Music Theory

Scales

Scales

In music, a scale is a set of notes, used to define the tonality or key of a musical piece, create melodies and to form chords.

There are many different types of scales, with different structures and number of notes, each with a distinct sound and characteristics.

In this book we are going to discuss the most commonly used scales: the Chromatic, Diatonic and Pentatonic Scales.

Scales can be qualified by the number of notes they contain.

Chromatic or Dodecatonic (12 notes)
Nonatonic (9 notes)
Octatonic (8 notes)
Heptatonic (7 notes)
Hexatonic (6 notes)
Pentatonic (5 notes)
Tetratonic (4 notes)
Tritonic (3 notes)
Ditonic (2 notes)

Some of those scales are primitive and not used on modern music (for example the Tetratonic, Tritonic and Ditonic scales)

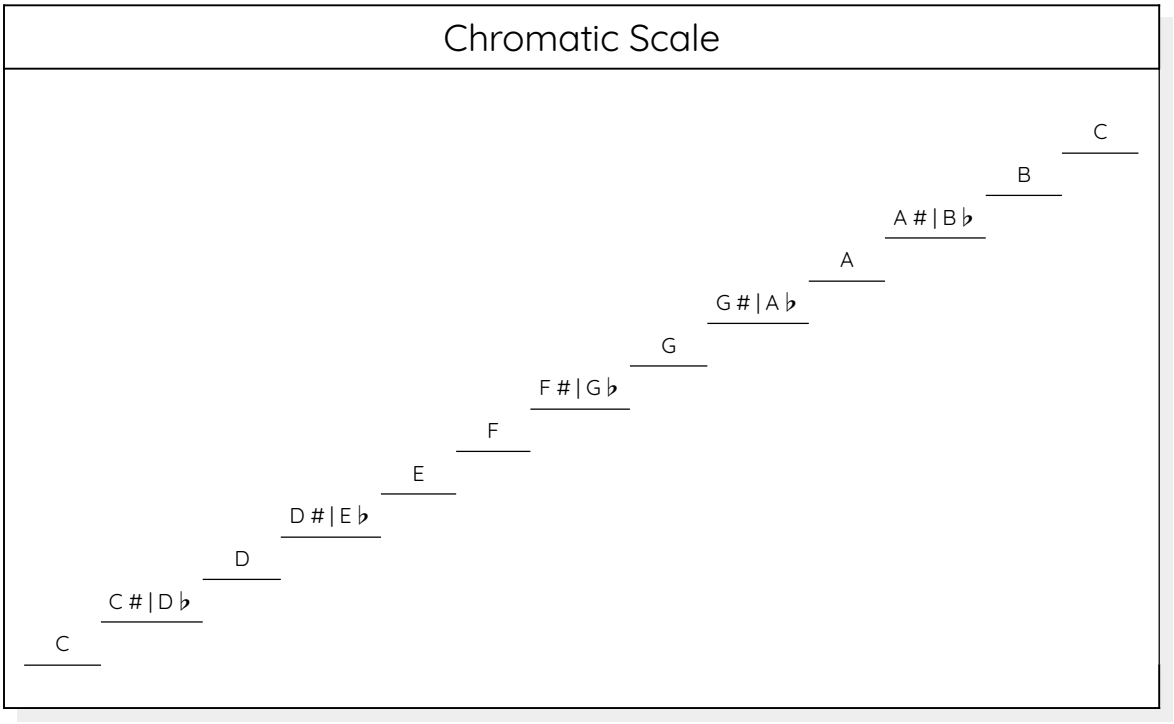
Scales are usually written in it's ascending form, from low to high notes.

The position of a note in a scale is called Degree, and it's counted from the first note of the scale, which is called the first degree.

The most commonly used scale in western music is the Diatonic Scale.

Chromatic Scale

The Chromatic Scale is a scale formed by semitones, containing all the twelve pitches used in western music.
The chromatic scale does not have a tonic note, key signature or any sort tonal centre, which means that there is only one chromatic scale, and for that reason, the chromatic scale cannot be used to set the tonality of a musical piece.



In a musical composition, the chromatic scale is commonly used in small segments called Chromaticism.
A chromatic passage in a composition is usually identified by a Chromatic Semitone, which is a semitone between a note, and the same note altered by an accidental (sharp or flat), for example: **C – C#**
A Diatonic Semitones, is a semitone between two different notes, for example: **C – D ♭**

Diatonic Scale

The Diatonic Scale is a Heptatonic Scale, which means a scale with seven different notes plus an eighth one, the Octave, which is the repetition of the first note.

The structure, or pattern of the intervals (whole tones and semitones) between those notes is called Mode.
The diatonic scale has seven modes, each one with characteristic intervals and chords, giving it a distinct sound.

The seven modern diatonic modes are:

Ionian (Major)
Dorian
Phrygian
Lydian
Mixolydian
Aeolian (Minor)
Locrian

The modes Ionian (Major Mode) and Aeolian (Minor Mode) were the two most commonly used modes since the Common Practice era (roughly between 1650 to 1900).

Further in this chapter we are going to learn, analyze and contrast each one of the seven diatonic modes.

Regardless of the mode, those diatonic scales must be formed using seven different notes, without repeating or skipping any note, for example:
C D E F G A B C (the only note repeated is the eighth note, the Octave).

Major Scale

(Ionian Mode)

The Ionian Mode, also known as Major Scale, is one of the most commonly used scales in western music.

Structure

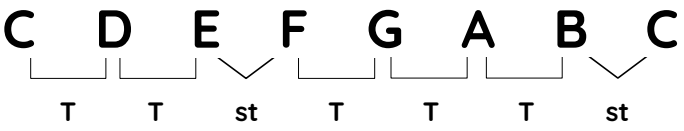
T T st T T T st

T = Whole Tone
st = Semitone

The structure of a scale is what defines the mode. It is the pattern of the intervals between the notes.

Example in **C**

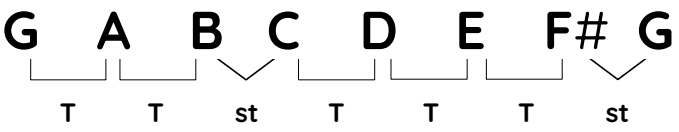
C Major Scale



The first degree of the scale is called Tonic, the main note of the scale, the one that defines the key of the musical piece. It is the centre of gravity of the tonality.
Applying the same formula, but starting from a different tonic note, will result in a major scale in a different key.

Example in **G**

G Major Scale



Key or Tonality

In music, the concept of key or tonality is the idea of having a central note, the tonic, as the gravitational centre of a musical piece.
The key involves not only the scale, but also the intervals, number of accidentals and the chords derived from it, used as the foundation to the musical piece.

The key of a piece can be identified by it's Key Signature.
The key signature is the number of accidentals (sharps or flats) contained on the scale being used to set the tonality, usually shown at the beginning of the music score.

As seen on the previous example, the G Major Scale has one sharp (F#), so the key signature of G Major would have one sharp on it. That means that if a piece of music is in the key of G Major, every F note on the piece will be altered with a sharp.

It is possible to change from one key to another in the middle of a musical piece, this process is called Modulation.
Although there are many kinds of modulations, it is commonly made by exploiting the similarities between the two key, often used to build interest or variety and to create contrasting moments.

The keys used in western music are mapped by the Circle of Fifths and Circle of Fourths.

Circle of Fifths and Circle of Fourths

The circle of fifths and circle of fourths (or circle of fifths ascending and descending) are used to organize the possible keys used on modern western music. It helps to show the relationship between the keys, and to set the order of the accidentals for the key signatures.
For both circles, we start using the C Major Scale, and proceed forming scales by ascending fifths (C, G, D, etc) for the circle of fifths or by ascending fourths (C, F, B ♭ , etc) for the circle of fourths.

Circle of Fifths

C D E F G A B C

T T st T T T st

G A B C D E F# G

T T st T T T st

D E F# G A B C# D

T T st T T T st

A B C# D E F# G# A

T T st T T T st

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

T T st T T T st

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

T T st T T T st

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

T T st T T T st

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

T T st T T T st

Circle of Fourths

C D E F G A B C

T T st T T T st

F G A B♭ C D E F

T T st T T T st

B♭ C D E♭ F G A B♭

T T st T T T st

E♭ F G A♭ B♭ C D E♭

T T st T T T st

A♭ B♭ C D♭ E♭ F G A♭

T T st T T T st

D♭ E♭ F G♭ A♭ B♭ C D♭

T T st T T T st

G♭ A♭ B♭ C♭ D♭ E♭ F G♭

T T st T T T st

C♭ D♭ E♭ F♭ G♭ A♭ B♭ C♭

T T st T T T st

Circle of Fifths									
Major	Minor	Sharps							
C	A								
G	E	1 #	F						
D	B	2 #	F	C					
A	F#	3 #	F	C	G				
E	C#	4 #	F	C	G	D			
B	G#	5 #	F	C	G	D	A		
F#	D#	6 #	F	C	G	D	A	E	
C#	A#	7 #	F	C	G	D	A	E	B

Circle of Fourths									
Major	Minor	Flats							
C	A								
F	D	1 ♭	B						
B♭	G	2 ♭	B	E					
E♭	C	3 ♭	B	E	A				
A♭	F	4 ♭	B	E	A	D			
D♭	B♭	5 ♭	B	E	A	D	G		
G♭	E♭	6 ♭	B	E	A	D	G	C	
C♭	A♭	7 ♭	B	E	A	D	G	C	F

Mapping the Fretboard

(C.A.G.E.D system)

The idea of mapping the fretboard is extremely helpful not just to expand the knowledge of the fretboard, but also for improvisation on the guitar.

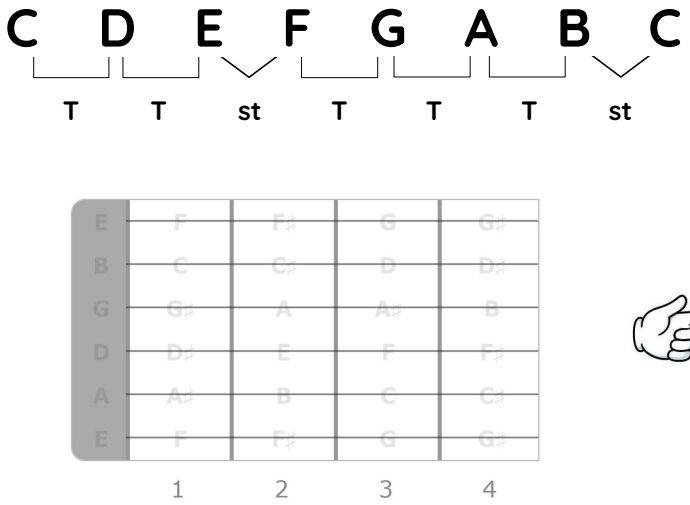
In order to do that, we use a system called C.A.G.E.D, which map the fretboard and divide it in 5 different patterns or shapes, for scales and chords.
These scale shapes that we use on the guitar are actually the structure of the diatonic scale (for example, **T T st T T T st** for the Major Mode) across the fretboard, meaning that it can be used in any key (e.g. C, D, E etc.) and eventually used in any mode (e.g. Ionian, Dorian, Lydian etc.) depending on the note that will be considered the Tonic.

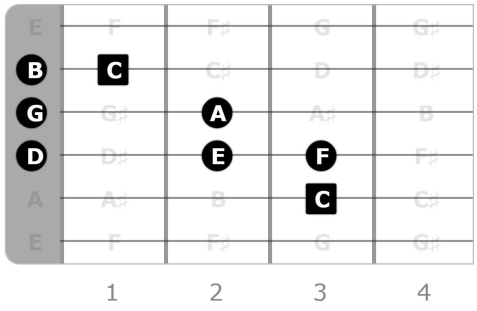
Although not a rule, the shapes usually span four frets, which fits the four fingers used on the left hand.

To form the shapes, we are going to use the first region of the guitar, which means frets 1, 2, 3 and the open strings, to map the notes of a diatonic scale.

On this example, we are going to start using the C Major Scale.
The shapes are commonly named based on the scale used to generate the shape, so in that case we are going to form the C Shape.

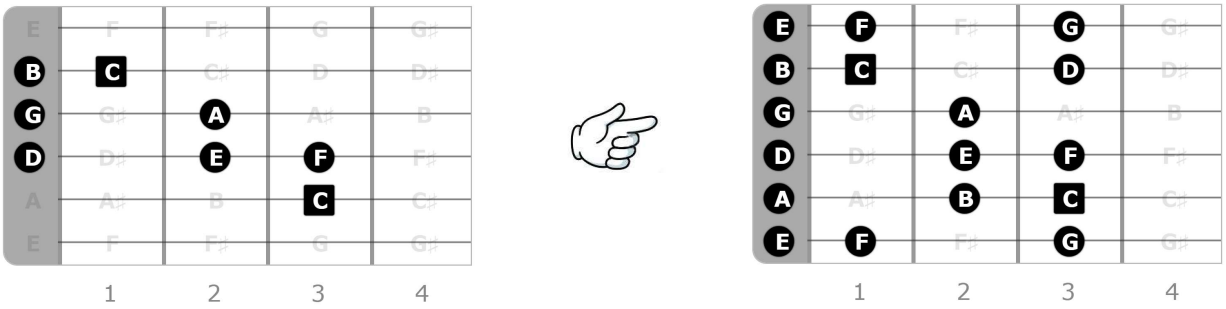
C Major Scale





Now we have a map or a shape with a diatonic scale spanning an octave, starting on the note C and following the structure **T T st T T T st**, thus forming the C Major Scale.

After finding an octave of the scale in question, we now need to finish mapping this region of the fretboard, finding all the notes of the scale across the entire region, not just an octave. That means starting from the lowest note possible to the highest note possible.



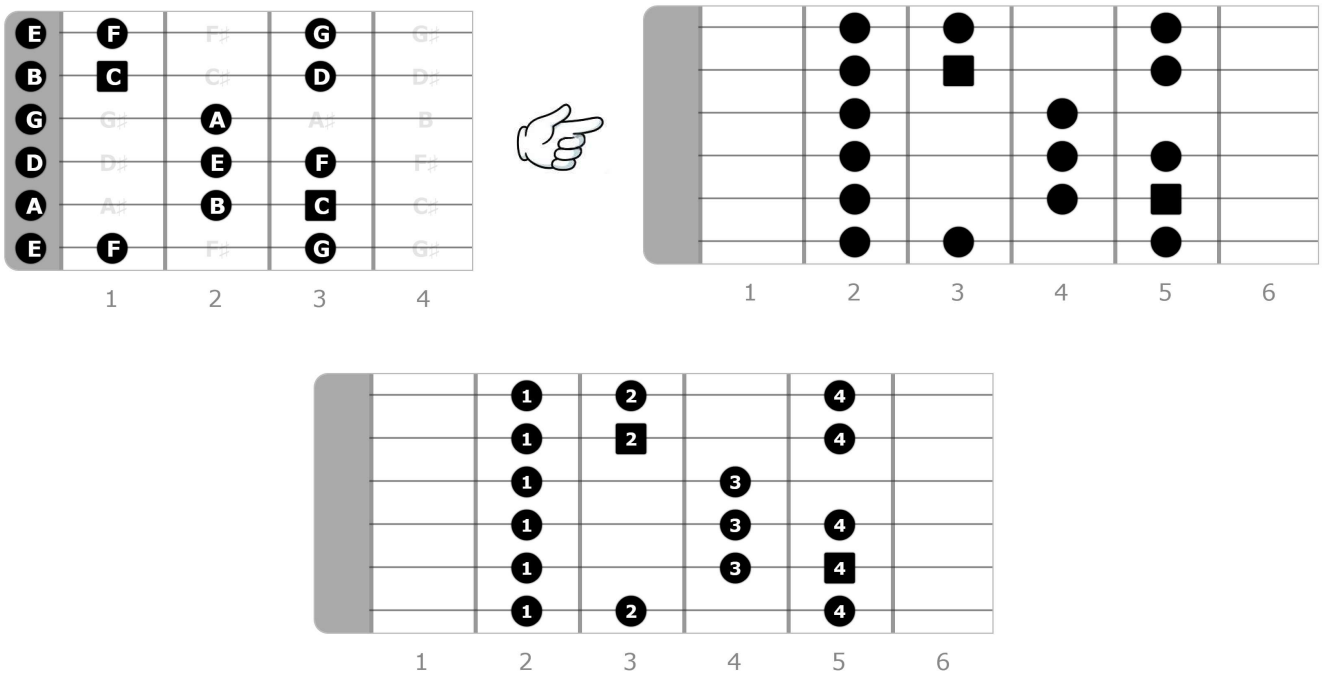
The square shaped note is the tonic

Now we have a complete map of this scale on the first region of the fretboard, that means not just an octave, but all the possible notes of that scale.

The next thing to do is to define the fingering, that is the fingers to be used to play this pattern.
Since this pattern will be used to play different keys and modes, not just the C Major Scale, we are going to consider the open strings as a fret to be played with finger number 1, that way it is now possible to play this pattern on different regions of the fretboard and not just on the first region, therefore resulting into different keys or modes.

Remember!

The shape is the structure of the diatonic scale, the tonality of the shape depends on where the shape is positioned, and which note is considered the tonic.



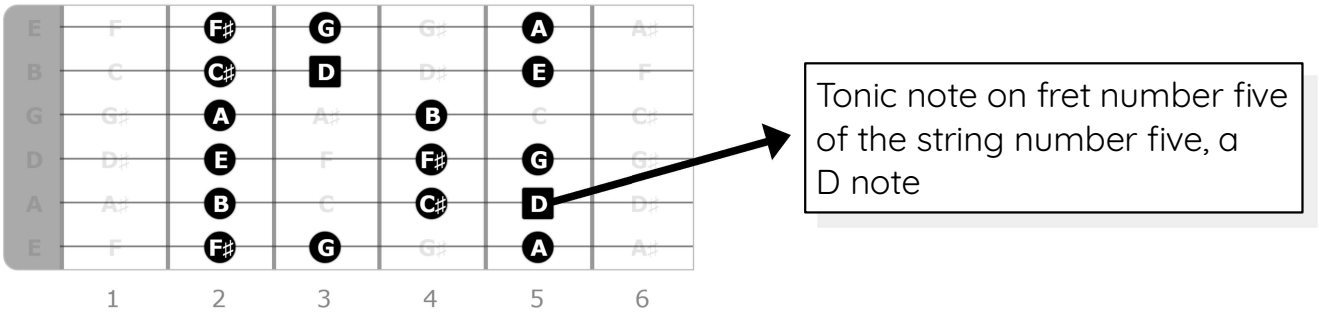
Shape with fingering, the numbers represent the fingers of the left hand.

Now we have a complete diatonic shape, spanning four frets, indicating fingering and the major tonic (square note).

Depending on the region that the shape is positioned on the fretboard, it will result in a different key or mode, based on the note on the tonic space (the square note).

For example, if this pattern, formed by the C Major Scale (thus called the “C Shape”) is placed on the region of fret number two (finger 1 on fret two, finger 2 on fret three, etc), the note on the tonic space would be a **D**, because the tonic space (the square note) is now on the fret five of string five, a **D** note. Since the shape is nothing more than the structure of a diatonic scale, this shape would now be in the key of D Major Scale, because **D** is now the tonic.

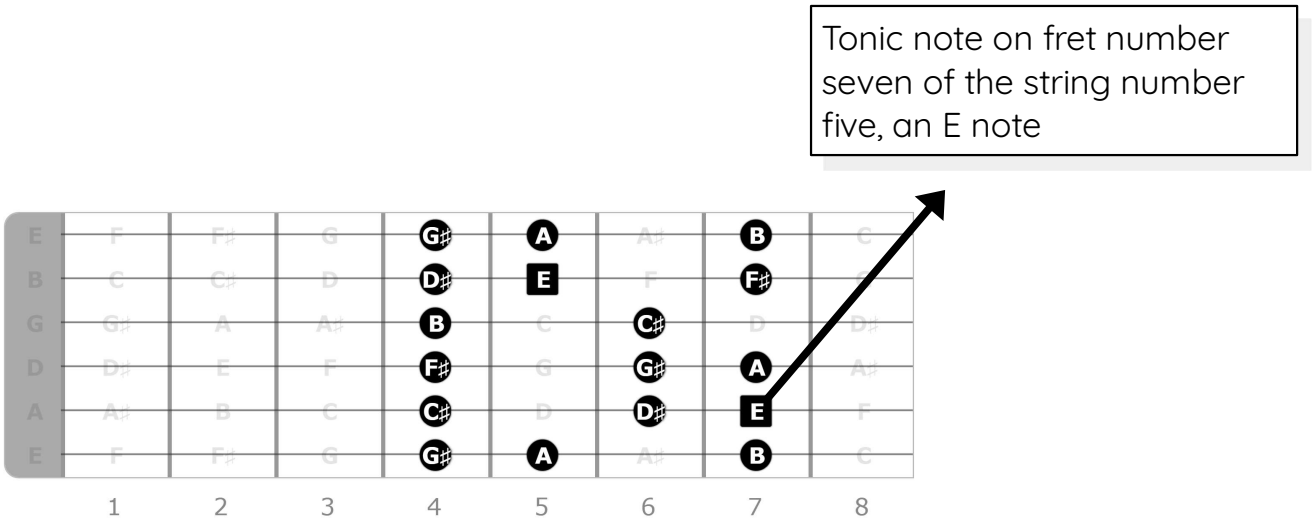
The tonic space is in a different position (string and fret) for each shape.



D Major Scale using the C Shape

Another example with a different approach; if we need to form an E Major Scale using this shape (the “C Shape”), we must first locate the E note on a string with a tonic space (square note).
For this example, let’s use the string number five again.

The E note is located on fret seven of the string number five, so in order to form an E Major Scale using the C Shape, we must place this shape in a position where the E note (fret seven of string five) will be on the tonic space of the shape (square note).



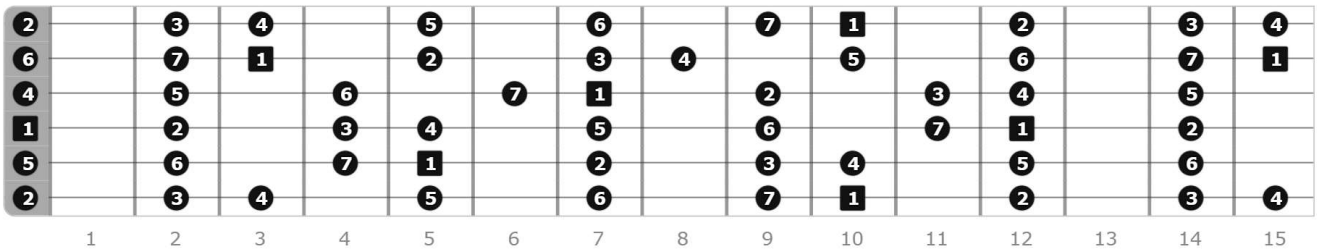
E Major Scale using the C Shape

Diatonic Scale – Complete Map

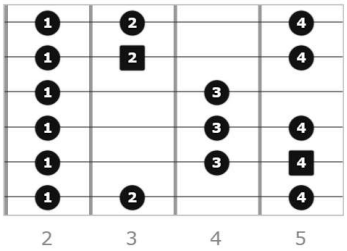
(C.A.G.E.D system)

Example in D Major

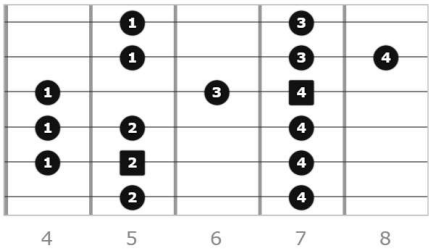
Complete Map - Intervals



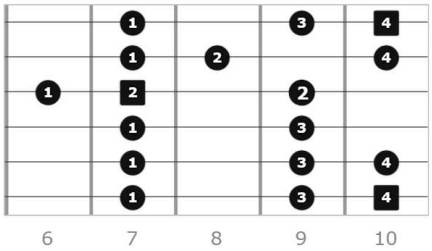
C Shape



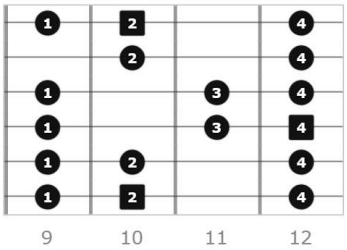
A Shape



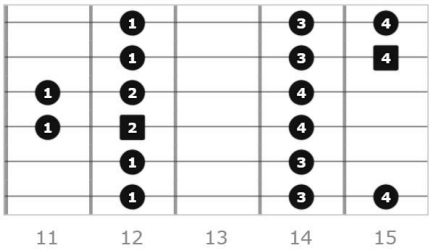
G Shape



E Shape

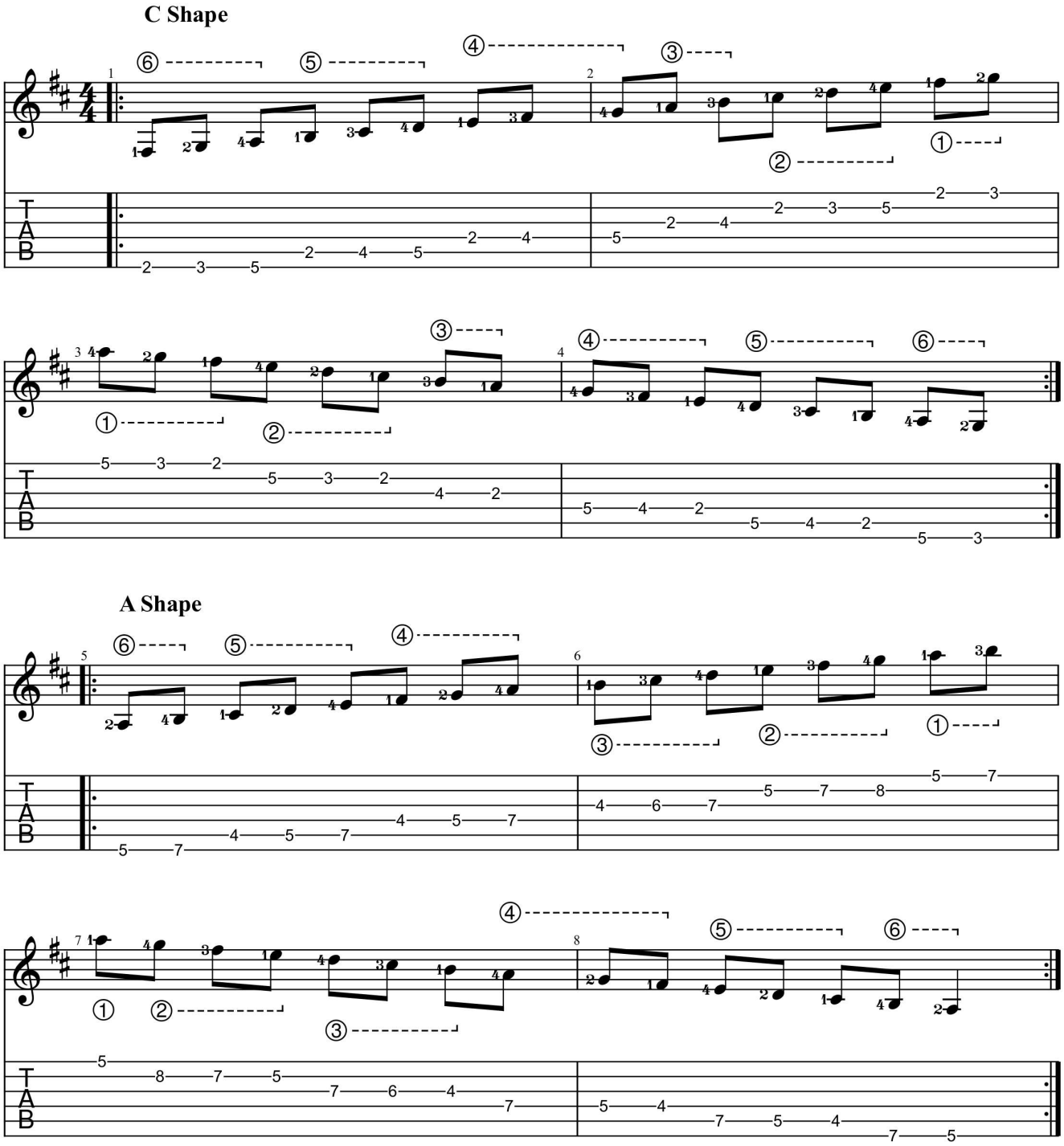


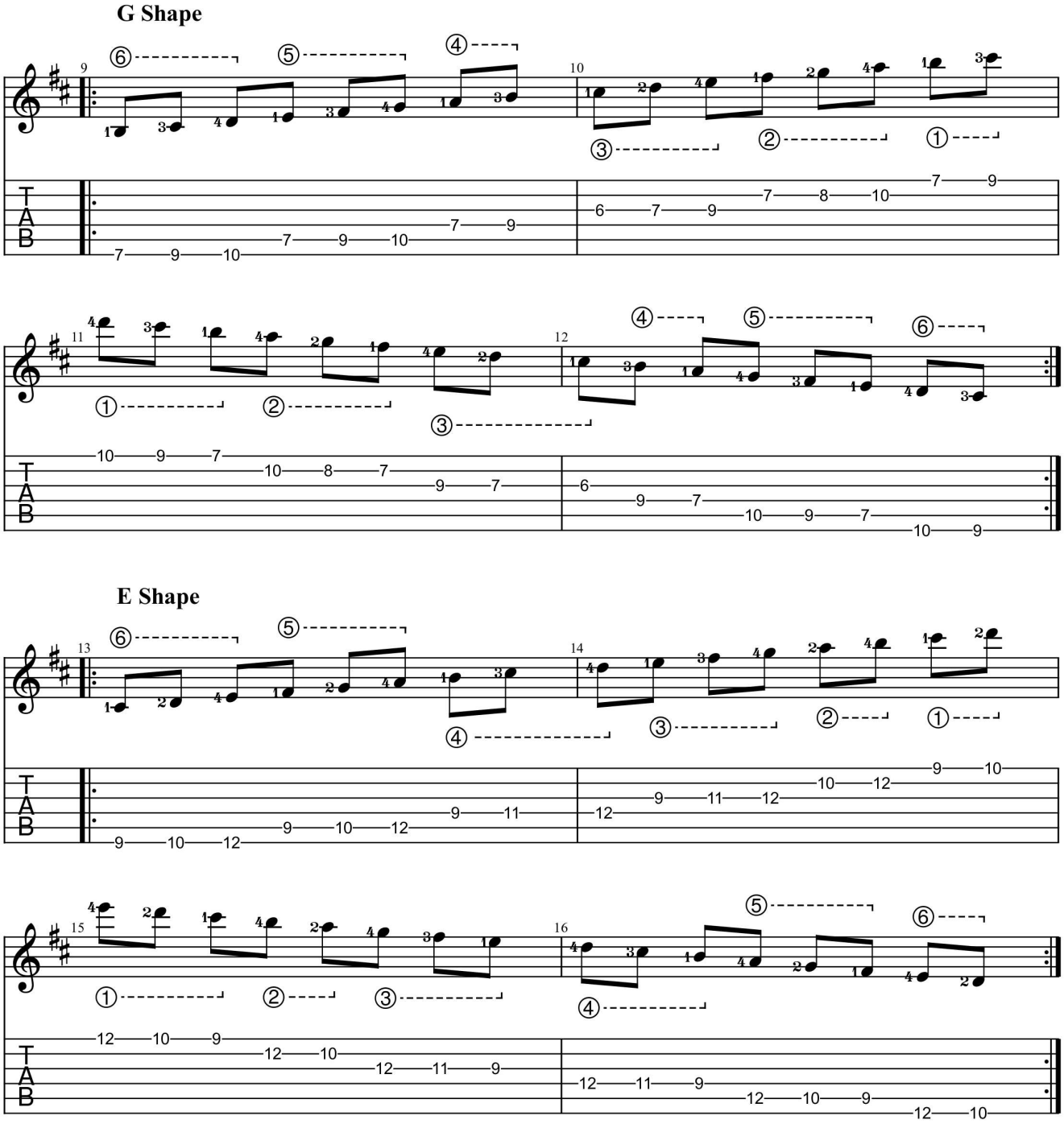
D Shape

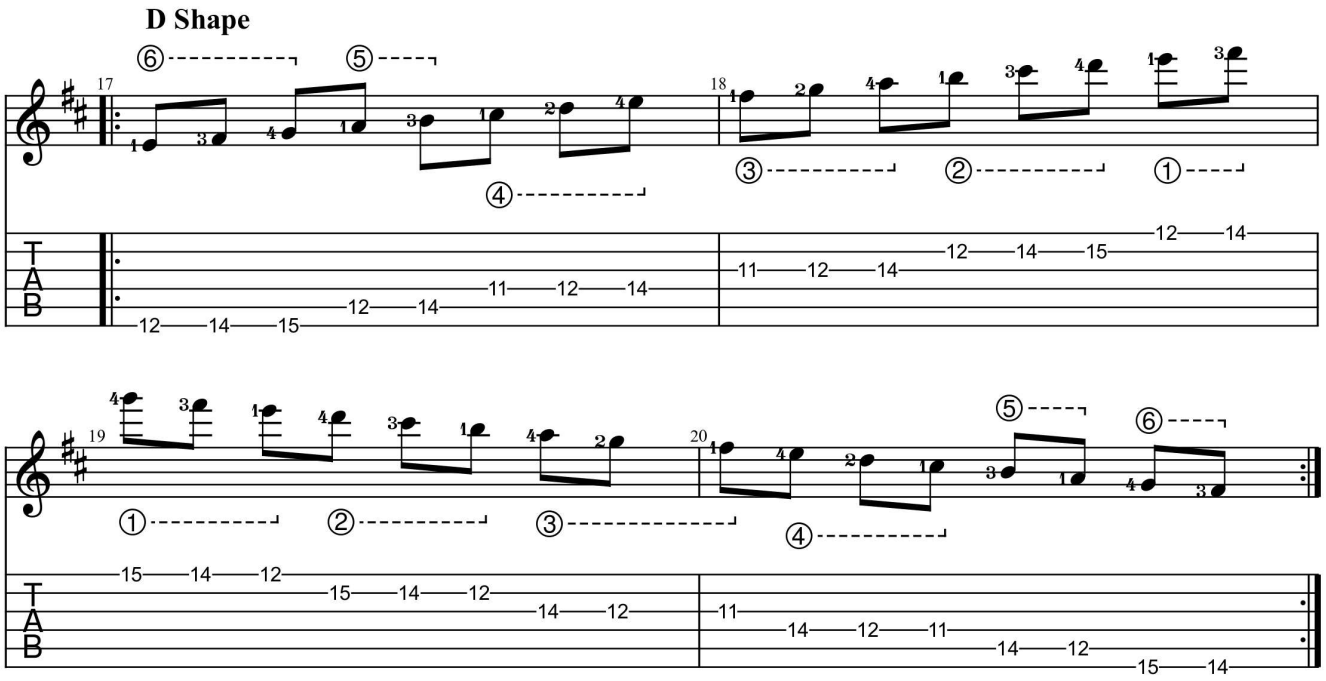


On the complete map, the numbers are intervals of the major scale.
On the individual shapes, the numbers are the fingers of the left hand

Exercise




G Shape
E Shape
TAB


D Shape
17
18
19
20
TAB