Reading Music: Common Notation

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C O N N E X I O N S

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How to Read Music[1]

Introduction

This is the first module in the course Reading Music[2], which is an introduction to common notation (p. 8). This module includes:

- Some basic definitions (p. 8)
- Practical suggestions for learning how to read music accurately and independently (Section : Learning to read music accurately and independently)
- Practical suggestions for learning how to use sheet music as a guide and memory aid (Section : Using written music as a guide and memory aid)
- A discussion of alternative music notations (Section : Other Types of Music Notation)
- A discussion of music reading vs. playing by ear (Section : Playing by Ear)

Reading music involves both skill and knowledge. In other words, you need to both understand how it works and also practice doing it. You won't improve without the practice, so learning how to read music will take some time and energy. The understanding is also important, however; if you don't understand clearly how the symbols you see are related to the sounds you hear, you can end up practicing incorrectly, which wastes your time and may result in bad habits that are difficult to break. You may be able to save yourself some time and frustration if you understand clearly what your goals as a musician are. In case you are not certain about your goals, the next section is a list of common reasons (Section : Why do you want to read music?) for wanting to read music. You can read through the list to see which ones describe you, and follow the links to the suggestions that will be most useful to you.

Why do you want to read music?

What is the best way to learn to read music? That depends on what you hope to be able to do. Some musicians may be better off concentrating on ear training rather than music-reading. Others will need to learn how to read music very accurately, so that they can play a piece of music exactly as written, regardless of whether they have heard it before, and regardless of what other people are playing. Some musicians just want to be able to use written music to help them figure out difficult pieces or remember long ones. Others would find a tablature or a shorthand notation more useful. You may already know which of these goals applies to you. If not, read through the following descriptions to see which one sounds the most like your goal.

- **Play a written part in an ensemble -** In many music genres, the composer (or arranger) writes specific parts for the various instruments in an ensemble (p. 8). The parts often fit together in very precise and complex ways, so performing them correctly requires that all group members be able to read music accurately and independently (Section : Learning to read music accurately and independently).

[1] This content is available online at <http://cnx.org/content/m43040/1.1/>.
[2] *Reading Music: Common Notation* <http://cnx.org/content/col10209/latest/>

Classical Western genres, such as symphonies, piano sonatas, and string quartets are the most obvious examples, but playing in jazz "big bands" or in the "horn section" of a popular band may also require good music-reading skills.

- **Play whatever is put in front of me (with or without a little practice)** - Learning long or complex pieces by ear and playing them from memory is time-consuming and difficult for most musicians. If you want to be able to learn new pieces quickly and build up a large repertoire of music that you can play well, it will be very useful to learn to read music accurately and independently (Section : Learning to read music accurately and independently).
- **Sing a written part in an ensemble** - If you want to sing as one member of a section (p. 8), you may be able to do it by ear, learning your part by listening to the other members of your section. Developing your music memory and ear-training (Section : Playing by Ear) skills may be more useful than learning to read music. However, if you have trouble memorizing pieces, have trouble distinguishing your part from other parts, or need to take a leadership role in your section, you may find it useful to learn how to use written music as a guide and memory aid (Section : Using written music as a guide and memory aid). Learning to read music independently (i.e. without hearing it first) as a vocalist requires a great deal of practice and ear-training. (See following paragraph.)
- **Sing a written part as a soloist** - The vocalist who sings solos, or is the only voice singing a particular part in an ensemble, or who needs to lead a vocal section, may find it very helpful to learn how to use written music as a guide and memory aid (Section : Using written music as a guide and memory aid). Vocalists who have developed a very accurate ear can learn how to read music independently (Section : Learning to read music accurately and independently), without hearing it first, but this is an advanced skill that takes much time and practice to develop. Learning to read music accurately and independently is harder for a singer than for an instrumentalist. Musical instruments provide strong visual and physical cues (such as piano keys or flute fingerings) that are associated with specific pitches. Vocalists don't have such strong cues. They must rely on their ear to tell them if they are producing the right pitch, so it is often a good idea for vocalists to begin by focusing on ear training (Section : Playing by Ear).
- **Sing whatever anyone puts in front of me** - Sight-singing (p. 8) is an excellent exercise for any musician. However, as explained in the previous paragraph, it is a advanced skill. If this is your goal, you must pursue both ear training (Section : Playing by Ear) and reading music accurately (Section : Learning to read music accurately and independently).
- **Sing or play in a popular-genre band** - In many genres of music, the written music is typically either a lead sheet (p. 8) or a piano reduction (p. 8), rather than separate written parts. Typically, band members are expected to create and play a part that is typical for their instrument, given the rhythm, harmony and style of the music. Band members who need to do this may find it more useful to learn to play by ear (Section : Playing by Ear) in their favorite styles. Lead sheets and piano reductions often include simplified notations (Section : Other Types of Music Notation) such as chord symbols, so learning these alternative notations can help you get started more quickly than learning common notation. The typical instrumentation of small bands (for example, guitar, drums, and bass, with just one or two solo voices or instruments) makes it fairly easy to create parts that do not clash with each other. However, the larger and more complex the group gets, the more useful written music is to ensure that parts fit together well. In any genre or style, members of large groups may need to be able to read music accurately and independently (Section : Learning to read music accurately and independently). Typically, there are standard ways to create a part for a particular instrument in a particular genre, but if you want to get more creative, you may also be interested in learning to improvise.
- **Improvise music, or improvise a part** - Many kinds of popular, jazz, non-Western, and fusion musics feature improvisation. If you are most interested in these kinds of music, you may want to begin by focusing on ear training (Section : Playing by Ear). However, some of these music styles also require that performers learn to read music accurately and independently (Section : Learning to read music accurately and independently). For example, many jazz forms call for ensemble members to take

turns improvising solos, and to play written parts when not soloing.

- **Decipher pieces that are too complex to learn by ear -** If you are happy playing by ear most of the time, and the main thing you want to do is play some pieces that you cannot learn by ear, you may not need to spend a lot of time learning to read music accurately. If you know what the music sounds like, but simply cannot figure out the notes or chords, you may be able to use written music as a guide and memory aid (Section : Using written music as a guide and memory aid). Or you may be able to use an alternative notation (Section : Other Types of Music Notation) to help you decipher difficult parts.
- **Compose or arrange music** - Written music is a very useful aid to remembering and working on compositions and arrangements, as well as sharing them with others. Even if you are comfortable preserving and sharing your work in the form of recordings and lead sheets, some of your fans may prefer written parts! Learning to read music accurately and independently (Section : Learning to read music accurately and independently) will be worth the time and effort.
- **Play music from other traditions -** Common notation was developed for use with Western music[3], so Western genres are what it represents most clearly. It is often not ideal for writing other kinds of music, particularly music that uses very different approaches to scales[4], tuning systems[5], harmony[6] or rhythm[7]. You may be better off concentrating on ear training (Section : Playing by Ear) or on an alternative notation (Section : Other Types of Music Notation) that was developed for the music that interests you.

Learning to read music accurately and independently

Common Notation

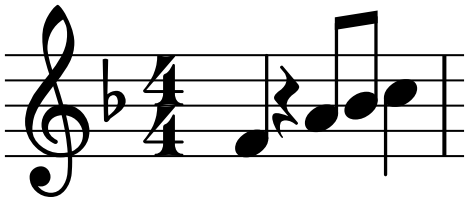


Figure 1: Common notation - a 5-line staff with notes and rests - is the most widely recognized type of music notation.

Most people, when they say they want to learn how to read music, are referring to **common notation**. This is the "notes on a five-line staff" notation that was invented in Europe and has since spread around the world. There are other methods for writing and reading music, and each method has advantages and disadvantages. Some of the advantages of common notation include:

- Common notation is an efficient way of organizing a large amount of information so that it can be read quickly.

[3] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[4] "Scales that are not Major or Minor" <http://cnx.org/content/m11636/latest/>
[5] "Tuning Systems" <http://cnx.org/content/m11639/latest/>
[6] "Harmony" <http://cnx.org/content/m11654/latest/>
[7] "Rhythm" <http://cnx.org/content/m11646/latest/>

- Because it is so widely used around the world, in so many different musical genres, it serves as a "common language" even among musicians who play different instruments in different genres.
- It does not depend on the instrument. Once you learn how to read common notation, much of what you know will still be useful if you switch instruments or learn new instruments.
- Common notation includes enough information so that you can learn a piece without hearing it. Many other notations leave out crucial information, such as exact rhythms.

The biggest drawback to common notation is that it is a challenge to learn how to read it well. The main reason for this is that it does condense a lot of information into a format that you can read quickly if you are accustomed to it. If you are not accustomed to it, the amount of information that you must decipher in the space of one beat can seem overwhelming. So the hardest part of learning to read music is getting started.

Confusing now, but convenient later

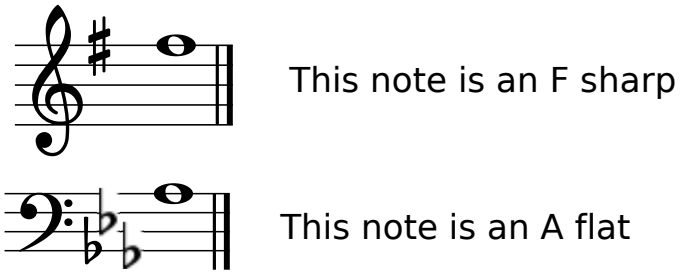


Figure 2: At first glance, these two notes may look the same, but one note is actually an F sharp, while the other is an A flat that is more than an octave lower than the F sharp. **The notes on each staff are the notes that are most likely to be played.** Are you more likely to play high notes or low notes? More likely to play sharp notes or flat notes? It depends on the instrument and on the piece of music. Common notation is very easy to read quickly once you get used to it, because the most likely notes are the easiest ones to read. But getting used to it takes practice and can be a bit confusing at first.

Another part of the challenge is that it is often not clear to beginners whether they are playing the written music correctly. In order to decide, they must pay attention simultaneously to the written music, the physical things that need to be done to produce the notes (such as fingerings (p. 8)), and the sounds they are actually making. The experienced musician can focus attention where it should be, on the sound, because the reading and the physical effort have become fairly automatic. Inexperienced music readers may be uncertain what kinds of sounds match the written music, as well as having difficulty with listening attentively at the same time that they are playing.

Reading rhythms accurately is particularly difficult for beginning instrumentalists. If you are using the correct fingerings or keys, you may be reasonably certain that you are playing the right pitches. If you are not certain, you can stop to check. It is more difficult for the beginner to be certain whether a rhythm is being played correctly. Also, rhythm is the aspect of music that happens in real time, so the rhythm changes if you stop to check or correct things. Many beginners can easily fall into bad habits such as misreading triple meters or adding extra time for difficult passages, because they are unable to listen critically while they are playing and also uncertain as to how to interpret written rhythms. After a time, the bad habits can be difficult to correct.

For this reason, most beginners who want to learn to read music accurately should get help from an experienced musician. If there is nobody available to help you learn to read music at this time, you might

be better off concentrating on playing by ear until a teacher is available. I do make some suggestions below (Helping yourself, p. 5) for those who have no choice, but there are a number of ways to enlist the help of others so that you can learn to read music correctly from the start:

Getting help from others

- **Private lessons** with a music teacher who plays your instrument and reads music well are the fastest, easiest, least frustrating way to learn to read music accurately.
- **Classes** such as "beginners' band" or "guitar class" involve less individual help for each student, so progress is usually slower. However, they usually cost much less than private lessons, and may even be free. Also, the social aspects of learning in a group and playing music with others can make classes more fun and less stressful than lessons for many beginning musicians. Classes may be available through a local music store, private music academy, community program, or philanthropic organization, as well as through school-based programs.
- **If you do not have the time or money for a long-term commitment to lessons or classes**, consider taking lessons or classes occasionally or for a short period when you have specific questions and goals and plenty of time to practice.
- **If you cannot afford a professional music teacher**, consider offering a smaller amount for more informal help from a non-professional musician who is experienced in reading music.
- **If there is no teacher available on your instrument**, a good music teacher who specializes in a different instrument can still be very helpful with basics such as music-reading, listening skills, and musicianship.
- **If you are in an ensemble that includes music readers**, they may be willing to help you, particularly if the help mainly involves occasional, specific questions. If you are not in an ensemble (p. 8), consider looking for one that would welcome you.

Helping yourself

- If there is no way to get personalized help, **try a book-with-recording or a video or online course**. I don't have recommendations for a specific course. What you are looking for is a format that you find easy to understand, and that introduces pieces as both written music and audio recordings. Play along with the recording while looking at the written music. Actively search for the connections between what you are seeing and hearing. If you are learning how to play the instrument, make sure you use books intended for beginners. If you can already play, start with books, videos, or courses that introduce pieces that are interesting to you but not difficult.
- **If you already play an instrument well** and understand keys[8], you might prefer to study the sheet music to your favorite pieces, but be careful! Be aware that what you are seeing may not be the same as what you are hearing. For example, the written version of a popular song is often simpler than the way it is sung in well-known recordings.
- **If you already know a little bit about reading music**, or knew how to do it at one time, or are getting just a little bit of reading help from friends and band-mates, you may be able to use this course on Reading Music[9] to answer specific questions, jog your memory, or build on what you already know.
- The distractions of reading and playing make it difficult to listen carefully at the same time, so **make recordings of yourself** and listen to them carefully, reading along with the music to see if the sound really matches the written music.

Using written music as a guide and memory aid

As explained above (p. 4), it is very difficult to learn to read music accurately without the help of an experienced music teacher, but you may not want or need to know how to read music that accurately. If you

[8] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[9] *Reading Music: Common Notation* <http://cnx.org/content/col10209/latest/>

already know what a piece of music sounds like, you can let that knowledge be your guide as you practice playing the piece yourself. In this case the written music is serving as a guide to help you discover more quickly which notes or chords you are supposed to play and to help you keep track of what to play next, so that you don't have to memorize the entire piece.

Getting help from others

- Taking lessons or a class for a short time can help you get started quickly and may give you a good enough idea of the basics to make further progress on your own.
- You can also benefit from occasional lessons after you get started, particularly if you arrive at the lesson with a list of specific questions and ready to play some pieces that illustrate the problem you are having.
- If you are in an ensemble with music-readers, or you have friends who can read music, they may not mind answering the occasional, specific question.

Helping yourself

- Instrumentalists will want to concentrate first on learning how to play each written pitch on the instrument (for example, knowing where a written "middle C" is, on a piano, guitar, or fiddle). A beginner's book or "teach yourself. . ." book can help you learn this. Let your ear guide you on rhythms. You may be able to begin making sense of rhythms by noticing how the meter of a piece organizes the rhythms into beats and measures (see Meter for more about this.)
- Vocalists, on the other hand, will find it easier and more useful to start with learning how to read rhythms. Join a choir if at all possible, and start making connections between the written rhythms, the conductor's beat, and the part you are singing. Let your ear guide you on pitches. You may be able to begin making sense of written pitches by noticing how the contour of the written notes follows the contour of the sound (see Melody[10] for more about this).
- You may be able to use this course Reading Music[11] as a guide to understanding common notation.
- Work on developing the ability to critique your own performance, especially if you do not take lessons or classes. If you find it difficult to listen objectively while you are playing or singing, record yourself and then listen carefully to the recording. Fix the problems that you know how to fix. Get help from others when you hear problems that you do not know how to fix.
- Understand that you may develop some quirks in your playing and music-reading, and that such quirks are more acceptable in some music genres than others. A self-taught blues guitarist who develops unusual techniques and plays mostly by ear fits well within the tradition; a self-taught concert pianist would not be as easily accepted.

Other Types of Music Notation

Common notation is not the only method of writing music down. Most other notations do not include as much information as common notation, and are not as useful as a "common written language" for musicians, but some people find them easier to learn, easier to use, and perfectly adequate for their needs. Widely-used alternative notations include:

- **Tablatures** - A tablature is a method of writing for a specific instrument. It usually notates the music by referring to how each note is played on that instrument. For example, a note written in guitar tablature[12] simply indicates where the note should be played (which string, and which fret). Many beginning instrumentalists find tablature to be much easier to learn than common notation.

[10] "Melody" <http://cnx.org/content/m11647/latest/>
[11] *Reading Music: Common Notation* <http://cnx.org/content/col10209/latest/>
[12] "Reading Guitar Tablature" <http://cnx.org/content/m11905/latest/>

- **Chord-Symbol Notations** - For many musicians, notating the chord progression[13] is enough. They know how to construct a part for their instrument based on each chord. This is a particularly useful skill for musicians in popular genres and jazz. Typically, beginners will simply memorize how to play the most common chords. Eventually, a basic knowledge about how chords are constructed helps the more advanced player to be able to decipher any chord symbol. (See Triads[14] and Beyond Triads[15] for more about this.
- **Shape-note and other in-key notations** - Some notations, rather then emphasizing the exact pitch of a note, emphasize its place within the key. This is most useful for singers, as it is easier for most singers to hear where a note belongs within the key than to know how high or low it is in an absolute sense.
- **Shorthand notations** - There are also notations, such as figured bass, that use some of the conventions of common notation, along with a shorthand that allows the performer at a glance to understand what notes may or may not be played. These are usually used in very specific contexts; for example, figured bass is typically used in Baroque music.
- **Notations from Non-western musical traditions** - Western music developed a highly detailed notation for a specific reason: in order to accurately share complex music in which each part is specifically composed. In most other music traditions, complexity is typically added at the discretion of the performer rather than the composer. For this reason, most other traditions rely largely on memorization, improvisation, and shorthand-style notations. If you are focused on learning one of these traditions, you may find it useful to learn the notation that goes with it. Western notation is often inadequate for accurately notating music that comes from a tradition with different expectations for rhythm, tuning, or harmony.

Getting help from others

- Find lessons or classes with a teacher who is familiar with the type of notation that you want to learn.
- Find a group to play with that typically uses that kind of notation, and that would not mind helping you while you learn to play with them.
- Find a friend or amateur musician familiar with the notation that interests you, who would not mind giving you some informal help for free, or for a small fee.

Helping yourself

- If you are already an experienced musician and simply want to learn a new type of notation, you can probably do it on your own using books or Internet-based resources. I do not have any recommendations for specific books or sites.
- If you are a beginning musician, you will probably want to get some help from others if at all possible. If that is not possible, try to find resources that include audio as well as written materials, and as you practice, pay close attention to the correlations between how the music is notated and what it sounds like.

Playing by Ear

Throughout history, people all over the world have learned and passed on their musical traditions without using written notation. Music is sound, and teaching and learning it by way of sound has many benefits, including:

- The student naturally concentrates on imitating the teacher and producing a musical sound, rather than concentrating on the written music.

[13] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[14] "Triads" <http://cnx.org/content/m10877/latest/>
[15] "Beyond Triads: Naming Other Chords" <http://cnx.org/content/m11995/latest/>

- Some of the subtle qualities that define good musicianship are very difficult, even impossible, to notate.
- The student who learns by ear can play by ear, a useful skill that many notation-reading musicians do not develop.

Getting help from others

- If you are taking music lessons, ask for help with ear-training. Mention the specific goals that you would like to reach. (For example: "I want to be able to improvise harmonies by ear.")
- Playing by ear is often considered a less formal approach to music. Some music teachers have a preferred curriculum that does not include playing by ear. If you are looking for a music teacher, find one who is comfortable with teaching and learning by ear.
- Sign up for lessons, ensembles, or classes, in music genres that feature playing by ear. This includes many kinds of jazz and traditional musics.

Helping Yourself: Make these activities part of your regular practice routine

- Play ear training games[16] by yourself or with friends.
- Pick a tune that you have heard many times but never seen, and try to play it.
- Pick a tune that you have already learned how to play, and try to play it in a different key.
- Play along with your favorite recordings. You can either try to play a part that you can hear, or try improvising your own additions to the music.

Definitions

- **Ear training** - refers to practices that are designed to help musicians develop aural skills. For example, a musician with a well-trained ear might be able to play an instrument by ear, sight-sing accurately, improvise a part, or name a note or chord after hearing it.
- **Ensemble** - Any group of people playing music together. This is a general, catch-all term that refers to groups of any size (from duo to large orchestra), and any genre (popular, classical, folk, traditional), and also includes both temporary and permanent groups (from those assembled for a one-time-only event to groups that play together for many years).
- **Fingering** - refers to the placement of the fingers to get a particular note, chord, or series of notes on an instrument. Two examples: The "fingering" for C sharp on a recorder involves covering specific holes with the fingers. If a piano student is struggling to play a difficult line, the teacher might suggest an "alternate fingering" - different choices for which finger to use for each note - that will make the line easier to play.
- **Independent parts** - The "independence" of a part refers to how different it is from other parts that are being played or sung at the same time. There is a range from parts that are essentially the same (for example, everyone singing the melody of a song together), to parts that are somewhat independent (for example, a harmony part that has the same rhythm as the melody) to very independent parts (for example, the lone cymbal player in an orchestra, whose part is very different from all the others).
- **Lead sheet** - (pronounced "LEED," not "LED") A highly simplified written version of a piece of music. The lead sheet typically includes only the written melody along with crucial information about the piece's style, chord progressions[17], and form[18].
- **Piano reduction** - Can also be called a **piano score** or simply **sheet music**. A piano reduction condenses all of the important parts of the piece into one part that can be played on a piano. Sheet music of songs also typically includes the words and notes of the melody, and often includes chord symbols (Section : Other Types of Music Notation).

[16] "Ear Training" <http://cnx.org/content/m12401/latest/>
[17] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[18] "Form in Music" <http://cnx.org/content/m10842/latest/>

- **Playing by ear** - refers to learning, performing, and understanding music by listening to it, rather than referring to written notations.
- **Section** - In a large ensemble, a section is a group of people who are playing the same instrument (for example, the "trumpet section") or have the same voice range (for example "the alto section"). At any time, a section may all be singing or playing the same part, or may be divided and performing multiple parts. (If each part has more than one performer, you can also refer to the divided parts as sections, for example the "second clarinet" or "second alto" section.)
- **Sight-reading** - refers to the first time someone tries to read an unfamiliar piece of written music and play it. Musicians who become very good at sight-reading can play a piece correctly the first time they see the written music, even if they have never heard the piece. Those who are not yet good at it can practice this skill (an excellent exercise that I highly recommend). Even if they make many mistakes, it is still considered sight-reading, with the goal of learning to produce the correct fingerings and rhythms more quickly.
- **Sight-singing** - refers to singing an unfamiliar piece based solely on written music. For most musicians, sight-singing is more difficult than sight-reading with an instrument. Because vocalists have more trouble than instrumentalists in identifying and learning from their mistakes, the term "sight-singing" is typically only used when the vocalist is doing an adequate job of singing what is written. Sight-singing is vocal sight-reading and using the term "sight-reading" is also appropriate.

Chapter 1

Pitch

1.1 The Staff[1]

People were talking long before they invented writing. People were also making music long before anyone wrote any music down. Some musicians still play "by ear" (without written music), and some music traditions rely more on improvisation and/or "by ear" learning. But written music is very useful, for many of the same reasons that written words are useful. Music is easier to study and share if it is written down. Western music[2] specializes in long, complex pieces for large groups of musicians singing or playing parts exactly as a composer intended. Without written music, this would be too difficult. Many different types of music notation have been invented, and some, such as tablature[3], are still in use. By far the most widespread way to write music, however, is on a **staff**. In fact, this type of written music is so ubiquitous that it is called **common notation**.

1.1.1 The Staff

The **staff** (plural **staves**) is written as five horizontal parallel lines. Most of the notes (Section 2.1) of the music are placed on one of these lines or in a space in between lines. Extra **ledger lines** may be added to show a note that is too high or too low to be on the staff. Vertical **bar lines** divide the staff into short sections called **measures** or **bars**. A **double bar line**, either heavy or light, is used to mark the ends of larger sections of music, including the very end of a piece, which is marked by a heavy double bar.

[1] This content is available online at <http://cnx.org/content/m10880/2.14/>.
[2] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[3] "Reading Guitar Tablature" <http://cnx.org/content/m11905/latest/>

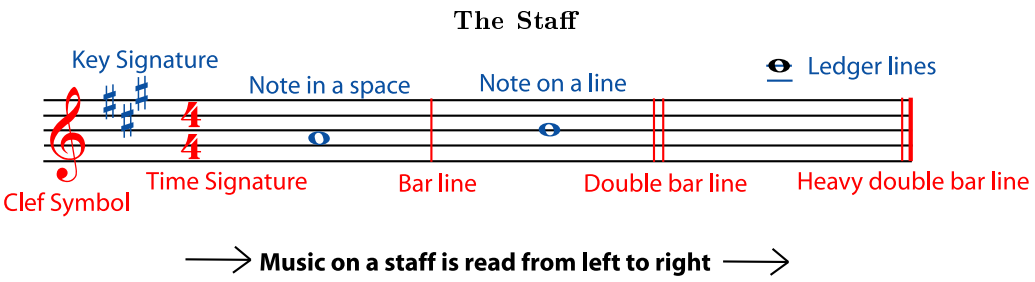


Figure 1.1: The five horizontal lines are the lines of the staff. In between the lines are the spaces. If a note is above or below the staff, ledger lines are added to show how far above or below. Shorter vertical lines are bar lines. The most important symbols on the staff, the clef symbol, key signature and time signature, appear at the beginning of the staff.

Many different kinds of symbols can appear on, above, and below the staff. The notes (Section 2.1) and rests (Section 2.2) are the actual written music. A note stands for a sound; a rest stands for a silence. Other symbols on the staff, like the clef (Section 1.2) symbol, the key signature (Section 1.4), and the time signature (Section 2.3), tell you important information about the notes and measures. Symbols that appear above and below the music may tell you how fast it goes (tempo (Section 2.6) markings), how loud it should be (dynamic (Section 3.1) markings), where to go next (repeats (Section 2.7), for example) and even give directions for how to perform particular notes (accents (p. 69), for example).

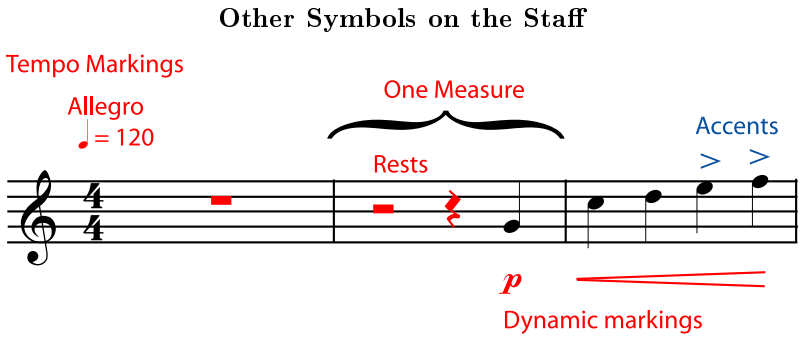


Figure 1.2: The bar lines divide the staff into short sections called bars or measures. The notes (sounds) and rests (silences) are the written music. Many other symbols may appear on, above, or below the staff, giving directions for how to play the music.

1.1.2 Systems of staves

The staff is read from left to right. Staffs (some musicians prefer the plural **staves**) are read, beginning at the top of the page, one staff at a time unless they are connected. If staves should be played at the same

time (by the same person or by different people), they will be connected by a long vertical line at the left hand side, to create a **system**. They may also be connected by their bar lines. Staves played by similar instruments or voices, or staves that should be played by the same person (for example, the right hand and left hand of a piano part) may be grouped together by braces or brackets at the beginning of each line.

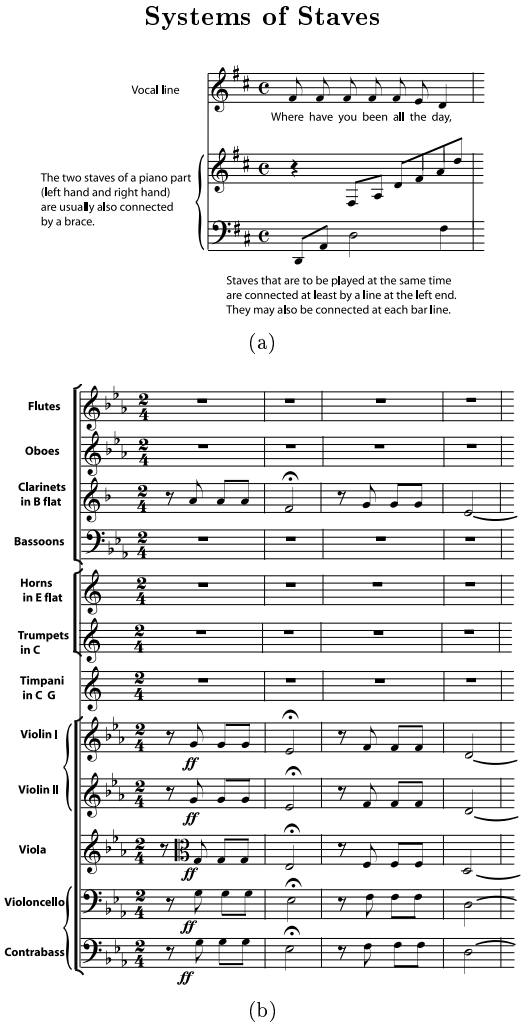


Figure 1.3: (b) When many staves are to be played at the same time, as in this orchestral score, the lines for similar instruments - all the violins, for example, or all the strings - may be marked with braces or brackets.

1.2 Clef[4]

1.2.1 Treble Clef and Bass Clef

The first symbol that appears at the beginning of every music staff (Section 1.1) is a **clef symbol**. It is very important because it tells you which note (Section 2.1) (A, B, C, D, E, F, or G) is found on each line or space. For example, a **treble clef** symbol tells you that the second line from the bottom (the line that the symbol curls around) is "G". On any staff, the notes are always arranged so that the next letter is always on the next higher line or space. The last note letter, G, is always followed by another A.

Treble Clef

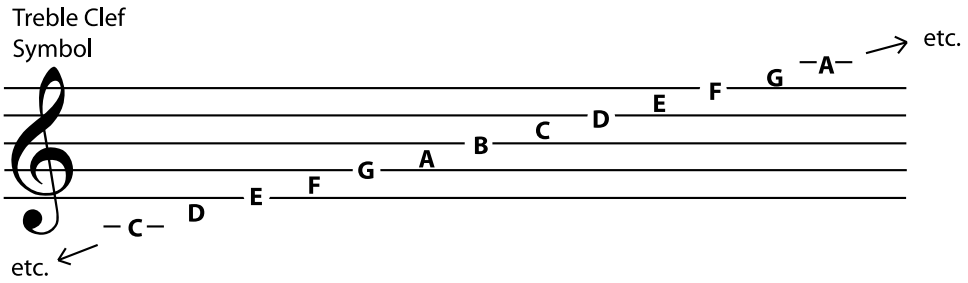


Figure 1.4

A **bass clef** symbol tells you that the second line from the top (the one bracketed by the symbol's dots) is F. The notes are still arranged in ascending order, but they are all in different places than they were in treble clef.

Bass Clef

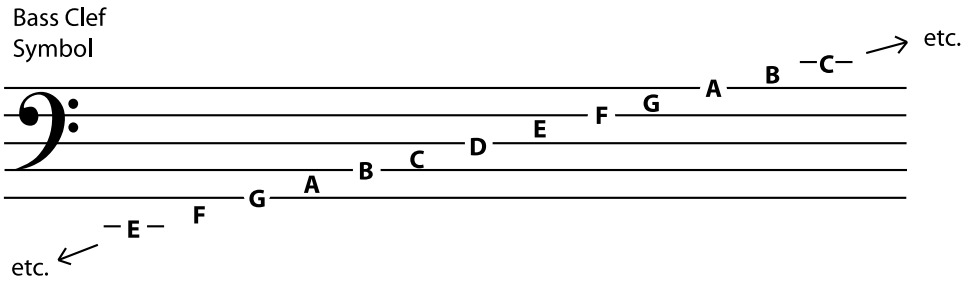
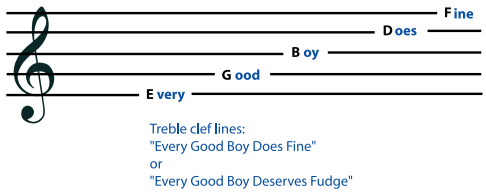


Figure 1.5

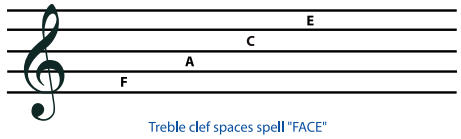
[4]This content is available online at <http://cnx.org/content/m10941/2.21/>.

1.2.2 Memorizing the Notes in Bass and Treble Clef

One of the first steps in learning to read music in a particular clef is memorizing where the notes are. Many students prefer to memorize the notes and spaces separately. Here are some of the most popular mnemonics used.

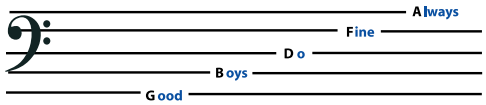


Treble clef lines:
"Every Good Boy Does Fine"
or
"Every Good Boy Deserves Fudge"

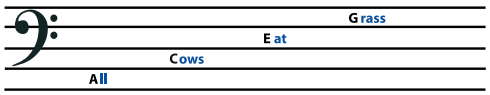


Treble clef spaces spell "FACE"

(a)



Bass clef lines:
"Good Boys Do Fine Always"
or
"Good Boys Deserve Fudge Always"



Bass clef spaces:
"All Cows Eat Grass"

(b)

Figure 1.6: You can use a word or silly sentence to help you memorize which notes belong on the lines or spaces of a clef. If you don't like these ones, you can make up your own.

1.2.3 Moveable Clefs

Most music these days is written in either bass clef or treble clef, but some music is written in a **C clef**. The C clef is moveable: whatever line it centers on is a middle C[5].

[5] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/#p2bb>

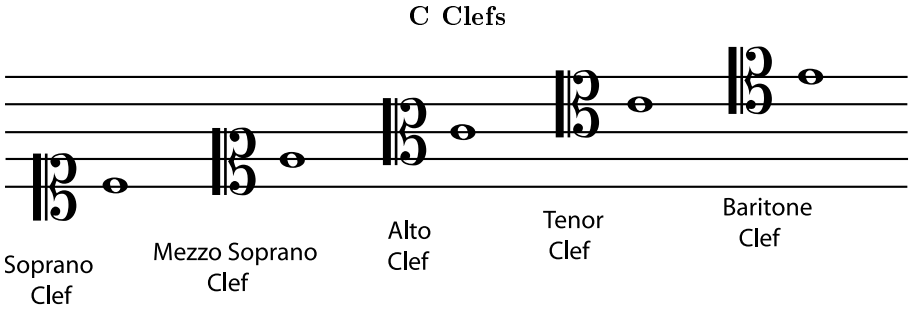


Figure 1.7: All of the notes on this staff are middle C.

The bass and treble clefs were also once moveable, but it is now very rare to see them anywhere but in their standard positions. If you do see a treble or bass clef symbol in an unusual place, remember: treble clef is a **G clef**; its spiral curls around a G. Bass clef is an **F clef**; its two dots center around an F.

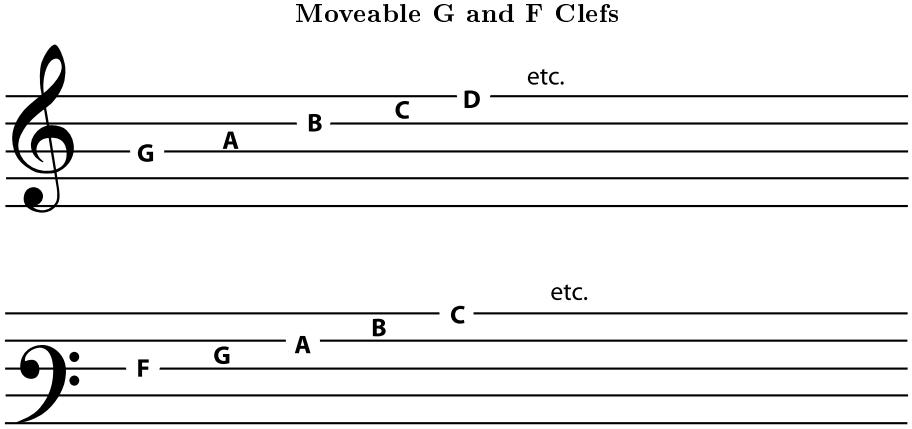


Figure 1.8: It is rare these days to see the G and F clefs in these nonstandard positions.

Much more common is the use of a treble clef that is meant to be read one octave below the written pitch. Since many people are uncomfortable reading bass clef, someone writing music that is meant to sound in the region of the bass clef may decide to write it in the treble clef so that it is easy to read. A very small "8" at the bottom of the treble clef symbol means that the notes should sound one octave lower than they are written.

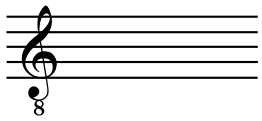


Figure 1.9: A small "8" at the bottom of a treble clef means that the notes should sound one octave lower than written.

1.2.4 Why use different clefs?

Music is easier to read and write if most of the notes fall on the staff and few ledger lines (p. 11) have to be used.

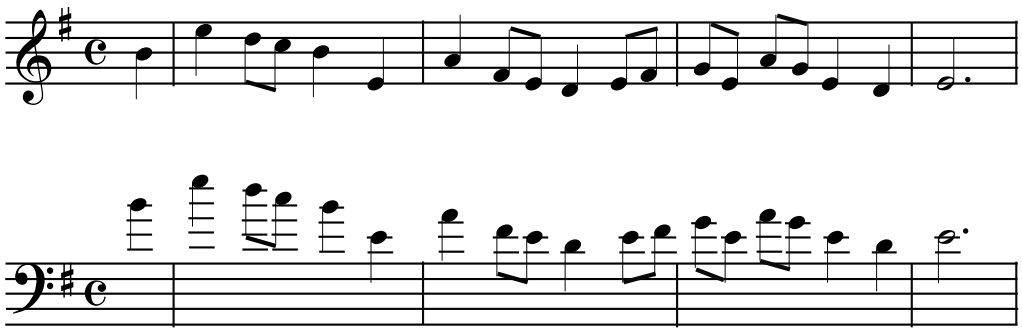


Figure 1.10: These scores show the same notes written in treble and in bass clef. The staff with fewer ledger lines is easier to read and write.

The G indicated by the treble clef is the G above middle C[6], while the F indicated by the bass clef is the F below middle C. (C clef indicates middle C.) So treble clef and bass clef together cover many of the notes that are in the range[7] of human voices and of most instruments. Voices and instruments with higher ranges usually learn to read treble clef, while voices and instruments with lower ranges usually learn to read bass clef. Instruments with ranges that do not fall comfortably into either bass or treble clef may use a C clef or may be transposing instruments[8].

[6] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/#p2bb>
[7] "Range" <http://cnx.org/content/m12381/latest/>
[8] "Transposing Instruments" <http://cnx.org/content/m10672/latest/>

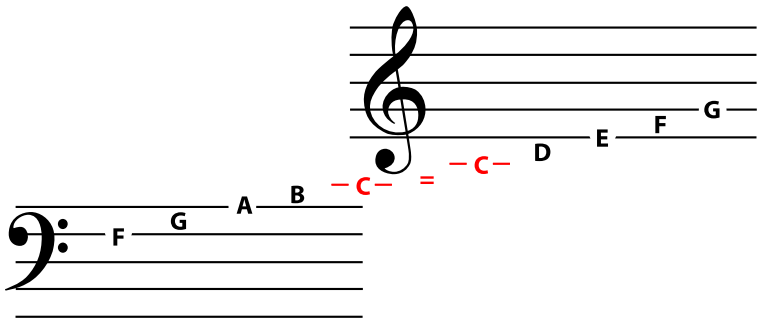


Figure 1.11: Middle C is above the bass clef and below the treble clef; so together these two clefs cover much of the range of most voices and instruments.

Exercise 1.2.1 *(Solution on p. 34.)*

Write the name of each note below the note on each staff in Figure 1.12.

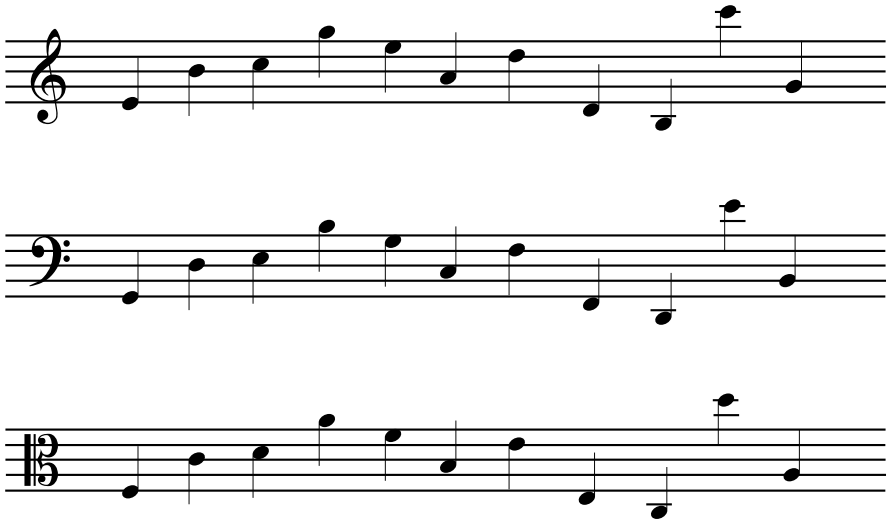


Figure 1.12

Exercise 1.2.2 *(Solution on p. 34.)*

Choose a clef in which you need to practice recognizing notes above and below the staff in Figure 1.13. Write the clef sign at the beginning of the staff, and then write the correct note names below each note.

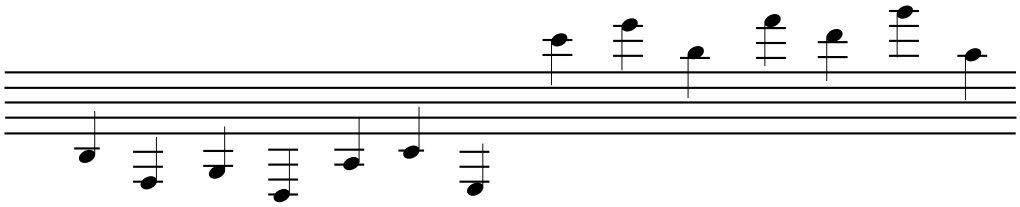


Figure 1.13

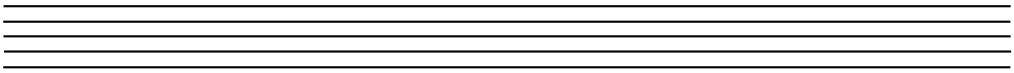
Exercise 1.2.3 ***(Solution on p. 35.)***

Figure 1.14 gives more exercises to help you memorize whichever clef you are learning. You may print these exercises as a PDF worksheet[9] if you like.

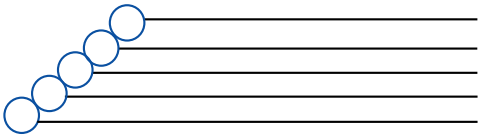
[9]See the file at <http://cnx.org/content/m10941/latest/ClefWorksheet.pdf>

Clef Practice

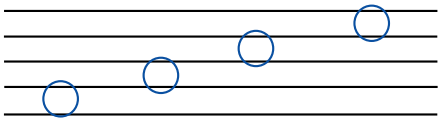
Practice writing your clef symbol on this staff. Write at least eight clef symbols



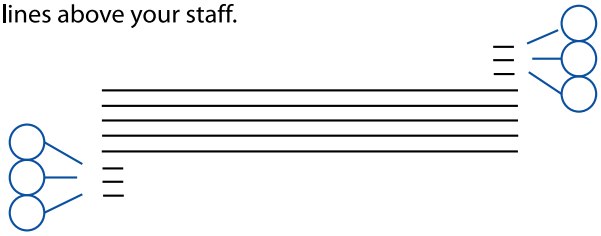
Write the letter names of the lines in your staff:



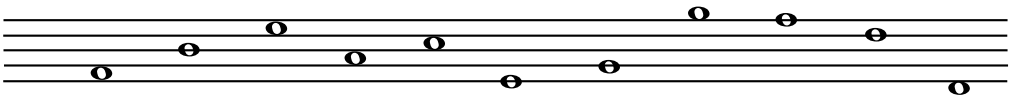
Write the letter names of the spaces:



Write the letter names of the three ledger lines below
and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.

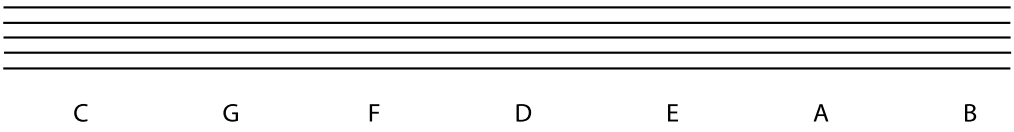


Figure 1.14

1.3 Pitch: Sharp, Flat, and Natural Notes[10]

The **pitch** of a note is how high or low it sounds. Pitch depends on the frequency[11] of the fundamental[12] sound wave of the note. The higher the frequency of a sound wave, and the shorter its wavelength[13], the higher its pitch sounds. But musicians usually don't want to talk about wavelengths and frequencies. Instead, they just give the different pitches different letter names: A, B, C, D, E, F, and G. These seven letters name all the **natural** notes (on a keyboard, that's all the white keys) within one octave. (When you get to the eighth natural note, you start the next octave[14] on another A.)

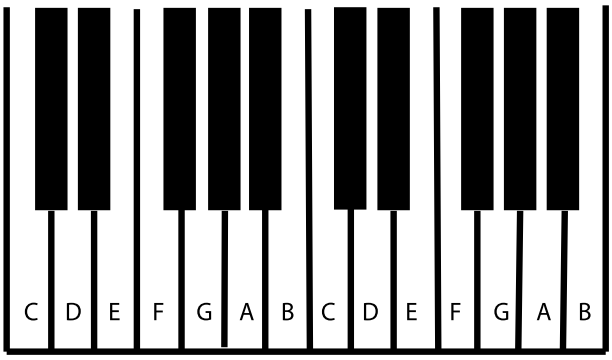


Figure 1.15: The natural notes name the white keys on a keyboard.

But in Western[15] music there are twelve notes in each octave that are in common use. How do you name the other five notes (on a keyboard, the black keys)?

[10] This content is available online at <http://cnx.org/content/m10943/2.14/>.
[11] "Acoustics for Music Theory": Section Wavelength, Frequency, and Pitch <http://cnx.org/content/m13246/latest/#s2>
[12] "Harmonic Series" <http://cnx.org/content/m11118/latest/#p1c>
[13] "Acoustics for Music Theory": Section Wavelength, Frequency, and Pitch <http://cnx.org/content/m13246/latest/#s2>
[14] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[15] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

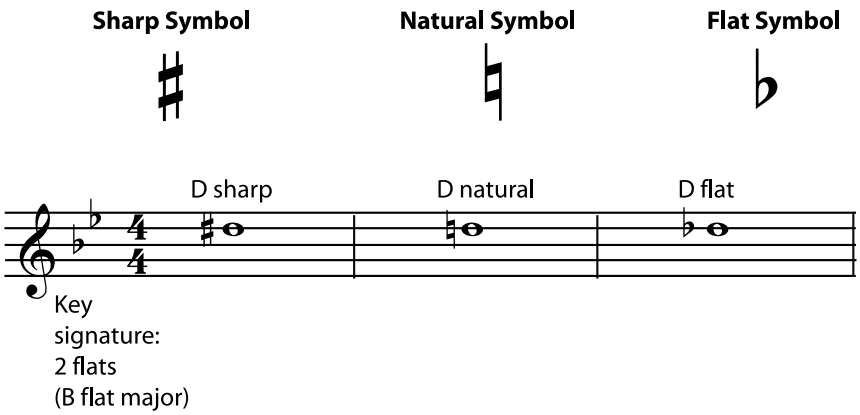


Figure 1.16: Sharp, flat, and natural signs can appear either in the key signature (Section 1.4), or right in front of the note that they change.

A **sharp sign** means "the note that is one half step[16] higher than the natural note". A **flat sign** means "the note that is one half step lower than the natural note". Some of the natural notes are only one half step apart, but most of them are a whole step[17] apart. When they are a whole step apart, the note in between them can only be named using a flat or a sharp.

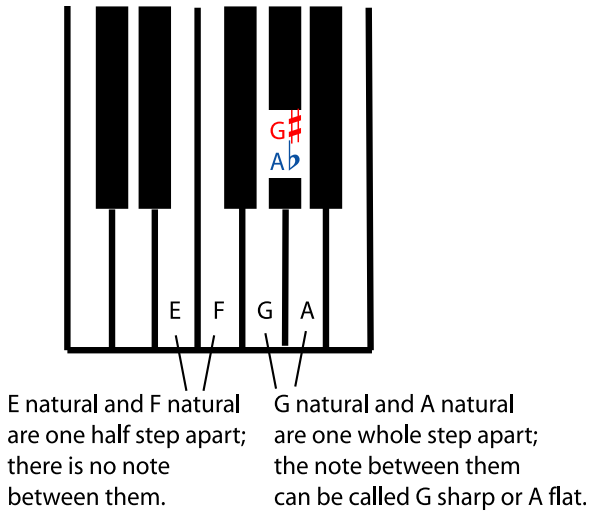


Figure 1.17

[16] "Half Steps and Whole Steps" <http://cnx.org/content/m10866/latest/>
[17] "Half Steps and Whole Steps" <http://cnx.org/content/m10866/latest/>

Notice that, using flats and sharps, any pitch can be given more than one note name. For example, the G sharp and the A flat are played on the same key on the keyboard; they sound the same. You can also name and write the F natural as "E sharp"; F natural is the note that is a half step higher than E natural, which is the definition of E sharp. Notes that have different names but sound the same are called enharmonic (Section 1.5) notes.

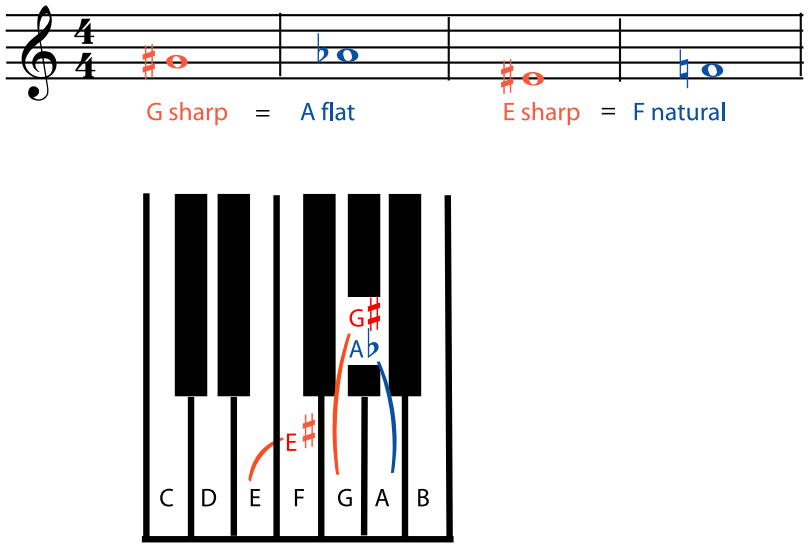


Figure 1.18: G sharp and A flat sound the same. E sharp and F natural sound the same.

Sharp and flat signs can be used in two ways: they can be part of a key signature (Section 1.4), or they can mark accidentals. For example, if most of the C's in a piece of music are going to be sharp, then a sharp sign is put in the "C" space at the beginning of the staff (Section 1.1), in the key signature. If only a few of the C's are going to be sharp, then those C's are marked individually with a sharp sign right in front of them. Pitches that are not in the key signature are called **accidentals**.

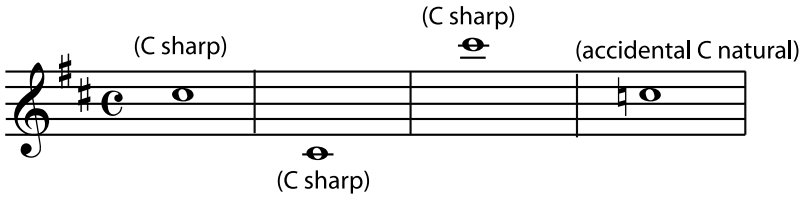


Figure 1.19: When a sharp sign appears in the C space in the key signature, all C's are sharp unless marked as accidentals.

A note can also be double sharp or double flat. A **double sharp** is two half steps (one whole step) higher than the natural note; a **double flat** is two half steps (a whole step) lower. Triple, quadruple, etc. sharps and flats are rare, but follow the same pattern: every sharp or flat raises or lowers the pitch one more half step.

Using double or triple sharps or flats may seem to be making things more difficult than they need to be. Why not call the note "A natural" instead of "G double sharp"? The answer is that, although A natural and G double sharp are the same pitch, they don't have the same function within a particular chord or a particular key. For musicians who understand some music theory (and that includes most performers, not just composers and music teachers), calling a note "G double sharp" gives important and useful information about how that note functions in the chord[18] and in the progression of the harmony[19].

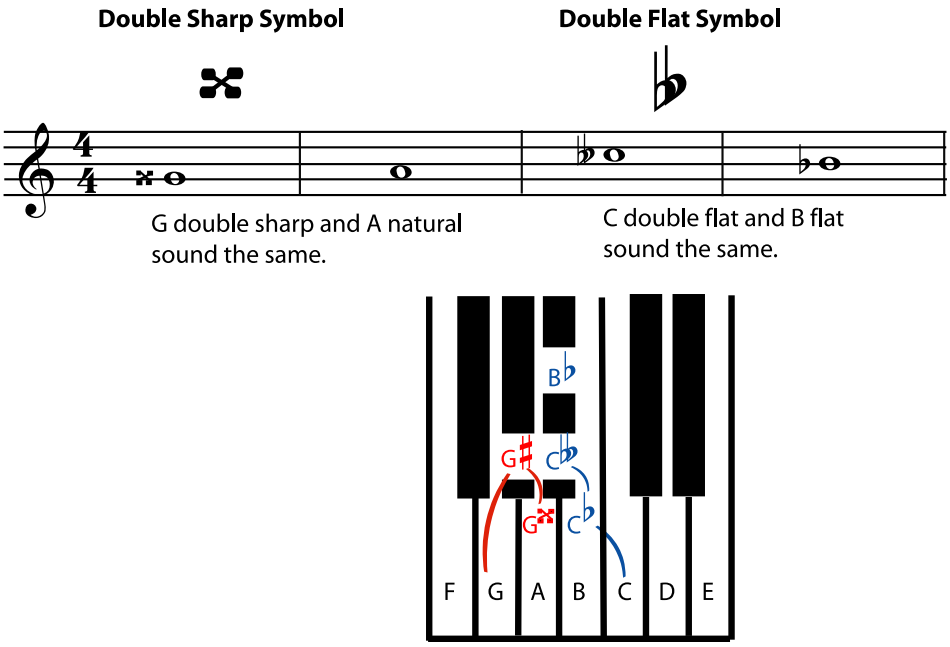


Figure 1.20: Double sharps raise the pitch by two half steps (one whole step). Double flats lower the pitch by two half steps (one whole step).

1.4 Key Signature[20]

The key signature appears right after the clef (Section 1.2) symbol on the staff (Section 1.1). In common notation, **clef and key signature are the only symbols that normally appear on every staff. They appear so often because they are such important symbols; they tell you what note is found on each line and space of the staff.** This can change from one piece of music to another, so the musician must know the clef and key signature in order to read the music correctly; in a way, the written music is a coded message, with each note standing for a sound with a particular pitch (Section 1.3), and the clef and

[18] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[19] "Beginning Harmonic Analysis" <http://cnx.org/content/m11643/latest/>
[20] This content is available online at <http://cnx.org/content/m10881/2.17/>.

key signature are the key that tell you how to decode this particular message. (For an explanation of why things are done this way, please see how to read music (Section : Learning to read music accurately and independently).)

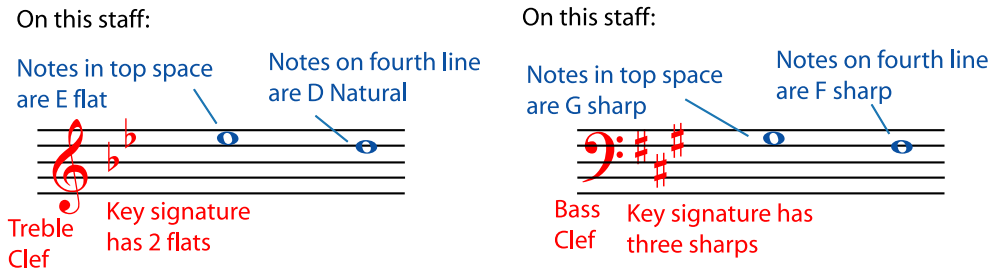


Figure 1.21

The clef tells you the letter name of the note - for example, the top line on a bass clef staff is always some kind of A; but you need the key signature to tell you what kind of A. It may have either some sharp (Section 1.3) symbols on particular lines or spaces, or some flat (Section 1.3) symbols, again on particular lines or spaces. If there are no flats or sharps listed after the clef symbol, then the key signature is "all notes are natural".

The **key signature** is a list of all the sharps and flats in the key[21] that the music is in. **When a sharp (or flat) appears on a line or space in the key signature, all the notes on that line or space are sharp (or flat), and all other notes with the same letter names in other octaves are also sharp (or flat).**

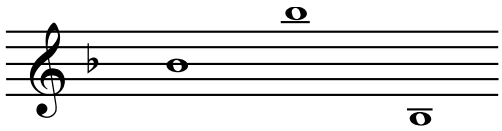


Figure 1.22: This key signature has a flat on the "B" line, so all of these B's are flat.

The sharps or flats always appear in the same order in all key signatures. This is the same order in which they are added as keys get sharper or flatter. For example, if a key (G major or E minor) has only one sharp, it will be F sharp, so F sharp is always the first sharp listed in a sharp key signature. The keys that have two sharps (D major and B minor) have F sharp and C sharp, so C sharp is always the second sharp in a key signature, and so on. **The order of sharps is: F sharp, C sharp, G sharp, D sharp, A sharp, E sharp, B sharp. The order of flats is the reverse of the order of sharps: B flat, E flat, A flat, D flat, G flat, C flat, F flat.** So the keys with only one flat (F major and D minor) have a B flat; the keys with two flats (B flat major and G minor) have B flat and E flat; and so on. The order of flats and sharps, like the order of the keys themselves, follows a circle of fifths[22].

[21] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[22] "The Circle of Fifths" <http://cnx.org/content/m10865/latest/>

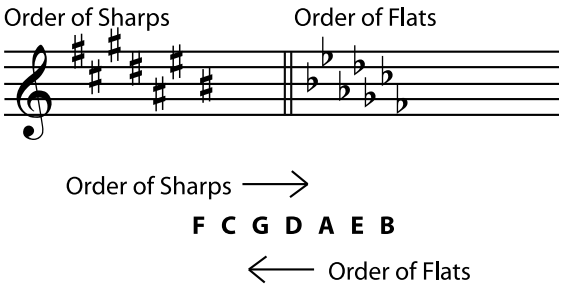


Figure 1.23

If you do not know the name of the key of a piece of music, the key signature can help you find out. Assume for a moment that you are in a major key[23]. If the key contains sharps, the name of the key is one half step[24] higher than the last sharp in the key signature. If the key contains flats, the name of the key signature is the name of the second-to-last flat in the key signature.

Example 1.1

Figure 1.24 demonstrates quick ways to name the (major) key simply by looking at the key signature. In flat keys, the second-to-last flat names the key. In sharp keys, the note that names the key is one half step above the final sharp.

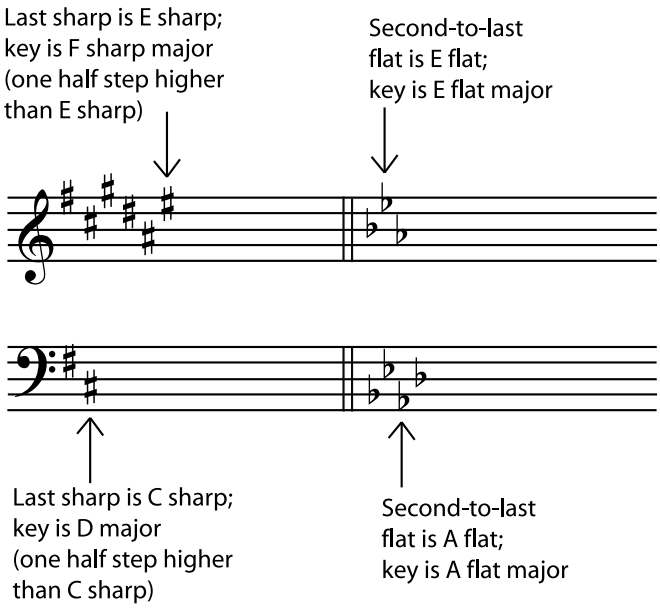


Figure 1.24

[23] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[24] "Half Steps and Whole Steps" <http://cnx.org/content/m10866/latest/>

The only major keys that these rules do not work for are C major (no flats or sharps) and F major (one flat). It is easiest just to memorize the key signatures for these two very common keys. If you want a rule that also works for the key of F major, remember that the second-to-last flat is always a perfect fourth[25] higher than (or a perfect fifth lower than) the final flat. So you can also say that the name of the key signature is a perfect fourth lower than the name of the final flat.

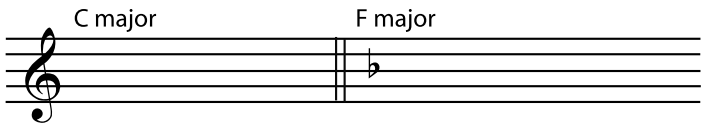


Figure 1.25: The key of C major has no sharps or flats. F major has one flat.

If the music is in a minor key, it will be in the relative minor[26] of the major key for that key signature. You may be able to tell just from listening (see Major Keys and Scales[27]) whether the music is in a major or minor key. If not, the best clue is to look at the final chord[28]. That chord (and often the final note of the melody, also) will usually name the key.

Exercise 1.4.1 ***(Solution on p. 37.)***

Write the key signatures asked for in Figure 1.26 and name the major keys that they represent.

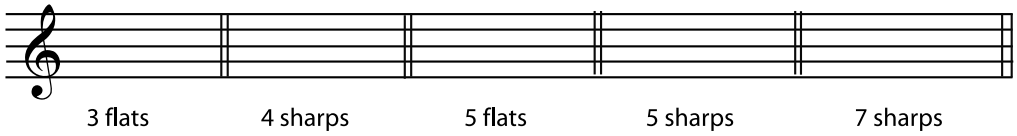


Figure 1.26

1.5 Enharmonic Spelling[29]

1.5.1 Enharmonic Notes

In common notation (Section 1.1), any note can be sharp, flat, or natural (Section 1.3). A sharp symbol raises the pitch (Section 1.3) (of a natural note) by one half step[30]; a flat symbol lowers it by one half step.

[25] "Interval" <http://cnx.org/content/m10867/latest/#p21b>
[26] "Minor Keys and Scales": Section Relative Minor and Major Keys <http://cnx.org/content/m10856/latest/#s3>
[27] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[28] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[29] This content is available online at <http://cnx.org/content/m11641/1.14/>.
[30] "Half Steps and Whole Steps" <http://cnx.org/content/m10866/latest/>

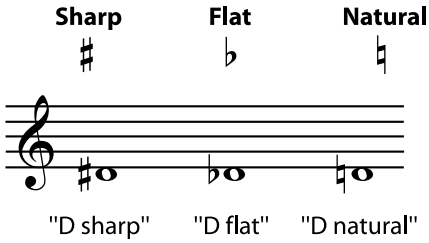


Figure 1.27

Why do we bother with these symbols? There are twelve pitches available within any octave[31]. We could give each of those twelve pitches its own name (A, B, C, D, E, F, G, H, I, J, K, and L) and its own line or space on a staff. But that would actually be fairly inefficient, because most music is in a particular key[32]. And music that is in a major[33] or minor[34] key will tend to use only seven of those twelve notes. So music is easier to read if it has only lines, spaces, and notes for the seven pitches it is (mostly) going to use, plus a way to write the occasional notes that are not in the key.

This is basically what common notation does. There are only seven note names (A, B, C, D, E, F, G), and each line or space on a staff (Section 1.1) will correspond with one of those note names. To get all twelve pitches using only the seven note names, we allow any of these notes to be sharp, flat, or natural. Look (Figure 1.28) at the notes on a keyboard.

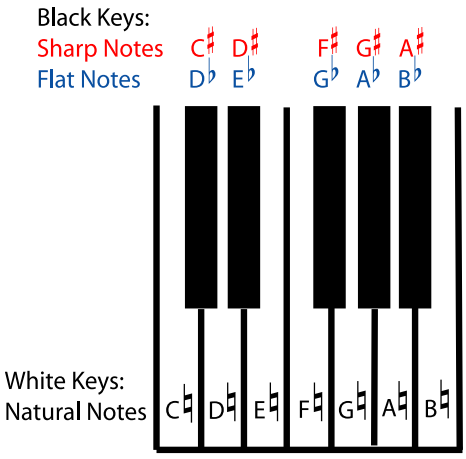


Figure 1.28: Seven of the twelve possible notes in each octave[35] are "natural" notes.

[31] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[32] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[33] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[34] "Minor Keys and Scales" <http://cnx.org/content/m10856/latest/>
[35] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

Because most of the natural notes are two half steps apart, there are plenty of pitches that you can only get by naming them with either a flat or a sharp (on the keyboard, the "black key" notes). For example, the note in between D natural and E natural can be named either D sharp or E flat. These two names look very different on the staff, but they are going to sound exactly the same, since you play both of them by pressing the same black key on the piano.

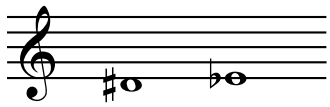


Figure 1.29: D sharp and E flat look very different when written in common notation, but they sound exactly the same when played on a piano.

This is an example of **enharmonic spelling**. Two notes are **enharmonic** if they sound the same on a piano but are named and written differently.

Exercise 1.5.1 ***(Solution on p. 38.)***

Name the other enharmonic notes that are listed above the black keys on the keyboard in Figure 1.28. Write them on a treble clef staff. If you need staff paper, you can print out this PDF file[36]

But these are not the only possible enharmonic notes. Any note can be flat or sharp, so you can have, for example, an E sharp. Looking at the keyboard (Figure 1.28) and remembering that the definition of sharp is "one half step higher than natural", you can see that an E sharp must sound the same as an F natural. Why would you choose to call the note E sharp instead of F natural? Even though they sound the same, E sharp and F natural, as they are actually used in music, are different notes. (They may, in some circumstances, also sound different; see below (Section 1.5.4: Enharmonic Spellings and Equal Temperament).) Not only will they look different when written on a staff, but they will have different functions within a key and different relationships with the other notes of a piece of music. So a composer may very well prefer to write an E sharp, because that makes the note's place in the harmonies of a piece more clear to the performer. (Please see Triads[37], Beyond Triads[38], and Harmonic Analysis[39] for more on how individual notes fit into chords and harmonic progressions.)

In fact, this need (to make each note's place in the harmony very clear) is so important that double sharps and double flats have been invented to help do it. A double sharp is two half steps (one whole step[40]) higher than the natural note. A double flat is two half steps lower than the natural note. Double sharps and flats are fairly rare, and triple and quadruple flats even rarer, but all are allowed.

[36] See the file at <http://cnx.org/content/m11641/latest/staffpaper1.pdf>
[37] "Triads" <http://cnx.org/content/m10877/latest/>
[38] "Beyond Triads: Naming Other Chords" <http://cnx.org/content/m11995/latest/>
[39] "Beginning Harmonic Analysis" <http://cnx.org/content/m11643/latest/>
[40] "Half Steps and Whole Steps" <http://cnx.org/content/m10866/latest/>

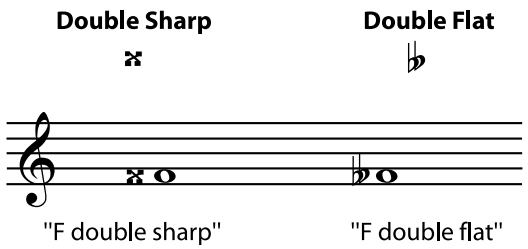


Figure 1.30

Exercise 1.5.2 ***(Solution on p. 38.)***

Give at least one enharmonic spelling for the following notes. Try to give more than one. (Look at the keyboard (Figure 1.28) again if you need to.)

1. E natural
2. B natural
3. C natural
4. G natural
5. A natural

1.5.2 Enharmonic Keys and Scales

Keys and scales can also be enharmonic. Major keys, for example, always follow the same pattern of half steps and whole steps. (See Major Keys and Scales[41]. Minor keys also all follow the same pattern, different from the major scale pattern; see Minor Keys[42].) So whether you start a major scale on an E flat, or start it on a D sharp, you will be following the same pattern, playing the same piano keys as you go up the scale. But the notes of the two scales will have different names, the scales will look very different when written, and musicians may think of them as being different. For example, most instrumentalists would find it easier to play in E flat than in D sharp. In some cases, an E flat major scale may even sound slightly different from a D sharp major scale. (See below (Section 1.5.4: Enharmonic Spellings and Equal Temperament).)

[41] "Major Keys and Scales" <http://cnx.org/content/m10851/latest/>
[42] "Minor Keys and Scales" <http://cnx.org/content/m10856/latest/>

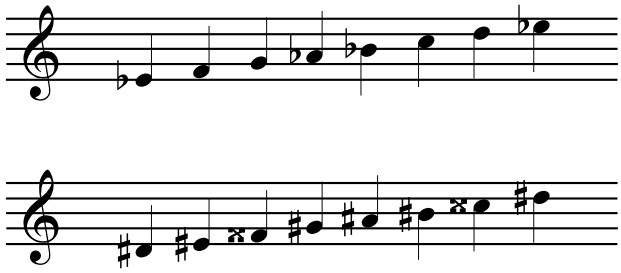


Figure 1.31: The E flat major and D sharp major scales sound the same on the piano, although they look very different. If this surprises you, look again at the piano keyboard (Figure 1.28) and find the notes that you would play for each scale.

Since the scales are the same, D sharp major and E flat major are also **enharmonic keys**. Again, their key signatures will look very different, but music in D sharp will not be any higher or lower than music in E flat.

Enharmonic Keys

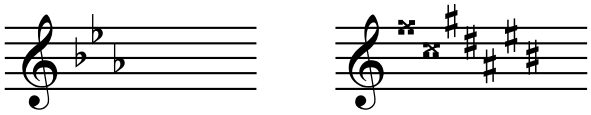


Figure 1.32: The key signatures for E flat and D sharp look very different, but would sound the same on a keyboard.

Exercise 1.5.3 ***(Solution on p. 38.)***

Give an enharmonic name and key signature for the keys given in Figure 1.33. (If you are not well-versed in key signatures (Section 1.4) yet, pick the easiest enharmonic spelling for the key name, and the easiest enharmonic spelling for every note in the key signature. Writing out the scales may help, too.)

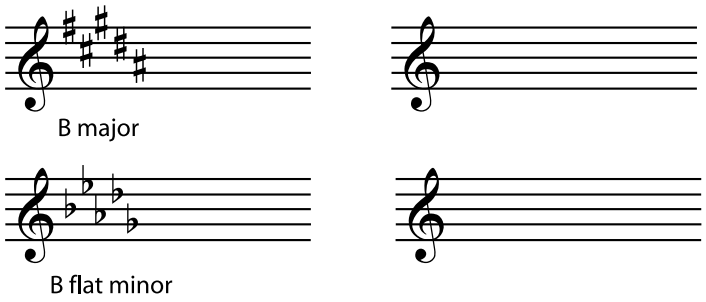


Figure 1.33

1.5.3 Enharmonic Intervals and Chords

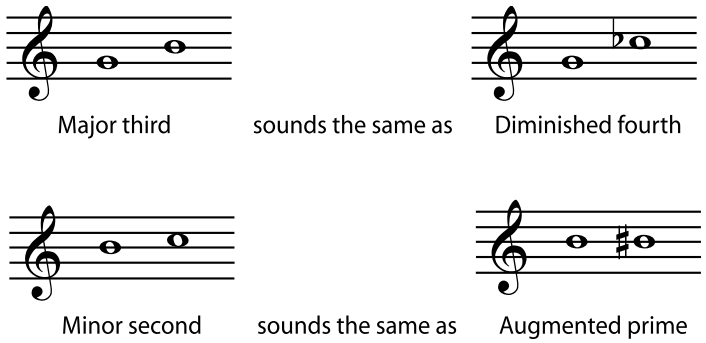


Figure 1.34

Chords[43] and intervals[44] also can have enharmonic spellings. Again, it is important to name a chord or interval as it has been spelled, in order to understand how it fits into the rest of the music. A C sharp major chord means something different in the key of D than a D flat major chord does. And an interval of a diminished fourth means something different than an interval of a major third, even though they would be played using the same keys on a piano. (For practice naming intervals, see Interval[45]. For practice naming chords, see Naming Triads[46] and Beyond Triads[47]. For an introduction to how chords function in a harmony, see Beginning Harmonic Analysis[48].)

[43] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[44] "Interval" <http://cnx.org/content/m10867/latest/>
[45] "Interval" <http://cnx.org/content/m10867/latest/>
[46] "Naming Triads" <http://cnx.org/content/m10890/latest/>
[47] "Beyond Triads: Naming Other Chords" <http://cnx.org/content/m11995/latest/>
[48] "Beginning Harmonic Analysis" <http://cnx.org/content/m11643/latest/>

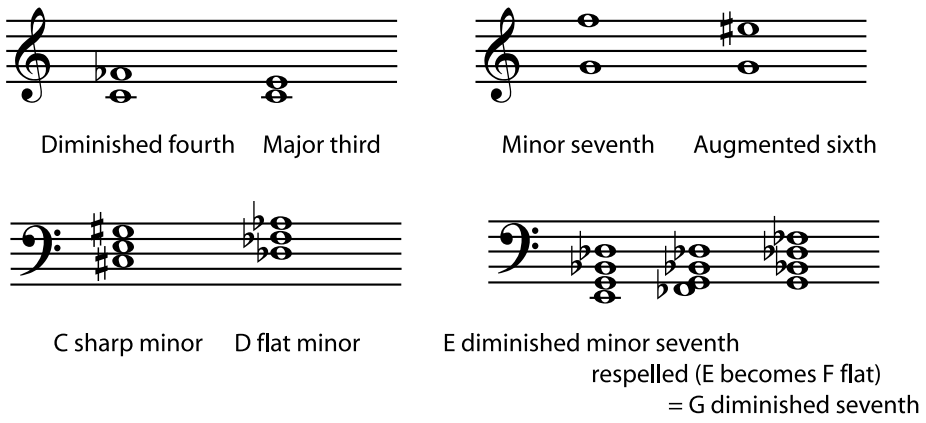


Figure 1.35

1.5.4 Enharmonic Spellings and Equal Temperament

All of the above discussion assumes that all notes are tuned in equal temperament[49]. Equal temperament has become the "official" tuning system for Western music[50]. It is easy to use in pianos and other instruments that are difficult to retune (organ, harp, and xylophone, to name just a few), precisely because enharmonic notes sound exactly the same. But voices and instruments that can fine-tune quickly (for example violins, clarinets, and trombones) often move away from equal temperament. They sometimes drift, consciously or unconsciously, towards just intonation[51], which is more closely based on the harmonic series[52]. When this happens, enharmonically spelled notes, scales, intervals, and chords, may not only be theoretically different. They may also actually be slightly different pitches. The differences between, say, a D sharp and an E flat, when this happens, are very small, but may be large enough to be noticeable. Many Non-western music traditions[53] also do not use equal temperament. **Sharps and flats used to notate music in these traditions should not be assumed to mean a change in pitch equal to an equal-temperament half-step**. For definitions and discussions of equal temperament, just intonation, and other tuning systems, please see Tuning Systems[54].

[49] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[50] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[51] "Tuning Systems" <http://cnx.org/content/m11639/latest/#p12a>
[52] "Harmonic Series I: Timbre and Octaves" <http://cnx.org/content/m13682/latest/>
[53] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[54] "Tuning Systems" <http://cnx.org/content/m11639/latest/>

Solutions to Exercises in Chapter 1

Solution to Exercise 1.2.1 (p. 18)

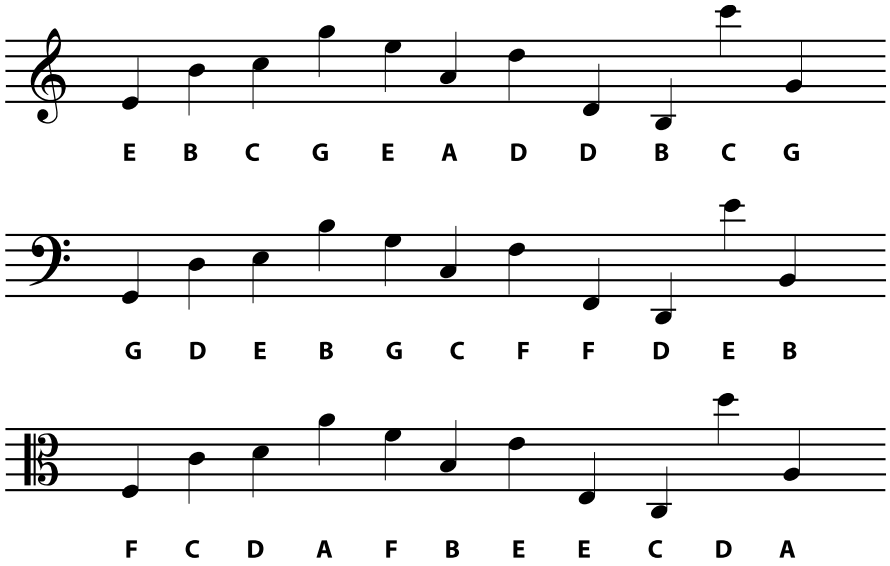


Figure 1.36

Solution to Exercise 1.2.2 (p. 18)
Figure 1.37 shows the answers for treble and bass clef. If you have done another clef, have your teacher check your answers.

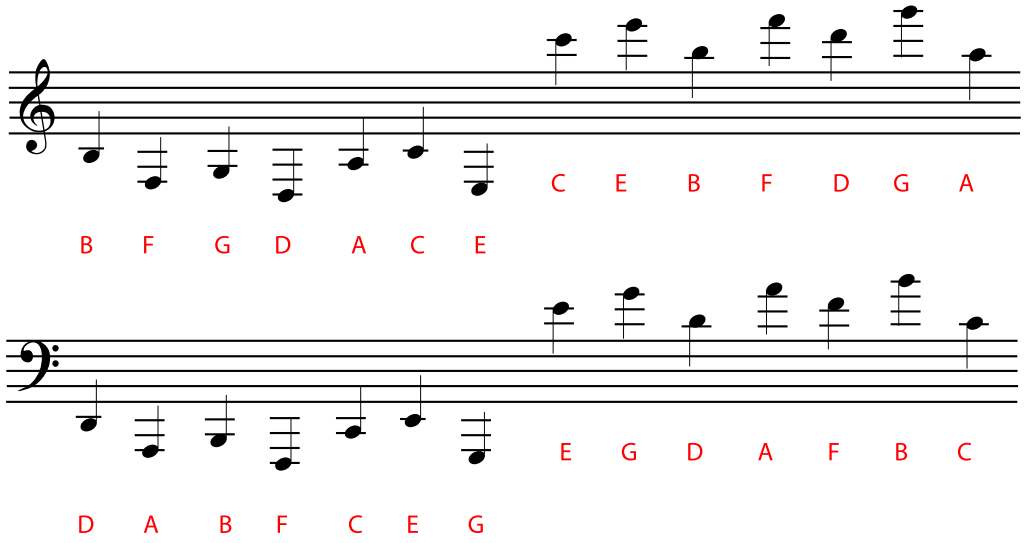
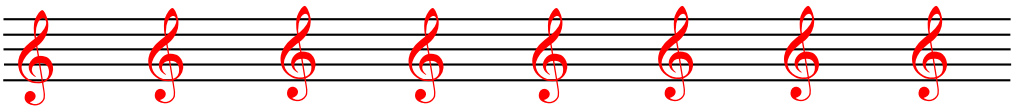


Figure 1.37

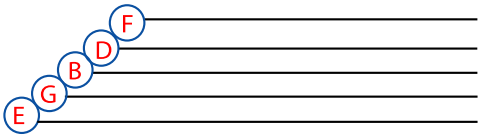
Solution to Exercise 1.2.3 (p. 19)
Figure 1.38 shows the answers for treble clef, and Figure 1.39 the answers for bass clef. If you are working in a more unusual clef, have your teacher check your answers.

Clef Practice

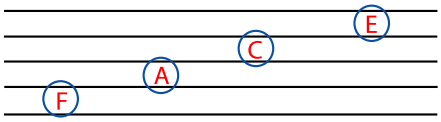
Practice writing your clef symbol on this staff. Write at least eight clef symbols



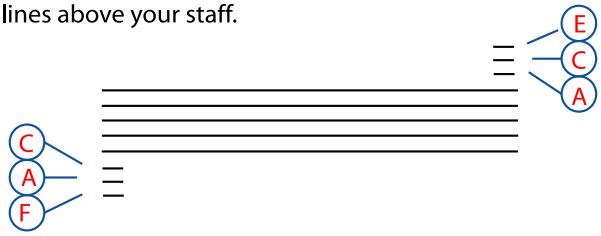
Write the letter names of the lines in your staff:



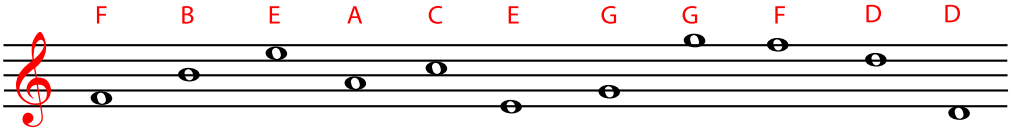
Write the letter names of the spaces:



Write the letter names of the three ledger lines below and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.

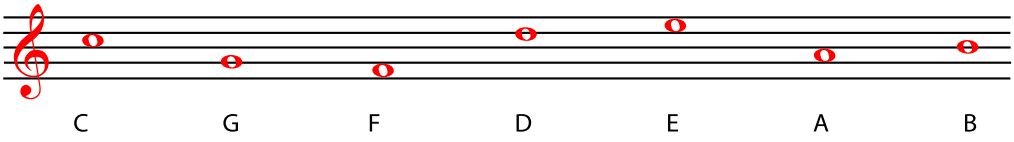
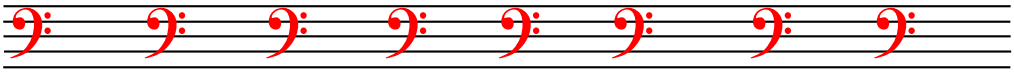


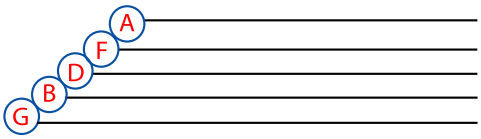
Figure 1.38

Clef Practice

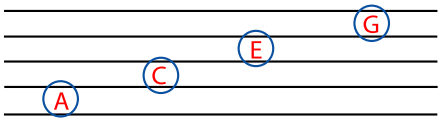
Practice writing your clef symbol on this staff. Write at least eight clef symbols



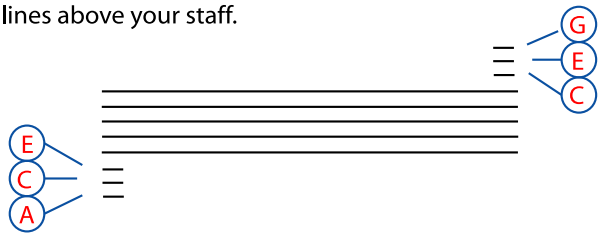
Write the letter names of the lines in your staff:



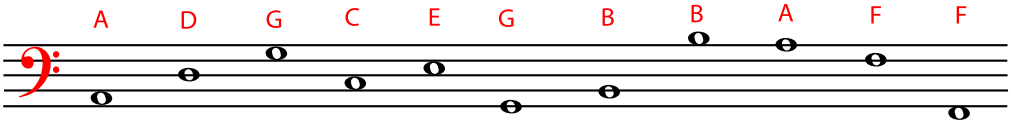
Write the letter names of the spaces:



Write the letter names of the three ledger lines below and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.

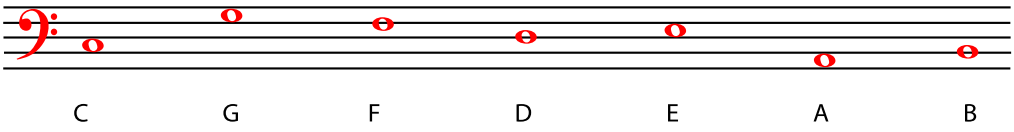


Figure 1.39

Solution to Exercise 1.4.1 (p. 27)

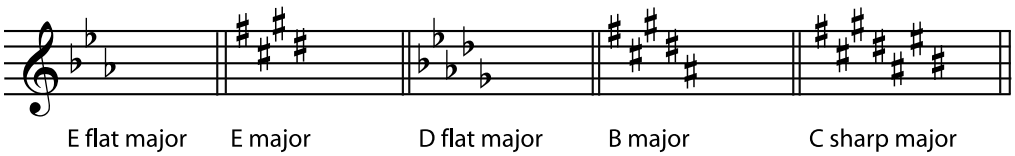


Figure 1.40

Solution to Exercise 1.5.1 (p. 29)

- C sharp and D flat
- F sharp and G flat
- G sharp and A flat
- A sharp and B flat

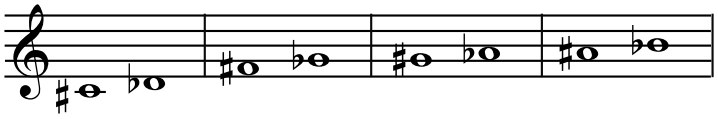


Figure 1.41

Solution to Exercise 1.5.2 (p. 30)

1. F flat; D double sharp
2. C flat; A double sharp
3. B sharp; D double flat
4. F double sharp; A double flat
5. G double sharp; B double flat

Solution to Exercise 1.5.3 (p. 31)

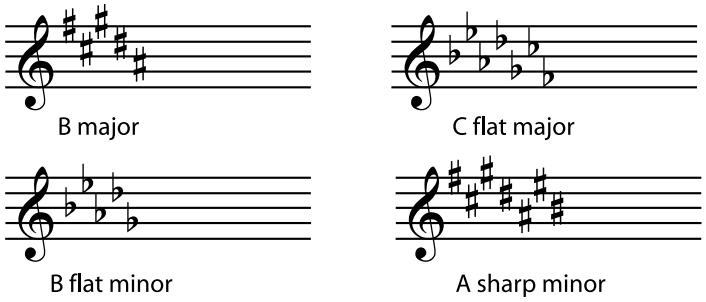


Figure 1.42

Chapter 2

Time

2.1 Duration: Note Lengths in Written Music[1]

2.1.1 The Shape of a Note

In standard notation, a single musical sound is written as a **note**. The two most important things a written piece of music needs to tell you about a note are its pitch - how high or low it is - and its **duration** - how long it lasts.

To find out the pitch (Section 1.3) of a written note, you look at the clef (Section 1.2) and the key signature (Section 1.4), then see what line or space the note is on. The higher a note sits on the staff (Section 1.1), the higher it sounds. To find out the duration of the written note, you look at the tempo (Section 2.6) and the time signature (Section 2.3) and then see what the note looks like.

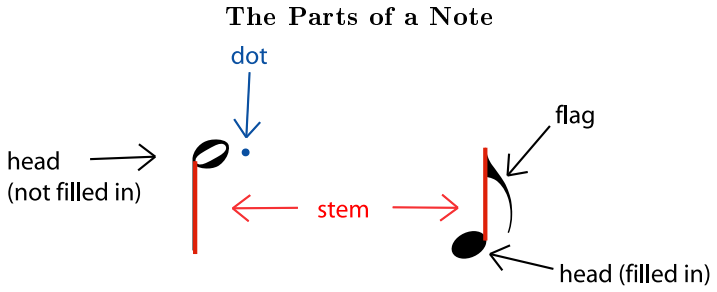


Figure 2.1: All of the parts of a written note affect how long it lasts.

The pitch of the note depends only on what line or space the **head** of the note is on. (Please see pitch (Section 1.3) , clef (Section 1.2) and key signature (Section 1.4) for more information.) If the note does not have a head (see Figure 2.2 (Notes Without Heads)), that means that it does not have one definite pitch.

[1] This content is available online at <http://cnx.org/content/m10945/2.14/>.

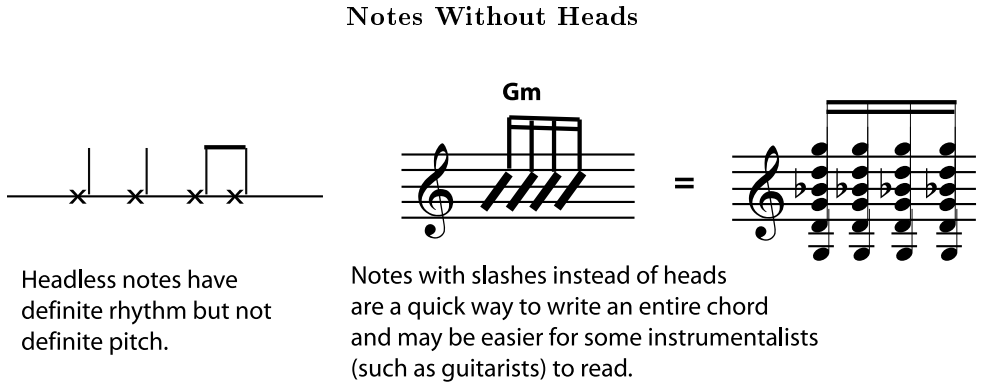


Figure 2.2: If a note does not have head, it does not have one definite pitch. Such a note may be a pitchless sound, like a drum beat or a hand clap, or it may be an entire chord rather than a single note.

The head of the note may be filled in (black), or not. The note may also have (or not) a stem, one or more flags, beams connecting it to other notes, or one or more dots following the head of the note. All of these things affect how much time the note is given in the music.

NOTE: A dot that is someplace other than next to the head of the note **does not affect the rhythm**. Other dots are articulation (Section 3.2) marks. They may affect the actual length of the note (the amount of time it sounds), but do not affect the amount of time it must be given. (The extra time when the note could be sounding, but isn't, becomes an unwritten rest (Section 2.2).) If this is confusing, please see the explanation in articulation (Section 3.2).

2.1.2 The Length of a Note

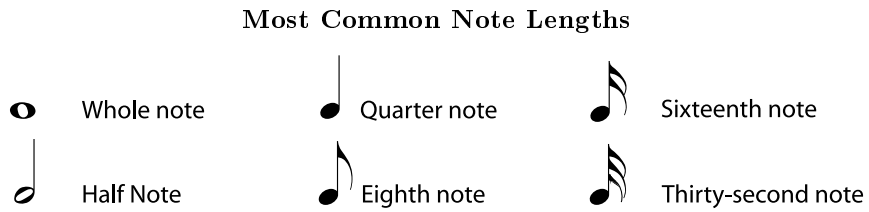


Figure 2.3

The simplest-looking note, with no stems or flags, is a **whole note**. All other note lengths are defined by how long they last compared to a whole note. A note that lasts half as long as a whole note is a **half note**. A note that lasts a quarter as long as a whole note is a **quarter note**. The pattern continues with **eighth notes**, **sixteenth notes**, **thirty-second notes**, **sixty-fourth notes**, and so on, each type of note being

half the length of the previous type. (There are no such thing as third notes, sixth notes, tenth notes, etc.; see Dots, Ties, and Borrowed Divisions (Section 2.5) to find out how notes of unusual lengths are written.)

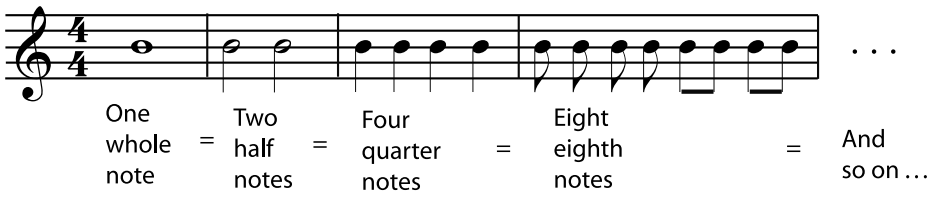


Figure 2.4: Note lengths work just like fractions in arithmetic: two half notes or four quarter notes last the same amount of time as one whole note. Flags are often replaced by beams that connect the notes into easy-to-read groups.

You may have noticed that some of the eighth notes in Figure 2.4 don't have flags; instead they have a **beam** connecting them to another eighth note. If flagged notes are next to each other, their flags can be replaced by beams that connect the notes into easy-to-read groups. The beams may connect notes that are all in the same beat, or, in some vocal music, they may connect notes that are sung on the same text syllable. Each note will have the same number of beams as it would have flags.

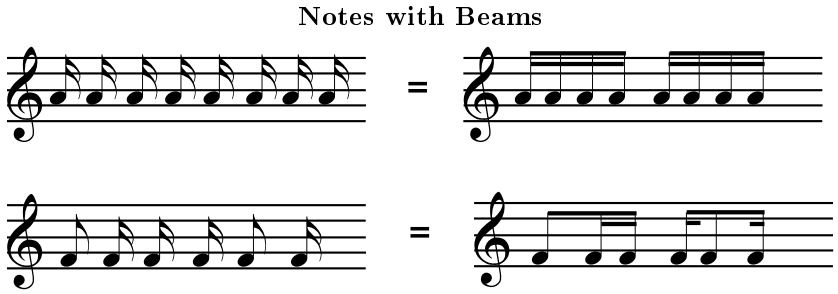


Figure 2.5: The notes connected with beams are easier to read quickly than the flagged notes. Notice that each note has the same number of beams as it would have flags, even if it is connected to a different type of note. The notes are often (but not always) connected so that each beamed group gets one beat. This makes the notes easier to read quickly.

You may have also noticed that the note lengths sound like fractions in arithmetic. In fact they work very much like fractions: two half notes will be equal to (last as long as) one whole note; four eighth notes will be the same length as one half note; and so on. (For classroom activities relating music to fractions, see Fractions, Multiples, Beats, and Measures[2].)

Example 2.1

[2] "Fractions, Multiples, Beats, and Measures" <http://cnx.org/content/m11807/latest/>

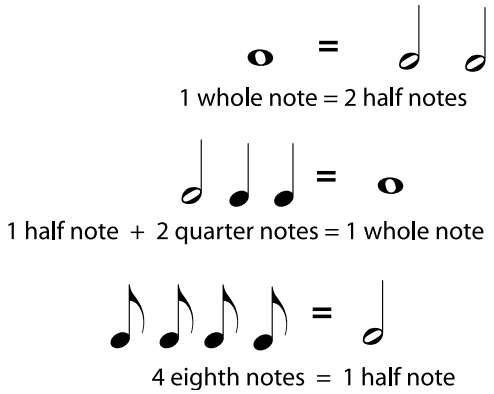


Figure 2.6

Exercise 2.1.1 *(Solution on p. 65.)*

Draw the missing notes and fill in the blanks to make each side the same duration (length of time).

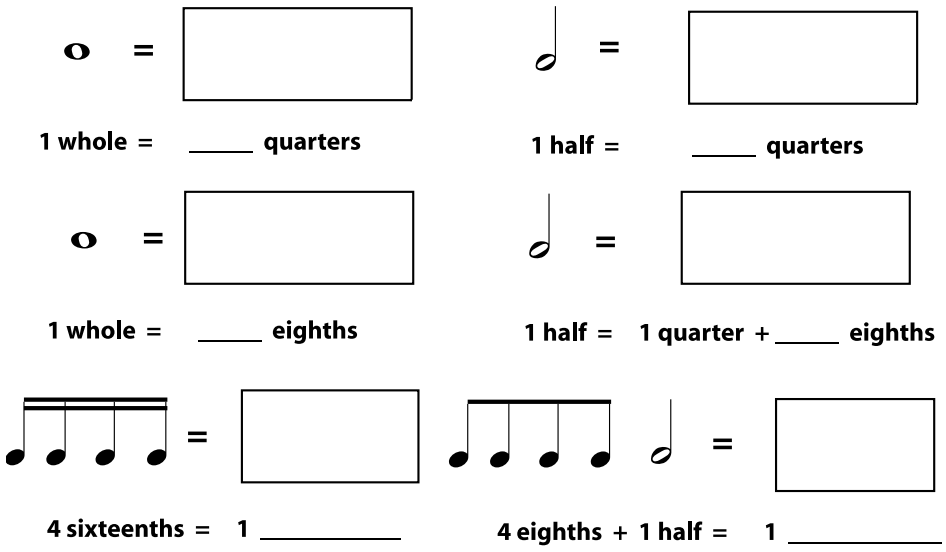


Figure 2.7

So how long does each of these notes actually last? That depends on a couple of things. A written note lasts for a certain amount of time measured in beats (Section 2.3.1: Beats and Measures). To find out exactly how many beats it takes, you must know the time signature (Section 2.3). And to find out how long a beat is, you need to know the tempo (Section 2.6).

Example 2.2

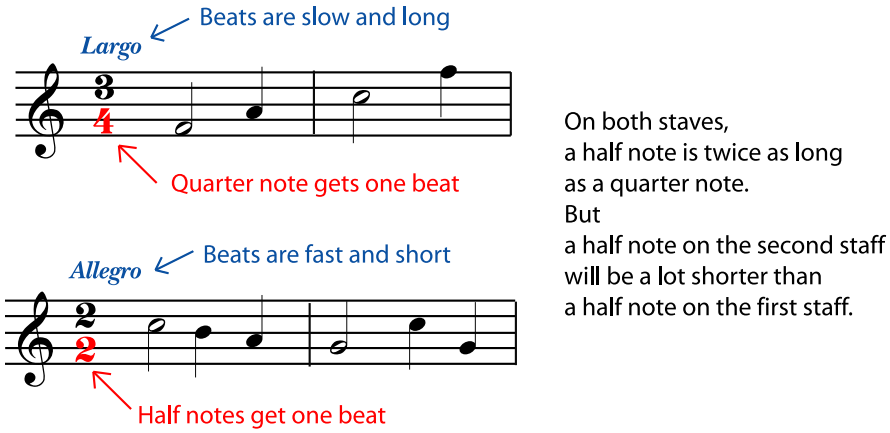


Figure 2.8: In any particular section of a piece of music, a half note is always twice as long as a quarter note. But how long each note actually lasts depends on the time signature and the tempo.

2.1.3 More about Stems

Whether a stem points up or down does not affect the note length at all. There are two basic ideas that lead to the rules for stem direction. One is that the music should be as easy as possible to read and understand. The other is that the notes should tend to be "in the staff" as much as reasonably possible.

Basic Stem Direction Rules

1. **Single Notes** - Notes below the middle line of the staff should be stem up. Notes on or above the middle line should be stem down.
2. **Notes sharing a stem (block chords)** - Generally, the stem direction will be the direction for the note that is furthest away from the middle line of the staff
3. **Notes sharing a beam** - Again, generally you will want to use the stem direction of the note farthest from the center of the staff, to keep the beam near the staff.
4. **Different rhythms being played at the same time by the same player** - Clarity requires that you write one rhythm with stems up and the other stems down.
5. **Two parts for different performers written on the same staff** - If the parts have the same rhythm, they may be written as block chords. If they do not, the stems for one part (the "high" part or "first" part) will point up and the stems for the other part will point down. This rule is especially important when the two parts cross; otherwise there is no way for the performers to know that the "low" part should be reading the high note at that spot.

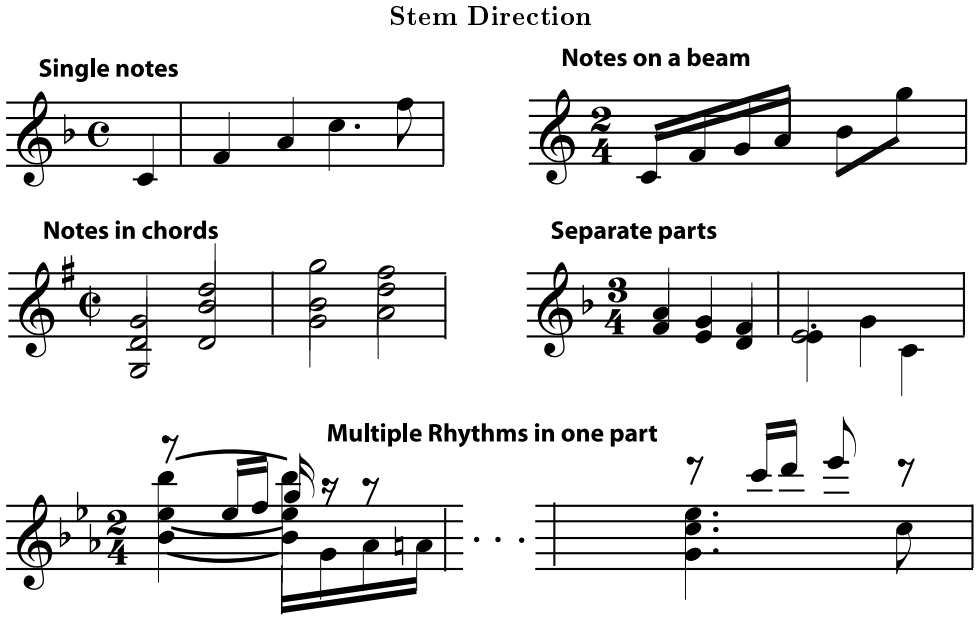


Figure 2.9: Keep stems and beams in or near the staff, but also use stem direction to clarify rhythms and parts when necessary.

2.2 Duration: Rest Length[3]

A **rest** stands for a silence in music. For each kind of note (Section 2.1), there is a written rest of the same length.

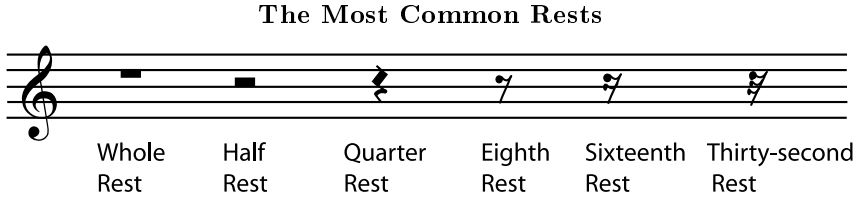


Figure 2.10

Exercise 2.2.1 ***(Solution on p. 65.)***

For each note on the first line, write a rest of the same length on the second line. The first measure (Section 2.3.1: Beats and Measures) is done for you.

[3] This content is available online at <http://cnx.org/content/m11887/1.9/>.

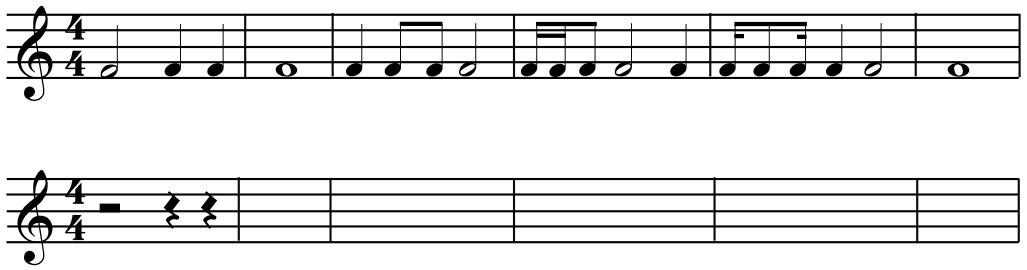


Figure 2.11

Rests don't necessarily mean that there is silence in the music at that point; only that that part is silent. Often, on a staff (Section 1.1) with multiple parts, a rest must be used as a placeholder for one of the parts, even if a single person is playing both parts. When the rhythms are complex, this is necessary to make the rhythm in each part clear.

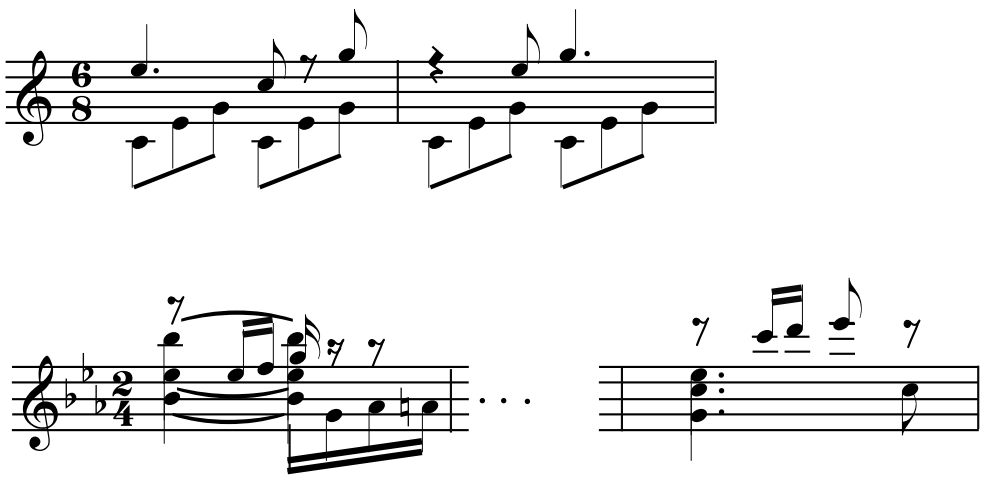


Figure 2.12: When multiple simultaneous rhythms are written on the same staff, rests may be used to clarify individual rhythms, even if another rhythm contains notes at that point.

The normal rule in common notation is that, for any line of music, the notes and rests in each measure must "add up" to exactly the amount in the time signature (Section 2.3), no more and no less. For example, in 3/4 time, a measure can have any combination of notes and rests that is the same length as three quarter notes. There is only one common exception to this rule. As a simplifying shorthand, a completely silent measure can simply have a whole rest. In this case, "whole rest" does not necessarily mean "rest for the same length of time as a whole note"; it means "rest for the entire measure".

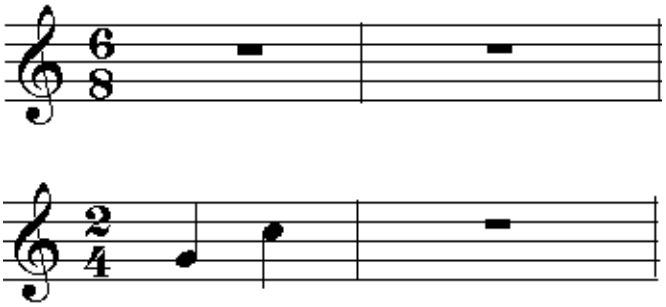


Figure 2.13: A whole rest may be used to indicate a completely silent measure, no matter what the actual length of the measure will be.

2.3 Time Signature[4]

In common notation (Section 1.1), the **time signature** appears at the beginning of a piece of music, right after the key signature (Section 1.4). Unlike the key signature, which is on every staff (Section 1.1), the time signature will not appear again in the music unless the meter changes. The meter[5] of a piece is a repetitive rhythmic pulse that underlies the music. The time signature is the symbol that tells you what meter is being used in a piece of music and what types of note (Section 2.1)) are being used to write it out.

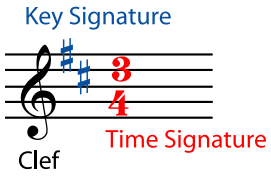


Figure 2.14: The time signature appears at the beginning of the piece of music, right after the clef symbol and key signature.

2.3.1 Beats and Measures

Music happens over a period of time, so a very common way to organize music is to divide that time into short periods of the same length, using audible pulses called **beats**. Each pulse is **a beat**, and the regular, predictable pulse of a piece of music is **the beat**. The beat is created when the musicians do things (like hit a drum, strum a guitar, or start singing a word) at very regular intervals. This creates an audible, predictable

[4] This content is available online at <http://cnx.org/content/m10956/2.15/>.
[5] "Meter in Music" <http://cnx.org/content/m12405/latest/>

pulse that helps the musicians to coordinate what they are doing so that they sound good together. The predictability and audibility of the beat also allows others to join in. As soon as listeners can "feel the beat," they can clap hands, snap fingers, tap their feet, nod their heads, march, dance, or sing along "in time" with the music (in other words, coordinated with the musicians). Anything that happens during the audible pulse (a clap or drum hit, for example), as well as anything that starts during a pulse (such as a sung word, or a note on a flute or violin) is said to be **on the beat**. Of course, things can happen in between the beats, too, but the timing for those is also coordinated using the beats; for example, a note might begin at exactly the halfway point between two beats.

NOTE: Not all music has beats and a time signature. In music with a **free** rhythm or meter, there is no time signature, and no regular pulse to the music; the musicians are free to play or sing a note at whatever time they feel is best. Other pieces may have a written time signature, to help the musicians keep track of time, but the musical events in the piece do not give it an audible beat.

Example 2.3
Listen to excerpts A, B, C and D. Can you clap your hands, tap your feet, or otherwise move "to the beat"? Is there a piece in which it is easier or harder to feel the beat?

- A[6]
- B[7]
- C[8]
- D[9]

When music is organized into beats, it makes sense to write it down that way. In common notation (Section 1.1), the composer assigns a particular kind of note to be one beat long. For example, if "a quarter note gets a beat," then playing many quarter notes in a row would mean playing a new note on every beat. The quarter note is most likely to play this role, but any type of note (Section 2.1) can get the "this is one beat" designation.

In most metered music, some of the beats are stronger (louder, more powerful, more noticeable, or busier), than others, and there is a regular pattern of stronger and weaker beats, for example, strong-weak-weak-strong-weak-weak, or strong-weak-strong-weak. So the beats are organized even further by grouping them into **bars**, or **measures**. (The two words mean the same thing.) For example, for music with a beat pattern of strong-weak-weak-strong-weak-weak, or 1-2-3-1-2-3, a measure would have three beats in it. The **time signature** tells you two things: how many beats there are in each measure, and what type of note (Section 2.1) gets a beat.

Reading the Time Signature

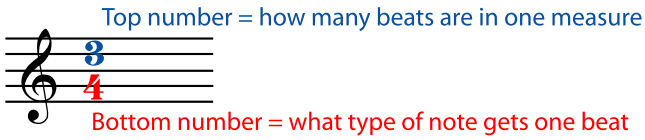


Figure 2.15: This time signature means that there are three quarter notes (or any combination of notes that equals three quarter notes) in every measure. A piece with this time signature would be "in three four time" or just "in three four".

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[6]See the file at <http://cnx.org/content/m10956/latest/Tanz.mp3>
[7]See the file at <http://cnx.org/content/m10956/latest/EasyWinners.MID>
[8]See the file at <http://cnx.org/content/m10956/latest/Jetztkommt.MID>
[9]See the file at <http://cnx.org/content/m10956/latest/Greensleeves.mp3>

Exercise 2.3.1 *(Solution on p. 65.)*
Listen again to the music in Example 2.3. Instead of clapping, count each beat. Decide whether the music has 2, 3, or 4 beats per measure. In other words, does it feel more natural to count 1-2-1-2, 1-2-3-1-2-3, or 1-2-3-4-1-2-3-4?

2.3.2 Reading Time Signatures

Most time signatures contain two numbers. The top number tells you how many beats there are in a measure. The bottom number tells you what kind of note gets a beat.

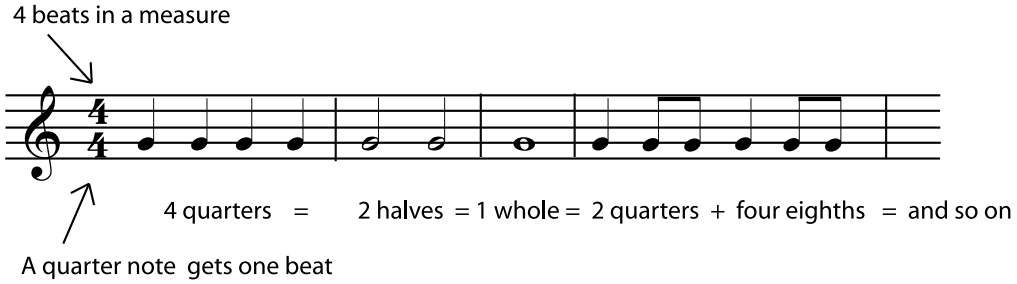

Figure 2.16: In "four four" time, there are four beats in a measure and a quarter note gets a beat. In order to keep the meter going steadily, every measure must have a combination of notes and rests that is equivalent to four quarter notes.

You may have noticed that the time signature looks a little like a fraction in arithmetic. Filling up measures feels a little like finding equivalent fractions[10], too. In "four four time", for example, there are four beats in a measure and a quarter note gets one beat. So four quarter notes would fill up one measure. But so would any other combination of notes and rests (Section 2.2) that equals four quarters: one whole, two halves, one half plus two quarters, a half note and a half rest, and so on.

Example 2.4
If the time signature is three eight, any combination of notes that adds up to three eighths will fill a measure. Remember that a dot (Section 2.5) is worth an extra half of the note it follows. Listen[11] to the rhythms in Figure 2.17.

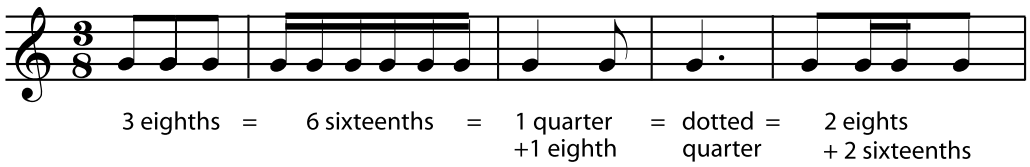

Figure 2.17: If the time signature is three eight, a measure may be filled with any combination of notes and rests that adds up to three eight.

[10] "Fractions, Multiples, Beats, and Measures" <http://cnx.org/content/m11807/latest/>
[11] See the file at <http://cnx.org/content/m10956/latest/timesig1.MID>

Exercise 2.3.2 ***(Solution on p. 65.)***

Write each of the time signatures below (with a clef symbol) at the beginning of a staff. Write at least four measures of music in each time signature. Fill each measure with a different combination of note lengths. Use at least one dotted note on each staff. If you need some staff paper, you can download this PDF file[12].

1. Two four time
2. Three eight time
3. Six four time

A few time signatures don't have to be written as numbers. Four four time is used so much that it is often called **common time**, written as a bold "C". When both fours are "cut" in half to twos, you have **cut time**, written as a "C" cut by a vertical slash.

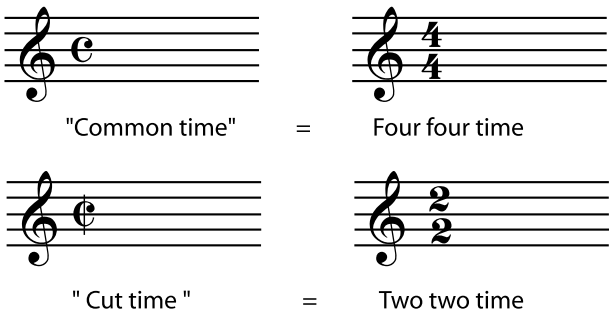

Figure 2.18

2.3.3 Counting and Conducting

You may have already noticed that a measure in four four time looks the same as a measure in two two. After all, in arithmetic, four quarters adds up to the same thing as two halves. For that matter, why not call the time signature "one one" or "eight eight"?

[12]See the file at <http://cnx.org/content/m10956/latest/staffpaper1.pdf>

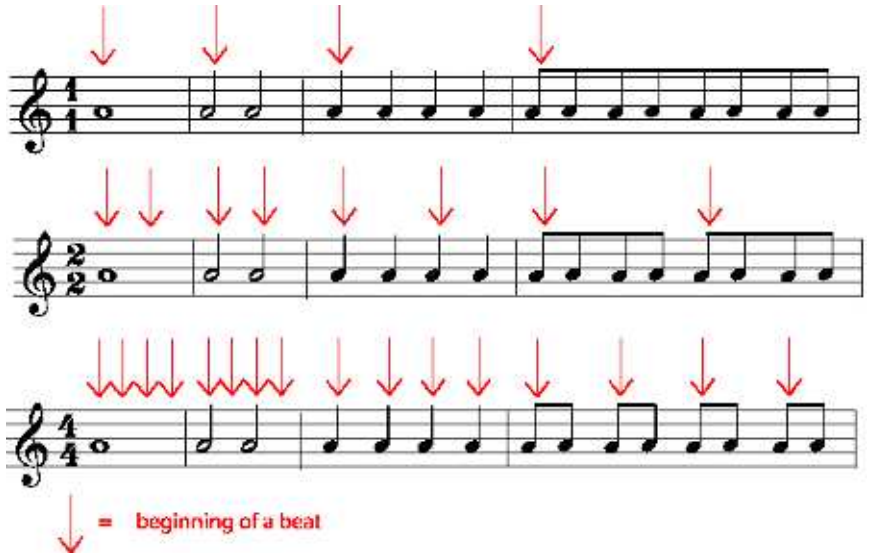

Figure 2.19: Measures in all of these meters look the same, but feel different. The difference is how many downbeats there are in a measure.

Or why not write two two as two four, giving quarter notes the beat instead of half notes? The music would look very different, but it would sound the same, as long as you made the beats the same speed. The music in each of the staves in Figure 2.20 would sound like this[13].

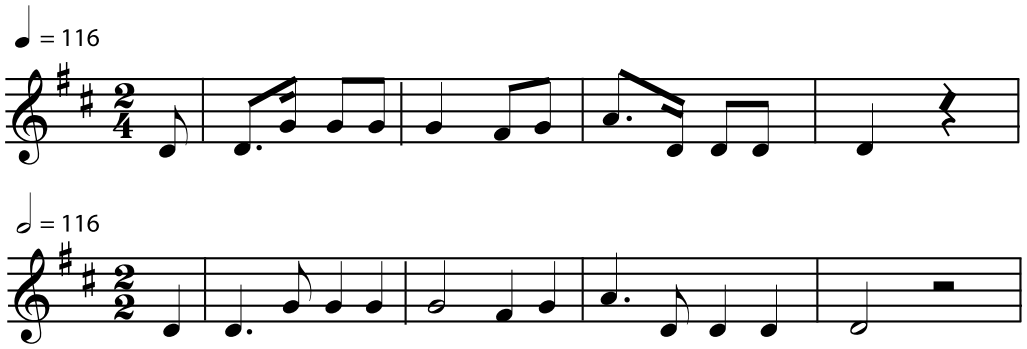

Figure 2.20: The music in each of these staves should sound exactly alike.

So why is one time signature chosen rather than another? The composer will normally choose a time signature that makes the music easy to read and also easy to count and conduct[14]. Does the music feel like

[13] See the file at <http://cnx.org/content/m10956/latest/14k.mid>
[14] "Conducting" <http://cnx.org/content/m12404/latest/>

it has four beats in every measure, or does it go by so quickly that you only have time to tap your foot twice in a measure?

A common exception to this rule of thumb is six eight time, and the other time signatures (for example nine eight and twelve eight) that are used to write compound meters[15]. A piece in six eight might have six beats in every measure, with an eighth note getting a beat. But it is more likely that the conductor (or a tapping foot) will give only two beats per measure, with a dotted quarter (or three eighth notes) getting one beat. In the same way, three eight may only have one beat per measure; nine eight, three beats per measure; and twelve eight, four beats per measure. Why the exceptions? Since beats normally get divided into halves and quarters, this is the easiest way for composers to write beats that are divided into thirds.

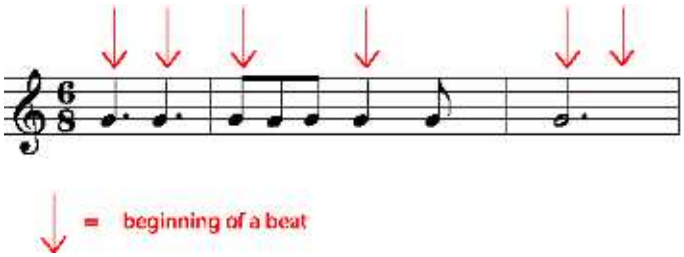

Figure 2.21: In six eight time, a dotted quarter usually gets one beat. This is the easiest way to write beats that are evenly divided into three rather than two.

2.4 Pickup Notes and Measures[16]

2.4.1 Pickup Measures

Normally, all the measures (Section 1.1.1: The Staff) of a piece of music must have exactly the number of beats (Section 2.3.1: Beats and Measures) indicated in the time signature (Section 2.3). The beats may be filled with any combination of notes or rests (with duration (Section 2.1) values also dictated by the time signature), but they must combine to make exactly the right number of beats. If a measure or group of measures has more or fewer beats, the time signature must change.

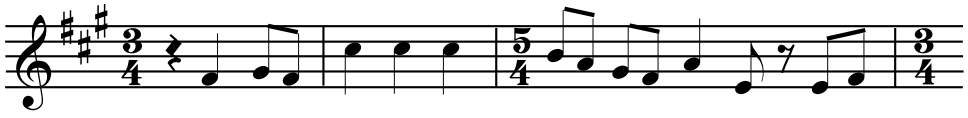

Figure 2.22: Normally, a composer who wants to put more or fewer beats in a measure must change the time signature, as in this example from Mussorgsky's *Boris Godunov*.

[15] "Meter in Music" <http://cnx.org/content/m12405/latest/>
[16] This content is available online at <http://cnx.org/content/m12717/1.8/>.

There is one common exception to this rule. (There are also some less common exceptions not discussed here.) Often, a piece of music does not begin on the strongest downbeat (p. 47). Instead, the strong beat that people like to count as "one" (the beginning of a measure), happens on the second or third note, or even later. In this case, the first measure may be a full measure that begins with some rests. But often the first measure is simply not a full measure. This shortened first measure is called a **pickup measure**.

If there is a pickup measure, the final measure of the piece should be shortened by the length of the pickup measure (although this rule is sometimes ignored in less formal written music). For example, if the meter[17] of the piece has four beats, and the pickup measure has one beat, then the final measure should have only three beats. (Of course, any combination of notes and rests can be used, as long as the total in the first and final measures equals one full measure.

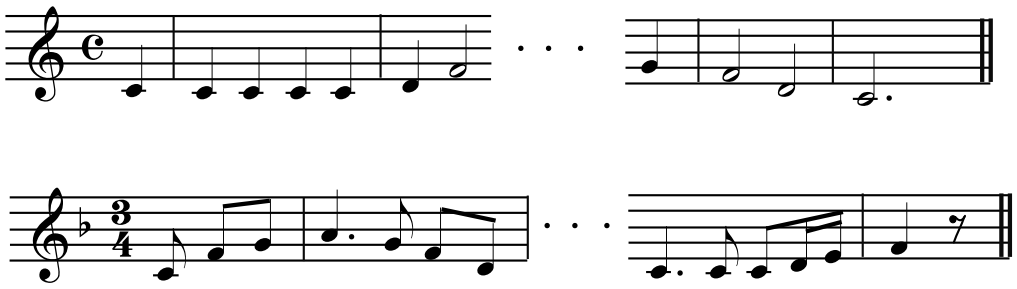

Figure 2.23: If a piece begins with a pickup measure, the final measure of the piece is shortened by the length of the pickup measure.

2.4.2 Pickup Notes

Any phrase[18] of music (not just the first one) may begin someplace other than on a strong downbeat. All the notes before the first strong downbeat of any phrase are the **pickup notes** to that phrase.

[17] "Meter in Music" <http://cnx.org/content/m12405/latest/>
[18] "Melody": Section Melodic Phrases <http://cnx.org/content/m11647/latest/#s2>

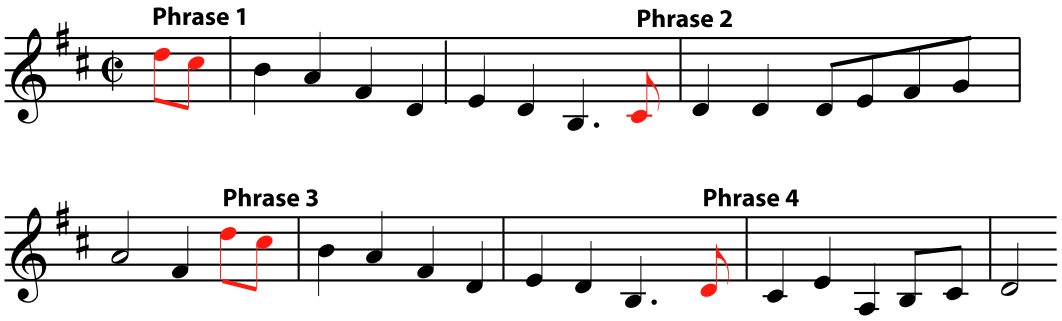

Figure 2.24: Any phrase may begin with pickup notes. Each of these four phrases begins with one or two pickup notes. (You may listen to the tune here[19]; can you hear that the pickup notes lead to the stronger downbeat?)

A piece that is using pickup measures or pickup notes may also sometimes place a double bar (p. 11) (with or without repeat signs) inside a measure, in order to make it clear which phrase and which section of the music the pickup notes belong to. If this happens (which is a bit rare, because it can be confusing to read), there is still a single bar line where it should be, at the end of the measure.

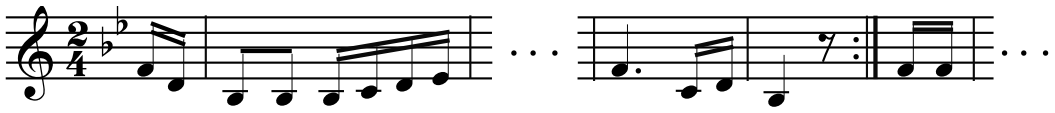

Figure 2.25: At the ends of sections of the music, a measure may be interrupted by a double bar that places the pickup notes in the correct section and assures that repeats have the correct number of beats. When this happens, the bar line will still appear at the end of the completed measure. This notation can be confusing, though, and in some music the pickups and repeats are written in a way that avoids these broken-up measures.

2.5 Dots, Ties, and Borrowed Divisions[20]

A half note is half the length of a whole note; a quarter note is half the length of a half note; an eighth note is half the length of a quarter note, and so on. (See Duration:Note Length (Section 2.1).) The same goes for rests. (See Duration: Rest Length (Section 2.2).) But what if you want a note (or rest) length that isn't half of another note (or rest) length?

[19] See the file at <http://cnx.org/content/m12717/latest/GirlILeftBehind.MID>
[20] This content is available online at <http://cnx.org/content/m11888/1.10/>.

2.5.1 Dotted Notes

One way to get a different length is by dotting the note or rest. A **dotted note** is one-and-a-half times the length of the same note without the dot. In other words, the note keeps its original length and adds another half of that original length because of the dot. So a dotted half note, for example, would last as long as a half note plus a quarter note, or three quarters of a whole note.

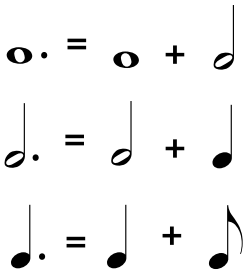

Figure 2.26: The dot acts as if it is adding another note half the length of the original note. A dotted quarter note, for example, would be the length of a quarter plus an eighth, because an eighth note is half the length of a quarter note.

Exercise 2.5.1 *(Solution on p. 66.)*

Make groups of equal length on each side, by putting a dotted note or rest in the box.

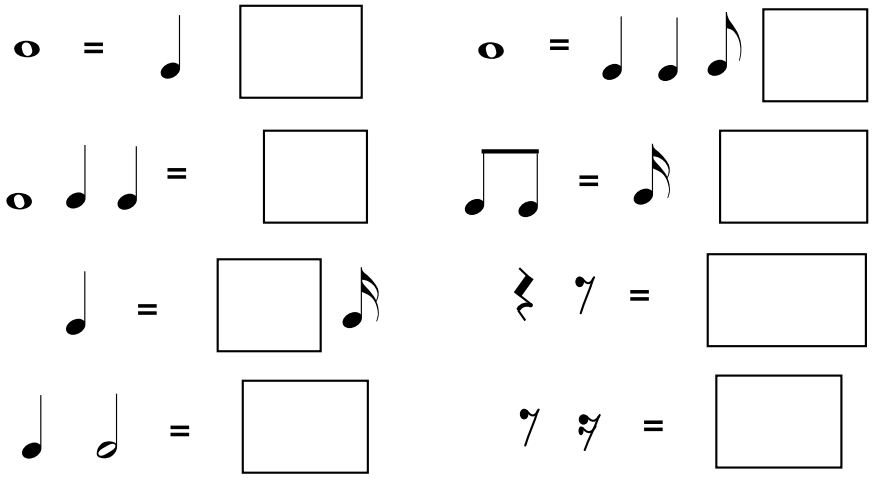

Figure 2.27

A note may have more than one dot. Each dot adds half the length that the dot before it added. For example, the first dot after a half note adds a quarter note length; the second dot would add an eighth note length.

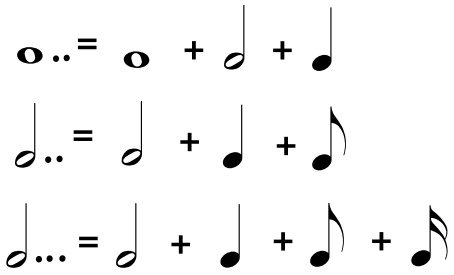

Figure 2.28: When a note has more than one dot, each dot is worth half of the dot before it.

2.5.2 Tied Notes

A dotted half lasts as long as a half note plus a quarter note. The same length may be written as a half note and a quarter note tied together. **Tied notes** are written with a curved line connecting two notes that are on the same line or the same space in the staff. Notes of any length may be tied together, and more than two notes may be tied together. **The sound they stand for will be a single note that is the length of all the tied notes added together.** This is another way to make a great variety of note lengths. Tied notes are also the only way to write a sound that starts in one measure (Section 2.3.1: Beats and Measures) and ends in a different measure.

NOTE: Ties may look like slurs (p. 72), but they are not the same; a slur connects to notes with different pitches (Section 1.3) and is a type of articulation (Section 3.2).

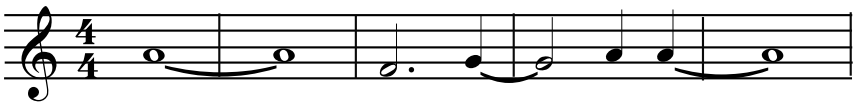

Figure 2.29: When these eight notes are played as written, only five distinct notes are heard: one note the length of two whole notes; then a dotted half note; then another note the same length as the dotted half note; then a quarter note; then a note the same length as a whole note plus a quarter note.

2.5.3 Borrowed Divisions

Dots and ties give you much freedom to write notes of varying lengths, but so far you must build your notes from halves of other notes. If you want to divide a note length into anything other than halves or halves of halves - if you want to divide a beat into thirds or fifths, for example - you must write the number of the division over the notes. These unusual subdivisions are called **borrowed divisions** because they sound as if they have been borrowed from a completely different meter[21]. They can be difficult to perform correctly

[21] "Meter in Music" <http://cnx.org/content/m12405/latest/>

and are avoided in music for beginners. The only one that is commonly used is **triplets**, which divide a note length into equal thirds.

Some Borrowed Divisions

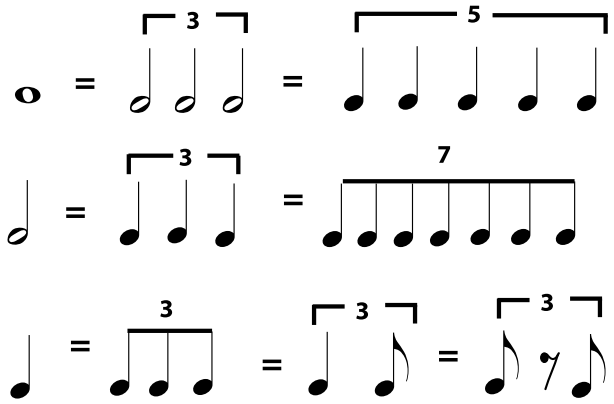

Figure 2.30: Any common note length can be divided into an unusual number of equal-length notes and rests, for example by dividing a whole note into three instead of two "half" notes. The notes are labeled with the appropriate number. If there might be any question as to which notes are involved in the borrowed division, a bracket is placed above them. Triplets are by far the most common borrowed division.

Borrowed Duplets

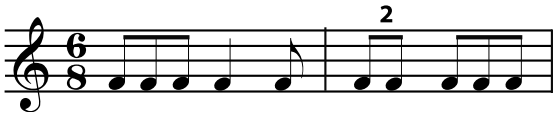

Figure 2.31: In a compound meter[22], which normally divides a beat into three, the borrowed division may divide the beat into two, as in a simple meter. You may also see duplets in swing music.

Notes in jazzy-sounding music that has a "swing" beat are often assumed to be triplet rhythms, even when they look like regular divisions; for example, two written eighth notes (or a dotted quarter-sixteenth) might sound like a triplet quarter-eighth rhythm. In jazz and other popular music styles, a tempo (Section 2.6) notation that says **swing** usually means that all rhythms should be played as triplets. **Straight** means to play the rhythms as written.

NOTE: Some jazz musicians prefer to think of a swing rhythm as more of a heavy accent on the second eighth, rather than as a triplet rhythm, particularly when the tempo (Section 2.6) is fast.

[22] "Meter in Music" <http://cnx.org/content/m12405/latest/>

This distinction is not important for students of music theory, but jazz students will want to work hard on using both rhythm[23] and articulation (Section 3.2) to produce a convincing "swing".

Swing Rhythms

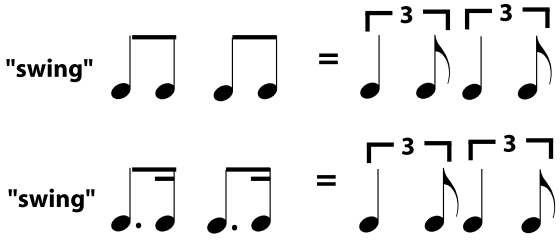

Figure 2.32: Jazz or blues with a **"swing" rhythm** often assumes that all divisions are triplets. The swung triplets may be written as triplets, or they may simply be written as "straight" eighth notes or dotted eighth-sixteenths. If rhythms are not written as triplets, the tempo marking usually includes an indication to "swing", or it may simply be implied by the style and genre of the music.

2.6 Tempo[24]

The **tempo** of a piece of music is its speed. There are two ways to specify a tempo. Metronome markings are absolute and specific. Other tempo markings are verbal descriptions which are more relative and subjective. Both types of markings usually appear above the staff, at the beginning of the piece, and then at any spot where the tempo changes. Markings that ask the player to deviate slightly from the main tempo, such as ritardando (Gradual Tempo Changes, p. 59) may appear either above or below the staff.

2.6.1 Metronome Markings

Metronome markings are given in beats per minute. They can be estimated using a clock with a second hand, but the easiest way to find them is with a **metronome**, which is a tool that can give a beat-per-minute tempo as a clicking sound or a pulse of light. Figure 2.33 shows some examples of metronome markings.

[23] "Rhythm" <http://cnx.org/content/m11646/latest/>
[24] This content is available online at <http://cnx.org/content/m11648/1.11/>.

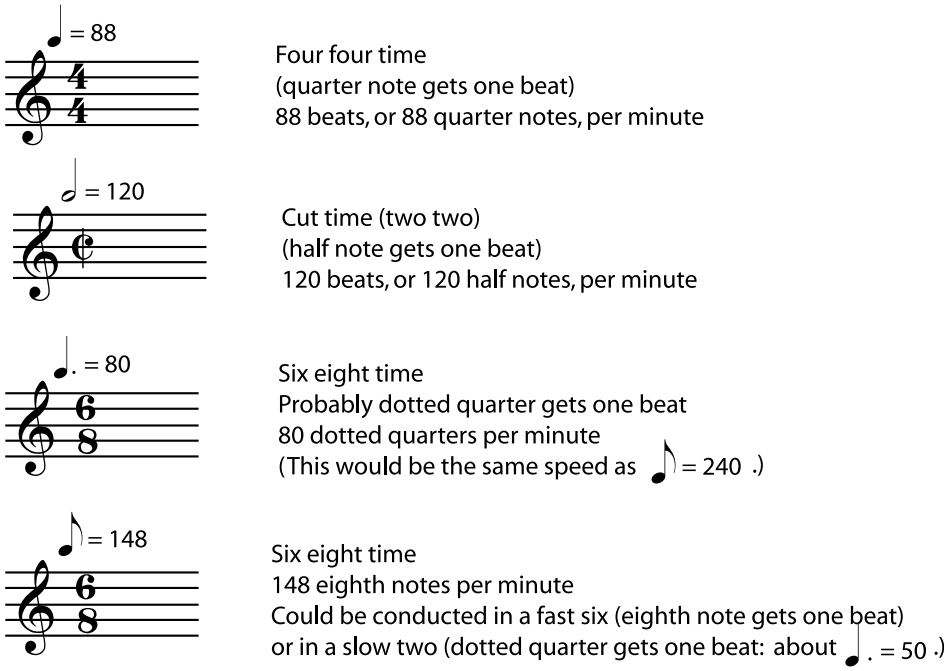

Figure 2.33

Metronomes often come with other tempo indications written on them, but this is misleading. For example, a metronome may have *allegro* marked at 120 beats per minute and *andante* marked at 80 beats per minute. *Allegro* should certainly be quite a bit faster than *andante*, but it may not be exactly 120 beats per minute.

2.6.2 Tempo Terms

A tempo marking that is a word or phrase gives you the composer's idea of **how fast the music should feel**. How fast a piece of music feels depends on several different things, including the texture and complexity of the music, how often the beat gets divided into faster notes, and how fast the beats themselves are (the metronome marking). Also, the same tempo marking can mean quite different things to different composers; if a metronome marking is not available, the performer should use a knowledge of the music's style and genre, and musical common sense, to decide on the proper tempo. When possible, listening to a professional play the piece can help with tempo decisions, but it is also reasonable for different performers to prefer slightly different tempos for the same piece.

Traditionally, tempo instructions are given in Italian.

Some Common Tempo Markings

- **Grave** - very slow and solemn (pronounced "GRAH-vay")
- **Largo** - slow and broad ("LAR-go")
- **Larghetto** - not quite as slow as largo ("lar-GET-oh")
- **Adagio** - slow ("uh-DAH-jee-oh")
- **Lento** - slow ("LEN-toe")

- **Andante** - literally "walking", a medium slow tempo ("on-DON-tay")
- **Moderato** - moderate, or medium ("MOD-er-AH-toe")
- **Allegretto** - Not as fast as allegro ("AL-luh-GRET-oh")
- **Allegro** - fast ("uh-LAY-grow")
- **Vivo, or Vivace** - lively and brisk ("VEE-voh")
- **Presto** - very fast ("PRESS-toe")
- **Prestissimo** - very, very fast ("press-TEE-see-moe")

These terms, along with a little more Italian, will help you decipher most tempo instructions.

More useful Italian

- **(un) poco** - a little ("oon POH-koe")
- **molto** - a lot ("MOLE-toe")
- **piu** - more ("pew")
- **meno** - less ("MAY-no")
- **mosso** - literally "moved"; motion or movement ("MOE-so")

Exercise 2.6.1 ***(Solution on p. 66.)***

Check to see how comfortable you are with Italian tempo markings by translating the following.

1. un poco allegro
2. molto meno mosso
3. piu vivo
4. molto adagio
5. poco piu mosso

Of course, tempo instructions don't have to be given in Italian. Much folk, popular, and modern music, gives instructions in English or in the composer's language. Tempo indications such as "Not too fast", "With energy", "Calmly", or "March tempo" give a good idea of how fast the music should feel.

2.6.3 Gradual Tempo Changes

If the tempo of a piece of music suddenly changes into a completely different tempo, there will be a new tempo given, usually marked in the same way (metronome tempo, Italian term, etc.) as the original tempo. Gradual changes in the basic tempo are also common in music, though, and these have their own set of terms. These terms often appear below the staff, although writing them above the staff is also allowed. These terms can also appear with modifiers (More useful Italian, p. 59) like *molto* or *un poco*. You may notice that there are quite a few terms for slowing down. Again, the use of these terms will vary from one composer to the next; unless beginning and ending tempo markings are included, the performer must simply use good musical judgement to decide how much to slow down in a particular *ritardando* or *rallentando*.

Gradual Tempo Changes

- **accelerando** - (abbreviated *accel.*) accelerating; getting faster
- **ritardando** - (abbrev. *rit.*) slowing down
- **ritenuto** - (abbrev. *riten.*) slower
- **rallentando** - (abbrev. *rall.*) gradually slower
- **rubato** - don't be too strict with the rhythm; while keeping the basic tempo, allow the music to gently speed up and relax in ways that emphasize the phrasing
- **poco a poco** - little by little; gradually
- **Tempo I** - ("tempo one" or "tempo primo") back to the original tempo (this instruction usually appears above the staff)

2.7 Repeats and Other Musical Road Map Signs[25]

Repetition, either exact or with small or large variations, is one of the basic organizing principles of music. Repeated notes (Section 2.1), motifs[26], phrases[27], melodies[28], rhythms[29], chord progressions[30], and even entire repeated sections in the overall form[31], are all very crucial in helping the listener make sense of the music. So good music is surprisingly repetitive!

So, in order to save time, ink, and page turns, common notation has many ways to show that a part of the music should be repeated exactly.

If the repeated part is very small - only one or two measures, for example - the repeat sign will probably look something like those in Figure 2.34 (Repeated Measures). If you have very many such repeated measures in a row, you may want to number them (in pencil) to help you keep track of where you are in the music.

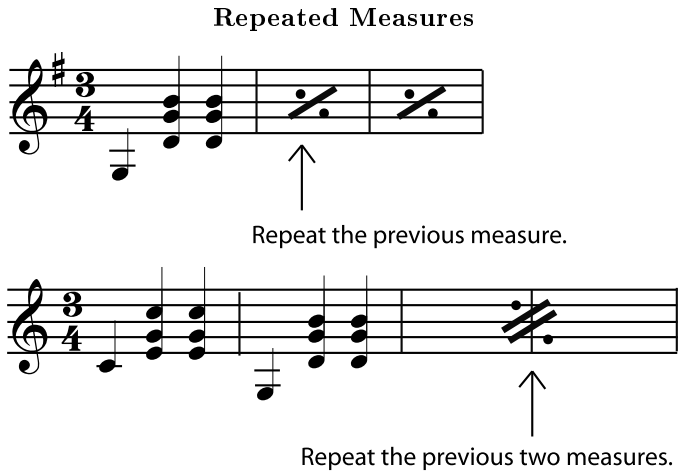

Figure 2.34

For repeated sections of medium length - usually four to thirty-two measures - **repeat dots** with or without endings are the most common markings. Dots to the right of a double bar line (Section 1.1.1: The Staff) begin the repeated section; dots to the left of a double bar line end it. If there are no beginning repeat dots, you should go all the way back to the beginning of the music and repeat from there.

[25] This content is available online at <http://cnx.org/content/m12805/1.8/>.
[26] "Melody": Section Motif <http://cnx.org/content/m11647/latest/#s3>
[27] "Melody": Section Melodic Phrases <http://cnx.org/content/m11647/latest/#s2>
[28] "Melody" <http://cnx.org/content/m11647/latest/>
[29] "Rhythm" <http://cnx.org/content/m11646/latest/>
[30] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[31] "Form in Music" <http://cnx.org/content/m10842/latest/>

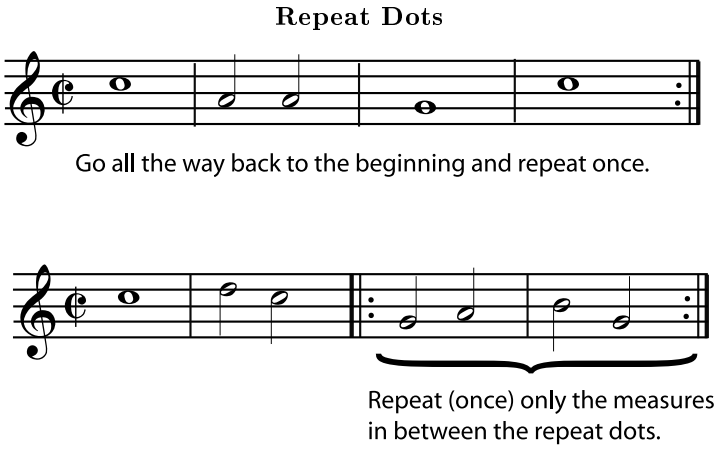

Figure 2.35: If there are no extra instructions, a repeated section should be played twice. Occasionally you will see extra instructions over the repeat dots, for example to play the section "3x" (three times).

It is very common for longer repeated sections of music to be repeated exactly until the last few measures. When this happens, the repeat dots will be put in an **ending**. The bracket over the music shows you which measures to play each time you arrive at that point in the music. For example, the second time you reach a set of endings, you will **skip the music in all the other endings; play only the measures in the second ending, and then do whatever the second ending directs you to do** (repeat, go on, skip to somewhere else, etc.).

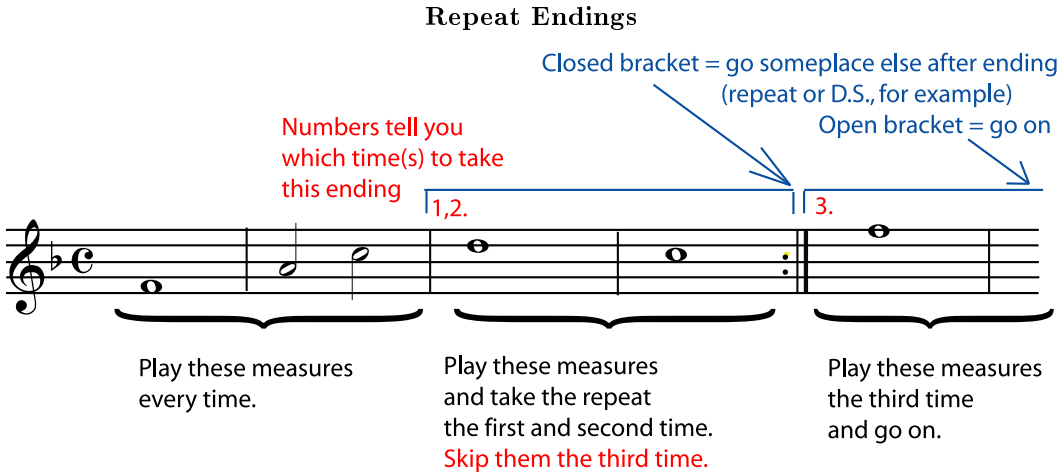

Figure 2.36: Some "endings" of a section of music may include a repeat, while others do not. Play only one ending each time (skipping over other, previously played endings when necessary), and then follow the "instructions" at the end of the ending (to repeat, go on, go someplace else, etc.).

When you are repeating large sections in more informally written music, you may simply find instructions in the music such as "to refrain", "to bridge", "to verses", etc. Or you may find extra instructions to play certain parts "only on the repeat". Usually these instructions are reasonably clear, although you may need to study the music for a minute to get the "road map" clear in your mind. Pencilled-in markings can be a big help if it's difficult to spot the place you need to skip to. In order to help clarify things, repeat dots and other repeat instructions are almost always marked by a double bar line (Section 1.1.1: The Staff).

In Western classical music[32], the most common instructions for repeating large sections are traditionally written (or abbreviated) in Italian. The most common instructions from that tradition are in Figure 2.37 (Other Common "Road Map" Signs).

[32] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

Other Common "Road Map" Signs

D.C. or *da capo*	"To the head" - Go back to the very beginning
D.S. or *dal segno*	"To the sign" - Go back to the sign
al fine	"To the end" - On the repeat, stop when it says "*fine*"
	Sign
fine	"End" - On the last time through, stop here
to 	Go to the coda section
	Coda section

Figure 2.37

Again, instructions can easily get quite complicated, and these large-section markings may require you to study your part for a minute to see how it is laid out, and even to mark (in pencil) circles and arrows that help you find the way quickly while you are playing. Figure 2.38 contains a few very simplistic examples of how these "road map signs" will work.

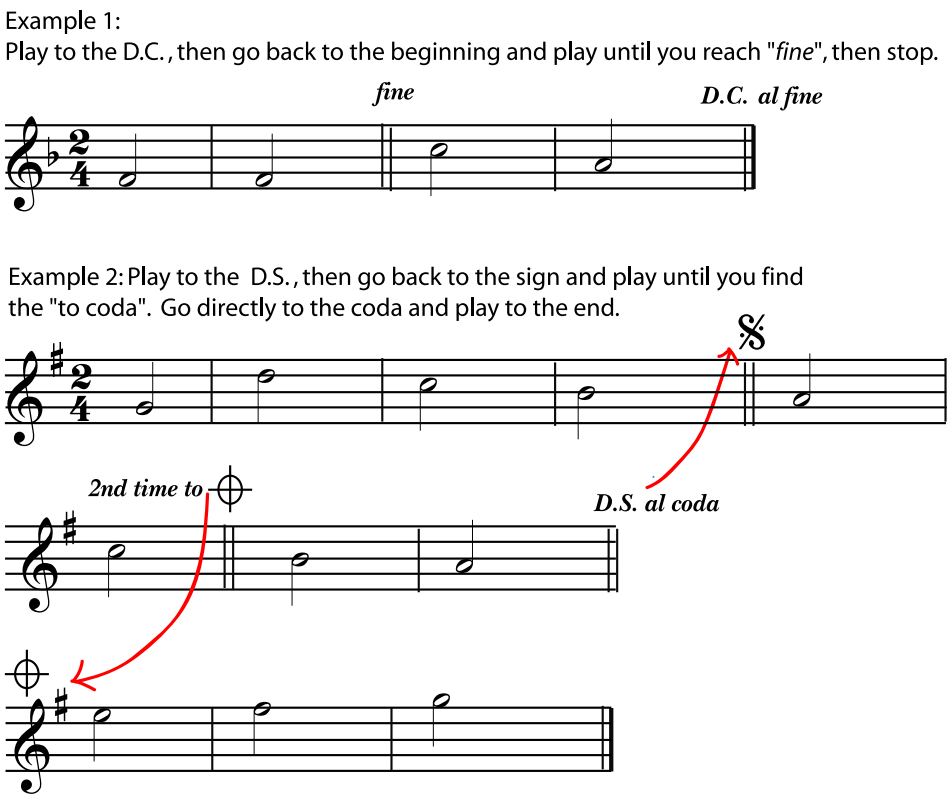

Figure 2.38: Here are some (shortened) examples of how these types of repeat instructions may be arranged. These types of signs usually mark longer repeated sections. In many styles of music, a short repeated section (usually marked with repeat dots) is often **not** repeated after a *da capo* or *dal segno*.

Solutions to Exercises in Chapter 2

Solution to Exercise 2.1.1 (p. 42)

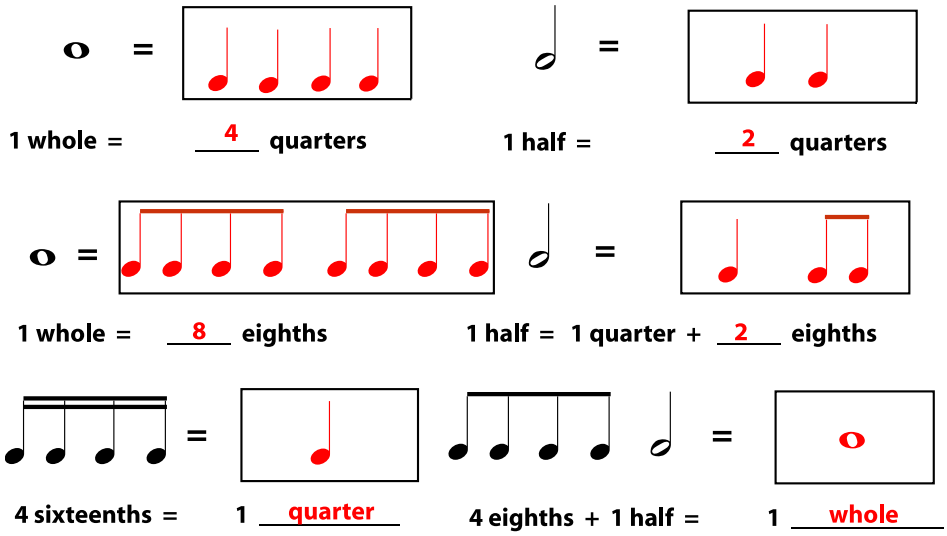

Figure 2.39

Solution to Exercise 2.2.1 (p. 44)

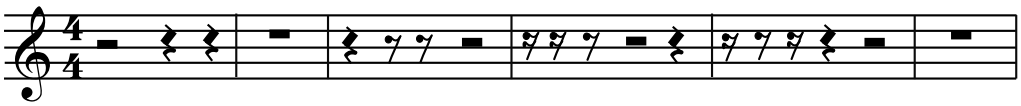

Figure 2.40

Solution to Exercise 2.3.1 (p. 48)

- A has a very strong, quick 1-2-3 beat.
- B is in a slow (easy) 2. You may feel it in a fast 4.
- C is in a stately 4.
- D is in 3, but the beat may be harder to feel than in A because the rhythms are more complex and the performer is taking some liberties with the tempo (Section 2.6).

Solution to Exercise 2.3.2 (p. 49)

There are an enormous number of possible note combinations for any time signature. That's one of the things that makes music interesting. Here are some possibilities. If you are not sure that yours are correct, check with your music instructor.

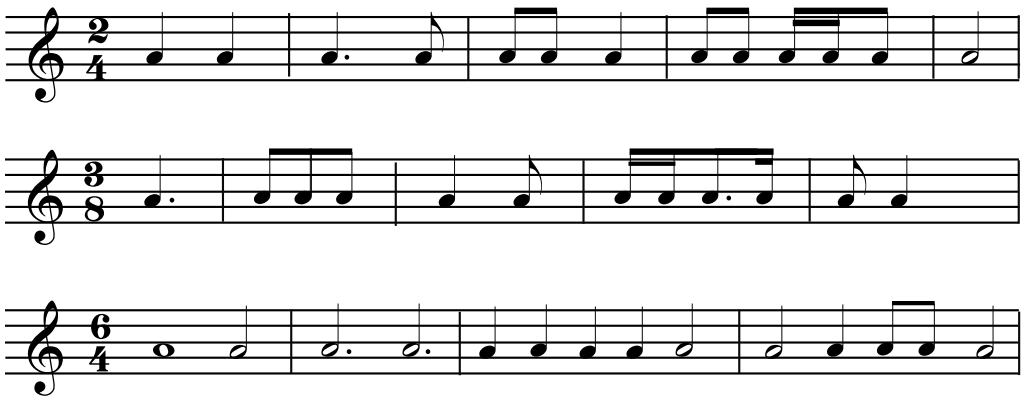

Figure 2.41: These are only a few of the many, many possible note combinations that could be used in these time signatures.

Solution to Exercise 2.5.1 (p. 54)

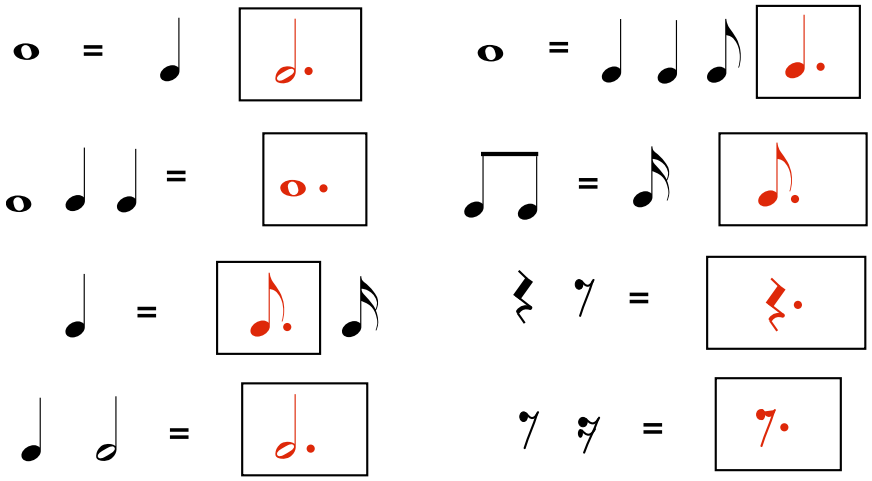

Figure 2.42

Solution to Exercise 2.6.1 (p. 59)

1. a little fast
2. much less motion = much slower
3. more lively = faster
4. very slow
5. a little more motion = a little faster

Chapter 3

Style

3.1 Dynamics and Accents in Music[1]

3.1.1 Dynamics

Sounds, including music, can be barely audible, or loud enough to hurt your ears, or anywhere in between. When they want to talk about the loudness of a sound, scientists and engineers talk about amplitude[2]. Musicians talk about **dynamics**. The amplitude of a sound is a particular number, usually measured in decibels, but dynamics are relative; an orchestra playing *fortissimo* sounds much louder than a single violin playing *fortissimo*. The exact interpretation of each dynamic marking in a piece of music depends on:

- comparison with other dynamics in that piece
- the typical dynamic range for that instrument or ensemble
- the abilities of the performer(s)
- the traditions of the musical genre being performed
- the acoustics of the performance space

Traditionally, dynamic markings are based on Italian words, although there is nothing wrong with simply writing things like "quietly" or "louder" in the music. *Forte* means loud and *piano* means quiet. The instrument commonly called the "piano" by the way, was originally called a "pianoforte" because it could play dynamics, unlike earlier popular keyboard instruments like the harpsichord and spinet.

[1] This content is available online at <http://cnx.org/content/m11649/1.13/>.
[2] "Acoustics for Music Theory": Section Wave Amplitude and Loudness <http://cnx.org/content/m13246/latest/#s12>

Typical Dynamic Markings

mf	mezzo forte	=	medium loud (pronounced "MET-soh FOR-tay")
f	forte	=	loud ("FOR-tay")
ff	fortissimo	=	very loud ("for-TISS-im-oh")
fff	fortisissimo	=	very, very loud ("FOR-tiss-SISS-im-oh")
ffff	and so on...		
mp	mezzo piano	=	medium quiet ("MET-soh PYAN-oh")
p	piano	=	quiet ("PYAN-oh")
pp	piannissimo	=	very quiet ("PEE-an-ISS-im-oh")
ppp	pianississimo	=	very, very quiet ("PEE-an-iss-ISS-im-oh")
pppp	and so on...		

Figure 3.1

When a composer writes a *forte* into a part, followed by a *piano*, the intent is for the music to be loud, and then suddenly quiet. If the composer wants the change from one dynamic level to another to be gradual, different markings are added. A *crescendo* (pronounced "cresh-EN-doe") means "gradually get louder"; a *decrescendo* or *diminuendo* means "gradually get quieter".

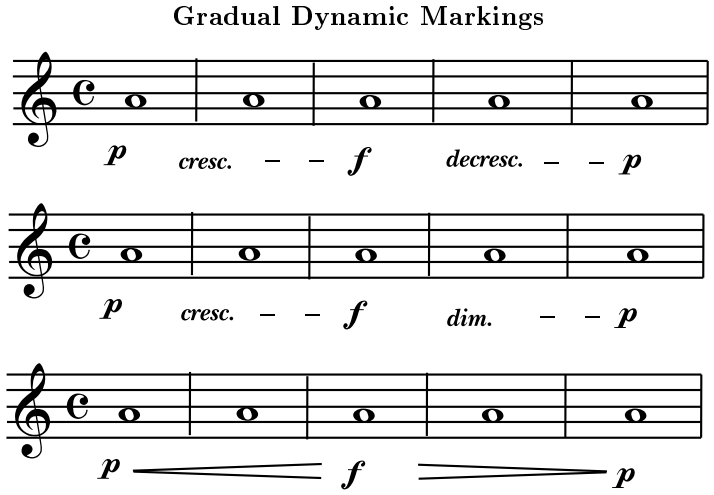

Figure 3.2: Here are three different ways to write the same thing: start softly (piano), gradually get louder (crescendo) until the music is loud (forte), then gradually get quieter (decrescendo or diminuendo) until it is quiet (piano) again.

3.1.2 Accents

A composer may want a particular note to be louder than all the rest, or may want the very beginning of a note to be loudest. **Accents** are markings that are used to indicate these especially-strong-sounding notes. There are a few different types of written accents (see Figure 3.3 (Common Accents)), but, like dynamics, the proper way to perform a given accent also depends on the instrument playing it, as well as the style and period of the music. Some accents may even be played by making the note longer or shorter than the other notes, in addition to, or even instead of being, louder. (See articulation (Section 3.2) for more about accents.)

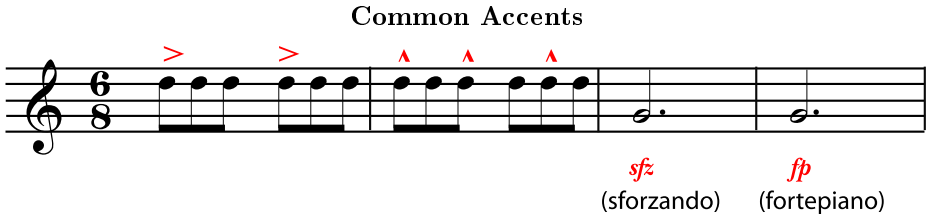

Figure 3.3: The exact performance of each type of accent depends on the instrument and the style and period of the music, but the *sforzando* and *fortepiano*-type accents are usually louder and longer, and more likely to be used in a long note that starts loudly and then suddenly gets much softer. *Caret*-type accents are more likely to be used to mark shorter notes that should be stronger than unmarked notes.

3.2 Articulation[3]

3.2.1 What is Articulation?

The word **articulation** generally refers to how the pieces of something are joined together; for example, how bones are connected to make a skeleton or syllables are connected to make a word. Articulation depends on what is happening at the beginning and end of each segment, as well as in between the segments.

In music, the segments are the individual notes of a **line** in the music. This could be the melodic[4] line, the bass[5] line, or a part of the harmony[6]. The line might be performed by any musician or group of musicians: a singer, for example, or a bassoonist, a violin section, or a trumpet and saxophone together. In any case, it is a string of notes that follow one after the other and that belong together in the music.The **articulation** is what happens in between the notes. The **attack** - the beginning of a note - and the amount of **space** in between the notes are particularly important.

3.2.2 Performing Articulations

Descriptions of how each articulation is done cannot be given here, because they depend too much on the particular instrument that is making the music. In other words, the technique that a violin[7] player uses to slur notes will be completely different from the technique used by a trumpet[8] player, and a pianist and a vocalist will do different things to make a melody sound legato. In fact, the violinist will have some articulations available (such as **pizzicato**, or "plucked") that a trumpet player will never see.

So if you are wondering how to play slurs on your guitar or staccato on your clarinet, ask your music teacher or director. What you will find here is a short list of the most common articulations: their names, what they look like when notated, and a vague description of how they sound. The descriptions have to be vague, because articulation, besides depending on the instrument, also depends on the style of the music. Exactly how much space there should be between staccato eighth notes, for example, depends on tempo (Section 2.6) as well as on whether you're playing Rossini or Sousa. To give you some idea of the difference

[3] This content is available online at <http://cnx.org/content/m11884/1.9/>.
[4] "Melody" <http://cnx.org/content/m11647/latest/>
[5] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>
[6] "Harmony" <http://cnx.org/content/m11654/latest/>
[7] "Introduction to the Violin and FAQ" <http://cnx.org/content/m13437/latest/>
[8] "Trumpets and Cornets" <http://cnx.org/content/m12606/latest/>

that articulation makes, though, here are audio examples of a violin playing a legato[9] and a staccato[10] passage. (For more audio examples of violin articulations, please see Common Violin Terminology[11].)

3.2.3 Common Articulations

Staccato notes are short, with plenty of space between them. Please note that this doesn't mean that the tempo (Section 2.6) or rhythm[12] goes any faster. The tempo and rhythm are not affected by articulations; the staccato notes sound shorter than written only because of the extra space between them.

Staccato

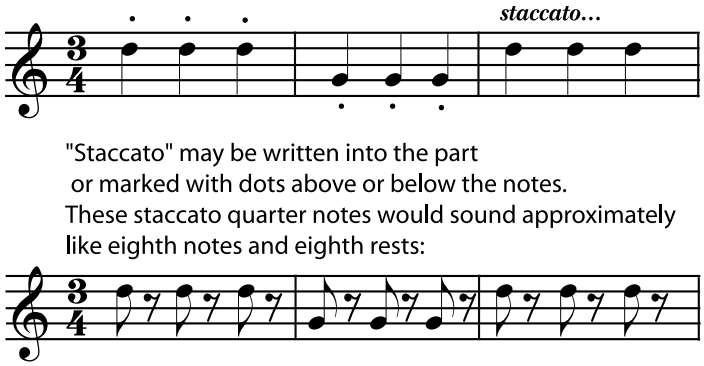

Figure 3.4

Legato is the opposite of staccato. The notes are very connected; there is no space between the notes at all. There is, however, still some sort of articulation that causes a slight but definite break between the notes (for example, the violin player's bow changes direction, the guitar player plucks the string again, or the wind player uses the tongue to interrupt the stream of air).

Legato

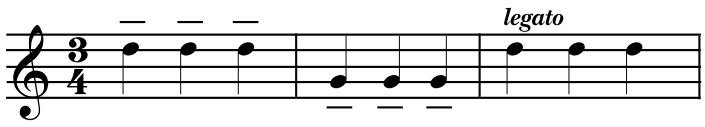

Figure 3.5

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[9] See the file at <http://cnx.org/content/m11884/latest/artleg.mp3>
[10] See the file at <http://cnx.org/content/m11884/latest/artstacc.mp3>
[11] "Common Violin Terminology" <http://cnx.org/content/m13316/latest/>
[12] "Rhythm" <http://cnx.org/content/m11646/latest/>

Accents - An accent (p. 69) requires that a note stand out more than the unaccented notes around it. Accents are usually performed by making the accented note, or the beginning of the accented note, louder than the rest of the music. Although this is mostly a quick change in dynamics (Section 3.1), it usually affects the articulation of the note, too. The extra loudness of the note often requires a stronger, more definite attack at the beginning of the accented note, and it is emphasized by putting some space before and after the accented notes. The effect of a lot of accented notes in a row may sound marcato (p. 74).

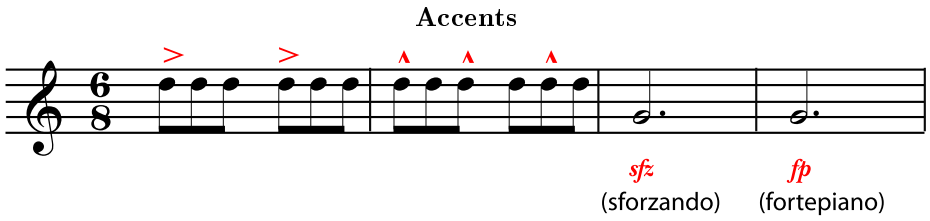

Figure 3.6: The performance of an accent depends on the style of music, but in general, sforzando and fortepiano accents involve a loud beginning to a longer note. They are usually heavier and longer than caret-type accents, which often rely more on a powerful attack (p. 70) to make a short note louder than the notes around it.

A **slur** is marked by a curved line joining any number of notes. When notes are slurred, only the first note under each slur marking has a definite articulation at the beginning. The rest of the notes are so seamlessly connected that there is no break between the notes. A good example of slurring occurs when a vocalist sings more than one note on the same syllable of text.

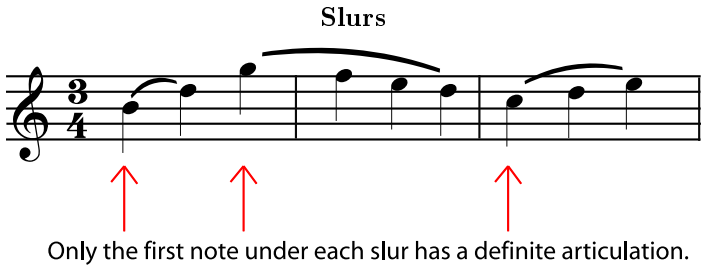

Figure 3.7

A tie (Section 2.5.3: Borrowed Divisions) looks like a slur, but it is between two notes that are the same pitch. **A tie is not really an articulation marking.** It is included here because it looks like one, which can cause confusion for beginners. When notes are tied together, they are played as if they are one single note that is the length of all the notes that are tied together. (Please see Dots, Ties, and Borrowed Divisions (Section 2.5).)

Slurs vs. Ties

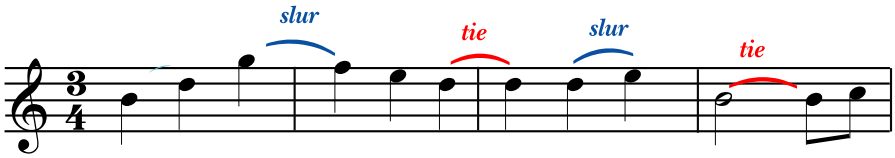

Figure 3.8: A slur marking indicates no articulation - no break in the sound - between notes of different pitches. A tie is used between two notes of the same pitch. Since there is no articulation between them, they sound like a single note. The tied quarters here would sound exactly like a half note crossing the bar line. Like a note that crosses bar lines, the two-and-a-half-beat "note" in the fourth bar would be difficult to write without using a tie.

A **portamento** is a smooth glide between the two notes, including all the pitches (Section 1.3) in between. For some instruments, like violin[13] and trombone[14], this includes even the pitches in between the written notes. For other instruments, such as guitar[15], it means sliding through all of the possible notes between the two written pitches.

Portamento

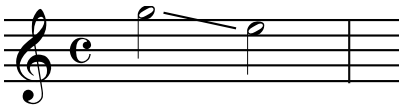

Figure 3.9

Although unusual in traditional common notation (Section 1.1), a type of portamento that includes only one written pitch can be found in some styles of music, notably jazz, blues, and rock. As the notation (Figure 3.10: Scoops and Fall-offs) suggests, the proper performance of **scoops** and **fall-offs** requires that the portamento begins (in scoops) or ends (in fall-offs) with the slide itself, rather than with a specific note.

[13] "Introduction to the Violin and FAQ" <http://cnx.org/content/m13437/latest/>
[14] "Trombones" <http://cnx.org/content/m12602/latest/>
[15] "Guitars" <http://cnx.org/content/m12745/latest/>

Scoops and Fall-offs

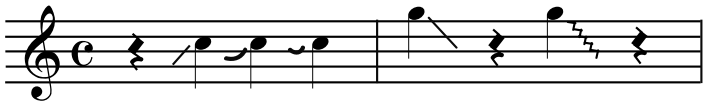

Figure 3.10: The notation for scoops and fall-offs has not been standardized, but either one will look something like a portamento or slur with a note on one end only.

Some articulations may be some combination of staccato, legato, and accent. **Marcato**, for example means "marked" in the sense of "stressed" or "noticeable". Notes marked *marcato* have enough of an accent and/or enough space between them to make each note seem stressed or set apart. They are usually longer than staccato but shorter than legato. Other notes may be marked with a combination of articulation symbols, for example legato with accents. As always, the best way to perform such notes depends on the instrument and the style of the music.

Some Possible Combination Markings

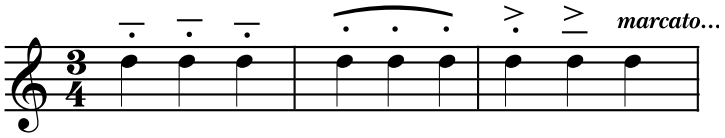

Figure 3.11

Plenty of music has no articulation marks at all, or marks on only a few notes. Often, such music calls for notes that are a little more separate or defined than legato, but still nowhere as short as staccato. Mostly, though, it is up to the performer to know what is considered proper for a particular piece. For example, most ballads are sung legato, and most marches are played fairly staccato or marcato, whether they are marked that way or not. Furthermore, singing or playing a phrase[16] with musicianship often requires knowing which notes of the phrase should be legato, which should be more separate, where to add a little *portamento*, and so on. This does not mean the best players consciously decide how to play each note. Good articulation comes naturally to the musician who has mastered the instrument and the style of the music.

[16] "Melody": Section Melodic Phrases <http://cnx.org/content/m11647/latest/#s2>

Index of Keywords and Terms

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