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

\[
\begin{align*}
&\text{W} & \text{W} & \text{H} & \text{W} & \text{W} & \text{W} & \text{H} \\
&C & D & E & F & G & A & B & C
\end{align*}
\]

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

\[
\begin{align*}
&W & H & W & W & H & W & W \\
&C & D & E_b & F & G & A_b & B_b & C
\end{align*}
\]

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
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**

**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 5th (from root)
- **Minor**: Root, minor 3d, perfect 5th (from root)
- **Augmented**: Root, Major 3d, augmented 5th (from root)
- **Diminished**: Root, minor 3d, diminished 5th (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?**
Scales and Chords

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

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

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

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

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 5\textsuperscript{th} from the bass)

To calculate a 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**

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 5\textsuperscript{th} note). We are simplifying by designating the chords from each scale degree by a roman numeral.

Ex: Key of F

<table>
<thead>
<tr>
<th>Roman Numeral</th>
<th>Chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>F</td>
</tr>
<tr>
<td>II</td>
<td>G</td>
</tr>
<tr>
<td>III</td>
<td>A</td>
</tr>
<tr>
<td>IV</td>
<td>Bb</td>
</tr>
<tr>
<td>V</td>
<td>C</td>
</tr>
<tr>
<td>VI</td>
<td>D</td>
</tr>
<tr>
<td>VII</td>
<td>E</td>
</tr>
</tbody>
</table>

The dominant and tonic degrees are the most important scale degrees (and chords) in the scale.
METERS and RHYTHMIC DURATIONS (Symbols)

Rhythmic symbols:

<table>
<thead>
<tr>
<th>Note Value</th>
<th>Whole</th>
<th>Half</th>
<th>Quarter</th>
<th>Eighth</th>
<th>Sixteenth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:**

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**

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 **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.
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).

<table>
<thead>
<tr>
<th>Top Number</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beats per measure</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Meter type</td>
<td>duple</td>
<td>triple</td>
<td>quadruple</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Bottom Number</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beat Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In a 2/4 time signature, the top number (2) means ________ and the bottom number means ________

Examples

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.

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.

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.
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: 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.

- 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 sequence on piano roll appears as small colored rectangles

NOT a waveform like an audio track.
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.
ETHICS in MUSIC PUBLICATIONS

Will examine:

• Not the philosophical question about the moral value of music
• The question about the $$$ commercial value of music

Songwriters typically own the copyrights in the music and lyrics to the songs they write and earn money, usually from license fees or royalties from the commercial use of their songs. Publishing income does not come from copyright ownership in sound recordings. It comes from ownership of the copyrights in the songs.

As a composer:

What do I do when I compose a song, want to have people listen to it (online), but don’t want people claiming it’s their own, or use it for making money?
What if I want to write a song using words from a recent poem? (70 years)
What if?
What if?
What if?
Copyright is a form of legal protection given to many kinds of created works such as musical compositions or songs, lyrics, records (CDs, LPs, singles, 45s, cassettes, DAT, etc.) poems, books, films, TV shows, computer software and even commercials. For a work to be protected under copyright, it must be:

1) “original” which means that it was not copied from any other source;
2) “fixed in a tangible medium of expression” which means that it exists in some reasonably permanent or stable form so that a person can perceive it and reproduce it;
3) have a minimum degree of creativity.

For the musician, copyrights can protect both songs (which usually consists of a melody and includes lyrics if the song has words) and recordings (CDs, mp3s, LPs, cassettes, DAT, and any other recording). The “fixed” requirement means that there is no protection for a song that is only in your head. A song may be "fixed" by writing it down, recording it (even on a handheld recorder), or saving it to a hard drive on a computer. Playing a song live does not meet the “fixed” requirement. But, if you record the live performance, you have now "fixed" the song.

Once an original work is fixed in a tangible medium, the creator has copyright protection automatically. Though registering the work with the Copyright Office may be desirable, it is not required to obtain copyright protection.

The Rights of the Copyright Owner:
The owner of a copyright has the exclusive rights to do the following:

**REPRODUCE THE WORK:** the rights to make copies of the work, such as the right to manufacture compact discs containing copyrighted sound recordings.

**DISTRIBUTE COPIES OF THE WORK:** The right to distribute and sell copies of the work to the public.

**PERFORM WORKS PUBLICLY:** Copyright owners of songs (but not owners of sound recording copyrights) control the rights to have their song performed publicly. Performance of a song generally means playing it in a nightclub or live venue, on the radio, on television, in commercial establishments, elevators or anywhere else where music is publicly heard.

**MAKE DERIVATIVE WORKS:** A derivative work is a work that is based on another work such as a remix of a previous song or a parody lyric set to a well-known song (a classic example being Weird Al Yankovic’s song “Eat It” which combines Michael Jackson’s copyrighted original work “Beat It” with a parody lyric “Eat It”)

**PERFORM COPYRIGHTED SOUND RECORDINGS BY MEANS OF A DIGITAL AUDIO TRANSMISSION:** This is a right recently added by Congress that gives copyright owners in sound recordings the rights to perform a work by means of a digital audio transmission. Examples of digital audio transmissions include the performance of a song on Internet or satellite radio stations (such as XM or Sirius).

**DISPLAY THE WORK:** Although this right is rarely applicable to music, one example would be displaying the lyrics and musical notation to a song on a karaoke machine.