

## Cheater Theory (v2)

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One thing I've noticed that consistently comes up in the 'ukulele forums (and probably many other music-related forums) is a lack of knowledge of some of the basics of music theory. So I decided to try and do something to alleviate this.

I'm not talking about the scary deep stuff here. Just the bedrock ideas that help musicians communicate with each other and allow a person to play better and, if their desires lean in that direction, write better songs. I'm writing this mainly for my 'ukulele friends but the knowledge is general.

This document will set out just enough music theory to get you by at your friendly local neighborhood jam. Music theory is a *vast* subject and I'm only going to lightly touch on the very basics of it. There are lots of resources available if you *want* to get into the "scary deep" bits.

I'm going to cover eight topics here and give you some "cheater tricks" to help you remember them, keeping the "memorization parts" to a minimum.

- What are all these letters about?
- What do you mean by "step", "whole step" and "half-step?"
- What is a key?
- What are these numbers people keep using for notes or chords?
- What about minor keys?
- What does "transpose" mean?
- I want to write my own songs, what chords should I use?
- What makes a chord?

That must be enough in the "further ado" department, so let's get right to the topics.

### What are all these letters about?

In the western music tradition there are only twelve notes. That's it. They are named after the alphabet running A through G, with five special notes tucked in among them called either **sharps** (represented by a # symbol) or **flats** (represented by a symbol that looks like a lower case b). The ones that are neither sharps nor flats are called **naturals**. The twelve notes together are called **The Chromatic Scale**.

As a side-note here, the "A through G" is for folks from an English-speaking country. Apparently in some European traditions there's an "H" note that corresponds with Bb but about the only use for it is it allowed Bach to spell out his name in one of his compositions!

I'll start out by just showing the notes in the chromatic scale to you and then give you the cheater trick to remember them (though you'll probably figure out the cheater trick by yourself for this one).

### Chromatic Scale

A	A#/Bb	B	C	C#/Db	D	D#/Eb	E	F	F#/Gb	G	G#/Ab
---	-------	---	---	-------	---	-------	---	---	-------	---	-------

When you get to the end of the list it "wraps around" and starts at the other end again. You can read it both ways, i.e. either up (the way the alphabet runs) or down. You can see that the five notes I mentioned earlier each have two names. We'll cover that in cheater trick #1. For right now don't worry about it.

### What do you mean by "step", "whole step" and "half-step?"

But first let's digress slightly and talk about steps and half-steps. In the table above, each of the cells is one **half-step** up (or down) from its neighbors. Two of them make up a **step** (also known as a **whole step**).

So from C to C# (also known as Db) is one half-step. From C to D is a whole step. That's all there is to that.

The frets on your 'ukulele (and *most* other fretted instruments, at least in the western music tradition) are each one half-step apart.

#### **Cheater Trick #1:** The rules for remembering the chromatic scale

1. Start at A and go through G, using half-steps.
2. The half-step between each letter is a note that can be named either the sharp of the note below or the flat of the note above -- e.g. between D and E is a note that can be either D sharp (D#) or E flat (Eb). (*Note that the actual flat symbol isn't exactly a small-case "b", but it resembles it closely enough that the small b is commonly used to represent it.*)
3. The only exceptions to #2 are between B and C and between E and F. There is only a half-step between B and C and between E and F (i.e. there is no such thing as B# or Cb nor E# or Fb).

That's about the hardest memorization part I'm going to talk about and I'm sure you've already got it down.

### What is a key?

So you're jamming with some folks and someone says, "This is in the **key** of G." What the heck does that mean?

Though there are 12 notes available in the chromatic scale, songs are in "keys" and a given key uses only seven of the notes. These notes are called the **scale**.

*Weirdly, this is called an **octave**, which would make you think that there are eight (I mean, an octopus doesn't have seven tentacles, does it?), but the eighth is named the same as the first, just one "octave" up.*

Let's talk about just how those seven notes are chosen to make up a major key (we'll talk about minor keys right afterwards).

To make the scale for a key you start with the **root note** of the key. That is the note that gives the key its name. We'll use "C."

Take a deep breath, I'm going to go through it all in a quick lump the first time.

Starting with the root we go up a step for the second note, up a step for the third note and up a half-step for the fourth. To get the fifth note we go up a whole step. Now up another whole step for the sixth and a whole step for the seventh. A final half-step completes the octave by returning to C.

Each of these notes has a number assigned to it called a **scale degree** and is simply written as 1 through 7. I'll cover this in more depth a little later in the topic "*What are these numbers people keep using instead of chord names?*" but meanwhile don't worry overmuch about it.

Recap: That's up two whole steps, a half-step, three more whole steps and a final half-step.

Let me tell you the cheater trick to remember this first and then we'll go through it again with the chromatic scale in front of us.

**Cheater Trick #2:** A mnemonic to get a major key from the chromatic scale

Start at the root note (key name), go up  $2\frac{1}{2}$  then up  $3\frac{1}{2}$ . (Mostly I remember " $2\frac{1}{2}$  then  $3\frac{1}{2}$ " or even just " $2\frac{1}{2}3\frac{1}{2}$ " when I'm feeling especially daring).

Here's the chromatic scale again for reference:

Chromatic Scale

A	A#/Bb	B	C	C#/Db	D	D#/Eb	E	F	F#/Gb	G	G#/Ab
---	-------	---	---	-------	---	-------	---	---	-------	---	-------

To get the C major scale:

1. Start with "C" note (the "root" or "1")

2. Go up one whole step (to the right on the chromatic scale above), "D" (the second -- 2)
3. Go up another whole step, "E" (the third -- 3)
4. Go up one half-step, "F" (the fourth -- 4)
5. Now go up another whole step, "G" (the fifth -- 5)
6. Another whole step takes us up to "A" -- remember, the table "wraps around" at the end -- (the sixth -- 6)
7. One more whole step takes us to "B" (the seventh -- 7)
8. The final half-step takes us back to the root of "C" (one octave up)

So the C major scale is C, D, E, F, G, A, B and the C one octave higher than the root. And don't worry overmuch about those Roman numerals, I'll cover them toward the end of this document.

Using that same method for the key of G gives us: G, A, B, C, D, E, F# and back to G.

*Note: When writing out the notes of the scale you can pretty much skip the octave root note, i.e. the key of C would just be written "C, D, E, F, G, A, B" and everyone understands that it starts all over again the next octave up. Like I said earlier, only 7 notes in an "octave."*

Here's a diagram of both the example scales.

root	step	step	½ step	step	step	step	½ step
C	D	E	F	G	A	B	C
G	A	B	C	D	E	F#	G

Go ahead -- try it!

### **What are these numbers people keep using for notes or chords?**

As I mentioned earlier, all of the notes in a scale have a **degree** or **scale degree**. While there are fancy names for each of them, they can all be referred to by number. These are written in Arabic numerals. The number simply matches their place in the scale.

You'll sometimes see Roman numerals used. These refer to the **chord scale**, that is, chords that correspond to a given scale degree, and I'll get into them when I talk a bit about chords.

Let's go back to our long-suffering C major scale for an example.

#### C major scale

Note Name	C	D	E	F	G	A	B
Scale Degree	1	2	3	4	5	6	7

So, if someone mentions "the five of C," that note is a G. Simple as that.

### **What about minor keys?**

If you want to find out the notes in one of those "spooky" sounding minor keys you have two choices. The first is to memorize a different set of steps and half-steps from the root (I'll give you that method at the end of this section) but the easiest way is this.

Every major key has its "relative minor" (and vice versa). These two relatives share the same notes, but they use a different root note.

The relative minor of any major key starts on the major key's 6 note. So for the key of C (C, D, E, F, G, A, B) the relative minor is A minor. To get the notes for the A minor scale you simply take the 6 and 7 note (A and B) and move them around to the front of the list. A minor is: A, B, C, D, E, F, G.

So if you don't want to remember the steps between notes in the minor scale you do this:

1. Choose your root note. Let's say we want to do the "E minor" scale so "E" would be our root.
2. Find out the relative major scale. You do that by going up one whole step and one half-step. So E minor is the relative minor of G major.
3. Now figure out the G major scale.
4. Move the 6 and 7 notes to the front.
5. You end up with E, F#, G, A, B, C, D

Try that now, it's not hard. I find it much easier to remember "step and a half" than trying to remember the steps in a minor scale (root, whole step,  $\frac{1}{2}$  step, whole step, whole step,  $\frac{1}{2}$  step, whole step, whole step).

**Cheater Trick #3:** Get a minor scale by going up  $1\frac{1}{2}$  steps from the root of your minor, building a major scale around *that* root and then moving the last two notes "around to the front" for your minor scale.

### **What does "transpose" mean?**

There seems to be a *lot* of confusion around this issue. Stated simply:

**Transposing is taking a song in one key and changing it to another key.**

That's it!

The main purpose of transposing a song is to move it into a key that the singer can more comfortably sing in. Sometimes it's also used to get to a key that is easier to finger on your instrument of choice.

**Dispelling a common 'ukulele myth:**

You *don't* have to "transpose" if you've found words and chords for guitar and you want to play it on 'ukulele. The chord names remain exactly the same, the only difference is a guitar player will put her fingers on the fretboard in the guitar shape for a given chord and a 'ukulele player will put her fingers on the fretboard in the 'ukulele shape for that chord.

So, how do you do it? You move the all the notes of a song up or down the same number of half-steps. Since us players of accompaniment instruments ('ukulele, guitar, etc.) mostly worry about chords rather than notes you could restate that as, "You move the all the *chords* of a song up or down the same number of half-steps."

Let's take a simple example here. You've got a blues song in the key of C. Most blues are 3-chord songs, root (or "I chord"), fourth ("IV chord") and fifth ("V chord"). Looking at the C scale again -- C, D, E, F, G, A, B -- you'll see that I, IV, and V are C, F and G.

Often seventh chords -- note that is "seventh chords", not "the VII chord" -- are used instead of major chords in blues. So we'll go ahead and introduce that concept, just to show that it *makes no difference* when you're transposing. So we're going to be working with C, F and G7.

We want to transpose to the key of "G" since that's where we sing it best. Let's look at our handy-dandy chromatic scale again:

Chromatic Scale

A	A#/Bb	B	C	C#/Db	D	D#/Eb	E	F	F#/Gb	G	G#/Ab
---	-------	---	---	-------	---	-------	---	---	-------	---	-------

To go from C to G you have to go up seven half-steps. So our first chord is G. Change everywhere in your song where you play C you're now going to play G.

Now to replace the F chord... go up those same seven half-steps. This brings us to C. So everywhere that you played an F chord before you're now going to play a C.

Our last chord is G7. Ignore the "7" part for a minute. Count up seven half-steps from G and you get D. In transposing chords, *you only have to change their note name*. So now everywhere you used to play a G7 chord you're going to be playing a D7 chord.

To wrap up here: Your song that used to use C, F and G7 now uses G, C and D7.

Here's where it all ties together. Our two scales are:

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

The blues song uses the I, IV and V chords. If you count over on the above scales you'll see that both instances use the I (C or G), IV (F or C) and V (G7 or D7) chords.

### I want to write my own songs, what chords should I use?

The short but not very enlightening answer is "any ones you want that sound good." The "Cheater Theory" answer is the chord scale.

To get a chord scale just build your major scale as usual and then assign chord types to each of the notes. Let's give C a rest and work with G.

#### Chord Scale for the key of G

Scale Note	G	A	B	C	D	E	F#
Scale Degree	1	2	3	4	5	6	7
#s for Chords	I	II	III	IV	V	VI	VII
Chord Type	major	minor	minor	Major	7 <sup>th</sup>	minor	diminished

Let me emphasize this one *very* strongly... *this is **just** an easy "starter framework."* You can change **any** of the chord types you want as long as it sounds good in the song. Use a lot of 9<sup>th</sup> chords for a jazzier sound, change a minor to a major, etc., etc. This chord scale helped me get past my "three chord wonders" when I was first trying to write my own tunes. Use it as a springboard and not as holy writ!

The reason that Roman numerals are used to refer to chords in a song is, as noted earlier, chords can have numbers as part of their name. So if you're doing the basic blues in our earlier example you can write it as the I, IV and V7 without confusing a "seventh chord" (C7, G7, whatever) with "the VII chord" (in the case of the key of C, the VII chord is a B chord). Without the Roman numerals for chords you'd end up having it look like a *fifty-seventh* chord (57<sup>th</sup> chord? what the heck is that?).

One more side note on the Roman numbers. Sometimes you'll see them written in lower case (e.g. iv). This is used to reflect minor chords, but it's just as acceptable (and *lots* easier to remember!) to write it IVm or IVmin.

### What makes a chord?

Here's a little "extra credit." You don't need this to "get by," but it's not hard and will give you a bit more depth.

According to Webster's, a chord is "three or more musical tones sounded simultaneously." If you're curious enough about the subject that you've read this far you've certainly already heard of major, minor and seventh chords. Perhaps even diminished or augmented chords or other odd names like that. So what determines which notes go into which chord?

I've made up this chart to show you the notes that make up all of the basic chord types and not just a few of the more obtuse types.

First step is to build whatever scale you need for the chord -- i.e. if you want to make an F9 chord you build an F scale. You then read the chart (for the Major 9 chord in this case) to see which notes make up that chord.

Reading the chart is relatively easy. Follow the row across from the chord name you wish to construct. Wherever you find a dot (•) you use the note for that scale degree. When you find a flat (**b**) you use that scale degree's note *lowered one half step*. When you run across a sharp (**#**) you use that scale degree's note *raised one half step*. Feel free to refer to the chromatic scale chart for further help on that.

Please note that when you get to the 8, 9 and 10 scale degree notes they simply starting the octave over again (as I mentioned earlier) so you can think of them as 1, 2 and 3 again as far as choosing the note names go.

Once you've figured out what notes are needed for a given chord you can pick out the one or more areas on the fretboard where you are able to finger those notes together and come up with the chord you need for that tricky old jazz number. To make that chore a bit easier I've included a fretboard diagram with all of the notes between open string and twelfth fret listed. You'll find the diagram at the end of this document.

You will also notice that a few of these chords have 5 notes in them. As you might gather, these will be hard to finger on a four-stringed instrument. As a rule of thumb the easiest way to get around that is to drop the root note when figuring out the fingering(s) for these chords. The root will be suggested by the context (i.e. the key of the song that the chord is being used in).

Chord Construction Chart									
Chord Name	Scale Degree								
	1	2	3	4	5	6	7	8	9
Major	•		•		•				
Major 6	•		•		•	•			
Major 7	•		•		•		•		
Major 9	•		•		•		•		•
Dominant 7*	•		•		•		<b>b</b>		
Dominant 7 Flat 9	•		•		•		<b>b</b>		<b>b</b>
Dominant 7 Sharp 9	•		•		•		<b>b</b>		<b>#</b>
Dominant 7 Flat 5	•		•		<b>b</b>		<b>b</b>		
Dominant 7 aug 5	•		•		<b>#</b>		<b>b</b>		
Dominant 7 sus 4	•			•	•		<b>b</b>		
Dominant 9	•		•		•		<b>b</b>		•
Dominant 9 sus 4	•			•	•		<b>b</b>		•
Augmented	•		•		<b>#</b>				
Minor	•		<b>b</b>		•				
Minor 6	•		<b>b</b>		•	•			
Minor 7	•		<b>b</b>		•		<b>b</b>		
Minor 7 Flat 5	•		<b>b</b>		<b>b</b>		<b>b</b>		
Diminished	•		<b>b</b>		<b>b</b>				
Diminished 7**	•		<b>b</b>		<b>b</b>	•			
Suspended 4	•			•	•				
Suspended 2	•	•			•				
Add 9	•				•				•

\* the Dominant 7 chord is the one we use most and just call the "seventh"

\*\* the Diminished 7 chord is the one we use most and just call the "diminished"

### **Kids, *do* try this at home!**

I'm hoping that this document helps you understand the rudiments of notes, scales, keys and such. Feel free to stop by my web site and send me a comment if you have any further confusion on the subjects I've covered.

You'll find the promised fingerboard chart right after I sign off here.

One last tip. None of this stuff will mean a thing if you don't "spend some time in the wood shed" to work that knowledge from your brain into your fingers.

Keep on strummin'!

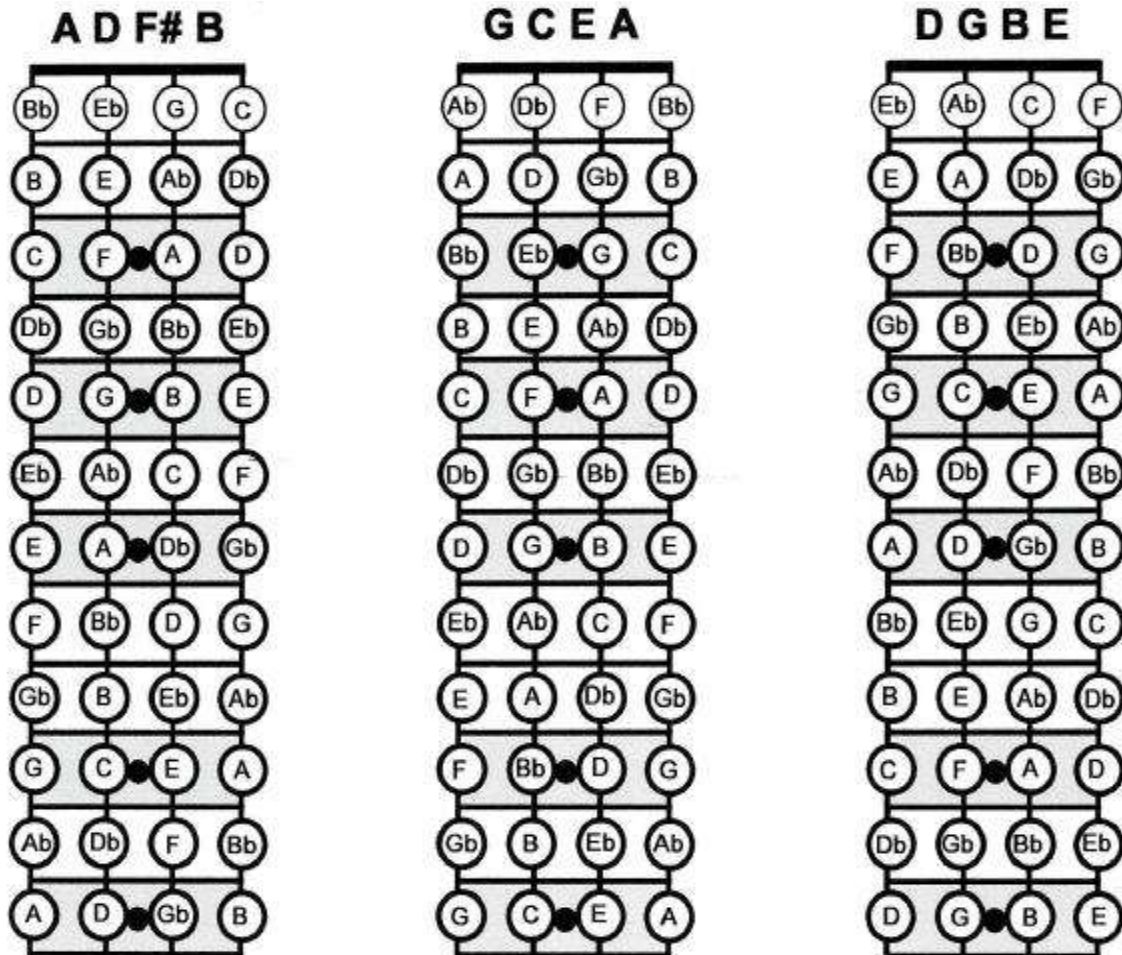
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June 10, 2005

### Ukulele Fingerboard Chart

(In the interest of saving space, the sharp/flat notes are only given as flats. Refer to the chromatic scale table if you need help with "translation".)



Notes on the ukulele fretboard for 3 standard tunings.  
Note: Gb is equal to F#.