



Oswaldo Glieca

Random Music Theory Studies

Volume 2

(2008)



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Scales

C Major

Major 2nd Major 2nd Minor 2nd Major 2nd Major 2nd Major 2nd Minor 2nd

I II III IV V VI VII I

C Natural minor This scale corresponds to the key signature.

Major 2nd Minor 2nd Major 2nd Major 2nd Minor 2nd Major 2nd Major 2nd

I II III IV V VI VII I

C Harmonic minor This scale includes the major 7th degree or leading tone.

Major 2nd Minor 2nd Major 2nd Major 2nd Minor 2nd Aug. 2nd Minor 2nd

I II III IV V VI VII I

C Melodic minor

Ascending: Major 2nd Minor 2nd Major 2nd Major 2nd Major 2nd Major 2nd Minor 2nd

Descending: Major 2nd Major 2nd Minor 2nd Major 2nd Major 2nd Minor 2nd Major 2nd

I II III IV V VI VII I I VII VI V IV III II I

Clefs

All examples show middle C

French violin clef G clef or Treble clef Soprano clef or Descant clef Mezzo-soprano clef Alto clef or C clef Tenor clef Baritone clef Baritone clef Bass clef or F clef

Transposing Instruments

Instruments for which the music is written in a key or octave other than that of their actual sound

Melody in C Major

Clarinet in A

Clarinet in Bb

Horn in F

Cadences

A melodic or harmonic formula that occurs at the end of a composition, section, or phrase, conveying the impression of a momentary or permanent conclusion

Authentic cadence Plagal cadence Half cadence Deceptive or interrupted cadence

V I IV I I V V VI

A cadence is called *perfect* if the final chord is the tonic triad with the tonic note in the soprano

A cadence is called *imperfect* if the final tonic chord has a note other than the tonic in the soprano, for example, either the 3rd or 5th

Intervals

Intervals in red are prohibited according to the rules of melodic motion

Intervals larger than an octave are called *Compound* intervals. The first four of these have special names:-
Ninth or *Compound 2nd*, Tenth or *Compound 3rd*, Eleventh or *Compound 4th*, and Twelfth or *Compound 5th*.

Chord Factors

	<p>This note could be the...</p> <p>Root of I 3rd of VI 5th of IV</p>	<p>These two notes could be the...</p> <p>Root and 3rd of I 3rd and 5th of VI</p>
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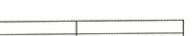
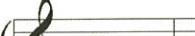


Inversions

Root position	First inversion	Second inversion	Root position	First inversion	Second inversion	Third inversion
I	I ⁶	I ⁶ ₄	V ⁷	V ⁶ ₅	V ⁴ ₃	V ²
Root in the bass	3rd in the bass	5th in the bass	Root in the bass	3rd in the bass	5th in the bass	7th in the bass

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Thus, there are three stages in the process of bringing about a modulation. First, a tonality must already be clear to the listener. Second, the music at some point must change its tonal centre. Finally, the listener must be made aware of the change by confirmation of the new tonal centre.

A single chord alone is not sufficient to establish a tonal center, nor is the progression V to I since, in both instances, the chords can be interpreted as being drawn from a number of keys. Infact, the tonic chord need not be present. For example, the progressions required are II to V, or V to II, and IV to V, or V to IV since they cannot be interpreted as being from more than one tonality.

C Major II V C Major V II C Major IV V C Major V IV

Let's suppose we wish to modulate from C Major to G Major using the tonic chord as the pivot chord. In the following example, the pivot chord in the fourth bar is preceded by the tonality defining root sequence II to V.

C Major IV II V I G Major IV

C Major IV II V I IV V II⁶ V I

Pivot Chords

I in C Major is equivalent to...

IV in G Major - Dominant Major
V in F Major - Subdominant Major
VI in E minor - Dominant minor
III in A minor - Relative minor
VII in D minor - Subdominant minor

II in C Major is equivalent to...

VI in F Major - Subdominant Major
III in Bb Major - Distant subdominant Major
IV in A minor - Relative minor
I in D minor - Subdominant minor
V in G minor - Distant subdominant minor

III in C Major is equivalent to...

II in D Major - Distant dominant Major
VI in G Major - Dominant Major
IV in B minor - Distant dominant minor
I in E minor - Dominant minor
V in A minor - Relative minor

IV in C Major is equivalent to...

I in F Major - Subdominant Major
V in Bb Major - Distant subdominant Major
VI in A minor - Relative minor
III in D minor - Subdominant minor
VII in G minor - Distant subdominant minor

V in C Major is equivalent to...

IV in D Major - Distant dominant Major
I in G Major - Dominant Major
VI in B minor - Distant dominant minor
III in E minor - Dominant minor
VII in A minor - Relative minor

VI in C Major is equivalent to...

II in G Major - Dominant Major
III in F Major - Subdominant Major
IV in E minor - Dominant minor
I in A minor - Relative minor
V in D minor - Subdominant minor

VII in C Major is equivalent to...

II in A minor - Relative minor

I in C minor is equivalent to...

II in Bb Major - Dominant Major
VI in Eb Major - Relative Major
III in Ab Major - Subdominant Major
IV in G minor - Dominant minor
V in F minor - Subdominant minor

II in C minor is equivalent to...

VII in Eb Major - Relative Major

III in C minor is equivalent to...

IV in Bb Major - Dominant Major
I in Eb Major - Relative Major
V in Ab Major - Subdominant Major
VI in G minor - Dominant minor
VII in F minor - Subdominant minor

IV in C minor is equivalent to...

II in Eb Major - Relative Major
VI in Ab Major - Subdominant Major
III in Db Major - Distant subdominant Major
I in F minor - Subdominant minor
V in Bb minor - Distant subdominant minor

V in C minor is equivalent to...

II in F Major - Distant dominant Major
VI in Bb Major - Dominant Major
III in Eb Major - Relative Major
IV in D minor - Distant dominant minor
I in G minor - Dominant minor

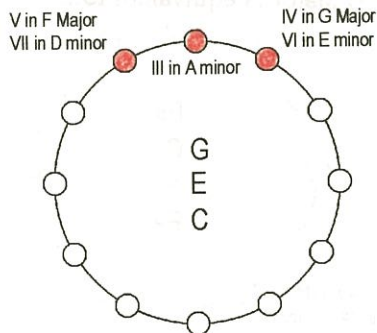
VI in C minor is equivalent to...

IV in Eb Major - Relative Major
I in Ab Major - Subdominant Major
V in Db Major - Distant subdominant Major
III in F minor - Subdominant minor
VII in Bb minor - Distant subdominant minor

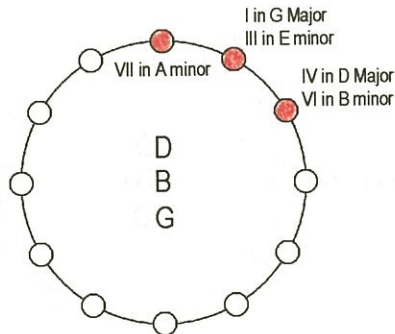
VII in C minor is equivalent to...

IV in F Major - Distant dominant Major
I in Bb Major - Dominant Major
V in Eb Major - Relative Major
VI in D minor - Distant dominant minor
III in G minor - Dominant minor

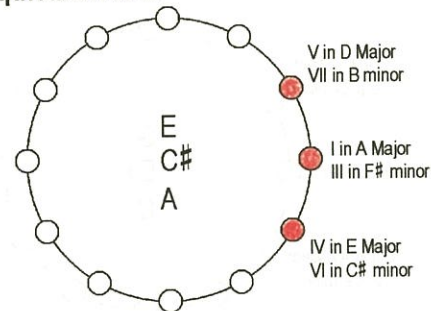
I in C Major is equivalent to...



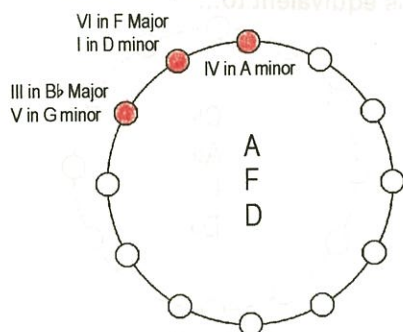
V in C Major is equivalent to...



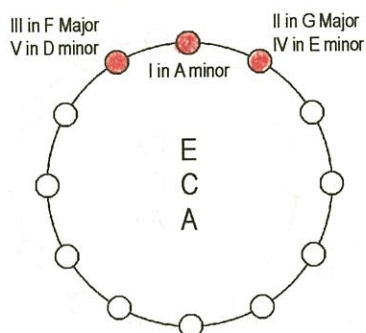
V of V of V in C Major is equivalent to...



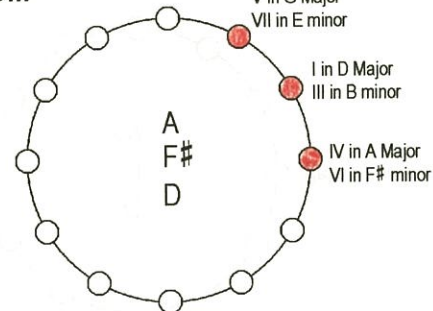
II in C Major is equivalent to...



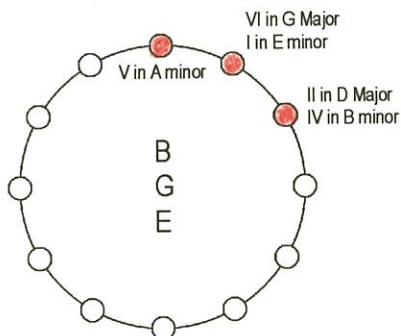
VI in C Major is equivalent to...



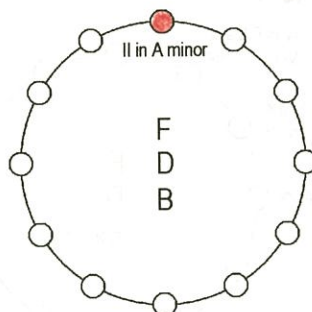
V of V in C Major is equivalent to...



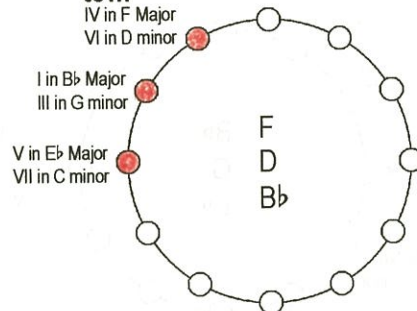
III in C Major is equivalent to...



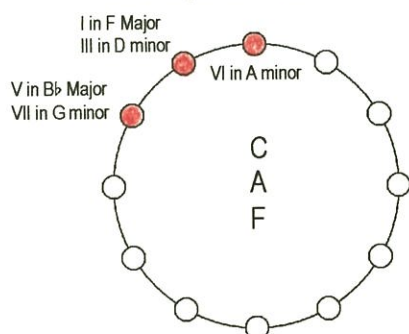
VII in C Major is equivalent to...



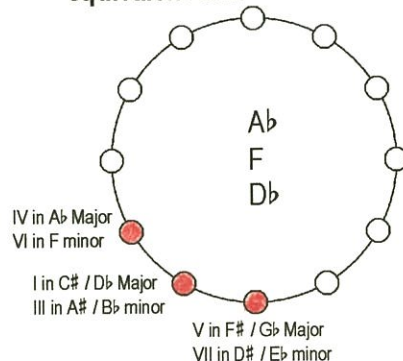
IV of IV in C Major is equivalent to...



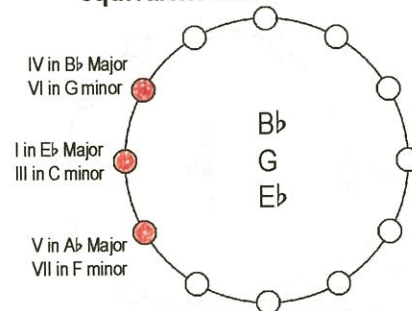
IV in C Major is equivalent to...



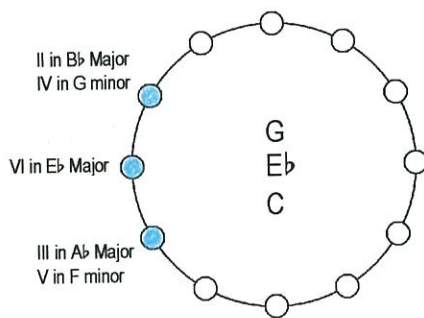
Neapolitan 6th in C Major is equivalent to...



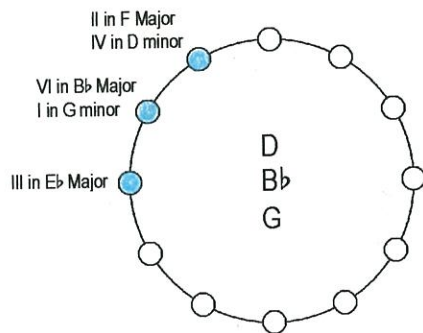
IV of IV of IV in C Major is equivalent to...



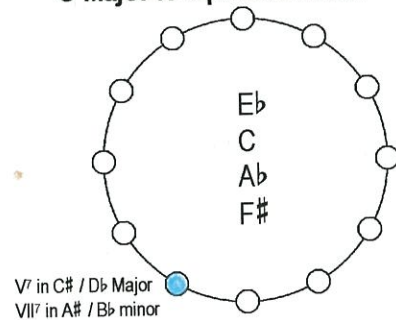
I in C minor is equivalent to...



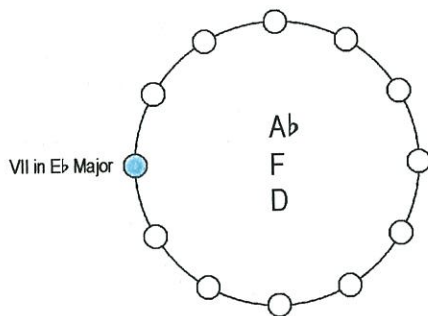
V in C minor is equivalent to...



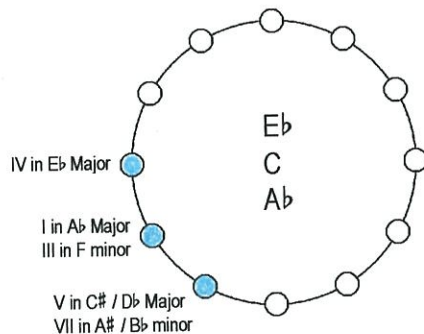
Augmented 6th (German) in C Major is equivalent to...



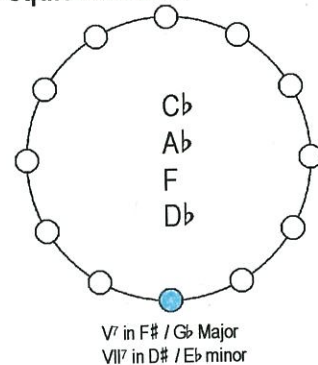
II in C minor is equivalent to...



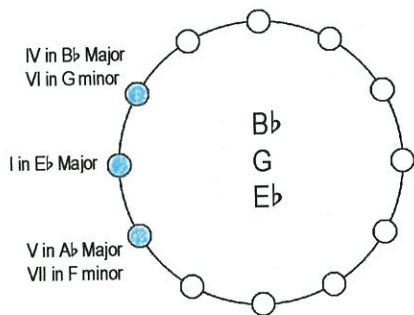
VI in C minor is equivalent to...



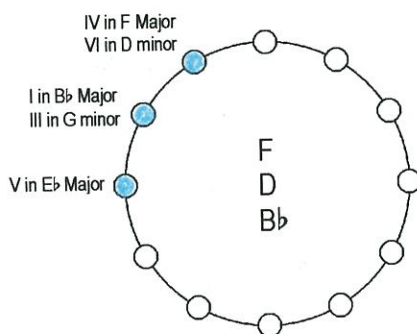
Tritone substitution in C Major is equivalent to...



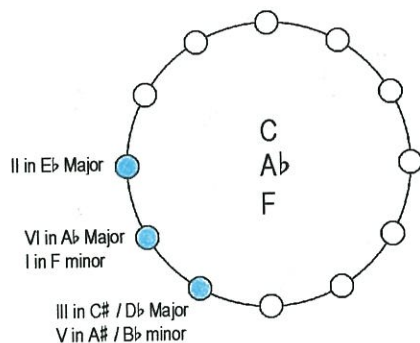
III in C minor is equivalent to...



VII in C minor is equivalent to...

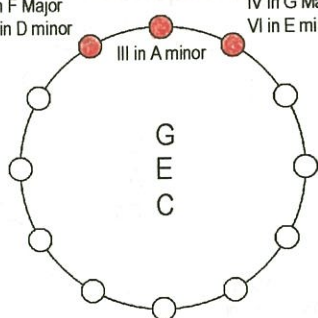


IV in C minor is equivalent to...



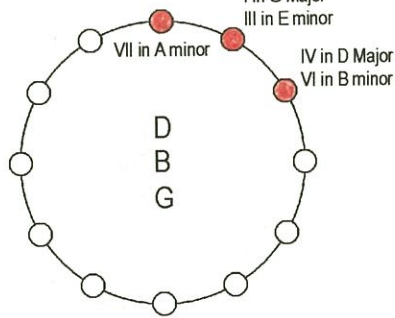
I in C Major is equivalent to...

V in F Major
VII in D minor



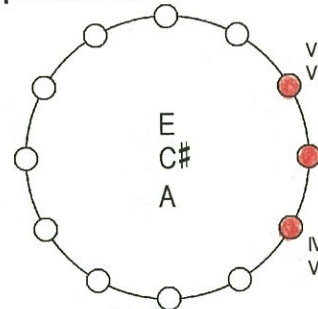
V in C Major is equivalent to...

I in G Major
III in E minor



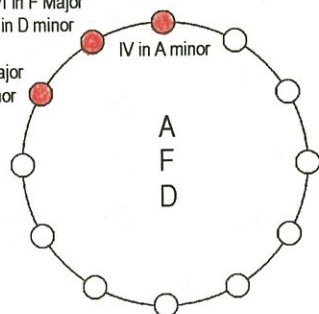
V of V of V in C Major is equivalent to...

V in D Major
VII in B minor
I in A Major
III in F# minor
IV in E Major
VI in C# minor



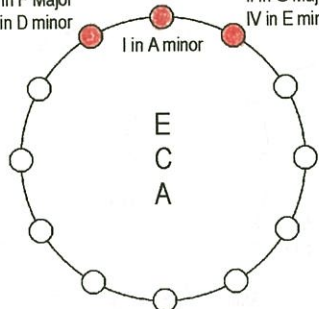
II in C Major is equivalent to...

VI in F Major
I in D minor
III in Bb Major
V in G minor



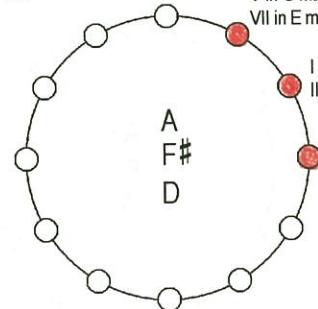
VI in C Major is equivalent to...

III in F Major
V in D minor
I in A minor
II in G Major
IV in E minor



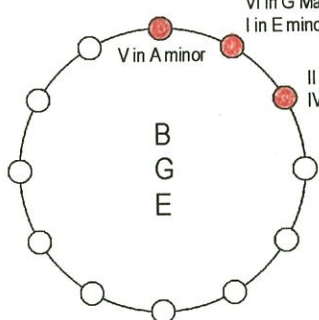
V of V in C Major is equivalent to...

V in G Major
VII in E minor
I in D Major
III in B minor
IV in A Major
VI in F# minor

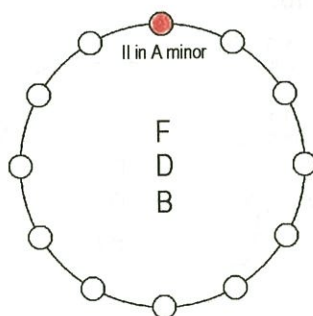


III in C Major is equivalent to...

VI in G Major
I in E minor
II in D Major
IV in B minor

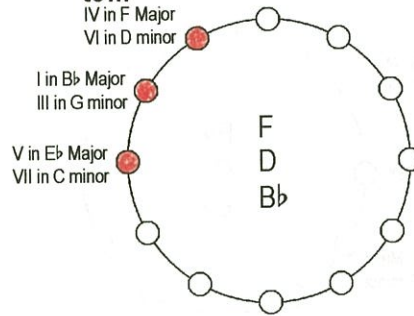


VII in C Major is equivalent to...



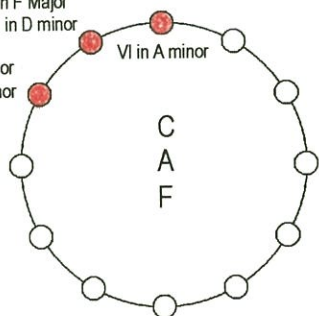
IV of IV in C Major is equivalent to...

IV in F Major
VI in D minor
I in Bb Major
III in G minor
V in Eb Major
VII in C minor



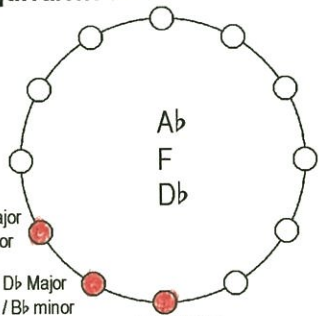
IV in C Major is equivalent to...

I in F Major
III in D minor
V in Bb Major
VII in G minor



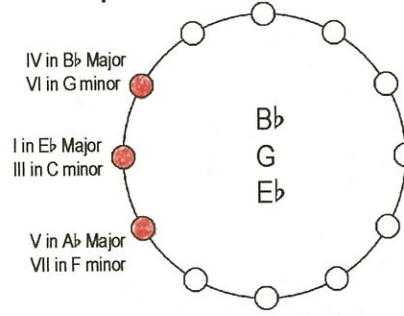
Neapolitan 6th in C Major is equivalent to...

IV in Ab Major
VI in F minor
I in C# / Db Major
III in A# / Bb minor
V in F# / Gb Major
VII in D# / Eb minor

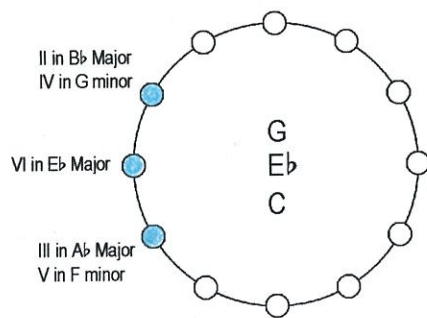


IV of IV of IV in C Major is equivalent to...

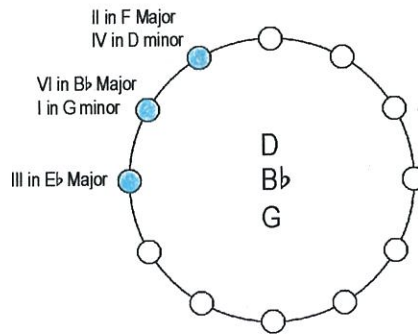
IV in Bb Major
VI in G minor
I in Eb Major
III in C minor
V in Ab Major
VII in F minor



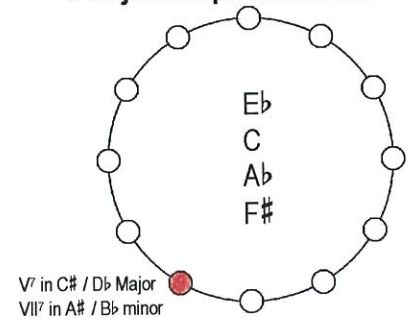
I in C minor is equivalent to...



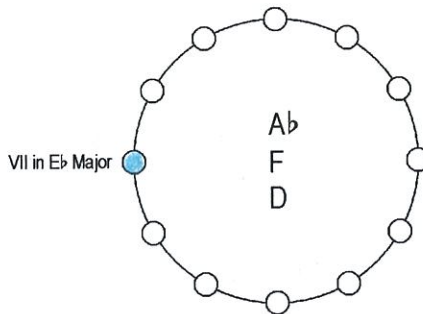
V in C minor is equivalent to...



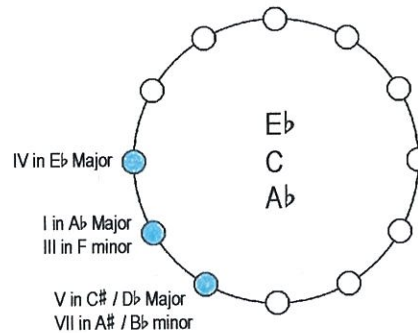
Augmented 6th (German) in C Major is equivalent to...



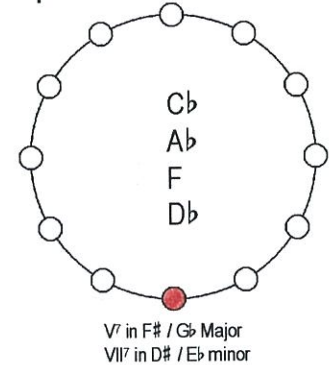
II in C minor is equivalent to...



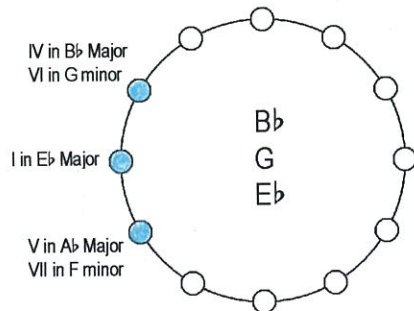
VI in C minor is equivalent to...



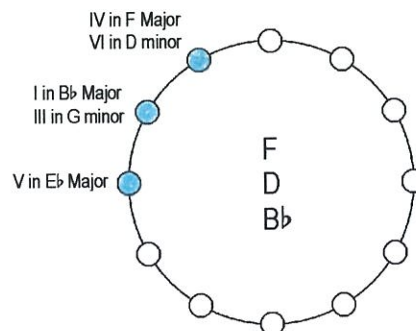
Tritone substitution in C Major is equivalent to...



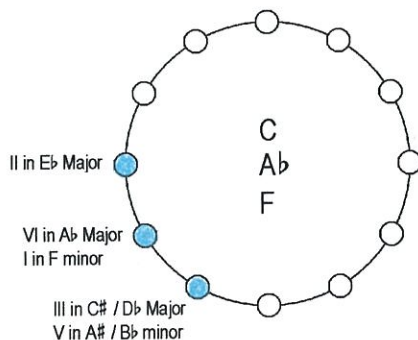
III in C minor is equivalent to...



VII in C minor is equivalent to...



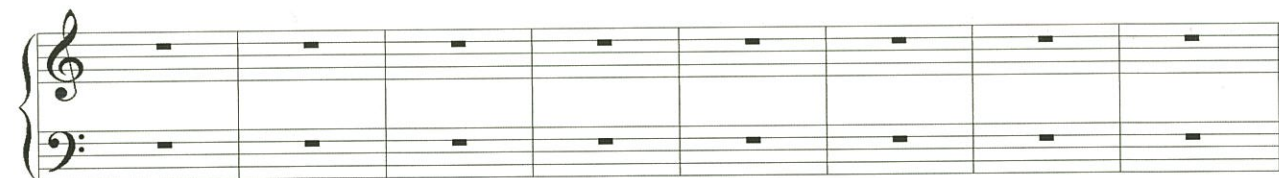
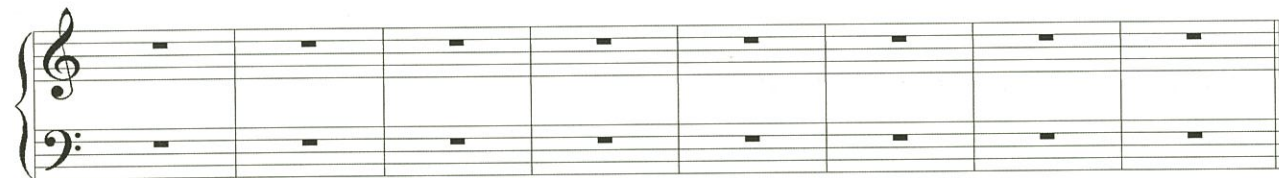
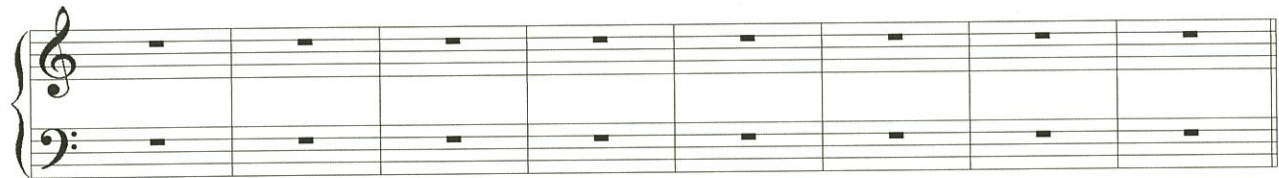
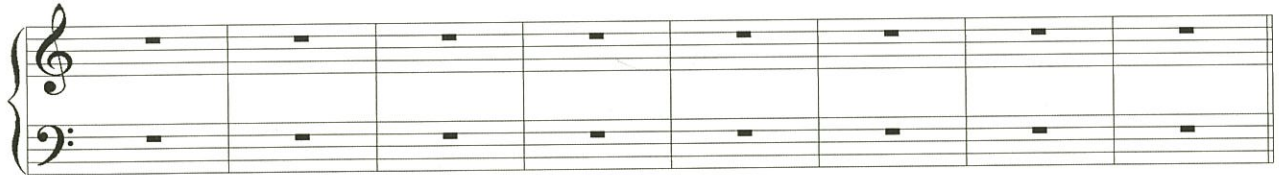
IV in C minor is equivalent to...



Worksheet 1: Modulation

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Beginning in C Major, construct an eight-bar phrase that modulates, via a pivot chord in bar four, to the key of G Major, the dominant major. Write your answer in four part harmony, labelling each chord with the customary roman numerals below the staff to indicate the root progression.



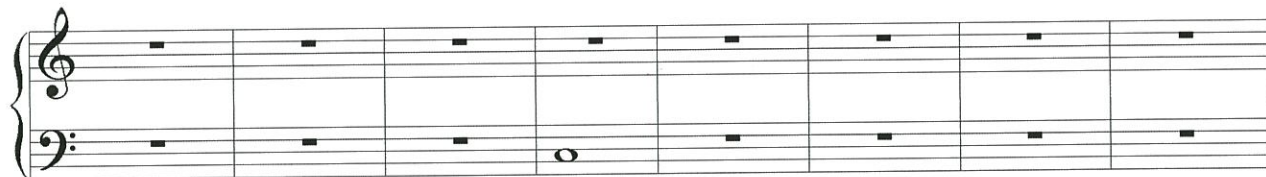
Worksheet 1: Modulation (Answers)

Beginning in C Major, construct an eight-bar phrase that modulates, via a pivot chord in bar four, to the key of G Major, the dominant major. Write your answer in four part harmony, labelling each chord with the customary roman numerals below the staff to indicate the root progression.

Since there are four chords in C Major (I, III, V and VI), that can be used as a pivot to the dominant major, there are four possible answers to this problem.

First, choose a pivot chord. Then, precede the chosen chord with a root sequence that defines the initial tonality. Finally, devise a root sequence to follow the pivot chord which not only defines the tonality, but also concludes the phrase with a cadence.

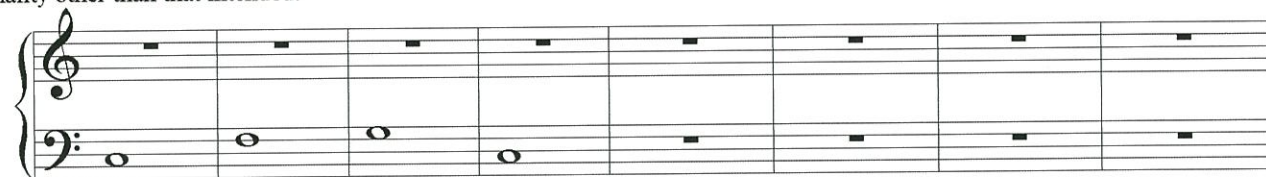
Step 1: Choose a suitable pivot chord for the position in the phrase where you wish to modulate, in this instance, bar 4. Indicate using roman numerals its interpretation in both the initial, as well as the destination key.



C Major: I
G Major: IV

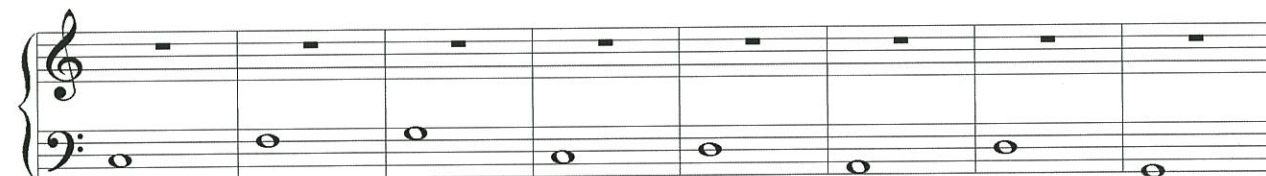
Step 2: Sketch in a root sequence to precede the pivot chord. This root sequence must establish the initial tonality so it must at some point, make use of the progression II to V, or V to II, or IV to V, or V to IV. Since we are required to construct a phrase of a given length, it will be necessary to use additional chords to make up the required number of bars.

Remember, establishing a tonal centre involves using a chord progression with tonal degrees as roots, with a few modal degree chords used for variety. Overemphasis of the modal degrees will give the effect of a mode or tonality other than that intended.



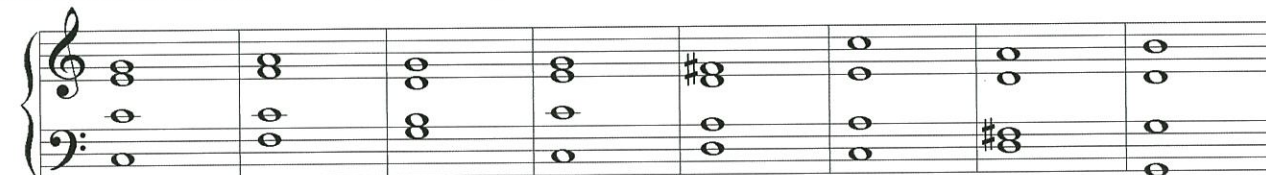
C Major: I IV V I
G Major: IV

Step 3: Similarly, sketch in a root sequence to follow the pivot chord that establishes the destination tonality. It too must at some point, make use of the progression II to V, or V to II, or IV to V, or V to IV. Since we are required to construct a phrase of a given length, a few additional chords will need to be used to make up the required number of bars and conclude with a cadence.



C Major: I IV V I
G Major: IV V II⁶ V I

Step 4: Complete the exercise in four-part harmony.



C Major: I IV V I
G Major: IV V II⁶ V I

Secondary Dominants

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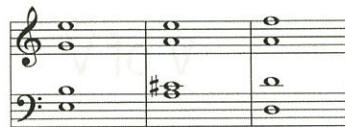
Almost any page of music contains numerous accidentals, sharps, flats, and naturals, that indicate the chromatic alteration of tones of the diatonic scale in which it is written. However, these chromatic signs do not necessarily indicate that a modulation has taken place. Some, for example, are required to notate the major sixth and seventh degrees in the harmonic minor mode, while others are chromatic non-harmonic tones, such as a passing tone between two diatonic scale degrees, or a neighbour note acting as a temporary leading tone beneath a principal note.

Other accidental signs result from a composer's preference for an expanded range of harmonic colour and the increased sense of direction and movement that can be given to a harmonic progression. In such instances, chromaticism results from the use of *secondary dominants*, and far from weakening an established tonality, secondary dominants are used as a means of strengthening it.

The simplest and most natural way to introduce a secondary dominant is to precede it with a chord that may be interpreted as a normal triad in the key of the secondary dominant. Likewise, the secondary dominant progresses onto a chord that is a member of the primary tonality. Thus, the appearance of a secondary dominant can be interpreted as a brief excursion into another tonality, being *prepared* and *resolved* by suitable pivot chords.

Any degree of the scale may be preceded by its own dominant harmony without weakening the fundamental tonality, as the following examples illustrate.

V of II



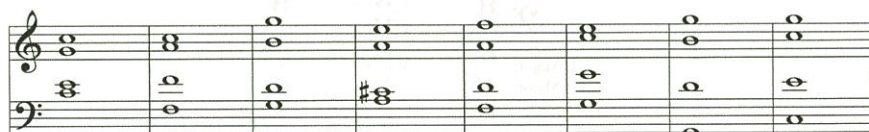
C Major: III V of II II
D Major: II V I



C Major: V V of II II
D Major: IV V I

An important principal of chromatic alteration to bear in mind when using secondary dominants is the tendency for chromatically raised tones to resolve upwards, and conversely, for chromatically lowered notes to proceed downward.

The following example illustrates the use of V of II as a reinforcement of the supertonic harmony preceding a cadence.

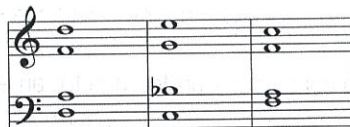


C Major: I IV V V of II II⁶ I^{6/4} V I
D Major: IV V V I⁶

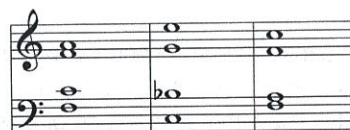
Continued...

V of IV

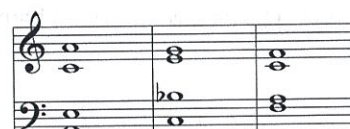
The tonic triad in the major mode may be interpreted as V of IV provided a minor seventh is added to clarify this relationship. V of IV is one of the commonest secondary dominants and is often used toward the end of a movement, where emphasis on the subdominant balances previous modulations to dominant tonalities.



C Major: II V of IV IV
F Major: VI V I

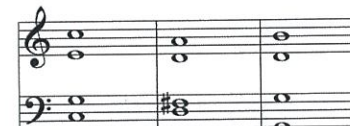


C Major: IV V of IV IV
F Major: I V I

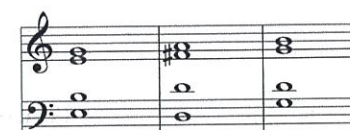


C Major: VI V of IV IV
F Major: III V I

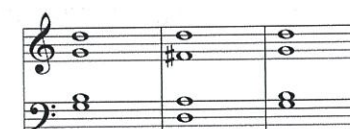
V of V



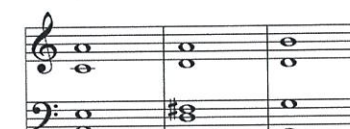
C Major: I V of V V
G Major: IV V I



C Major: III V of V V
G Major: VI V I



C Major: V V of V V
G Major: I V I



C Major: VI V of V V
G Major: II V I

ACT VII, Scene 4

Enter ALOYSIUS [*the teacher*] and MICO [*the student*].

Aloysius. You're quite fascinated by harmony, aren't you Mico? You've been on about it for weeks. So let's proceed in our work of classifying the intervals, consonances, *etc.*, taking our beginning from God himself, thrice greatest, the fount of all the sciences.

Mico. O.K.

Aloysius. Harmony is the chordal, or vertical, structure of a musical composition, in contrast to its melodic, or horizontal structure.

Mico. So it is the study of how individual chords are combined in succession to form a piece of music, then?

Aloysius. That is correct. Harmony came to be appreciated considerably later than counterpoint. Although, even in the early days of counterpoint between the ninth and twelfth centuries, it was apparent that certain intervals sounded better simultaneously than others, it was not until the mid sixteenth century that musicians began to think of harmonies as the primary building material of music.

Mico. You mentioned that certain intervals sound better simultaneously than others?

Aloysius. Yes. Consonance and dissonance are the terms used to describe these agreeable and disagreeable effects.

Mico. But what distinguishes a consonance from a dissonance. Is it something inherent in the mathematical properties of the intervals, or is it in our perception, how we hear the intervals?

Aloysius. You pose a difficult question Mico, for in spite of numerous efforts, no wholly satisfactory explanation and definition of consonance and dissonance has yet been found.

Mico. Surely, there must be some process that governs our perception of these things?

Aloysius. Well, a consonance can be defined as tones that sound well together. Indeed, the word *consonance* comes from the Latin *consonare*, which means exactly that, *sounding well together*.

Mico. I suppose the shortcoming of such a definition is that it is based entirely on subjective impressions.

Aloysius. That is so, but considering the number of competing theories, it is the best answer I can give you. There are cultural theories that examine the social, and stylistic norms; acoustic theories look at the physical properties of sound and its production; and psychophysical theories consider how the neurophysical structure of the ear may be involved.

Mico. I see... [*Writes.*]

Aloysius. Then there are the cognitive theories that examine learning, expectation, and categorical perception.

Mico. Right... [*Busy writing.*]

Aloysius. As an example of a cognitive theory, a dissonant sound may be heard as consonant if it is preceded by many sounds that are even more dissonant. This is why sixteenth-century harmony, for example, does not strike the modern ear as particularly dissonant, yet listeners contemporary with its composition found it quite shocking.

Mico. [*Busy writing.*] ...So where intervals are concerned, it seems that familiarity breeds consonance.

Aloysius. ...Quite shocking.

Mico. ...And what of dissonance?

Aloysius. The concept of dissonance is one of the most complicated and contentious in music scholarship. Once again, let's sidestep this myriad of issues and focus on the phenomenon of sensory dissonance.

Mico. Sounds interesting!

Aloysius. Sensory dissonance appears to be caused by physiological interference along the basilar membrane of the cochlea.

Mico. The membrane on which the sensory hair-cells are situated...

Aloysius. In effect, the presence of one tone component interacts with other tone components in a way that renders the hearing organ less able to discern the various spectral components present in the environment. The phenomenon can be likened to visual glare where a bright light source or reflection interferes with our ability to see. That is, a visual stimulus degrades the performance of the visual system so that we are less able to gather information from the environment.

Mico. Some sonorities, then, must result in stimulus engendered degradation of the auditory system, am I right?

Aloysius. In simple terms, some sounds make it more difficult to *hear* than other sounds. These *glaring* sounds include the sorts of sonorities that music theorists have conventionally characterized as *dissonant*, such as the tritone,

semitone intervals, and dense loud sonorities containing many close pitches, the sorts of sounds that have a tendency to appear at moments of musical climax.

Mico. So, if a consonance can be defined as tones that *sound well together*, then surely we could simply define a dissonance, as something that *sounds bad together*, couldn't we?

Aloysius. Not really...

Mico. No?

Aloysius. It cannot be too strongly emphasised that the essential quality of dissonance is its sense of movement and not, as is often erroneously assumed, its degree of unpleasantness to the ear.

Mico. A consonant interval sounds stable and complete, then?

Aloysius. And dissonant intervals sound unstable, calling for resolution into a consonance. This is the reason why music without dissonant intervals is often lifeless and uninteresting, since it is the dissonant element that furnishes much of the sense of forward motion and rhythmic energy.

Mico. So which intervals are consonant and which are dissonant?

Aloysius. The consonant intervals can be divided into two groups. The unison, fifth, and octave are known as the *perfect* consonances, while major and minor thirds, and similarly, sixths, are known as the *imperfect* consonances.

Mico. So the remaining intervals, the second, fourth and seventh, are dissonant, right?

Aloysius. The second and seventh must always be considered dissonant, as are augmented and diminished intervals, but the perfect fourth is an exception; it is considered dissonant when it stands alone, but consonant when there is a third or perfect fifth below it. In fact, ideas about which intervals are consonant and dissonant have changed considerably during the course of music history. It seems as well to be a matter of taste decided differently by each musical culture and each age. In medieval times, for example, the perfect fourth was considered highly consonant and stable, but for modern Western-enculturated listeners, the isolated interval of a fourth tends to sound like a suspension yearning to be resolved to a third.

Mico. Enculturation?

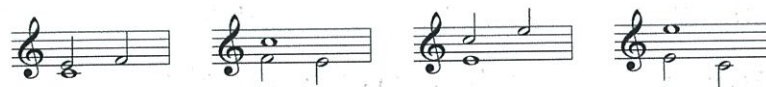
Aloysius. Yes, the gradual acquisition of the social and stylistic norms of a group. Bear in mind also that consonance and dissonance are relative, not categorical, terms, and another important way we characterise intervals is by how pleasing or disagreeable their sound is to us.

Mico. You mean, there is an orderly progression from most to least pleasant? But are these not subjective impressions...

Aloysius. [Subito.] Influenced, but not determined, by underlying psychophysical principles we all share. Ordered by decreasing consonance, the unison is the most consonant, followed by the octave, fifth, fourth, major sixth, major third, minor third, minor sixth, major second, major seventh, minor seventh, minor second, with the interval of the tritone being the most dissonant. [Pauses.] These, then, are the elements that account for all harmony in music, and the purpose of harmony is to give pleasure. Pleasure is awakened by variety of sound and this variety, is the result of the progression from one interval to another, and progression, finally, is achieved by motion. Thus it remains to examine the nature of motion. Relative to each other, two voices may move in one of three ways. Firstly, there is *contrary motion* in which the voices move by step or skip in opposite directions, as shown in the example:



Aloysius. Secondly, there is *oblique motion* in which one voice moves while the other remains stationary:



Aloysius. Finally, there is *similar motion*, where both voices move in the same direction:



Aloysius. In similar motion, if the two voices remain the same distance apart, they are said to be in *parallel motion*.

Mico. What? Even if a major third is followed by a minor third?

Aloysius. It's still considered a succession of parallel thirds.

Mico. Eventhough the thirds are unequal in size?

Aloysius. Indeed. Now, these types of motion having been made clear, it remains to be seen how they are used in practice. It is important that you remember that parallel fifths and octaves are avoided between all pairs of voices, but are considered especially objectionable between soprano and bass. Consecutive motions such as fifth to twelfth, unison to octave, and vice versa, are also avoided.



Mico. Yuk!

Aloysius. Parallel thirds and sixths may be used feely:



Aloysius. Parallel fourths may be used if supported by parallel thirds below:

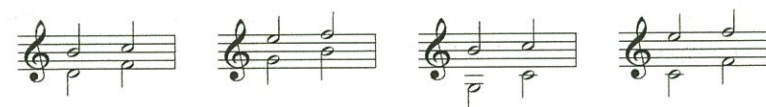


Aloysius. You must also be careful about any approach by similar motion to the intervals of the octave and the perfect fifth. These intervals thus approached are called *direct octaves* and *direct fifths*:



Mico. So an octave or perfect fifth is not approached by similar motion with skips in both voices, yeah?

Aloysius. Yes, but there are couple of exceptions; the direct octave and direct fifth are permitted when the soprano ascends by step of a minor second and thus, acts as a leading tone:



Mico. That's interesting. Whereas the perfect consonances must be used with care, the imperfect consonances may be employed impartially.

Aloysius. You have been attentive. Indeed, the only progression that is forbidden is the direct motion into a perfect consonance.

Mico. So from one perfect consonance to another perfect consonance one must proceed in contrary or oblique motion.

Aloysius. And likewise, one must proceed in contrary or oblique motion from an imperfect consonance to a perfect consonance.

Mico. So that means from one imperfect consonance to another imperfect consonance one may proceed in any of the three motions.

Aloysius. And likewise, one may proceed in any of the three motions from a perfect consonance to an imperfect consonance.



1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text also mentions the need for regular audits and the role of independent auditors in ensuring the reliability of the data.

2. The second part of the document focuses on the implementation of internal controls. It outlines the various measures that can be taken to minimize the risk of errors and misstatements, such as the separation of duties, the use of standardized procedures, and the establishment of a strong internal control environment.

3. The third part of the document addresses the issue of transparency and disclosure. It discusses the importance of providing timely and accurate information to stakeholders and the role of public reporting in building trust and confidence in the organization.

4. The fourth part of the document discusses the role of technology in improving financial reporting. It highlights the benefits of using automated systems for data collection, processing, and analysis, and the importance of ensuring the security and integrity of the information systems.

5. The fifth part of the document discusses the importance of ongoing monitoring and evaluation. It emphasizes the need for regular reviews of the internal control system and the implementation of corrective actions to address any identified weaknesses or deficiencies.

6. The sixth part of the document discusses the role of the board of directors in overseeing the financial reporting process. It outlines the responsibilities of the board in ensuring the accuracy and integrity of the financial statements and the importance of maintaining a strong relationship with the external auditors.

7. The seventh part of the document discusses the importance of communication and collaboration. It emphasizes the need for clear communication between all levels of the organization and the importance of working closely with the external auditors to ensure the highest quality of the financial reporting process.

8. The eighth part of the document discusses the importance of training and education. It emphasizes the need for ongoing training for all employees involved in the financial reporting process and the importance of staying up-to-date with the latest developments in the field.

9. The ninth part of the document discusses the importance of documentation. It emphasizes the need for clear and concise documentation of all internal control procedures and the importance of keeping the documentation up-to-date and accessible to all relevant personnel.

10. The tenth part of the document discusses the importance of the overall financial reporting culture. It emphasizes the need for a strong commitment to integrity and transparency at all levels of the organization and the importance of fostering a culture of continuous improvement.

11. The eleventh part of the document discusses the importance of the external environment. It emphasizes the need for a strong regulatory framework and the importance of working closely with the regulatory authorities to ensure compliance with all applicable laws and regulations.

12. The twelfth part of the document discusses the importance of the overall financial reporting process. It emphasizes the need for a strong commitment to accuracy and integrity and the importance of maintaining a strong relationship with the external auditors.

13. The thirteenth part of the document discusses the importance of the overall financial reporting process. It emphasizes the need for a strong commitment to accuracy and integrity and the importance of maintaining a strong relationship with the external auditors.

14. The fourteenth part of the document discusses the importance of the overall financial reporting process. It emphasizes the need for a strong commitment to accuracy and integrity and the importance of maintaining a strong relationship with the external auditors.

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CLOSURE / Cadence

12 JUL 2008

Listeners make a distinction between events that happen midway through a phrase and events that happen at points of melodic termination or repose. For example, theorists consider the cadence to be the quintessential gesture for creating repose, but when cadential progressions occur at metric positions other than those expected by listeners, they are not interpreted as being cadential.

The word *cadence* comes from the Italian word *cadenza*, meaning to fall or decline. The label is apt since, as in speech, the final pitch in music is very often approached in a descending contour. In many cultures, tumbling phrases epitomize the termination of a phrase. There is a tendency in Western music for phrases to exhibit arch-shaped contours, and listeners form expectations that the notes in the latter half of a phrase are likely to descend in pitch. In music, cadences are not restricted to the final moments of a work, but also occur at the ends of individual phrases. Cadences differ in their degree of closure, like different punctuation marks, commas, semicolons, periods, some cadences sound more final than others.

Music theorists have long observed that cadences tend to be organized in a stereotypic fashion. It is not simply the final note of the cadence that is predictable; the final note is often approached in a characteristic or formulaic manner. Thus, cadences are both melodically and harmonically more predictable than other segments of the music. Such stereotypic cadential patterns are ubiquitous throughout music, both Western and non-Western.

Example 1 shows a *Landini cadence*, a common pre-Renaissance way of terminating phrases, and named after the fourteenth-century Italian composer, Francesco Landini (1325 to 1397), who used it consistently.



Example 2 shows a typical cadence associated with gypsy, or Romani music.



Example 3 shows a common cadential progression from the Classical era using the German sixth-chord resolving to an authentic cadence via a cadential six-four chord.



Example 4 shows a common twentieth-century jazz cadence ending on the tonic chord with an added major seventh and ninth. The tonic chord is approached here by a *tritone substitution chord*, a chord based on the Neapolitan seventh rather than a dominant seventh.



Example 5 shows the final cadence of a Chinese bamboo flute melody where it is common to terminate works or phrases with sustained trills.



Example 6 shows a common way in which works or phrases of Moroccan *Jajouka* music are terminated with a series of repeated pitches.



Example 7 shows how a similar device is used in American Indian songs.



Not all music is organized into phrases. Nor does all music ends with final closing gestures, but for music that does exhibit cadences, these points of closure are among the most clichéd aspects of the music.

Incidentally, the high degree of predictability when approaching a phrase boundary is also evident in speech. Speech researchers have shown that people are very good at predicting the end point of a spoken utterance, even when they have no knowledge of the speaker's language.



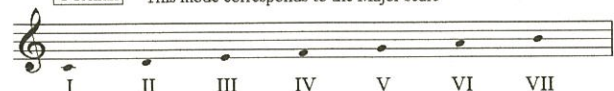
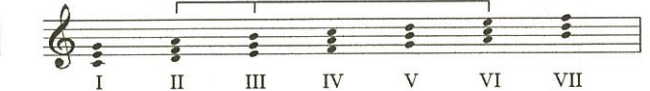

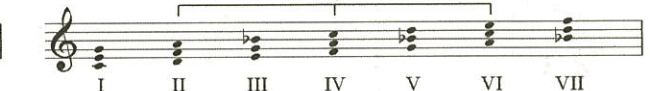

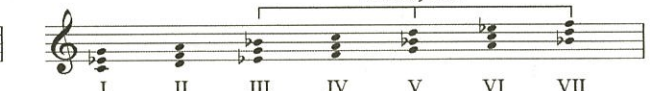
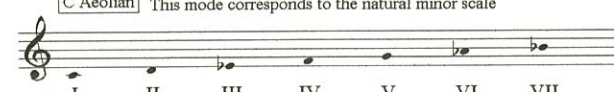


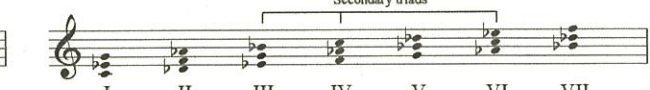
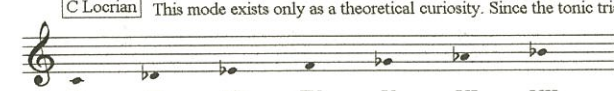
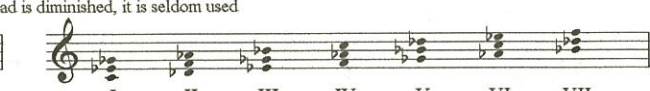
A high degree of predictability in approaching a point of closure is not the only characteristic feature of closure. Another feature is the increase in uncertainty that commonly follows after the closure point. Phrase boundaries exhibit both an increase in predictability as the cadence is approached, and an increase in uncertainty about what will follow after the cadence.

Modes

16 JUL 2008

A mode is a selection of tones, arranged into a scale, that forms the basic tonal substance of a composition. From this selection, one tone is designated to function as a *tonic*. The examples below are arranged according to their tension relationships, with the Lydian mode being the *brightest* and the Locrian the *darkest*.

For a more detailed discussion see Persichetti, Vincent, *Twentieth Century Harmony*, W. W. Norton & Co., London, 1961, pages 31 to 41.

<p>C Lydian</p>  <p>I II III IV V VI VII</p> <p>Characteristic scale degree</p> <p>This is the scale degree that distinguishes it from either the Major or the minor mode</p>	<p>C D Em F#° G Am Bm</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Ionian This mode corresponds to the Major scale</p>  <p>I II III IV V VI VII</p>	<p>C Dm Em F G Am B°</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Mixolydian</p>  <p>I II III IV V VI VII</p> <p>Characteristic scale degree</p>	<p>C Dm E° F Gm Am Bb</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Dorian</p>  <p>I II III IV V VI VII</p> <p>Characteristic scale degree</p>	<p>Cm Dm Eb F Gm A° Bb</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Aeolian This mode corresponds to the natural minor scale</p>  <p>I II III IV V VI VII</p>	<p>Cm D° Eb Fm Gm Ab Bb</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Phrygian</p>  <p>I II III IV V VI VII</p> <p>Characteristic scale degree</p>	<p>Cm Db Eb Fm G° Ab Bbm</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>
<p>C Locrian This mode exists only as a theoretical curiosity. Since the tonic triad is diminished, it is seldom used</p>  <p>I II III IV V VI VII</p>	<p>C° Db Ebm Fm Gb Ab Bbm</p>  <p>I II III IV V VI VII</p> <p>Primary triads</p>

Modes and the use of Seventh Chords

Seventh chords containing the tritone require special consideration since they imply the dominant seventh of either a major or minor scale. The most useful seventh chords are those without tritones, and such chords progress easily from one to another while in the same mode.

C Lydian

I II III IV V VI VII

Avoid the progression II to V which would imply V to I in G Major, and the progression IV to VII which would imply V to I in B minor.

C Ionian

I II III IV V VI VII

C Mixolydian

I II III IV V VI VII

Avoid the progression I to IV which would imply V to I in F Major, and the progression III to VI which would imply V to I in A minor.

C Dorian

I II III IV V VI VII

Avoid the progression IV to VII which would imply V to I in Bb Major, and the progression VI to II which would imply V to I in D minor.

C Aeolian

I II III IV V VI VII

C Phrygian

I II III IV V VI VII

Avoid the progression III to VI which would imply V to I in Ab Major, and the progression V to I which would imply V to I in C minor.

C Locrian

I II III IV V VI VII

Avoid the progression VI to II which would imply V to I in Db Major, and the progression I to IV which would imply V to I in F minor.

The Lydian Mode

I to II● 380 IV to V	II● to I 39	III to I 139	IV○ to I 138	V to I 309 I to IV	VII● to I 340 III to IV
I to III 25	II● to III 119	III to II● 286 VI to V	IV○ to II● 194	V to II● 376 I to V	VII● to II● 63
I to IV○ 132	II● to IV○ 5	III to IV○ 116	IV○ to III 55	V to III 120	VII● to III 383 III to VI
I to V 304 IV to I	II● to V 793 V to I	III to V 155	IV○ to V 583 VII to I	V to IV○ 25	VII● to IV○ 21
I to VI 132	II● to VI 21	III to VI 232 VI to II	IV○ to VI 0	V to VI 143	VII● to V 63
I to VII● 25	II● to VII● 21	III to VII● 69	IV○ to VII● 27	V to VII● 25	VII● to VI 127

The distinctive character of any scale can be exploited by using harmonic progressions in which the characteristic step occurs often. Triads indicated with the marker ● contain the characteristic scale degree. Diminished triads indicated by the marker ○ also contain the characteristic scale degree. The boxed progressions all contain the characteristic scale degree and are considered the most suitable progressions for establishing a given mode. However, those without a marker could just as easily be employed. The numbers following each progression are a measure of the statistical probability of occurrence of the equivalent progression in the Major mode. If a given progression has a high probability of occurrence in the Major mode then it is likely to sound like a progression in the Major mode. For this reason, progressions with a probability greater than 200 have been considered unsuitable for use. These progressions are shown in grey. For example, in order to prevent the C Lydian mode sounding like a major key avoid the progression II to V which would imply V to I in G Major.

The Mixolydian Mode

I to II 119	II to I 286 VI to V	III○ to I 194	IV to I 376 I to V	V● to I 564 II to V	VII● to I 380 IV to V
I to III○ 5	II to III○ 116	III○ to II 55	IV to II 120	V● to II 40	VII● to II 25
I to IV 793 V to I	II to IV 155	III○ to IV 583 VII to I	IV to III○ 25	V● to III○ 48	VII● to III○ 132
I to V● 21	II to V● 232 VI to II	III○ to V● 0	IV to V● 143	V● to IV 274 II to I	VII● to IV 304 IV to I
I to VI 21	II to VI 69	III○ to VI 27	IV to VI 25	V● to VI 40	VII● to V● 132
I to VII● 39	II to VII● 139	III○ to VII● 138	IV to VII● 309 I to IV	V● to VII● 32	VII● to VI 25

The Dorian Mode

I to II● 40	II● to I 127	III to I 132	IV● to I 21	V to I 232 VI to II	VII to I 143
I to III 32	II● to III 340 III to IV	III to II● 25	IV● to II● 21	V to II● 69	VII to II● 25
I to IV● 564 II to V	II● to IV● 63	III to IV● 380 IV to V	IV● to III 39	V to III 139	VII to III 309 I to IV
I to V 40	II● to V 383 III to VI	III to V 25	IV● to V 119	V to IV● 286 VI to V	VII to IV● 376 I to V
I to VI○ 48	II● to VI○ 21	III to VI○ 132	IV● to VI○ 5	V to VI○ 116	VII to V 120
I to VII 274 II to I	II● to VII 63	III to VII 304 IV to I	IV● to VII 793 V to I	V to VII 155	VII to VI○ 25

The Phrygian Mode

I to II● 340 III to IV	II● to I 25	III to I 21	IV to I 69	V○ to I 27	VII● to I 40
I to III 63	II● to III 380 IV to V	III to II● 39	IV to II● 139	V○ to II● 138	VII● to II● 32
I to IV 383 III to VI	II● to IV 25	III to IV 119	IV to III 286 VI to V	V○ to III 194	VII● to III 564 II to V
I to V○ 21	II● to V○ 132	III to V○ 5	IV to V○ 116	V○ to IV 55	VII● to IV 40
I to VI 63	II● to VI 304 IV to I	III to VI 155	IV to VI 155	V○ to VI 583 VII to I	VII● to V○ 48
I to VII● 127	II● to VII● 132	III to VII● 21	IV to VII● 232 VI to II	V○ to VII● 0	VII● to VI 274 II to I

The figures in this column refer to the frequency of various chord progressions in a sample of Baroque music. For example, 79.3% of dominant chords are followed by the tonic. Other progressions, such as VII to II, almost never occur. (See Huron, David, *Sweet Anticipation*, The MIT Press, London, 2006, page 250 to 252.)

793 - V to I
 583 - VII to I
 564 - II to V
 383 - III to VI
 380 - IV to V
 376 - I to V
 340 - III to IV
 309 - I to IV
 304 - IV to I
 286 - VI to V
 274 - II to I
 232 - VI to II
 194 - VII to V
 155 - VI to I
 143 - I to II
 139 - VI to IV
 138 - VII to IV
 132 - IV to VII
 132 - IV to II
 127 - III to II
 120 - I to VI
 119 - V to VI
 116 - VI to VII
 069 - VI to III
 063 - III to V
 063 - III to I
 055 - VII to VI
 048 - II to VII
 040 - II to VI
 040 - II to III
 039 - V to IV
 032 - II to IV
 027 - VII to III
 025 - IV to VI
 025 - IV to III
 025 - I to VII
 025 - I to III
 021 - V to III
 021 - V to II
 021 - III to VII
 005 - V to VII
 000 - VII to II

The figures in this column are similar to the generalisations given by Piston whose observations are based on the usage by composers in the period of common practice. (Piston, Walter, *Harmony*, W. W. Norton & Co., London, 1987, page 23.) For example, III is followed by VI, sometimes followed by IV, less often followed by II, V, or I, and seldom followed by VII.

376 - I to V
 309 - I to IV
 143 - I to II
 120 - I to VI
 025 - I to VII
 025 - I to III
 564 - II to V
 274 - II to I
 048 - II to VII
 040 - II to VI
 040 - II to III
 032 - II to IV
 383 - III to VI
 340 - III to IV
 127 - III to II
 063 - III to V
 063 - III to I
 021 - III to VII
 380 - IV to V
 304 - IV to I
 132 - IV to VII
 132 - IV to II
 025 - IV to VI
 025 - IV to III
 793 - V to I
 119 - V to VI
 039 - V to IV
 021 - V to III
 021 - V to II
 005 - V to VII
 286 - VI to V
 232 - VI to II
 155 - VI to I
 139 - VI to IV
 116 - VI to VII
 069 - VI to III
 583 - VII to I
 194 - VII to V
 138 - VII to IV
 055 - VII to VI
 027 - VII to III
 000 - VII to II

18 JUL 2008

Synthetic Scale Formations

18 JUL 2008

There are 75 scale formations possible when the tonic chord is Major or minor.

All scales in which the tonic chord is either augmented or diminished have been excluded.

Thus, the Locrian, Enigmatic, and Leading whole-tone scales are not shown.

The following table summarizes the scale formations shown in the image, organized by row and column. Each entry includes the tonic chord, the scale name (if applicable), and the sequence of intervals.

Row	Column	Tonic Chord	Scale Name	Intervals
1	1	Cm		m M m A m M M
1	2	Cm		m M m A m A m
1	3	Cm		m M m A M m M
2	1	Cm		m M m A M M m
2	2	Cm		m M m A A m m
2	3	Cm	Phrygian	m M M M m M M
3	1	Cm	Neapolitan minor	m M M M m A m
3	2	Cm		m M M M M m M
3	3	Cm	Neapolitan Major	m M M M M M m
4	1	Cm		m M M M A m m
4	2	Cm		m M A m m M M
4	3	Cm		m M A m m A m
5	1	Cm		m M A m M m M
5	2	Cm		m M A m M M m
5	3	Cm		m M A m A m m
6	1	C(b5)		m A m m M M M
6	2	C(b5)		m A m m M A m
6	3	C(b5)	Oriental	m A m m A m M
7	1	C(b5)		m A m m A M m
7	2	C(b5)		m A m m A m m
7	3	C		m A m M m M M
8	1	C	Double harmonic	m A m M m A m
8	2	C		m A m M M m M
8	3	C		m A m M M M m
9	1	C		m A m M A m m
9	2	C		m A M m m M M
9	3	C		m A M m m A m
10	1	C		m A M m M m M
10	2	C		m A M m M M m
10	3	C		m A M m A m m
11	1	Cm		M m m A m M M
11	2	Cm		M m m A m A m
11	3	Cm		M m m A M m M
12	1	Cm		M m m A M M m
12	2	Cm		M m m A A m m
12	3	Cm	Aeolian (Natural minor)	M m M M m M M

<p>Cm Harmonic minor</p> <p>M m M M m A m</p>	<p>Cm Dorian</p> <p>M m M M M m M</p>	<p>Cm Ascending melodic minor</p> <p>M m M M M M m</p>
<p>Cm</p> <p>M m M M A m m</p>	<p>Cm</p> <p>M m A m m M M</p>	<p>Cm Hungarian minor</p> <p>M m A m m A m</p>
<p>Cm</p> <p>M m A m M m M</p>	<p>Cm</p> <p>M m A m M M m</p>	<p>Cm</p> <p>M m A m A m m</p>
<p>C(b5) Major Locrian</p> <p>M M m m M M M</p>	<p>C(b5)</p> <p>M M m m M A m</p>	<p>C(b5)</p> <p>M M m m A m M</p>
<p>C(b5)</p> <p>M M m m A M m</p>	<p>C(b5)</p> <p>M M m m A m m</p>	<p>C</p> <p>M M m M m M M</p>
<p>C</p> <p>M M m M m A m</p>	<p>C Mixolydian</p> <p>M M m M M m M</p>	<p>C Ionian (Major)</p> <p>M M m M M M m</p>
<p>C</p> <p>M M m M A m m</p>	<p>C Lydian minor</p> <p>M M M m m M M</p>	<p>C</p> <p>M M M m m A m</p>
<p>C Overtone</p> <p>M M M m M m M</p>	<p>C Lydian</p> <p>M M M m M M m</p>	<p>C</p> <p>M M M m A m m</p>
<p>C(b5)</p> <p>A m m m M M M</p>	<p>C(b5)</p> <p>A m m m M A m</p>	<p>C(b5)</p> <p>A m m m A m M</p>
<p>C(b5)</p> <p>A m m m A M m</p>	<p>C(b5)</p> <p>A m m m A m m</p>	<p>C</p> <p>A m m M m M M</p>
<p>C</p> <p>A m m M m A m</p>	<p>C</p> <p>A m m M M m M</p>	<p>C</p> <p>A m m M M M m</p>
<p>C</p> <p>A m m M A m m</p>	<p>C</p> <p>A m M m m M M</p>	<p>C</p> <p>A m M m m A m</p>
<p>C Hungarian Major</p> <p>A m M m M m M</p>	<p>C</p> <p>A m M m M M m</p>	<p>C</p> <p>A m M m A m m</p>

Intervals in the key of C major

20 JUL 2007

Unison	Major 2nd	Major 3rd	Perfect 4th	Perfect 5th	Major 6th	Major 7th	Perfect 8ve	Perfect 8ve	Major 7th	Major 6th	Perfect 5th	Perfect 4th	Major 3rd	Major 2nd	Unison
T	T	T	St	T	Sd	T	D	T	Lt	T	Sm	T	D	T	T
T	T	St	St	M	T	Sm	T	Lt	T	Sm	T	D	T	St	T

Unison	Major 2nd	Minor 3rd	Perfect 4th	Perfect 5th	Major 6th	Minor 7th	Perfect 8ve	Perfect 8ve	Minor 7th	Major 6th	Perfect 5th	Perfect 4th	Minor 3rd	Major 2nd	Unison
St	St	St	M	St	Sd	St	D	St	Sm	St	St	D	St	St	St
St	St	St	Sd	St	D	St	Sm	St	Lt	St	Sm	St	Sd	St	St

Unison	Minor 2nd	Minor 3rd	Perfect 4th	Perfect 5th	Minor 6th	Minor 7th	Perfect 8ve	Perfect 8ve	Minor 7th	Minor 6th	Perfect 5th	Perfect 4th	Minor 3rd	Minor 2nd	Unison
M	M	M	Sd	M	Sm	M	Lt	M	T	M	St	M	M	D	M
M	M	M	Sd	M	D	M	St	M	M	St	M	T	M	D	M

Unison	Major 2nd	Major 3rd	Aug. 4th	Perfect 5th	Major 6th	Major 7th	Perfect 8ve	Perfect 8ve	Major 7th	Major 6th	Perfect 5th	Aug. 4th	Major 3rd	Major 2nd	Unison
Sd	Sd	Sd	D	Sd	Sm	Sd	Lt	Sd	T	Sd	St	Sd	Sm	Sd	Sd
Sd	Sd	Sd	D	Sd	Sm	Sd	Lt	Sd	T	Sd	St	Sd	Sm	Sd	Sd

Unison	Major 2nd	Major 3rd	Perfect 4th	Perfect 5th	Major 6th	Minor 7th	Perfect 8ve	Perfect 8ve	Minor 7th	Major 6th	Perfect 5th	Perfect 4th	Major 3rd	Major 2nd	Unison
D	D	D	Sm	D	Lt	D	T	D	St	D	M	D	St	D	T
D	D	D	Sm	D	Lt	D	T	D	St	D	M	D	St	D	T

Unison	Major 2nd	Minor 3rd	Perfect 4th	Perfect 5th	Minor 6th	Minor 7th	Perfect 8ve	Perfect 8ve	Minor 7th	Minor 6th	Perfect 5th	Perfect 4th	Minor 3rd	Major 2nd	Unison
Sm	Sm	Sm	Lt	Sm	T	Sm	St	Sm	M	Sm	Sd	Sm	M	Sm	Sm
Sm	Sm	Sm	Lt	Sm	T	Sm	St	Sm	M	Sm	Sd	Sm	M	Sm	Sm

Unison	Minor 2nd	Minor 3rd	Perfect 4th	Dim. 5th	Minor 6th	Minor 7th	Perfect 8ve	Perfect 8ve	Minor 7th	Minor 6th	Dim. 5th	Perfect 4th	Minor 3rd	Minor 2nd	Unison
Lt	Lt	Lt	T	Lt	St	Lt	M	Lt	Sd	Lt	D	Lt	M	Lt	Lt
Lt	Lt	Lt	T	Lt	St	Lt	M	Lt	Sd	Lt	D	Lt	M	Lt	Lt

Intervals in the key of C minor

17

The Kingdom of God be with thee, Thy will be done on earth as it is in heaven. Deliver us from evil. Amen.

Unison Major 2nd Minor 3rd Perfect 4th Perfect 5th Major 6th Minor 7th Perfect 8ve Perfect 8ve Major 7th Major 6th Perfect 5th Perfect 4th Minor 3rd Minor 2nd Unison

Unison Minor 2nd Minor 3rd Perfect 4th Perfect 5th Major 6th Minor 7th Perfect 8ve Perfect 8ve Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Minor 2nd Unison

Unison Major 2nd Minor 3rd Aug. 4th Aug. 5th Major 6th Major 7th Perfect 8ve Perfect 8ve Major 7th Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Major 2nd Unison

Unison Major 2nd Major 3rd Aug. 4th Perfect 5th Major 6th Minor 7th Perfect 8ve Perfect 8ve Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Major 2nd Unison

Unison Major 2nd Major 3rd Perfect 4th Perfect 5th Minor 6th Minor 7th Perfect 8ve Perfect 8ve Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Minor 2nd Unison

Unison Major 2nd Minor 3rd Perfect 4th Perfect 5th Major 6th Major 7th Perfect 8ve Perfect 8ve Major 7th Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Major 2nd Unison

Unison Minor 2nd Minor 3rd Dim. 4th Dim. 5th Minor 6th Minor 7th Perfect 8ve Perfect 8ve Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Major 2nd Unison

Unison Minor 2nd Minor 3rd Dim. 4th Dim. 5th Minor 6th Minor 7th Perfect 8ve Perfect 8ve Minor 7th Minor 6th Perfect 5th Perfect 4th Minor 3rd Major 2nd Unison

1:1	C	C	C	C	C	C	C	C	C	C	C	C	C	C
1:2	C	C	Dm	Dm	Em	Em	F	F	G	G	Am	Am	B°	B°
1:3	C	C	Em	Em	G	G	B°	B°	Dm	Dm	F	F	Am	Am
1:4	C	C	F	F	B°	B°	Em	Em	Am	Am	Dm	Dm	G	G
1:5	C	C	G	G	Dm	Dm	Am	Am	Em	Em	B°	B°	F	F
1:6	C	C	Am	Am	F	F	Dm	Dm	B°	B°	G	G	Em	Em
1:7	C	C	B°	B°	Am	Am	G	G	F	F	Em	Em	Dm	Dm
2:1	C	Dm	Dm	Em	Em	F	F	G	G	Am	Am	B°	B°	C
2:2	C	Dm	Em	F	G	Am	B°	C	Dm	Em	F	G	Am	B°
2:3	C	Dm	F	G	B°	C	Em	F	Am	B°	Dm	Em	G	Am
2:4	C	Dm	G	Am	Dm	Em	Am	B°	Em	F	B°	C	F	G
2:5	C	Dm	Am	B°	F	G	Dm	Em	B°	C	G	Am	Em	F
2:6	C	Dm	B°	C	Am	B°	G	Am	F	G	Em	F	Dm	Em
2:7	C	Dm	C	Dm	C	Dm	C	Dm	C	Dm	C	Dm	C	Dm
3:1	C	Em	Em	G	G	B°	B°	Dm	Dm	F	F	Am	Am	C
3:2	C	Em	F	Am	B°	Dm	Em	G	Am	C	Dm	F	G	B°
3:3	C	Em	G	B°	Dm	F	Am	C	Em	G	B°	Dm	F	Am
3:4	C	Em	Am	C	F	Am	Dm	F	B°	Dm	G	B°	Em	G
3:5	C	Em	B°	Dm	Am	C	G	B°	F	Am	Em	G	Dm	F
3:6	C	Em	C	Em	C	Em	C	Em	C	Em	C	Em	C	Em
3:7	C	Em	Dm	F	Em	G	F	Am	G	B°	Am	C	B°	Dm
4:1	C	F	F	B°	B°	Em	Em	Am	Am	Dm	Dm	G	G	C
4:2	C	F	G	C	Dm	G	Am	Dm	Em	Am	B°	Em	F	B°
4:3	C	F	Am	Dm	F	B°	Dm	G	B°	Em	G	C	Em	Am
4:4	C	F	B°	Em	Am	Dm	G	C	F	B°	Em	Am	Dm	G
4:5	C	F	C	F	C	F	C	F	C	F	C	F	C	F
4:6	C	F	Dm	G	Em	Am	F	B°	G	C	Am	Dm	B°	Em
4:7	C	F	Em	Am	G	C	B°	Em	Dm	G	F	B°	Am	Dm
5:1	C	G	G	Dm	Dm	Am	Am	Em	Em	B°	B°	F	F	C
5:2	C	G	Am	Em	F	C	Dm	Am	B°	F	G	Dm	Em	B°
5:3	C	G	B°	F	Am	Em	G	Dm	F	C	Em	B°	Dm	Am
5:4	C	G	C	G	C	G	C	G	C	G	C	G	C	G
5:5	C	G	Dm	Am	Em	B°	F	C	G	Dm	Am	Em	B°	F
5:6	C	G	Em	B°	G	Dm	B°	F	Dm	Am	F	C	Am	Em
5:7	C	G	F	C	B°	F	Em	B°	Am	Em	Dm	Am	G	Dm
6:1	C	Am	Am	F	F	Dm	Dm	B°	B°	G	G	Em	Em	C
6:2	C	Am	B°	G	Am	F	G	Em	F	Dm	Em	C	Dm	B°
6:3	C	Am	C	Am	C	Am	C	Am	C	Am	C	Am	C	Am
6:4	C	Am	Dm	B°	Em	C	F	Dm	G	Em	Am	F	B°	G
6:5	C	Am	Em	C	G	Em	B°	G	Dm	B°	F	Dm	Am	F
6:6	C	Am	F	Dm	B°	G	Em	C	Am	F	Dm	B°	G	Em
6:7	C	Am	G	Em	Dm	B°	Am	F	Em	C	B°	G	F	Dm
7:1	C	B°	B°	Am	Am	G	G	F	F	Em	Em	Dm	Dm	C
7:2	C	B°	C	B°	C	B°	C	B°	C	B°	C	B°	C	B°
7:3	C	B°	Dm	C	Em	Dm	F	Em	G	F	Am	G	B°	Am
7:4	C	B°	Em	Dm	G	F	B°	Am	Dm	C	F	Em	Am	G
7:5	C	B°	F	Em	B°	Am	Em	Dm	Am	G	Dm	C	G	F
7:6	C	B°	G	F	Dm	C	Am	G	Em	Dm	B°	Am	F	Em
7:7	C	B°	Am	G	F	Em	Dm	C	B°	Am	G	F	Em	Dm

This table shows chord progressions in the key of C Major for two figure ratios. The initial chord of all progressions is the tonic.

Ratios involving 1 all give rise to repeated chords. These are shown in grey.

All remaining ratios are shown in black up to the point at which the tonic chord introduces a REPETITION the sequence.

Ratios in which the first integer is the same as the second repeat after the seventh change of root.

Ratios in which the sum of the integers equals nine repeat after the second change of root. Note that the integers of these examples are equivalent to the complements of intervallic inversion. For example, a 2nd inverted at the octave gives rise to a 7th.

Ratios involving 4 all give rise to the authentic cadence.

Ratios involving 5 all give rise to the plagal cadence.

Note that all ratios eventually repeat at the same point, after the fourteenth change of root.

- 1 AUG 2008

Cadences

Authentic cadence

The authentic cadence is comparable to a full-stop.

Authentic A

V I⁶

Authentic B

IV V I⁶

Authentic B

II⁶ V I⁶

Authentic C

IV I⁶ V I⁶

Authentic C

II⁶ I⁶ V I⁶

The cadential I⁶ usually marks a strong downbeat directly following the barline.

Perfect & imperfect cadences

The use of the authentic cadence is not restricted to final phrases. The most conclusive arrangement, with dominant and tonic chords in root position and the tonic note in the soprano at the end, is perfect. All other forms being termed imperfect, meaning less final.



When the tonic is in the soprano, only certain chord spacings can be used.

If the tonic chord is in the inversion, the cadence is less conclusive and usually implies that the phrase will be extended so that a more conclusive final cadence follows later.

Upbeat & downbeat cadences

The final chord of a phrase may end on either an upbeat or a downbeat. Upbeat cadences emphasise continuation into the next phrase.

Transposed cadence (half cadence)

Trans. A

V/V V I⁶ V

Trans. B

I V I⁶ V

Trans. C

I IV I⁶ IV

Trans. D

IV/IV IV I⁶ IV

A transposed cadence is one that ends on the dominant chord. They are comparable to a comma. They are typically used at the end of the first of a pair of phrases, where the second ends in an authentic cadence. In many cases, the chord before the dominant will contain a chromatically raised fourth degree, the leading tone to the dominant.

Melodic movement in the final chord often acts as an anacrusis to the following phrase.

The cadential I⁶ may also be used to accentuate the transposed cadence.

Plagal cadence

Plagal A

IV I

A plagal cadence can be used alone, but is most often found after an authentic cadence as an added close to a movement.

The minor form of subdominant harmony is frequently used at the end of a movement in the major mode. It gives a particularly colourful ending.

Plagal B

iv I

Deceptive cadence

Deceptive A

V I⁷

A deceptive cadence consists of V followed by any other chord that can substitute the final tonic. There are as many deceptive cadences as there are chords to which the dominant can progress.

The most frequently employed is V to VI. If, at the end of a phrase predominantly in the major mode, the minor sixth degree is used, there is a strong element of surprise in the resolution, which is often accentuated, as in other deceptive cadences, by a sudden change of nuance or orchestration.

Deceptive B

V II

The use of a deceptive cadence near the end of a piece helps to sustain or increase interest at the moment when the final cadence is expected.

Deceptive C

V III

Phrases that overlap consist of the second phrase starting on the last chord of the preceeding cadence, which is most often a deceptive cadence.

Deceptive D

V IV

Deceptive E

V VI or vi

Deceptive F

V VII

Chromatic mediant chords are chromatically altered major and minor chords based on the third and sixth scale degrees; they are chords that do not conform to the key, hence the designation *chromatic*.

In any given key, there are six chromatic mediant chords.

In the key of C major, for example, they are the triads E major, E-flat major, E-flat minor, A major, A-flat major, and A-flat minor.

Chromatic mediant progressions are rare, and consequently, surprising. In Western music, perhaps the quintessential example of a schematic violation is the deceptive cadence. The deceptive cadence thwarts the expectation for the more probable dominant-to-tonic progression, but chromatic mediant progressions are even more surprising.

These sorts of progressions are commonly used in film music where they are associated with moments of high emotion.

(See Huron, David, *Sweet Anticipation*, The Massachusetts Institute of Technology Press, London, 2006. Page 271.)

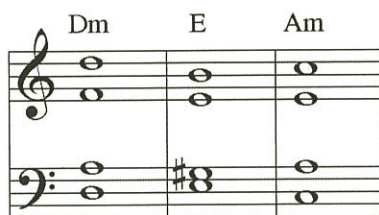
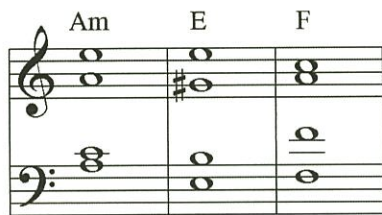
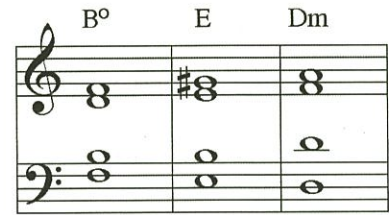
The use of certain chromatic mediant chords is restricted due the necessity of resolving the chromatic tones accordingly; remember that sharpened notes have a tendency to ascend to their resolution, while flatted notes descend.

Additionally, the preparation and resolution of the chromatic entity may give the impression of a modulation, something which would detract from its sense of surprise. For example, the presence of two flatted tones in E \flat Major would dictate that the chord resolve onto II. However, in doing so there is the possibility of the progression being heard as IV to III in B \flat Major, or VI to V in G minor.

Therefore, with these restrictions in mind, only certain chords are of value to the composer.

Mediant with sharpened 3rd

In the key of C Major, the E Major chord may be prepared by a chord on any scale degree, but it must resolve accordingly onto either VI, IV, or II.

Dm E Am	Am E F	B \circ E Dm
		
II III $^{3\#}$ VI 6	VI III $^{3\#}$ IV	VII 6_4 III $^{3\#}$ II

Possible progressions: 0423 II III VI (The numerals indicate the absolute probability of the chord progression.)

0410 VII III VI
 0409 VI III IV
 0408 I III VI
 0408 IV III VI
 0404 V III VI
 0380 II III IV
 0367 VII III IV
 0365 I III IV
 0361 V III IV
 0196 VI III II
 0154 VII III II
 0152 I III II
 0152 IV III II
 0148 V III II

Continued...

Submediant with sharpened 3rd

In the key of C Major, the A Major chord may only be prepared by either I, II, IV and VII. It must only resolve accordingly onto either II or VII.

The first diagram shows three chords in C Major: C (I), A (VI 3#), and Dm (II 6). The second diagram shows three chords: Dm (II 6), A (VI 3#), and B° (VII 6/4). Each chord is shown in both treble and bass staves with its figured bass notation below.

Possible progressions:

- 0352 I VI II
- 0287 VII VI II
- 0257 IV VI II
- 0236 I VI VII
- 0156 II VI VII
- 0141 IV VI VII

Submediant with flatted root and 5th

In the key of C Major, the A^b Major chord may be prepared by a chord on any scale degree, but it must resolve accordingly onto V.

The first diagram shows three chords: Em (III), A° (VI 6^b/_{3^b}), and G (V). The second diagram shows three chords: B° (VII 6/4), A° (VI 6^b/_{3^b}), and G (V 6). Each chord is shown in both treble and bass staves with its figured bass notation below.

Possible progressions:

- 0669 III VI V
- 0406 I VI V
- 0341 VII VI V
- 0326 II VI V
- 0311 IV VI V

24 SEP 2008

First species counterpoint, or note against note, is the composition of two or more voices which, having notes of equal length, consist only of consonances.

Second species counterpoint is the composition of two or more voices that have two notes against each note of the *cantus firmus*, (that is, the implied harmony). The first note of each bar, the downbeat, must always be consonant. The second note is dissonant if it moves from the preceding note by step. However, if it moves by skip, it must be consonant.

In this example, the added notes are interpreted as factors of independent harmonies.

The Neapolitan Sixth

29 SEP 2008

The major triad built on the chromatically lowered supertonic is known as the *Neapolitan sixth*. Although frequently found in works of the Neapolitan school that flourished in 18th century Naples, the members of which cultivated an operatic style of composition, the Neapolitan sixth was already an established idiom throughout the second half of the previous century. During this period it was primarily used in the first inversion, hence the *sixth*. Later, in the nineteenth century, the triad continued to be known as the *Neapolitan sixth* even when it was used in root position or the second inversion.

The Neapolitan sixth is a major triad, and therefore, not a dissonant chord. However, the chromatic alteration of the second degree gives that tone a downward tendency so that it makes for a descending resolution as though it were a dissonant tone. Being a chord of strongly subdominant character it usually progresses to some form of the dominant chord. Under such circumstances, however, the chromatically altered second degree unavoidably resolves downwards by a skip of a diminished third. For this reason, the cadential six-four usually precedes the dominant chord. This produces a smooth stepwise progression in all voices by allowing both chromatically altered tones to resolve according to their tendency.

The Neapolitan sixth may be used in any part of the phrase, even at the beginning, but it is most often used in the cadential formations IV to I^{6/4} to V to I, and II⁶ to I^{6/4} to V to I, where it replaces IV and II⁶ respectively. In the following examples, in the key of C Major, note that the bass of the Neapolitan sixth chord has been doubled since it is a tonal degree, and the use of the commonly accepted symbol N in lieu of the Roman numeral II:

Diagram illustrating the Neapolitan sixth chord (N⁶) in C Major, showing its first inversion (I^{6/4}) and subsequent resolution to the dominant (V) and tonic (I). The bass of the Neapolitan sixth chord is doubled.

Another chord that could be used to allow both chromatically altered tones to resolve according to their tendency is the submediant seventh. In the following example, note the descending stepwise motion in the bass resulting from the various states of inversion used for each individual chord, and the regular resolution of the submediant seventh onto the chord of the supertonic:

Diagram illustrating the Neapolitan sixth chord (N⁶) in C Major, showing its first inversion (I^{6/4}) and subsequent resolution to the dominant (V) and tonic (I). The bass of the Neapolitan sixth chord is doubled.

The Neapolitan sixth may be preceded by its dominant without weakening any previously established tonality:

Diagram illustrating the Neapolitan sixth chord (N⁶) in C Major, showing its first inversion (I^{6/4}) and subsequent resolution to the dominant (V) and tonic (I). The bass of the Neapolitan sixth chord is doubled.

The Neapolitan sixth is also a useful pivot chord enabling modulation to a number of distantly related keys that are not accessible by diatonic modulation. For example, N⁶ in the key of C Major can be interpreted as IV⁶ in A[♭] Major (VI⁶ in F minor), I⁶ in C[♯] / D[♭] Major (III⁶ in A[♯] / B[♭] minor), and V⁶ in F[♯] / G[♭] Major (VII⁶ in D[♯] / E[♭] minor).

Continued...

In the following example, the Neapolitan sixth, appearing in its customary first inversion, is used as a pivot chord to modulate to A^b Major:

The musical notation shows two measures. The first measure contains a C Major triad (C4, E4, G4) and a Neapolitan sixth chord in first inversion (D^b4, F4, A^b4). The second measure contains an A^b Major triad (A^b4, C5, E5). The key signature changes from one flat to two flats.

	D ^b /F	E ^b
C Major	N ⁶	
A ^b Major	IV ⁶	V

The following example modulates to D^b Major and illustrates the use of the Neapolitan sixth in the second inversion. When the Neapolitan sixth is used in the second inversion to modulate to either C[#] Major or D^b Major, interpreting the Neapolitan sixth as the cadential six-four of the new key demands immediate resolution onto the dominant:

The musical notation shows two measures. The first measure contains a C Major triad (C4, E4, G4) and a Neapolitan sixth chord in second inversion (D^b4, A^b4, F4). The second measure contains a D^b Major triad (D^b4, F4, A^b4). The key signature changes from one flat to two flats.

	D ^b /A ^b	A ^b
C Major	N ^{6/4}	
D ^b Major	I ^{6/4}	V

The final example shows how the Neapolitan sixth may be used to modulate to G^b Major:

The musical notation shows two measures. The first measure contains a C Major triad (C4, E4, G4) and a Neapolitan sixth chord in first inversion (D^b4, F4, A^b4). The second measure contains a G^b Major triad (G^b4, B^b4, D^b5). The key signature changes from one flat to three flats.

	D ^b /F	C ^b /E ^b
C Major	N ⁶	
G ^b Major	V ⁶	IV ⁶

Fibonacci Numbers

1	1	C	C	000000000000000001
2	2	D	C#/Db	000000000000000010
3	3	E	D	000000000000000011
4	5	G	E	000000000000000101
5	8	C	G	000000000000001000
6	13	A	C	00000000000001101
7	21	B	G#/Ab	00000000000010101
8	34	A	A	00000000000100010
9	55	A	F#/Gb	0000000000110111
10	89	G	E	0000000001011001
11	144	F	B	0000000010010000
12	233	D	E	0000000011101001
13	377	A	E	0000000101111001
14	610	C	A	0000001001100010
15	987	B	D	0000001111011011
16	1597	C	C	0000011000111101
17	2584	C	D#/Eb	0000101000011000
18	4181	D	E	0000100001010101
19	6765	E	G#/Ab	00001101001101101
20	10946	G	C#/Db	00010101011000010
21	17711	C	A#/Bb	00100010100101111
22	28657	A	C	00110111111110001
23	46368	B	B	01011010100100000
24	75025	A	C	10010010100010001
25	121393	A	C	
26	196418	G	C#/Db	
27	317811	F	D	
28	514229	D	E	
29	832040	A	G	
30	1346269	C	C	
31	2178309	B	G#/Ab	
32	3524578	C	A	
33	5702887	C	F#/Gb	
34	9227465	D	E	
35	14930352	E	B	
36	24157817	G	E	
37	39088169	C	E	
38	63245986	A	A	
39	102334155	B	D	
40	165580141	A	C	
41	267914296	A	D#/Eb	
42	433494437	G	E	
43	701408733	F	G#/Ab	
44	1134903170	D	C#/Db	

This data was produced using an expanded version of the Manuscript code reproduced overleaf.

The Fibonacci sequence appears in the second column.

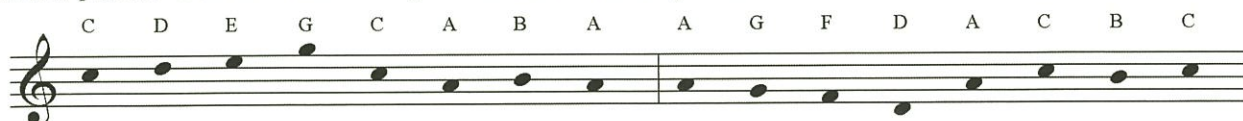
The third column indicates the scale factor when the Fibonacci sequence is assigned to the diatonic scale of C major, that is, 1=C, 2=D, ... 7=B, 8=C, etc... This pattern repeats after every 16th Fibonacci number.

The fourth column indicates the scale factor when the Fibonacci sequence is assigned to the chromatic scale beginning on C. This pattern repeats after every 24th Fibonacci number.

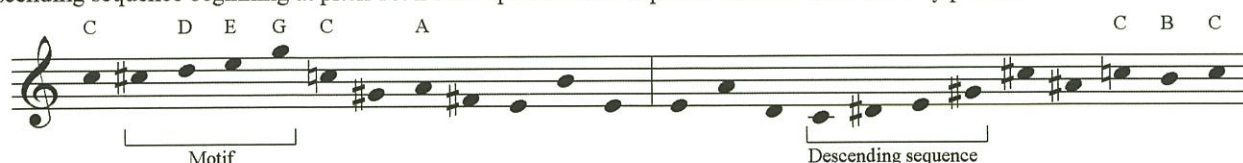
The fifth column shows the Fibonacci number in 17-bit binary code up to the point at which the chromatic data repeats.

Running time: 24 seconds

Note how pitches 9 to 16 of the diatonic sequence are an inversion of pitches 1 to 8.



Note how portions of the chromatic sequence reproduce parts of the diatonic sequence, and how pitches 2 to 5 reappear in descending sequence beginning at pitch 16. Both sequences have repeated tones at their mid-way points.



```

SW1=Sibelius.ResetStopWatch(1);

FNA=0;FNB=1;C1=1;

for F1=0 to 44{

FN=FNA+FNB;

C2=FN;while(C2>=8){C2=C2-7;}
if(C2=1){T1="C";}
if(C2=2){T1="D";}
if(C2=3){T1="E";}
if(C2=4){T1="F";}
if(C2=5){T1="G";}
if(C2=6){T1="A";}
if(C2=7){T1="B";}

C2=FN;while(C2>=13){C2=C2-12;}
if(C2=01){T2="C      ";}
if(C2=02){T2="C#/Db";}
if(C2=03){T2="D      ";}
if(C2=04){T2="D#/Eb";}
if(C2=05){T2="E      ";}
if(C2=06){T2="F      ";}
if(C2=07){T2="F#/Gb";}
if(C2=08){T2="G      ";}
if(C2=09){T2="G#/Ab";}
if(C2=10){T2="A      ";}
if(C2=11){T2="A#/Bb";}
if(C2=12){T2="B      ";}

Trace(C1&"      "&FN&"      "&T1&"      "&T2);

FNA=FNB;FNB=FN;C1=C1+1;}

SW1=Sibelius.GetElapsedSeconds(1);

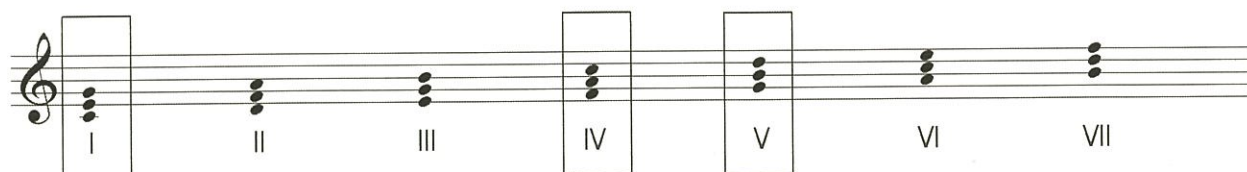
Trace(" ");Trace("Running time: "&SW1&" seconds");

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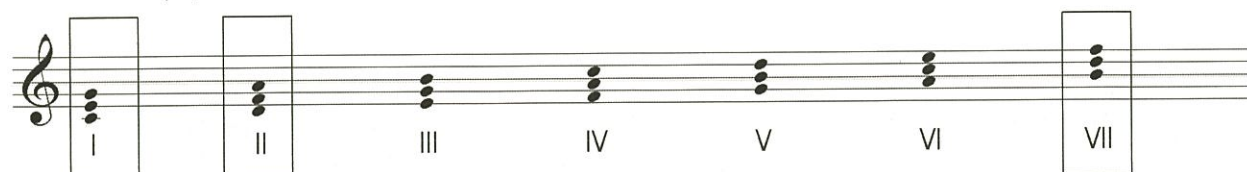
The existing theories and practices of music are full of error, their professors trying to conceal what they do by enigmatic writings and passing reference to the great masters. Nevertheless, because the professed ends of these sciences are noble, they should be taken seriously, even if they are wrong.

For example, these three chords are the primary triads in the Major mode.

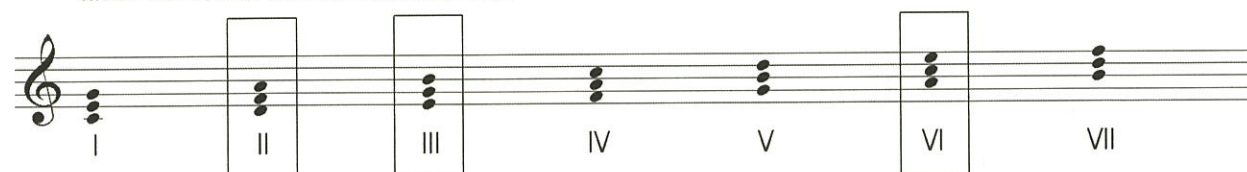
Together, these three triads use all seven scale degrees, but this observation is not what makes them *primary triads*.



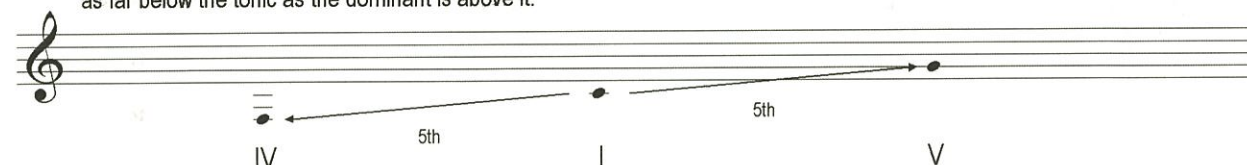
For example, the triads built on I, II and VII use all seven scale factors, but it does not mean that we consider them primary triads.



Again, in this example, what we could assume to be the primary triads, simply because they employ all seven scale degrees, shows that we need not even include the tonic.



We consider the subdominant and dominant triads to be primary triads because their roots are a 5th away from the tonic. Remember, the subdominant is called the *subdominant* not because it is below the dominant, but because it is as far below the tonic as the dominant is above it.



That being the case, why do we not consider VI, III, and VII to be primary triads, since VI is a 5th below III, and VII is a 5th above?

Well, one reason could be is that what could be interpreted as the *tonic* (III), is supported on one side by a minor chord (VI), and a diminished chord (VII), on the other, a pattern which is determined by the unequal distribution of major and minor seconds used to construct the diatonic scales.

Additionally, a progression using these chords alone, indeed, any progression using predominantly the modal chords (II, III, and VI), will tend to be heard as a progression in another key rather than that intended by the composer.

	Am	Em	B ^o
C Major	VI	III	VII
A minor	I	V	II

F C G

C Major IV I V
A minor VI III VII

The progression IV to I to V in C Major could be heard as VI to III to VII in A minor, but it is unlikely, unless that is, A minor was subsequently confirmed by a cadence. As it stands, however, it would more likely be interpreted by the listener as C Major.

G Dm Am

C Major V II VI
A minor VII IV I

The progression V to II to VI in C Major could be heard as VII to IV to I in A minor, but it is unlikely.

Am Em B°

C Major VI III VII
A minor I V II

In this example, the progression in C Major does not define the tonality. That is, it does not use either IV to V, V to IV, II to V, or V to II. However, what was intended by the composer to sound in C Major, is more likely to be heard in A minor since its interpretation in this key does use a tonality defining progression, V to II.

B° F C

C Major VII IV I
A minor II VI III

This progression in C Major could be heard as a progression in A minor, but it is unlikely.

C G Dm

C Major I V II
A minor III VII IV

This progression in C Major could be heard as a progression in A minor, but it is unlikely.

Dm Am Em

C Major II VI III
A minor IV I V

This progression in C Major would be heard unmistakably in the key of A minor since the progression IV to I to V confirms the tonality.

Em B° F

C Major III VII IV
A minor V II VI

Again, the progression in C Major does not define the tonality. That is, it does not use either IV to V, V to IV, II to V, or V to II. Thus, what was intended by the composer to sound in C Major, is more likely to be heard in A minor.

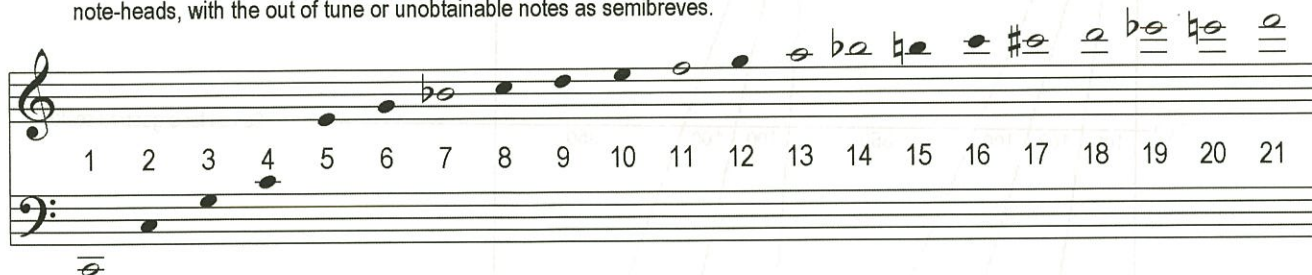
Remember, the tonal structure of music consists mainly of harmonies with tonal degrees as roots (I, IV, and V, sometimes even II), with modal degree chords (II, III, and VI), used for variety. There are many variations to this generalisation, but it may be considered the norm for tonal music.

The Harmonic Series

25 OCT 2008

If you were to take a length of metal tubing with a mouthpiece at one end, it would be possible, by stretching the lips across the mouthpiece and blowing, to cause the column of air inside the tube to vibrate. By varying the pressure of the breath and the tension of the lips, that is, by adjusting the *embouchure*, the column of air can be compelled to vibrate in various ways, thus producing a series of musical notes whose pitch *relative to each other* is always the same. This series of notes is called the *harmonic series*, and constitutes the means of tone production in natural horns and natural trumpets.

The harmonic series is of fundamental importance in the technique of all brass instruments because, on them, no notes except members of the harmonic series can be produced from any given length of tube. The pitches of the harmonic series for a length of tube which would give C as its fundamental note is illustrated in the following example. Of these notes, numbers 7, 11, 13, and 14 are, according to our present ideas, out of tune. Additionally, it is often difficult to produce the fundamental, number 1, or for any practical purposes, numbers 17, 18, 19, 20, and 21. Thus, the remaining eleven usable notes are shown with crotchet note-heads, with the out of tune or unobtainable notes as semibreves.



—

The natural horn, with all its limitations, has had a lasting influence on melody and harmony. Melodic turns of phrase for all sorts of instruments, even the pianoforte, often show the characteristic limited repertoire of notes of natural horn music. For example, the first major step in the evolution of the concerto from the sonata was undertaken in the second half of the 18th century by a school of composers in Bologna. A favourite genre of these composers was the sonata for one or more trumpets and strings, which often functioned as a kind of overture to divine service on festive occasions. Whether because it found itself so often echoing the trumpets phrases in *concertato* exchanges or because the *stile tromba* sounded so effective on instruments whose resonant open strings happened to coincide with important trumpet notes, the string ensemble came to reproduce trumpet mannerisms almost automatically, even when no trumpet was present.

Orchestration of Brass Instruments

Horn in F



It is best to confine melodic passages between G3 and C5, but remember, agility is not in the nature of the instrument. The best writing suggests that it might be playable on the natural horn. Repeated notes are effective and are often used for accompaniment, as are long held notes. As a general rule, shakes do not suit any of the brass instruments.

Trumpet in B♭



All sorts of melodic figures, arpeggios, diatonic and chromatic scales, can be played with ease. Notes between C4 and G5 are the most satisfactory. Repeated notes are effective, but they are best placed in the middle register with rests in order to give the player time to breath. The trumpet suffers the mute more gladly than any other brass instrument, reducing the tone to a faint echo.

Trombone

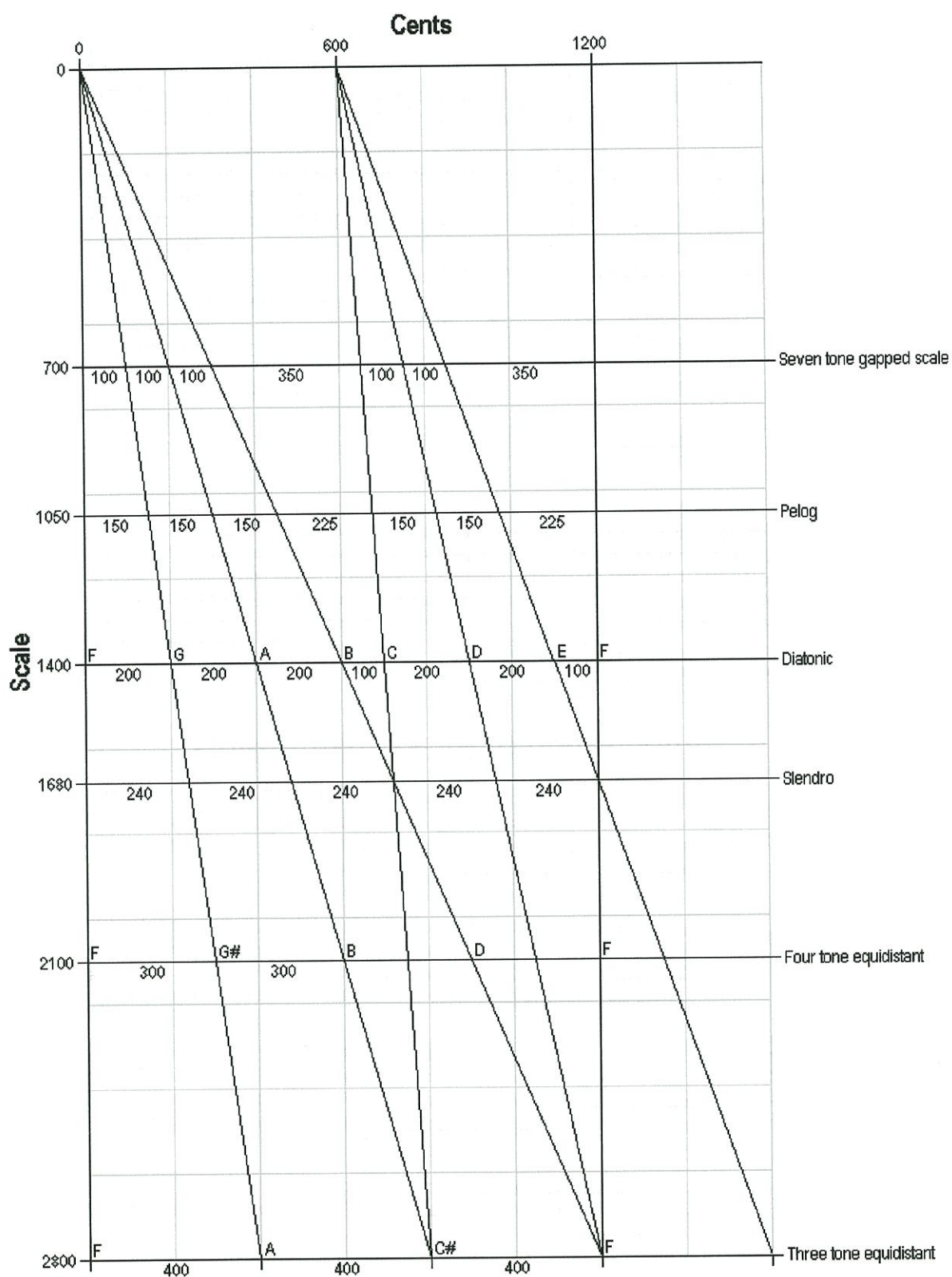


Unable to play *legato*. Trombones are essentially group instruments that make their effects harmonically by differences of register and spacing. Care should be taken that wide changes in slide position do not have to be made rapidly. Phrasing should be arranged to allow frequent opportunities for breathing. Writing should be confined between between G2 and B♭4.

Tuba



Should not be given feats of technical dexterity. Enormous amounts of breath are required so avoid long slurred passages and long notes. The tuba often acts as the bass of a quartet with three trombones.



Number 6

Harmonise the following melody, adding A, T and B.

This phrase is unusual in being three bars long

Return to original key?

- Are there any characteristic motifs?
- Into what sections can it be divided? Six phrases, A B B' B'' A A''
- Are there any modulations? Are they actual modulations or extensions of diatony, such as the use of secondary dominants?
- Are there any sequential passages?
- What is its overall form? A B A B A
- Are there any peculiarities? The fourth phrase has an extra bar

Step 2: Decide upon what type of cadences are to be used and where they are placed.

Deceptive cadence

Step 3: Sketch in the **fundamental bass**, assuming that in this exercise, the harmony changes on every **crochet**.

- There may be several possibilities available when considering the harmonising a given note.

Use the harmonisation of bars 1 and 2.

Use the harmonisation of this section for bars 10 and 11

Step 4: Decide upon the root sequence to be employed, using tonal degrees (I, IV & V), to establish and maintain the tonality and the modal degrees (II, III, IV), for relief and variation.

- The actual bass need not be a replication of the fundamental bass. First-inversion chords can be used to make the bass move by step.
- Make the bass as independent a melody as the soprano, using any characteristic motifs as points of imitation to unify to the texture.

The progression I to V to V establishes the tonality.

Inversion of Motif A

Using the first-inversion of a seventh chord here indicates that the 7th ought to be in the soprano.

Using V here means the first quaver is a non-harmonic tone.

2

Root position chords are red

First inversion chords are blue

Seventh chords have the 7th shown in pink Cadential six-four in green

1 2 3 4 5 6 7 8 9 10 11 12 13

15 19 17 19 21 19 13 15 17 17 12 22 17 17 12 17 19 15 12 17 17 10 13 15 19 17 13 12 13 10 10 15 13 19 15 13 19 15

10 15 12 13 12 13 3 10 5 5 10 8 12 5 12 17 8 10 5 8 12 10 10 6 10 10 8 10 12 10 10 5 4 10 15

5 8 10 3 12 5 8 12 3 8 12 8 10 5 6 12 10 10 5 4 10 15

I V I V⁷ V⁶ VI V IV I VI I⁶ V II V⁶ I IV I V I III VI V⁶ I VII⁶ IV V VI V⁶ I V I V⁷ V⁶ II V⁶ I V⁶ VI IV I I⁶ V I

Transposed back into the original key of G major.)

1 2 3 4 5 6 7 8 9 10 11 12 13

15 19 17 19 21 19 13 15 17 17 12 22 17 17 12 17 19 15 12 17 17 10 13 15 19 17 13 12 13 10 10 15 13 19 15 13 19 15

10 15 12 13 12 13 3 10 5 5 10 8 12 5 12 17 8 10 5 8 12 10 10 6 10 10 8 10 12 10 10 5 4 10 15

5 8 10 3 12 5 8 12 3 8 12 8 10 5 6 12 10 10 5 4 10 15

I V I V⁷ V⁶ VI V IV I VI I⁶ V II V⁶ I IV I V I III VI V⁶ I VII⁶ IV V VI V⁶ I V I V⁷ V⁶ II V⁶ I V⁶ VI IV I I⁶ V I

Motif A (inversion)

Two octaves are permitted between Tenor and Bass

Three successive points of imitation of Motif B

Exact repeat of bars 1 and 2

Remember to make the bass an independent melody like the soprano, using any characteristic motifs as points of imitation to unify to the texture. Similarly, introduce motivic material into the tenor and alto so that the listener's attention passes from one polyphonic strand to another.

