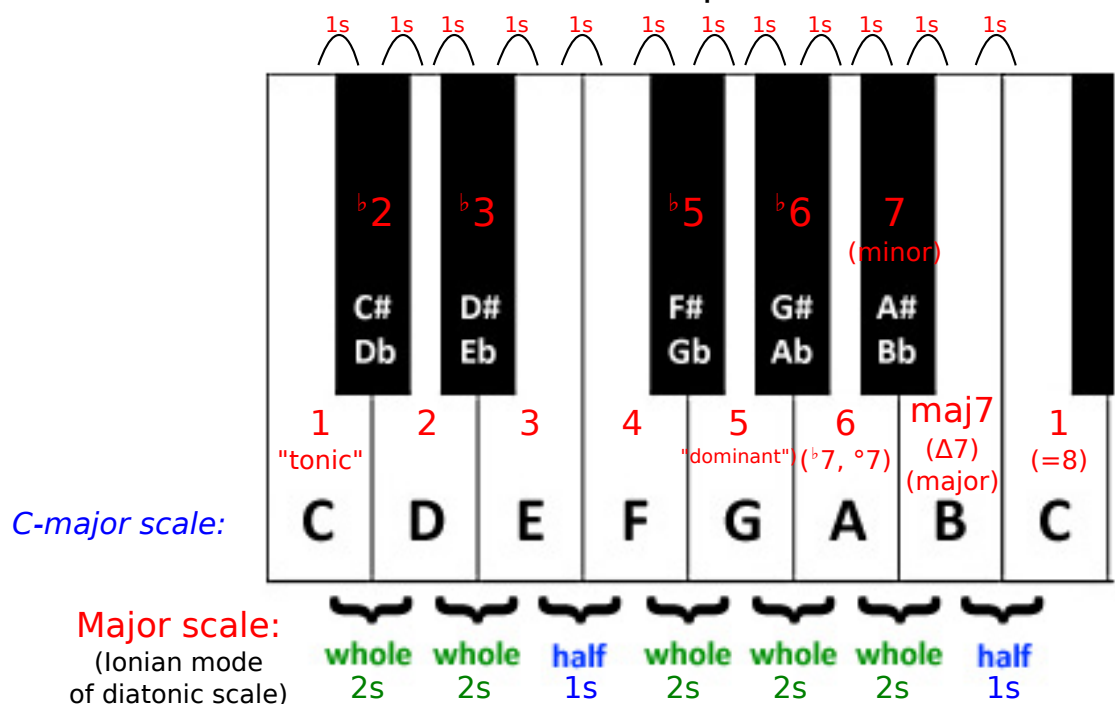


Chromatic scale: 12 equal frequency ratios of $2^{1/12}$ ["equal temperament"]
 = 12 "semitones" (12s) or "half-steps" = 6 "tones" (6t) or "whole steps"



Interval = pitch ratio = number of semitones:

second (2) = 2 semitones = 1 whole step [examples: C-D, E-F#]

minor third (b3, m3) = 3 semitones [examples: C-Eb, E-G]

(major) **third (3)** = 4 semitones = 2 whole steps [examples: C-E, A-C#]

fourth (4) = 5 semitones [example: C-F, E-A, F-Bb]

fifth (5) = 7 semitones [examples: C-G, D-A, B-F#]

sixth (6) = 9 semitones [example: C-A]

(minor) **seventh (7)** = 10 semitones [examples: C-Bb, D-C]

major seventh (maj7, Δ7) = 11 semitones [examples: C-B, D-C#]

diminished interval N (-N, °N, Ndim): *subtract one semitone*

augmented interval N (+N): *add one semitone*

Chord = 2+ intervals starting at "root" of chord

major = 3 and b3 [e.g. 1-3-5, C = C-E-G, D = D-F#-A]

minor = b3 and 3 [e.g. 1-b3-5, Cm = C-Eb-G, Am = A-C-E]

(dominant) **seventh** = 3 and b3 and b3 [e.g. 1-3-5-7, C7 = C-E-G-Bb, G7 = G-B-D-F]

minor seventh = b3 and 3 and b3 [e.g. 1-b3-5-7, Cm7 = C-Eb-G-Bb, Dm7 = D-F-A-C]

major seventh = 3 and b3 and 3 [e.g. 1-3-5-maj7, Cmaj7 = C-E-G-B, Dmaj7 = G-B-D-F#]

ninth = 3 and b3 and b3 and 3 [e.g. 1-3-5-7-1(=9), G9 = G-B-D-F-A]

augmented = 3 and 3 [e.g. 1-3-#5, C+ = C-E-G#, E+ = E-G#-C, G#+ = G#-C-E]

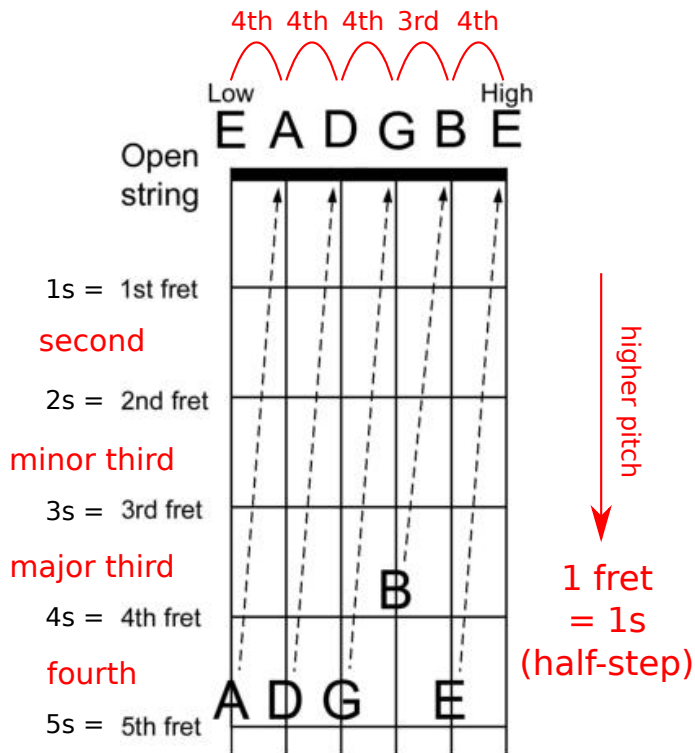
diminished = b3 and b3 [e.g. 1-b3-b5, C- = Cdim = C-Eb-Gb]

diminished seventh = b3 and b3 and b3 [e.g. 1-b3-b5-b7(=6), Cdim7 = C-Eb-Gb-A, Adim7 = A-C-Eb-Gb]

Changing the root of a chord X: **X/R** means play X with R on the bottom. e.g. C/E = E-G-C-... (= inversion of C)]

Transposition = shift all pitches by same interval [e.g. transposing down by 4th gives F→C, Bb→F, ...]

Standard guitar tuning:



Em chord diagram:

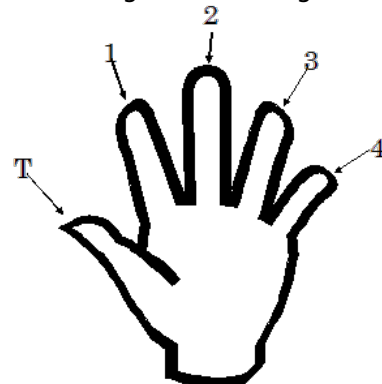
o = strum the "open" string

x = do not strum! (or mute by touching)

fingering ("voicing") is not unique! another Em chord:

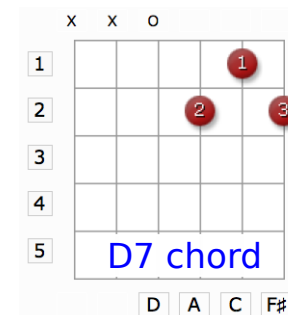
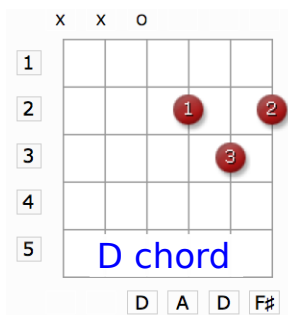
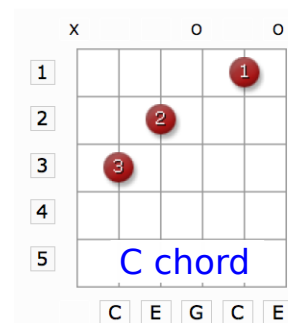
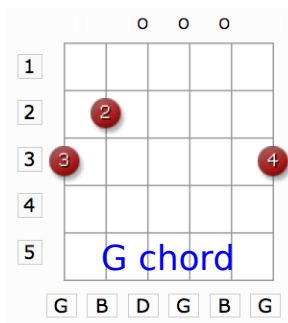
starts on 7th fret!

finger numbering:



E (major) chord:

a few more simple chords:



compare: ♭3 to 3!