

CHORDS OF A MAJOR SCALE

Inversions, Natural, Borrowed

This lesson talks about inversions of chords, those which are not in their “triad” configuration, explains Natural and Borrowed chords, and expands the Roman numeral notation.

Chords are not always played in their root positions in fact that is rather uncommon particularly on a Ukulele. There are also only three notes in the basic triads. This means that on a 4 string Ukulele, some notes will be doubled.

You may want to have a piece of staff paper for scratch work.

Inversions:

When the chord is played in the triad or stacked third configuration, that is for C: C-E-G that is called the Root position. But many times the chord may be played as: E-G-C or G-C-E which are the first and second inversions. It doesn't change the name of the chord, if the notes can be arranged into a triad, then the bottom note determines the chord name, in this case: C, C Major to be precise because the first third: C-E is 4 half steps, a Major third.

This becomes evident if you analyze chord fingerings. Most do not have the root on the bass string. On a G tuned Uke (Baritone) a C chord is fingered: 2-0-1-0. As the open 4th string is D, this puts E in the bass. On a C tuned Uke (any treble), C is fingered 0-0-0-3 which puts G in the bass.

Tonality is strongest when the tonic is in the bass thus you will find that a tune played in one key may sound different when played in another key. That “different” may be better, sometimes worse.

To see what a collection of notes, that is a “chord”, really is, arrange the notes into triad form and the easiest way to do that is to put the notes in alphabetic order. Most of the time this will become a triad or triad plus added notes. If not, you will have to move notes around to get the answer and sometimes that is only close to a triad. Then you have to look at triad alterations such as suspended thirds which will be covered later.

Natural Chords:

Thus far you have constructed triads, chords, on each note of a scale. Reflect for a moment that all of the notes in each chord came from the notes of the scale. sharps or flats were used only when in the key signature. These chords occur naturally within the scale and are called “Natural” chords. The Roman numbers associated with these chords are just I, II, III, IV, V, VI, and VII.

Natural chords can be augmented by adding additional notes. This is accomplished simply by adding a number representing the degree above the tonic that is to be added. Example: C6 means add the sixth note above C to the C chord: C-E-G-A. If you notice something odd about this chord, relax, that will be discussed later.

Borrowed Chords:

Often a chord is used which is not natural to the key. These are called “Borrowed” chords because they don't occur within the key signature and are only represented with the roman numerals by altered notes, that is, the addition of sharps, flats, or naturals.

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There is nothing wrong with this and it is so common that it should be expected. In annotation, a borrowed chord is ALWAYS based on a natural chord in that the natural chord is altered to produce the borrowed chord. This is necessary because we only have seven roman numerals and they are already used for the natural chords. So if the tune is in C and a G# chord is needed, do I use G and sharp it or A and use flats. No real rule for this just guidelines: If the key is a sharp key, use G and sharp it. If the key is a flat key, use A and flat it. If the key is C you get to take your pick. Does it make any difference to the player? Only if they don't know that G# and Ab are equivalent and fingered exactly the same. This equivalent quality is technically known as "enharmonic", two names for the same sound. The term applies to single notes as well. "A" and "Bbb" are the same white key on the piano but in notation the latter is sometimes required in order to follow the interval naming rules something which happens frequently in diminished seventh chords.

Chord Annotation:

The following discussion on annotation will not distinguish between Natural and Borrowed chords as both will be discussed in terms of annotation. The Natural and Borrowed distinction is of lesser importance than the actual notation. Prior to this lesson and continuing here, lower case letters indicate minor chords and UPPER CASE letters represent MAJOR chords.

It is important to understand that with the Roman Numeral annotation unaltered added tones are always taken from within the key of the composition. Thus all numbers indicating added notes are from the scale of the key and are counted from the root of the chord in question. If it is necessary to raise or lower the tone, a sharp or flat will be used. This is done by indicating the degree of the note within the chord and how it is to be changed.

[In the following examples you need to remember that there are only 12 half steps in a major scale, also that a Major seventh is 11 half steps, minor 7th 10, a diminished 7th 9 half steps. Hint, consider C major. The major 7th is B, a half step below tonic, thus any major 7th is a half step below the starting note but do remember it has to be the seventh tone which may need a sharp.]

Examples in the key of C:

1. The II chord is d (D minor, Dm by other notation schemes), but lets add a seventh. Counting seven tones up from D (and heeding the scale) this means add a C and this would be annotated simply as II7 (Dm7 or d7 in other notations). This is still a "natural" chord within the key of C as all of the notes come from the scale. Pay attention that this seventh has 10 half steps so it is a minor seventh and it is still a "natural" chord as all notes came from the scale.
2. The composer needs to use an A Major chord: A-C#-G. This is based on the VI chord which is "a" ("A minor") and we need a C# which does not exist in C Major The notation would be: II3# indicating that within the number six (VI) chord, the third, which is C, is to be raised a half step to C#: A-C#-G which is A. This is a borrowed chord because A isn't natural to the key of C.
3. For emphasis on the Dominant, a minor seventh is added to the V (dominant) chord. Counting to the seventh, this is: D-E-F-G-A-B-C so the "C" is to be added. This is written V7, also D7, and is called a "Dominant Seventh" form as the structure is so commonly used. Please note that this seventh is a **minor seventh as it is 10 half steps**, not 11. *This is also a natural chord **IN C**.*

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4. For emphasis on the transition to the IV chord. C to F, counting up is a fourth, but it is also a Fifth counting down. Thus C (I) functions as a Dominant for the F (IV). By adding a minor seventh to C, it takes the Dominant Seventh form thus functions in that role by resolving a fifth down to the F. C is C-E-G, adding the 7th is C-E-G-B but that is a Major seventh so it has to be lowered a half step thus: C-E-G-B \flat is the chord. The annotation is: I 7^b (I 7^b) also C 7^b . So for a moment, this “C” chord is a “borrowed” chord.

You can try these chords in these progressions. Key signature stated first although any key may be used. Space is left so you can write in the chord names if you wish:

1. C: First I - VI - II - V - I Then: I - VI - II 7 - V - I

2. G: First: I - VI - II - V - I Then: I - VI - II $^{3\#}$ - V - I

3. C: First: I - VI - II - V - I Then: I - VI - II - V 7 - I

4. C: First: I - IV - V - I Then: I - I 7 - IV - V 7 - I

The modifications of the Roman numerals are usually in superscript, which is a little hard to read, but the notation for the D chord would be: II $^{3\#}$ Additional notations would be separated by a comma. Example: II $^{3\#,6}$ Make d a D and add the 6th (B). Usual notation: II $^{3\#,6}$

The reason for superscript is that in advanced theory notation (which is rarely if ever seen), subscript numbers are used to indicate the bass tone and particular placement of tones (inversion structure) within the chord. That’s “nice to know” and the last you will hear of it in this course.

Most if not all annotations which introduce sharps or flats (there can be more than one and they can be mixed) will represent a Borrowed chord. Nice to know.

The importance of this is not so much the distinction between natural and borrowed but that there is an annotation required to document the proper structure of the chord.

Added Notes:

Sixth chords

The phrase “sixth chords” is common when referring to the added notes to a triad. This does not mean the sixth chord in a scale it means any triad with a fourth note added that is a sixth above the tonic. This applies to 7ths, 9ths, 11ths, etc.

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By now it should be clear that not all chords are just triads. Additional notes are often included to create a specific effect such as the added 6th and minor 7ths illustrated above. Adding a 6th to a triad weakens the chord but the effect is somewhat ethereal, light, and airy and there is a good reason for that. 6th chords are “Janus” chords, they are two faced.

[Janus is a Roman God depicted as having two faces representing beginning and end, War and peace, etc, representing two sides of a situation. During the discussion of 6th chords you will see how they are “two-faced”]

Adding the sixth does not necessarily mean a major or minor sixth. It means six notes up from tonic within the scale. Thus in C the C6 would be C-E-G-A, 9 half steps to the A, a major 6th, but e6 is E-G-B-C only 8 half steps from E to the C which is a minor sixth.

The following discussion assumes the key of C.

Example: C Major: C-E-G, C Major added 6th: C-E-G-A Notation: I6 or I⁶

To play this on the Baritone: C: 2-0-1-0 which is E-G-C-E C6: 2-2-1-3 E-A-C-G

Note that C6 can also be played 2-2-1-0 E-A-C-E which is frequently used.

BUT we lost the G in the first example so added it back on the first string but didn't add it back on the second example. So if you rearrange the notes in the second example (not the fingering) this becomes “a” minor!

What? What happened to the C?

Tonality usually relies on context just like conversation. Playing the a/C6 by itself generates a somewhat weak sound. As played the tonic (fundamental some say) is not in the bass and the third, or fifth depending on your argument for the chord name, is not only in the bass but it is doubled!

This contradiction will occur in many chords of more than three notes.

There is also a problem with the second fingering of the C6: 2-2-1-3 example. Sure, all the notes are there but this can be rearranged to be A-C-E-G which is a7, “a” minor with an added 7th!

So, which is this “thing”, C6 or a or, based on fingering, a7? That would be determined by the Key, the chord progression, the context within which it is played, the position on the fretboard thus affecting the tone in the bass. The effective tonality will be influenced by where it shows up.

Janus.

Dominant Seventh

One added tone is so common and has such a profound impact that it has its own name: Dominant Seventh. Recall that the fifth degree of a scale and the V chord built on it are both called Dominant. Adding a minor 7th strengthens this propensity to “dominate” the key and creates a dissonance which is almost always resolved to the scale tonic. Part of this dominance is caused by

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the presence of the leading tone (number 7 in the scale) as the third of the V chord. You can try this by playing C - G - C. You will observe that the first chord establishes the tonal environment, the second contains an unbalance and starts a movement and the final chord provides the tonal resolution of that tension. The second part that causes the need for resolution is that the second have of the dominant seventh is a diminished chord. Quick example: V7 in C is G-B-D-F and you should recognize the B-D-F part as two stacked minor thirds, the VII or diminished chord in the C major scale. Adding the minor seventh to the V chord combines the natural Dominant tonality of V with the inherent instability of the VII both contributing to the dissonance which cries for resolution.

The notation is V7. It is structurally a Major chord with a minor 7th. Example: G-B-D is V in the key of C and V7 is G-B-D-F, the F being the seventh tone *in key* counting from the G. But this is not a Major seventh (refer back to the chart), it is minor seventh. Look at the “chord” starting on B and you will find: B-D-F, which is the seventh chord, a “diminished” chord and these have a natural instability demanding resolution. The combination of the two tonalities as a result of the added 7th is a very strong demand to resolve down a perfect fifth. To illustrate this feeling play: C - G7 - C - G7 and stop. This should create an unsettled, incomplete, unfinished feeling.

An example of how this is done will be better than several pages of discussion. “Santa Catalina” or “26 Miles” was a popular tune in the late 1950s early 1960s by the Four Preps. It can be found on Youtube.

G	e ⁷	C (a ⁷)	D ⁷	G	e ⁷	C (a ⁷)	D ⁷
C	a ⁷	F (d ⁷)	G ⁷	C	a ⁷	F (d ⁷)	G ⁷
I	VI ⁷	IV(II ⁷)	V ⁷	I	VI ⁷	IV(II ⁷)	V ⁷

1. Twenty- six miles a-cross the sea. Santa Cata-lina is a-waitin' for me

There are two chord lines shown above the Roman numbers. It is correct to assume that the first chord over the I represents the key so chording for C and G are shown. The first chord: “I” is simply the Tonic triad. Immediately following is an altered VI chord (a) which has an added 7th. This will be G, seven notes up from A and it is again a minor 7th. There is no need to show that it is minor with this notation. There are other notations which will be discussed later that do attempt to indicate that (but don’t succeed very well).

Then IV, with an alternative chording shown in parenthesis, the II with added seventh. In this case, this is d. Seven notes up from D is C for D-F-A-C, a d minor seventh: d7.

V7 is the Dominant Seventh: G-B-D-F which resolves back to I and the sequence repeats.

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In tunes with complex harmonies the notation gets busier. Stevie Wonder's lovely tune "You are the Sunshine of my life" is a good example. The first section is shown for analysis.

[CHORUS 1]

C	F ⁶	e ⁷	Bbdim	d ⁷	G ⁷	C	d ⁷	G ⁷
I	IV ⁶	III ⁷	VII ^{1b,3b,5b}	II ⁷	V ⁷	I	II ⁷	V ⁷
1. You are the sunshine of my life				That's why I'll always be a-round				

The key is C and the first chord is easy. Then it blows up!

IV6 - add the sixth tone: F-A-C-D (remember the discussion of 6ths? This *can* be d7 but with F in the bass, it behaves more like F6). 3-2-3-1 F is doubled and yes, this is really d: F-A-D-F but with the F in the bass (and doubled), it behaves more like F6 than d. Try playing both: 3-2-3-1 then 0-2-3-1.

III7 - add the seventh tone above 3: E-G-B-D (Yes it is a minor seventh)

And next. Bb is NOT in the C scale and this one is diminished! Now it isn't really all that bad because the VII chord in C is Bdim so we just have to flat ... everything: VII1b,3b,5b! Why did I use B instead of A as a starting point and sharp everything? Two reasons: the key is C, B is already a diminished chord. The relationship is clearer than using "a" which is minor and a1#,3# (a^{1#,3#}) although correct and enharmonic is less clear. The other reason? In music sources, including the score, it is identified as a Bbdim.

On the Baritone this is fingered: 2-3-2-0 Very nice sound. Because there are only three notes here, it is a triad, the Fb (E) is doubled and it is NOT a diminished seventh!

The remainder of the chords should be easily understood.

This is a lengthy module and there is a lot of information. All the fingering patterns provided can be played on a treble but they will be a perfect fourth higher than as shown. For example, 2-0-1-0 is C on the Baritone, but F on a treble.

Assignment: For C, G and F scales, on each note of the scale:

1. Construct triads with added major and minor 6th
2. Construct triads with added major and minor 7th
3. Show the notes for each of the above, i.e. C-E-G-A/Ab (Ok, I did the first one for you)
4. Show fingering relevant to your Uke (identify what kind) for each chord.
5. Mark the chords as either natural or borrowed.

#4 will be tricky and please feel free to use any application which shows you fingerings just check out what you get to be certain it is accurate.

As usual, please ask questions.