Basic Music Theory

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1 Abstract

This document is intended to strengthen one's understanding of Western music theory, whether you play an instrument or not (although if you are curious enough to read this document and don't play an instrument, I strongly recommended you do!) I hope that this document serves well as a text for students and professionals, at any stage of their musical journey.

This document won't enable you to play double bass blast beats on your drum kit at 600bpm, that comes with practice...

2 The Keyboard

A standard modern full-size keyboard has 88 keys, both white and black. 88 keys might seem like a lot of notes but in Western music theory there are only 7 natural notes: A, B, C, D, E, F and G, and the keyboard simply repeats this order of keys from left to right starting at a certain note. To start off with the basics, we will only concentrate on the white keys:

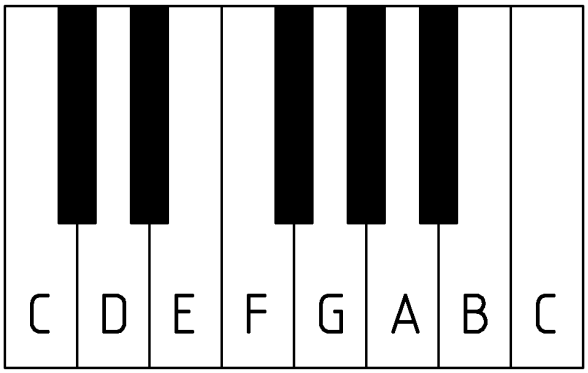


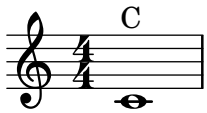
Figure 1: The white keys on a keyboard

The figure above shows the notes C, D, E, F, G, A, B, C. This pattern of notes will repeat on the keyboard, getting higher and higher in pitch. So if we were to start on the note C, then going to the right, the notes will be C, D, E, F, G, A, B, C, D, E, F, G, A, B, C... going higher and higher in pitch.

So in the figure above, the C on the right will be higher in pitch than the C on the left, an octave in fact.

2.1 Middle C

Keyboard players usually sit at where middle C is, normally on the middle of the keyboard. There is some disagreement as to whether middle C is noted as C3 or C4, but scientifically, middle C is generally known as C4, shown here on the treble clef:



3 The C Major Scale

When playing all the white keys in order up (to the right) and back down (to the left) again, you are playing what is known as the C major scale. Because you are playing in the key of C you do not need to play any of the black keys. When playing the notes of a scale you do not need to repeat the note at the end, you simply go back down (C, D, E, F, G, A, B, C, B, A, G, F, E, D, C).

3.1 Accidentals

Playing only the white keys, means that you are playing in the key of C. When playing in the key of C, the black keys correspond to notes known as accidentals, in other words they are not normally in the key. They are sharps and flats; a sharp note is a note raised by one semitone and a flat is a note lowered by one semitone. A semitone on a keyboard is simply the movement between adjacent notes, both white and black. We already know the seven natural notes:

C D E F G A B

There are actually a total of 12 different notes in the Western musical system if you include sharps and flats. The black keys satisfy the rest of the five notes.

If you write them as sharps, you have:

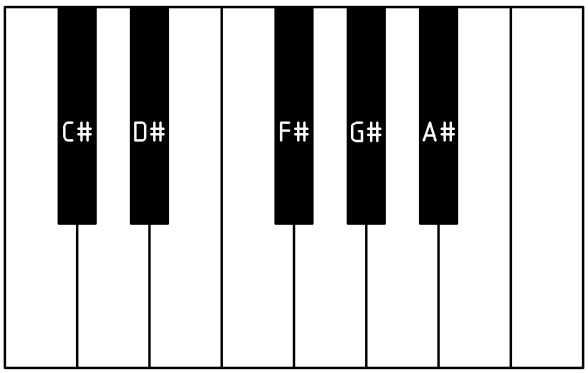


Figure 2: The black keys on a keyboard written as sharps

If you write them as flats, you have:

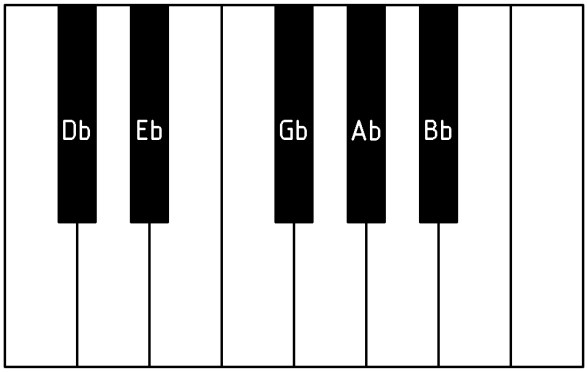


Figure 3: The black keys on a keyboard written as flats

Note that the notes in the previous two figures are the same, only called something different. They are known as enharmonically equivalent. Notes that are enharmonically equivalent means that their names are interchangeable:

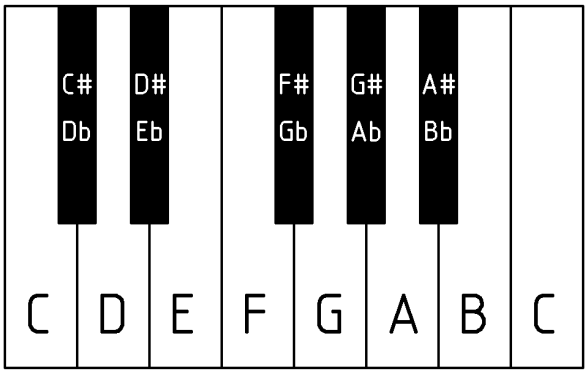


Figure 4: The black keys on a keyboard written as sharps and flats

You may notice that there is no black key between B and C, and E and F. There is only a semitone difference between these notes. Consequently, E# is known as F in most cases and B# is usually known as C. Similarly, F♭ is usually known as E and C♭ is usually known as B.

There is another accidental, known as the natural. Used as an accidental, it cancels the sharp or flat:



The music above would be played: C D# D D.

The difference between sharp and flat notes is important when you are playing in a different key. For example there are sharp keys and flat keys. We will discuss sharp and flat keys in the Cycle Of Fifths and the Cycle Of Fourths sections, respectively, later.

To work out other keys than C major, we can use the key of C major as a blueprint for what makes up the notes of a key:

C D E F G A B C

The gap between C and D is two semitones, or two keys on the keyboard. A spacing of two semitones is known as a whole tone. However, the gap between E and F is a semitone. The spacing, whole tone or semitone, between the notes in C major are:

Notes	**Spacing**
C to D	Whole tone
D to E	Whole tone
E to F	Semitone
F to G	Whole tone
G to A	Whole tone
A to B	Whole tone
B to C	Semitone

Table 1: Spacing between notes in the C major scale

This pattern of note spacing is the same for any major key, and with it you can apply it to any note and find the notes of that scale using the note as the root.

For example, if we use the note G as the root, we can find the notes of the key (it is known that the key of G major is a sharp key, to be discussed in the Cycle Of Fifths section later, so the extra sharp note is F#, not a flat note G♭):

Notes	**Spacing**
G to A	Whole tone
A to B	Whole tone
B to C	Semitone
C to D	Whole tone
D to E	Whole tone
E to F#	Whole tone
F# to G	Semitone

Table 2: Spacing between notes in the G major scale

4 The Cycle Of Fifths

The key of C major is neither a sharp key or a flat key. We can use it as a starting point to work out the sharp keys using what is known as the Cycle Of Fifths. A perfect fifth, or seven semitones from the note C is G. The key of G major has one more sharp than the key of C major. The extra sharp note is one semitone lower than the root: F#.

To continue the cycle, a fifth above G is D, and the extra sharp note is C#. A fifth above D is A and the extra sharp note is G#. Then a fifth above A is E and the extra sharp note is D#. This cycle continues...

Major Key	**Sharp Notes**
C	None
G	F#
D	F# C#
A	F# C# G#
E	F# C# G# D#
B	F# C# G# D# A#

Table 3: The Cycle Of Fifths

For example, the notes in G major would be:

G A B C D E F#

The notes in D major would be:

D E F# G A B C#

The notes in A major would be:

A B C# D E F# G#

And so on...

5 The Cycle Of Fourths

When working out the flat keys, we can use C major as the starting point again, but instead count a perfect fourth above, this being five semitones. So the next key is a fourth above C: F major. The extra flat note is a perfect fourth above F: B♭, and it is also the next key in The Cycle Of Fourths.

Major Key	**Flat Notes**
C	None
F	B♭
B♭	B♭ E♭
E♭	B♭ E♭ A♭
A♭	B♭ E♭ A♭ D♭
D♭	B♭ E♭ A♭ D♭ G♭
G♭	B♭ E♭ A♭ D♭ G♭ C♭

Table 4: The Cycle Of Fourths

For example, the notes in F major would be:

F G A B♭ C D E

The notes in B♭ major would be:

B♭ C D E♭ F G A

The notes in E♭ major would be:

E♭ F G A♭ B♭ C D

And so on...

6 Chords

So far, we have been playing scales only. When you play more than one note at the same time, it is known as a chord. The most common chords, the major and minor triads, are made from three different notes. Here for example, is the C major chord:

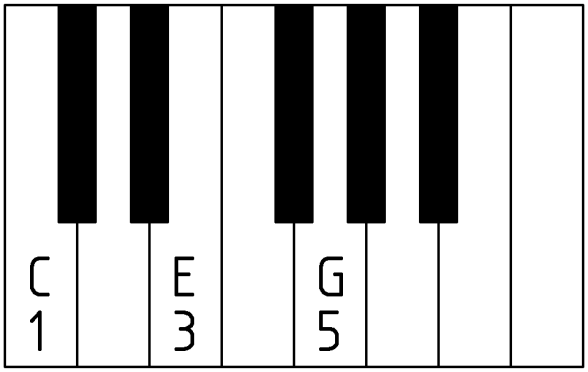


Figure 5: The C major chord

The notes of the chord C major are: C E G. Try playing the chord with your right hand thumb (1) on C, middle finger (3) on E and little finger (5) on G.

In scale theory, each interval, or step, can be given a number:

```
1  2  3  4  5  6  7
C  D  E  F  G  A  B
```

We can see that the numbers above C E and G are 1 3 and 5 respectively. This can be applied to all major chords, the interval from C to E is a major third (four semitones) and from E to G it is a minor third (three semitones).

We can see the difference between major and minor chords if we look at a minor chord, for example D minor:

```
1  b3 5
D  F  A
```

D to F is three semitones, or a minor third. F to A is four semitones, or a major third. There is still seven semitones from 1 to 5, but the third is a minor third (♭3).

Therefore, you could say that the third is essential in determining the tonality of a chord, whether it is major or minor.

In a major key like C major, the chords are found by looking at any set of three intervals in the key with one space apart and the first note being the root. For example:

1 3 5: C E G

2 4 6: D F A

3 5 7: E G B

4 6 1: F A C

By looking at the middle note (the third when using the first note as a root) of these three note chords, you can determine whether the chord is major or minor. For example, D to F would be three semitones, or a minor third, indicating a D minor chord. E to G is also a minor third, indicating a E minor chord.

The chords of C major are:

Chord	**Major Or Minor Or Diminished**
C	Major
D	Minor
E	Minor
F	Major
G	Major
A	Minor
B	Diminished

Table 5: Chords (triads) in the key of C major

The 7th degree triad in the key of C major is B diminished. Its notes are B D F (1 ♭3 ♭5).

The root (C), fourth (F) and fifth (G) chords are fundamental in Western music.

This sequence of major and minor chords (as well as the diminished chord), is the same for any major key. So you can apply this pattern to any major key to find out the tonality of the chords without counting intervals. For example, in the key of G major:

Chord	**Major Or Minor Or Diminished**
G	Major
A	Minor
B	Minor
C	Major
D	Major
E	Minor
F#	Diminished

Table 6: Chords (triads) in the key of G major

7 Timing

The chord progression in this section is in what is known as 4/4 time. This time signature indicates that the bar is grouped into beats of four (the first/top number) and the value of each beat is a quarter note (the second/bottom number). Every bar can be counted with the numbers one to four for each beat, with the spacing/timing between beats being equal:



Here is a chord progression using the root, fourth and fifth chords. Play one chord per bar and hold it for the duration of the bar. Try to anticipate the chord movement/change.

```
4/4
| C | F | C | F |

| C | F | G | C |
```

8 Dominant 7th Chords

The dominant 7th chord is similar to a standard major chord, but it has an extra note. The note is not in the usual scale, it is a ♭7, which is two semitones lower than the root. An efficient way to play dominant 7th chords is to have the ♭7th as the bass note, as it is close to the root and therefore less of a stretch. The G7 chord (G dominant 7th) has the notes G B D F:

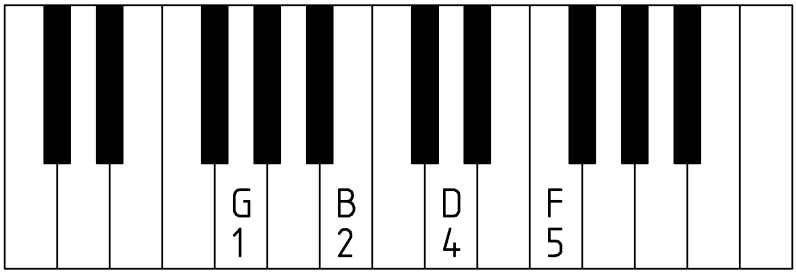


Figure 6: The G dominant 7th (G7) chord

C7 (C dominant 7th) has the notes C E G B♭:

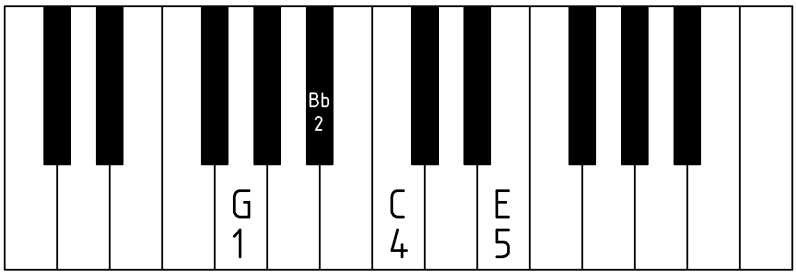


Figure 7: The C dominant 7th (C7) chord

When played with one hand, the large span of notes can be too difficult. The chord can be played by missing out the 5th (G):

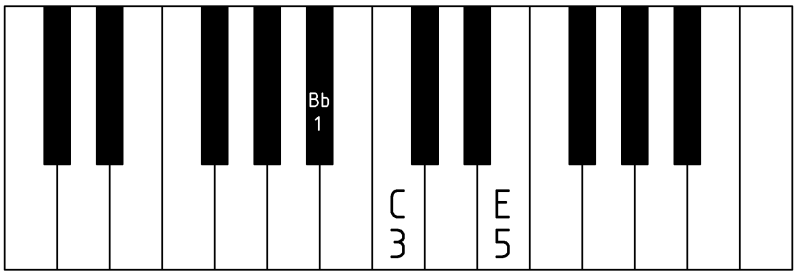


Figure 8: The C dominant 7th (C7) chord without the fifth

Now that you can play dominant 7th chords, try playing the following chord progression:

```
4/4
|: C | G | G7 | C |

| F | C | G7 | C :|
```

You may have not come across these bar lines with repeat marks. You should repeat everything enclosed in them once. For example:

```
4/4
|: C | G | C7 | G7 :|
```

Is played:

```
4/4
| C | G | C7 | G7 | C | G | C7 | G7 |
```

And:

```
4/4
|: C | G :| G7 |
```

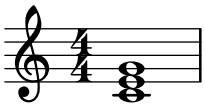
Is played:

```
4/4
| C | G | C | G | G7 |
```

9 Inversions

The notes of any chord can be played in any position to create different inversions, or voicings. By rearranging notes, we give chords a different sound, which makes chord progressions more interesting. Also, generally, the closer the notes are to each other in a chord change, the more smooth the change will sound, and reduces the need for large jumps between chords.

For example, the C major chord has the notes C E G. When played with the notes in this order, it is known as the root position or root inversion:



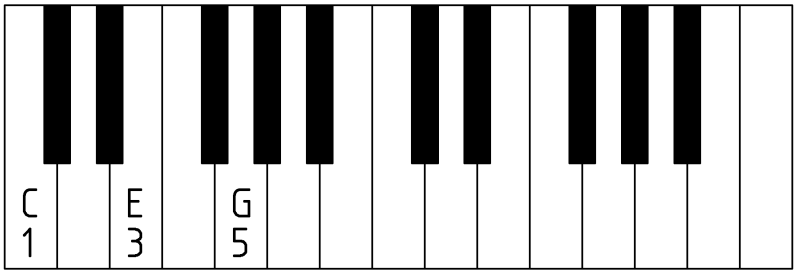


Figure 9: The C major chord in root position

For the first inversion, the E will be the lowest note and C the highest note, effectively moving C to the end. So the chord is now E G C:



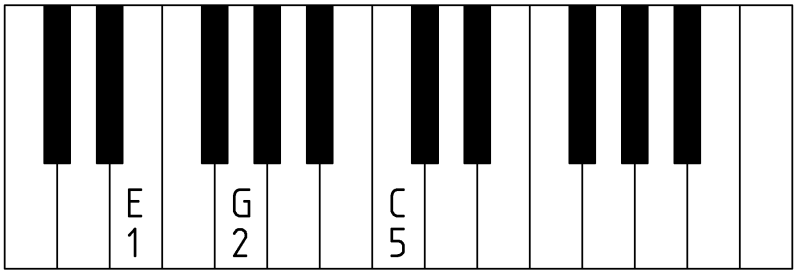


Figure 10: The C major chord first inversion

For the second inversion, the E is moved to the end, and the chord now has the note order G C E:



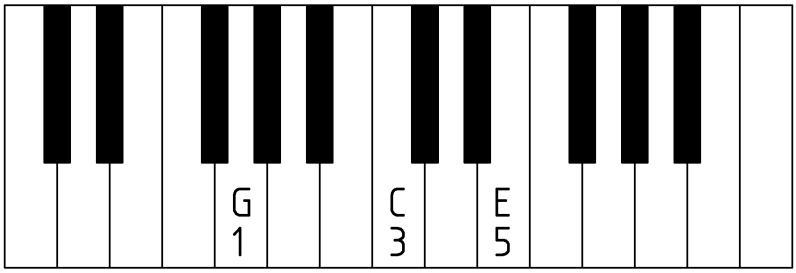


Figure 11: The C major chord second inversion

10 Transposition

If we have the following chord progression in the key of C:

```
4/4
|: C | G | G7 | C |

| F | C | G7 | C :|
```

The challenge is to play it in other keys, this is known as transposition. It serves as a useful tool in changing the tonality of songs, so you can suit a singer's voice or vocal range for example. It is also helpful when there are many different instruments in the performance.

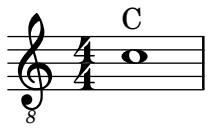
For example, we will transpose the chord progression to the key of D. The root has moved up two semitones from C. We know that D major is a sharp key, so the F# and C# are noted with a sharp sign. We simply add two semitones to every chord to transpose to D major:

```
4/4
|: D | A | A7 | D |

| G | D | A7 | D :|
```

11 Transposing Instruments

Taking the guitar, a transposing instrument, as an example where middle C sounds an octave lower than middle C played on an instrument like the piano. If music is written for the guitar with an unmarked treble clef, it is assumed to be played an octave lower than written. Here we will be using the treble clef with the number 8 below it, which means the same thing, to play an octave lower than written:



The music above shows C4 written for the guitar. Note that it is written an octave above middle C when written for the piano, for example.

12 References

[1] Skinner, T. (2001) **Electric Guitar Playing Grade 5**, The Registry of Guitar Tutors, Registry Publications Ltd: Surrey, Great Britain

[2] Taylor, E. (1989) **The AB Guide to Music Theory Part I**, The Associated Board of the Royal Schools of Music: London, United Kingdom