

Rooted strings

Enzo Evers

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1 How to use this book

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.

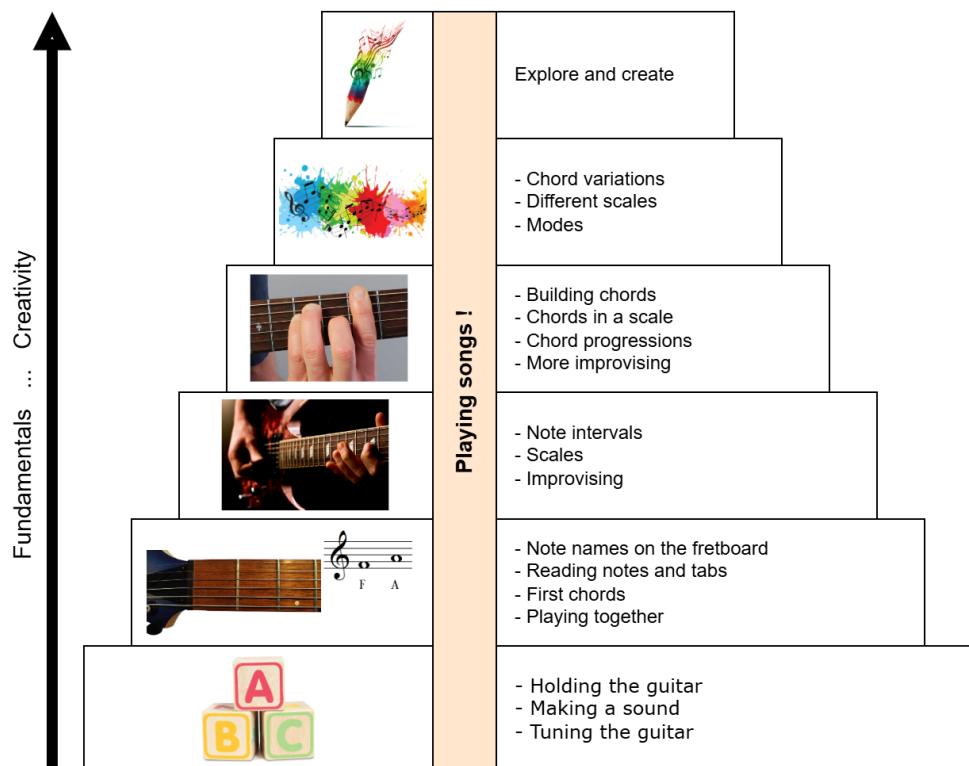
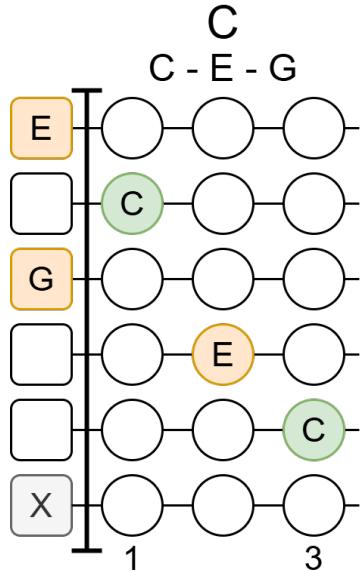


Figure 1.1: General building blocks of this book

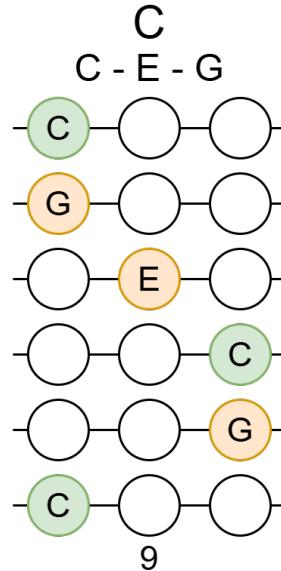
The fretboard diagrams are drawn such that the **thickest string is at the bottom**. This resembles the way that you look at the neck when you are holding the guitar.

The chord charts will be shown either with or without the open strings being shown (Figure 1.2a and Figure 1.2b respectively). The fret numbers shown at the bottom are in the same position that you would find fret indications on the guitar neck.

The **green notes** indicate the root note. The **orange notes** are the rest of the notes in the chord. The **gray "X"** means to not play, or to mute, this note/string.



(a) Open-C chord chart



(b) Closed-C chord chart

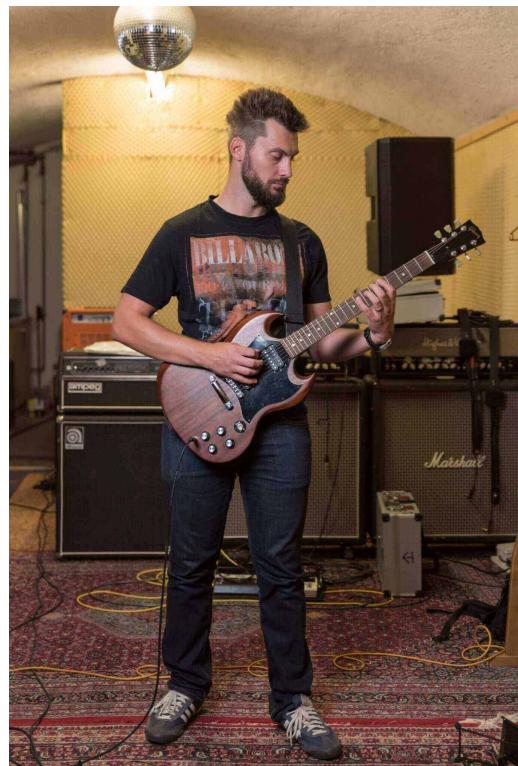
Figure 1.2: Different kinds of chord charts used in this book

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.

First of all, there is no single correct way playing the guitar. Depending on what you find most comfortable, or the style that you play, you may use a different position. Or you simply mix multiple positions when you play different things.

However, for more technical/quicker playing, you will probably 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.

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 the high/thin to the low/thick string):

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



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 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 below it.

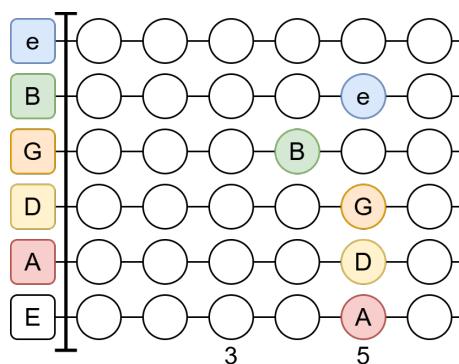


Figure 2.4: Relative tuning

3 First sounds

3.1 Fretboard

For each string, each position on the neck has a different pitch. The metal bars on the neck are called the **frets**. Note that the same pitch of a single note can also be found on other strings (think back to tuning the guitar by using another string as the reference).

If someone asks you 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.

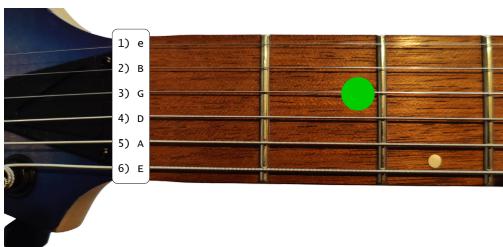


Figure 3.1: The green dot in the finger placement for the 2nd fret on the 3rd string

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

Previously it was mentioned that the same pitch can be found on multiple strings. This is illustrated in Figure 3.3. These are the name ascending notes/pitches as in Figure 3.2, but played on a different string.

This also indicates a big difference between tabs and notes. With notes, the expected sound (pitch) is described. You are free to determine where to play this on the fretboard. Tabs show one possible position to play the notes. You are of course still free to change the position as long as the resulting pitch is the same. But to do this you have to know where each note is on the fretboard.

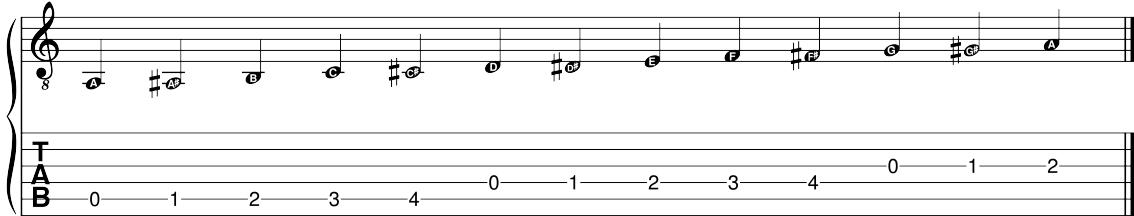


Figure 3.3: An octave from A to A on the multiple strings using sharps

Besides sharps there are also flats. A 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 (♮). This means that the note on which a ♭ or ♯ was placed, now is 'normal' again. Whenever a ♭ or ♮ 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.

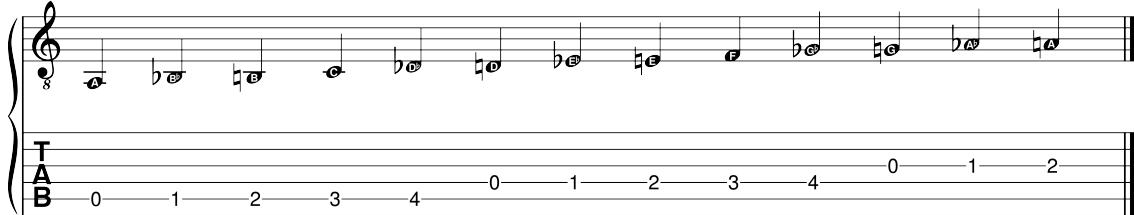


Figure 3.4: An octave from A to A on the multiple strings using flats and naturals

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.

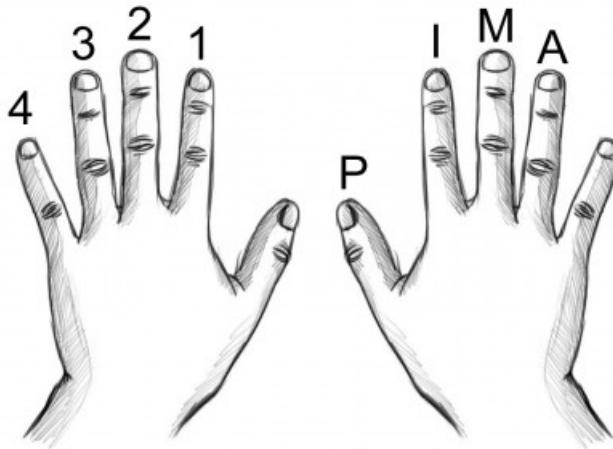


Figure 3.5: Names of the fingers [5]

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 or mute other strings.

Sometimes, however, there is a sequence of notes that would require you to play a single finger over two or more strings. But in general, keep your fingers perpendicular on the 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/pull the string.



(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).

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.

To pick smoothly through the string. Don't place the pick flat on the string. Instead, keep the pick at a small angle so that the string slides a little bit over the edge of the pick. Just a small angle is sufficient.



(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. The *i* and *m* indicate which right-hand finger should be used to play the note.

Try playing Figure 3.9 with a free stroke, rest stroke, and a pick to hear the differences. If you play with a pick, the *i* and *m* indication of course can be ignored.

When playing with a pick, try to play once with only downstrokes, and once with alternate picking. Downstrokes mean that you only play notes by placing the pick on a string, and then push through and place the pick back on the string again. Alternate picking starts the same as a single downpick. But instead of going on top of the string again after the first note, you play the note by pushing the pick upwards through the string. Then you start with a downpick again and continue alternating.

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 (Figure 3.11). You can also try to play this 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. Again, you can also use a pick.

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

Perfect - Ed Sheeran

Verse 1

Music: Ed Sheeran
Arranged: Enzo Evers

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 patterns on the fretboard and playing along with songs without really knowing what is going on. And if **that is sufficient for you, that is completely fine**.

However, by getting familiar with the fretboard and some theory to connect it all, you can be a lot more creative with music.

Later on you will also learn about scales, which allow to you improvise over songs. You will learn about different kind of chords and where you can find these on the fretboard. To know which frets (or chords) to play, you will need to know which notes belong to the frets.

The goals of this chapter is to get you familiar with reading notes on a staff, how to know at what speed a note should be played relative to other notes, and to learn where the notes are on the fretboard.

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.
- The notes go up alphabetically per step (starting again with A after G).
- Notes in between the lines nicely spell out "**FACE**", making it easy to remember.
- Notes on the lines can be remembered with the mnemonic "**Every Good Boy Does Fine**".
- The most left symbol (G clef) is called the G clef. Note that the curl of the G clef (second line from the bottom) indicates where the G is. More specifically, the G4.

Note that the G clef shown in Figure 4.1 is slightly different from the ones seen in earlier exercises. For guitar notation you sometimes see a little 8 under the clef. This means that all the notes sound an octave lower than how they would sound with a G clef without the 8 below it. So **the curl of a G clef that has an 8 below it, would indicate a G3 instead of a G4**. However, when a piece is written for guitar, sometimes the little 8 is omitted. But then you can imaging that it is there.

- 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.

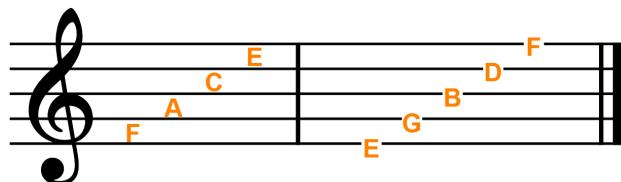


Figure 4.1: Note names on the staff in two measures

4.3 Counting

So far we have also only seen one type of note. The quarter note (J). However, there are more. See Figure 4.2. In the same time that a whole note is played, two half notes can be played. And in the same duration as a half note, two quarter notes can be played, etc.

The $\frac{4}{4}$ means that there can fit 4 (top number) quarter notes (bottom number) in a measure.

Important: A whole note (o) equals 4 quarter notes (J). It does **not** equal a whole measure. But because the time signature says that there are 4 quarter notes in a measure, the whole note takes up a whole measure here.

The " $\text{J} = 60$ " indicates the tempo and says how many notes of the indicated duration fit in a minute (the BPM). In this case 60 quarter notes fit in a minute. So it's 60 BPM Resulting in a quarter note being equal to 1 second. " $\text{J} = 80$ " would be 80 BPM, and a quarter note would be 0.75 seconds.



Figure 4.2: Note duration

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^{\cdot}). 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.

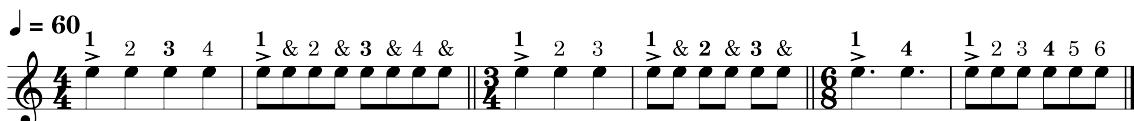


Figure 4.3: Time signatures

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.

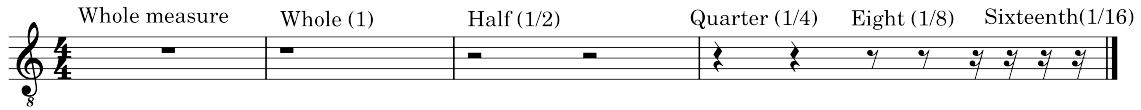


Figure 4.4: Rest notations of different duration

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.

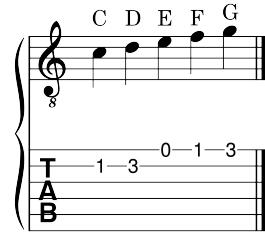


Figure 4.6: Notes used in jingle bells

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 are used in this tune. The only new notes are A and B.

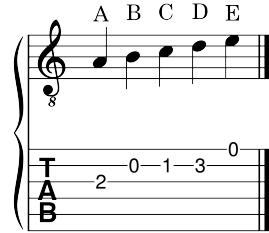


Figure 4.8: Notes used for the first part of the Tetris tune

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. The chords above the staff can be ignored for now.

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).

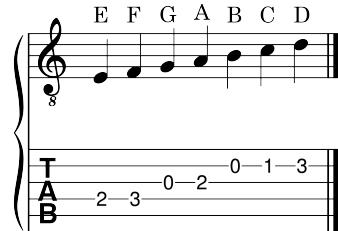


Figure 4.10: The G, F, and G, notes on the 3rd and 4th strings

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 notes that are tied together. All tied notes after the note that starts the tie are therefore not played. Only counted.

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 have 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.

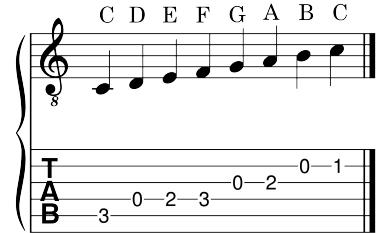


Figure 4.13: Notes used for the song "De Vogeltjesdans"



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.

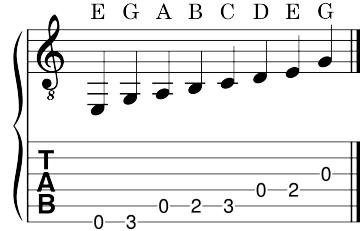


Figure 4.15: Notes used for the song "Seven Nation Army"

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 on the staff lines (and the other direction if you go down on the staff lines). This sequence simply continues below and above the normal staff lines. Lines through a note that are above or below the main staff are called **ledger lines**. They help to keep track of how many lines the note is below or above the main staff.

Play the song once using the tab positions indicated in Figure 4.15.

Seven Nation Army

The White Stripes

Music: Jack White, Meg White
Arranged: Enzo Evers

Figure 4.16: Seven Nation Army - The White Stripes

This song (Seven Nation Army) is typically played with power chords (discussed in a later chapter). When you do that, it's more convenient to play the (root) notes mainly on the 5th and 6th string. Figure 4.17 shows alternative tab positions which are more convenient when playing power chords. You can give it a try.

Figure 4.17: Seven Nation Army - The White Stripes (alternative tabs)

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 4.18: Notes used for the song "Californication"

Note the fingering in Figure 4.19. In this piece, keep your fingers on the frets for the duration of the measure after playing them to let them ring through.

Californication (intro)

Red Hot Chili Peppers

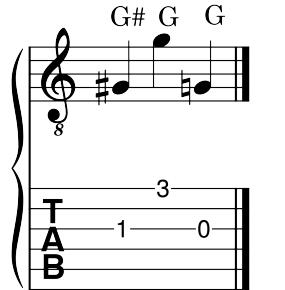
Music: Red Hot Chili Peppers
Arranged: Enzo Evers

Figure 4.19: Californication - Red Hot Chili Peppers

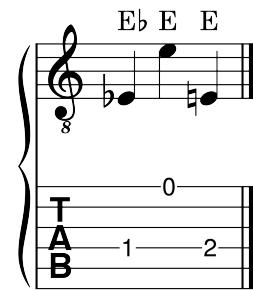
4.5 Sharps and flats

Earlier 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.

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 staff). See for example Figure 4.20a. 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 $G\sharp$ note on the third string 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 4.20b).



(a) Usage of sharps and naturals



(b) Usage of flats and naturals

Figure 4.20: 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 of the key used for the song are shown at the beginning of the piece and apply to all pitches of the notes (unless natural symbols are used). This is called a **key signature**. A standard set of key signatures will be described in a later section about the circle of fifths (section 5.9).

See for example Figure 4.21 and Figure 4.22.

Figure 4.21: Example of adding a key signature with sharps

Figure 4.22: Example of adding a key signature with flats

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

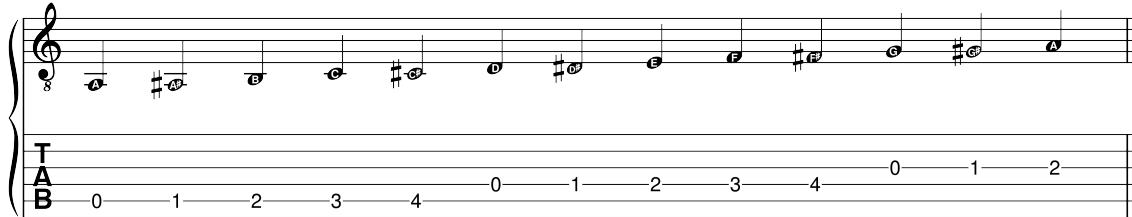


Figure 4.23: An octave from A to A on the multiple strings using sharps

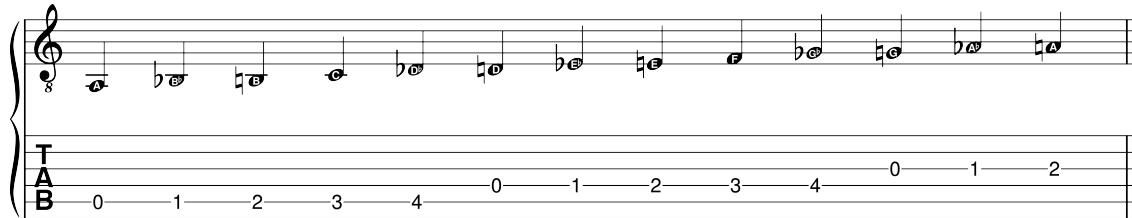


Figure 4.24: An octave from A to A on the multiple strings using flats and naturals

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 a half step.

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 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 is the same as an F♭? An E indeed.

Note that C♯ and D♭ are on in same position in Table 4.1. When two (or more) different names for the same note can be used, these names are called **enharmonic**.

Previously we have already played Happy Birthday without any sharps or flats. But the music can be **transposed** to a different key. In this case to the key of G major. See Figure 4.25.

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, and a 3/4 time signature. It contains eight measures of the 'Happy birthday' melody. The bottom staff starts at measure 6, also with a treble clef, one sharp, and 3/4 time, continuing the melody.

Figure 4.25: Happy birthday with sharps

In Figure 4.26 there are two song-wide sharps. The F and the C. This is the key of D major. But since the chorus starts on the B minor chord, you could also argue that it is in the key of B minor which has the same key signature. But this will all be discussed in a later section.

C'est La Vie (intro + chorus melody)

Chef'Special

Music: Chef'Special
Arranged: Enzo Evers

The musical score for 'C'est La Vie' is presented in three staves. Above each staff are six chord diagrams: Em, A, D, G, C[#]dim, and F[#]. The first staff covers measures 1-5, the second staff covers measures 6-10, and the third staff continues from measure 11. The music consists of eighth-note patterns and rests, with measure numbers 1, 6, and 10 indicated.

Figure 4.26: 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 added. You can fill this tablature 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 4.27). Previously it was already explained how the notes below the staff lines can be determined. The same holds for notes above the staff. You simply go alphabetically up the staff and ledger lines.

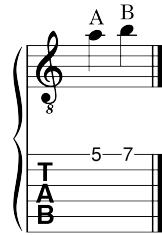


Figure 4.27: The high A and B notes

The other new symbol is the repeat symbol as seen in Figure 4.28. 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 4.28: 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

Guitar 1

Guitar 2

8

Guit.

Guit. 2

15

Guit.

Guit. 2

22

Guit.

Guit. 2

28

Guit.

Guit. 2

As promised, the whole Tetris tune would be played when we learned about sharps. So here it is (Figure 4.29).

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 4.29: 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 4.30).

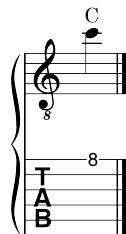


Figure 4.30: The high C note

This song has a song-wide flat B. This corresponds to the D minor key. You see that the song both starts and ends on a D note. The different melody parts/walks in the songs also frequently start and/or stop on a D note. This makes D like a 'home' note.

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 is done to make for easier/quicker playing. In terms of learning, this forces you to learn where identical pitched notes can be played on the fretboard.

The benefit of these positions are 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 to 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 at measure 8. The second staff begins at measure 16. The third staff begins at measure 24. The fourth staff begins at measure 32. The fifth staff begins at measure 41. The sixth staff begins at measure 51. The seventh staff begins at measure 61. The eighth staff begins at measure 70. The ninth staff begins at measure 80. The music is in common time (indicated by '4'). Key signatures include one sharp (G major) and no sharps or flats (C major). Fingerings are indicated above the notes, such as '1', '2', '3', '4', and '2(3)'. Measure numbers are provided for each staff.

TODO: Songs that show triplets, gallops, legato/hammer-on-pull-off, natural and artificial harmonics.

5 The main scales and chords

5.1 Why learn scales

- Chords are build on scales
- Chord progressions are based on scales
- Improvising
- 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 a framework that allows you to make interesting and good sounding combination of notes.

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 foundation and framework to work with. A set of notes that sound good together in a certain context. 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.

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 5.17 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 which are more or less correct.

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 (or correct wrong tabs/chords that you find on the internet), making chords sound more interesting by playing them in different positions, 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 diatonic major (happy/bright sound) and diatonic 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 (a half step) again (Table 5.1). Going one position 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 single move to the left or right is a half step.

A list of intervals and their names is shown in Table 5.2. These are used when describing the scales and when building chords.

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	Augmented 5th / Minor 6th	5♯ / 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

Play Figure 5.1 to hear how these intervals sound.

Figure 5.1: 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, separated by five whole steps and two half steps, in the scale where each letter only occurs once. 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. One possible way to play this on the guitar is shown in Figure 5.2. Here a color groups notes in a single octave together.

	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

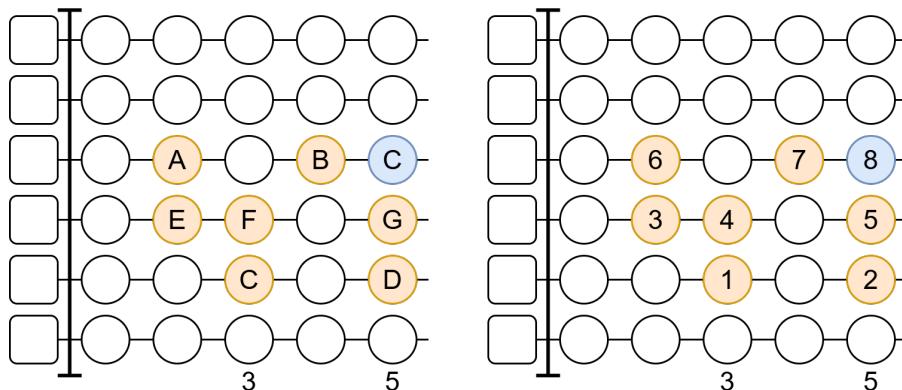


Figure 5.2: C major scale described with note names and with intervals

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 (section 5.9).
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". To give a little hint, there is a mnemonic that describes the order of sharps to add: **Father Charles Goes Down And Ends Battle**. But more about that in section 5.9.

	W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8	
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 5.5: Major scales of all natural notes

Example

In Figure 5.4 different shapes are shown on how the (F \sharp) 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 5.4c 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 \sharp 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 5.4 indicate different octaves. 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 5.4c. 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 \sharp major scale has the notes shown in Table 5.6. All these sharps may look overwhelming. But just try to follow the scale formula starting from F \sharp . You will see that you come up with the same notes.

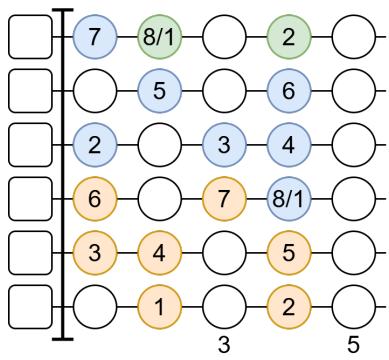
	W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8	
F \sharp	G \sharp	A \sharp	B	C \sharp	D \sharp	E \sharp	F \sharp	

Table 5.6: F \sharp major scale

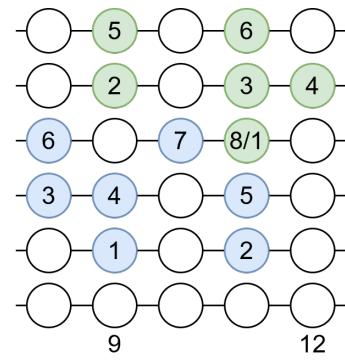
Table 5.6 demonstrates an important point mentioned earlier. **A scale only has unique letters.** Note how the 7th scale degree is an E \sharp instead of an F. Generally we wouldn't write E \sharp . But because the F \sharp major scale already uses the letter F for F \sharp , we can't use F for just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

Figure 5.3 shows the notes that correspond to Figure 5.4d.

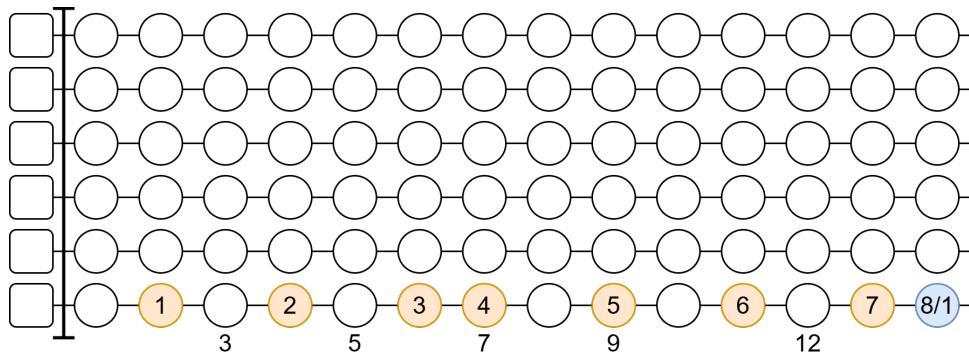
Figure 5.3: Multiple octaves of the F \sharp major scale



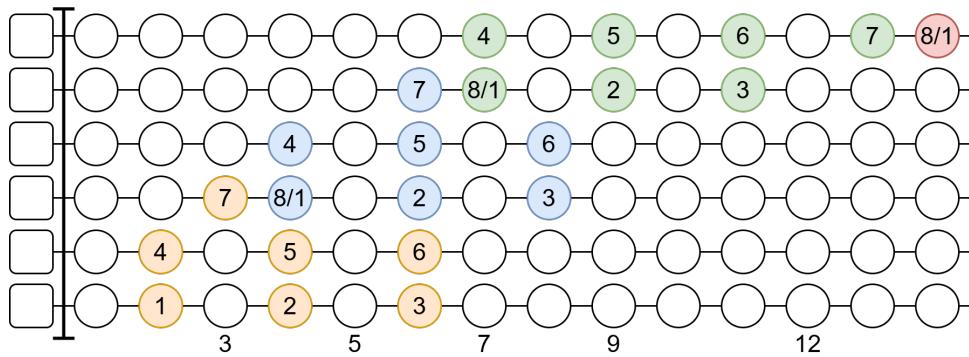
(a) Major scale on the fretboard (standard)



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



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



(d) Major scale octaves over the whole fretboard

Figure 5.4: F \sharp major scale on the fretboard

The song "Tattoo" from "Loreen" uses notes from the F♯ major scale. The main melody that you hear in the background is shown in Figure 5.5. Also note that the chords are all in the scale of F♯ major.

Tattoo

Main backing melody

Music: Loreen
Arranged: Enzo Evers

Figure 5.5: Tattoo - Loreen main backing melody

If you now compare the notes on the fretboard that are used, shown in Figure 5.6 below, and the multi-octave major scale on the fretboard of F♯ shown in Figure 5.4d, 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 two octaves). Note how all numbers 1 till 8 are used.

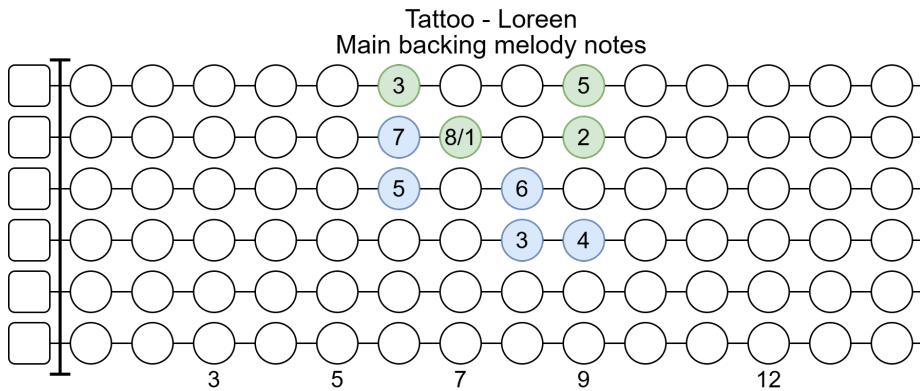


Figure 5.6: Notes used in the main backing melody of "Tattoo - Loreen"

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 is in the **key of C-major**. The chords shapes are shown in Figure 5.7. 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).

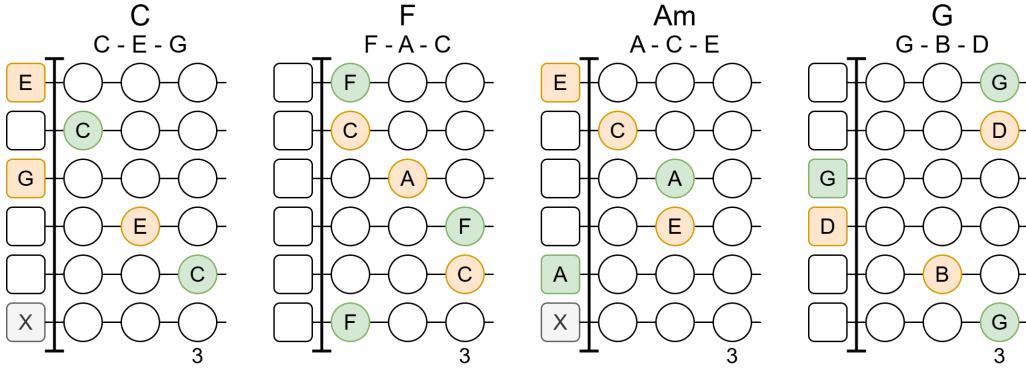
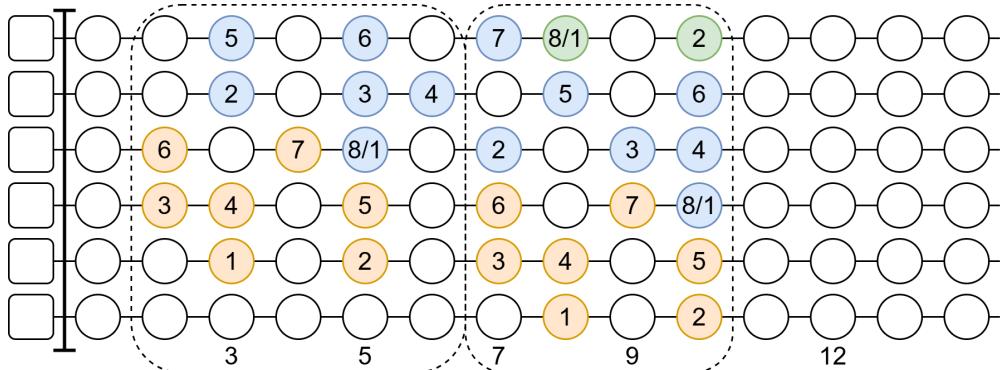
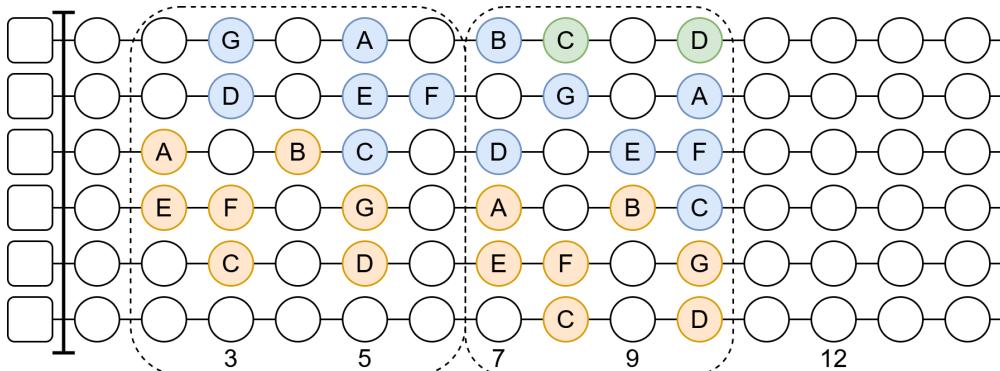


Figure 5.7: C major chord progression

Figure 5.8a 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 5.4a and Figure 5.4b but in a different key. Also note that the colors all show notes in the same octave. 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 5.8: 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	3b	4	5	6b	7b	8

Table 5.7: Minor scale intervals

To create, for example, the C minor scale we will start on the C and then simply follow the formula. One possible way to play it is shown in Figure 5.9.

	W	H	W	W	H	W	W
1	2	3b	4	5	6b	7b	8
C	D	Eb	F	G	Ab	Bb	C

Table 5.8: C minor scale

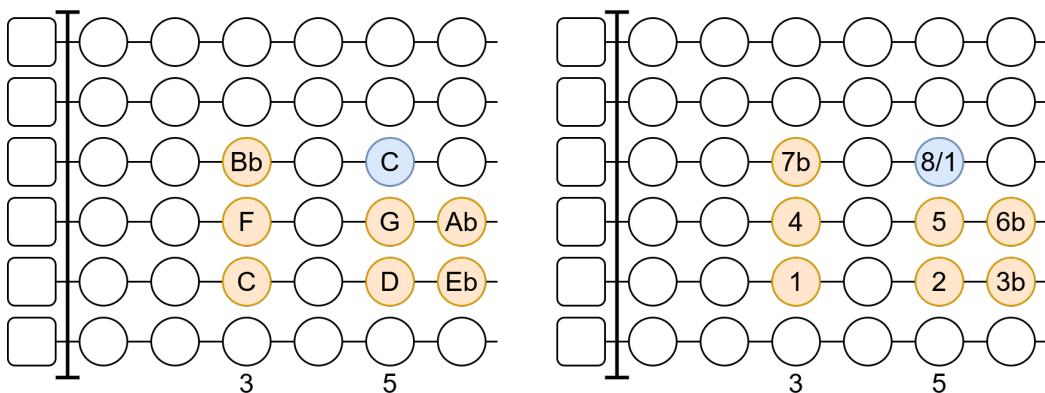


Figure 5.9: C minor scale described with note names and with intervals

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 \flat and not an A \sharp .
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. Note that for the major scale this was the fifth note. Also this all has to do with the "circle of fifths" which is described in section 5.9.
3. Each scale below another in this list has one more \flat 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". To give a little hint, there is a mnemonic that describes the order of flats to add: **Battle Ends And Down Goes Charles' Father**. This is the reverse of the mnemonic for the sharps. But more about that in section 5.9.

	W	H	W	W	H	W	W	W
1	2	3 \flat	4	5	6 \flat	7 \flat	8	
B	C \sharp	D	E	F \sharp	G	A	B	
E	F \sharp	G	A	B	C	D	E	
A	B	C	D	E	F	G	A	
D	E	F	G	A	B \flat	C	D	
G	A	B \flat	C	D	E \flat	F	G	
C	D	E \flat	F	G	A \flat	B \flat	C	
F	G	A \flat	B \flat	C	D \flat	E \flat	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 5.11). 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 \sharp 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 5.11a 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 5.11c. 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.

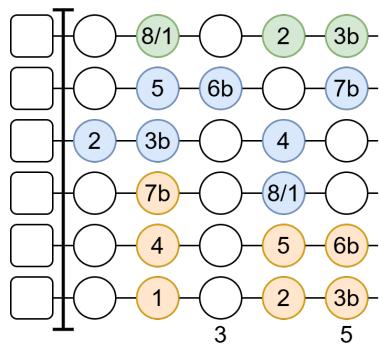
The F \sharp minor scale has the following notes:

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

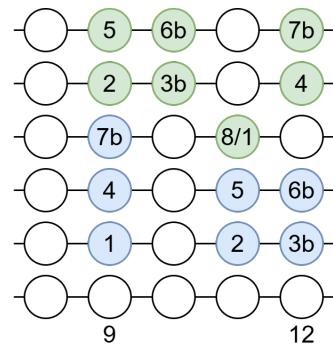
Table 5.10: F \sharp minor scale

Figure 5.10 shows the notes that correspond to Figure 5.11d.

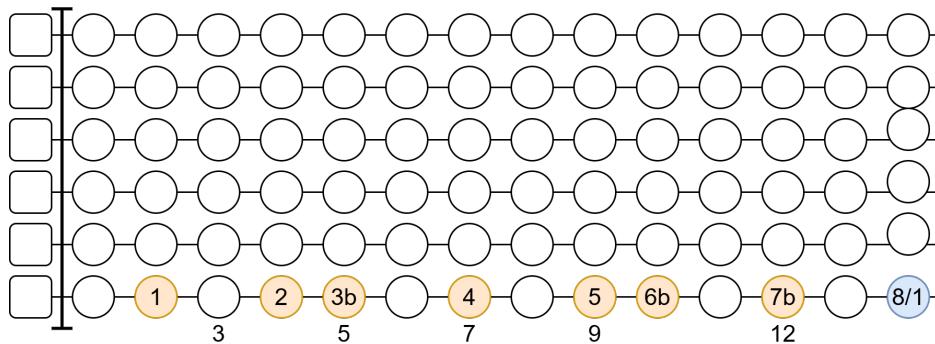
Figure 5.10: Multiple octaves of the F \sharp minor scale



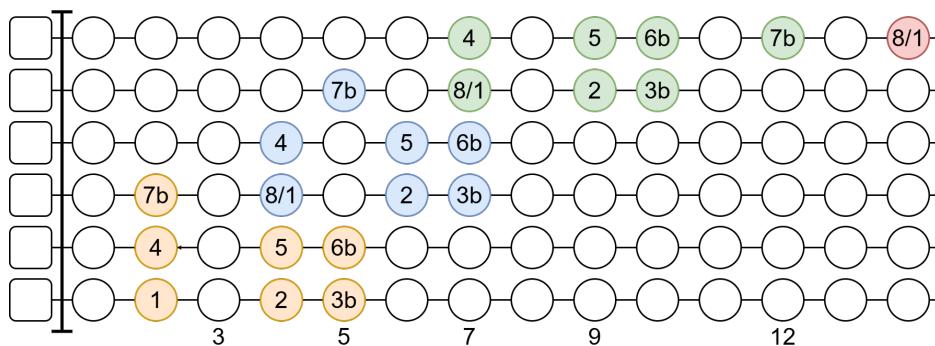
(a) Minor scale on the fretboard (standard)



(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 5.11: F♯ minor scale on the fretboard

The song "The Final Countdown" from "Europe" is in F♯ minor. The intro is shown in Figure 5.12.

The Final Countdown

Intro

Music: Europe
Arranged: Enzo Evers

Figure 5.12: The Final Countdown - Europe intro

Looking at the notes used (see Figure 5.13), you see that it nicely overlaps with the F♯ minor scale shown in Figure 5.11a. Just as in the previous fretboard diagrams, the numbers in the circles indicate the degree in the, in this case, minor scale.

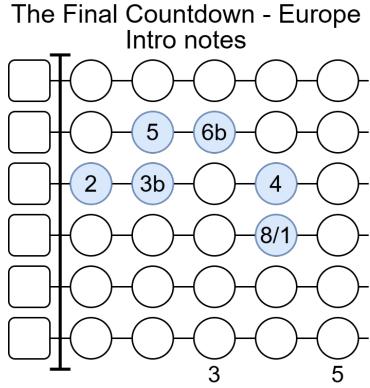


Figure 5.13: Notes used in the intro of "The Final Countdown - Europe"

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).

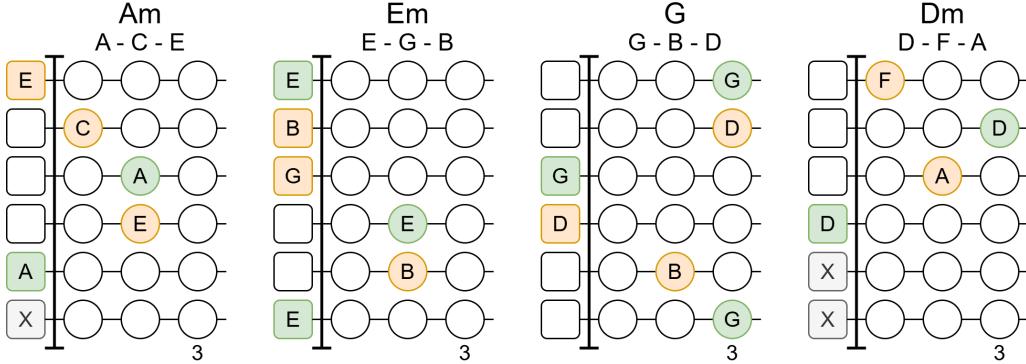
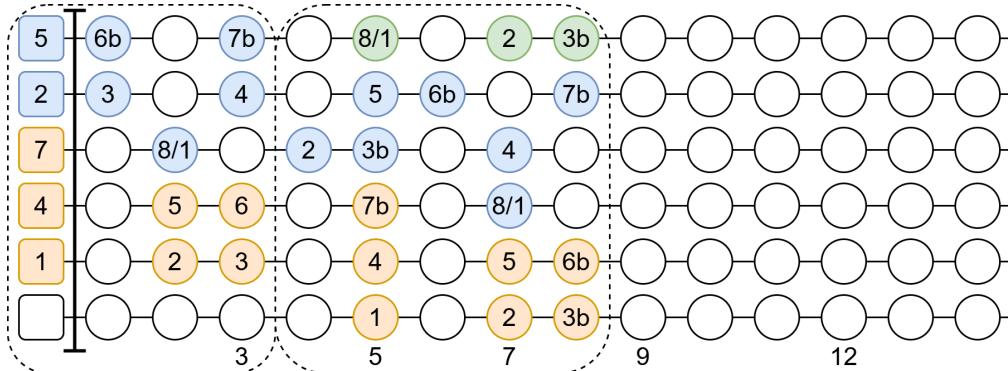
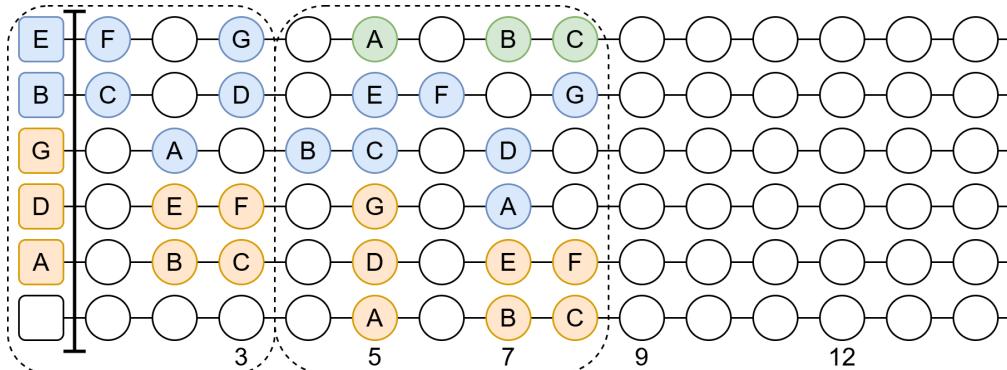


Figure 5.14: A minor chord progression

Figure 5.15a 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 5.11a and Figure 5.11b 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 5.15: 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 1st, 3rd, and 5th scale indexes (also called scale degrees) are used. The green notes are the root notes. These determine the main name of the chord. The orange ones are the rest of the notes in the chord.

	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	3 \flat	4	5	6 \flat	7 \flat	8

Table 5.12: Building up a minor chord

Table 5.13 and Table 5.14 show the construction of other chords. 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 in the chord charts in Figure 5.17.

Note how the 1st and 5th note in both major and minor chords are the same. Only the 3rd note is always a half step lower in the minor chord compared to the major chord.

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

Table 5.13: Major chords from the major scale

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

Table 5.14: Minor chords from the minor scale

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 5.16a). When a chord is played without open strings, it is called a "Closed chord" or "barre chord" (e.g. Figure 5.16b). Note that a barre chord is a type of closed chord.



(a) Open C chord [6]



(b) Barre F chord [7]

Figure 5.16

The nice thing about closed/barre chords is that you can move them up and down the neck. At that point the closed/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 5.17 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 that make up the chord (see Table 5.13 and Table 5.14).

The green dots indicate the root note. This note determines the main name of 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.

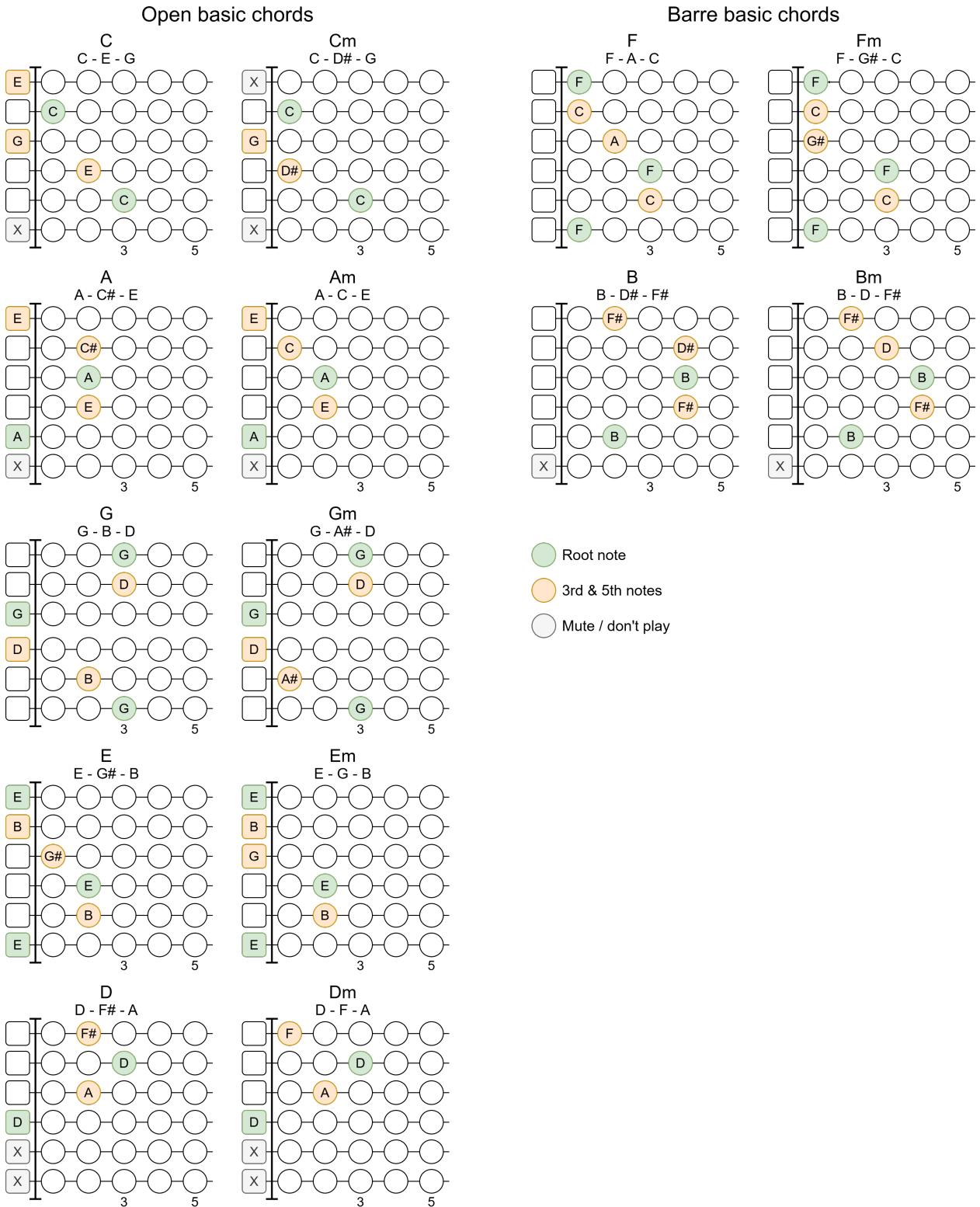


Figure 5.17: Major and minor chords

Lets play some chords. The theme song of the Adventure Time series is a good start (Figure 5.18). 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.

The small symbol above the staff that looks like a square with an open bottom means a downstroke. This means that you play the chord by moving your hand/pick downwards through the string(s). The symbol above the staff that looks like a "V" is an upstroke. This means that you move your hand/pick upwards through the string(s).

Adventure Time Theme

Music: Pendleton Ward
Arranged: Enzo Evers

The tablature shows three staves of music. The first staff starts at measure 1 with a tempo of 180 BPM. It features a G chord (downstroke), a D chord (downstroke), a C chord (downstroke), and another D chord (downstroke). The lyrics are: "come on grab your friends. We're going to very distant lands." The second staff begins at measure 5 with a G chord (downstroke), followed by a D chord (downstroke), a C chord (downstroke), and a D chord (downstroke). The lyrics are: "With Jake the dog, and Finn the human. The fun will never end, it's adventure". The third staff starts at measure 9 with a G chord (downstroke). The lyrics "time!" are written below the staff.

Figure 5.18: 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 is "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 closed barre shapes. These are shown in Figure 5.17 as the A_b, F_m, D_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 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 these 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, F_m, D_b, and E_b. Or if shown with sharps: G_#, F_m, 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 5.19. Note the numbers below the shapes. These are the fret numbers.

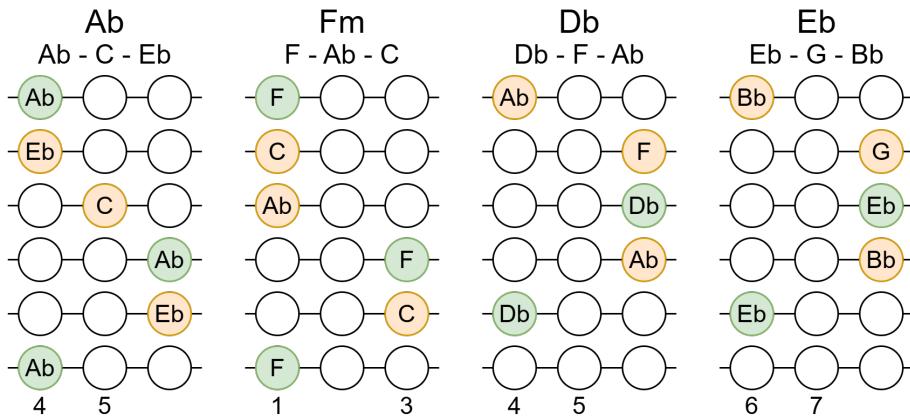


Figure 5.19: Barre chords used in "Perfect - Ed Sheeran"

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. You will learn more about this later on.

Perfect - Ed Sheeran

A_b F_m
 1. I found a love for me
 D_b E_b
 Oh, darling, just dive right in and follow my lead
 A_b F_m
 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 is a set of chords played in a certain order, most often played repeatedly.

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, this chord progression isn't universal. Lets say that the C - G progression is in the key of C major, which chords should you play if you want to change this progression to the key of A major? You can figure it out by a lot of counting, but there is an easier way. Chord progressions are often referred to with roman numerals to make them universal.

Using roman numerals, the chord progression C - G would become I - V (1 - 5). The degrees in the (major) scale can be shown using the roman numerals as well. See Table 5.15. The chord on the 7th index (vii°) 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 degree 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
I	ii	iii	IV	V	vi	vii $^\circ$

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
i	ii $^\circ$	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. Take a look at Table 5.17 and Table 5.18 (you've seen these in an earlier section).

W	W	H	W	W	W	H
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

Table 5.18: Building up a minor chord

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

This section will often refer to intervals. Have a look at Table 5.2 again if you want a refresher.

For the Major scale:

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

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

For the Minor scale:

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

Also, there are 4 semitones between the 3rd and 5th degree. 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 the 3rd degree of the major scale is a major or minor chord. The colored indexes in Table 5.19 are found by starting at the 3rd degree, 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 the 5th degree of the major scale is a major or minor chord. The colored indexes in Table 5.20 are found by starting at the 5th degree, 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/dissonant. That is why a diminished chord also gives this uneasy feeling / tension. Note that the pentatonic scale can help with this. More about this later.

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

	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 a 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 key of G major. The G major scale is shown in Table 5.22. The highlighted chords are the ones used in "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 roman numerals that we've identified, 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).

W	W	H	W	W	W	H	
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 a previous section) 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. 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. It is quite common that the first and/or last chords of a song are the same as the key of the song.

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

If 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 (dissonance) of the tritone interval. But why?

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 degree. This removes the tritone interval from the scale. But it also removes all the semitone intervals from the scale.



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

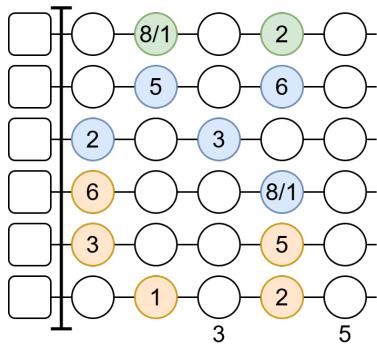
Table 5.25: Major pentatonic scale intervals

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

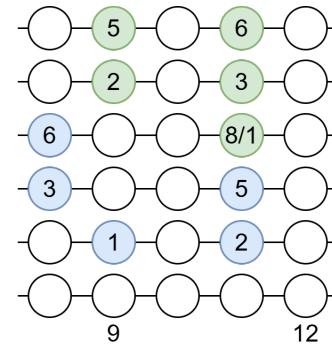
W+	W	W	W+	W
1	3b	4	5	7b

Table 5.26: Minor pentatonic scale intervals

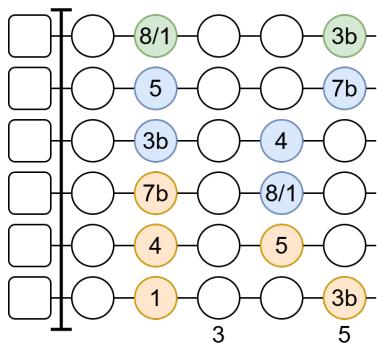
That's all nice and well, but how to use this? Figure 5.20 shows the shape of both the major and minor pentatonic scales. These are basically the same shapes as the diatonic shapes that you learned earlier, but with some notes removed (4 and 7 for major, 2 and 6b for minor).



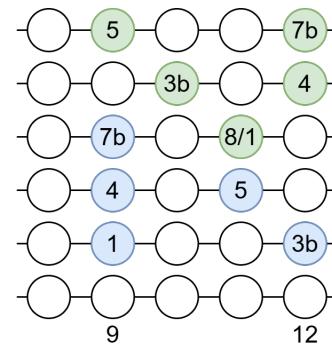
(a) Major pentatonic shape from the 6th string



(b) Major pentatonic shape from the 5th string



(c) Minor pentatonic shape from the 6th string



(d) Minor pentatonic shape from the 5th string

Figure 5.20

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" mentioned and that this has to do with the fact that there is always one more accidental added (# or ♭).

	W	W	H	W	W	W	H
I	ii	iii	IV	V	vi	vii°	8
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 5.27: Major scales of natural notes

	W	H	W	W	H	W	W
i	ii°	III	iv	v	VI	VII	
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 5.28: Minor scales of natural notes

Take a look at the circle in Figure 5.21.

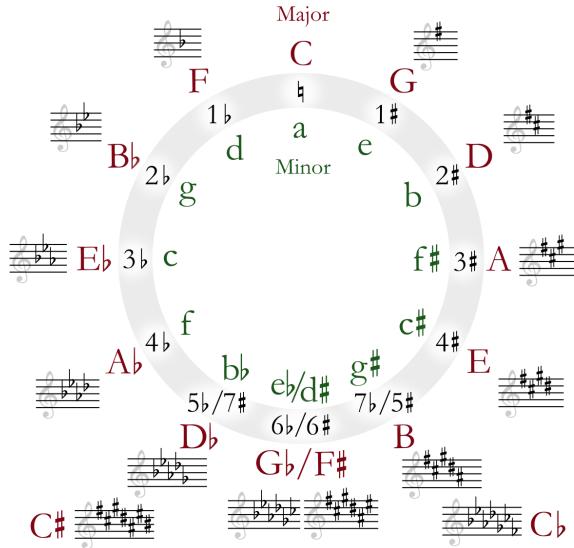


Figure 5.21: Circle of fifths [9]

Things to note:

- **Going clockwise:** Each note to 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 to 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 # is added.
- **Going counterclockwise:** With each new 'step' a ♭ is added.

The # and ♭ that are added both follow the same mnemonic but one of them is reversed:

Clockwise (#)		Father	Charles	Goes	Down	And	Ends	Battle
Counterclockwise (♭)		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 seen that there are major, minor, and diminished chords in a scale and how to identify these. These chords where identified with roman numerals.

Chords in the major scale

Take a look at Figure 5.22a. 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, and that the note on the left is the 4th degree of a scale.

The 6th degree in the major scale is the relative minor. This is the note below the I of the major circle. 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

Take a look at Figure 5.22b. We start at a note on the minor circle.

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. This is the note above the i of the minor circle. Going up a perfect 5th from the 3rd degree in the minor scale lands on the 7th degree. Going down a perfect 5th from the 3rd degree 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 circle.

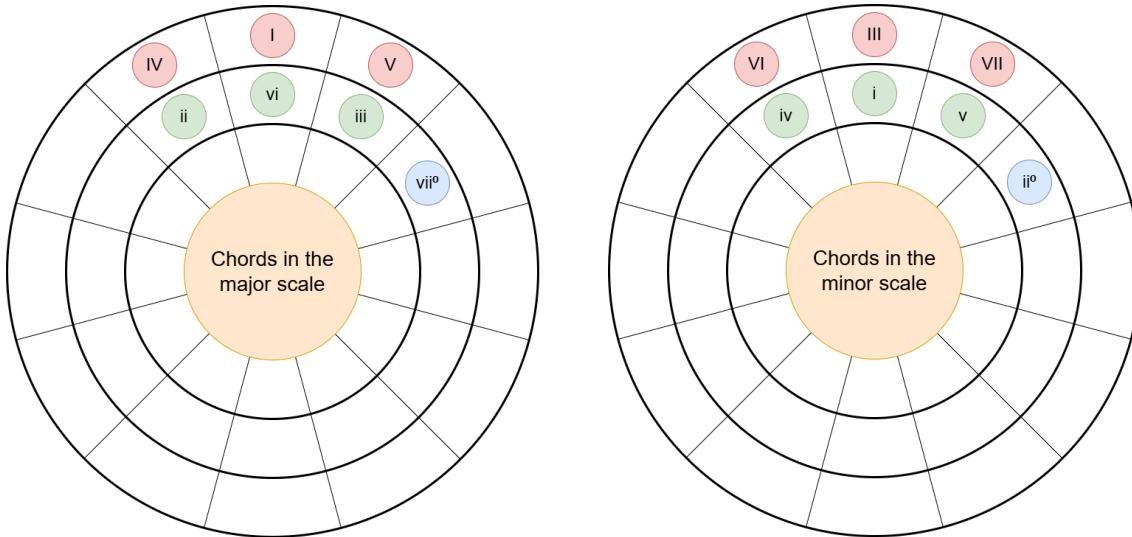


Figure 5.22: Rotatable chord degrees in the circle of fifths

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, and can therefore be considered to be in the key of A major. However, it could also be in the key of F \sharp minor (the relative minor key of A major). They use the same notes. But the context of the song determines if it is A major or F \sharp minor.

Seeing which keys to 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 \flat	F	B \flat	E \flat	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 \flat F B \flat E \flat F
Outro-chorus: Woooooo, we're halfway there, Woah oh, livin' on a prayer.

Gm E \flat F
Take my hand and we'll make it I swear
B \flat E \flat F
Woah oh, livin' on a prayer.

Looking at Figure 5.21, 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 5.23 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.

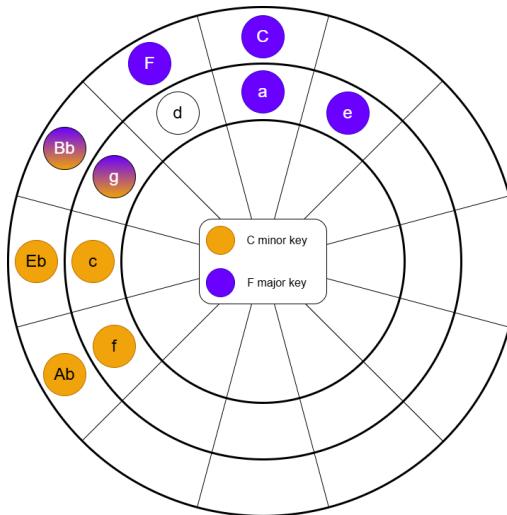


Figure 5.23: Showing the overlap of the chords in C minor (orange) and F major (purple)



Some of these chord names are not discussed yet. This will be described in the next chapter. However, to already play along, see the chord shapes on the next page (Figure 5.24).

We Are The Champions - Queen

$E\flat$ $B\flat$ Cm

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

F^7 $B\flat$

But I've come through

$A\flat/B\flat$ $B\flat m^{7(b5)}$ $B\flat 7$ $C7$

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

F Am Dm $B\flat C7$

Chorus: We are the champions, my friends

F Am $B\flat$ $F\sharp dim7$

And we'll keep on fighting till the end

Gm $C7/G$ $B\flat m$ $E dim7$

We are the champions, we are the champions

F Gm $A\flat$ $B\flat$ $C7 sus4$

No time for losers 'cause we are the champions

Fm $Gm7$

Of the world

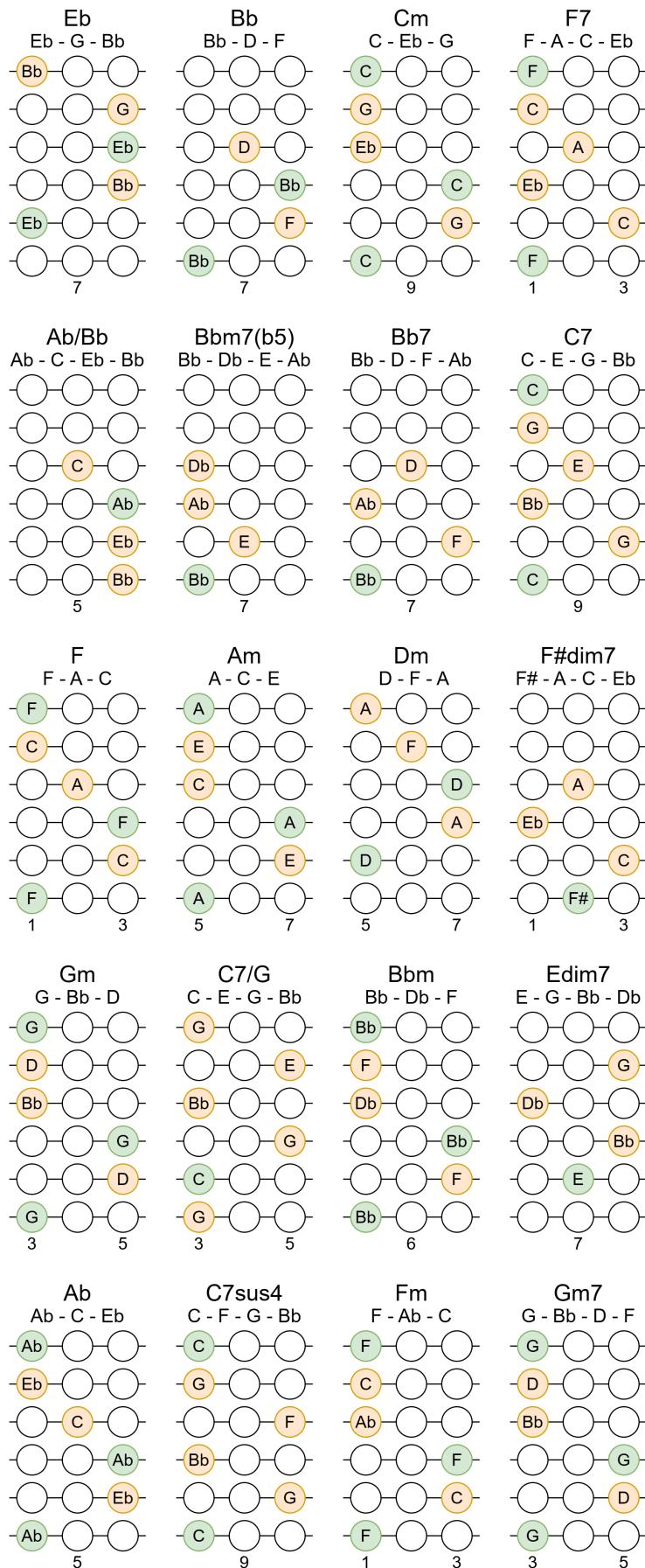


Figure 5.24: Some of the chords in "We Are The Champions" - Queen

6 Chord alterations

6.1 Power/fifth chords

The power chord, or more formally called a fifth chord, is a chord where you only play the root and the perfect 5th.

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 the C chord as an example):

- C5
- C(no 3)

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

6.1.2 Example

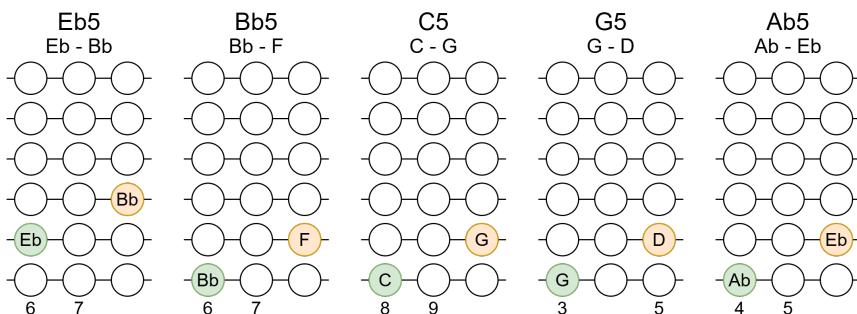


Figure 6.1: Chords used in verse 1 of "Basket Case - Green Day"

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 & open/closed voicing

So far we have learned that a basic chord consists of the **1st/root**, **3rd**, and **5th** degree of a (major or minor) scale stacked on top of each other.

Lets assume that we play all three notes **within a single octave** (meaning that the 1st, 3rd, and 5th degree pitches are ascending). This means that the voicing of this chord is **closed** due to it being within a single octave.

Figure 6.2 shows the 1st inversion (C/E) and 2nd inversion (C/G). The 1st inversion means to play the 3rd degree (E) as the bass note. The 2nd inversion means to play the 5th degree (G) as the bass note. To keep the chord in a closed voicing (within a single octave), you simply move the current bass note one octave higher so that it now is the highest pitch in the chord.

Figure 6.2: Inversions of the C major chord/triad on guitar

Examples of open voicing (playing notes over 2 or more octaves) can be seen in Figure 6.3.

Figure 6.3: Examples of open voicings for the C major chord

6.2.1 Examples

In a previous section it was already shown that "We Are The Champions" from "Queen" uses chord inversions.

Another example is from Ed Sheeran's "Thinking out loud". Here the D 1st inversion (D/F#) is played. The chord shapes are shown in Figure 6.4.

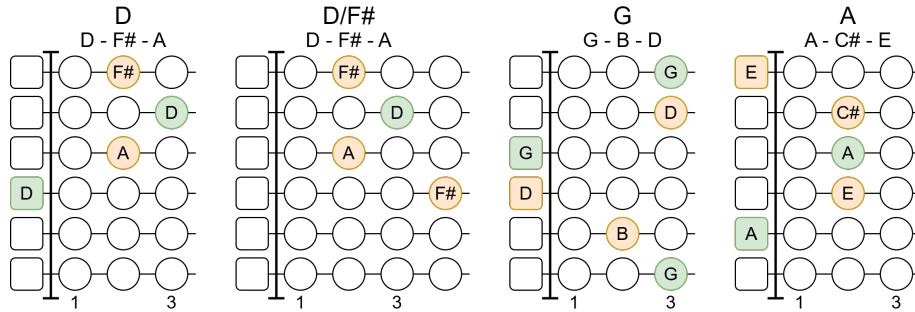


Figure 6.4: Chords used in verse 1 of "Thinking Out Loud - Ed Sheeran"

Thinking out loud - Ed Sheeran (verse 1)

D D/F# G A D
1. When your legs don't work like they used to before
D/F# G A D
And I can't sweep you off of your feet
D/F# G A D
Will your mouth still remember the taste of my love
D/F# G A
Will your eyes still smile from your cheeks

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 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 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 6.5).

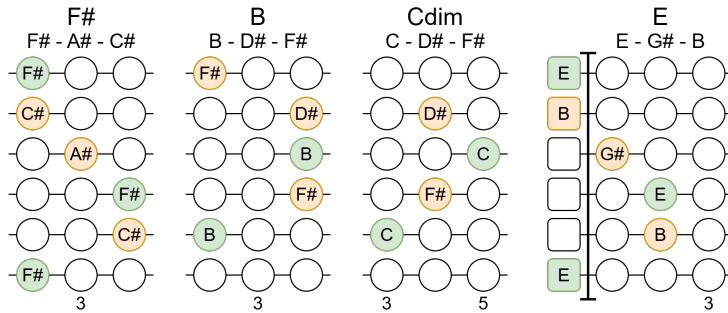


Figure 6.5: Chords used in the chorus of "All Stars" by "Smash Mouth"

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 6.6).

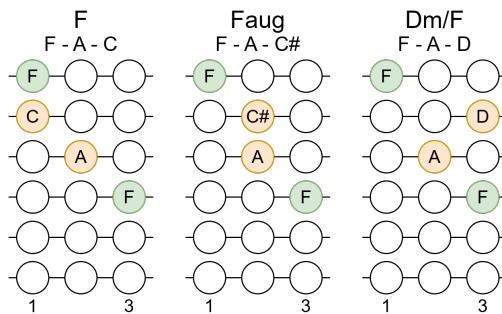


Figure 6.6: Some of the chords used in "Impossible Year - Panic! At The Disco"

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

First a reminder which chords in the major and minor scales are major, minor, and diminished.

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

Table 6.3: Chords in the major scale

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

Table 6.4: Chords in the minor scale

Now for each chord, we add the note that is two scale degrees up from the 5th degree to the chord/triad.

6.4.1 Major and minor 7th chords

An example for the root chord of the scale is shown in Table 6.5 and Table 6.6.

In Table 6.5 (the major chord) a major 3rd (4 semitones) is stacked on the 5th degree. This results in a major 7 interval from the root note. This type of chord (a major chord with a major 7) is notated as a **M7** or **maj7** chord. For example, **Cm7** or **Cmaj7**.

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

Table 6.5: Building up a major 7th chord

In Table 6.6 (the minor chord) a minor 3rd (3 semitones) is stacked on the 5th degree. This results in a minor 7 interval from the root note. This type of chord (a minor chord with a minor 7) is notated as a **m7** or **min7** chord. For example, **Cm7** or **Cmin7**.

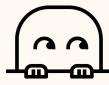
W	H	W	W	H	W	W
1	2	3b	4	5	6b	7b
						8

Table 6.6: Building up a minor 7th chord

6.4.2 Dominant 7th chord

But what about major chord/triad with a minor 7 (stacking a minor 3rd on the 5th)? This is called a **dominant 7** chord. This is denoted with only a **7**. For example, **C7**.

There is some subtlety needed here. A dominant 7th chord is a major triad with a minor 7th. But a chord with dominant function is the 5th chord in the scale. In case of the major scale, the 5th chord is also a dominant 7th chord. But in the minor scale, the 7th chord is a dominant 7th and the 5th chord is a minor chord (with dominant function). A chord with dominant function leads towards the tonic (the root of the scale). Therefore, you will often see that in a minor scale the 5th chord is replaced by a dominant 7th chord (instead of a minor chord).



You could then also think about a minor chord/triad with a major 7. This doesn't naturally occur in the diatonic scale. But it does naturally occur when creating a 7th chord from the root note in the **harmonic minor scale**. This scale is just the diatonic/natural minor scale that you have learned, but raising the minor 7th a half step to get a major 7th.

6.4.3 Half-diminished & diminished 7th chords

There is also the diminished chord/triad. This has the root, a minor 3rd and a minor 5th. In the diatonic scale you will only find a diminished triad with minor 7th at the 7th scale degree and is called a **half-diminished** chord. This is either notated with a **ø7** (note the slash) or with **m7b5**. For example, **Cø7** or **Cm7b5**.

If that is called a half-diminished chord. What is a full diminished 7th chord? It is a diminished triad with a diminished 7th from the root. A diminished 7 is 1 semitone lower than a minor 7th (the same as a major 6). This is indicated with **ø7** or **dim7**. For example, **Cø7** or **Cdim7**. While not found in the diatonic scale. It can be found as the chord at the 7th scale degree in the harmonic minor scale.

6.4.4 Putting it together

With this knowledge, the different, natural occurring, 7th chords in the diatonic major and minor scales can be indicated in Table 6.7 and Table 6.8. Note that roman numerals are used. Here a **M7** means that a major 7 is added and **ø7** means half-diminished, so a minor 7 is added to a diminished triad. Lastly, **7** means that a minor 7 is added. This last one can be applied to either a major (capital roman numeral) or minor (lower-case roman numeral) chord. When it is applied to a major chord, it is a dominant 7 chord. If it is applied to a minor chord, it is a minor 7 chord.

	W	W	H	W	W	W	H	
1	2	3	4	5	6	7	8	
I M7	ii ⁷	iii ⁷	IV M7	V ⁷	vi ⁷	vii ^{ø7}		

Table 6.7: 7th chords in the major scale

	W	H	W	W	W	H	W	W
1	2	3 ^b	4	5	6 ^b	7 ^b	8	
i ⁷	ii ^{ø7}	III M7	iv ⁷	v ⁷	VI M7	VII ⁷		

Table 6.8: 7th chords in the minor scale

Table 6.9 shows a summary of the different 7th chord intervals.

Chord	Intervals	Symbol
Major 7th	1 - 3 - 5 - 7	maj7, M7
Minor 7th	1 - 3 ^b - 5 - 7 ^b	min7, m7, (just 7 if using a lower-case roman numeral)
Dominant 7th	1 - 3 - 5 - 7 ^b	7
Half-diminished 7th	1 - 3 ^b - 5 ^b - 7 ^b	ø7, m7 ^b 5
Diminished 7th	1 - 3 ^b - 5 ^b - 7 ^b	ø7, dim7

Table 6.9: Intervals for 7th chords

6.4.5 Examples

A song that contains major, minor, and dominant 7th chords is "Valerie" from "Amy Winehouse". The chord diagrams are shown in Figure 6.7. This song is in the key of Eb. Try to see why Bb⁷ is a dominant 7th chord here.

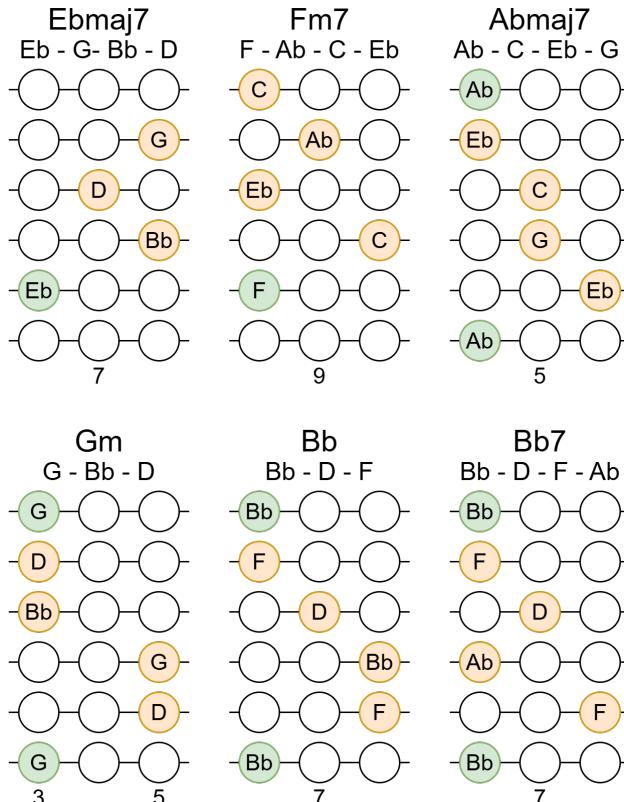


Figure 6.7: Chords used in "Valerie- Amy Winehouse"

Valerie - Amy Winehouse (first verse + chorus)

Eb^{maj7}

Well, sometimes I go out by myself, and I look across the water

Eb^{maj7}

And I think of all the things, what you're doin', and in my head, I paint a picture

Fm⁷

Chorus: Since I've come on home, well, my body's been a mess

Ab^{maj7}

Gm

And I've missed your ginger hair, and the way you like to dress

Ab^{maj7}

Won't you come on over?

Gm

Bb

Stop makin' a fool out of me

Bb⁷

Eb^{maj7}

Why don't you come on over, Valerie?

Fm⁷

Valerie, yeah

Eb^{maj7}

Fm⁷

Valerie, Valerie

A song that has all the 4 different 7th chords that occur in the diatonic scale, is "Fly Me To The Moon" by "Frank Sinatra". The chord diagrams are shown in Figure 6.8.

Note that there are two versions of the Am⁷ chord. The closed/barre version is only used for the first chord of the songs. After that, the open shape is used. The reason for this is the chords that follow and/or precede the Am⁷ chord. The first Am⁷ is followed by a barre version of the Dm⁷ chords. Both are on the position of the 5th fret. Playing the barre versions of these chords have a little bit of a brighter sounds due to the common high A note on the first E string. You could of course play the open version of Am⁷ and then either play the barre or the open version of the Dm⁷ chord. Neither is correct or wrong. It's a matter of what you think sounds the best. For the rest of the verse the open version of the Am⁷ is played. Also here it is because the surrounding chords are closer to the sound of open Am⁷ chord than the barre chord. A second reason is because the chords are played closer to each other, resulting in less hand movement. But feel free to experiment with which version/voicing of the chords you think sound best.

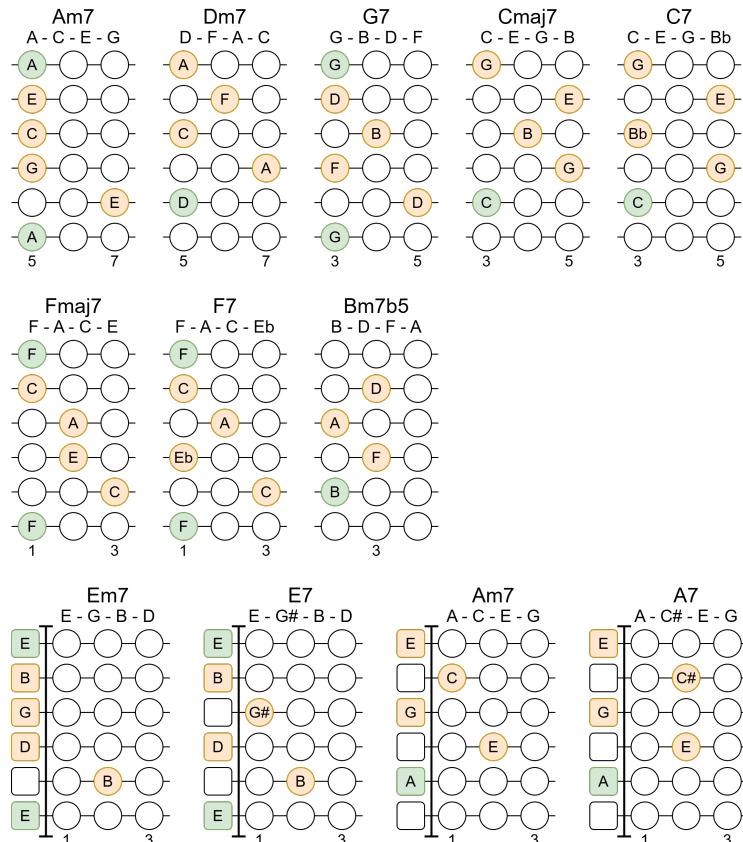


Figure 6.8: Chords used in "Fly Me To The Moon - Frank Sinatra"

Fly Me To The Moon - Frank Sinatra (first verse)

Am⁷ Dm⁷
 Fly me to the moon
 G⁷ C^{maj7} C⁷
 Let me play among the stars
 F^{maj7} Bm^{7b5}
 And let me see what spring is like
 E⁷ Am⁷ A⁷
 On a-Jupiter and Mars
 Dm⁷ G⁷ C^{maj7} F⁷ Em⁷ A⁷
 In other words, hold my hand
 Dm⁷ G⁷ C^{maj7} Bm^{7b5} E⁷
 In other words, baby, kiss me

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.

You have also learned about relative minor and major scales during the circle of fifths. In Table 7.1 you see that by starting on the 6th degree of the major scale (Ionian mode), you get the intervals of the natural minor scale (also called Aeolian mode) while still having the same notes.

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. (which have the same notes) by looking at the **tonal center** (the tone that is most prominent) of the musical context. Note that the intervals from the root note of each mode is different.

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

Ionian (major)	W	W	H	W	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	W	H
	I	II	iii	iv ^o	V	vi	vii	
	1	2	3	4 [#]	5	6	7	
Mixolydian	W	W	H	W	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	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	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 chord of your mode (so the E minor chord for E phrygian), 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 major or minor. This means looking at the 3rd degree 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 want to emphasize the characteristic note 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, 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 could add the characteristic note in the chord.

Ionian (major)				
Lydian (major)	II	iv°	V M7	vii
Mixolydian (major)	I 7	iii°	v	VII
Aeolian (natural minor)				
Dorian (minor)	ii	IV	vi°	VII M7
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.

Playing the mode scales

We have already seen shapes for the major and minor scales. Figure 7.1 shows the shape for all the modes. The numbers represent the interval of the note.

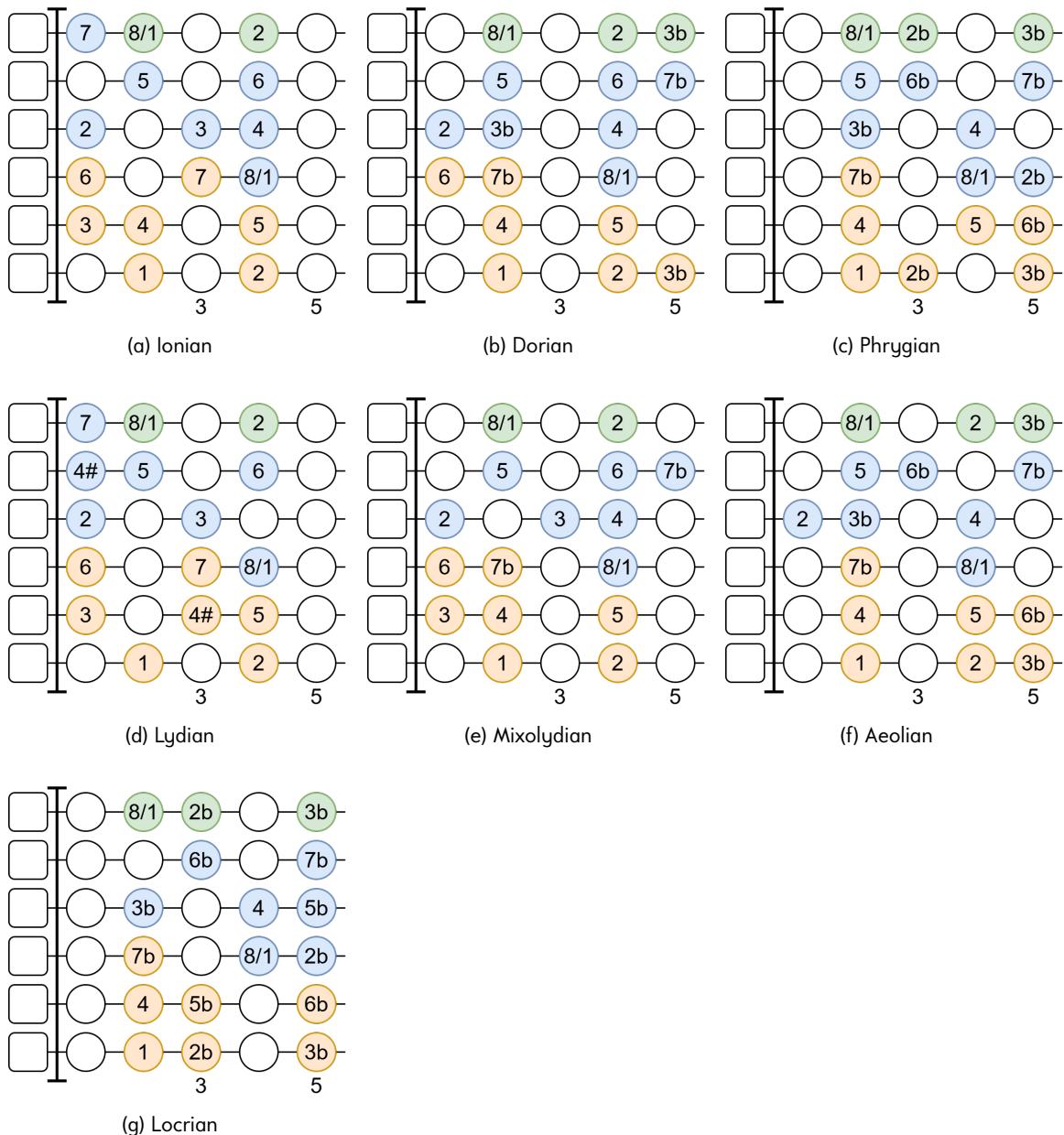


Figure 7.1: F# scale in all different modes

TODO: Give examples of songs in different modes

Using modes-shapes to open up the fretboard

Mode-shape is a tricky word that can be misunderstood. Shapes are just that, shapes. The musical context determines the mode.

Figure 7.2 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 numbers 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 7.2 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 7.2 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 (intervals) would be different.

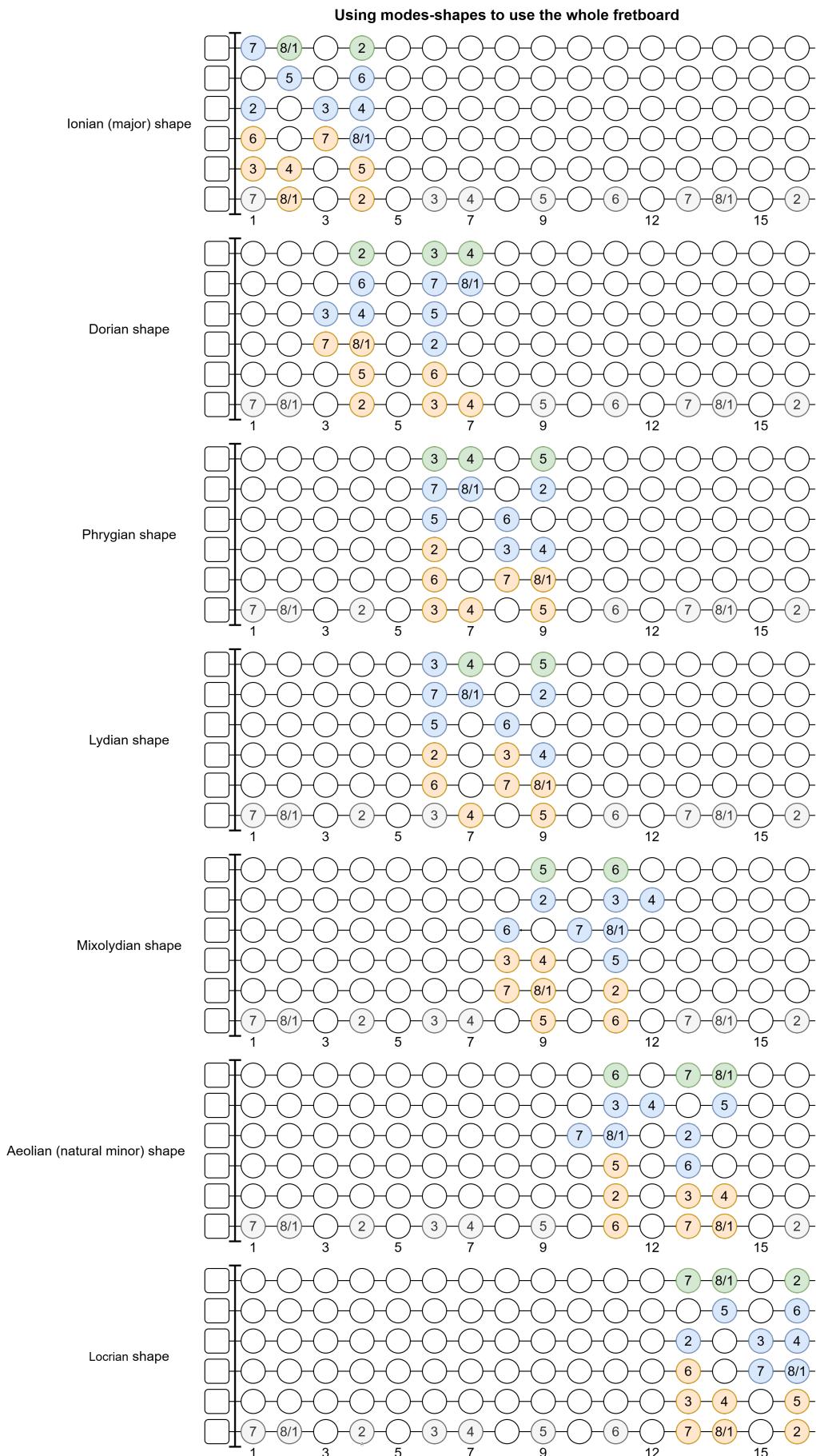


Figure 7.2: Diatonic modes on the guitar

7.1.2 Pentatonic modes

TODO

7.2 CAGED

TODO

8 More scales

TODO: Scales from different music and cultures

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Appendices

A Empty guitar fretboard

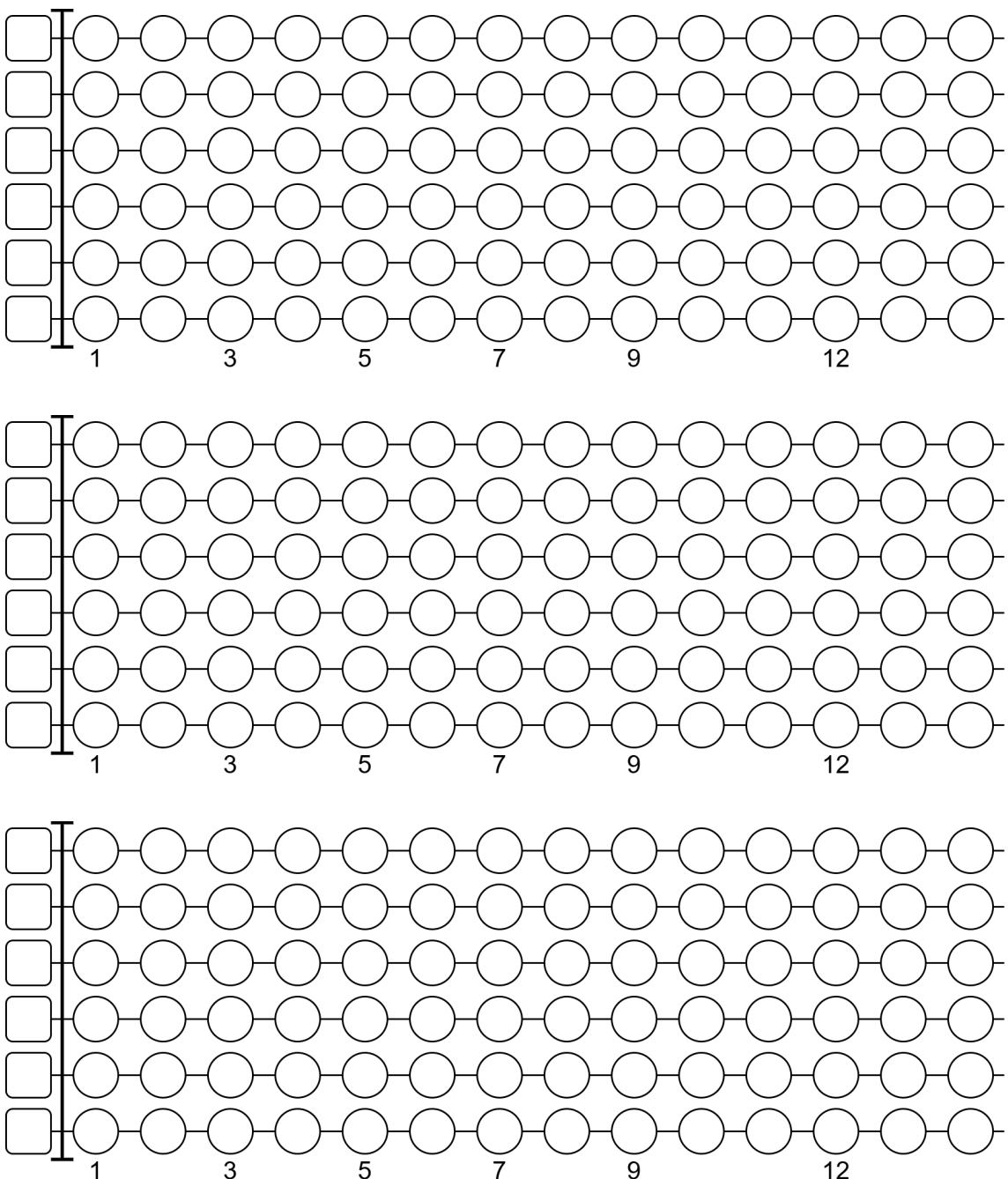


Figure A.1: Empty guitar fretboard

B Finger exercises

B.1 Fretting hand

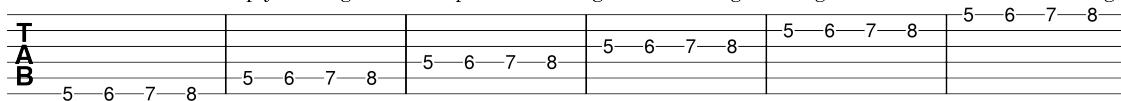
B.1.1 Play songs and scales slow

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 unclear 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.

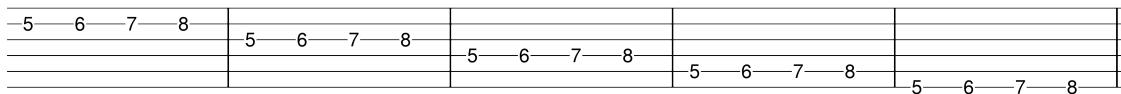


Figure B.1: Spider exercise

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