

Programming Music Theory

Ben Hughes
@rubiety
<http://benhugh.es/>

Music is Math!

C \Rightarrow **0**

C# / Db \Rightarrow **1**

D \Rightarrow **2**

D# / Eb \Rightarrow **3**

E \Rightarrow **4**

F \Rightarrow **5**

F# / Gb \Rightarrow **6**

G \Rightarrow **7**

G# / Ab \Rightarrow **8**

A \Rightarrow **9**

A# / Bb \Rightarrow **10**

B \Rightarrow **11**

```
Tone = [  
    Tone Index,  
    Letter Index,  
    Octave Index  
]
```

```
"Middle D#" = [3, 1, 4]
```

```
"Middle Eb" = [3, 2, 4]
```



C Major Chord

C

E

G

[[0,0,4], [4,2,4], [7,5,4]]

Just Pitches: **[0, 4, 7]**



Intervals

C E G

Pitches: [0, 4, 7]

Intervals: [4, 3]

(Major 3rd, Minor 3rd)



Key Transposition

C Major Chord \Rightarrow D Major Chord

Add 2 (Interval between D and C), Modulo 12!

C E G = **[0, 4, 7]**

[(0+2) % 12, (4+2) % 12, (7+2) % 12]

[2, 6, 9] \Rightarrow D, F#, A



github.com/rubiety/jazz_model

```
Chord['Ebmaj7'].notes  
# => ['Eb', 'G', 'Bb', 'D']
```

```
Chord['F7b9#9'].notes  
# => ['F', 'A', 'Eb', 'Gb', 'G#', 'C#']
```

```
Scale['Whole Tone'].notes  
# => ['C', 'D', 'E', 'F#', 'G#', 'Bb']
```

```
Scale['Major'].in_key_of('Eb').modes['Dorian'].notes  
# => ['F', 'G', 'Ab', 'Bb', 'C', 'D', 'Eb']
```

```
Scale['Major'].chords.map(&:name_with_notes) * "\n"  
# => Major 7: C, E, G, B  
#     Major 6: C, E, G, A  
#     Dominant 6/9: C, E, G, Bb, D, A
```

Tunes / Chord Changes

(Medium Swing)

C-Jam Blues

Duke Ellington

$\frac{4}{4}$ C₇		⋮.		⋮.		⋮.	
F₇		⋮.		C₇		⋮.	
G₇		⋮.		C₇		⋮.	

github.com/rubiety/**chords-json**

```
{  
  "name": "C-Jam Blues",  
  "composer": "Ellington Duke",  
  "style": "Medium Swing",  
  "key": "C",  
  "changes": [  
    {  
      "time": "4/4",  
      "bars": ["C7", "%", "%", "%",  
               "F7", "%", "C7", "%",  
               "G7", "%", "C7", "G7"]  
    }  
  ]  
}
```

github.com/rubiety/iREALb_parser



**1200 Jazz Tunes
Parsed & Normalized
to chords-json**

Programming Chord Changes

```
Tune["F Blues"].changes
```

```
# => Tune::Changes<["F", "Bb", ...]>
```

```
Tune["F Blues"].changes.in_key_of("Bb")
```

```
# => Tune::Changes<["Bb", "Eb", ...]>
```

```
Tune["F Blues"].changes.bars.size
```

```
# => 12
```

```
Tune["F Blues"].changes.bars.roots(:relative).pitches
```

```
# => [0, 5, 0, [7,0], 5, 6, 0, [4,9], 2, 7, [0,9], [2,7]]
```

```
Tune.with_bars(12).starting_with_chords("F7", "Bb7")
```

```
# => "F Blues"
```

<http://jazzity.com/chords/major-7-11>

Jazzity

The Jazz Community & Knowledge Engine...



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Major 7 #11 Chord: maj7#11 (Also: M7#11, major7#11, lyd, lydian)

Parent Chord: [Major 7](#)

Intervals: M3, 2, m2, M3

C, E, F#, G, B



Related Scales/Modes:

C Lydian

The major scale and its modes is the most commonly-used scale in western music.



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Discussion:

[Start a Discussion](#)



How would you voice this?

Ben Hughes, a month ago

Key:

[C](#)

[F](#)

[Bb](#)

[Eb](#)

[Ab](#)

[Db](#)

[Gb](#)

[B](#)

[E](#)



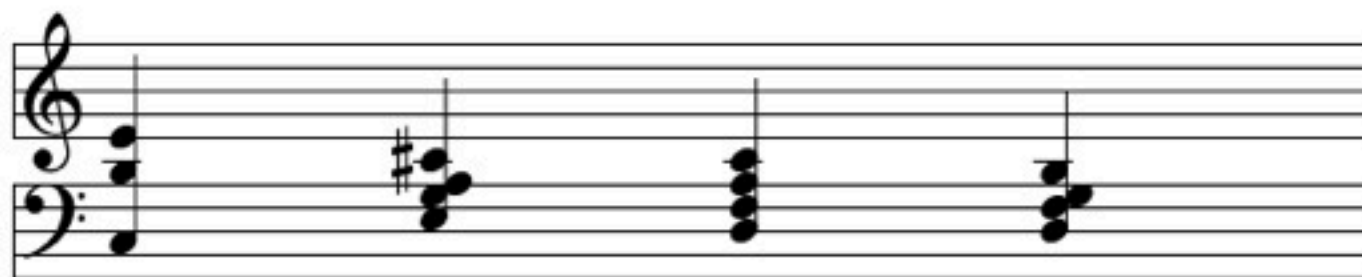
We're still seeding content for this page. Want to contribute?

Major I-iv-ii-V Progression: Cmaj7, A7, Dmin7, G7

[Information](#)

[Comments \(0\)](#)

A typical turn-around at the end of a major tune.



Voice Leading:

Cmaj7 () A7 () Dmin7 () G7 ()

[Update Voicings](#)

Key:

C
F
Bb
Eb
Ab
Db
Gb
B
E
A

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Autumn Leaves

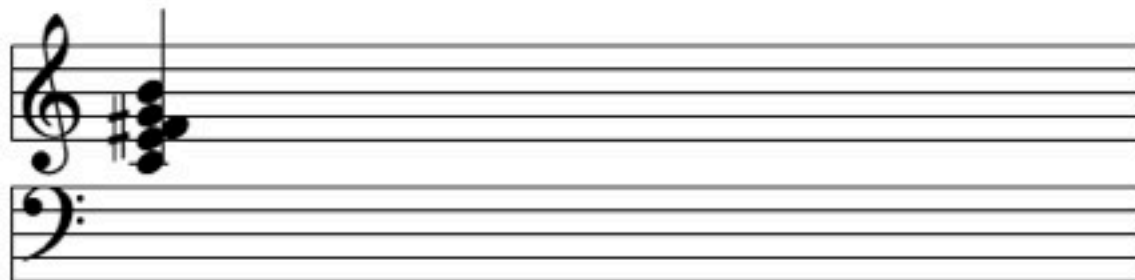
Vehicle: Standard Meter: 4/4 Concept: Instrumental Key: G Minor

Spare ribs flank jowl corned beef ham short ribs t-bone rump tenderloin, biltong ground round beef ribs. Rump salami meatball, pastrami shankle ham hock beef ribs ribeye. Rump tri-tip shoulder ball tip, chicken pastrami salami capicola pork loin fatback pig. Biltong frankfurter spare ribs salami. Short loin brisket andouille chuck. Filet mignon short loin turducken jowl chuck, ball tip drumstick pig hamburger rump meatloaf. Flank corned beef frankfurter hamburger brisket short loin.

Styles

Bebop
Bossa-Nova
Ballad

You can also try this chord here:



Other Information

Spare ribs flank jowl corned beef ham short ribs t-bone rump tenderloin, biltong ground round beef ribs. Rump salami meatball, pastrami shankle ham hock beef ribs ribeye. Rump tri-tip shoulder ball tip, chicken pastrami salami capicola pork loin fatback pig. Biltong frankfurter spare ribs salami. Short loin brisket andouille chuck. Filet mignon short loin turducken jowl chuck, ball tip drumstick pig hamburger rump meatloaf. Flank corned beef frankfurter hamburger brisket short loin.

Resources:



[Vol. 54, Maiden Voyage: Fourteen Easy-To-Play Jazz Tunes](#)

Popular Recordings:



[Barbra Streisand - Autumn Leaves](#)



[Oscar Peterson - Autumn Leaves](#)



[Bill Evans - Autumn Leaves](#)



[Nat "King" Cole - Autumn Leaves](#)



[Paul Desmond - Autumn Leaves](#)



[Joe Pass - Autumn Leaves](#)



[Mantovani Orchestra - Autumn Leaves](#)



[Bill Evans, Scott Lafaro & Paul Motian - Autumn Leaves](#)



[Roger Williams - Autumn Leaves](#)



[Hank Garland - Autumn Leaves](#)

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(BALLAD)

ALONE TOGETHER

- DIETZ & SCHWARTZ

Handwritten musical score for the ballad "Alone Together" by Dietz & Schwartz. The score is written on ten staves, with chords and melodic lines. The key signature is one flat (B-flat), and the time signature is 4/4.

Chords and notation across the staves:

- Staff 1: D- E-7b5 A7b9 D- E-7b5 A7b9
- Staff 2: D- A-7b5 D7b9 G- G-7
- Staff 3: B-7 E7 G-7 C7 F F7 E-7b5 A7
- Staff 4: 1. D minor7 E-7b5 A7 2. D minor7
- Staff 5: A-7b5 G- (trills)
- Staff 6: G-7b5 C7b9 F F7 E-7b5 A7b9
- Staff 7: D- E-7b5 A7b9 D- E-7b5 A7b9
- Staff 8: D- Bb7 A7 D- (E-7b5 A7)
- Staff 9: FINE

MILES SMITH - "COLLECTOR'S ITEMS"

426.

-WARREN/GORDON

(VP) **THERE WILL NEVER BE ANOTHER YOU**

Handwritten musical score for "There Will Never Be Another You" by Warren/Gordon. The score is written on ten staves, each with a treble clef and a key signature of one flat (Bb). The music is in 4/2 time. Chord symbols are written above the staves, and some staves have a "Z." marking. The score ends with a double bar line and the word "(FIVE)" written below the final staff.

Chord symbols and markings:

- Staff 1: Eb maj7, Z., D-7 b5, G7 b9
- Staff 2: C-7, Z., Bb-7, Eb7
- Staff 3: Ab maj7, F-7 b5, Bb7, Eb maj7, C-7
- Staff 4: F7, (C-7 F7), F-7, Bb7
- Staff 5: Eb maj7, Z., D-7 b5, G7 b9
- Staff 6: C-7, Z., Bb-7, Eb7
- Staff 7: Ab maj7, F-7 b5, Bb7, Eb maj7, G-7, C7
- Staff 8: Eb maj7, D7, G7, C7, F-7, Bb7, Eb (Bb7)
- Staff 9: (FIVE)