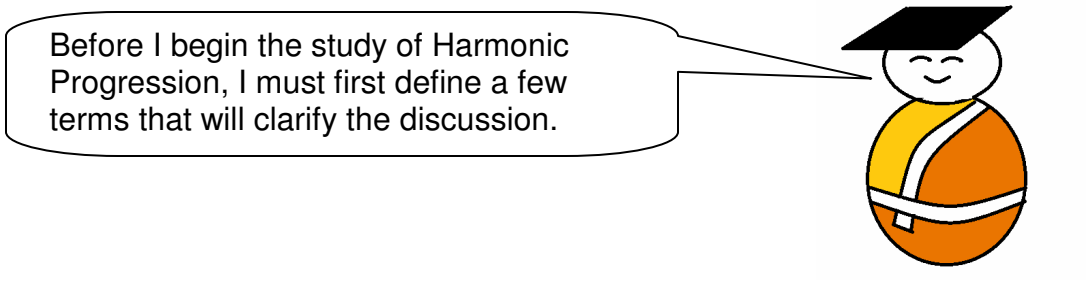
See the example below.



Sometimes students get confused about this. The point here is that the same G major triad can be IV (subdominant) in the key of D major, it can be I (tonic) in

the key of G major, or it can be V (dominant) in the key of C major. The triad takes on a different function or role in a harmonic progression depending on what key it is in.

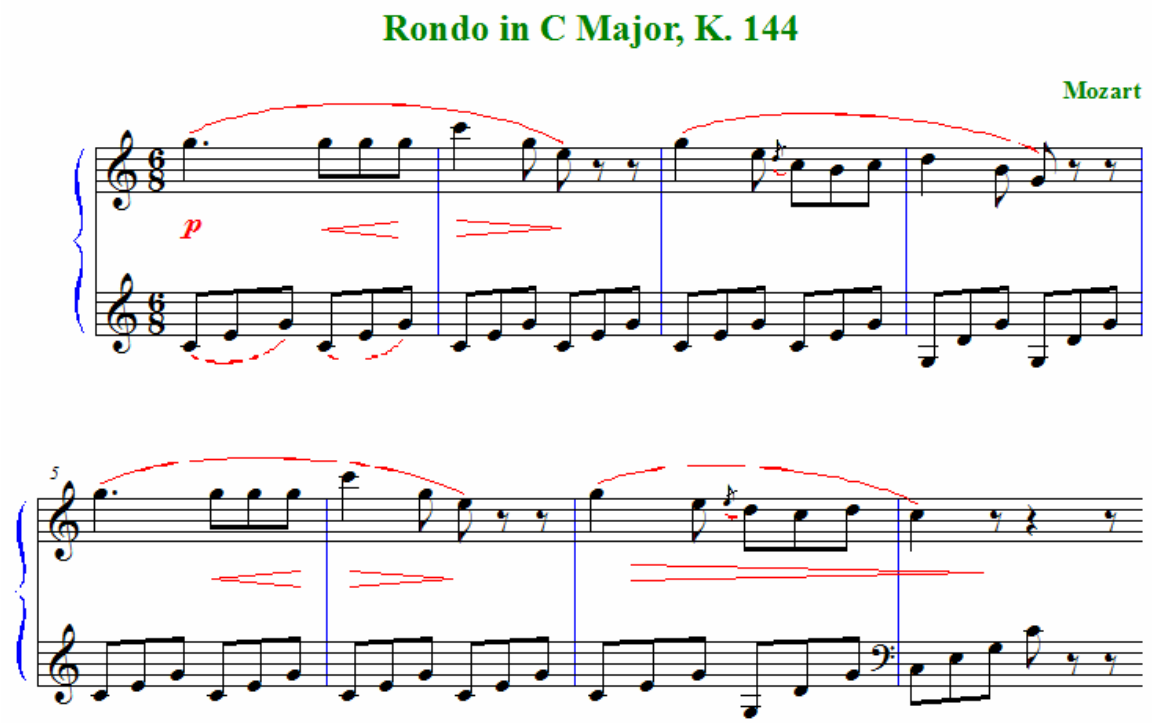
Lesson 26: Harmonic Progression



Phrase: A phrase can be compared to a sentence in language where a complete idea in conveyed. In music, a complete "musical thought" is shared with the listener. A good rule of thumb for the length of a phrase is 4 measures long. For punctuation, a "cadence" ends the phrase.

Cadence: A cadence is a point of relaxation that occurs at the end of a phrase. It is also the harmonic "goal" of the phrase. Sometimes, that relaxation is very final and conclusive, like when a sentence ends with a period. In music, this is called an "authentic cadence." Sometimes, a musical phrase does not sound like the end, and more music is required to finish it—similar to a sentence that ends with a question mark that needs an answer. This is called a "half cadence."

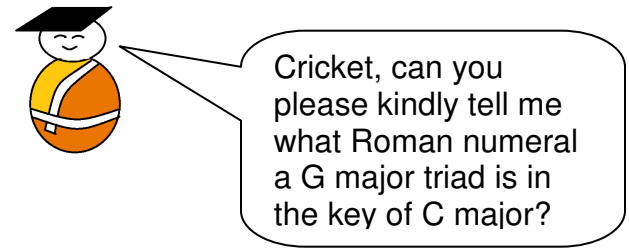
Below is a short composition by Wolfgang Amadeus Mozart, Rondo in C, K. 144.

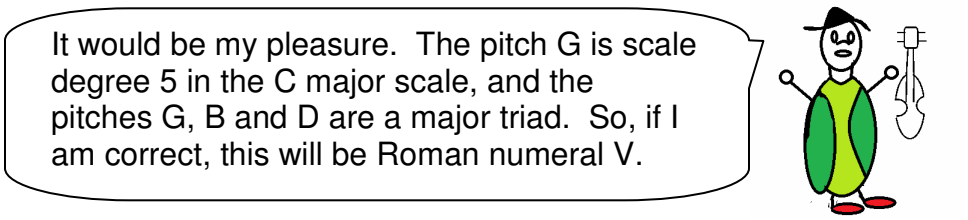


This composition has two phrases. The first phrase concludes in measure 4 at the end of the first line. (Remember, this is on a "grand staff" so the staffs that are barred together will be played together. Sounds like a recent advertising campaign, "What happens in…stays in…") The second phrase concludes at the end of measure 8. (This tune is actually longer than shown, thus, no double bar line at the end.)

The composition is in C major. The title says it is in C major, but you cannot always trust that to be the case. The key signature has no sharps or flats, again, pointing toward C major, but you can't always trust the key signature either! But you can trust looking at all the pitches involved and determining that they are all part of the C major scale, there are lots of C's, particularly in the left hand (the lower staff) and if the 3 notes beamed together in the first measure are stacked, they make a C major triad. So, yes, C major is the correct key.

Look at the pitches in measure 4. They are all G, B or D. When stacked into a snowman, they create a G major triad.

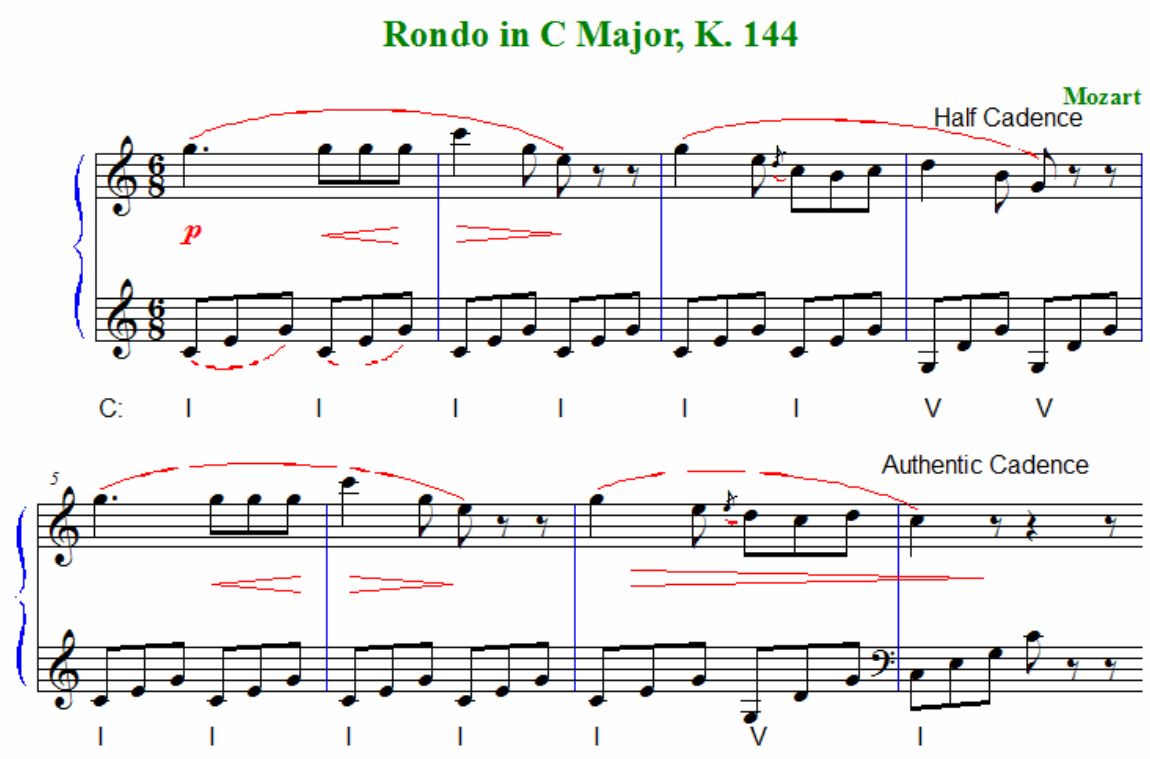




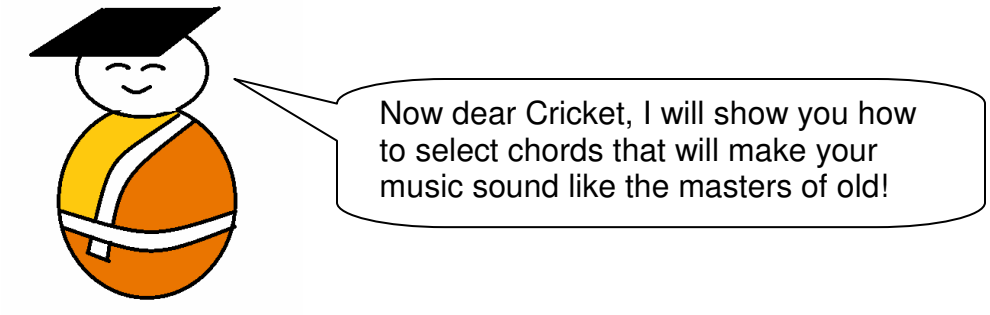
Cricket is correct. It is Roman numeral V, the dominant triad. Phrases that end on a dominant chord are inclusive and do not sound finished. This kind of cadence is called a **half cadence**.

The second phrase concludes with the pitches C, E and G, which build a tonic chord, Roman numeral I. Preceding the tonic chord is a dominant triad, V. Phrases that end with V-I cadences are called **authentic cadences** and sound final.

A "complete harmonic analysis" has been completed on the score below. The key indicated at the beginning of the composition below the clefs of the first system. Also shown are all the Roman numerals and the location of the cadences.



There are two other types of cadences that can be found in music. One of them is called a **Plagal Cadence**, which is IV to I. This is the sound of "A-men" at the end of hymns, or the last "Hallelujah" of George Frideric Handel's (1685-1759) "Hallelujah Chorus" from "The Messiah." The other is a sneaky cadence used when composers are being evil---err, that's unfair to say, let's say when they are being jokesters—called a **Deceptive Cadence**. This is V to vi. It's called deceptive because they set us up to expect an authentic cadence, but surprises us with V-vi instead of V-I.



You've probably been to a college football game. Consider how odd it would be for the marching band to do their halftime show before the game starts, take a break during at halftime, to play the National Anthem after the game is over while

the fans are leaving, and during the game, to play the Fight Song every time the *opposing* team did something good. It's just NOT the way it is supposed to be! There is an expected order of events to be followed and what was just described simply isn't right!

Harmonic progression is very similar in that our ears have been trained over the years to expect chords to be played in a certain order. (I bet you didn't even realize that…) When the order is not followed, it sometimes sounds "fresh" or "innovative" and sometimes it simply sounds "bad!"

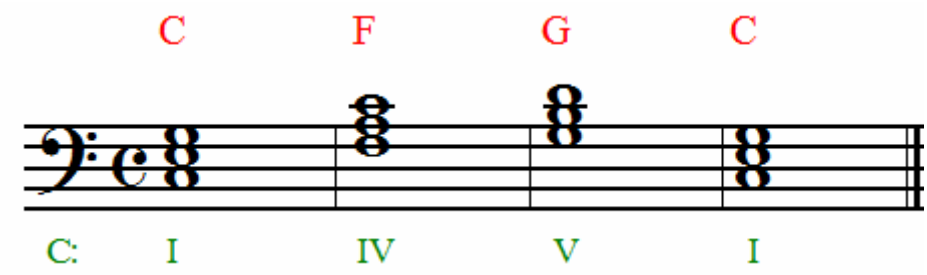
The normal progression of chords is generally describes as starting on the tonic chord and "progressing" through predominant functioning chords, with the ultimate goal of reaching dominant function at the end of a phrase. After reaching dominant, there is usually an obligatory return to tonic to end the passage of music. This "basic phrase model" looks like:

Tonic → Predominant → Dominant → Tonic

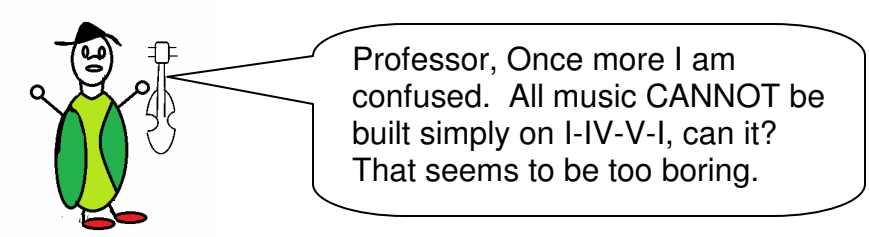
From a Roman numeral standpoint, this is easiest seen as:

I → IV → V → I

In notation form, with leadsheet symbols above, and Roman numerals below:



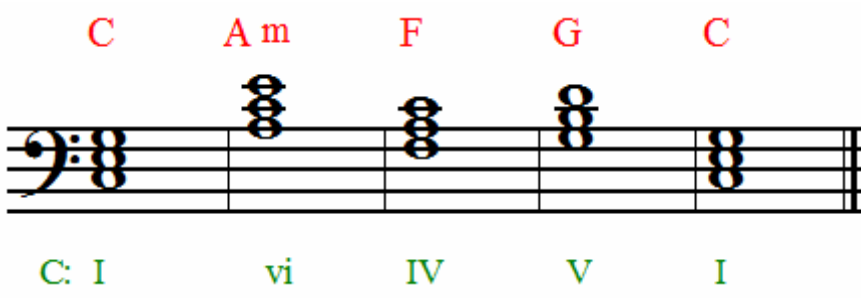
There are truly countless numbers of compositions written over the centuries that have used this model. The "Three B's" used it, (Bach, Beethoven and Brahms) but so did the other "Three B's" (Beatles, Beach Boys, and Jimmy Buffett!) You can find this progression in hymn tunes, Christmas carols, folk songs, pop tunes—including rock and country—and basically any genre, classical or otherwise.



Not ALL music follows this fundamental progression, but a lot does. In addition to I—IV—V—I, there are ways to expand the "Tonic—Predominant—Dominant – Tonic" model that provides variety. Below are a small number of "tricks" composers have used.

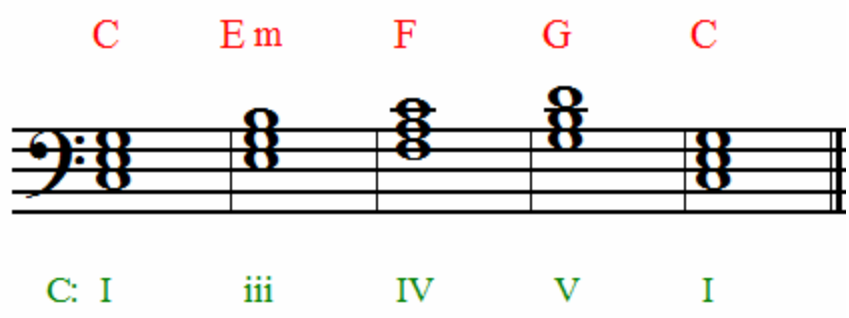
The initial tonic can be expanded by adding vi after it.

I—vi—IV—V—I



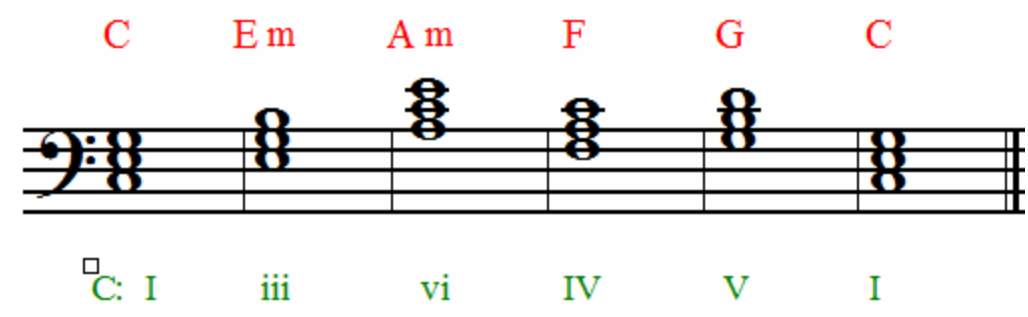
Rarely in classical music, but sometimes in pop music, the iii chord can be used to expand tonic.

I—iii—IV—V—I



Or

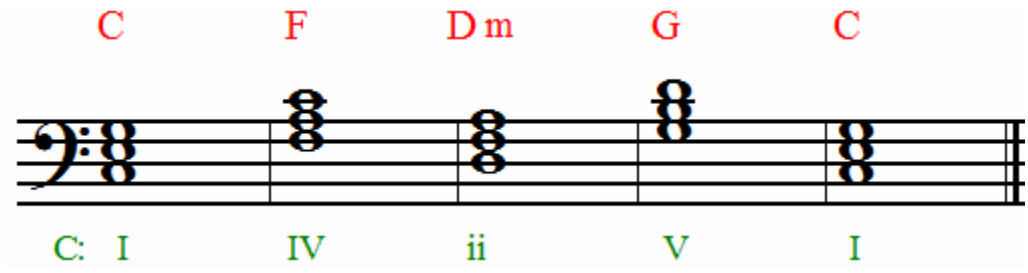
I—iii—vi—IV—V—I



(Queen has both of these uses of iii in the chorus of “We Are The Champions.”)

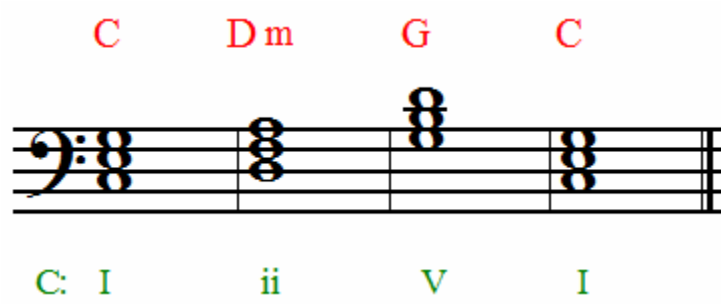
The predominant can either be expanded by placing a ii chord after the IV, or sometimes the IV is just replaced with ii. (In the Classic Period in music, that is Mozart, Haydn and Beethoven, it seems ii was used more frequently than IV.)

I—IV—ii—V—I



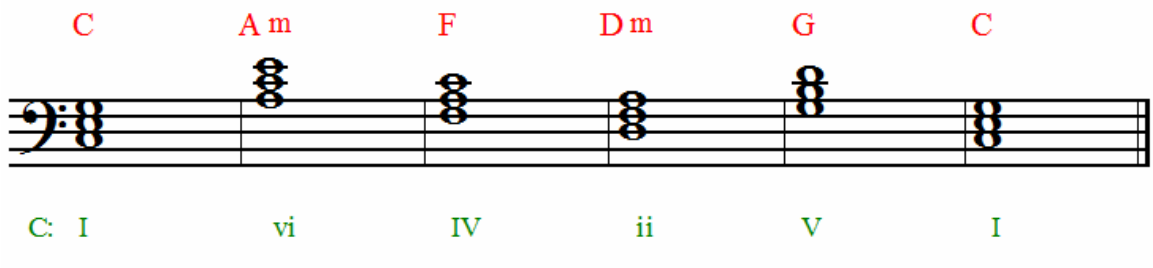
Or

I—ii—V—I



Both the tonic area and the predominant area can be expanded:

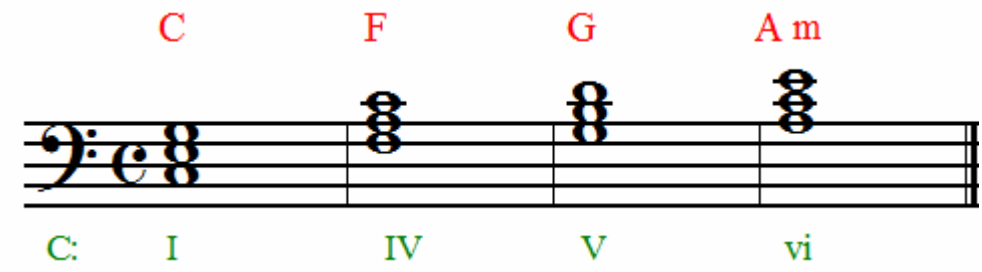
I—vi—IV—ii—V—I



Tonic ----------→ Predominant----------→ Dominant→ Tonic

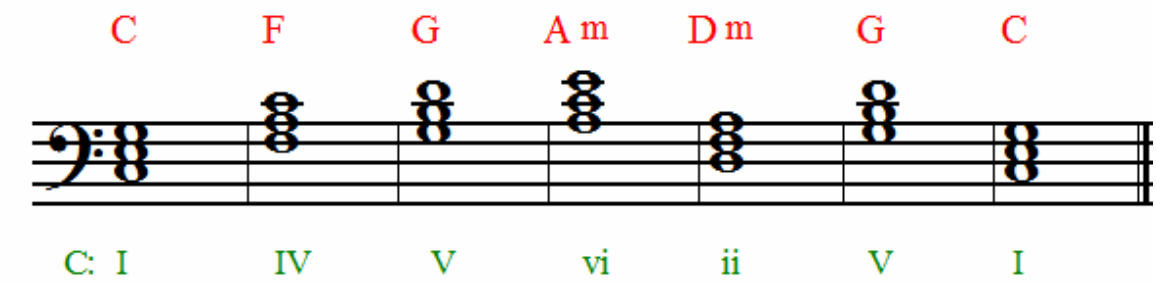
The final tonic can be substituted with vi, giving the deceptive cadence referenced earlier.

I—IV—V—vi



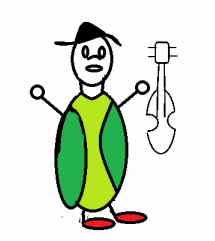
If this is done, the phrase must be extended so that an authentic cadence can ultimately be reached.

I—IV—V—vi—ii—V—I



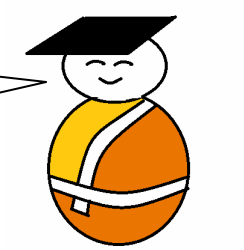
These are just a few of the many, many ways to expand the basic phrase model. When chords are placed in different orders than what is described, the music will often sound as if it is wandering, or that it has no goal. Some composers want this feeling and will use this to their advantage. It doesn't make it "wrong" but it makes it sound different than expected, like the National Anthem at the end of a football game.

Lesson 27: Seventh Chords

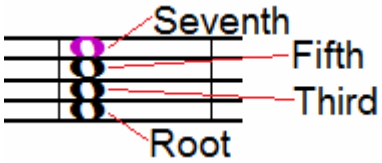


Professor, I have seen music where the chords have more than three pitches, and heard music that has a peculiar crunch to it. Can you please enlighten me, yet again?

Yes, dear Cricket, I will gladly enlighten you again. I do not know the music you are referring to, but it is quite possible the chords are “seventh chords.”



An extra snowball can be added to any triad making it look like a 4-ball snowman. The interval from the root—the big snowball on bottom—up to the new snowball on top will be some quality of seventh. Therefore, these 4-pitch chords are generically called “seventh chords.”

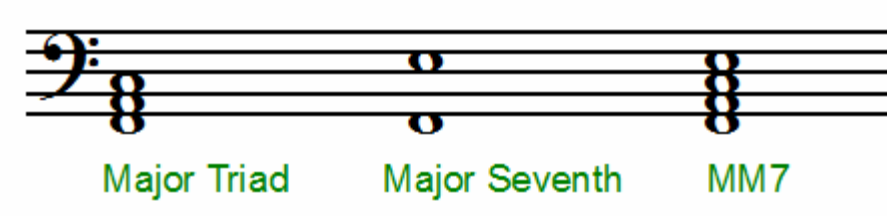


As with triads, when the seventh chord looks like a four-ball snowman, it is said to be in “root position.” The bottom snowball is the root, the next snowball up is the third and the next up is the fifth, all the same as triads. The snowball on top is called, yes, you guessed it, the “seventh” because it is a seventh above the root.

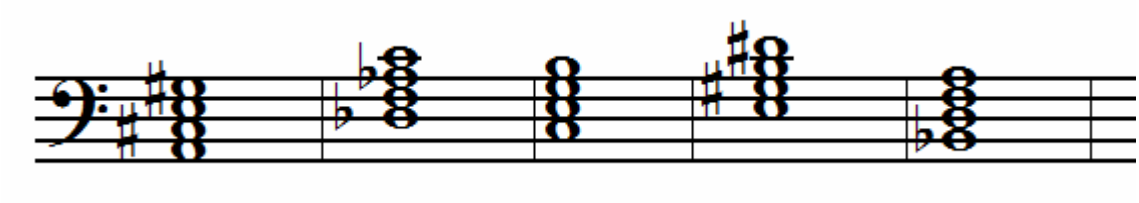
In all, there are 12 ways to combine the four qualities of triads with three qualities of sevenths. (The augmented seventh isn’t used because it is enharmonically the same as an octave above the root.) In reality, there are only five types of seventh chords that are used. The quality of the seventh chords is identified by the quality of the triad plus the quality of the seventh, as shown below.

Major-major seventh (MM7)

This seventh chord is built by placing a major seventh above the root of a major triad. You won’t find this chord too often in the music of Bach or Mozart, but you will find it in pop music and in jazz.



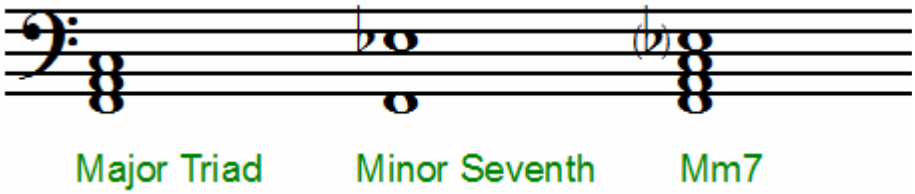
Below are examples of other MM7 chords. In each chord, the triad is major quality, and the seventh is major quality. Stated a slightly different way, all of the pitches are contained within the major scale built on the root. (Note: for all of the examples of other types of seventh chords, these same roots are used so the comparison between the various chords will be easier.)



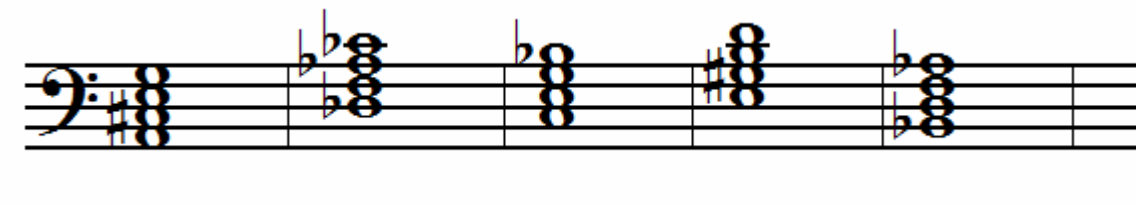
Major-major Seventh Examples

Major-minor seventh (Mm7)

This seventh chord is built by placing a minor seventh above the root of a major triad. This chord is EVERYWHERE. It is most commonly used as the dominant seventh chord (V7) and is used in all styles of music. Jazz and pop music will use this quality of seventh chord built on other scale degrees in addition to scale degree 5.



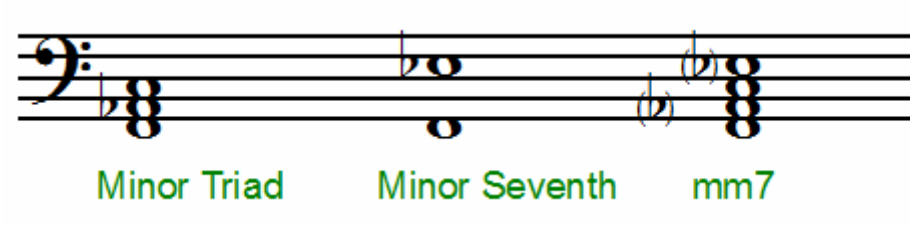
Below are examples of other Mm7 chords. In each chord, the triad is major quality, and the seventh is minor quality.



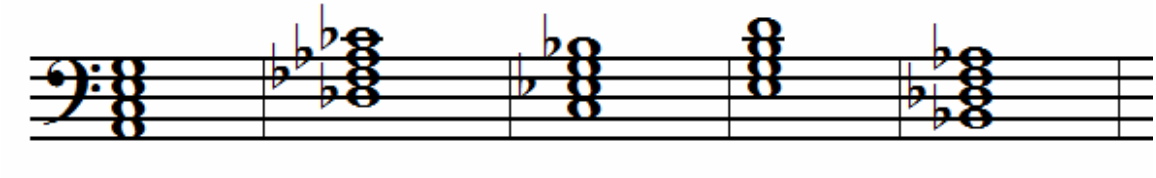
Major-minor Seventh Examples

Minor-minor Seventh

This seventh chord is built by placing a minor seventh above the root of a minor triad. You can find this chord in many, dare I say, most, styles of music, usually built on scale degree 2 (ii7). Sometimes you can find this quality built over scale degree 6 (vi7).



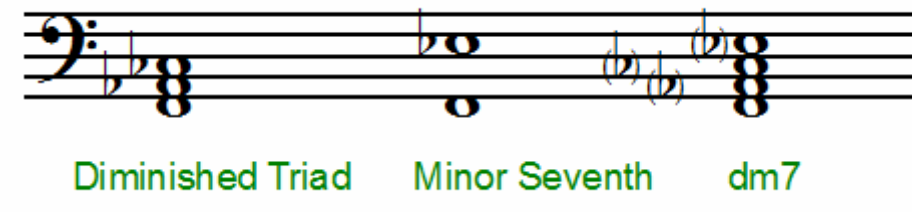
Below are examples of the minor-minor seventh chord. Note that the quality of the triad is minor, and the quality of the seventh is minor.



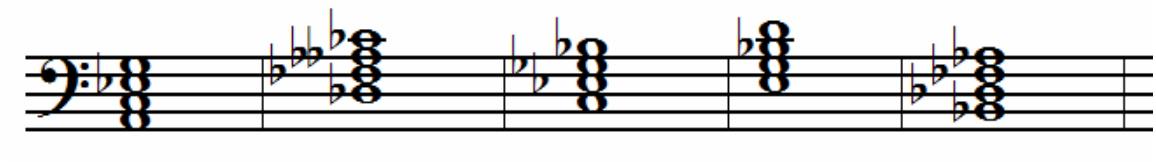
Minor-minor Seventh Examples

Diminished-minor seventh (dm7)

This seventh chord is built by placing a minor seventh above the root of a diminished triad. It is also called “half diminished seventh” and has the symbol ø attached as a superscript to the Roman numeral or lead sheet symbol. This chord is often built on scale degree 7 in major keys, and on scale degree 2 in minor keys. (Minor scales and minor keys will be the subject of Lessons 29 and 30.)



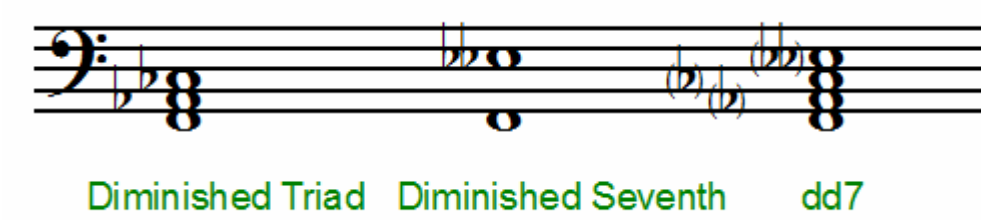
Below are examples of other dm7 chords. In each chord, the triad is diminished quality, and the seventh is minor quality. Hey, we finally have an opportunity to use the “Double Flat!”



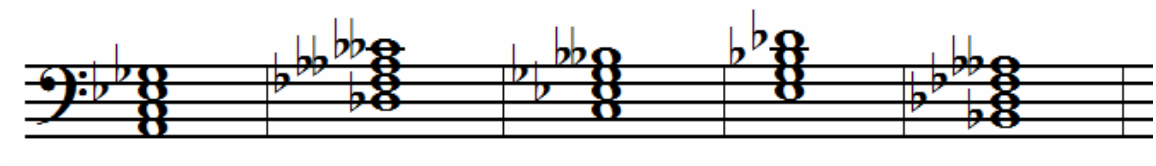
Diminished-minor Seventh (Half-diminished 7) Examples

Diminished-diminished seventh (dd7)

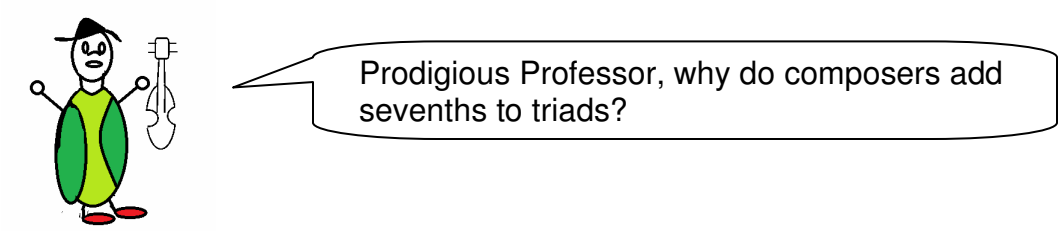
This seventh chord is built by placing a diminished seventh above the root of a diminished triad. It is also called “fully diminished seventh” and has the symbol ^{o} attached as a superscript to the Roman numeral or lead sheet symbol. This chord is often built on scale degree 7 in major keys—this requires an extra accidental in addition to those in the key signature—and on scale degree 7 in minor keys without needing an extra accidental. This is a very “tense” sounding chord and was often used in chase scenes for silent movies, or when the bad guy was tying the girl to the railroad tracks!



Below are examples of other dm7 chords. In each chord, the triad is diminished quality, and the seventh is minor quality.



Diminished-diminished Seventh (Fully Diminished 7) Examples



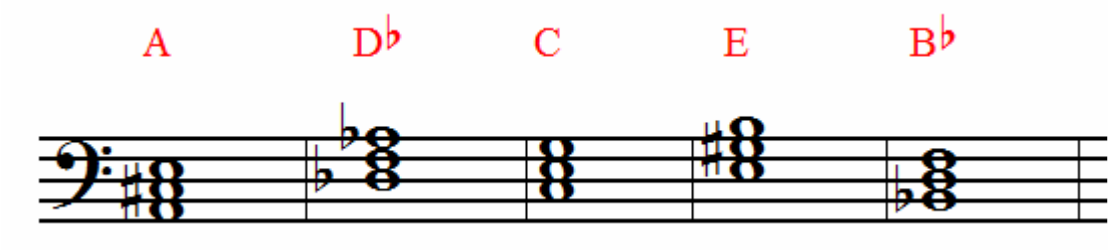
Recall that all intervals of a seventh are known as “dissonant intervals.” The dissonance adds tension to a triad not only because the interval from the root to the seventh is dissonant, but often the interval between the third or fifth to the seventh is also dissonant. All this tension acts to provide forward harmonic motion and intensifies the approach to the following chord. Adding a seventh doesn’t change a chord’s function—a dominant seventh chord still functions exactly like a dominant triad—it only strengthens its power to move back to tonic.

Lesson 28: Lead Sheet Notation

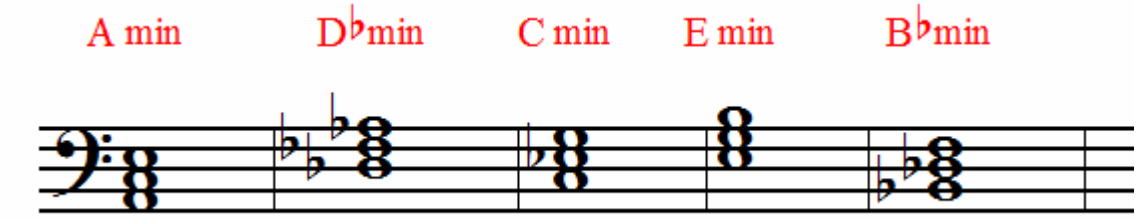
Lead sheet notation is a short hand method for telling performers what chords to play. You will see this quite frequently in jazz compositions and many pop tunes. Church praise bands will often play from lead sheets. Composers and arrangers will use this type of notation sometimes as they are sketching new materials before actually writing all the orchestration and individual instrument parts.

Below are some of the main symbols used for lead sheets, plus the chord it implies in staff notation. It is good to note that lead sheet notation is not universally codified and a variety of symbols may be used for the same chord. Also, the voicing of the chord, that is, which octave and how the pitches are spread out, is determined by the performer, not the lead sheet symbol. The chords shown below are just “snowman” position representations.

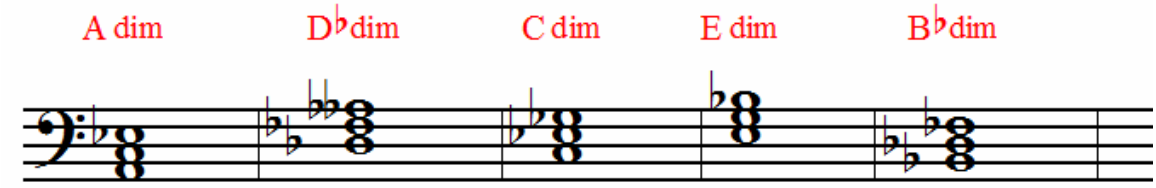
A letter by itself (or with its accidental) implies the root of a **major triad**.



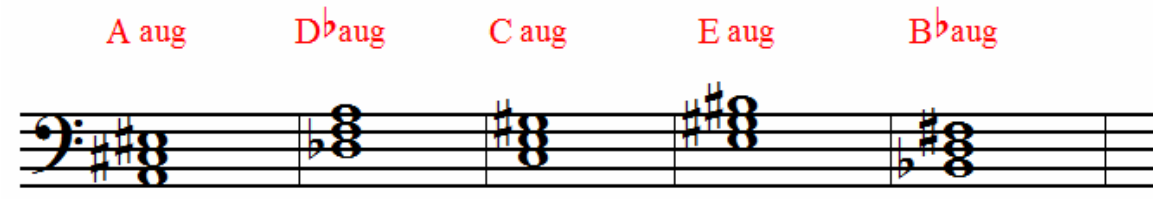
Minor triads are indicated as below. Sometimes, Am, or A- will be used for minor triads.



Diminished triads are shown below. Some editors will use A^{o} for a diminished triad.

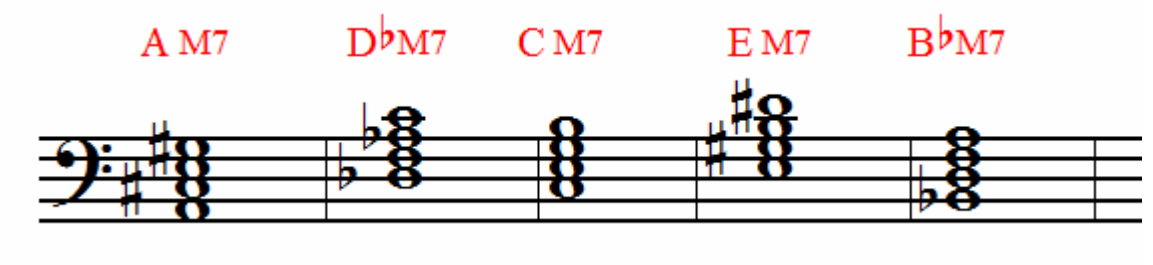


Augmented triads, when they occasionally are used, are indicated with the following symbol. Sometimes, lead sheet editors will use “A^{+}” for an augmented triad built on A.

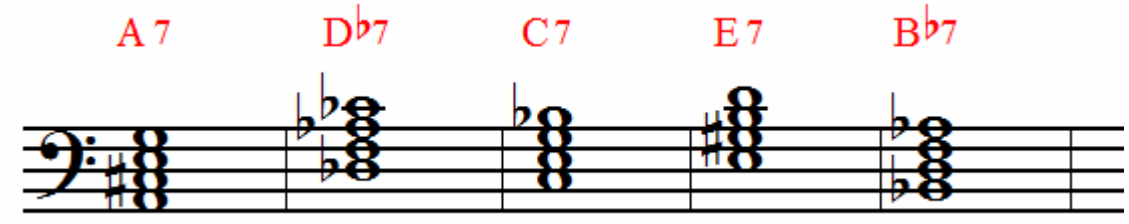


Seventh Chords

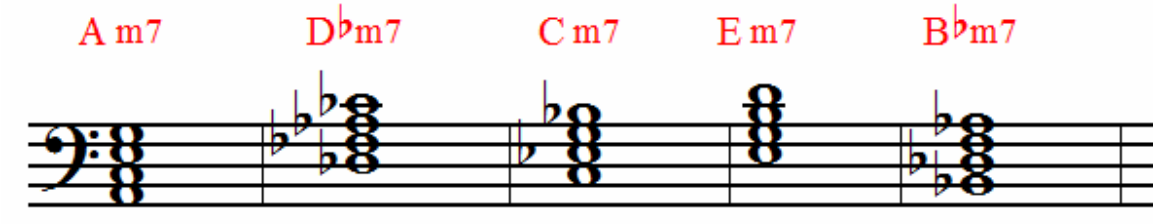
Major-major seventh chords will have a capital letter with "M7" attached. Some lead sheet editors will use a small triangle, $A^{\triangle 7}$ instead.



Major-minor seventh chords, as mentioned before, are most common, and usually found as V7, or "dominant 7." Since lead sheet notation is a shorthand, any Mm7 chord is shown as a capital letter plus "7."



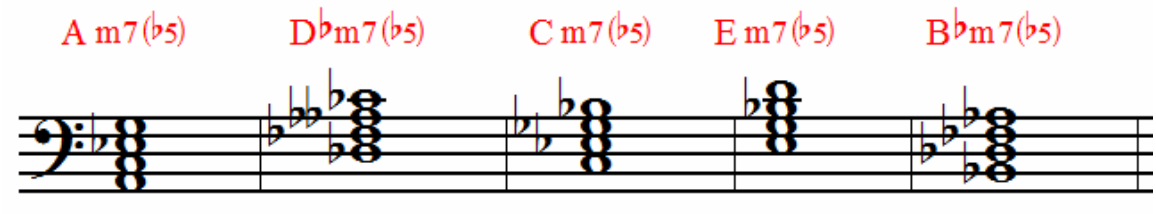
Minor-minor seventh chords (mm7) are shown as below. Just as with triads, the lower case "m" implies a minor triad and the 7 will mean a minor 7.



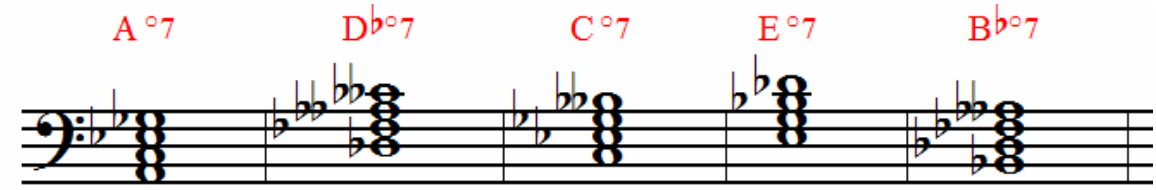
The **diminished-minor seventh chord** (half-diminished seventh chord) has a bit unusual lead sheet symbol as shown below. The lower case "m" implies a minor

triads, but the “b5” indicates the fifth is lowered a half step. If you recall from Lesson 24, you can lower the fifth of a minor triad to create a diminished triad.

The seventh is minor. Some editors will use A$^{\phi}$7 for a half-diminished seventh chord who’s root is A.



The diminished-diminished seventh chord (fully diminished seventh) simply has the capital letter with the diminished symbol and 7 attached.

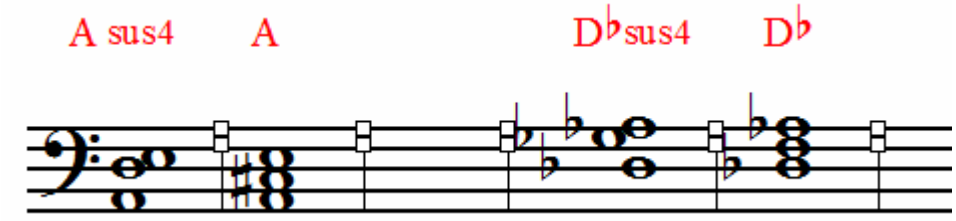


Special Chords

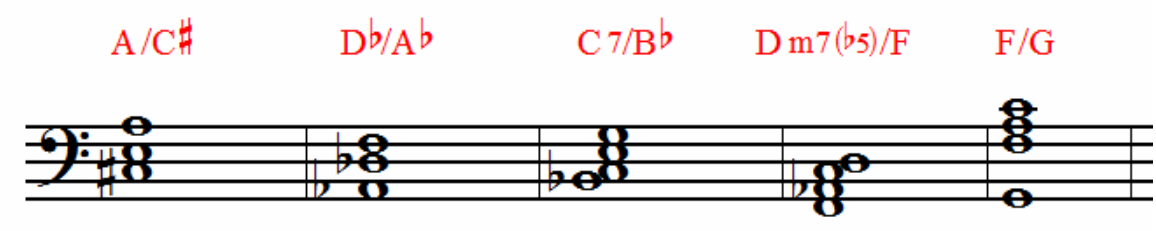
There are several lead sheet symbols that I am calling “Special Chords” for lack of a better term to lump them into!

“Sus chords”

Suspensions are a type of non-chord tone (yes, that’s a pitch that does not belong to the chord that it is sounded with) that is most frequently the third of the chord being replaced by a pitch a fourth above the root, as shown below. You’ll see the lead sheet symbol for sus chords as well as its chord of resolution. (Sometimes, “sus” is used instead of “sus4.”)



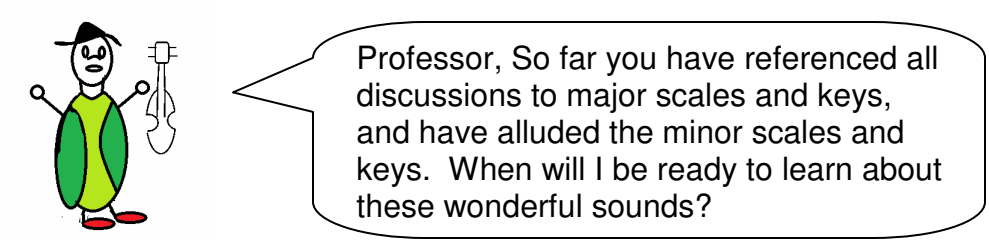
“Slash chords” are also part of lead sheet notation. If you think of this as a fraction, the main chord as described above is indicated as the “numerator” and the “denominator” represents the bass note, or the lowest pitch. In traditional music theory, this usually means the third or fifth, or even the seventh, is the lowest sounding pitch, but it is not uncommon to have a slash chord where the bass is not part of the triad at all.

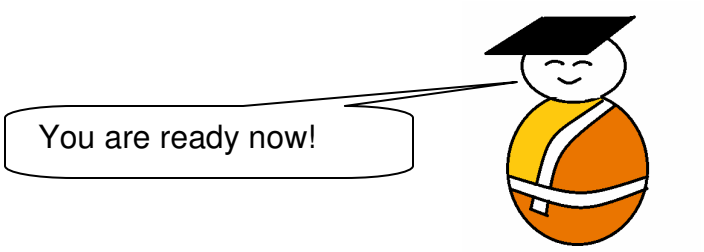


The first chord is an A major triad, but C#, the third of the chord, is in the bass. The second chord represents a Db major triad with Ab, the fifth as the bass. The third chord is a C7 with Bb as the bass. Bb is the seventh of this chord. The next chord is D half diminished seventh with F, the third, in the bass. The last chord is an F major triad, but G is sounded as the bass. G isn’t even part of an F major triad!

Jazz musicians have a very large palette of chords to use due to “extensions”, and therefore a large amount of lead sheet symbols. This will be outside the scope of this book. A quick internet search of “jazz lead sheet symbols” will yield great results.

Lesson 29: Minor Scales

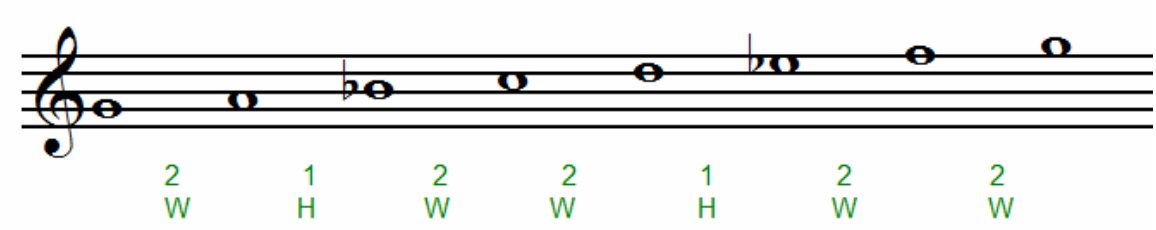




As mentioned in Lesson 16 through Lesson 19, major scales are just one of many types of scales used by composers. Similar to major scales are the three versions of minor scales. A “theoretical” method for identifying and writing minor scales will be presented, followed by a second approach that may seem more “practical” in some situations.

Do not be confused, there is one minor scale with three variants. The first version is the Natural Minor Scale, next is the Harmonic Minor Scale, and the third is the Melodic Minor Scale.

Below is the natural minor scale beginning on G4.



As with the major scales, there is an identifying interval pattern unique to the natural minor scale. All natural minor scales will have this pattern regardless of the tonic pitch. (Recall that “tonic” is scale degree 1, or the starting pitch, for the scale.)

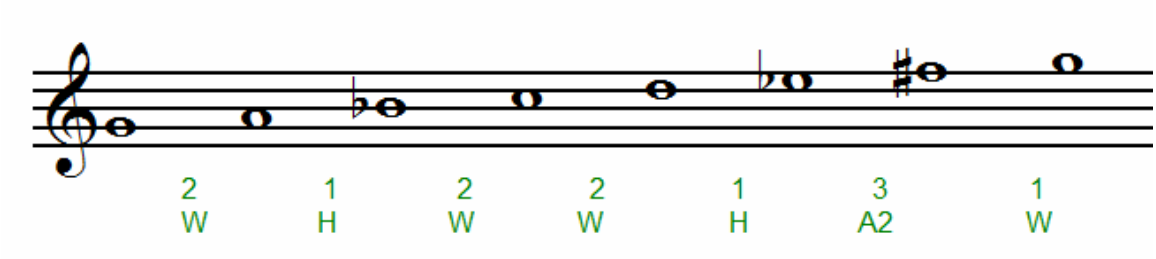
The intervallic pattern for natural minor is:

2—1—2—2—1—2—2

Or if you prefer the “whole step and half step” method.

W—H—W—W—H—W—W

Presented next is the harmonic minor scale.

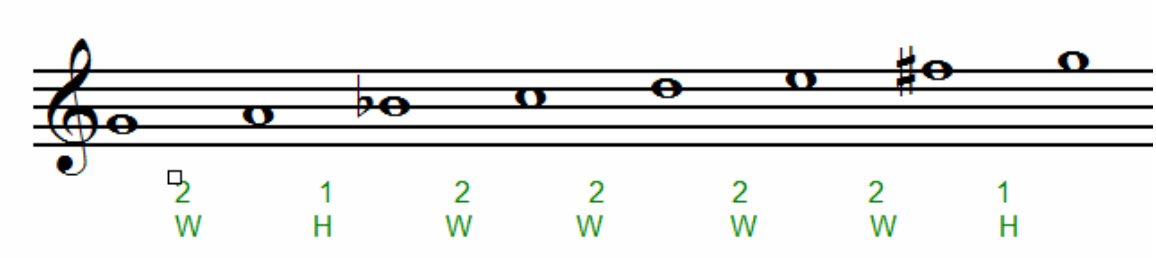


Its intervallic pattern is:

2—1—2—2—1—3—1
W—H—W—W—H—A2—H

Remember from Lesson 20, Intervals, that A2 is an augmented second. This augmented second gives the harmonic minor scale a very unique sound, almost like it is from the orient or middle east.

The melodic minor scale is shown here.



Its intervallic pattern is:

2—1—2—2—2—2—1
W—H—W—W—W—W—H

As with major scales, if you think of these intervallic patterns as “tetrachords” it is sometimes easier to remember.

All versions of minor scales have 2—1—2 as the lower tetrachord. (This sounds like a good reason to say there is just one scale, but three versions.) An interval of 2 then separates the lower tetrachord from the upper tetrachord. Natural

minor has 1—2—2 as the upper tetrachord, harmonic minor has 1—3—1 as its upper tetrachord, and melodic minor has 2—2—1 for the upper tetrachord.

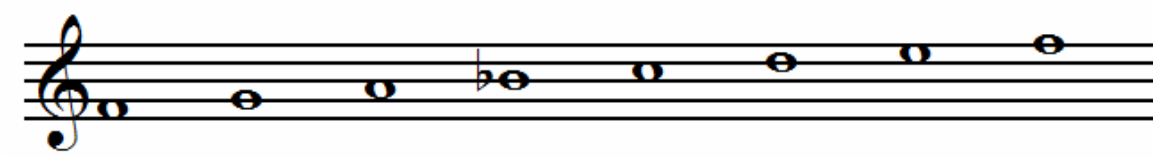
Notice that the melodic minor (upper) tetrachord is the same as the major tetrachord (2—2—1.) Natural minor (upper) tetrachord is basically the reverse (1—2—2.) Harmonic minor's (upper) tetrachord is a palindrome, that is, the same forwards or backwards, like "kayak" or "level" or "A Toyota." (1—3—1)

Practical Method

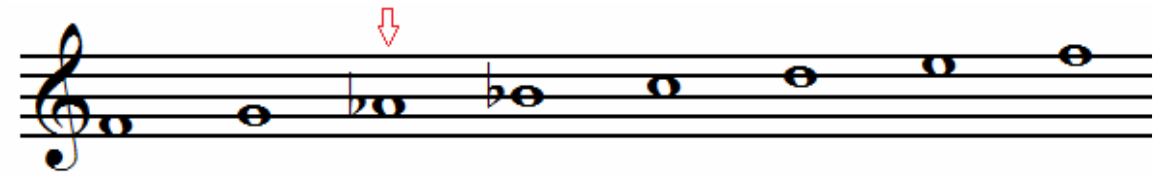
Two approaches will be presented. The first starts with the major scale; the second starts with the natural minor. Both of these approaches work, most of the time!

Practical Method 1

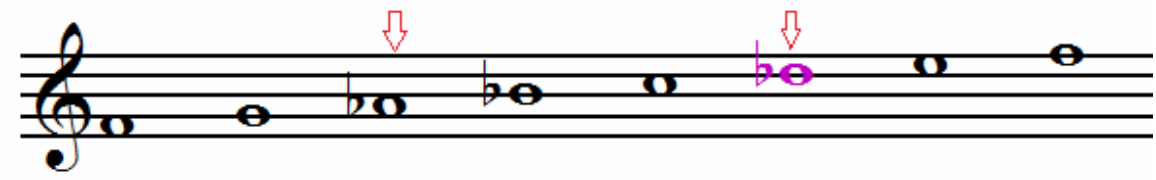
Below is the F major scale.



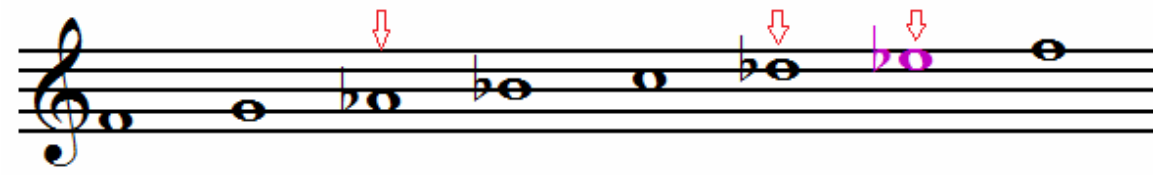
If scale degree 3 is lowered by one half step, the melodic minor version is created.

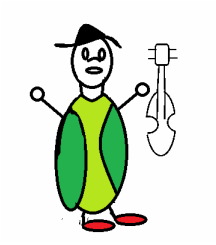


Now, using the melodic minor scale as the next starting point, lower scale degree 6 by one half step to create the harmonic minor scale.



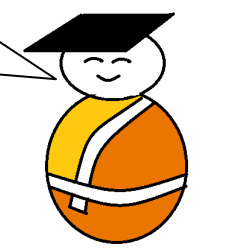
Finally, using the harmonic minor scale as the start, lower scale degree 7 by one half step to create the natural minor scale.





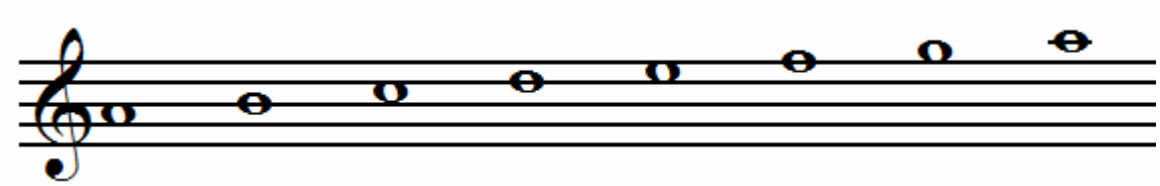
Professor, that is so easy!

Yes, Cricket, it is, as long as you know the major scales AND the tonic pitch for the minor scale is one of the “normal” pitches used for major scales. There’s trouble if tonic is G# because no one usually plays the G# major scale.

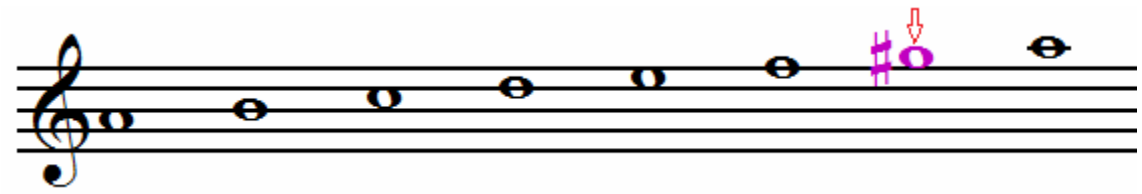


Practical Method 2

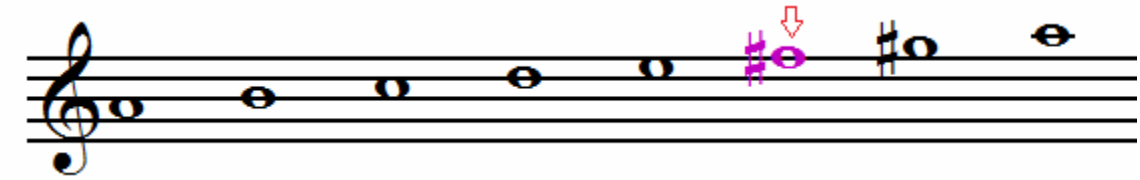
This method is similar to Practical Method 1, but it starts with the natural minor scale. This is the way most people are taught minor scales, by the way!



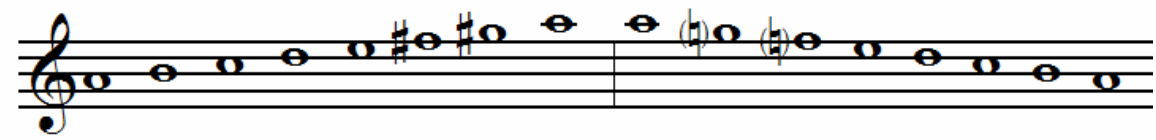
To create the harmonic minor scale, simply raise scale degree 7 by a half step.

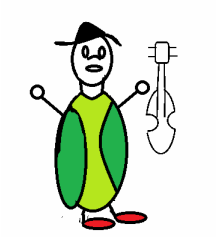


Now to create melodic minor, raise 6 and 7 of the natural minor scale (or just 6 if you think of the harmonic minor as a middle step.)

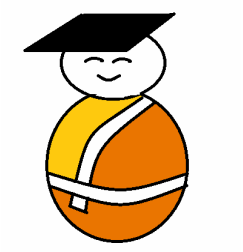


It needs to be pointed out that all of the scales have been shown ascending only. That's because the pitches are the same ascending and descending. BUT, melodic minor scale will revert to the natural minor scale when descending.





Professor, why are there 3 versions of minor scales?

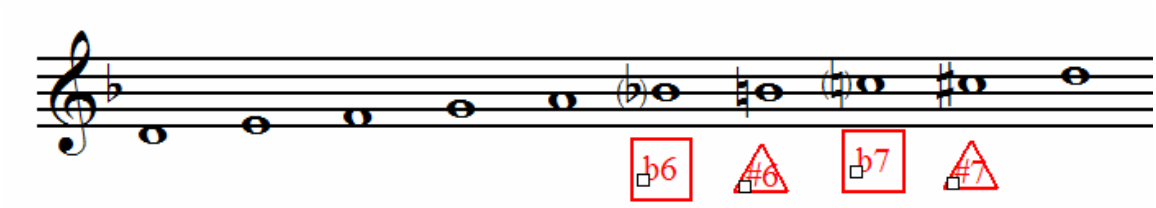


Again, Cricket, you pose an insightful question. The natural minor scale is essentially the starting point. As I will discuss in the next Lesson, it is related to the major scale by key signature. But its scale degree 7 is 2 half steps below tonic and does not have the same "pull" toward tonic as a true leading tone (1 half step) does. Raising scale degree 7 puts the leading tone into the scale, thus creating the harmonic minor scale. Unfortunately, that interval of "3" between scale degree 6 and 7 is awkward to sing, so composers also raised scale degree 6 to make it easier to sing. *Voila*, the melodic minor scale. And you might ask why does melodic minor revert back to natural minor? Well, let's just say gravity works and pulls the pitches back down to the natural minor scale.

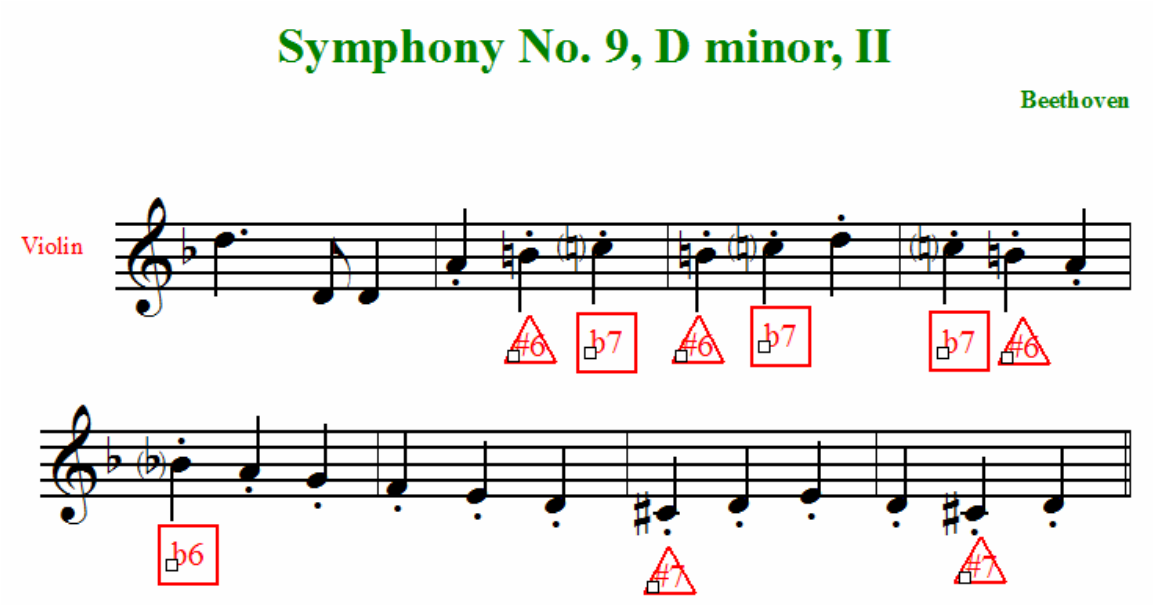
In reality, composers rarely use a single version of the minor scale, but tend to mix the three versions in a way that they think sounds best for their melodies. Because of this, the three versions of minor scales are "collected" into one scale called a "synthetic minor scale," shown below. Notice that the lowered scale degree 6 and lowered scale degree 7 from the natural minor version are included,

plus the raised 7 from harmonic and melodic minor, and raised scale degree 6 from melodic minor, are ALL included.

The excerpt that follows is from the Second Movement of Ludwig von Beethoven's (1770-1827) Symphony No. 9 in D minor, the "Ode to Joy" symphony. Notice that Beethoven uses lowered and raised scale degree 6 and lowered and raised scale degree 7.



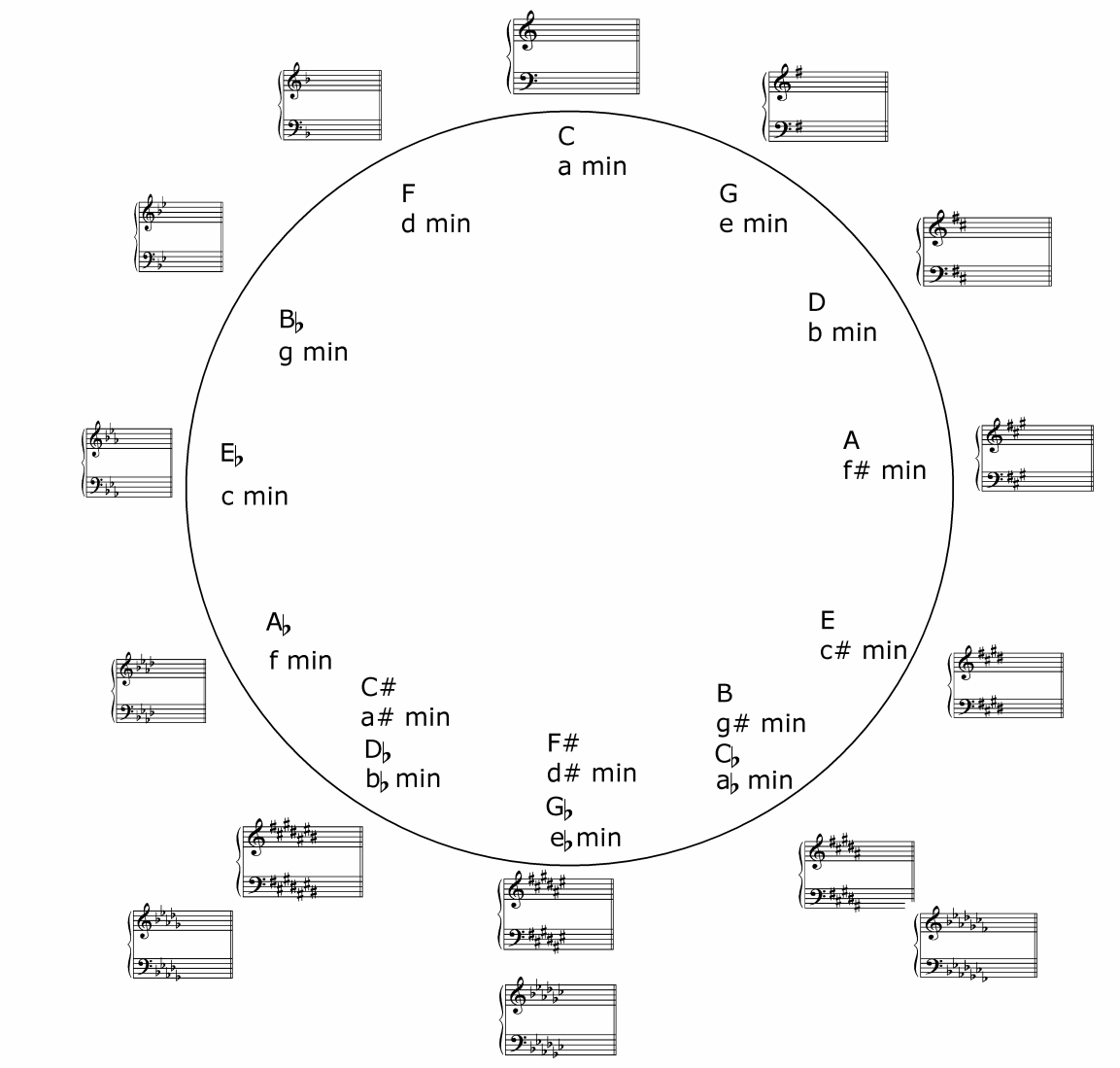
"Synthetic Minor Scale"



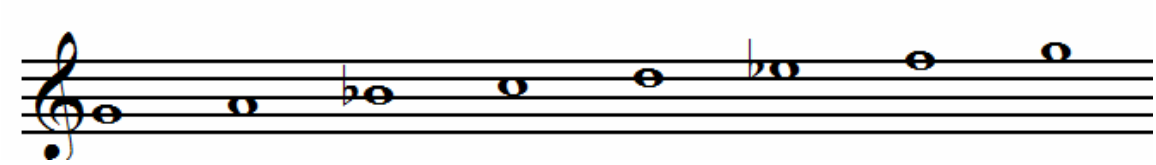
Lesson 30: Minor Key Signatures and Key Relationships

Minor scales can be written using a key signature just as the major scale can. The key signature always reflects the pitches of the natural minor version of the scale. To create harmonic or melodic minor scales, accidentals are added to the scale as necessary.

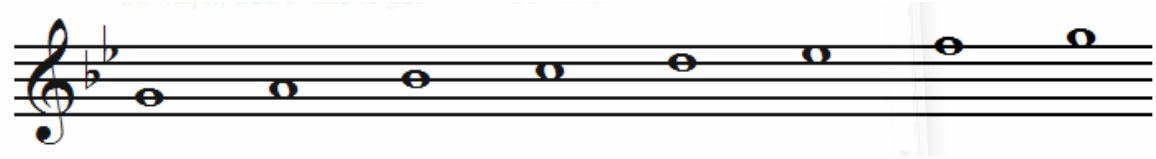
Below is the circle of fifths with the minor keys included.



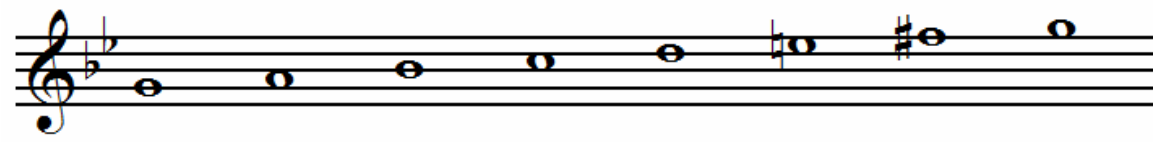
Here is the G natural minor scale, without a key signature.



Now, look at the G natural minor scale, this time with a key signature.



And here is the G melodic minor scale with a key signature. The chromatic alterations (accidentals) for scale degree 6 and 7 are added in the music, not to the key signature. Don't be tempted to change the key signature. It would look funny, and be incorrect, to show this with one flat and one sharp as a key signature!



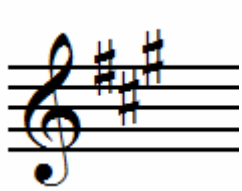
On the circle of fifths notice that C major and A minor are at the same location, F major and D minor are at the same location, etc. Keys with the same key signature are called **relative major** and **relative minor**. (Usually you'll refer to Bb major as the relative major to G minor, or E minor is the relative minor to G major.)

There are also keys with the same letter name or tonic, such as D major and D minor. They do not share the same key signature, and they are not at the same location on the circle, but they are related. Keys with the same tonic pitch are called **parallel keys**. Again, it will be normal to talk of F minor as the parallel minor to F major. You should note that the parallel minor key will have 3 more flats (or 3 less sharps) than its parallel major.

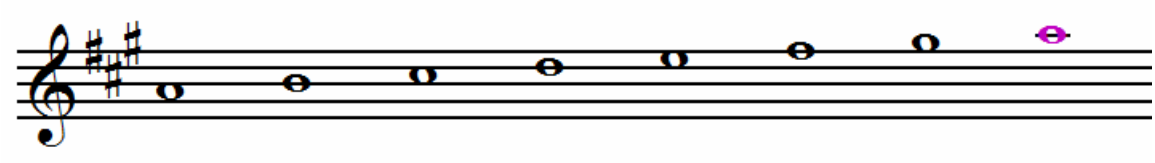
When learning to identify the minor keys for the first time, it is sometimes easier to compare them to the major keys first.

1. Identify the major key (scale) with the same key signature. (That's thinking relative keys.)
2. Determine scale degree 6.
3. Scale degree 6 is the name of the relative minor.

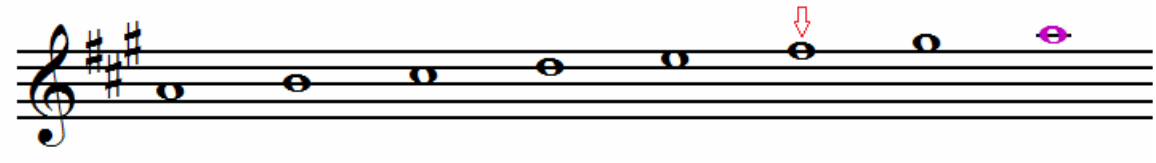
Here is a key signature with three sharps.



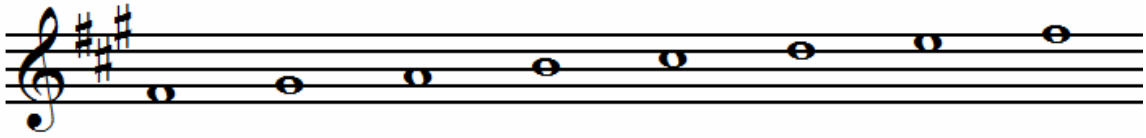
Step 1. Recall that to determine the tonic pitch (name of the key) for a key signature with sharps, the last sharp in the signature is the leading tone of the key. G# is the last sharp, a minor second higher is A, the name of the key.



Step 2. Determine scale degree 6. This can be done by simply thinking the scale from tonic up to scale degree 6, or down to scale degree 6, or thinking up a major sixth from A, or down a minor third from A. (Wow, using many of those skills learned in earlier Lessons!)

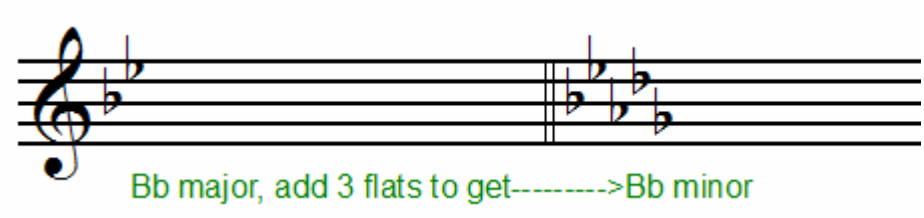


Step 3. Since F# is scale degree 6, it is the tonic pitch of the relative minor key that has 3 sharps in it. Note again, that the key signature represents the accidentals in the natural minor version of the scale. Harmonic minor and melodic minor are created by the addition of accidentals to specific pitches, not with a key signature.



If you are asked to identify the key signature given the tonic pitch, recall the major key signature with the same letter name and add 3 flats. (Or take away 3 sharps. If you think about the circle of fifths as a clock face, you can move “3 hours” in the flat direction and get the same results.)

What is the key signature for Bb minor? Bb major has 2 flats, so add three more flats and Bb minor will have 5 flats. This is, of course, using the parallel relationship between keys to find the parallel minor key signature.



You can develop other “tricks” that will work, but these methods work all the time.

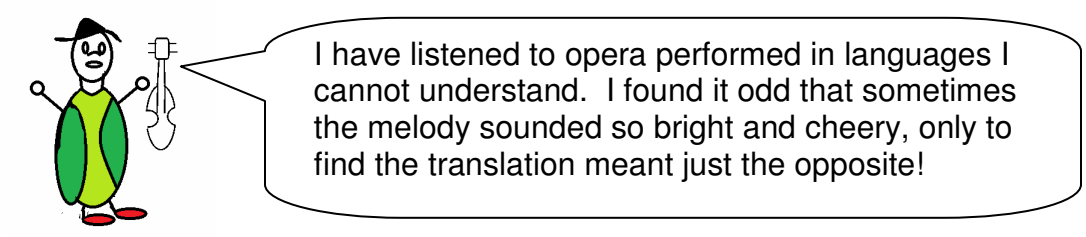
Lesson 31: Composing a Melody

"Composing" is the art of creating music. Composing is often a very individualized and personal experience that sometimes composers have a difficult time expressing the process used to create a melody. (And then there are some who have no trouble sharing their methods!) Many times, composers will have a general idea of a tune, write it down and start "noodling around" on the piano to refine it into something they like and works for their intended purpose.

This Lesson offers some food for thought as you compose your own melodies.

Key

Possibly the first consideration is whether to compose using the pitches from the major scale, or from one of the versions of minor scale. Major keys are often used to share happy feelings, or some kind of emotion that might be considered "positive." Minor keys often reflect sadness or anger. Both of these statements are generalizations, of course, but if you think of happy songs, ("Happy Birthday" or "We Wish You a Merry Christmas") these are based on major scales. Sad songs, like "Phantom of the Opera" or "Fifteen Miles on the Erie Canal," are minor keys.



Once major or minor has been decided, the actual key (C major, G minor…) must be determined. In many ways, the key doesn't matter, but consider the intended performers. Most non-professional musicians are more comfortable playing when the key is between 3 sharps and 3 or 4 flats. Vocalists become concerned with the range, that is, are the pitches too high or too low for them to sing. (This is also something to consider for instrumentalists also.)

Time Signature and Rhythm

If you are composing a melody for a poem, the meter and rhythm should be selected to help emphasize the natural accents in the lyrics. If the composition is a fast march, usually a duple meter is used. Waltzes are in triple meter, and lots of popular tunes are quadruple meter. In the really old days, triple meter was often used for sacred compositions to reflect the Holy Trinity.

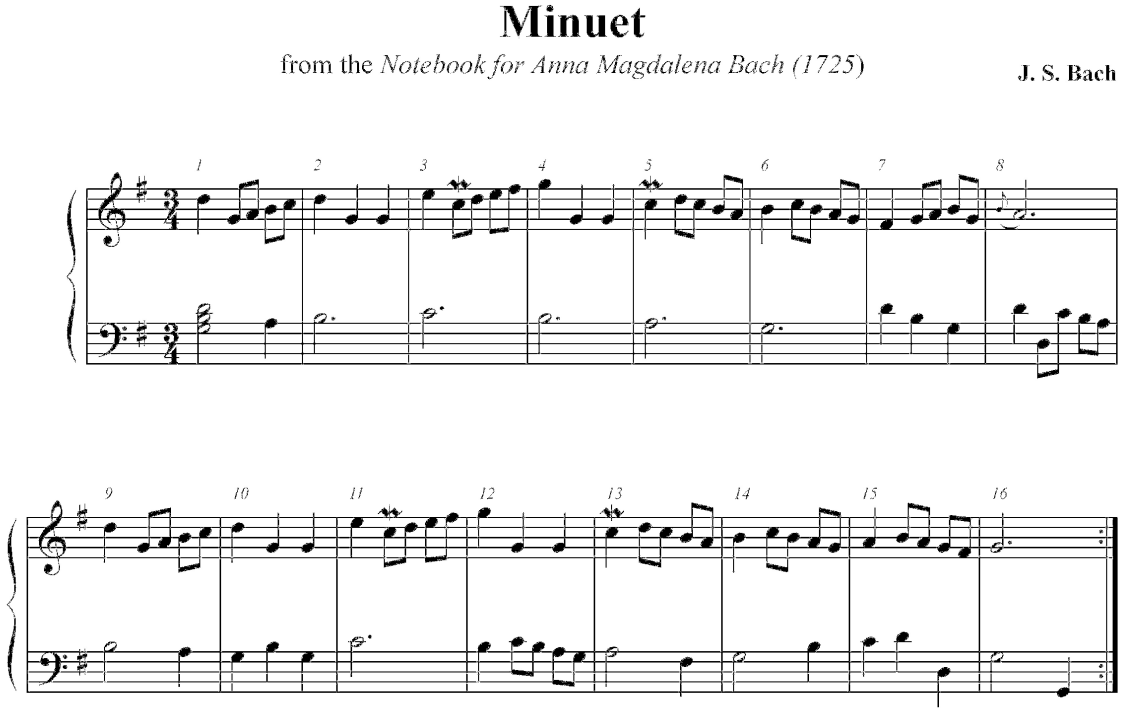
Tempo

Do you want this composition to be a high energy dance tune? Then a fast tempo would be good. Is there a text? If so, a moderate tempo that allows good enunciation might be preferred. Slow tempos are often equated with sad or melancholy tunes.

Intervals

Generally speaking, intervals that are a perfect fourth or smaller should be used, mostly. Larger intervals are often followed by a step-wise motion in the opposite direction of the large leap. Small intervals with a few larger intervals is a good way to add variety and avoid monotony of a purely scale based tune.

Below is an excerpt by Bach shown earlier. Notice that most intervals are seconds (step-wise motion) but there are a few larger leaps.



Dynamics

Loud can be good, but if everything is loud, then loud may not always be loud enough. Soft passages are required to balance to the loud sections.

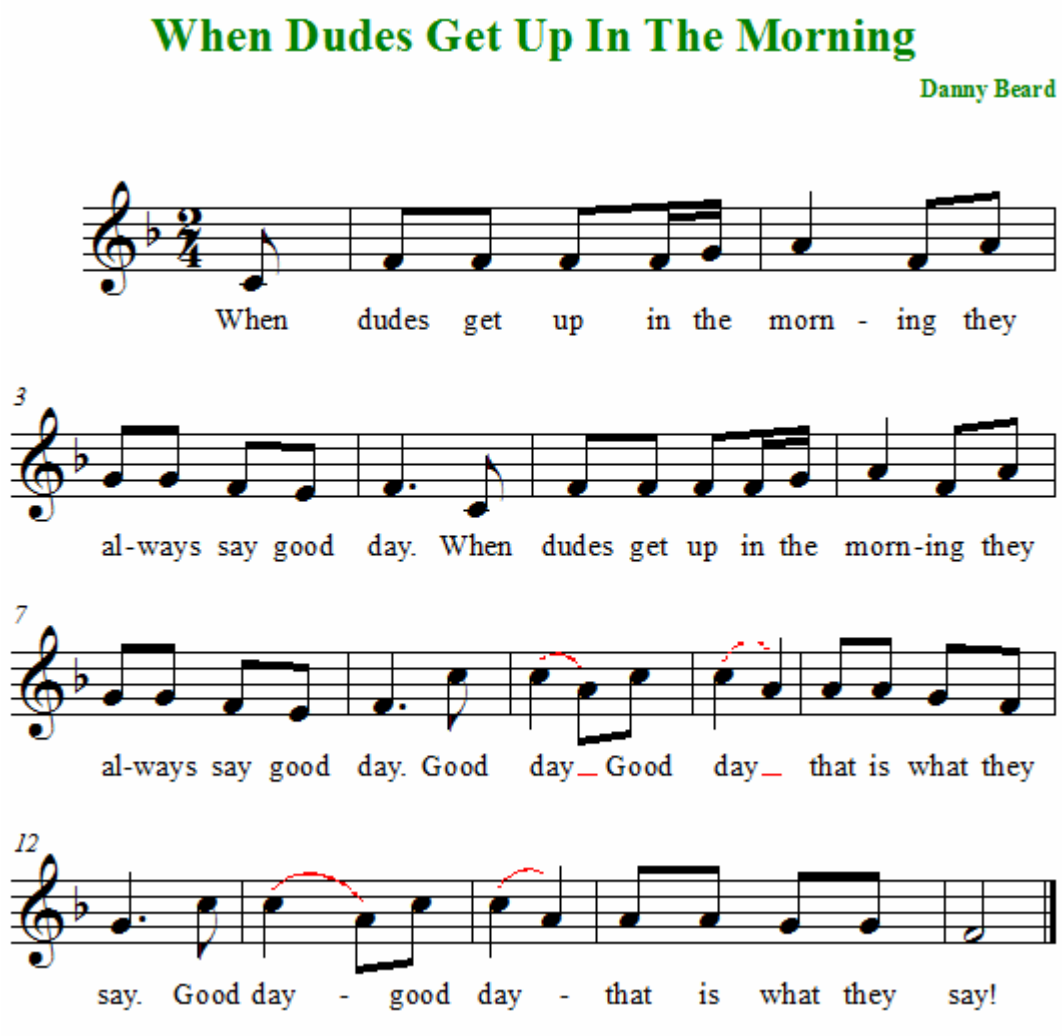
Length, Cadences

Most tunes are built on four measure phrases that end with a cadence. Authentic cadences and half cadences are most frequently used. In Bach's music above,

he has weak authentic cadences at measures 4 and 12, but stronger cadences at measure 8 (half cadence) and measure 16 (authentic cadence.)

Unless you have a very specific reason to do otherwise, don't end your tune with a half cadence as it will sound unfinished. One reason to do so might be setting a text that speaks of eternity, or of unending love. To end with a half cadence will sound inconclusive and therefore might be used to reflect eternity or never ending!

Below is a little ditty I made up for waking up my sons each morning. I chose major key to start the day on a "happy" sound, F major because it is within my voice range, and 2/4 as the tune is somewhat of like a march. There are many repeated pitches and step-wise motion, but a few leaps. The largest leap I used is a perfect fifth in measure 8.



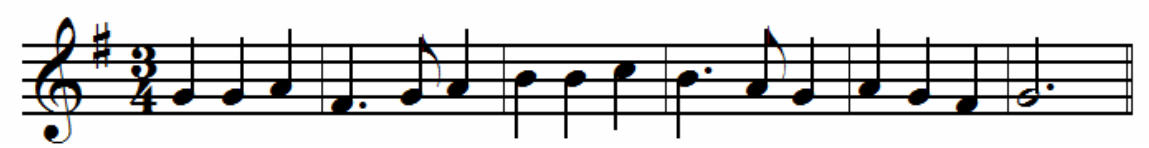
Lesson 32: Harmonizing a Melody

Adding chords, or harmonic support, to a melody usually takes several steps.

Step 1. Determine the key of the melody. If you composed the melody, this is probably a “no-brainer,” but if you are harmonizing a tune composed by someone else, you’ll need to look for clues.

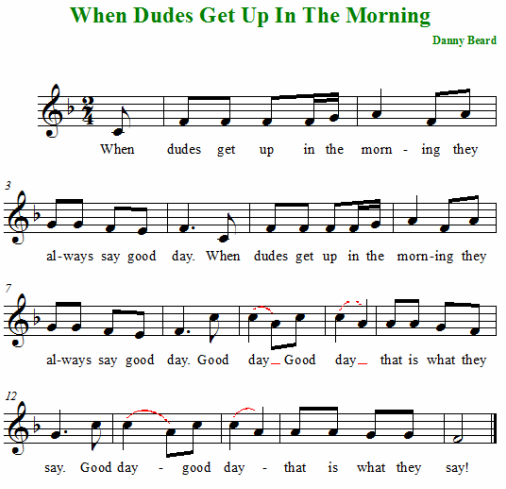
First, collect all the pitches used in the tune into one location. Can these pitches be arranged into a single major scale? If yes, you possibly have your answer. Do you see a specific accidental that happens repeatedly? Is this the altered scale degree 7 that would indicate a minor scale?

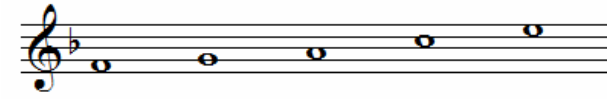
Sometimes there are two possible keys! Look at “My Country Tis of Thee.”



The key signature would indicate G major, all of these pitches are part of G major scale and using our memory of the tune, G major is probably correct. But, this key signature and these pitches also belong to E minor. Since there is no D or D# in this short excerpt, it could also be considered E minor!

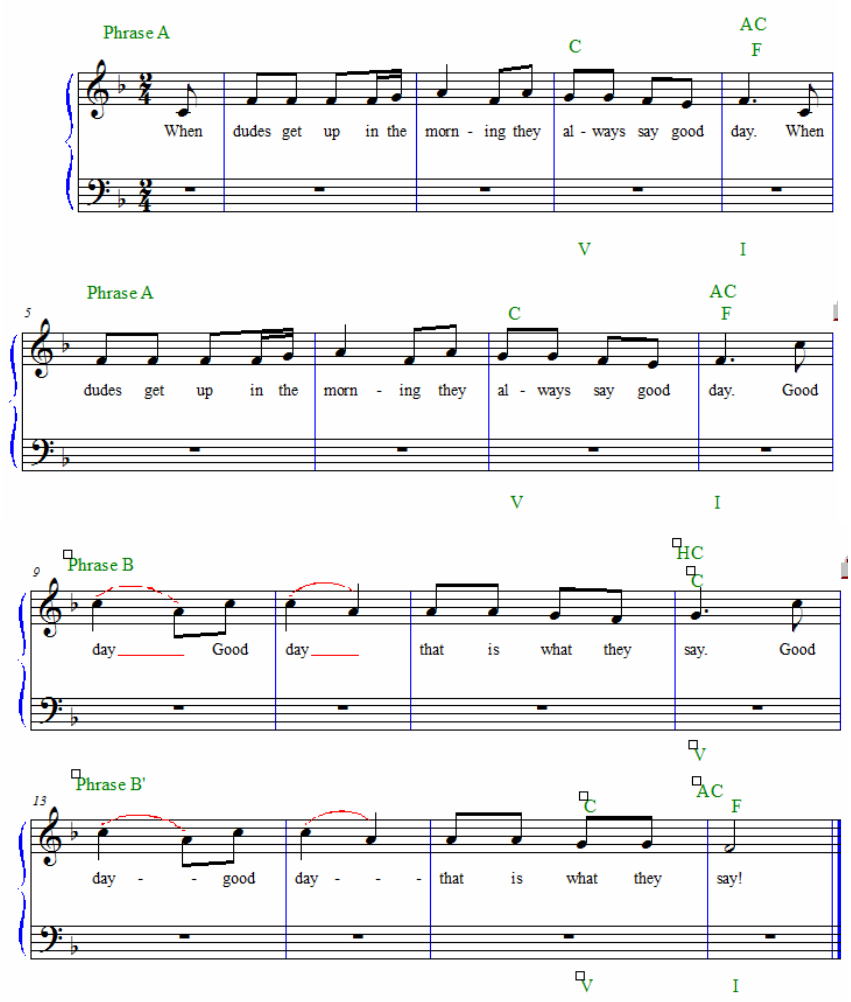
Here is “When Dudes Get Up In The Morning” again. The key signature is one flat and the collection of pitches creates the F major scale, though it does have some pitches missing. This tune should probably be best harmonized in F major.





Step 2. Determine where the phrases are and decide what cadences to use. “When Dudes…” has four phrases as shown. Since “good day” in measure 4 and in measure 8 have E to F (or Ti to Do, if you like solfege) this is a good place for an authentic cadence, V to I. Measure 12 relaxes on “say” on scale degree 2, G. This is a good place for a half cadence, V. The fourth phrases ends with “they say” on G to F, another great place for an authentic cadence. Since measures 1-4 and 5-8 are identical, they are both labeled the same, “Phrase A.” Measures 9-12 and measures 13-16 are ALMOST the same, so they are labeled B and B’. The “prime” indicates the phrases are almost the same, but not exactly.

With cadences identified, chords can be added to support these phrase endings. You can use lead sheet symbols, or Roman numerals, or both if you like!



Step 3. Finish the chord selection by examining the melody and determining which chords match most of the pitches. For many songs, the “harmonic rhythm”

will be about one chord per measure. (Harmonic rhythm has nothing to do with “rhythm,” it is a term used to describe how often the chords change.)

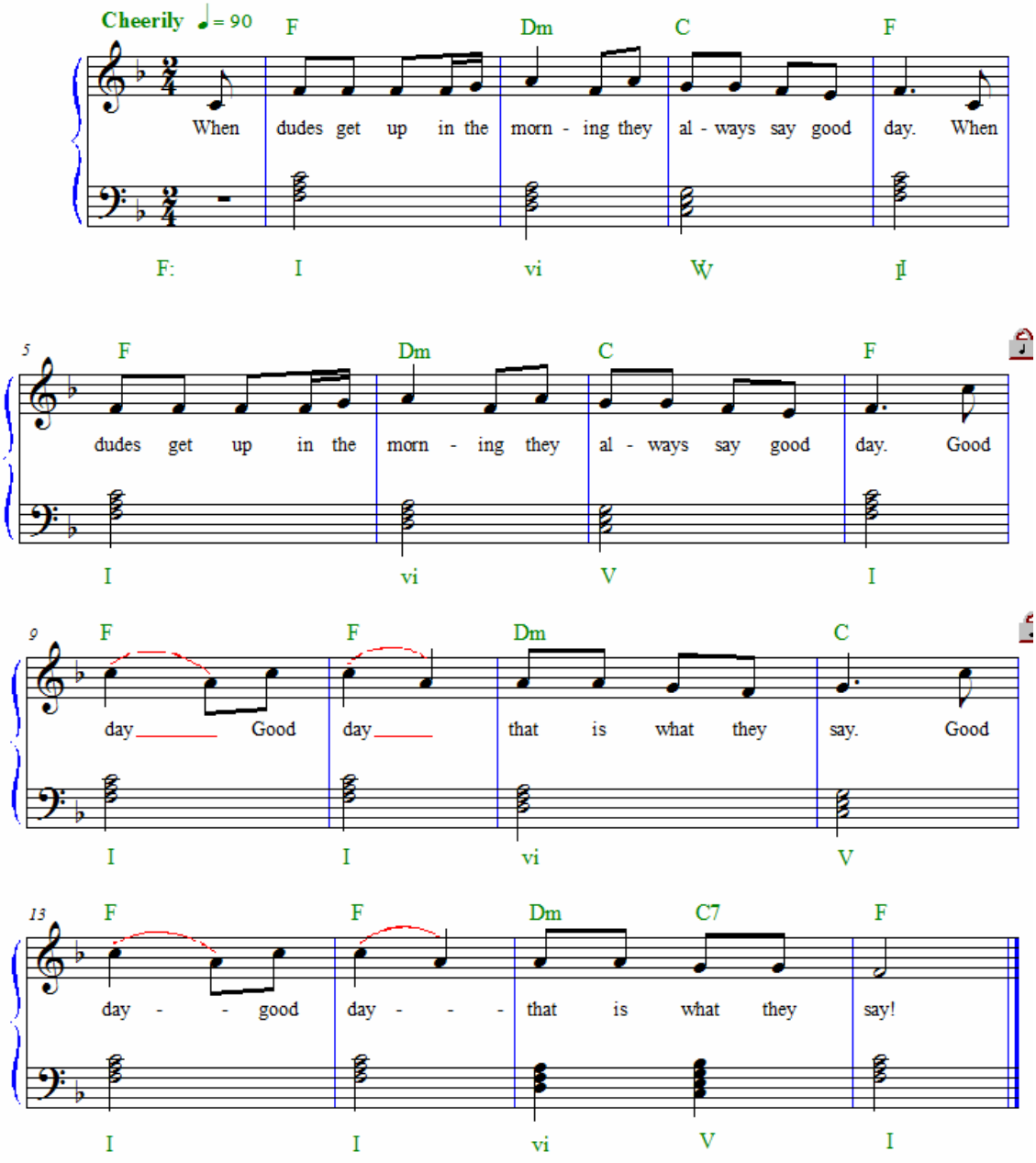
When I say “match” I mean that the pitches in the melody are part of the chord. In the first full measure, there are only F and G for pitches. F is root of the F major triad, the tonic chord, so that will be the best choice for the first chord.

Below shows lead sheet symbols, Roman numerals and also pitches in the bass clef to support the melody.

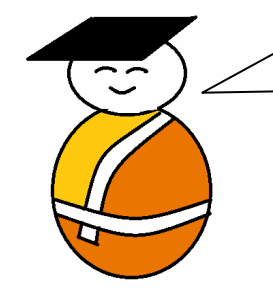
Most of the chords are tonic (F) or dominant (C) but Dm chords are used in measures 2, 6, 11 and 15. The pitches F and A are both part of the Dm chord and add a little variety to the harmonization. The next to last chord has been changed to V7 (C7) to add more intensity and drive to the song’s ending.

When Dudes Get Up In The Morning

Pop



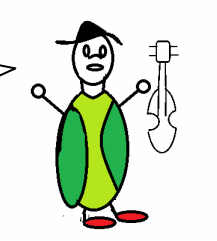
Coda

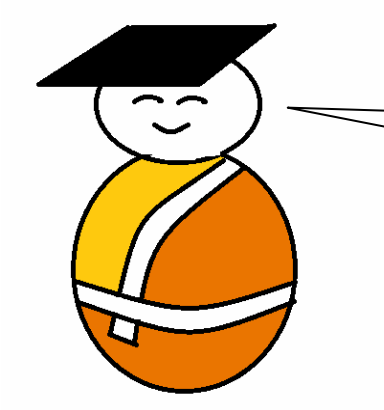


My dear Cricket, this concludes your trek to understand the basics of music. It is now time for you to begin applying what you have learned as you begin the great journey into musicianship.

Go in peace!

Most Excellent Professor Powe, thank you sincerely for you wise and patient guidance as I have sought to unlock the mysteries of music theory. I have learned much, but mostly I have gained an understanding that this is not as difficult as I originally thought. I will forever be in your debt.





It has been MY pleasure to serve you!

Soli Deo Gloria.