MUSIC THEORY & MIDI
Notation Software

Scales and Chords

The sharp makes a note a semitone higher. The flat makes a note a semitone lower

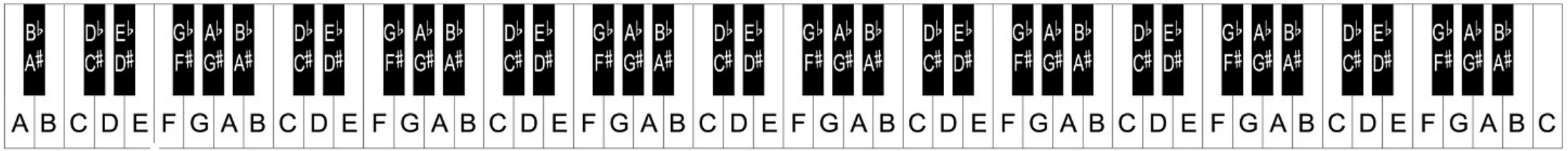
Arrangement of Whole tones and Semitones for Major – Happy, Glorious

W W H W W W H
C D E F G A B C

Arrangement of Whole tones and Semitones for Natural Minor – Sad, Poignant

W H W W H W W
C D E_b F G A_b B_b C

88-Key Piano Keyboard Layout



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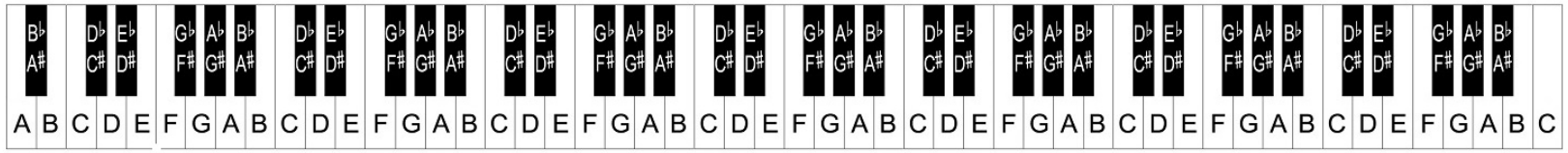
The major and minor scales have all seven letter names in it (and tonic is repeated)

Major Tetrachord: First 4 notes of a major scale: C D E F (WWH)

2 major tetrachords separated by a whole tone make up a major scale

Scales and Chords: Transposable

88-Key Piano Keyboard Layout



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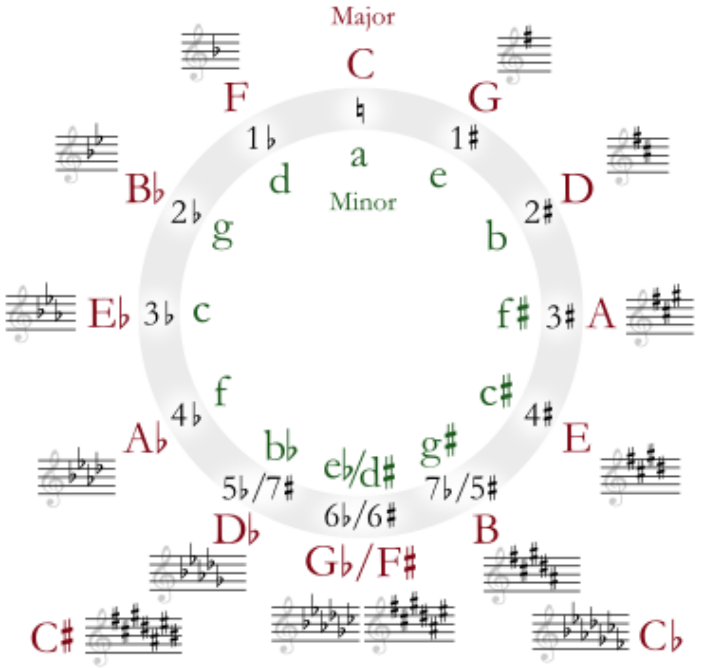
Seven consecutive fifths on the circle of fifths rearranged from the tonic (second of the seven fifths)

The Circle of fifths



The tonic is the first note of the scale
Number of sharps at the key signature
Number of flats at the key signature
Order of flats or sharps

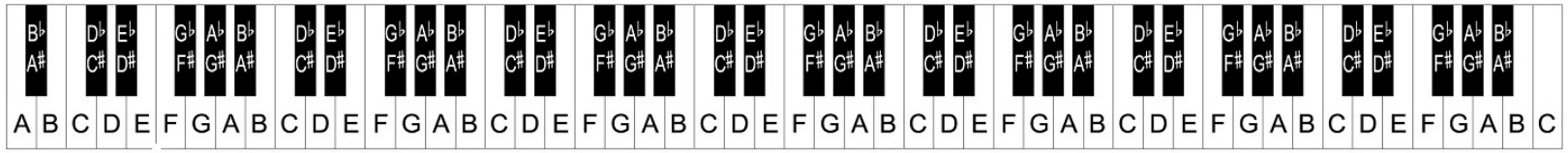
Find the notes/pitches needed to create a D major scale (use tetrachords or circle of 5ths)
What major scale (tonic) contains the notes _____?
E G A Bb C F D **(put in order use permutation till you get WWHWWWH)**

A fifth is an interval of seven semi-tones (7 half-tones)

Pythagorean system of fifths, except 12 in a closed circle, instead of an infinity in a spiral

Scales and Chords

88-Key Piano Keyboard Layout



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CHORDS: 3 notes, 4 notes, or more
A chord that has 3 notes is called a **triad**

Structure:
Root, **third** from the root, **fifth** from the root: Ex: A(root), C(third), E(fifth)
Thirds: can be major (4 semitones) or minor (3 semitones)
Fifths: Can be perfect (7 semitones), diminished (6 semitones), or augmented(8 semitones)

There are four kinds of triads: **major**, **minor**, **augmented**, **diminished**

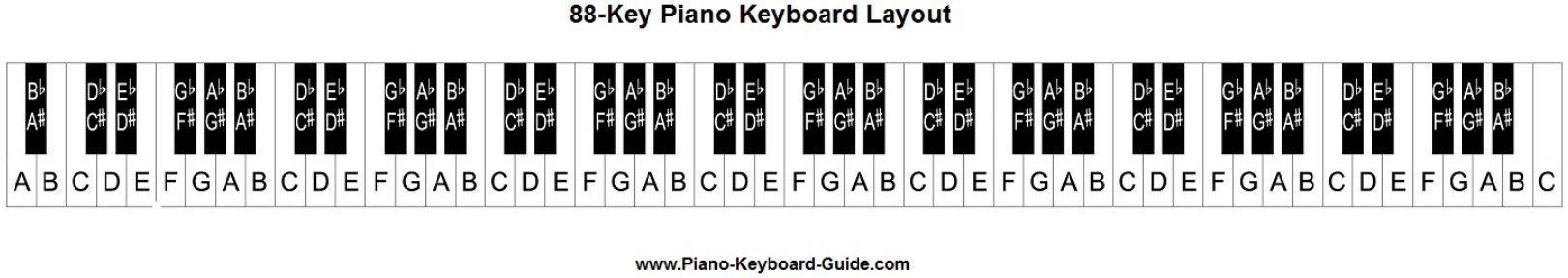
Major: Root, Major 3d, perfect 5^{th} (from root)
Minor: Root, minor 3d, perfect 5^{th} (from root)
Augmented: Root, Major 3d, augmented 5^{th} (from root)
Diminished: : Root, minor 3d, diminished 5^{th} (from root)

Construct a minor triad from Bb
Construct a Major triad from F#
Construct an augmented triad from G
Construct a diminished triad from A

List the three minor triads that exist in the key of D major
List the three major triads that exist in the key of D major
Is there any augmented triad in G major?
Is there any diminished triad in G major

E minor, F# minor, B minor

Scales and Chords



TRIAD INVERSION: when the root of the triad is not in the **bass** (lowest pitch of chord)

Root position: Root, 3rd, 5th Example: D F A. (quality?)

First Inversion: The 3rd of the triad is in the bass Example: F A D (Interval between bass and fundamental is a 6th)

Second Inversion: The 5th of the triad is in the bass Example: A D F(Interval between bass and fundamental is a 4th)

Inversions do not change the quality of a chord.

The order of the upper two notes do not change the nature of the inversion:
EX: GBE or GEB are still a first inversion of an E minor chord

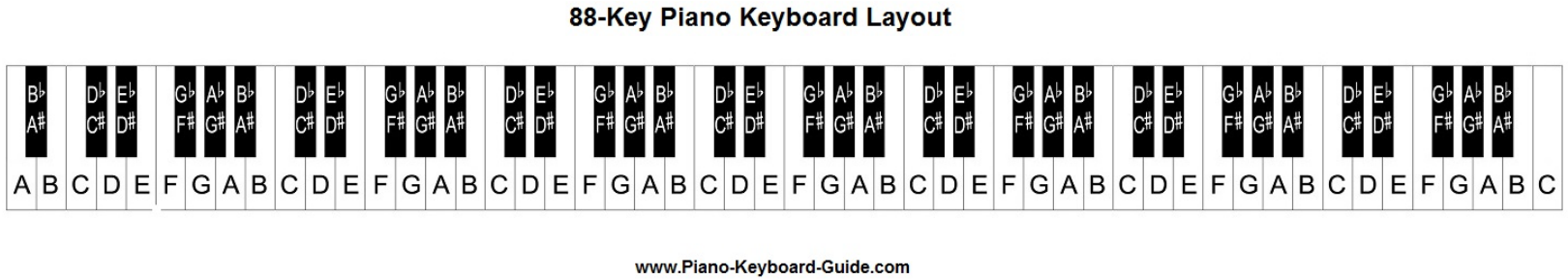
What is the second inversion of a Bb major chord?

If the chord reads: G C E, what is the root (permutate the notes until you have a 3d from the bass and a 5th from the bass)

To calculate an music interval, count the number of letter names. Always include the first letter name:

G to C is a fourth because you counted G (1) A(2) B(3) C(4), therefore GCE is a second inversion of CEG. C is the root

Scales and Chords



Scale Degrees

Any major (or minor) scale has seven possible triads, based on the different degrees (notes) of the scale
These degrees have names (Tonic for 1st note), and Dominant (for 5th note)
We are simplifying by designating the chords from each scale degree by a roman numeral
Ex: Key of F

I F (tonic)
II G
III A
IV Bb
V C. (Dominant)
VI D
VII E

The dominant and tonic degrees are the most important scale degrees (and chords) in the scale

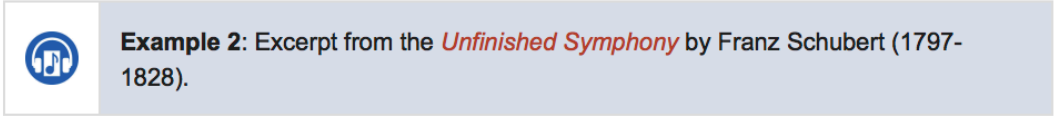
Rhythm II: Pulse and Tempo

Pulse

If you listen carefully to the music around you, one of the first things you will notice is that most of it has a recurring beat or **pulse**. The terms beat and pulse are basically synonymous, both referring to the regular beating or pulsation of our hearts. Like our heartbeats, the pulse in music can speed up or slow down, and it can be regular or irregular. Most of the music that we hear has a steady, regular pulse, however.

Pulse is the propelling force in music that makes us want to dance, to bob our heads, or to tap our toes. Listen to the first musical example below and try to focus only on its rhythms, moving your body along with the beat. You might even want to tap or clap along with the music. Do you feel a steady pulse? Is it fast or slow? Now listen to the second example. How does its pulse feel different? Note that in some music the beat is very clearly articulated (such as in dance music), but in other types of music the beat is only felt internally.

Example 1: Excerpt from the *William Tell* Overture by Gioaccino Rossini (1792-1868).



Example 2: Excerpt from the *Unfinished Symphony* by Franz Schubert (1797-1828).

Tempo

Some music has a slow-moving pulse and some music has a very fast-moving pulse. The speed at which the pulse moves in music is known as its tempo. This tempo can be indicated by the number of beats occurring per minute (bpm), as measured mechanically by a metronome. An average tempo ranges somewhere between 80 to 120 beats per minute—or around 1-2 beats per second. Tempo can also be indicated by using Italian musical terms such as *Andante* and *Allegro*. Below are some of the most common tempo indications and their approximate speeds.

Largo	very slow	(40-60 bpm)
Adagio	slow	(60-76 bpm)
Andante	at a walking pace	(76-106 bpm)
Moderato	moderate	(106-120 bpm)
Allegro	fast	(120-168 bpm)
Vivace	quick	(140-168 bpm)
Presto	very fast	(168-200 bpm)

Common tempo markings

In addition to these tempo markings, gradual *changes* in tempo can be indicated by the Italian terms *ritardando* (slowing down) or *accelerando* (speeding up).

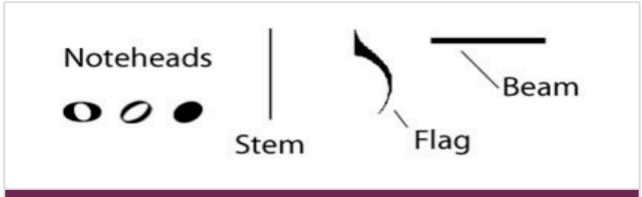
Rhythm III: Note Values

Duration

Another important aspect of rhythm is duration, which refers to the length of time that a sound or a silence lasts. The most basic duration is the pulse, which can be represented in written music by different note values, as described below. Other durations are longer or shorter than the pulse and are often related to the pulse by *ratios* (for example, twice as long as the pulse, twice as short as the pulse, and so on). We will now look at the system of rhythm notation that allows us to write down these durations.

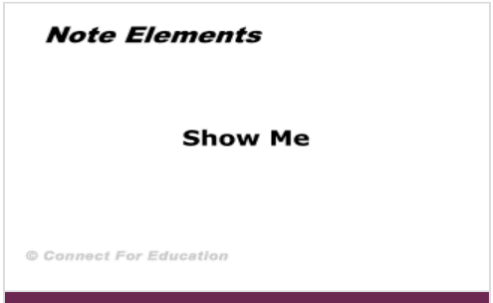
Note Values

Notes are musical symbols that indicate two basic parameters: **pitch** (how high or low the sound is) and **duration** (how long the sound lasts). As we have seen, the position of notes on the staff indicates their pitch. The relative duration of a note is indicated by means of a notational system that combines different types of noteheads with stems and flags (or beams) to create a **note value**.



Rhythm notation symbols

The following animation illustrates how a notehead can be combined with a stem and a flag to create a note value. This particular note value is an eighth note. The chart given below the animation provides all of the most common note values.

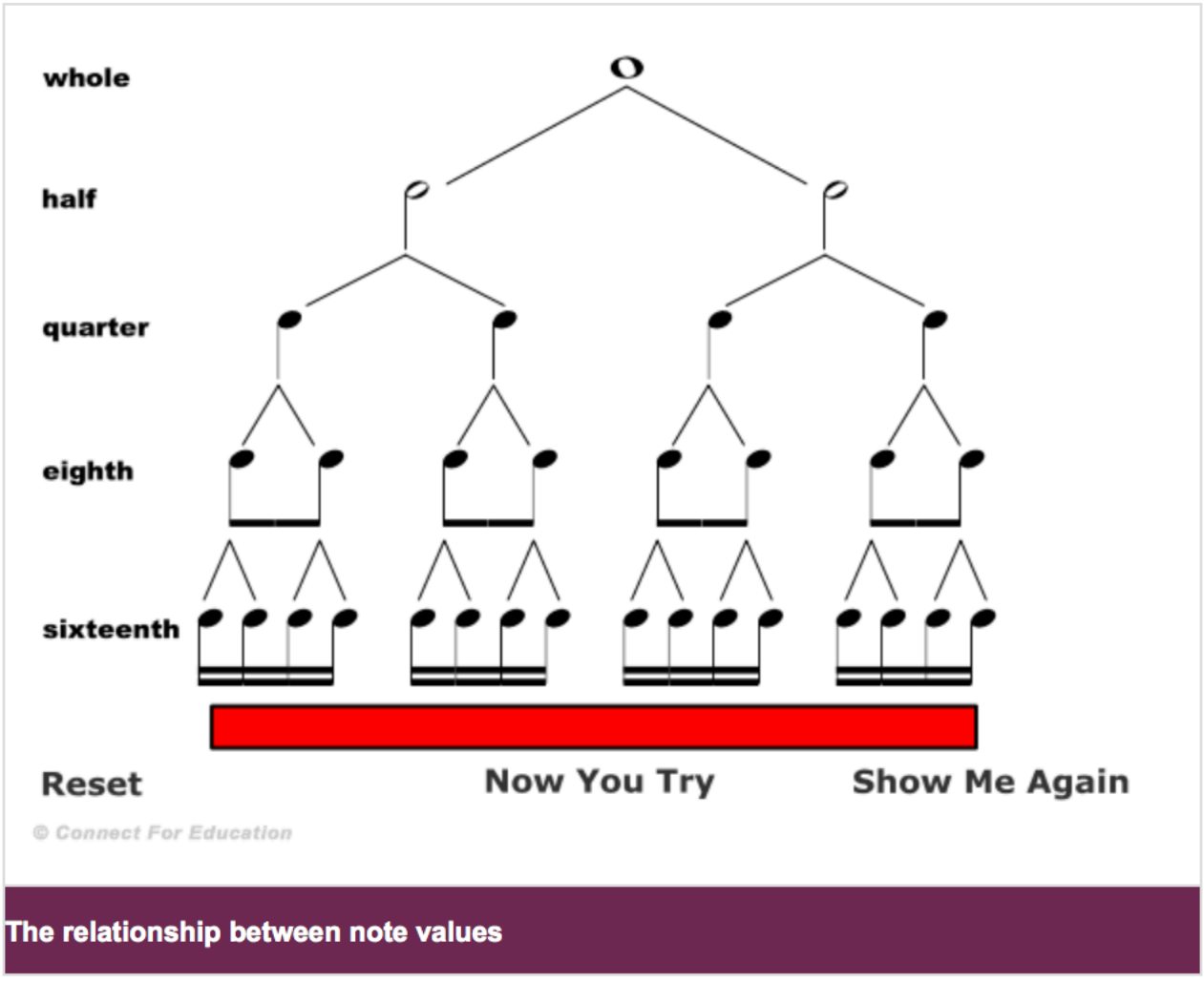


The elements of an eighth note

Note Value	Whole	Half	Quarter	Eighth	Sixteenth
Symbol					

The longest note value found in most notated music is the whole note, which is represented by an oval-shaped notehead. It is the only note value without a stem, and its notehead is not slanted like the other note values. As the whole note is divided into smaller values, the names are derived in a very logical way. The half note (represented by an open notehead and a stem) is half as long as the whole note. The quarter note (represented by a filled notehead and a stem) is half as long as the half note. The eighth note (represented by a filled notehead, a stem, and a flag) is half as long as the quarter note. And the sixteenth note (represented by a filled notehead, a stem, and *two* flags) is half as long as the eighth note. The following interactive example illustrates how these note values are related (click on "Show Me").

RELATIONS of Rhythmic Values



The relationship between note values

Note that it takes two half notes, four quarter notes, eight eighth notes or sixteen sixteenth notes to make a whole note. Thus, each line of note values in the example above takes the same amount of time to perform.

If we were to use the quarter note to represent the beat (as it often does), then each line would contain the equivalent of four beats. That is why the eighth notes are grouped together into sets of two and the sixteenth notes into sets of four here (using **beams** rather than flags). These shorter notes are grouped into quarter-note beats. (We will discuss beaming further in a later lesson—for now, you should note that the number of beams used to group the sets of notes is the same as the number of flags that each note would contain.)

Other Note Values

As you have probably guessed, you can continue to divide note values in half by adding additional flags. A sixteenth note divided in half creates a thirty-second note (using three flags). A thirty-second note divided in half creates a sixty-fourth note (using four flags), and so on. Thirty-second notes are not uncommon, but sixty-fourth notes (and smaller values) are only rarely used.

eighths	sixteenths	thirty-seconds	sixty-fourths
			
			

Note values with flags

Note that flags are always written on the **right-hand side** of the stem, and that they always curve inwards towards the notehead. Also note that the stem is sometimes lengthened to accommodate these extra flags.

Remember

- Flags always go on the right-hand side of the stem

Rhythm IV: Rests

Rests

The note value symbols introduced in the previous lesson are used to indicate durations of **sound**. By contrast, rests are used to indicate durations of **silence**, during which time no notes are played or sung. Rests are just as important for musicians to understand as notes, since they need to know precisely how long to wait before coming in when they are *not* playing. Rests also tell a performer exactly when to *stop* playing.

For each note value there is a corresponding rest. For example, the whole rest is equal in duration to the whole note and the quarter rest is equivalent to the quarter note. The following table provides a summary of the symbols that are used to represent the most common note values and their equivalent rests.

Note Name	Note Value	Equivalent Rest
Whole		
Half		
Quarter		
Eighth		
Sixteenth		

The whole and half rests look very similar—both are rectangular boxes that fill up half of a space on the staff. But they are positioned differently on the staff: the whole rest *hangs* from the fourth line of the staff while the half rest *sits* on the third line of the staff. One clever way of remembering this is to imagine that the rest is a helium balloon; if it is full (a *whole* rest), it floats to the top of the third staff space, but if it is only *half*-full, it rests on the bottom. Click on "Whole Rest" and "Half Rest" in the example below to see this.

Whole and half rests

Note that the eighth rest and the sixteenth rest have the same number of flags as the eighth note and the sixteenth note (click "Eighth Rest" or "16th Rest" in the example below to see this illustrated). As with note values, you can continue to make smaller rest values by adding more flags. Thus, a 32nd-note rest would have three flags, a 64th-note rest would have four flags, and so on.

Notation Practice

Now, print out another Notation Practice Sheet. Practice tracing the notes and rests described in the last two lessons. You might also want to print out some blank staff paper and practice writing these notes and rests without tracing them. Here are some basic points to keep in mind:

- Noteheads are oval-shaped rather than round
- Stems that point up are always on the right; stems that point down go on the left
- Flags always go on the right-hand side of the stem, and point inwards towards the notehead
- Whole and half rests should only fill *half* of the staff space
- Quarter rests are the most difficult to draw. Good luck!

Rhythm V: Dots

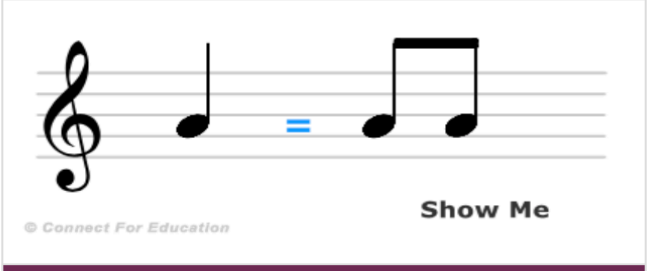
Dotted Notes

The duration of any note can be lengthened slightly by adding a dot. A dot placed to the right of a notehead increases its duration by **one-half**. For example, a dotted quarter note would be equal to the duration of a quarter **plus** an eighth note (since one-half of a quarter is an eighth note).

Remember

- A dotted note is equal to its original duration plus one-half of its original duration

Another way of thinking of this is that a dotted note is equal to **three** of the next smallest note value, as illustrated in the following example. Click "Show Me" to see what happens when a dot is added to the quarter note.

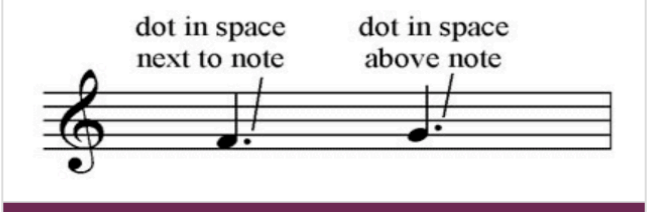


Adding a dot

The following table provides all of the common dotted-note types and their equivalent values. Note that dots can be added to rests as well as notes. For example, a dotted half rest would be equal to three quarter rests.

Note Value	Symbol and Equivalent Value	Equivalent Rest
Dotted Half		
Dotted quarter		
Dotted eighth		
Dotted sixteenth		

When a notehead is written on a space, the dot simply goes in the same space on the right-hand side of the note. When a notehead is on a line, the dot is placed just above the line rather than on the line, so that it is clearly visible (as illustrated below).

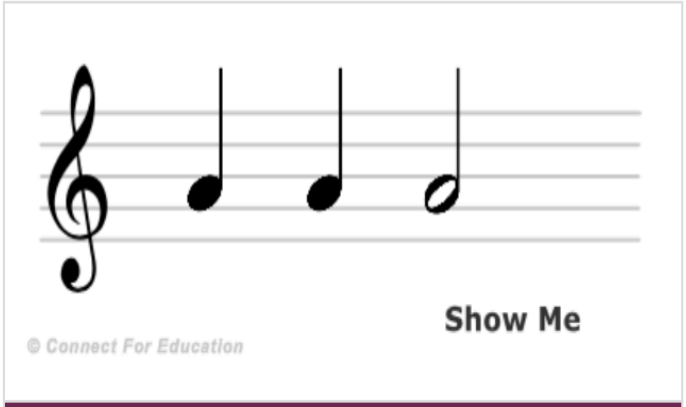


Dot placement

Rhythm VI: Ties

Ties

A tie is a curved line that extends the duration of a note by combining its duration with the duration of the note that comes next. When two notes of the same pitch are tied, only ONE note is heard; the second note is NOT sounded separately. The total duration of the tied notes is equal to the sum of their durations, as illustrated in the following animation:



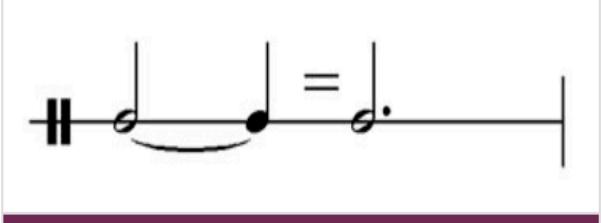
Ties

Be careful not confuse ties with slurs. The slur is a curved line that connects **different pitches**, indicating that those pitches should be played in a smooth, connected way (a legato style of playing). Ties can only connect two notes of the **same pitch**. Unlike ties, slurs do not affect duration.

Remember

- Ties combine the durations of the pitches they connect
- Ties can only join notes of the same pitch

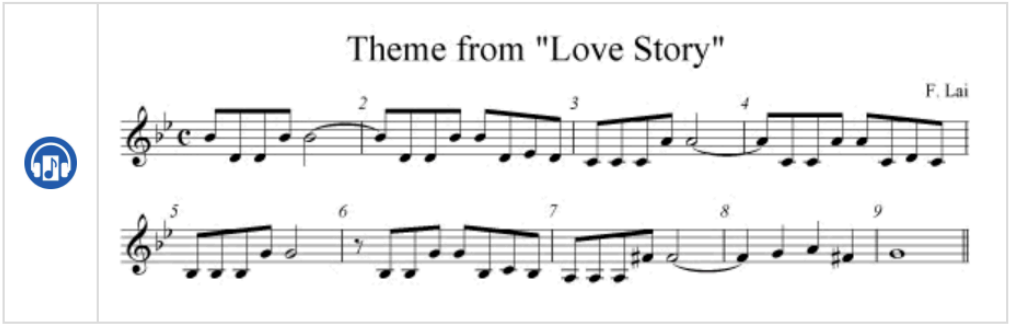
In some cases, tied notes can be rewritten as dotted note values. For example, a half note tied to a quarter note could be rewritten as a dotted half note (as illustrated below). Both would sound the same since they each contain the equivalent of three quarter notes.



Ties and dots

Tying Notes over the Barline

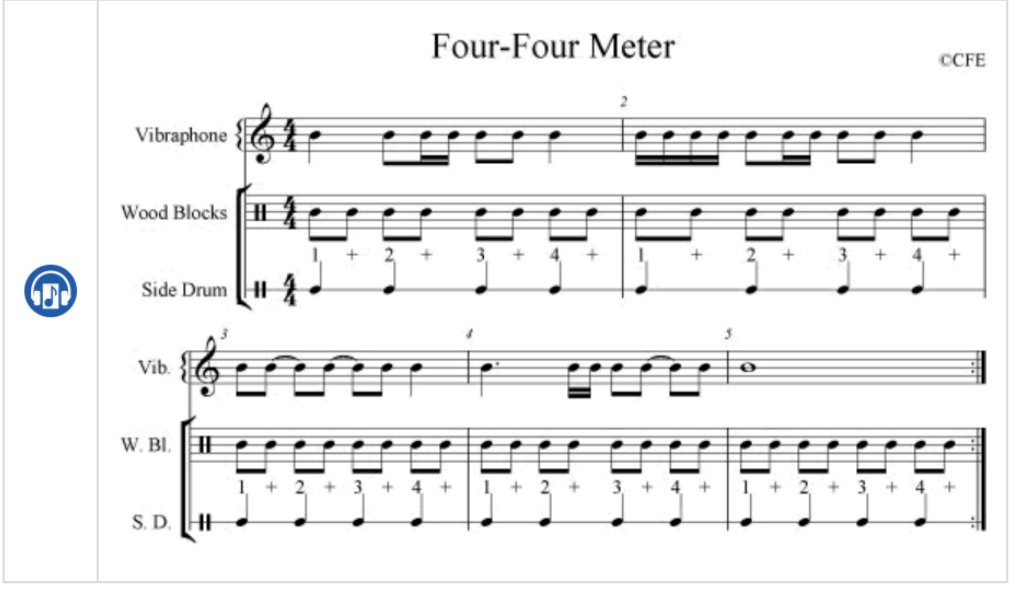
One of the most common uses of ties is to allow a note to continue over the barline. For example, in the excerpt below (the theme from the 1970 movie *Love Story*), the half note in measure 7 is *tied* to the quarter note in measure 8, creating a sound that lasts for three beats, allowing the note to continue *beyond* the end of the measure. The same duration could be spelled as a dotted half note, but this duration would NOT fit into measure 7. Also, the half notes tied to the eighth notes in measures 1 and 4 could not be spelled as a simple dotted note. The only way to create this particular duration (lasting five eighth notes) is to tie two notes together (a half note and an eighth note).



Note that ties should be drawn from notehead to notehead (not from stem to stem), and can be drawn above the noteheads (as in measure 1) or below them (as in measure 7). The direction of the tie is normally chosen to avoid collision with the stems. Rests are never tied together.

An Example

In this example, three rhythm instruments—one pitched and two unpitched—play a short passage in four-four meter. The side drum (on the bottom staff) plays steady quarter notes throughout, representing the beat. The wood blocks play the subdivision of that beat with steady eighth notes. The vibraphone plays a rhythm that uses a variety of note values, including dotted notes and ties, over the foundation laid down by the other instruments. As you listen, note particularly that the second pitch in each tied group is not sounded separately. Only the first note is heard.



METERS and RHYTHMIC DURATIONS (Symbols)

Rhythmic symbols:

Note Value	Whole	Half	Quarter	Eighth	Sixteenth
Symbol					

Time Signature

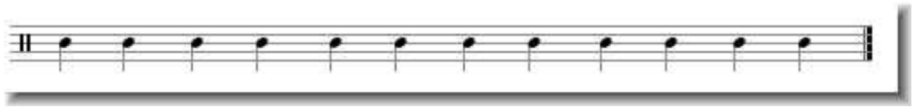
Four-four time signature

The quarter note serves as reference note for most simple meters.
Pulse by quarter notes
Common Time signature is 4/4 (four quarters per measure)

Meter: regularly recurring patterns and accents such as bars/measures and beats

METRIC Representation:

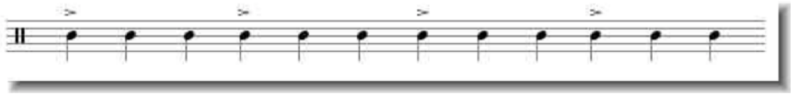
Pulse without rhythmic stress, represented by a line of quarter notes



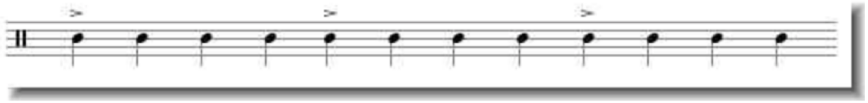
A water drip or the ticking of a clock are everyday examples of unstressed pulses

A pattern of alternating strong and weak beats, creating **duple meter**

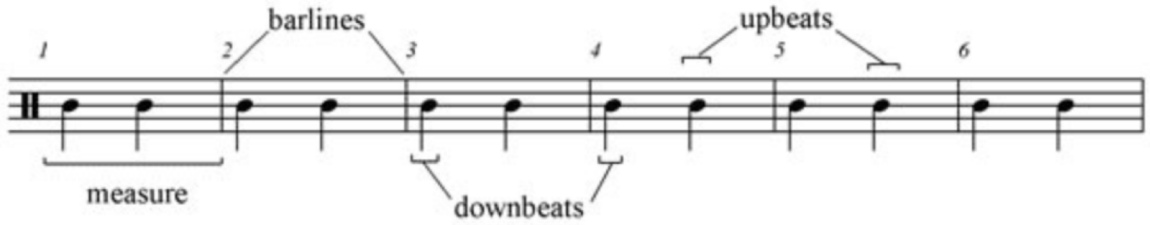
A pattern with one strong beat followed by two weak beats, creating **triple meter**



A pattern with one strong beat followed by three weak beats (in which the third beat is moderately strong), creating **quadruple meter**



A time signature is a symbol that indicates the meter of a piece of music. It consists of two numbers placed one on top of the other. Time signatures always appear at the beginning of a piece of music (after the clef). Keep in mind that even though time signatures may resemble fractions, they are never written with a horizontal line between the two numbers.



METERS and RHYTHMIC DURATIONS (Symbols)

The Top Number

In simple meters, the top number indicates how many beats (or pulses) there are in each measure. For example, in "four-four" meter, the top number 4 indicates that there are four beats in a measure.

The following chart provides a summary of the three possible types of simple meter: those containing 2, 3, or 4 beats per measure. Thus, the only possible top numbers for simple meters are 2 (signifying duple meter), 3 (triple), and 4 (quadruple).

Top Number	2	3	4
Beats per measure	2	3	4
Meter type	duple	triple	quadruple

METERS and RHYTHMIC DURATIONS (Symbols)

The Bottom Number

In simple meters, the bottom number of the time signature represents the note value that is used as the beat. For example, in "four-four" meter, the bottom number 4 indicates that a quarter note is used as the beat. So, "four-four" is a quadruple meter with four quarter note beats in each measure.

Since the quarter note is often used as the beat, the most common bottom number for time signatures is 4. But other numbers can be used as well. The following chart explains what these bottom numbers represent. For example, an 8 on the bottom of a time signature means that an eighth note is used as the beat. Memorizing the number that represents each beat value will help you understand and recognize time signatures quickly and reliably.

Bottom Number	1	2	4	8	16
Beat Value					

METERS and RHYTHMIC DURATIONS (Symbols)

Note Value	Whole	Half	Quarter	Eighth	Sixteenth
Symbol					

In a 2/4 time signature, the top number (2) means _____ and the bottom number means _____

Remember

- In a simple meter, the bottom number indicates the note value of the beat

Examples

$\frac{3}{4}$ In three-four meter, the top number (**3**) indicates that there are **three** beats in a measure. This means that the music is in **triple** meter. The bottom number (**4**) indicates that the beat is a **quarter** note. So, there are three quarter note beats in every measure.

$\frac{2}{2}$ In two-two meter, the top number (**2**) indicates that there are **two** beats in a measure. This means that the music is in **duple** meter. The bottom number (**2**) indicates that the beat is a **half** note. So, there are two half note beats in every measure.

$\frac{4}{8}$ In four-eight meter, the top number (**4**) indicates that there are **four** beats in a measure. This means that the music is in **quadruple** meter. The bottom number (**8**) indicates that the beat is an **eighth** note. So, there are four eighth note beats in every measure.

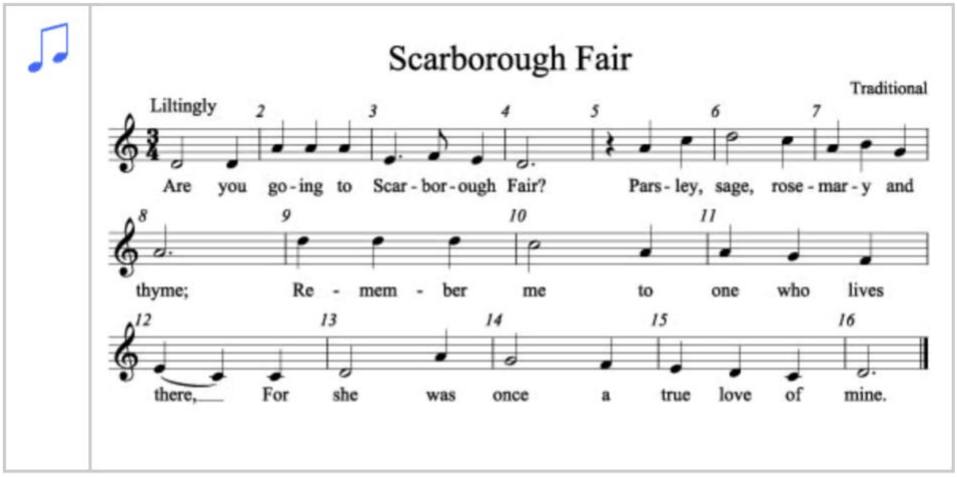
Dotted Notes

The rhythmic value of any note can be lengthened by using a **dot** and/or a **tie**. A **dot** placed to the right of a notehead or a rest increases its value by a half of its own duration. A dot can be added to any note or any rest.

The following table summarizes the most common dotted note names and their symbols including the ones that represent **rests**. Rests indicate periods of silence during which no notes are played or sung.

Note Name	Symbol and Equivalent Value	Equivalent Rest
Dotted Half	= + +	
Dotted quarter	= + +	
Dotted eighth	= + +	
Dotted sixteenth	= + +	

Scarborough Fair, a well-known traditional song, uses a *dotted quarter* note in measure 3, and *dotted half* notes in measures 4, 8, and 16. In this short, sixteen-measure song each measure contains three quarter notes or its equivalent in other note values. Measure 1, for example, contains one half note and one quarter note; measure 3 contains one dotted quarter note, one eighth note, and one quarter note; and measure 16 contains only a dotted half note.



The underlying pulse of three quarter notes per measure in *Scarborough Fair* can be indicated by a row of quarter notes in the bottom rhythm line in the score below (pulse). A second line can be added immediately above (subdiv.) to indicate the subdivision of the beat into eighth notes—each quarter note equals two eighth notes. Above these two rhythmic lines the melody progresses with the **tempo** and combination of note values that give it its unique character.

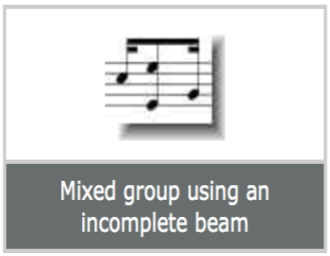
Try counting the main beat and the subdivision of the beat as you listen to the melody. To count the beats say *ONE, TWO, THREE* with each quarter note in the pulse line. To count the subdivision of the beat say *ONE and TWO and THREE and* (+ = and) in synch with the eighth notes for each measure. Use the Scorch™ tempo control to slow down the speed of the music if necessary.

Notice that the dotted quarter note in m.3 equals three eighth notes in the subdivision line (the syllable *bor* of Scar-bor-ough corresponding to the + of the second beat), and that the dotted half note in m. 4 (D4) equals three quarter notes in the pulse line, and six eighth notes in the subdivision line.

Beams

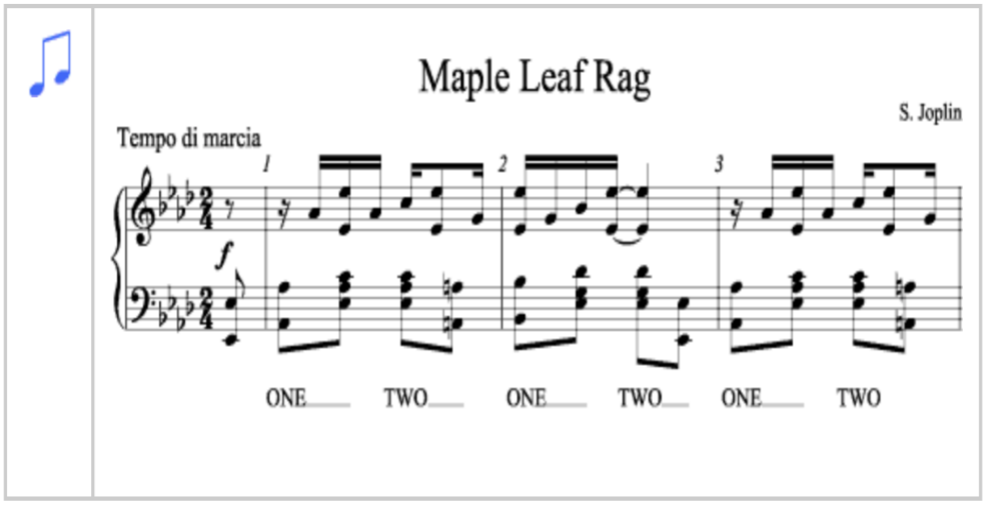
Adjacent notes that have flags are usually joined by beams. The main purpose of beams is to indicate the location of pulses within the measure. Usually, every new pulse within the measure coincides with a new beam. The most common groupings are combinations of two, three, four, six, or eight notes joined by a beam or combination of beams. This provides a clear rhythmic layout that enhances score legibility.

The rhythmic value of beamed notes is determined by the number of beams touching the stem from the right or the left. Notes of different rhythmic value can be joined in mixed groups using an incomplete beam.



Mixed group using an incomplete beam

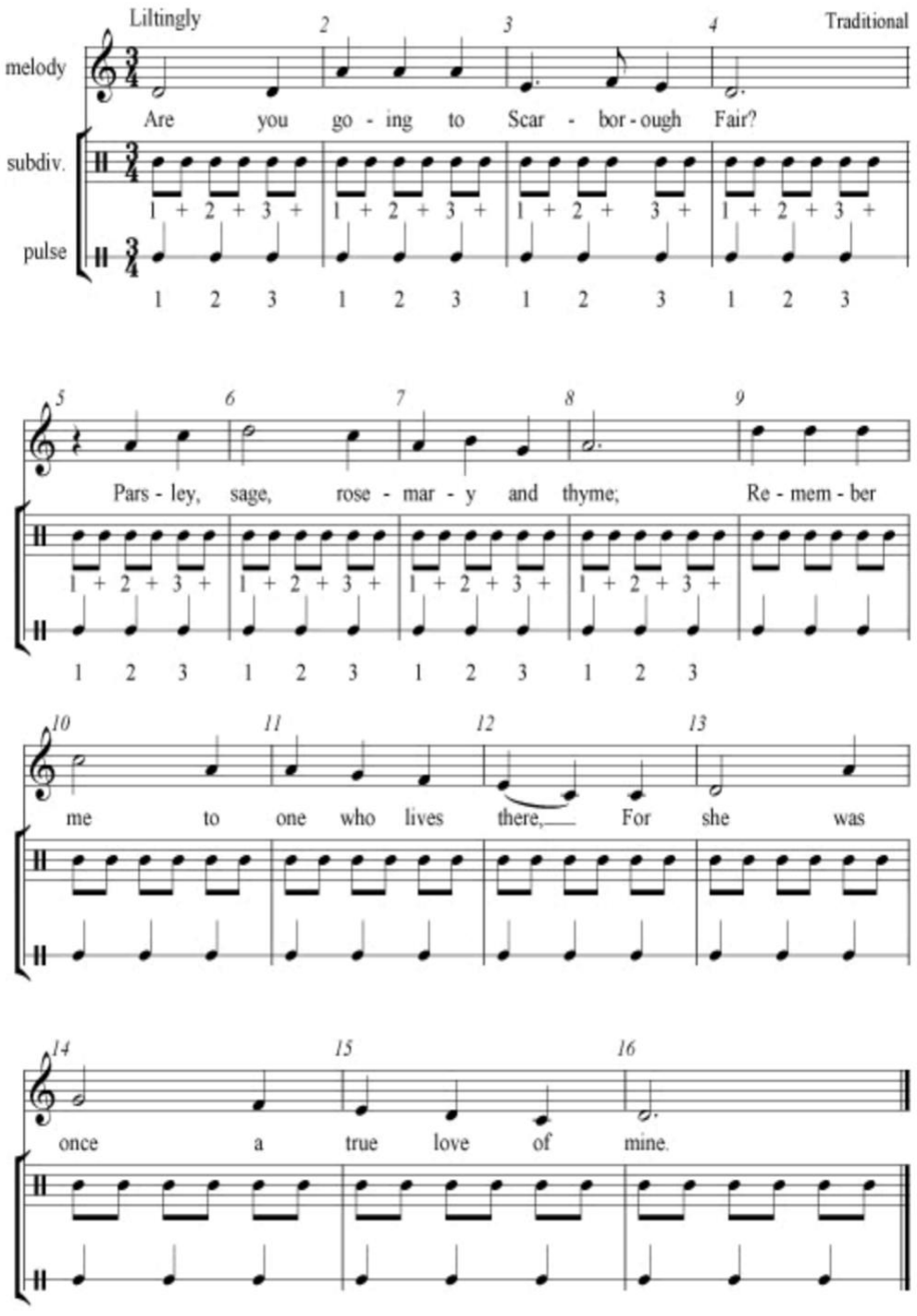
The opening of the *Maple Leaf Rag* by Scott Joplin (1868-1917) illustrates several aspects of the use of beams.



1. The paired eighth note beaming of the left hand accompaniment clearly shows where the two beats (marked ONE-TWO) of each measure fall.
2. The four sixteenth note beam grouping on beat ONE of measure 2 in the treble clef melody line clearly shows that four sixteenth notes make up the value of two eighth notes. The arched line joining the last sixteenth note of that group to the quarter note that follows on beat TWO is called a tie. More about ties below.
3. Each pulse in the measure starts a new beam.
4. The rhythmic value of the first note (C5) on beat TWO of measure 1 is a sixteenth note. It is joined to the following eighth note (octave E4-E5) by an incomplete beam.

Now, compare the beamed version of the opening of the *Maple Leaf Rag*—as Joplin wrote it—with the unbeamed version below. Notice how much harder it is for the eye to see the rhythmic layout of the piece and group the different note values to quickly grasp the placement of the beats within each measure.

Scarborough Fair



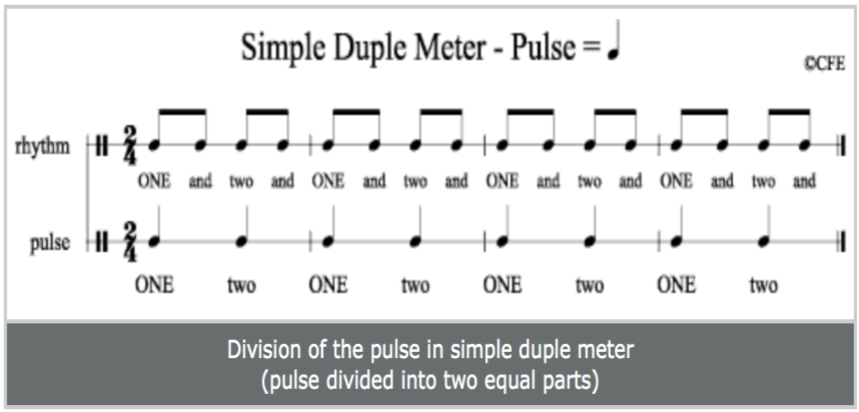
CONMPOUND METERS

Compound Meter

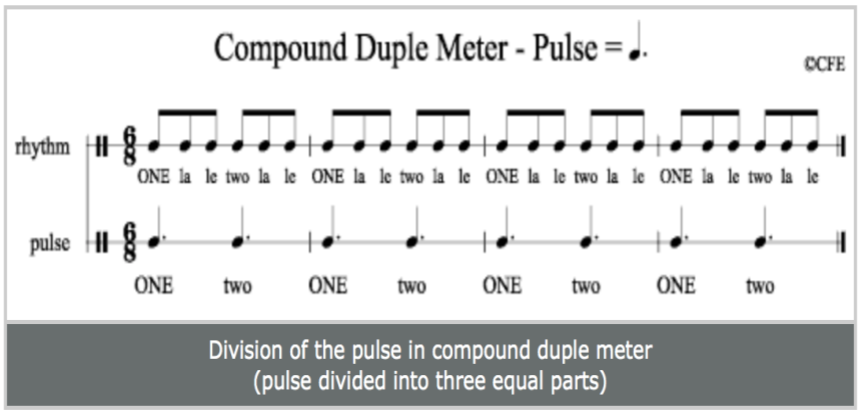
We already know that in *simple* meter the value of each beat is a straightforward note, and each beat is subdivided into *two* equal parts. For example, in two-four each beat gets a quarter note, and each of those quarter notes can be subdivided into two eighth notes.

There are musical situations, however, in which the beat is subdivided into three instead of two equal parts. If each quarter note in two-four were to be subdivided into three instead of two equal parts, we would have six eighth notes in each bar, and the value of each beat would, therefore, change from a straightforward quarter note (two eighth notes) to a dotted quarter note (three eighth notes). The two-four time signature would not apply anymore. When each beat is subdivided into three parts, we are working in the realm of compound meter.

The following two examples illustrate the pulse subdivision in simple and compound duple meter. A counting system is suggested for each one of them.



Division of the pulse in simple duple meter
(pulse divided into two equal parts)



Division of the pulse in compound duple meter
(pulse divided into three equal parts)

Compound: Multiple of 3 starting at 6 (2X3)
6/8, 9/8, 12/8 are the most frequent compound meters

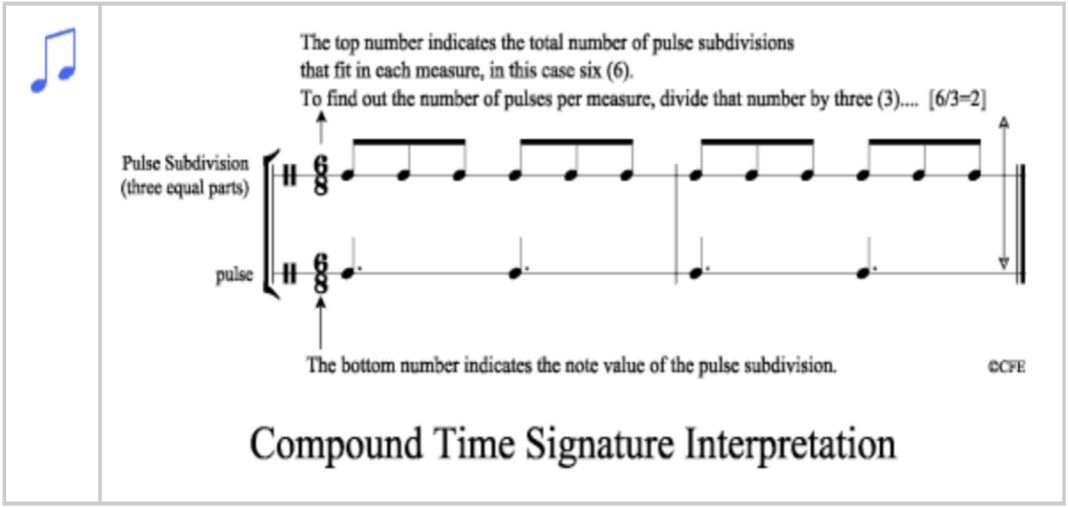
Interpreting Compound Meter Time Signatures

Compound meter time signatures are not interpreted in the same way as simple meter time signatures. In *simple* meter time signatures the top number tells us the number of beats per measure, and the bottom number indicates the value of each beat (pulse). If we were to apply the same rule to a *compound* meter time signature, for example six-eight, the top number six (6) would indicate that there are six beats per measure, and the bottom number (8) would indicate that each beat (pulse) gets an *eighth note*. In compound meters, six-eight in the previous example, this is not correct.

In *compound* time signatures, the top number does *not* represent the number of beats per measure. Instead, it tells us how many total subdivisions of the pulse there are in each measure. To find out how many beats (pulses) there are in each measure, always divide the top number by three (3)—the number of equal parts in each pulse. Let's take, for example, six-eight and look at the top number (6). That number tells us that there are six (6) equal subdivisions of the pulse in each measure. Six divided by three is two, which is the number of pulses in each measure. Each one of those pulses gets the equivalent of three eighth notes, i.e. a dotted quarter note.

The lower number in *compound* meter time signatures does *not* represent the note value that gets one beat because there is no single numerical representation for dotted notes. It represents the value of the note that results from subdividing the beat into three equal parts. For example, the bottom number (8) in the six-eight time signature tells us that the value each pulse subdivision is an eighth note. Now, to find out the value of the note that gets one beat, go up one note value from the pulse subdivision and add a dot. In six-eight time, you would a) go from an eighth note (8) to a quarter note (4), and b) add a dot to that quarter note. The value of each beat is, therefore, a dotted quarter note.

In practice, the six eighth notes that represent the subdivision of the pulse in six-eight time are grouped in two sets of three eighth notes each. Each one of those sets constitutes one beat. Therefore, in six-eight there are two beats in each measure. That is why the music *feels* like duple meter.



Compound meter can be duple (two beats per measure), triple (three beats per measure), or quadruple (four beats per measure). Keep in mind that in *compound* meter a) Each beat is divided into *three*, not two equal parts, and b) The value of each beat is a dotted, not a straightforward note.

Conducting pattern is 2 (but with subdivision in 3)

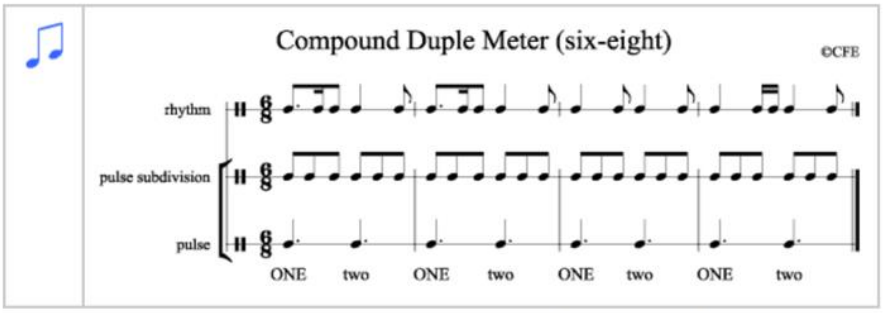
Compound Duple Meter

The top number in a compound duple time signature is always the number six (6). The most common compound duple time signature is six-eight. The six-sixteen and six-four time signatures are far less common.

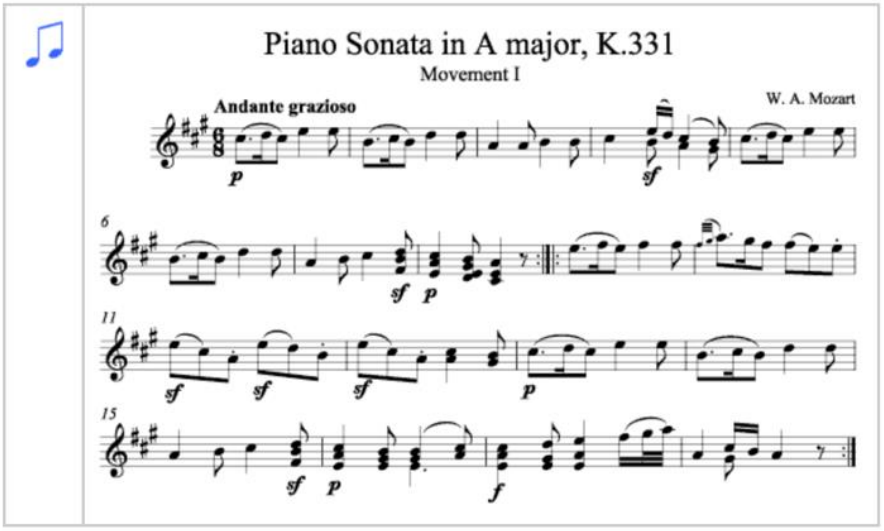
Six-eight Time Signature

Six-eight Time Signature

The top number (6) in the six-eight time signature tells us that there are six equal subdivisions of the beat per measure. The bottom number (8) indicates that each one of those subdivisions gets a *eighth* note. Dividing the top number in the time signature (6) by three (3) tells us that there are two beats in each measure. Each one of those beats is worth three (3) eighth notes. The single note that represents three eighth notes is the dotted quarter note. Each beat (pulse) in six-eight is, therefore, worth a dotted quarter note.



The rhythmic outline in the example above is the basis for the main theme in the *Piano Sonata in A Major*, K.331 by W. A. Mozart (1756-1791).



Six-sixteen Time Signature

Six-sixteen Time Signature

The top number (6) in the six-sixteen time signature tells us that there are six subdivisions per measure. The bottom number (16) indicates that each one of those subdivisions is worth a *sixteenth* note. Dividing the top number in the time signature by three (3) tells us that there are two beats in each measure. Each one of those beats is worth three (3) sixteenth notes. The single note that represents three sixteenth notes is the dotted eighth note. Each beat (pulse) in six-sixteen is, therefore, worth a dotted eighth note.

Six-four Time Signature

Six-four Time Signature

The top number (6) in the six-four time signature tells us that there are six subdivisions per measure. The bottom number (4) indicates that each one of those subdivisions is worth a *quarter* note. Dividing the top number in the time signature by three (3) tells us that there are two beats in each measure. Each one of those beats is worth three (3) quarter notes. The single note that represents three quarter notes is the dotted half note. Each beat (pulse) in six-four is, therefore, worth a dotted half note.

NOTATION SOFTWARE

Finale- https://www.finalemusic.com/products/notepad/
Noteflight - https://www.noteflight.com
MuseScore - https://musescore.org/en

BASED on MIDI: Acronym that stands for **Musical Instrument Digital Interface**

MENU

- **Instrument Choice**
- **Key signature**
- **Time signature**
- **Note and Rest input**
- **Rhythm input**
- **Lyrics input**
- **Dynamics input**
- **Articulations input**
- **Continuous Data input**
- **Editing: copying, pasting, cutting**
- **Playback – MIDI & Sampled sounds**
- **Adding measures**

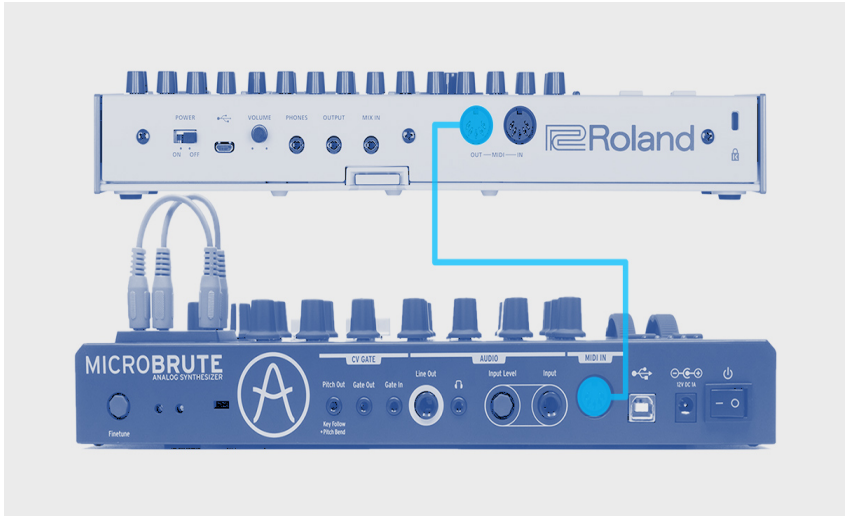
Inputting notes: pitch and rhythm

60 is middle C

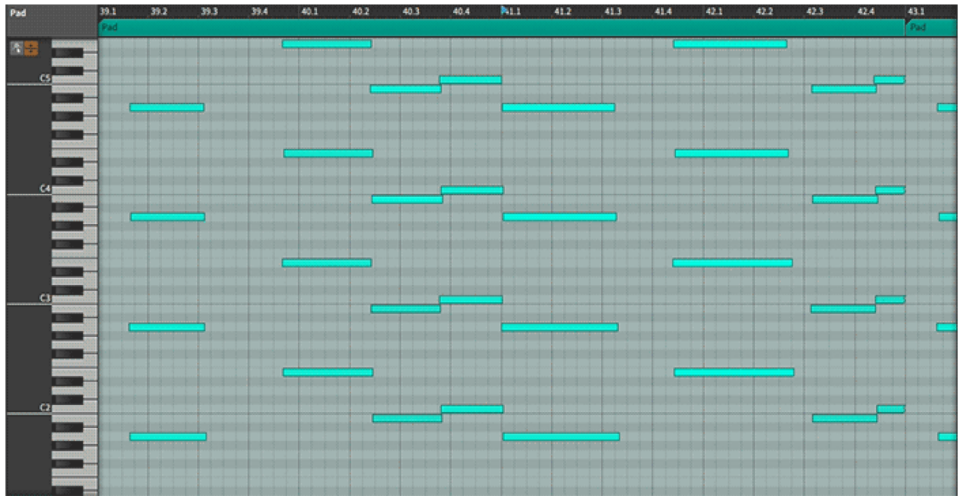
MIDI

MIDI: Acronym that stands for **Musical Instrument Digital Interface**

MIDI is a technical standard that describes a communications protocol, digital interface, and electrical connectors that connect a wide variety of electronic musical instruments, computers, and related audio devices for playing, editing and recording music



NOT a waveform like an audio track.



MIDI sequence on piano roll appears as small colored rectangles

- It's a language that allows computers, musical instruments and other hardware to communicate.
- A MIDI setup includes the interface, the language that MIDI data is transmitted in, and the hardware connections.
- Developed by Ikutaro Kakehashi (Roland) in 1980
- Proposed the idea of a standard instrument language to the other major manufacturers, including Dave Smith Instruments and Moog, in 1981.
- Technical Grammy Award (for technological development) in 2013

MIDI Notes and MIDI Events: Events from 1-127

When using a MIDI instrument, each time you press a key a MIDI note is created (sometimes called a MIDI event).

Each MIDI event carries instructions that determine:

Key ON and OFF: when the key is pressed/released

Pitches or notes played

Velocity: how fast and hard the key is pressed

Aftertouch: how hard the key is held down

Tempo (or BPM)

Panning

Modulations

Volume

MIDI also carries MIDI clock data between 2 or more instruments. This allows for perfect synchronization between your whole setup.

MIDI clock data is dependent on the tempo of your main device—usually the sequencer. So if you change your main tempo, MIDI ensures that your setup stays synced. It's like a tiny digital band leader for all your gear!

MIDI Sequencers

The most common MIDI setup uses a sequencer as the main hub. Sequencers are used to record, edit, send and playback the MIDI data that makes up your project. They can be hardware like an Akai MPC or sound station, or a computer running a DAW sequencer or other sequencing program.

The sequencer is the hub for your track. It sends instructions to all the different parts of your setup, records your performance, and keeps track of your overall arrangement. MIDI is what makes it possible.

What MIDI Isn't: MIDI does *NOT* transmit an actual audio signal.

MIDI is data. It's a set of instructions that machines use to speak.

Sequencers record the data transmitted via MIDI. They DO NOT record the actual audio signal.

MIDI In, MIDI Out, and MIDI Thru

Let's go through each MIDI port type and talk about what they do.

MIDI OUT

The MIDI OUT transmits MIDI data from a device like a sequencer or a synthesizer to another source.
If you're using a DAW or sequencer to send information to outboard gear, then your sequencer's MIDI OUT would go to the gear's MIDI IN.
Most times your sequencer or DAW is the only time you use the MIDI OUT.
The rest of the instruments in your chain will use MIDI THRU or MIDI IN.

MIDI IN

The MIDI IN receives MIDI data from another source.
The MIDI IN on your gear is used to receive instructions from your sequencer or another piece of hardware.

MIDI THRU

MIDI THRU duplicates the data coming to the MIDI IN port.
This allows you to connect multiple devices without needing multiple ports on your sequencer or MIDI interface.
MIDI THRU allows you to connect all your gear together with one central sequencer.
It's called 'Daisy Chaining.'

MIDI Channels: 16 channels is a good creative limitation to have.

MIDI data is transmitted on MIDI channels. This means you can sequence up to 16 different sounds from one instrument. as long as they're on different channels.
Most MIDI instruments are capable of transmitting MIDI data on 16 different channels. 16 channels is a good creative limitation to have and should be more than enough.
Hot Tip: Don't get confused with the MIDI TRACK number in your DAW. It's easy to mix up the MIDI track number with the MIDI channel.

Setting the MIDI Channel

To communicate properly, your DAW or sequencer and your MIDI controller have to be set to the same MIDI channel.
Picture it like your gear phoning each other—they have to use the right number to get in touch!
Each sequencer, controller and instrument has its own process for setting the MIDI channel.
So check your manual for the details.

MIDI channels can be a bit confusing. So let me explain.
Say you want to make a lead part *AND* a bass line from the same synth. Your DAW or MIDI sequencer can record the MIDI notes of your lead line and your bass line from the same synth as long as each sound is assigned to a different channel.

If the channels are set properly, the bass line and lead will play as an entire composition when you play it back. You can repeat this process for all 16 possible channels and edit each layer independently.
Note: your synthesizer needs to be multitimbral in order to playback multiple sounds.
So arranging, editing, and playing back an entire track from one instrument is possible with the help of MIDI.