



Rooted strings

Enzo Evers



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1 Philosophy

The idea of this method is to give you the tools to be creative with music. Concretely this means that instead of saying "The D chord is played using this shape", the following will be said: "A chord is constructed like *this*. So to play a D chord do *this* and you will end up with this shape". Where the "*this*" is some knowledge you will learn.

During the method you will notice that you will see certain constructs/symbols/etc. that you may not know yet and that are not explained directly. This is with intention. The idea is that by exposing you early on to something, while not consciously needing it yet, it is easier to learn the meaning of it later on.

When putting it in steps it looks as follows:

1. Expose you to new concepts so you have seen it, but not necessarily understand it yet.
2. Guided by exercises and songs, explain the previously shown concepts and how they work together.
3. Understand the theory of the concepts and be able to use them in playing.
4. Start at 1. again with new concepts.

Figure 1.1 illustrates the main building blocks of this method. The book starts at the bottom row (the fundamentals) and builds up from there.

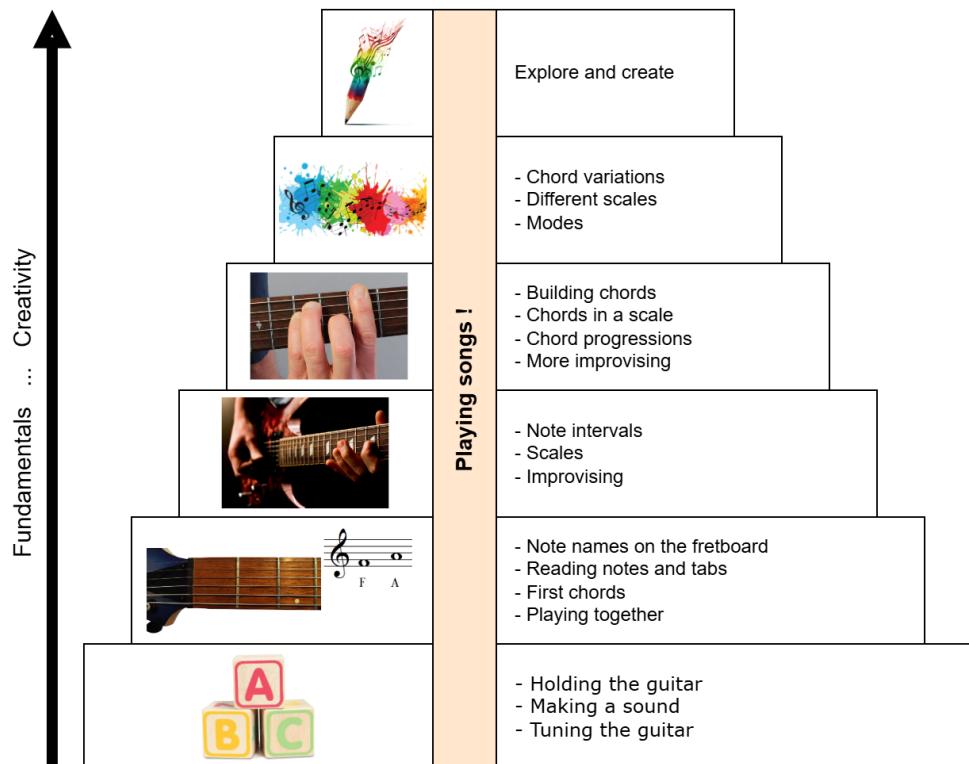


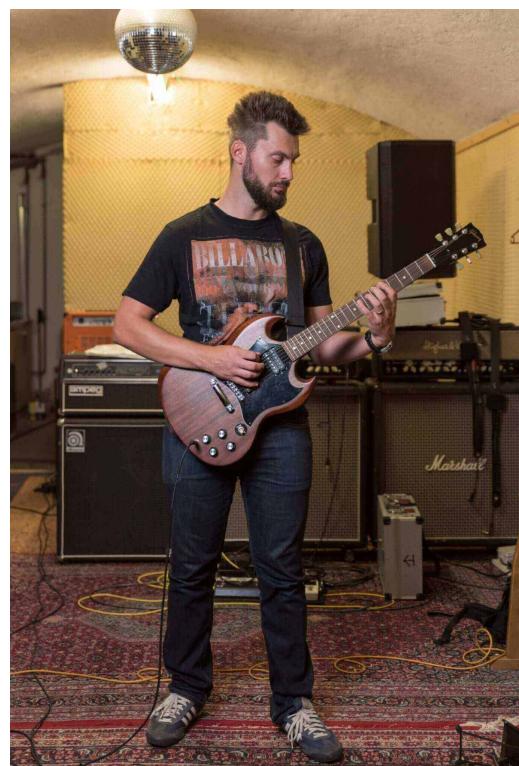
Figure 1.1: General building blocks of this book

2 Getting ready to play

2.1 Sitting/standing position



(a)



(b)

Figure 2.1: [2]



This method assumes a right-handed player. If you are left-handed, replace “right” with “left” and vice versa.

Even though it may look cooler to place the guitar on your right leg. You will be more comfortable and precise when you are sitting the classical way. The classical way of sitting also translates better to a standing position (see Figure 2.1b).

In the classical position you place the guitar on your left leg and the left leg will be slightly raised. You can use a foot stool for this (see the left foot in Figure 2.1a).

2.2 Tuning

Your guitar needs to be in tune. This means that each string has a certain pitch. Even though this is already implied, it is important to note that the relative pitch difference per string is important as well.

In Figure 2.2 you see the names (letters) from the thinnest (*e*) to the thickest (*E*) string.



Figure 2.2: Names of the guitar strings

A mnemonic is (from low/thick to high/thin):

- 6) **E** ddie
- 5) **A** te
- 4) **D**ynamite
- 3) **G**ood
- 2) **B**ye
- 1) **e** eddie



Note that things is the standard tuning. Sometimes the guitar will be tuned differently. But that will then be explicitly mentioned

You use a tuner to tune (see Figure 2.3). The tuner either gives a note value, and then you have to tune up or down to get the correct note on the screen. Or it shows a string number and you have to get the 'pointer' in the middle.

Be careful with tuning the string up (to a higher pitch). Especially the thinner strings can break if they are too tight.



Figure 2.3: Using a tuner on a guitar

Another tuning options relies on the previously mentioned difference in pitch between the strings. In Figure 2.4 you see which positions on the neck have the same pitch as the thinner string next to it.

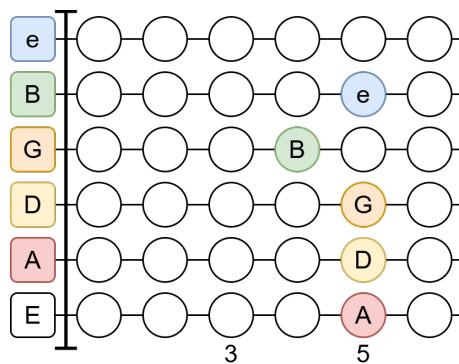


Figure 2.4: Relative tuning

3 First sounds

3.1 Fretboard

Each position on the neck has a different pitch. The metal bars on the neck are called the **frets**. For example, if someone asks to press the 2nd fret on the 3rd string, then you press your finger in the area of the green dot. Right next to the fret. See Figure 3.1.

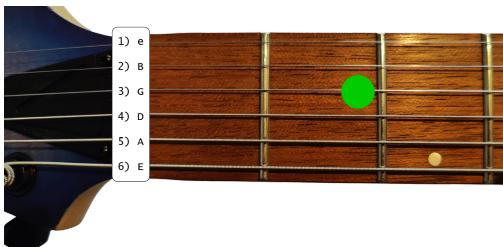


Figure 3.1: The green dot in the finger placement for the 2nd fret on the 3rd string

In music there are 12 different pitches before coming 'back around'. When you come back at the same note letter you are an octave higher. The 12 different notes are shown below.

A A♯ B C C♯ D D♯ E F F♯ G G♯

You may see that there are only **7** different letters and **5** letters with a **#**. These **#** symbols are called **sharps**. On the fretboard a **#** means you move one fret up (to the body of the guitar).

In Figure 3.2 you see a **music staff** with underneath it **tablature (TAB)**. In the next section we will learn to read the notes. For now you can try to read the tabs first to play the sequence.

Each line in the TAB section represents a guitar string, with the 6th (thickest) string on the bottom. The numbers indicate which fret should be pressed (a 0 means an open string). So the TAB in Figure 3.2 says to first play an open A string, and then play each ascending fret up to the 12th fret.

Figure 3.2: An octave from A to A on the 5th A string using sharps

Remember the relative tuning? This means that we can play the same note in multiple places on the fretboard. This can be seen in Figure 3.2.

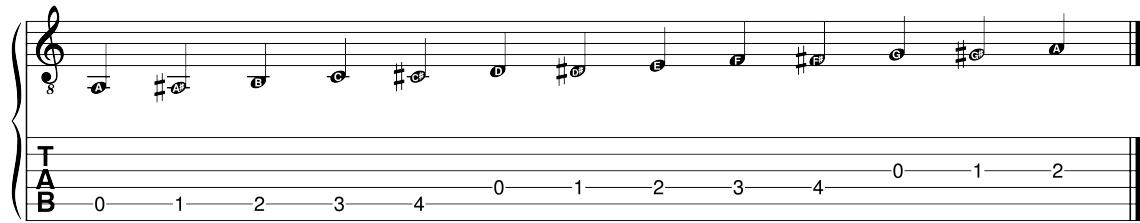


Figure 3.3: An octave from A to A on the multiple strings using sharps

Besides sharps there are also flats. A flat (\flat) means to go a halve tone (one fret) down. Rewriting Figure 3.3 with flats would look like Figure 3.4.

In Figure 3.4 also a new symbol is shown. The natural (\natural). This means that the note on which a \flat or \sharp was placed, now is 'normal' again. Whenever a \flat or \sharp is added to a note, it remains valid for this note up to the end of the measure. What a 'measure' is will be explained later.

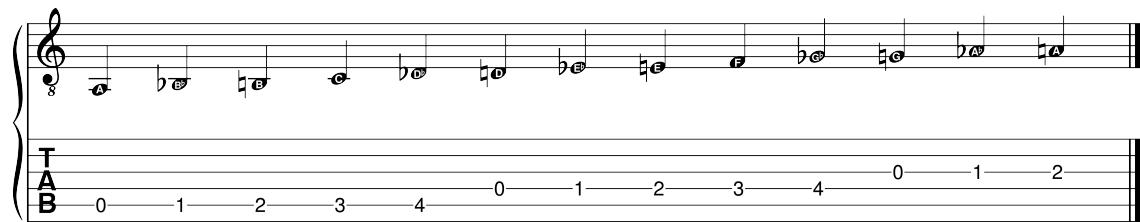


Figure 3.4: An octave from A to A on the multiple strings using flats and naturals

3.2 Finger names

When playing guitar, your fingers will be given a name. This makes it easier in music notation to indicate which finger should be used. The names are shown in Figure 3.5.



Figure 3.5: Names of the fingers [5]

Figure 3.6 shows how to position your left hand. The most important thing is to have your fingertips almost completely perpendicular on the string. This makes sure that you get a clean sound and don't accidentally touch other strings.



(a)



(b)

Figure 3.6: Left hand position [3]

3.3 Free and rest stroke

With a free stroke you hold your right hand in a relaxed position over the strings (see Figure 3.7). To play a string, move your finger through the string without lifting the upper part of your finger. Your finger should slightly curl into your hand. Once you made the sound, move your finger back to the relaxed position.

The trick now is, to not hit the other strings, and to not 'pluck' the string (making a buzzing sound).



(a)



(b)

Figure 3.7: Free stroke position [4]

A rest stroke may sound a bit louder (but with some practicing a free stroke can be as loud). Like the name suggests, a rest stroke means that you move your finger through a string to play it, but now you let your finger rest on the next string.

3.4 Using a pick

Besides fingers, you can also play guitar with a pick (also called a plectrum). For classical music you won't use a pick much, if at all. But when you are playing songs with chords, or playing some rock or metal riffs, you will be using a pick almost all the time.

While there is no single correct way to hold a pick, Figure 3.8 is a good starting point. The most important thing is that you don't grip too loose or too strong on the pick. Also, try to not bend your thumb inwards, but either keep it straight or a little bit bend outwards.



(a)



(b)

Figure 3.8: How to hold a pick [8]

3.5 Exercises

In the exercises below you see some symbols above the notes. The numbers with circles around them indicate on which string the note should be played (this can also be seen from the TAB). The *i* and *m* indicate which right-hand finger should be used to play the note.

Play exercise Figure 3.9 first with a rest stroke and then with a free stroke to feel the difference. You can also try to play it with a pick afterwards.

Figure 3.9: Exercise: rest and free strokes

This second exercise (Figure 3.10) is similar to Figure 3.9, but a bit more challenging.

Figure 3.10: Exercise: changing strings with *i* and *m* fingers

To make use of all PIMA fingers, try to play the intro of *Nothing Else Matters* from Metallica. Play Figure 3.11 with a free stroke. Also this you can try to play with a pick.

Nothing Else Matters - Metallica

Intro

Figure 3.11: Exercise: PIMA with Nothing Else Matters - Metallica intro

In Figure 3.12 you will also use your left hand. The numbers above the notes indicate which left-hand finger should be used to press the fret. Play this exercise using alternating *i* and *m* fingers.

Focus on the tabs for now and ignore the other symbols.

Perfect
Verse 1

Music: Ed Sheeran
Arranged: Enzo Evers

$\text{♩} = 95$

A \flat **Fm** **D \flat**

I found a love for me Darling, just dive right in and follow my

T A B

4 4 4 4 1 1 1 1 2 2 2 2

E \flat **A \flat** **Fm** **D \flat**

lead Well, I found a girl beauti-ful and sweet I never knew you were the someone waiting for

4 4 4 4 4 4 4 4 1 1 1 1 2 2 2 2

E \flat

me

4 4 4 4

Figure 3.12: Finger exercise using Perfect - Ed Sheeran

4 Getting familiar with the fretboard

4.1 Can I already play the that song that I like?

The answer is, "kinda". So far you've made your first sounds and played along with a known song.

By just reading tabs you can get quite far. But you will most likely be stuck with playing along with songs without really knowing what is going on. And if **that is your goal, that is completely fine**.

However, by getting familiar with the fretboard (which frets are which notes, and how to check this), you can be a lot more creative with music.

Later on you will also learn about scales, which allow to you improvise over songs. To know which frets (or chords) to play, you will need to know which notes belong to the frets.

Additionally, some (mostly classical) music doesn't have a version with tabs. Meaning that reading notes is still good to know.

4.2 Music staff

You have already seen the music staff from Figure 4.1 in the previous exercises. But the meaning of it was not explained yet.

- The letters A-G on the staff show which line on the staff has which note name. Note names go from A to G as shown in an earlier chapter.
- The notes go up alphabetically (starting again with A after G).
- Notes in between the lines nicely spell out "**FACE**", making it easy to remember.
- Note on the lines can be remembered with the mnemonic "**Every Good Boy Does Fine**".
- The most left symbol () is called the G clef. Note that the curl of the G clef is on the line of the G note (second line from the bottom).
- The vertical line in the middle indicates the start/end of a measure.
- The thicker vertical line in at the end indicates the end of the piece.

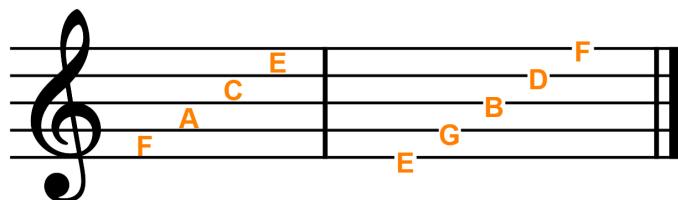


Figure 4.1: Note names on the staff in two measures

Detail: note that the clef shown in Figure 4.1 is different than the ones seen in earlier exercises. For guitar notation you sometimes see a little 8 under the clef. This means that the original position of "middle C" (C4) with treble clef sounds an octave lower. This results in the C that you see in Figure 4.1 to be the middle C (C4) when there is a little 8 below the clef.

4.3 Counting

So far we have also only seen one type of note. The quarter note. However, there are more. See Figure 4.2. The $\frac{4}{4}$ means that there can fit 4 (top number) quarter notes (bottom number) in a measure.



Figure 4.2: Note duration

Important: A whole note (o) equal 4 quarter notes (d). It does **not** equal a whole measure.

There are also other time signatures. The top value indicates how many notes of the bottom number's duration fit in a measure. So a $\frac{3}{4}$ time signature can fit 3 quarter notes per measure. And a $\frac{6}{8}$ time signature can fit 6 eighth notes per measure. Note that $\frac{3}{4}$ and $\frac{6}{8}$ indicate the same duration per measure, but they provide a different feel. This is demonstrated in Figure 4.3.

In Figure 4.3 you also see a new duration notation. In the first measure with $\frac{6}{8}$ timing, there are dots next to the notes (p). This means that the note has a duration of 1.5x its original duration.

The ">" symbol means that this note should be played with a more powerful accent. The **bold** numbers above the notes indicate the counting of the notes. A bold number means to put an accent on it, but played less accented than the ones where there is also an ">" symbol.

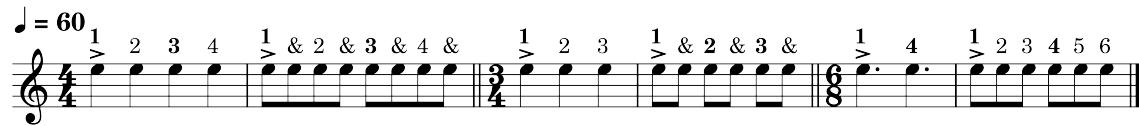


Figure 4.3: Time signatures

Remember exercise Figure 3.11 (Metallica - Nothing else matters (intro))? That is also in $\frac{6}{8}$.

Where notes indicate when to play a sound, rests indicate when to be silent. In Figure 4.4 the most common rest durations are shown.



Figure 4.4: Rest notations of different duration

In Figure 4.5 an exercise is provided to count the rests. Remember to take this slow and to be conscious about the counts. As a help the tempo is set to the 60 quarter notes per minutes (BPM). This way each quarter note is 1 second. But feel free to play it slower.

Figure 4.5: Rest notations of different duration

4.4 Learning the main notes

As a first tune that uses multiple note durations, and to learn the first notes on the guitar, Jingle bells will be played (Figure 4.7). The notes used for this tune are shown in Figure 4.6.



Figure 4.6: Notes used in jingle bells

Now Jingle bells can be played as shown in Figure 4.7.

Jingle bells

Music: James Lord Pierpont
Arranged: Enzo Evers

Figure 4.7: Jingle bells

To learn a few more notes, the "Tetris" tune will be played. The notes from Figure 4.8 should be used in this tune. The only new notes are A and B.

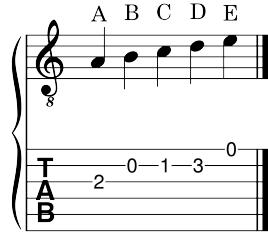


Figure 4.8: Notes used for the first part of the Tetris tune

In Figure 4.9 the first part of the Tetris tune is written. Note the dotted note in measure 3. The full tune requires to learn about sharps and flats. So we will play the full tune later.

Tetris (first part)

Music: Hirokazu Tanaka
Arranged: Enzo Evers

Figure 4.9: First part of the Tetris tune



The "Tetris" tune is derived from a Russian folk song called "Korobeiniki", which is based on a similar named poem written by Nikolay Nekrasov. [11]

We have now played all non-sharp/flat notes. But each note can be placed in different positions, and with different pitches.

Let's take the melody of "Memory" from the musical "Cats" Figure 4.11. It uses most of the notes we already learned, but also uses a lower G, F, and E (Figure 4.10).

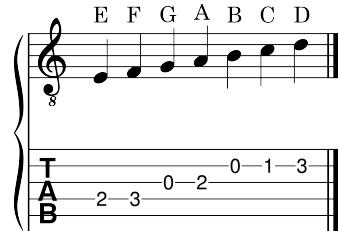


Figure 4.10: The G, F, and G, notes on the 3rd and 4th strings

It also uses a new symbol. The **tie** symbol (seen to connect notes from measure 5 and 6 in Figure 4.11). This symbol indicates that the duration of the first note that starts the tie has the summed duration of all consecutive identical note. All identical notes after the note that starts the tie are therefore not played

Memory
Cats (musical)

Music: Andrew Lloyd Webber
Arranged: Enzo Evers

Figure 4.11: Memory from the musical Cats

Another song that you know that uses all the notes that you've learned so far is Happy birthday Figure 4.12.

Happy birthday

Music: Patty Hill, Mildred J. Hill
Arranged: Enzo Evers

Figure 4.12: Happy birthday

In the following song you will learn the low C and D notes.

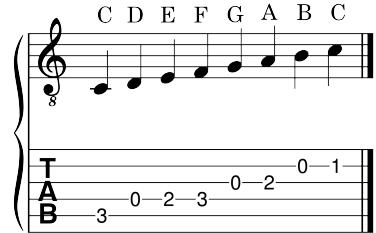


Figure 4.13: Notes used for the song "De Vogeltjesdans"



In Figure 4.13 you not only see the notes used in the song, but you also see the C major scale. Later on we will talk more about scales.

De vogeltjesdans

Music: De Electronica's
Arranged: Enzo Evers

Figure 4.14: De vogeltjesdans - De Electronica's



While most people know this as the Dutch titled "De vogeltjesdans". It is based on the original song called "Der Ententanz" composed by Werner Thomas. [10]

In the next song the low B, A, G, and E notes is introduced.

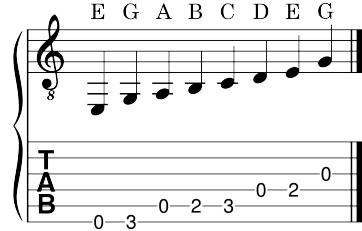


Figure 4.15: Notes used for the song "Seven Nation Army"

Before playing Figure 4.16. Lets see how these notes work that are below the normal lines. In the beginning of this chapter, the names of the notes that correspond to the lines of the staff where shown (Figure 4.1). Note there that each line and space between the lines had the sequence of "A, B, C, D, E, F, G, A, B, etc." if you go up up on the staff lines (and the other direction if you go on the staff lines). This sequence simply continues below and above the normal staff lines.

Seven Nation Army

The White Stripes

Music: Jack White, Meg White
Arranged: Enzo Evers

Figure 4.16: Seven Nation Army - The White Stripes

To introduce the last non-sharp/flat note within the first 3 frets, we will play the first part from "Californication" from "Red Hot Chili Peppers". This introduces the low F note.

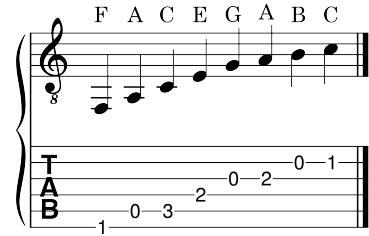


Figure 4.17: Notes used for the song "Californication"

Note the fingering in Figure 4.18. In this piece, keep your fingers on the frets for the duration of the measure after playing them to let them ring.

Californication (intro)

Red Hot Chili Peppers

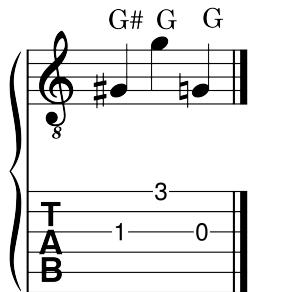
Music: Red Hot Chili Peppers
Arranged: Enzo Evers

Figure 4.18: Californication - Red Hot Chili Peppers

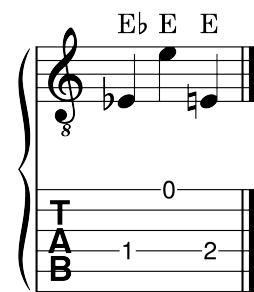
4.5 Sharps and flats

In the beginning of this method it was already mentioned that sharps \sharp increase the note by a half step and flats \flat decrease the note by a half step. It has also been mentioned that sharps and flats are valid for the duration of a measure. If a note should get its 'normal' sound back, a natural \natural symbol is placed in front of it. This undoes the sharp/flat for the rest of the measure (until another sharp/flat is placed).

What has not been mentioned yet, is that a sharp/flat placed at a note is valid only for that pitch of the note (position on the sheet music). See for example Figure 4.19a. Here you see that the first G (open third string) got a sharp, and is therefore now played a half tone (1 fret) higher on the 1st fret. The G that is played one octave higher on the first string is still a G. When the G note then gets a natural sign, it becomes the normal G note again which is played on the open third string. The same example can be given for flats (Figure 4.19b).



(a) Usage of sharps and naturals



(b) Usage of flats and naturals

Figure 4.19: Sharps, flats and naturals

Sometimes a song uses a note with a flat or sharp a lot of times. It can then be considered to be in a certain key (we will come back to that later). It is then not desired to add sharps/flats all over the sheet music. That could get messy. Instead, the sharps/flats used for the song are shown as the beginning of the piece and apply to all pitches of the notes (unless natural symbols are used). Note that this is different than adding sharps inside a measure, there it only applied to that specific pitch.

See for example Figure 4.20 and Figure 4.21.

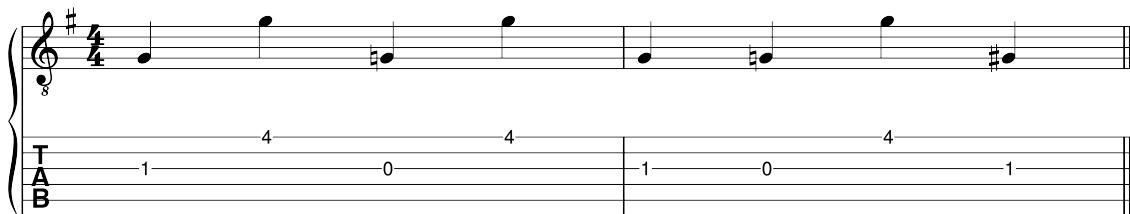


Figure 4.20: Example of adding sharps at the beginning of the music

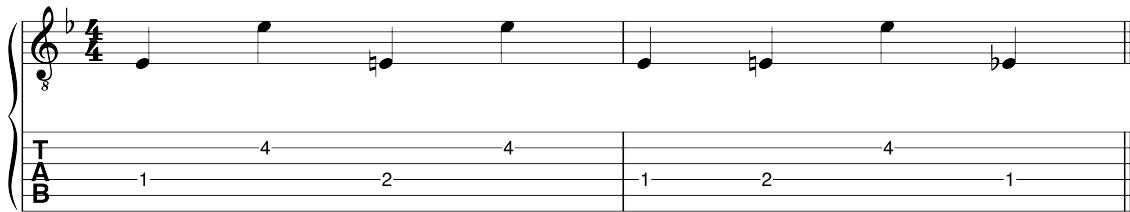


Figure 4.21: Example of adding flats at the beginning of the music

Before playing some pieces to learn the sharps and flats, let's first show the sharps and flats on the fretboard again:

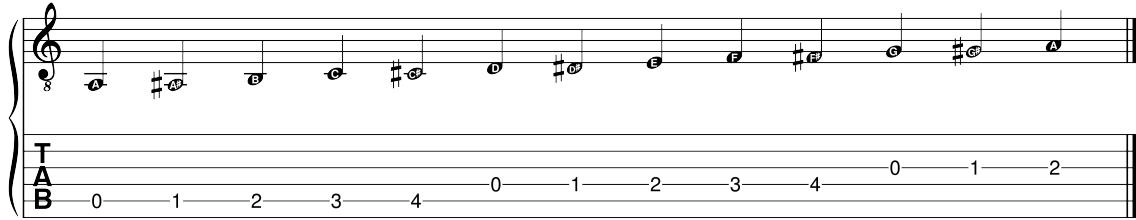


Figure 4.22: An octave from A to A on the multiple strings using sharps

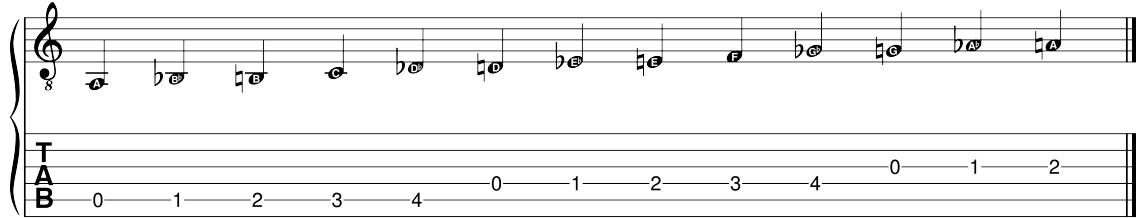


Figure 4.23: An octave from A to A on the multiple strings using flats and naturals

Also remember that between each note, except for B-C and E-F, there are two half steps. Between B-C and E-F there is only one half step.

A	A#	B	C	C#	D	D#	E	F	F#	G	G#
A	B-flat	B	C	D-flat	D	E-flat	E	F	G-flat	G	A-flat

Table 4.1: Sharp and flat intervals

Remember that a sharp and flat simply move the note a half step up or down respectively. So what would happen when the E note gets a #? It would become an F. And what does an F-flat resolve to? An E indeed. The same holds for the B-C interval. B# is the same as a C and a C-flat is the same as a B.

Previously we have already played Happy Birthday without any sharps or flats. But the music can be 'transposed' to a different key. This can introduce sharps/flats. Also in Figure 4.24.

Happy birthday

Music: Patty Hill, Mildred J. Hill
Arranged: Enzo Evers

The musical score consists of two staves of music. The top staff starts with a treble clef, a key signature of one sharp (G major), and a 3/4 time signature. It contains eight measures of music. The bottom staff starts with a treble clef, a key signature of one sharp (G major), and an 8/8 time signature. It contains six measures of music, labeled with a '6' above it. Both staves use quarter notes and eighth notes.

Figure 4.24: Happy birthday with sharps

In Figure 4.25 there are two song-wide sharps. The F and the C.

C'est La Vie (intro + chorus melody)

Chef'Special

Music: Chef'Special
Arranged: Enzo Evers

The musical score consists of three staves of music. The first staff starts with a tempo of 90 BPM, a treble clef, a key signature of two sharps (F# and C#), and a 4/4 time signature. It contains six measures of music, labeled with a '1' above it. The second staff starts with a treble clef, a key signature of two sharps (F# and C#), and an 8/8 time signature. It contains six measures of music, labeled with a '6' above it. The third staff starts with a treble clef, a key signature of two sharps (F# and C#), and an 8/8 time signature. It contains six measures of music, labeled with a '10' above it. The music includes various note values such as eighth and sixteenth notes, and rests. Chord diagrams are provided above the staff for each measure.

Figure 4.25: C'est La Vie - Chef'Special (intro + chorus melody)

In Hedwig's Theme (see the next page) you will see the usage of sharps, flats, naturals and music-wide sharps. It uses the same music-wide F# as Happy birthday.

To better help you learn the position of these notes there is an empty tablature staff added. You can fill this staff with the correct tabs to help you learn.

Hedwig's Theme

Harry Potter movies

Music: John Williams
Arranged: Enzo Evers

$\text{J} = 180$

T
A
B

11

T
A
B

21

T
A
B

31

T
A
B

The next classical piece introduces a couple new things

First it introduces the high A and B notes (Figure 4.26). Previously it was already explained how the notes below the staff lines can be determined. The same holds for notes above the staff.



Figure 4.26: The high A and B notes

The other new symbol is the repeat symbol as seen in Figure 4.27. When you come to the end of the measure that has the right side of the repeat symbol, you go back to the left repeat symbol. When you come to the right repeat symbol again, you will just play further this time.



Figure 4.27: The repeat symbol

Another thing you will see in this song is that there are two parts. One for the melody and one for the bass line. This sheet music is meant to be played by two people together.

Minuet in G

Music: Christian Petzold
Arranged: Enzo Evers

Classical Guitar

Classical Guitar 2

Guit. 6

Guit. 2

12

Guit. 2

18

Guit. 2

25

Guit. 2

32

Guit. 2

As promised, the whole Tetris tune would be played when we learned about sharps. So here it is (Figure 4.28).

This also introduces the **D.C. al Fine** term. The "D.C. al Fine" term means to go back to the beginning of the music piece and play until you see the "Fine" text. Then the music is finished. Here "D.C." means "Da Capo" and is Italian for "from the beginning".

Tetris

Music: Hirokazu Tanaka
Arranged: Enzo Evers

Figure 4.28: Tetris tune (full)

In the song "He's a pirate" (see the next page) from the "Pirates of the Caribbean" movies there is one new note. The High C (Figure 4.29).



Figure 4.29: The high C note

This song has a song-wide flat B.

This song also introduces the concept of playing in a different position. Measure 32 - 39 are played from the 3rd position, and from measure 40 till the end you are playing in the 5th position. What this means is that you take the 3rd and 5th fret respectively as the 'starting' point. Imagine that the frets before that don't exist. This forces you to learn where identical pitched notes can be played on the fretboard.

The benefit of these positions is that you don't have to fly with your hand all over the fretboard. Instead, by utilizing the correct finger positions you can keep your hand in one position.

To help you, think about the relative tuning diagram from the beginning (Figure 2.4) and the interval of each fret (a semitone) together with how these steps relate do the different notes (section 3.1).

He's a pirate

Pirates of the Caribbean

Music: Klaus Badelt, Hans Zimmer

Arranged: Enzo Evers

♩ = 210 Start quiet and build up volume

The sheet music contains ten staves of musical notation. The first staff begins with a treble clef, a key signature of one flat (B-flat), and a common time signature (indicated by a '4'). The tempo is marked as 210 BPM. The instruction "Start quiet and build up volume" is placed above the first staff. The music consists of eighth-note patterns. From measure 8 onwards, the key signature changes to no sharps or flats. Measures 16 through 32 show a transition with the key signature changing back to one flat. Fingerings are indicated above the notes in measures 32, 41, 51, 61, 70, and 80. Measure 32 includes markings for 'III' and 'V'. Measures 41, 51, 61, 70, and 80 include fingerings such as 1, 2, 3, 4, 23, 34, 234, 123, 124, 34, 21, 23, 312, 312, and 312#.

5 The main scales and chords

5.1 Why learn scales

- Improvising
- Chords are build on scales
- Chord progressions are based on scales
- Making interesting melodies
- Learn songs by ear easier
- And more...

Learning scales may sound boring. And, if you learn it without context, it indeed may be boring. However, scales are the foundation of music.

When a house doesn't have a good foundation, it can easily be destroyed by natural phenomena. But having a good foundation for the main house doesn't stop you from making a beautiful fairy-like garden or a nice painting all over the walls of the house.

The same goes for music. Scales will give you a framework to work with. A set of notes that sound good together. But you can, and should, be creative with how you use this framework. Using notes outside the scale can give some interesting sounds as well when used properly.

Some benefits for example are that you will be able to more easily figure out music by ear and that you will be able to improvise more easily over songs.

5.2 Creating context: playing your first chords

If you can't wait to play some chords, feel free to have a look at Figure 5.14 right away to learn the basic chord shapes. If you search for songs on the internet with "*<song name> <artist> chords*" you will most likely find a webpage with the chords to play.

Just learning these chord shapes will get you quite far in terms of being able to play along with songs.

But wouldn't it be nice to be able to figure songs out by ear as well, making chords sound more interesting, being able to improvise over a song, and making your own chord progressions? If so, continue with the next sections.

5.3 Scales and intervals

A scale is a collection of notes in ascending order between a note and its octave. The two main scales are the major (happy/bright sound) and minor (sad/dark sound) scale.

When describing scales, often the terms "whole" (w) and "half" (h) steps are used. Sometimes you will also see the terms "tone" (T) and "semitone" (S) respectively. Moving up a half step on the guitar means moving to the next fret (towards the body). Moving up a whole step is the same as two half steps. Moving down a half step means moving down one fret (towards the head).

Lets look at the intervals of 1 semitone again (Table 5.1). Going one step to the left or to the right is a half step interval. To take a whole step, simply take two half steps.

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

Table 5.1: Sharp and flat intervals. Each step to the left or right is a half step.

A list of intervals and their names is shown in Table 5.2. You don't have to learn these by heart as of now. But we will refer to these later on when describing the scales.

Semitones	Name	Symbol
0	Unison	1
1	Minor 2nd	2♭
2	Major 2nd	2
3	Minor 3rd	3♭
4	Major 3rd	3
5	Perfect 4th	4
6	Augmented 4th / Diminished 5th / Tritone	4♯ / 5♭
7	Perfect 5th	5
8	Minor 6th	6♭
9	Major 6th / Diminished 7th	6 / 7♭
10	Minor 7th	7♭
11	Major 7th	7
12	8th (octave)	8

Table 5.2: Intervals in an octave

5.3.1 The major scale

As mentioned. The most common scales are the major and minor scales. A lot of music theory is based on the major diatonic scale. A diatonic scale means that it has 7 different notes in the scale where each letter only occurs once. So the major diatonic scale is the first one we will learn.

Each scale has a formula. For the major diatonic scale the formula is shown in (Table 5.3). On the top you see the steps between each note (the formula itself). The numbers indicate the interval of the note in the scale. Note 1 and 8 are the same note. But the 8 is one octave higher than the 1.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8

Table 5.3: Major scale intervals

Note that Table 5.1 has 12 different notes/pitches. Now count the total amount of half steps that are shown in Table 5.3 (a whole step is two half steps). Indeed, there are 12 half steps to go from the note at note 1 to the same note one octave higher (note 8).

For example, to create the C major scale we will start on the C and then simply follow the formula.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8
C	D	E	F	G	A	B	C

Table 5.4: C major scale

In Table 5.5 you see the major scales of all the natural notes. You don't need to remember these by heart at the moment. You do need to learn the formula of the major scale by heart. There are three things to note:

1. **Each scale only has unique letters.** Therefore the 4th note in the F major scale is a B♭ and not an A♯.
2. The 5th note in the scale is the start of the scale on the next row. Of course, this is because they are listed as such now. But it is the basis of the "circle of fifths" which we will learn more about later.
3. Each scale below another in this list has one more ♯ than the previous. And the notes that have a sharp in one scale, also have a sharp in the scales below it. Again, this has to do with the "circle of fifths".

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8
F	G	A	B♭	C	D	E	F
C	D	E	F	G	A	B	C
G	A	B	C	D	E	F♯	G
D	E	F♯	G	A	B	C♯	D
A	B	C♯	D	E	F♯	G♯	A
E	F♯	G♯	A	B	C♯	D♯	E
B	C♯	D♯	E	F♯	G♯	A♯	B

Table 5.5: Major scales of all natural notes

Example

In Figure 5.2 different shapes are shown on how the major scale can be played. The numbers correspond to the interval in the scale. These shapes can be moved up and down the fretboard, as long as the distance between the frets stay the same. Shape Figure 5.2c can even be moved up and down the strings. By moving the shape, you will play a different major scale. The scale that you are playing is determined by the root note (the "1" note). In this example we are therefore playing the F♯ major scale. If you would move all notes up by 1 fret, you would be playing the G major scale.

The different colors in Figure 5.2a indicate different octaves. This is the 'standard'/compact major scale shape. Note how the frets with "8/1" indicate the 8 of the previous octave, and the 1 of the next octave.

There are other "shapes" to play the major scale as well, but these shapes don't start on the root (1) note. We will come back to those later.

Learning these shapes by heart makes it easy to improvise over a song. But more important is to see how these shapes relate to the intervals of the major scale. The easiest shape for this is Figure 5.2c. With this shape you can easily recognize the major diatonic scale formula (w-w-h-w-w-w-h). All shapes have the same notes, just played on a different position on the fretboard and possibly in a different octave. The shapes shown below don't cover all possibilities yet.

The F♯ major scale has the following notes:

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8
F♯	G♯	A♯	B	C♯	D♯	E♯	F♯

Table 5.6: F♯ major scale

Table 5.6 demonstrates an important point mentioned earlier. **A scale only has unique letters.** Note how the 7th scale degree is an E♯ instead of an F. Generally we wouldn't write E♯. But because the F♯ major scale already uses the letter F for F♯, we can't use F for just F. We have to use E♯ instead.

Figure 5.1 shows the notes that correspond to Figure 5.2d.

Figure 5.1: Multiple octaves of the F♯ major scale

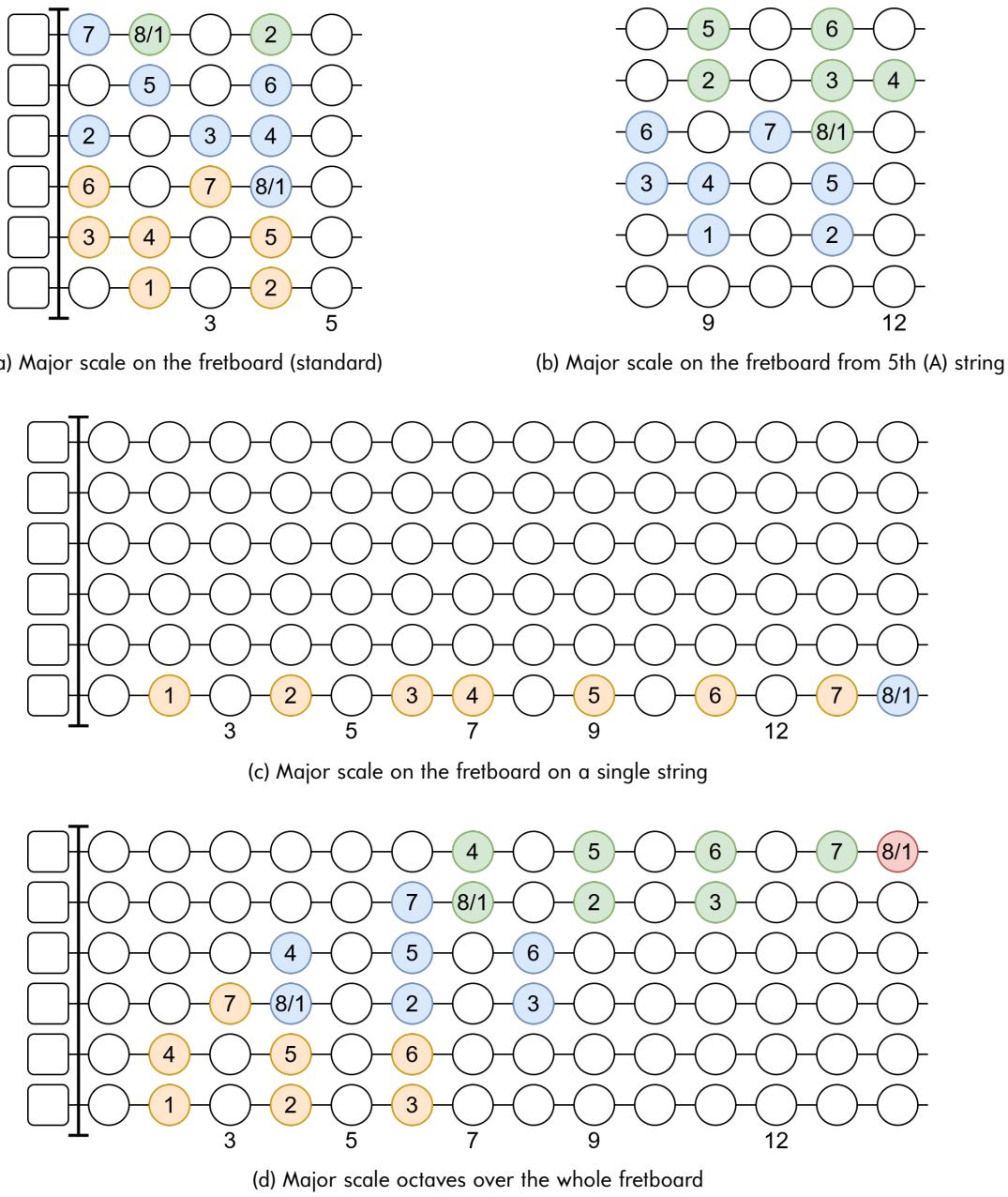


Figure 5.2: F# major scale on the fretboard

The song "Tattoo" from "Loreen" uses the F♯ major scale. The main melody that you hear in the background is shown in Figure 5.3. Also note that the chords are all in the scale of F♯ major.

Tattoo

Main backing melody

Music: Loreen
Arranged: Enzo Evers

Figure 5.3: Tattoo - Loreen main backing melody

If you now compare the notes that are used, shown in Figure 5.4, and the multi-octave major scale of F♯ shown in Figure 5.2d, you will see that it nicely matches up.

The main differences are that the 'blue' 4 is now played on the 9th fret of the D string, and that the 'green' 3 is now played on the 6th fret of the high E string. Try to verify for yourself that these are indeed the same notes.

Because the number in the frets show the degree of the major scale we see that this melody covers all notes from the F♯ major scale (over seven octaves). Note how all numbers 1 till 8 are used.

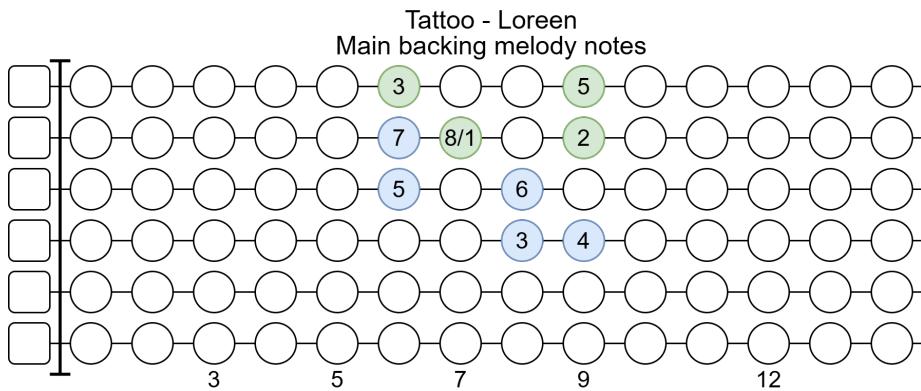


Figure 5.4: Notes used in the main backing melody of "Tattoo - Loreen"

Improvising

Another way to learn the major scale on the guitar is by improvising over songs and/or chord progressions (we will learn more about this in section 5.7). A chord progression is a set of chords that is repeated.

The following chord progression in the **key of C-major**. You can play the C-major scale over this to make a nice melody.

- C - F - Am - G

This is a "I - IV - vi - V" chord progression (see section 5.7 if you want to know what this means).

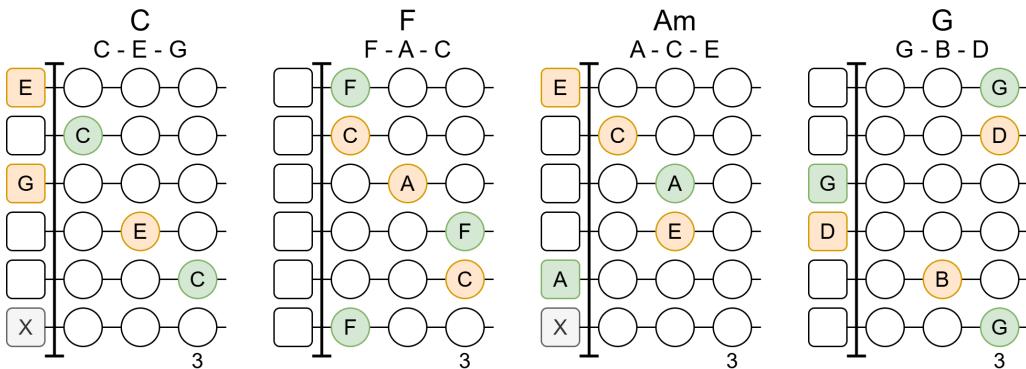
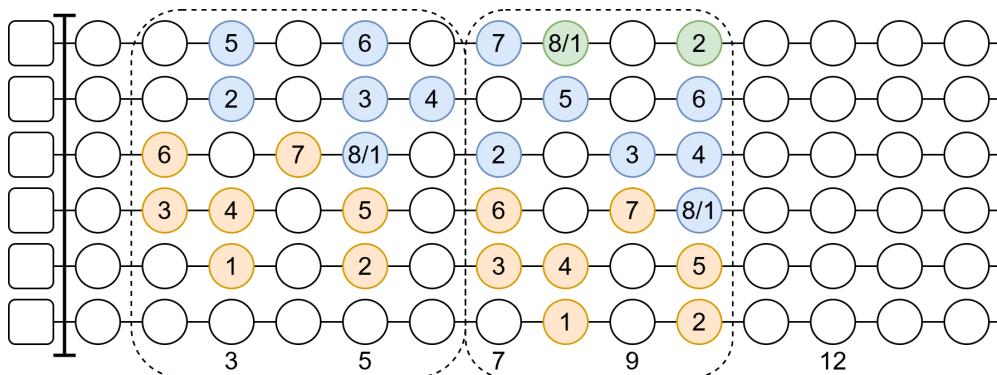
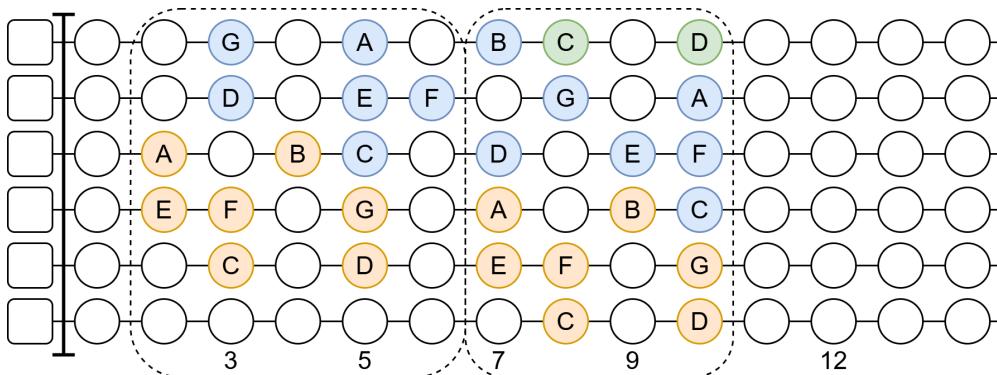


Figure 5.5: C major chord progression

Figure 5.6a shows the C major scale starting from both the 5th and 6th string. Note that the boxes around the frets outline the same shape as Figure 5.2a and Figure 5.2b but in a different key. Also note that the colors all show the same pitch of the note. Try to verify this for yourself.



(a) C major scale starting from both the 5th and 6th string with scale degrees



(b) C major scale starting from both the 5th and 6th string with note names

Figure 5.6: C major scale on the fretboard

YouTube is full of different chord progressions in different keys if you search for it.

5.3.2 The minor scale

The minor diatonic scale has the formula shown in Table 5.7.

	W	H	W	W	H	W	W
1	2	3♭	4	5	6♭	7♭	8

Table 5.7: Minor scale intervals

To create the A minor scale we will start on the A and then simply follow the formula.

	W	H	W	W	H	W	W
1	2	3♭	4	5	6♭	7♭	8
A	B	C	D	E	F	G	A

Table 5.8: A minor scale

Similar to example for the major scales of the natural notes, Table 5.9 shows the minor scales of the natural notes.

1. **Each scale only has unique letters.** Therefore the 6th note in the D minor scale is a B♭ and not an A♯.
2. The 4th note in the scale is the start of the scale on the next row. Of course, this is because they are listed as such now. But it is the basis of the "circle of fourths" which we will learn more about later. Note that for the major scale this was the fifth note. Therefore the earlier mentioned "circle of fifth" applies to major scale, while the term "circle of fourths" applies to minor scale.
3. Each scale below another in this list has one more ♭ than the previous. And the notes that have a flat in one scale, also have a flat in the scales below it. Again, this has to do with the "circle of fourths".

	W	H	W	W	H	W	W
1	2	3♭	4	5	6♭	7♭	8
B	C♯	D	E	F♯	G	A	B
E	F♯	G	A	B	C	D	E
A	B	C	D	E	F	G	A
D	E	F	G	A	B♭	C	D
G	A	B♭	C	D	E♭	F	G
C	D	E♭	F	G	A♭	B♭	C
F	G	A♭	B♭	C	D♭	E♭	F

Table 5.9: Minor scales of all natural notes

Example

Just as for the major scale, there are different patterns for the minor scale (Figure 5.8). The numbers correspond to the interval in the scale. The scale that you are playing is determined by the root note (the "1" note). In this example we are therefore playing the F♯ minor scale. If you would move all notes up by 1 fret, you would be playing the G minor scale.

The different colors in Figure 5.8a indicate different octaves. This is the 'standard'/compact minor scale shape. Note how the frets with "8/1" indicate the 8 of the previous octave, and the 1 of the next octave.

Learning these shapes by heart makes it easy to improvise over a song. But more important is to see how these shapes relate to the intervals of the minor scale. The easiest shape for this is Figure 5.8c. With this shape you can easily recognize the minor diatonic scale formula (w-h-w-w-h-w-w). All shapes have the same notes, just played on a different position on the fretboard and possibly in a different octave. The shapes shown below don't cover all possibilities yet.

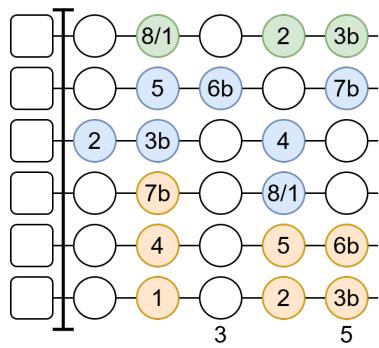
The F♯ minor scale has the following notes:

	W	H	W	W	H	W	W
1	2	3♭	4	5	6♭	7♭	8
F♯	G♯	A	B	C♯	D	E	F♯

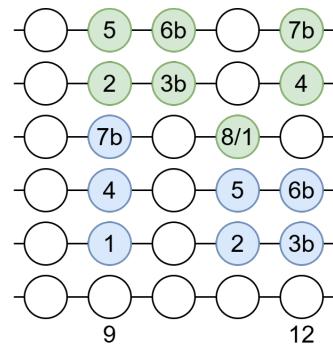
Table 5.10: F♯ minor scale

Figure 5.7 shows the notes that correspond to Figure 5.8d.

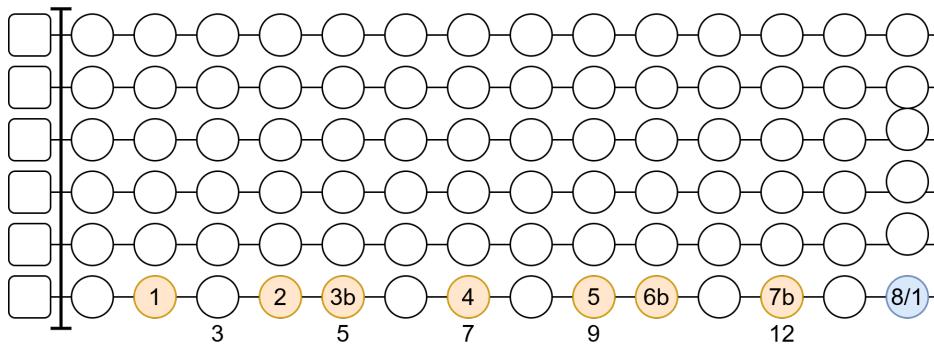
Figure 5.7: Multiple octaves of the F♯ minor scale



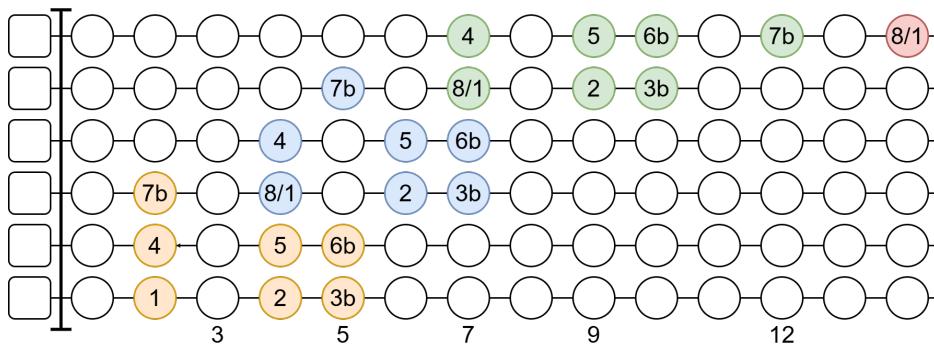
(a) Minor scale on the fretboard (standard)



(b) Minor scale on the fretboard from 5th (A) string



(c) Minor scale on the fretboard on a single string



(d) Minor scale octaves over the whole fretboard

Figure 5.8: F♯ minor scale on the fretboard

The song "The Final Countdown" from "Europe" is in F♯ minor. The intro is shown in Figure 5.9.

The Final Countdown

Intro

Music: Europe
Arranged: Enzo Evers

Figure 5.9: The Final Countdown - Europe intro

Looking at the notes used, you see that it nicely overlaps with the F♯ minor scale shown in Figure 5.8a. Just as in the previous fretboard diagrams, the numbers in the circles indicate the degree in the, in this case minor, scale.

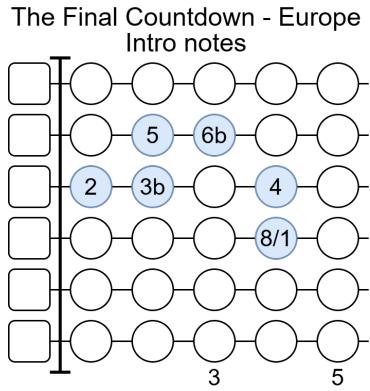


Figure 5.10: Notes used in the intro of "The Final Countdown - Europe"

Improvising

Just as we did for the major scale, we will also improvise over a minor chord progression (we will learn more about chord progressions in section 5.7).

The following chord progression in the **key of A-minor**. You can play the A-minor scale over this to make a nice melody.

- Am - Em - G - Dm

This is a "i - v - VII^b - iv" chord progression (see section 5.7 if you want to know what this means).

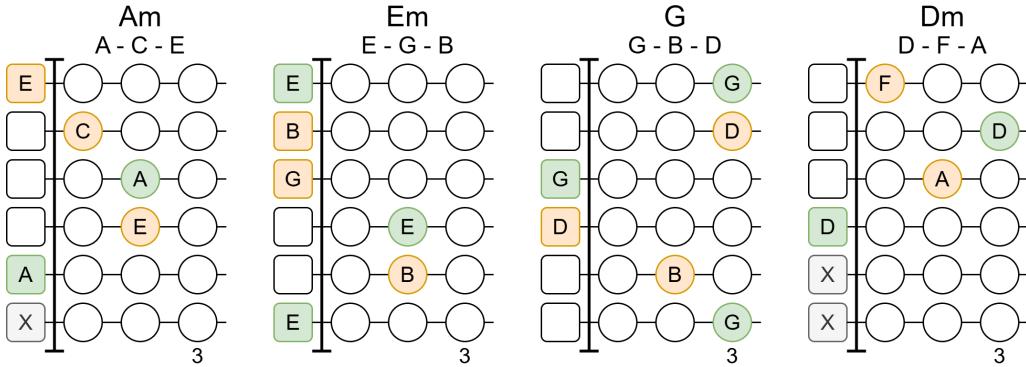
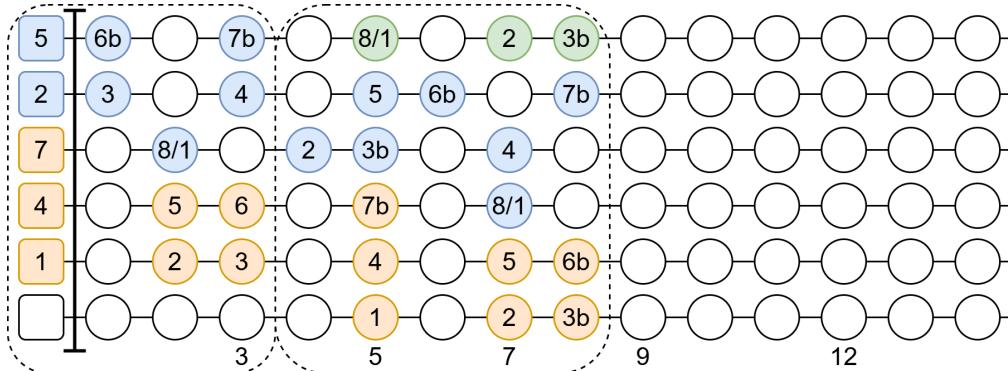
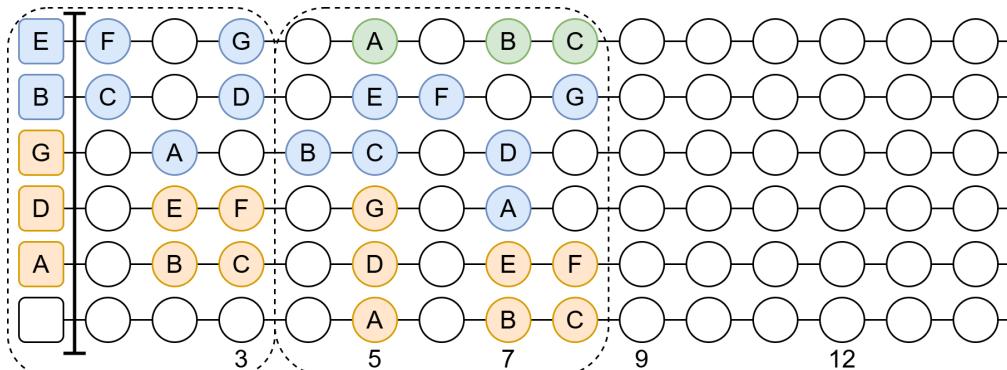


Figure 5.11: A minor chord progression

Figure 5.12a shows the A minor scale starting from both the 5th and 6th string. Note that the boxes around the frets outline the same shape as Figure 5.8a and Figure 5.8b but in a different key. Also note that the colors all show the same pitch of the note. Try to verify this for yourself.



(a) A minor scale starting from both the 5th and 6th string with scale degrees



(b) A minor scale starting from both the 5th and 6th string with note names

Figure 5.12: A minor scale on the fretboard

YouTube is full of different chord progressions in different keys if you search for it.

5.4 Internalizing the scale formulas

The most important formula to remember is the one of the diatonic major scale. Most music theory is based on this scale. Secondly, memorize the minor scale formula. At the beginning a good way to do it is:

- Write the diatonic major (w-w-h-w-w-w-h) and minor (w-h-w-w-h-w-w) scale formulas on paper, and then write the scale of each note (A to G) by going through the formula.
- Practice the compact shapes starting from both the 6th and 5th string over the whole neck. While doing this, think about the note names in the scale that you are playing.

It might take some time to really internalize this, and it may be boring, but it's worth it in the long run.

In Appendix A there are empty guitar fretboards. You can use these to fill in note names of a certain scale on the guitar as an additional exercise.

5.5 Using a metronome (synchronize the left and right hand)

Playing scales up and down is also a good time to focus on hand synchronization. Set a metronome to a comfortable speed and just play the scales up and down. Make sure that you hit a new note exactly on each beat of the metronome. If you feel comfortable with the speed, increase the BPM a bit.

5.6 Chords

5.6.1 Building chords

In the previous sections we have learned about the major and minor scales. This information can be used to finally start to learn about chords.

A major or minor chord is constructed by playing the 1st, 3rd and 5th note of a scale at the same time. That's it.

As seen in Table 5.11 and Table 5.12, in both major and minor scales the 1, 3, and 5 scale indexes are used. The green notes are the root notes.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8

Table 5.11: Building up a major chord

	W	H	W	W	H	W	W
1	2	3b	4	5	6b	7b	8

Table 5.12: Building up a minor chord

Table 5.13 and Table 5.14 show how to determine which notes are in a chord. The order of the chords in the major and minor tables are the same. This way you can compare them. These notes are also seen under the chords in Figure 5.14.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8
A	B	C#	D	E	F#	G#	A
B	C#	D#	E	F#	G#	A#	B
C	D	E	F	G	A	B	C
D	E	F#	G	A	B	C#	D
E	F#	G#	A	B	C#	D#	E
F	G	A	Bb	C	D	E	F
G	A	B	C	D	E	F#	G

Table 5.13: Major chord from scales

	W	H	W	W	H	W	W
1	2	3b	4	5	6b	7b	8
A	B	C	D	E	F	G	A
B	C#	D	E	F#	G	A	B
C	D	Eb	F	G	Ab	Bb	C
D	E	F	G	A	Bb	C	D
E	F#	G	A	B	C	D	E
F	G	Ab	Bb	C	Db	Eb	F
G	A	Bb	C	D	Eb	F	G

Table 5.14: Minor chord from scales

5.6.2 Open and barre chords

When a chord is played that contains open strings, it is called an "open chord" (e.g. Figure 5.13a). When a chord is played without open strings, it is called a "barre chord" (e.g. Figure 5.13b).

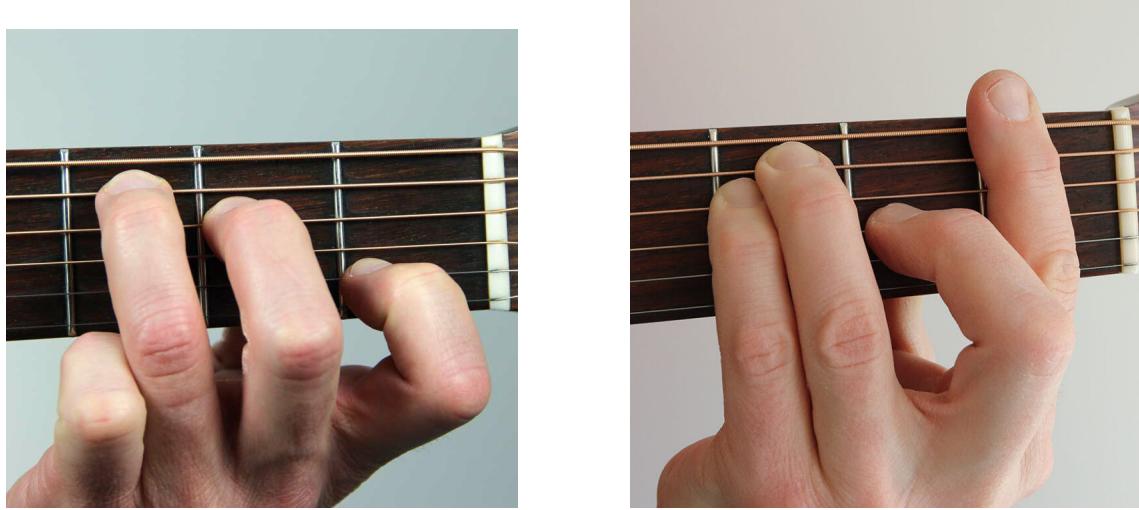


Figure 5.13

The nice thing about barre chords is that you can move them up and down the neck. At that point the barre chord becomes more of a shape than a chord per se. Depending on what the root note is at a certain position, the barre chord will get a different name. We will see this later in the **CAGED system**.

On the next page in Figure 5.14 you will see all the major and minor chords listed. The chord **C** is a major chord and the chord **Cm** is a minor chords. The same holds for the other chords. Below each chords there are the 1st, 3rd and 5th notes from the respective scale (see Table 5.5 and Table 5.9).

The green dots indicate the root note. This is the note with the same name as the chord.

A couple things to note:

- The root and the 5th note of a scale are same for both the major and minor variant.
- The 3rd note of minor chord is always a half step / 1 semitone lower than it is in the major chord.

The barre F chord is a good example of what was mentioned in the beginning. The thing about barre chords to become more like a shape that can become different chords. Compare the shape of the E and Em chords with the F and Fm chord shapes. Note how the shape is the same and there are no open strings in the F and Fm. By just moving the E chord shape a half step (one fret) to the right, the root note has changed and it is therefore now an F chord.

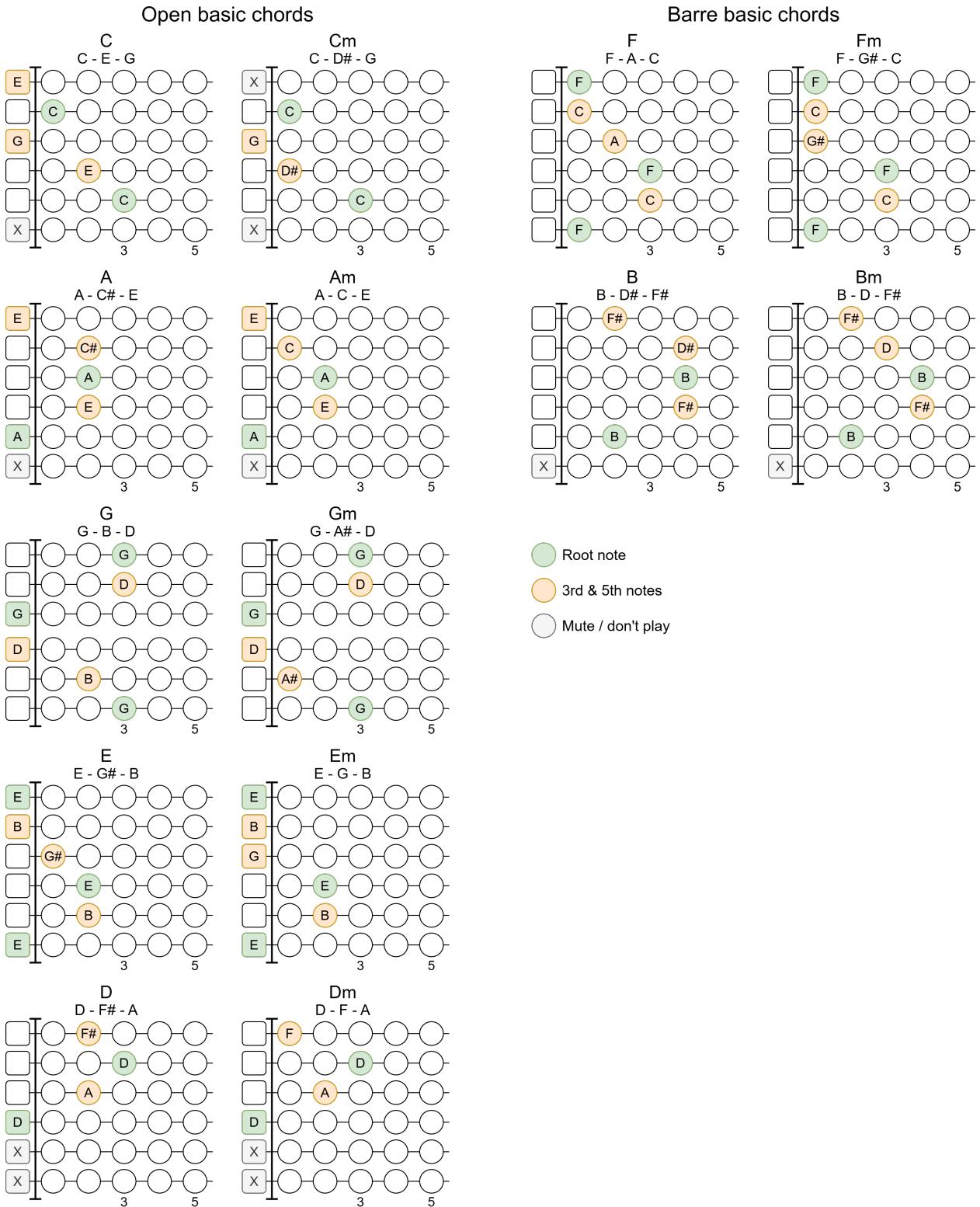


Figure 5.14: Major and minor chords

Lets play some chords. The theme song (Figure 5.15) of the Adventure Time series is a good start. The notes on the staff here are replaced by rhythm notation. The duration of the note shapes is still the same. But now it only indicates the strumming rhythm.

Adventure Time Theme

Music: Pendleton Ward
Arranged: Enzo Evers

The tablature shows four measures of chords G, D, C, and D. The tempo is indicated as =180. The lyrics "come on grab your friends. We're going to very distant lands." are written below the tablature. The next section starts at measure 5, with chords G, D, C, and D. The lyrics "With Jake the dog, and Finn the human. The fun will never end, it's adventure" are written below. The final measure shown is measure 9, starting with a G chord.

Figure 5.15: Adventure Time Theme Song

In the song "Knockin' On Heaven's Door" By Bob Dylan, the same chords are used as in the Adventure Time theme, plus one extra chord. The **Am**.

Knockin' On Heaven's Door - Bob Dylan

G D Am G D C
 Intro: Oo oo-oo oo
 G D Am G D C
 Oo oo-oo oo Oo oo-oo oo

G D Am
 1. Mama, take this badge off of me
 G D C
 I can't use it anymore
 G D Am
 It's gettin' dark, too dark for me to see
 G D C
 I feel like I'm knockin' on heaven's door

G D Am
 Chorus: Knock, knock, knockin' on heaven's door
 G D C
 Knock, knock, knockin' on heaven's door
 G D Am
 Knock, knock, knockin' on heaven's door
 G D C
 Knock, knock, knockin' on heaven's door

G D Am
 2. Mama, put my guns in the ground
 G D C
 I can't shoot them anymore
 G D Am
 That long black cloud is comin' down
 G D C
 I feel like I'm knockin' on heaven's door

G D Am
 Chorus: Knock, knock, knockin' on heaven's door
 G D C
 Knock, knock, knockin' on heaven's door
 G D Am
 Knock, knock, knockin' on heaven's door
 G D C
 Knock, knock, knockin' on heaven's door

Another song to practice chord changes with can be "Hey Ya!" from Outkast. This only uses four chords, and the order of the chords is the same throughout the whole song.

To give a feel for the chords, the first part of the song is shown here. You can listen to the song and play these chords for the rest of the song.

Hey Ya! - Outkast

Intro: One, two, three, uh!

G C

1. My baby don't mess around

D E

Because she loves me so, and this I know for sure (Uh)

G C

But does she really wanna

D E

But can't stand to see me walk out the door? (Ah)

There are two (actually 4) more important shapes to learn. The barre shapes. These are shown in Figure 5.14 as the A_b and E_b chords. For these chords you place your index finger over all the strings, and use the remaining fingers to press the remaining notes. Note that for the E_b chord you only have to place your index finger over the first 5 strings.

The song "Perfect" by Ed Sheeran is a good song to practice both shapes. This also shows the power of barre chords. The fact that they can be moved up and down the neck to make different chords.

The song uses 4 chords: A_b, Fm, D_b, and E_b. Or if shown with sharps: G_#, Fm, C_#, and D_#

Only the first verse is shown here to focus on the barre chords themselves. The barre chords to use are shown in Figure 5.16. Note the numbers below the shapes. These are the fret numbers.

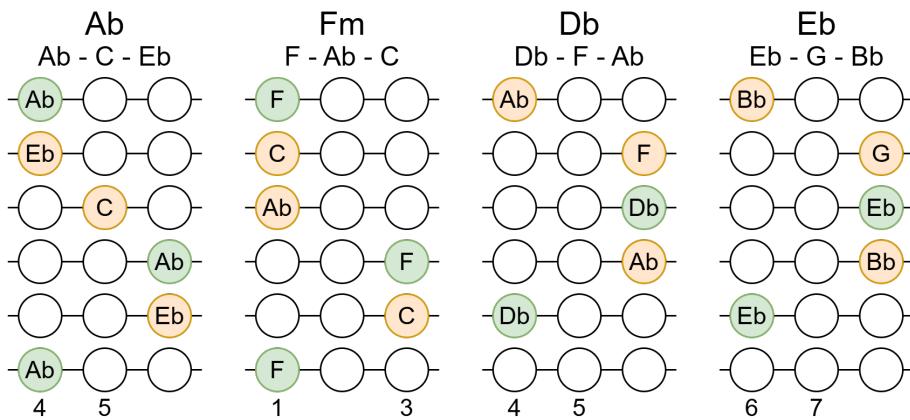


Figure 5.16: Barre chords used in "Perfect - Ed Sheeran"

Note how the shapes are all very similar, but that the note on the lowest string indicates which chord name it is.



It is not a rule that the note on the lowest string indicates the chord for all shapes.
The combination of notes determine the chord.

Perfect - Ed Sheeran

A_b Fm
 1. I found a love for me D_b E_b
 Oh, darling, just dive right in and follow my lead
 A_b Fm
 Well, I found a girl, beautiful and sweet D_b E_b
 Oh, I never knew you were the someone waitin' for me

5.6.3 Your turn

We've played all kind of different chords now. It's up to you to see which song you want to play, look up the chords on the internet, and practice the chord transitions. Feel free to play the chords in different ways/shapes. Each option gives a different sound, or maybe one option is easier to play within the transition than another. Just experiment!

5.7 Chord progression

5.7.1 Chords in a scale

A chord progression of chords. For example, if you would play the chords C and G repeatedly for (part of) a song then the chord progression would be C - G. However, assuming that we are in the key of C major and therefore the C would be the root note/chord, this chord progression isn't universal. For that reason chord progressions are often referred to with numbers (notated with roman numerals).

Using numbers, the chord progression C - G would become 1 - 5, or with roman numerals I - V. The indexes in the major scale can be shown using the roman numerals as well. See Table 5.15. The chord on the 7th index (vii^o) is called a diminished chord, but we will ignore this for now. The 8th index is not assigned a chord because it's the same as index 1. The same can be done for the minor scale (Table 5.16).

Two things to note:

- **Capitalized** roman numerals correspond to **major** chords
- **Non-capitalized** roman numerals correspond to **minor** chords

W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8
I	ii	iii	IV	V	vi	vii ^o	

Table 5.15: Chords in the major scale

W	H	W	W	H	W	W	
1	2	3 ^b	4	5	6 ^b	7 ^b	8
i	ii ^o	III	iv	v	VI	VII	

Table 5.16: Chords in the minor scale

5.7.2 Why the major, minor, and diminished chords?

Initially it might seem arbitrary why some indexes in the scale are major chords and others are minor. However, let's look back at subsection 5.6.1. And then specifically to these tables. The green notes are the root note.

W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8
1	2	3	4	5	6	7	8

Table 5.17: Building up a major chord

W	H	W	W	H	W	W	
1	2	3 ^b	4	5	6 ^b	7 ^b	8
1	2	3 ^b	4	5	6 ^b	7 ^b	8

Table 5.18: Building up a minor chord

These tables show that a chord is made up out of the 1st, 3rd, and 5th note in a scale. Another way to look at it is always just two notes in the scale ahead until you have 3 notes that form a chord.

This last way of looking will be used here.

In this subsection a half step will be called a semitone. Remember that there are two half steps in a whole step.

For the Major scale:

- There are **4 semitones** between 1 and 3. This interval is called a **major 3rd**.
- There are **7 semitones** between 1 and 5. This interval is called a **perfect 5th**.

Also, there are 3 semitones between the 3 and the 5. This interval is called a minor 3rd.

For the Minor scale:

- There are **3 semitones** between 1 and 3. This interval is called a **minor 3rd**.
- There are **7 semitones** between 1 and 5. This interval is called a **perfect 5th**.

Also, there are 4 semitones between the 3 and the 5. This interval is called a major 3rd.

Note that both major and minor have a perfect 5th. The only difference is that a major chord has a major 3rd, while a minor chord has a minor 3rd.

Some examples will be given next. Note that these principles can be applied to any note in both the major and minor scales.

Identifying a minor chord

Lets determine if index 3 of the major scale is a major or minor chord. The colored indexes in Table 5.19 are found by starting at the 3rd index, and then jumping two steps ahead each time until we found three notes.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8

Table 5.19: Intervals for the 3rd chord in the major scale

Now we should look at the intervals between the note.

- 3 to 5: 3 semitones (minor 3rd)
- 3 to 7: 7 semitones (perfect 5th)

We have a minor 3rd and a perfect 5th. This means that it's a minor chord.

Identifying a major chord

Lets determine if index 5 of the major scale is a major or minor chord. The colored indexes in Table 5.20 are found by starting at the 5th index, and then jumping two steps ahead each time until we found three notes.

Note that this time we wrapped around for the last note. Remember that the 8th note is the same note at the 1st note. So from index 7 we first made a half step to 8 (same as 1) and then made a whole step to index 2.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8

Table 5.20: Intervals for the 5th chord in the major scale

Now we should look at the intervals between the note.

- 5 to 7: 4 semitones (major 3rd)
- 5 to 2: 7 semitones (perfect 5th)

We have a major 3rd and a perfect 5th. This means that it's a major chord.

Identifying a diminished chord

A diminished chord is made up of:

- minor 3rd: 3 semitones
- diminished 5th: 6 semitones (also called a tritone)



The tritone interval is generally considered to sound uneasy/restless. That is why a diminished chord also gives this uneasy feeling. Note that the pentatonic scale can help with this.

The major (and minor) scales only have one diminished chord. For the major scale that is the chord on the 7th index.

	W	W	H	W	W	W	H
1	2	3	4	5	6	7	8

Table 5.21: Intervals for the 7th chord in the major scale

- 7 to 2: 3 semitones (minor 3rd)
- 7 to 4: 6 semitones (diminished 5th)

We have a minor 3rd and a diminished 5th. This means that it's a diminished chord.

5.7.3 Analyzing songs

Analyzing "Knockin' On Heaven's Door - Bob Dylan"

In the previous section you played "Knockin' On Heaven's Door" using the G, D, C, and Am chords. There were two alternating sequences:

- G - D - Am
- G - D - C

The song is in the G major key. The G major scale is shown again in Table 5.22. The bold notes are the chords from "Knockin' On Heaven's Door".

W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8
I	ii	iii	IV	V	vi	vii ^o	
G	Am	Bm	C	D	Em	F# ^o	G

Table 5.22: G major scale with chords

With this knowledge, the chords sequences can be described in terms of roman numerals instead of chords.

- G - D - Am: I - V - ii
- G - D - C: I - V - IV

Changing key

Lets say that your singer is more comfortable in a different key, or you just want to play the song in a different key for whatever reason. Then you can change the key of the song.

As an example, "Knockin' On Heaven's Door" will be changed to the D major key. By using the intervals that we've seen, and applying them to the D major key, we get a new sequence of chords.

- D - A - Em: I - V - ii
- D - A - G: I - V - IV

W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8
I	ii	iii	IV	V	vi	vii ^o	
D	Em	F# ^o	G	A	Bm	C# ^o	D

Table 5.23: D major scale with chords

Analyzing "Perfect - Ed Sheeran"

This song is in the key of Ab (Table 5.24). The reason that Ab is used instead of G# is because Ab uses more natural notes.

W	W	H	W	W	W	W	
1	2	3	4	5	6	7	8
I	ii	iii	IV	V	vi	vii ^o	
Ab	Bbm	Cm	Db	Eb	Fm	G ^o	Ab

Table 5.24: Ab major scale with chords

In the first verse of this song (shown in the previously) the following chord progression is used:

- Ab - Fm - Db - Eb: I - vi - IV - V

Deviating from the scale chords

Of course, the things described so far are a good starting point, but music is a creative endeavor after all. So feel free to experiment.

The song "Hey Ya!" from Outkast did that a bit as well. The song is in the key of G major. The chords sequence played through the whole song is:

- G - C - D - E

Strictly speaking this doesn't fit in the chords of the G major scale. You would expect an Em chord instead of an E (see Table 5.22).

5.7.4 Your turn

When you are playing a song, try to see if you can find the chord progression pattern. When looking for chords on the internet you often see the key of the song as well. If it's not there, you can always ask the internet if it knows the key of the song.

When you have the key, see if you can fit the chords in the scale of that key.

If you internet couldn't provide you the key. Then see how many half/whole steps are between the chords in the song. By using these intervals you may be able to recognize the pattern in a scale.

5.8 The pentatonic scale

In the last section when we talked about the diminished cord, it was hinted that the pentatonic scale allows you to avoid the restlessness of the tritone interval. But why?

While playing the major and minor scales you may have noticed that half step interval can give some kind of suspension. For example, when you play the 7th note in the major scale, it is only half a step to the root note. Depending on the context, if you play the 7th note, your ear expects the root note to follow.

The pentatonic scale means to have 5 (penta) notes in the scale. Meaning that in general, any 5 notes can form a pentatonic scale. But the pentatonic scale that we know and use is known as the major pentatonic scale. This is the major diatonic scale without the 4th and the 7th note. This removes any semitone tone intervals, and it removes the tritone interval.



Note that the word 'removed' was used. This doesn't really do justice to the pentatonic scale. Most likely the pentatonic scale pre-dates the major (diatonic) scale. For example, in 2008 a flute was found that was 30-40 thousand years old and which was tuned to the pentatonic scale. Additionally, Pythagoras studied how the pentatonic scale tones occurred naturally in nature. [1]

What the pentatonic scale gives us with this is a 'safer' scale to improvise with. By removing these two notes, we remove the chance that a note that we use while improvising would form a tritone with a note that is played in the chord progression for example.

Again, no one is stopping you from going outside the pentatonic scale and be creative. But especially in the beginning, the pentatonic scale is a safe scale for improvising.

We will relate the major pentatonic scale to the major (diatonic) scale.

Table 5.25 shows the major pentatonic scale. Here **W+** means 3 semitones (a whole step (W) + a half step (H)). Note that the indexes are still 1-7 and not 1-5. This is to more easily connect it with the diatonic scales that we've learned in previous chapters.

	W	W	W+	W	W+
1	2	3	5	6	8

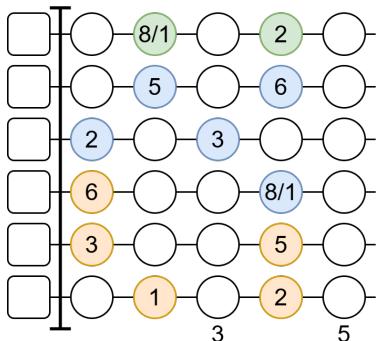
Table 5.25: Major pentatonic scale intervals

For the minor pentatonic scale we remove the 2nd and 6th notes for the same reasons. This results in the following intervals.

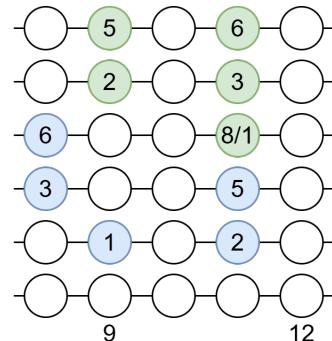
	W+	W	W	W+	W
1	3b	4	5	7b	8

Table 5.26: Minor pentatonic scale intervals

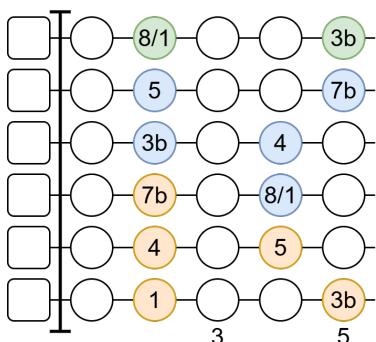
That's all nice and well, but how to use this? Figure 5.17 shows the shape of both the major and minor pentatonic scales. These are basically the same shapes as the diatonic shapes that you learned earlier, but with some notes removed (4 and 7 for major, 2 and 6b for minor).



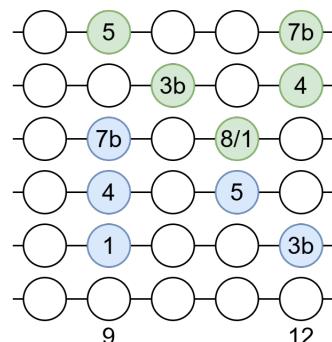
(a) Major pentatonic shape



(b) Major pentatonic shape from 5th (A) string



(c) Minor pentatonic shape



(d) Minor pentatonic shape from 5th (A) string

Figure 5.17

5.8.1 Your turn

Find a song that you like, find the key, and use the pentatonic scale to improvise over the song. The key can often be found on the internet as well.

Note that some songs may change key during the song. This will result in the pentatonic scale to sound a bit off during those parts. When that happens, you can find the key that was switched to and continue in the pentatonic scale in that key.

Another thing you can try is to search for backing tracks in a certain key on the internet.

5.9 Circle of fifths

5.9.1 What does it say?

In a previous section the following tables were shown. There was also the term "circle of fifths" and "circle of fourths" mentioned and that this has to do with the fact that there is always one more accidental added (\sharp or \flat).

	W	W	H	W	W	W	H
I	ii	iii	IV	V	vi	vii ^o	8
1	2	3	4	5	6	7	
F	G	A	B \flat	C	D	E	F
C	D	E	F	G	A	B	C
G	A	B	C	D	E	F \sharp	G
D	E	F \sharp	G	A	B	C \sharp	D
A	B	C \sharp	D	E	F \sharp	G \sharp	A
E	F \sharp	G \sharp	A	B	C \sharp	D \sharp	E
B	C \sharp	D \sharp	E	F \sharp	G \sharp	A \sharp	B

Table 5.27: Major scales of natural notes

	W	H	W	W	H	W	W
i	ii ^o	III	iv	v	VI	VII	8
1	2	3 \flat	4	5	6 \flat	7 \flat	
B	C \sharp	D	E	F \sharp	G	A	B
E	F \sharp	G \sharp	A	B	C	D	E
A	B	C \sharp	D	E	F \sharp	G \sharp	A
D	E	F \sharp	G	A	B	C \sharp	D
G	A	B	C	D	E	F	G
C	D	E	F	G	A	B \flat	C
F	G	A \flat	B \flat	C	D \flat	E \flat	F

Table 5.28: Minor scales of natural notes

Take a look at the circle in Figure 5.18. Things to note:

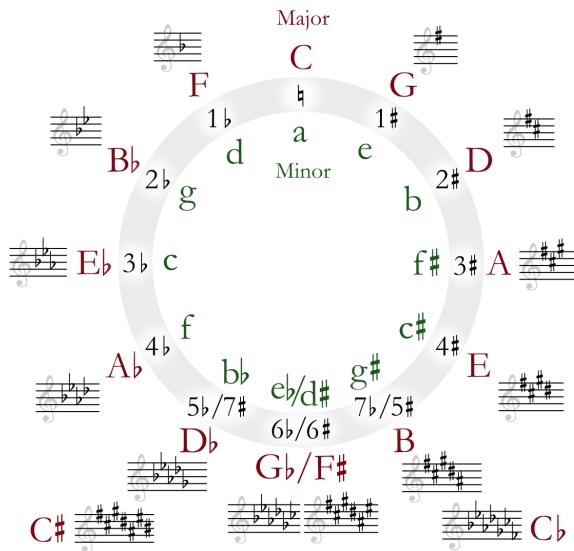


Figure 5.18: Circle of fifths [9]

- **Going clockwise:** Each note on the right of a note, is the **5th degree** in the major scale of the note. We went **up a perfect 5th interval**.
- **Going counterclockwise:** Each note on the left of a note, is the **4th degree** in the major scale of the note. We went **down a perfect 5th interval**. To see this, look at Table 5.27, start at the 8th degree and count the number of half-steps when you go back to the 4th degree. This is 7 half-steps. Now look at Table 5.2 and see that 7 half-steps (semitones) is a perfect 5th interval.
- **Going clockwise:** With each new 'step' a \sharp is added.
- **Going counterclockwise:** With each new 'step' a \flat is added.

The \sharp and \flat that are added both follow the same mnemonic but one of them is reversed:

Clockwise (\sharp)	Father	Charles	Goes	Down	And	Ends	Battle
Counterclockwise (\flat)	Battle	Ends	And	Down	Goes	Charles	Father

Note how the sharps and flats are separated by a perfect 5th as well.

5.9.2 Using the circle of fifths

Relative minor/major scales

If you compare the notes in the C major and A minor scales, you see that they have the same notes. This means that A minor is the **relative minor** of C major. And vice versa, C major is the **relative major** of A minor. The inner circle in the circle of fifths (the minor circle), show the relative minor scales to the outer (major) circle (and vice versa).

So you can quickly see that the relative minor of E♭ major is C minor, and that the relative major key of B minor is D major.

Quickly showing chords in a scale

In the beginning of this chapter you have already learned that there are major, minor, and diminished chords in a scale and how to identify these. These chords were identified with roman numerals.

Chords in the major scale

We start at a note on the major circle.

It was already said that the note on the right is the 5th degree of a scale, the note on the left is the 4th degree of a scale.

The 6th degree in the major scale is the relative minor. If you go a perfect 5th (7 semitones) up from the 6th degree in the major scale, you end up at the 3rd degree. If you go down a perfect 5th, you end up at the 2nd degree.

The remaining chord is the diminished chord. This can be found by going up a perfect 5th from the 3rd degree (one step to the right).

Chords in the minor scale

We start at a note on the minor scale.

The perfect 4th and perfect 5th interval are in both the major and minor scale. Meaning that on the right we have the 5th degree and on the left we have the 4th degree in the minor scale (by going up and down a perfect 5th respectively).

The relative major is the 3rd degree. Going up a perfect 5th from the 3rd degree in the minor scale lands on the 7th degree. Going down a perfect 5th in the minor scale lands on the 6th degree.

To get the remaining diminished chord you go up a perfect 5th from the 5th degree in the minor scale.



Figure 5.19: Rotatable chord degrees in the circle of fifths

Starting point for identifying the key of sheet music

If you see 3 **#**s at the beginning on the sheet music, the song will (mostly) use notes from the A major key (which are the same notes of F# minor key). To determine if the song is major, minor, or any other mode (more about this in section 7.1) you need more context of the notes in the song.

Seeing which keys to change and modulate to

When you go through the circle there is always one note that is different (an added/removed **#/b**).

So if you want to modulate to a new key, you can use the circle of fifth to determine how 'rapid' you want to change to be. Or to see through which keys you can go to reach the 'final' key.

Example of abrupt key change

In "Livin' On A Prayer" from "Bon Jovi" there is a key change in the outro-chorus. It goes from E minor to G minor. Both use the same chord progression.

Chord Key \	i	VI	VII	III	VI	VII
E minor	Em	C	D	G	C	D
G minor	Gm	E _b	F	B _b	E _b	F

Livin' On A Prayer - Bon Jovi

Em C D G C D
Chorus: Oh, we're halfway there, woah oh, livin' on a prayer.

Em C D
Take my hand, we'll make it I swear
G C D
Woah oh, livin' on a prayer.

Gm E_b F B_b E_b F
Outro-chorus: Woooooo, we're halfway there, Woah oh, livin' on a prayer.
Gm E_b F
Take my hand and we'll make it I swear
B_b E_b F
Woah oh, livin' on a prayer.

Looking at Figure 5.18, you see that G minor is 3 steps to the left of E minor. Meaning there are quite some different notes between both scales.

Also if you look at the scale of E minor (in Table 5.28) then you see that G is the 3rd degree in the scale (a minor 3rd interval). Meaning that the G is an important note that makes the E minor scale, minor.

Example of pivot chord/note

In "We Are The Champions" from "Queen" an example of a pivot chords/note can be seen. This song changes not only from key, but also from mode. It goes from C minor (during the verses) to F major (during the chorus).

Figure 5.20 shows that there are two overlapping chords ($B\flat$, G minor) and five overlapping notes ($B\flat$, C, D, F, G) in these two keys. Note that no D minor chord was mentioned as overlapping chord. This is because in the C minor key the d is a diminished chord, while in the F major key d is a minor chord. In "We Are The Champions", $B\flat$ is used as the pivot chord/note to connect the C minor to the F major keys.

Additionally, at the end of the verse, a C7 chord is played which is in the F major scale but not in the C minor scale. The Cm chord contains $C, E\flat, G$. The C7 chord contains $C, E, G, B\flat$. The only note in the C7 that makes it F major scale specific is the E note.

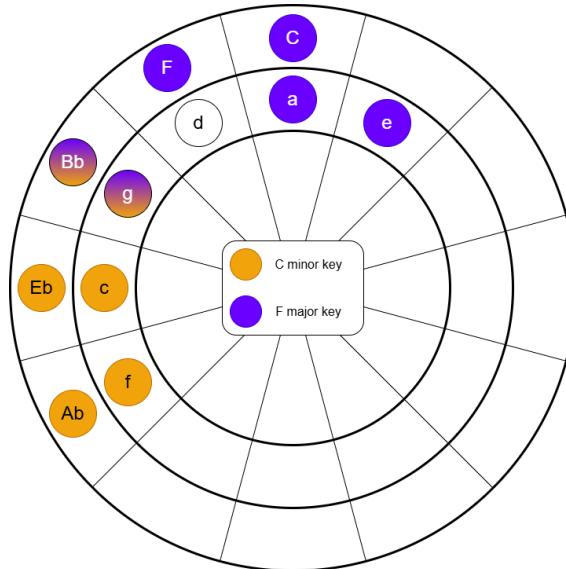


Figure 5.20: Showing the overlap of the chords in C minor (orange) and F major (purple)

We Are The Champions - Queen

<other lyrics>

$E\flat$ $B\flat$ Cm

I've had my share of sand kicked in my face

F^7 $B\flat$

But I've come through

$A\flat/B\flat$ $B\flat m^7 \flat^5$ $B\flat^7$ C^7

And I mean to go on, and on, and on, and on

F Am Dm $B\flat C^7$

Chorus: We are the champions, my friends

F Am $B\flat$ $F\sharp^{\text{dim}7}$

And we'll keep on fighting till the end

Gm C^7/G $B\flat m$ $E^{\text{dim}7}$

We are the champions, we are the champions

F Gm $A\flat$ $B\flat$ $C^7 \text{sus}4$

No time for losers 'cause we are the champions

Fm Gm^7

Of the world

6 Chord alterations

6.1 Power/fifth chords

The power chord, or more formally called a fifth chord, is chord where you only the root and the perfect 5th from that root. You can have multiple octaves of the root and/or fifth in the same chord.

Power chords don't have the 3rd, meaning that they are neither major or minor.

Power chords are often used on electric guitar with distortion. If you would play the full chord (with the 3rd), it can sound quite muddy depending on the amount of distortion.

6.1.1 Notation

A power chord can be indicated by (taking C and the base):

- C5
- C(no 3)

Both indicate that the power chord doesn't contain the 3rd.

6.1.2 Example

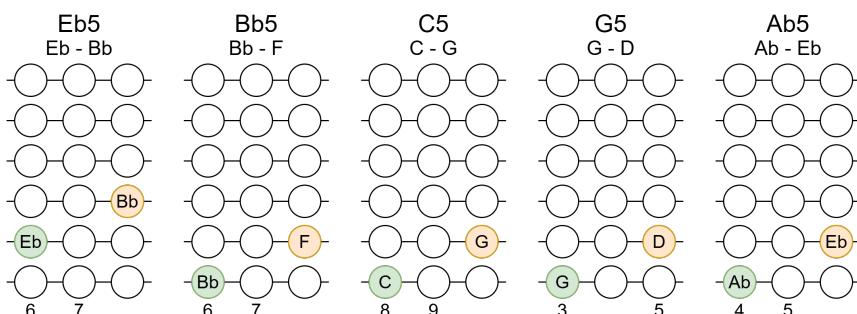


Figure 6.1: Chords used in verse 1 of "Basket Case - Green Day"

Note that on most places on the internet you will find just the chord names without the "5" or "(no 3)". In those cases you have to listen to the song to know what kind of chord is being played. In most cases, for punk, rock, metal, etc. kind of songs, powers chords are a safe bet.

Basket Case - Green Day (verse 1)

- E \flat ⁵ B \flat ⁵ C⁵ G⁵
1. Do you have the time to listen to me whine?
A \flat ⁵ E \flat ⁵ B \flat ⁵
About nothing and everything, all at once
E \flat ⁵ B \flat ⁵ C⁵ G⁵
I am one of those melodramatic fools
A \flat ⁵ E \flat ⁵ B \flat ⁵
Neurotic to the bone, no doubt about it

6.2 Chord inversions

TODO

6.3 Diminished & augmented chords

Diminished and augmented chords have sort of an uneasy tone. This makes them great as a passing chord to bring in some tension.

Where major and minor chords are identified by their 3rd note, diminished and augmented chords are identified by their 5th note.

Simply put:

- **Diminished chord:** **minor** chord with the **5th lowered** by a half step (1 semitone)
- **Augmented chord:** **major** chord with the **5th raised** by a half step (1 semitone)

Table 6.1 and Table 6.2 show how these relate to the major and minor scales (and chords created from them).

Minor intervals	W	H	W	W	H	W	W
Diminished chord from minor scale	1	2	3♭	4	5	6♭	7♭

Table 6.1: Diminished intervals

Major intervals	W	W	H	W	W	W	H
Augmented chord from major scale	1	2	3	4	5	6	7

Table 6.2: Augmented intervals

In subsection 5.7.2 you have already learned the following:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Minor chord: 1 - 3♭ - 5: Interval 1 - 3♭: minor 3rd Interval 3♭ - 5: major 3rd | <ul style="list-style-type: none"> • Major chord: 1 - 3 - 5: Interval 1 - 3: major 3rd Interval 3 - 5: minor 3rd |
|--|---|

Note that both the major and minor chords have a major and minor 3rd stacked on top of each other. Diminished chords have only minor thirds stacked and augmented chords have only major thirds stacked:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Diminished chord: 1 - 3♭ - 5♭: Interval 1 - 3♭: minor 3rd Interval 3♭ - 5♭: minor 3rd | <ul style="list-style-type: none"> • Augmented chord: 1 - 3 - 5♯: Interval 1 - 3: major 3rd Interval 3 - 5♯: major 3rd |
|---|---|

Earlier in this book at subsubsection 5.7.2 it was explained that a diminished chord has a tritone (meaning 6 semitones). This is the result of stacking two minor 3rd intervals.

6.3.1 Notation

Diminished chords can be indicated by (taking C and the base):

- Cdim
- C(♭5)
- C°

Augmented chords can be indicated by (taking C and the base):

- Caug
- C(♯5)
- C+

6.3.2 Examples

The song "All Stars" by "Smash Mouth" uses the diminished chord to bring in some tension.

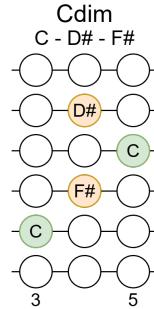


Figure 6.2: C[#]dim chord

All Stars - Smash Mouth (chorus)

F# B C^{dim} B
 Chorus: Hey now you're an All Star get your game on, go play
 F# B C^{dim} B
 Hey now you're a Rock Star get the show on get paid
 F# B C^{dim}
 And all that glitters is gold
 B F# E B
 Only shooting stars break the mold

The song "Impossible Year" by "Panic! At The Disco" uses augmented chords to create what is called a "line cliché". This is when either the root or the 5th of a chord is moved up (or down) a semitone a couple of times while keeping the rest of the notes the same. You see that happening here with the 5th of the F chord (see Figure 6.3).

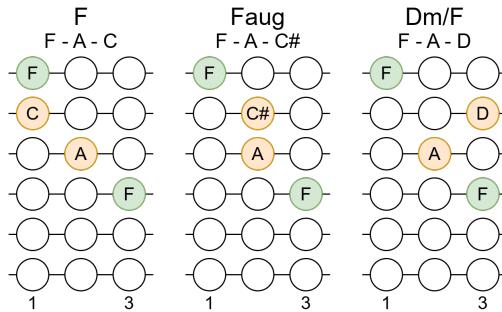


Figure 6.3: Some of the chords used in "Impossible Year - Panic! At The Disco"

Impossible Year - Panic! At The Disco (Part of Verse 1)

F Faug
 Chorus: There's no sunshine
 Dm/F Faug
 This impossible year

6.4 7th chords

TODO

6.5 Suspended (sus) chords

TODO

6.6 Extended & Add chords

TODO

6.7 More interesting chord progressions

TODO

7 Using the whole fretboard and modes

7.1 Modes

7.1.1 Diatonic modes

So far we have seen the major and minor scales. Both the diatonic and pentatonic versions. And all starting from the 6th string. This will allow you to improvise a nice melody over a song.

But, did you realize that the notes in the (diatonic) C major scale (Table 5.4) and the A minor scale (Table 5.8) are the same? That is because the **relative minor** of a major scale starts at the 6th index of the major scale. In Table 7.1 you see that by starting on the 6th note, you get the intervals of the natural minor scale (also called Aeolian).

So does that mean that you can improvise with the notes of A minor scale over a song in C major. YES!. After all, they are the same notes.

Does that mean that C major and A minor are identical. **No**. That also means that you can only say that a song is in C major, A minor, E phrygian, etc. by looking at the **tonal center** (the tone that is most prominent) of the musical context (chord progression).

A mnemonic for the mode name order: I Don't Particularly Like Modes A Lot.

Ionian (major)	W	W	H	W	W	W	H
<i>Chords</i>	I	ii	iii	IV	V	vi	vii ^o
<i>Intervals</i>	1	2	3	4	5	6	7
Dorian	W	H	W	W	W	H	W
	i	ii	III	IV	v	vi ^o	VII
	1	2	3 ^b	4	5	6	7 ^b
Phrygian	H	W	W	W	H	W	W
	i	II	III	iv	v ^o	VI	vii
	1	2 ^b	3 ^b	4	5	6 ^b	7 ^b
Lydian	W	W	W	H	W	W	H
	I	II	iii	iv ^o	V	vi	vii
	1	2	3	4 [#]	5	6	7
Mixolydian	W	W	H	W	W	H	W
	I	ii	iii ^o	IV	v	vi	VII
	1	2	3	4	5	6	7 ^b
Aeolian (natural minor)	W	H	W	W	W	H	W
	i	ii ^o	III	iv	v	VI	VII
	1	2	3 ^b	4	5	6 ^b	7 ^b
Locrian	H	W	W	H	W	W	W
	i ^o	II	iii	iv	V	vi	vii
	1	2 ^b	3 ^b	4	5 ^b	6 ^b	7 ^b

Table 7.1: Mode intervals

Using modes to give a different feeling

So far we have looked at modes as being a variant of the major scale. Meaning that if a song is in C major, that you can play notes from all the different modes that are derived from C major (D dorian, E phrygian, etc.). Note that this assumes that the tonal center, the note that the songs always wants to come back to, is C. And by playing notes and chords from the C major scale, it gets the major feeling.

To get the feeling of a different mode, you most often want to start on the chords of your mode (so the D minor chord for D dorian), and then play chords that emphasize the characteristic notes in the mode.

What are the characteristic notes of the mode? For that we first have to determine if a mode is a major or minor chord. This means looking at the 3rd index to see if it is a major or minor 3rd (3 or 3♭). Next you compare the mode intervals with either the major or minor intervals and see which are different. This is shown in Table 7.2.

Ionian (major)	1	2	3	4	5	6	7
Lydian (major)	1	2	3	4♯	5	6	7
Mixolydian (major)	1	2	3	4	5	6	7♭
Aeolian (natural minor)	1	2	3♭	4	5	6♭	7♭
Dorian (minor)	1	2	3♭	4	5	6	7
Phrygian (minor)	1	2♭	3♭	4	5	6♭	7
Locrian (diminished)	1	2♭	3♭	4	5♭	6	7

Table 7.2: Mode characteristic notes

The next step is to see which chords in the mode that you want to play have the characteristic note. This is important because we really want to emphasize the tonal center of the mode to give the right 'feel'. In subsection 5.7.2 you learned how to build chords from the diatonic scales. The chords in Table 7.1 are created the same way. With this knowledge the table Table 7.3 can be created that shows which chords of the mode are characteristic for the mode. This table is limited to the 3-note chords and (maj)7th chords. But you can of course alter a chord to become, for example, sus2 chords which would add the characteristic note in the chord.

Ionian (major)				
Lydian (major)	II	iv°	V maj7	vii
Mixolydian (major)	I 7	iii°	v	VII
Aeolian (natural minor)				
Dorian (minor)	ii	IV	vi°	VII maj7
Phrygian (minor)	II	III 7	iv	VI
Locrian (diminished)	all			

Table 7.3: Mode characteristic chords

Now when you create a chord progression for a mode, it would be good to use at least one chord listed in Table 7.3 besides having the first chord of the mode.

Using modes-shapes to open up the fretboard

Figure 7.1 shows the different **mode-shapes**. In this case we start with F# Ionian (major) scale. But remember that these can be shifted up or down to be in a different key.

The gray frets with number on the 6th string show the F# major scale on the 6th string. This is used to show the connection between the starting position of the different modes with the major scale intervals. Because we are looking from the major scale's perspective, the numbers in the frets of a shape also correspond to the intervals in the major scale.

Just as before, the different colors indicate different octaves in the shape. Meaning that each shape covers 2 and a bit octaves.



- The mode names in Figure 7.1 correspond to the shape in this case.
- The relative position of these shapes simply cover the whole fretboard with notes of a certain scale/mode.
- All shapes shown in Figure 7.1 are relative to the F# major scale (ionian mode). If they would be relative to the G# dorian mode then the shapes would be the same, but the numbers would be different. If they would be relative to G dorian mode, then all the shapes would move one fret down (to the left).

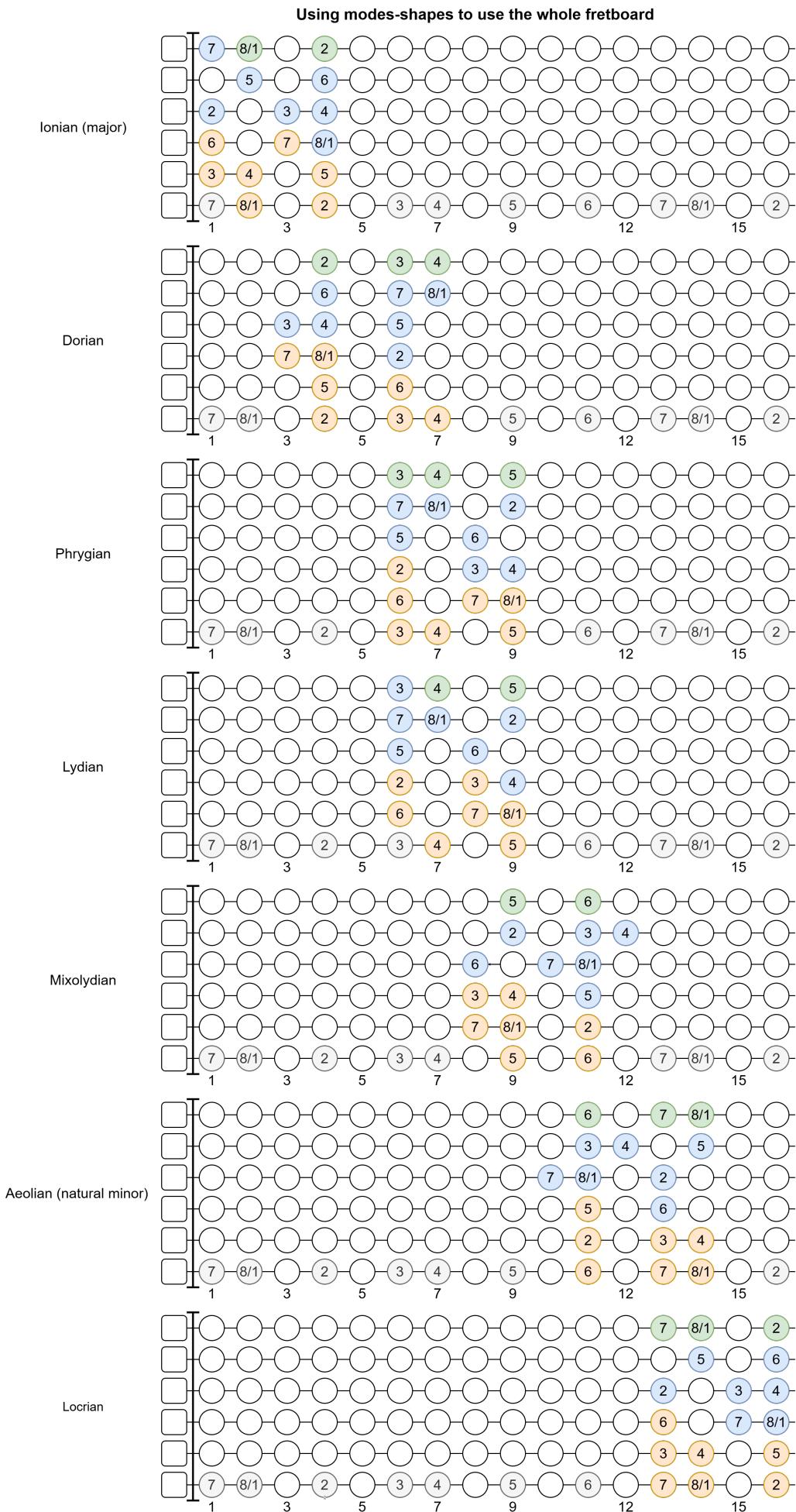


Figure 7.1: Diatonic modes on the guitar

7.1.2 Pentatonic modes

TODO

7.2 CAGED

TODO

8 More scales

TODO

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Appendices

A Empty guitar fretboard

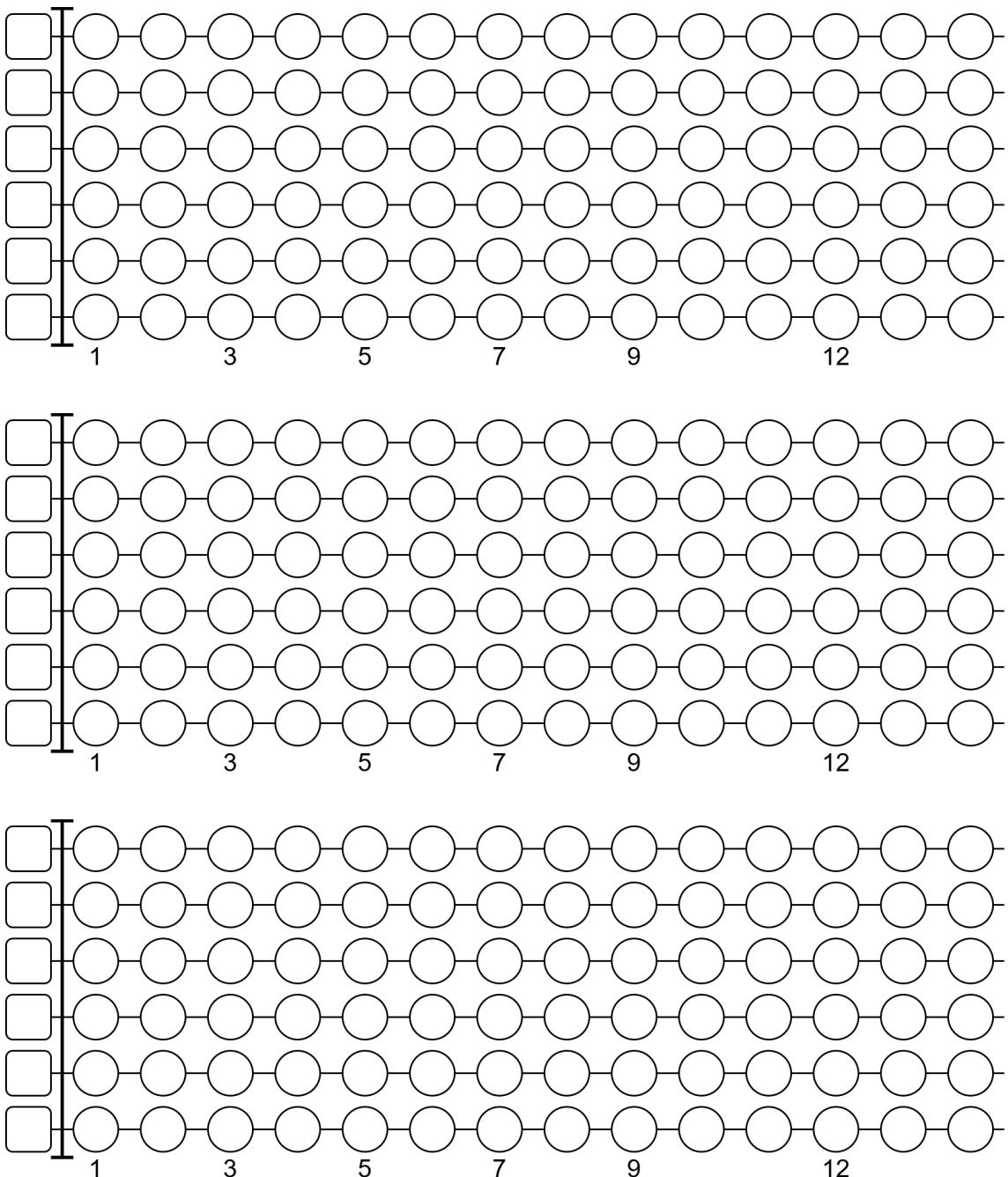


Figure A.1: Empty guitar fretboard

B Finger exercises

B.1 Fretting hand

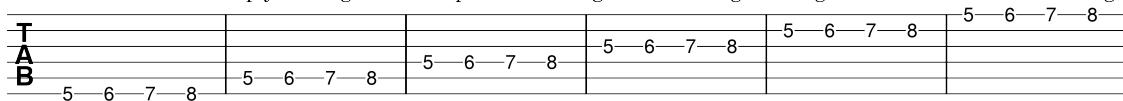
B.1.1 Play songs and scales slow

By just practicing a song slow and with a metronome, you can focus on good finger placement. Focus on a clear sound of the note.

B.1.2 Spider exercise

There are many variations of the spider exercise. But Figure B.1 focuses on straight finger placement. If you don't have your fingers correct on the strings, you will mute the lower string, resulting in no clear notes when playing notes on that string.

Keep your fingers on the previous string while moving one finger at a time to the next string.⁷



⁷ Also when going down, keep your fingers on the previous string.

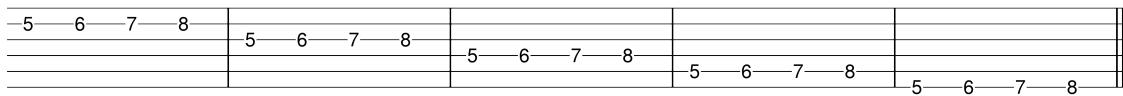


Figure B.1: Spider exercise

You can of course start on a different fret than the 5th. And you could also for example skip each-other string. Figure B.1 is just the basis.

B.2 Strumming & picking hand

TODO