The Canadian Brass

- Silver Bells
- White Christmas
- The Christmas song
- Winter Wonderland

Introduction

- Why do certain chords or combos of sounds sound good and others not?
- For many it is a tension between familiar and new.

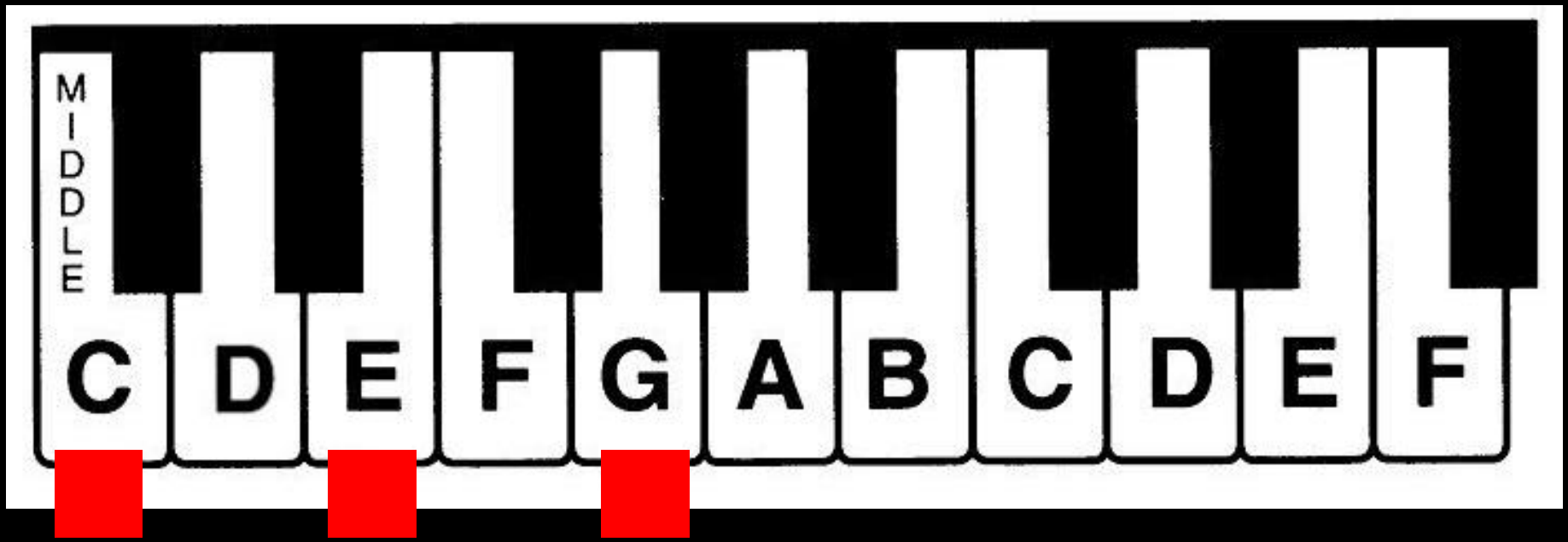
Triads

- Three note chord build on thirds.
- Four kinds: major, minor, augmented, and diminished.
- Major and minor are used most often.

Melody vs. Harmony

- Melody is horizontal
- Harmony is vertical, but also has a horizontal aspect in the sequence or progression of chords.

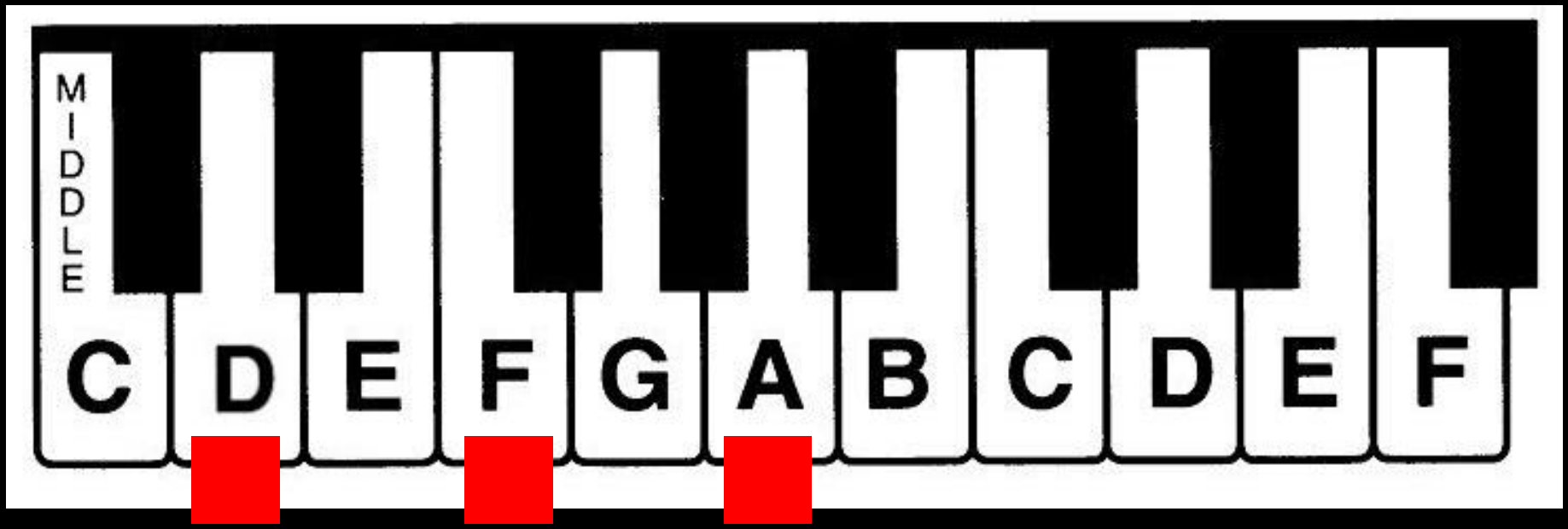
Major Triad



C – E = major third (4 s)

E – G = minor third (3 s)

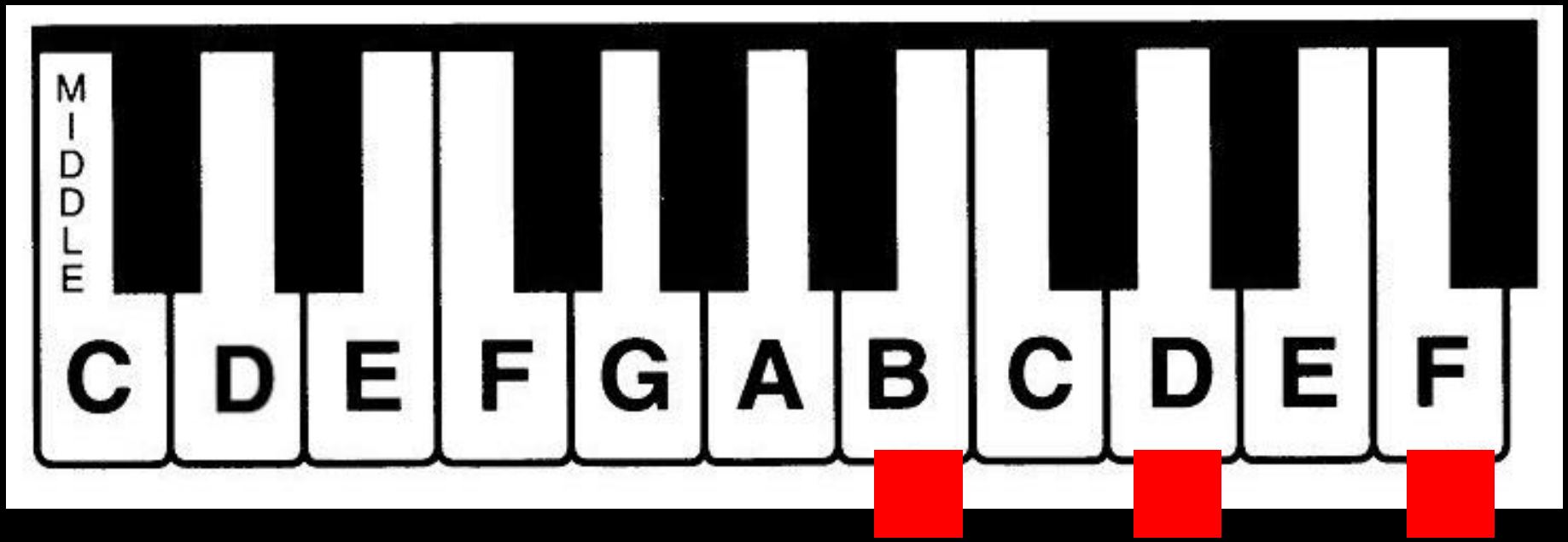
Minor Triad



D – F = minor third (3 s)

F – A = major third (4 s)

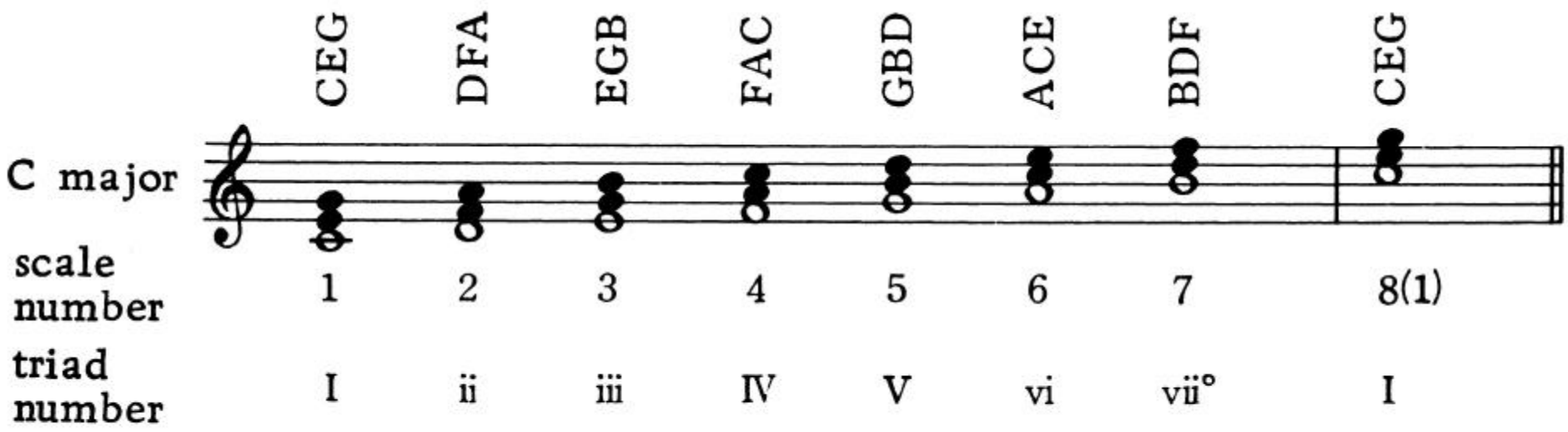
Diminished Triad



B – D = minor third (3 s)

D – F = minor third (3 s)

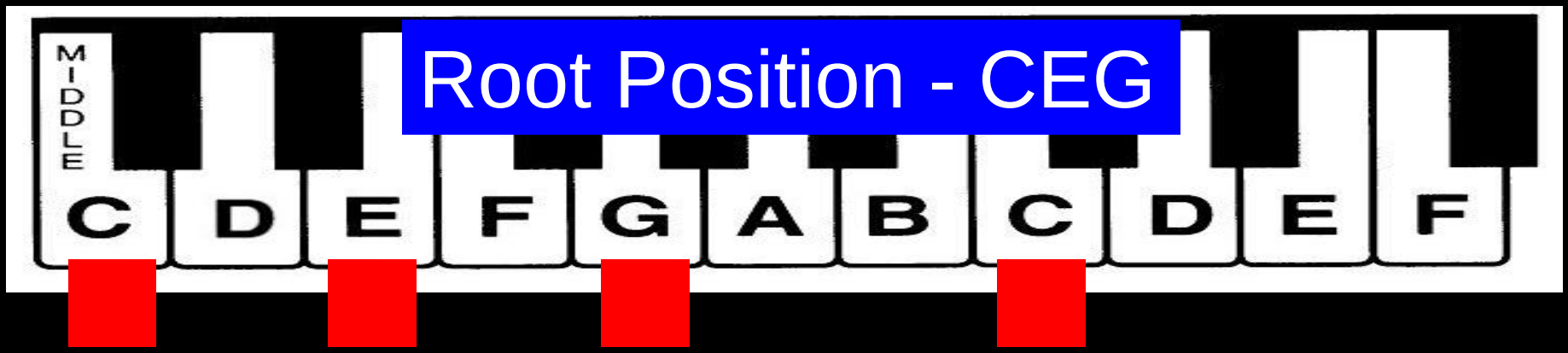
Triads

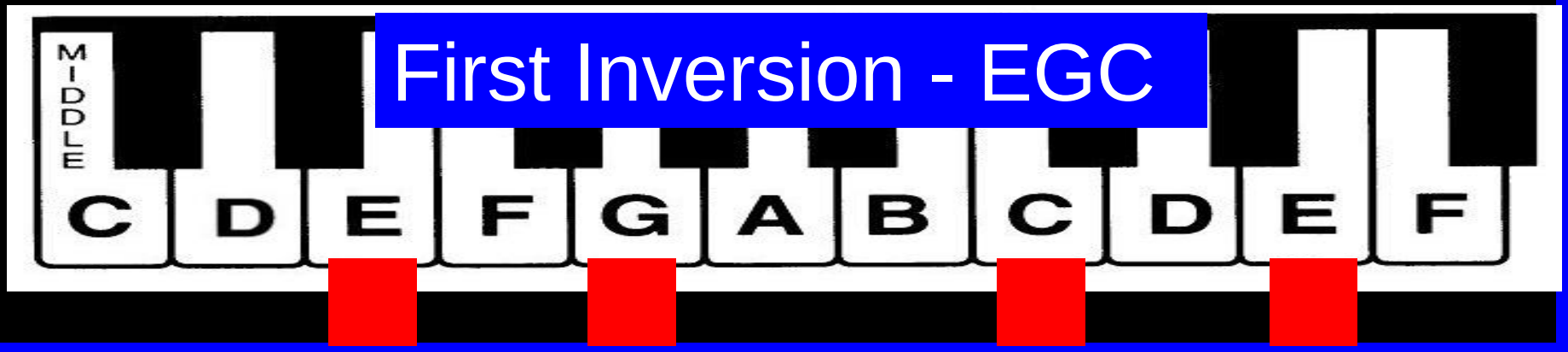

CEG
DFA
EGB
FAC
GBD
ACE
BDF
CEG
C major
scale number
1 2 3 4 5 6 7 8(1)
triad number
I ii iii IV V vi vii° I

Triads of the Scale

Note	Scale Degree	Degree Name	Triad
C	I	Tonic	C E G
D	ii	Supertonic	D F A
E	iii	Mediant	E G B
F	IV	Subdominant	F A C
G	V	Dominant	G B D
A	vi	Submediant	A C E
B	vii	Leading Tone	B D F

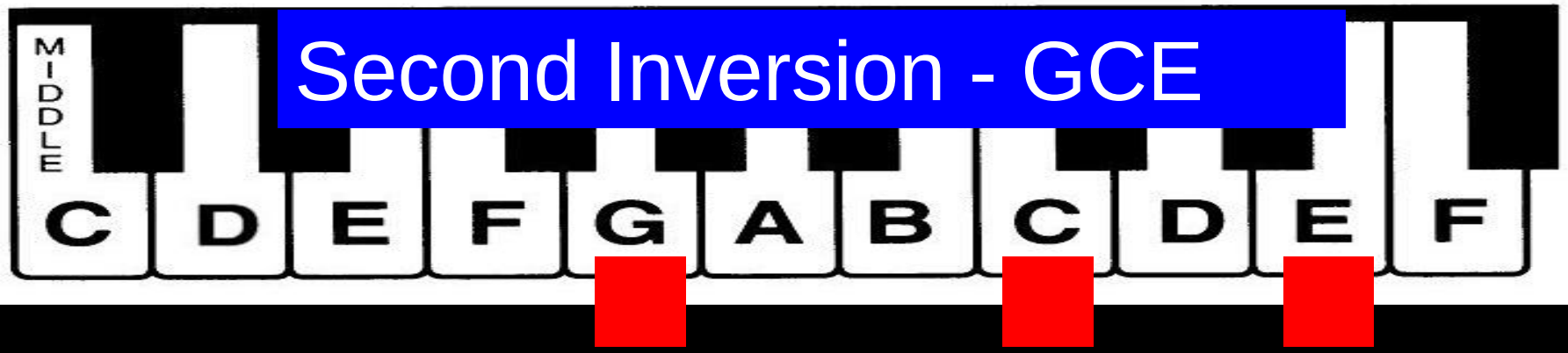
C Major Triad



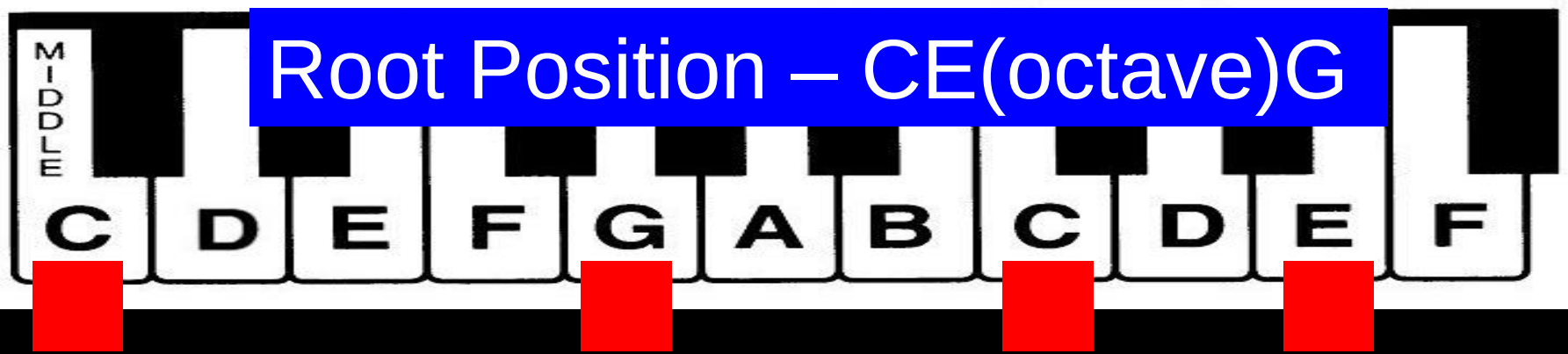


C Major Triad

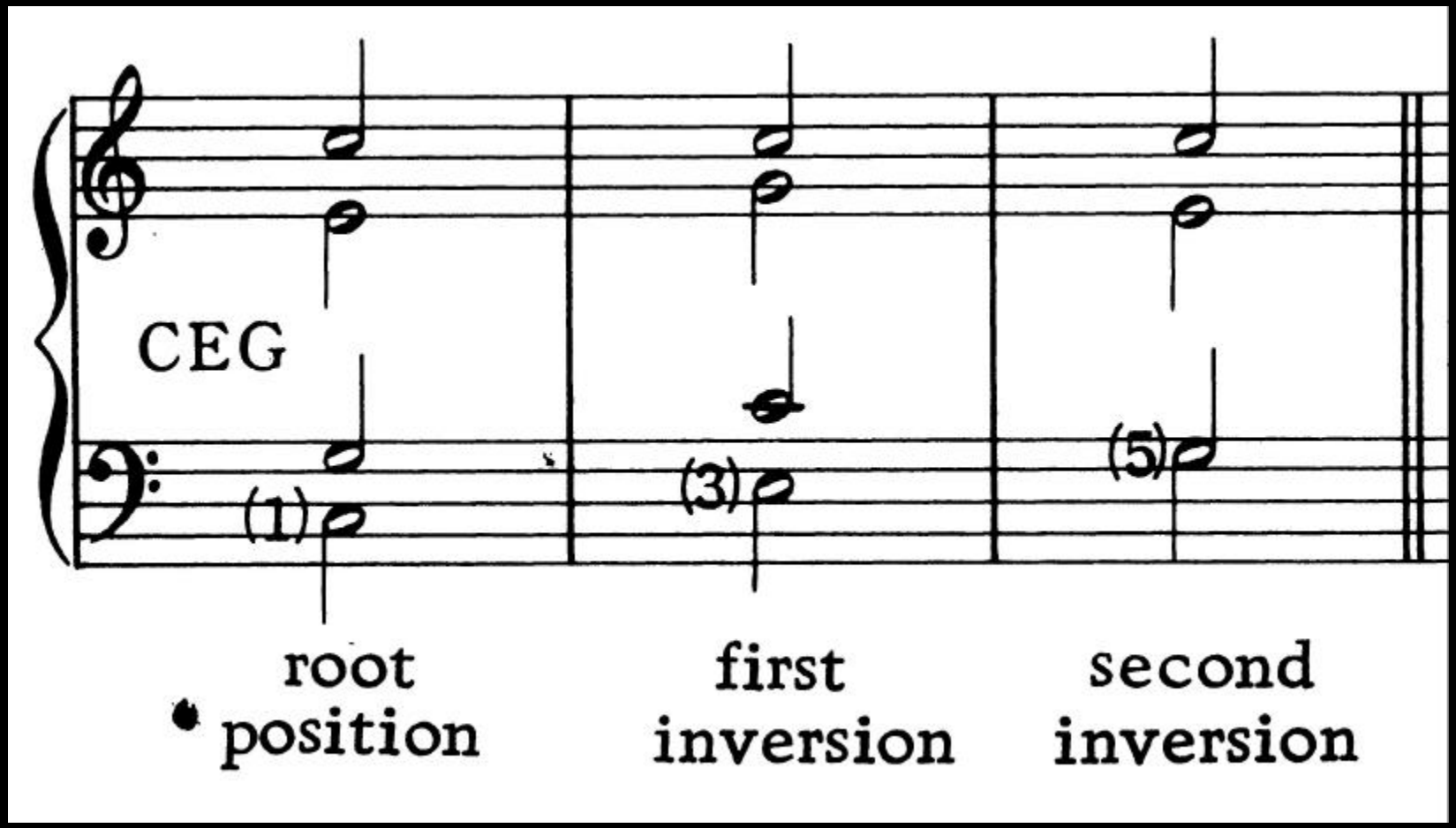
Second Inversion - GCE



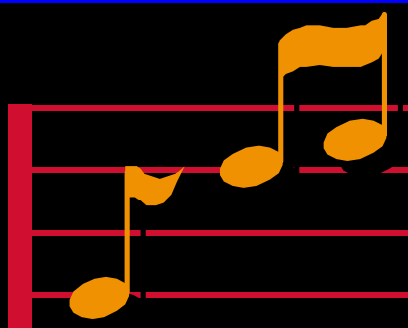
Root Position – CE(octave)G



Triad Inversions



Demo
Triad Inversions



Consonant vs. Dissonant

- Consonant = pleasant
- Dissonant = harsh
- All possible chords and intervals from the tones in a triad are consonant.
- All others are dissonant.

Demo all intervals

Which are consonant and which are dissonant?

Consonant

For the C-E-G triad we have:

- C-E major third
- E-G minor third
- C-G perfect fifth

Consonant

For the first inversion E-G-C we have:

- E-G minor third
- G-C perfect fourth
- E-C major sixth

Consonant

For the second inversion G-C-E we have:

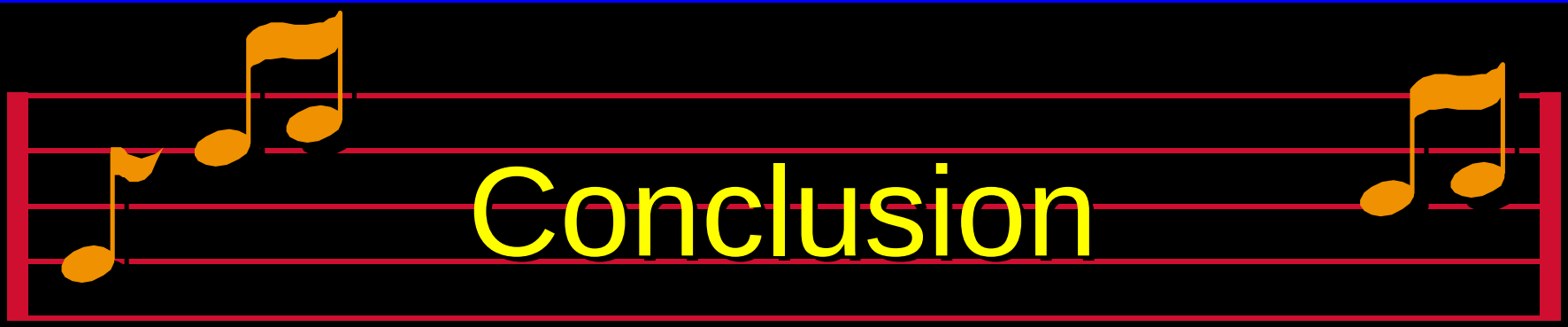
- G-C perfect fourth
- C-E major third
- G-E major sixth

Interval	# of Semitones	Character
Unison	0	Consonant
Minor Second	1	Dissonant
Major Second	2	Dissonant
Minor Third	3	Consonant
Major Third	4	Consonant
Perfect Fourth	5	Consonant
Aug. 4^{th}/Dim 5^{th}	6	Dissonant
Perfect Fifth	7	Consonant
Minor Sixth	8	Consonant
Major Sixth	9	Consonant
Minor Seventh	10	Dissonant
Major Seventh	11	Dissonant
Octave	12	Consonant

Dissonance

- What makes certain chords sound dissonant?

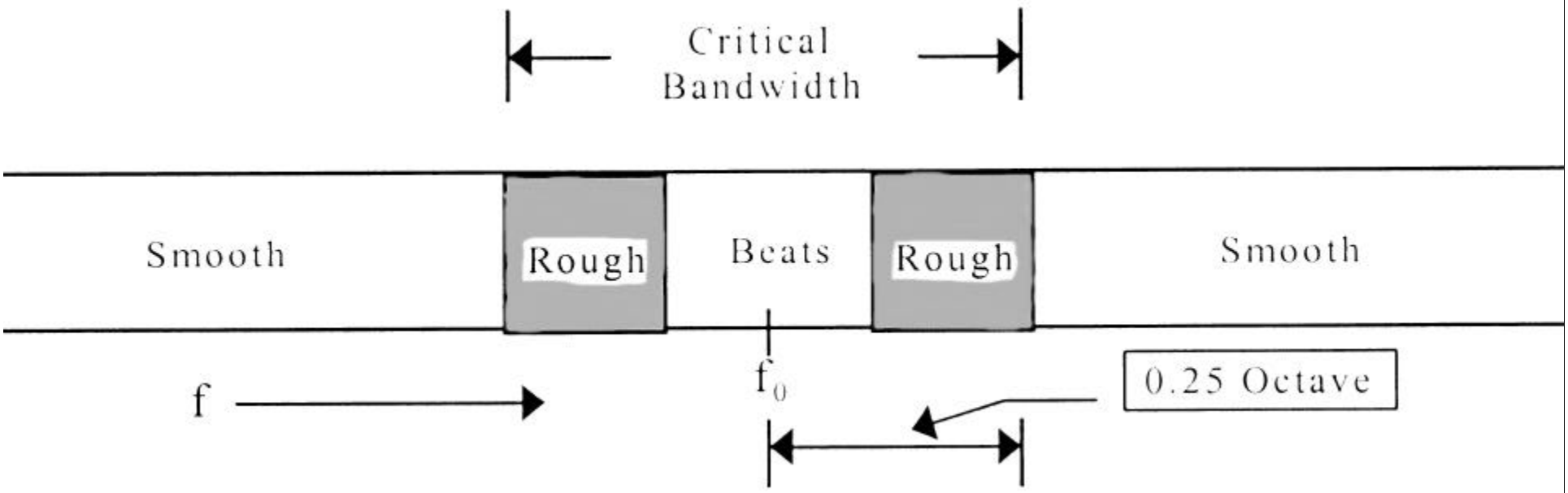
Demo with pure sounds.



Conclusion

- Two sounds or tones are consonant when they are either identical (unison) or well separated.

Critical Bandwidth



Critical Bandwidth

- Region where we hear beats or roughness
- ¼ octave rule or minor third.

Critical Bandwidth Example

What is the range of dissonance for F_2=87.3 Hz and F_6=1397 Hz?

Use Fig. 10.8 to find the third above each which is G#. G_2# = 103.8 Hz so the range is 103.8-87.3 =**16.5** Hz, whereas G_6# =1661 Hz and the range is 1661-1397=**264** Hz.

Physiological Reason

- If two tones are far enough apart they activate separate nerve cells in the ear.
- If they are close together they activated nerve cells overlap and a mixed signal goes to the brain.

Dissonance

- What do we hear if we replace pure tones by real instruments with rich harmonics?

  Similar, except there is again roughness at some large intervals such as major sixth.

Dissonance

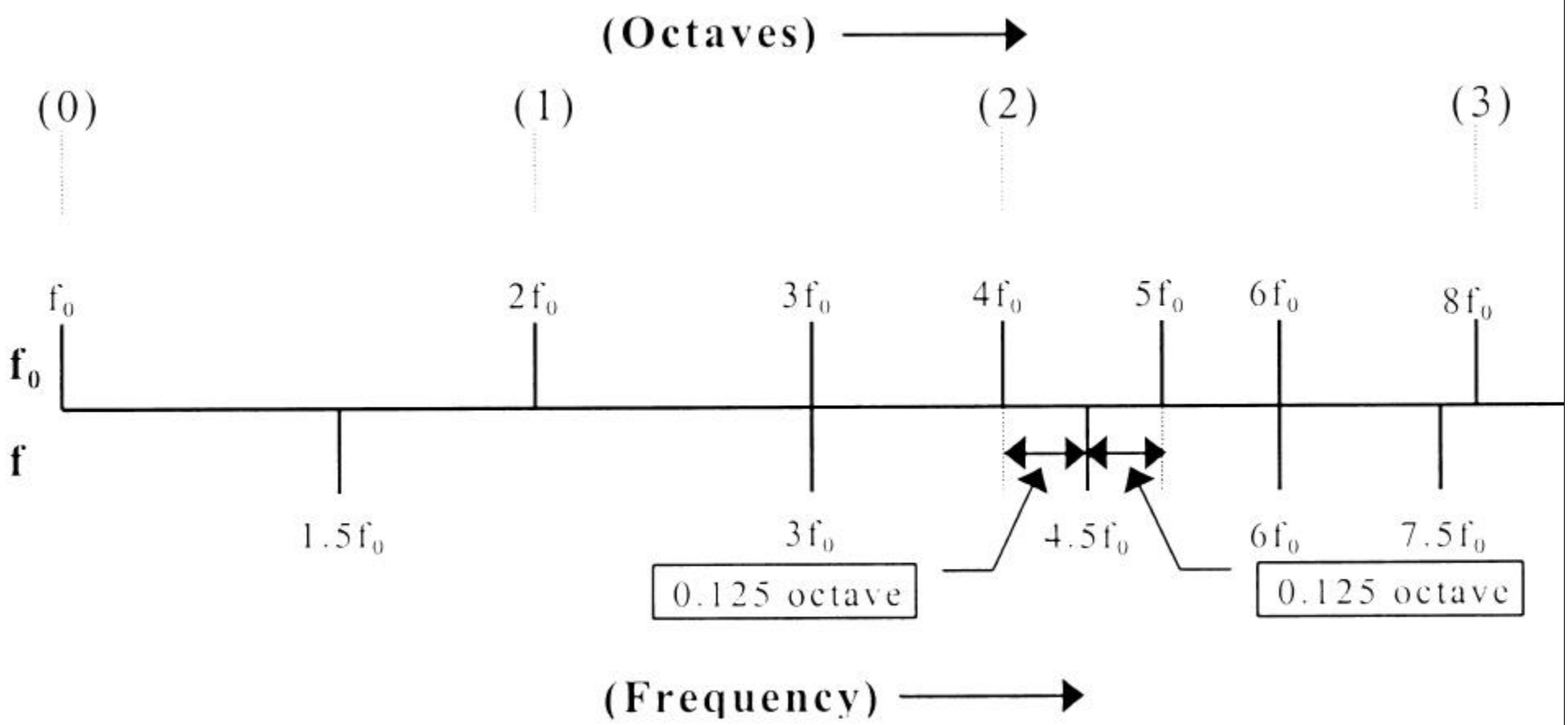
- We need to consider the harmonics of both pitches to understand why.
- We will consider only the first 6 harmonics.

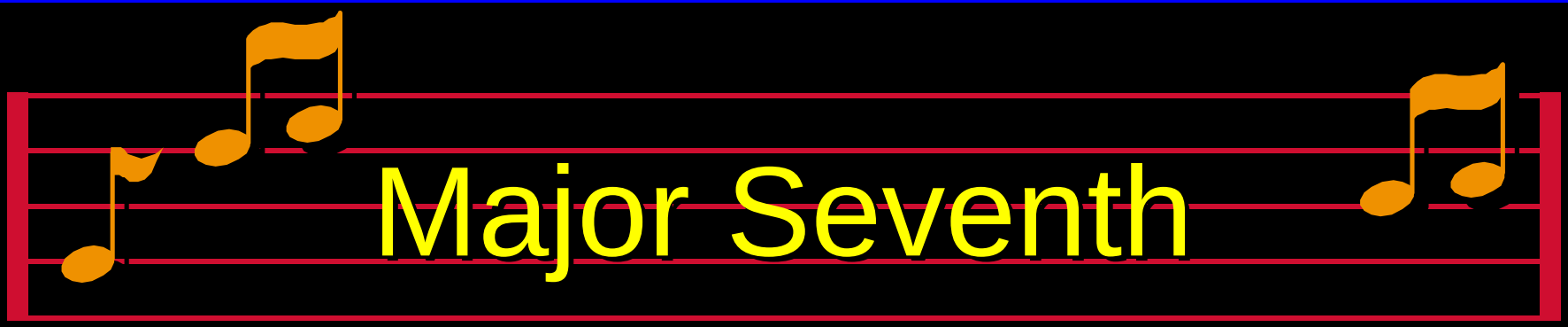
Octave

- f, 2f, 3f, 4f, 5f, 6f, 7f, 8f.
- 2f, 4f, 6f, 8f.
- These either coincide or are widely spaced.

- f, 2f, 3f, 4f, 5f, 6f,
- 1.5f, 3f, 4.5f, 6f, 7.5f, 9f.
- Only two intervals of the more than 10 are closer than ¼ octave. 4f–4.5f and 4.5f–5f.

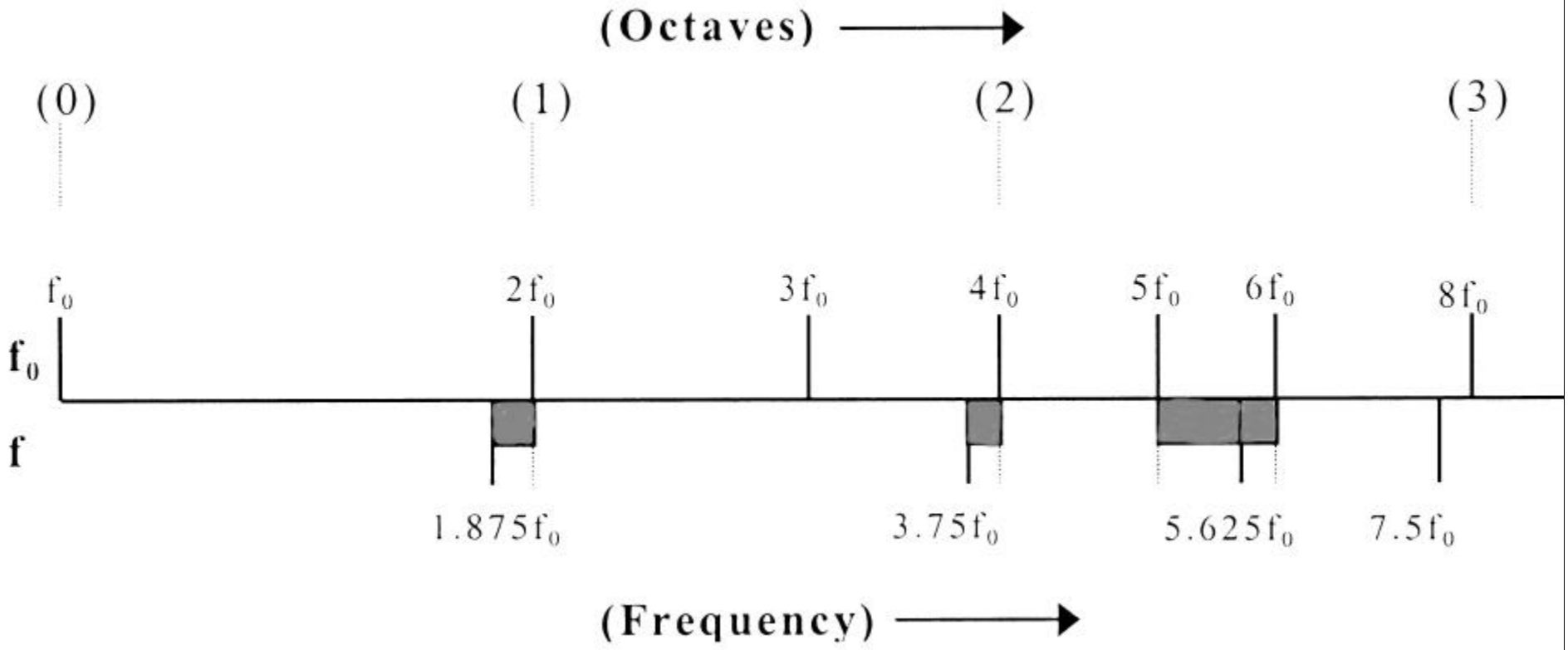
Perfect Fifth Harmonics



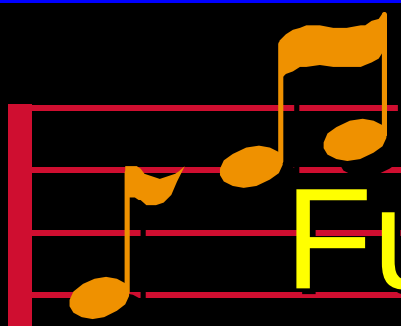


- f, 2f, 3f, 4f, 5f, 6f,
- 1.9f, 3.8f, 5.6f,
- More intervals are closer than ¼ octave. Dissonant.

Major Seventh Harmonics




Fundamental Bass



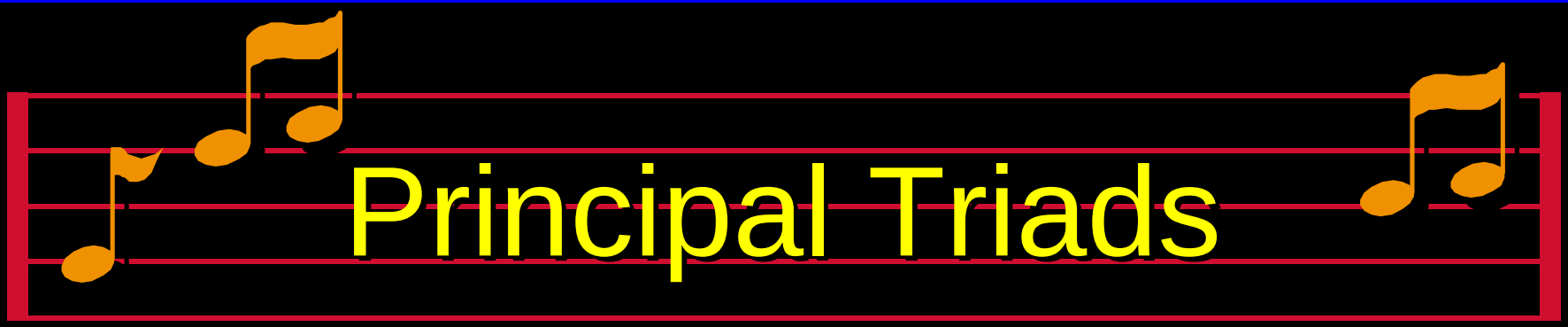
Fundamental Bass

- C = f_1, E = (5/4)f_1, G = (3/2)f_1
- Let f_b = (1/4)f_1 then we get three harmonic series for the three notes. They are:

- C: $4f_b$, $8f_b$, $12f_b$, $16f_b$, $20f_b$, $24f_b$
- E: $5f_b$, $10f_b$, $15f_b$, $20f_b$, $25f_b$, $30f_b$
- C: $6f_b$, $12f_b$, $18f_b$, $24f_b$, $30f_b$, $36f_b$
- We hear a harmonic series of f_b!

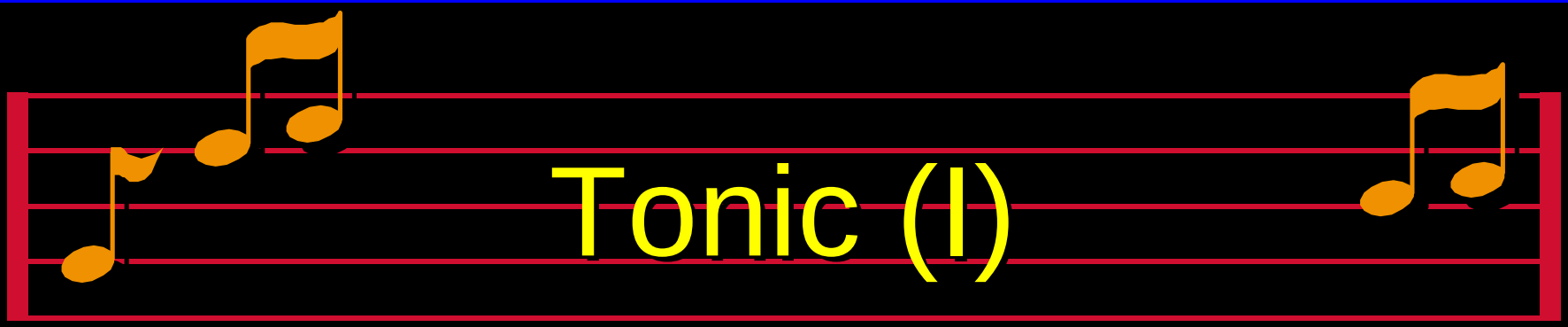
Chord Progressions

- Tonic or I chord
- Dominant or V chord
- Subdominant or IV chord
- These three are called the Principal Triads



Principal Triads

Chord	Notes
Tonic (I)	C E G
Dominant (V)	G B D
Subdominant (IV)	F A C



Tonic (I)

- Establishes the key.
- Center of gravity about which the music moves.
- Feeling of release.
- Almost always ends a piece.

Dominant (V)

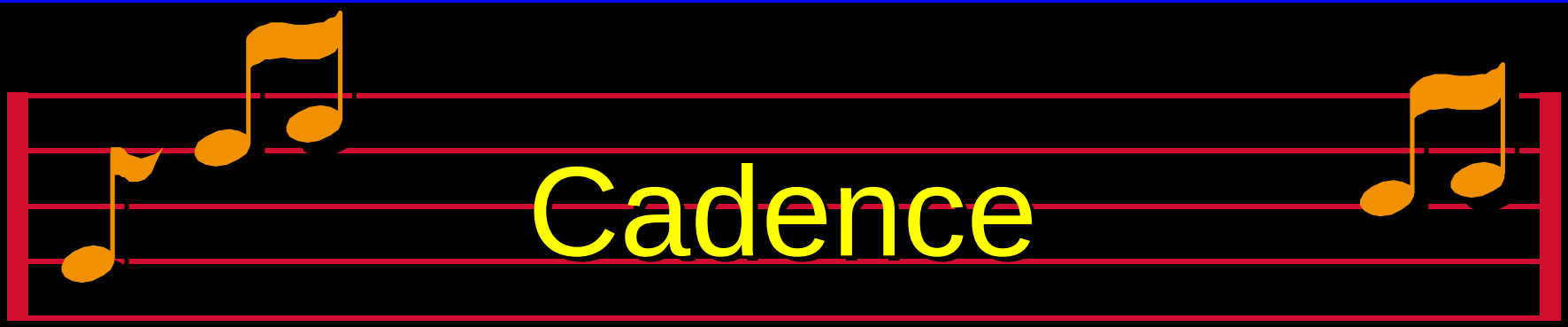
- Creates tension.
- Active

Subdominant (IV)

- Midway between Tonic and Dominant in terms of tension and release.

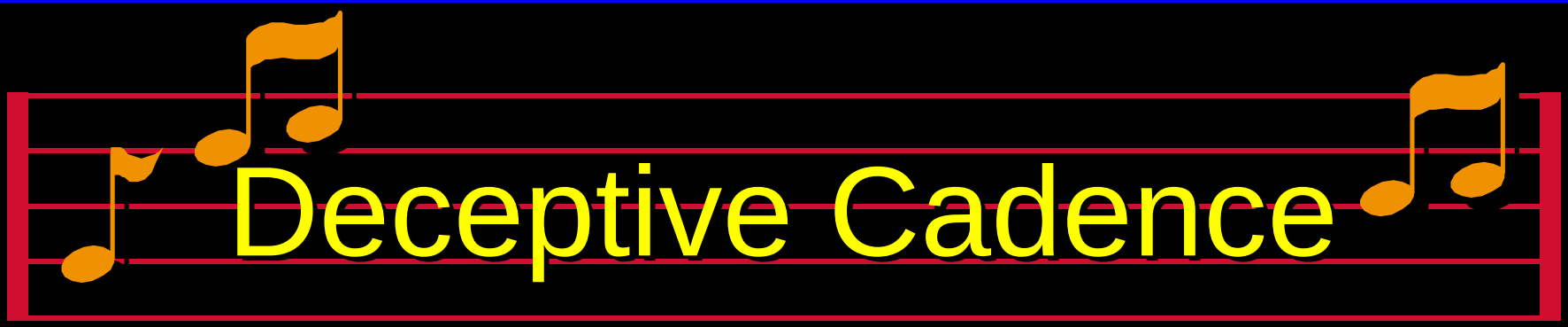
Dominant Seventh

- A dominant chord (G B D) with another third added (the seventh) so it would be G B D F
- Particularly dissonant and creates great tension.
- Leading tone.



Cadence

- Progression of chords that leads to a point of repose or end.
- Examples of I-V-I cadences on Studio.



- Does not end on the chord that you expect.
- Example in book.