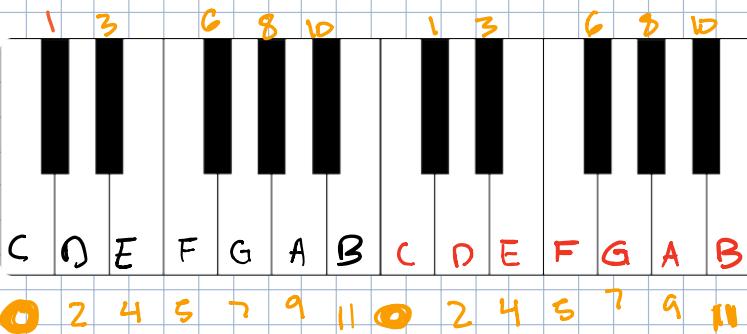


<https://youtu.be/CCbIc218XTI>



Index: 0 2 4 5 7 9 11 0 2 4 5 7 9 11

Index: Order: Scale Degree ( $\overset{\uparrow}{Asc} + \overset{\downarrow}{Des}$ )

0 - 1 - 1	6 - 7 - #4 165
1 - 2 - #1/b2	7 - 8 - 5
2 - 3 - 2	8 - 9 - #5 166
3 - 4 - #2 163	9 - 10 - 6
4 - 5 - 3	10 - 11 - #C 167
5 - 6 - 4	11 - 12 - 7

- 24 keys = 12 major keys + 12 minor keys
  - 12 notes, then repeat
  - Tonic, or key center, is our first note and '0' index
  - Diatonic Scales

- ↳ 7 notes
- ↳ main scales

- major

1 2 3 4 5 6 7

- natural minor

1 2 b3 45 66 67 \*

### • harmonic minor

1 2 63 4 5 66 7 // x  
f.x

• melodic minor

1 2 63 45 C 7

up 1

1 2 6 5 4 5 C 7  
8

down  $\Rightarrow$  67 66 5 4 63 2 1

• Major

↳ chords

I i iii IV V vi vii<sup>o</sup>

• minor

↳ chords

i ii<sup>o</sup> bIII+ iv V bVI vii<sup>o</sup>

• chord notation

↳ uppercase, M, Δ = major m3 / m3

↳ lowercase, m, - = minor m3 / M3

↳ aug, + = augmented M3 / M3

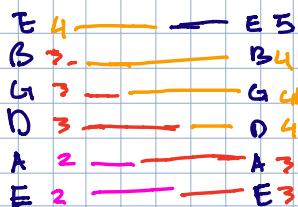
↳ dim, ° = diminished m3 / m3

↳ dom = dominant major chord ↗ b7

↳ ♫ = half diminished 1 b3 b5 b7  
(m: n7 b5)

diminished Seventh = 1

## Building a Guitar



Helmholtz Pitch Notation System:

↳ new octave starts

at "C"

Program guitar notes at tuples w/ note and octave

E4		E5	A	a	D#	3
B		B	A#	b	E	4
G		G	B	II	F	5
D		D	C	0	F#	c
A		A	C#	1	G	7

E 2   .   .   E 3   0   2   G# 3

↳ String/Fret

0	1	2	3	4	5	6	7	8	9	10	11	12
C	4	5	C	7	9	10	11	0	1	2	3	4
5	11	0	1	2	3	4	5	C	7	9	10	11
4	7	8	9	10	11	0	1	2	3	4	5	C
3	2	3	4	5	C	7	8	9	10	11	0	1
2	9	10	11	0	1	2	3	4	5	C	7	8
1	4	5	C	7	8	9	10	11	0	1	2	3

### Octave Coloring

■ = 5  
■ = 4  
■ = 3  
■ = 2

↳ String/first

or if in scale degrees (Key of C) 0 - 1   ↳ root = "C"

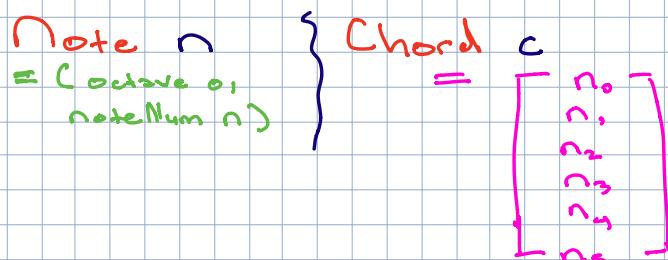
0	1	2	3	4	5	6	7	8	9	10	11	12
6	3	4	b5	5	#5	C	b7	7	1	b2	2	b3
5	7	1	b2	2	b3	3	4	b5	5	#5	C	b7
4	5	#5	6	b7	7	1	b2	2	b3	3	4	b5
3	2	b3	3	4	b5	5	#5	b6	7	1	b2	2
2	6	b7	7	1	b2	2	b3	3	4	b5	5	#5
1	3	4	b5	5	#5	C	b7	7	1	b2	2	b3

## Chords

Common	
· Maj	1 3 5
· minj	1 b3 5
· dim	1 b3 b5
· aug	1 3 #5

### • Chord Object for Guitar

↳ List of 6 Note Object



• Notes can contain

n = 0 - 11 or \*  
 and

0 = 0 - 8

4 - 2 - 4 - 5

on 12 frets, 6 strings

Guitar

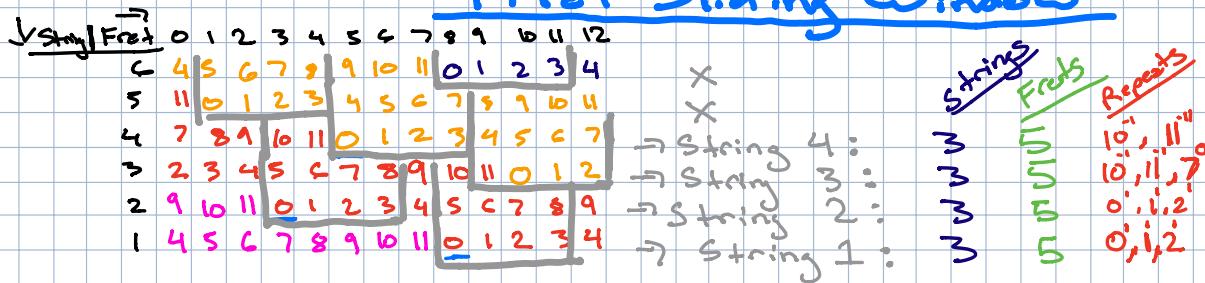
## Constructing Hand

- From (Scale And Arpeggio Resource pg. 18)

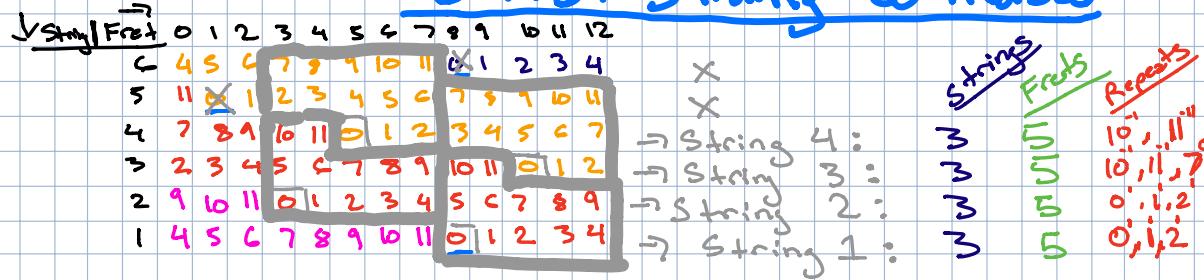
"For as long as they've existed, stringed instruments have been learned in what are known as 'positions', each position consisting of all notes that can be played without moving the middle finger up and down the neck. Because each position requires only a minimum of hand movement, it helps promote efficiency"

up and down refers to left/right  
or shifting hands

## 4 Fret Sliding Window



## 5 Fret Sliding Window



## 4 vs 5 Fret Windows

- 4 is too small, leaves out 2 notes of 12
  - ↳ most parts don't actually use all 12, can use diff positions to remedy
- 5 covers all 12 (chromatic), but is much more difficult and almost always unnecessary

- Solution: Hybrid window
  - ↳ 4-fret window with a stretch when necessary
  - ↳ 4 positions for major scale

1. Index(1) stretch

2. No stretch

William  
Levitt  
= position  
planning

3. No stretch 
4. Pinky (4) stretch 

### 1) Index Stretch

String/Fret position II or if in scale degrees (Key of C) 0 - 1 7 - 5  $\leftarrow$  root = "C"

6	3 4	5	C	7 1	2	3	2 - 2	1 - 6
5	7 1	2	3 4	5	6	7	4 - 3	11 - 7
4	5	6	7 1	2	3 4	5	5 - 4	
3	2	3 4	5	6	7 1	2		
2	6	7 1	2	3 4	5	6		
1	3 4	5	C	7 1	2	3		
	1 (C) 2 3 4							

remember these are open strings

- Built off tonic on 2nd string
- ↳ finger 2 @ fret 3

### 2) No Stretch G Major

String/Fret position II or if in scale degrees (Key of G) 0 - 1 7 - 5  $\leftarrow$  root = "G"

6	C	7 1	2	3 4	5	C	2 - 2	1 - 6
5	3 4	5	C	7 1	2	3	4 - 3	11 - 7
4	1	2	3 4	5	6	7 1	5 - 4	
3	5	6	7 1	2	4	5		
2	2	3 4	5	6	7 1	2		
1	C	7 1	2	3 4	5	C		
	1 2 3 4							

Tonic Top ↳ finger 2 @ fret 3  
Tonic Bottom ↳ finger 1

- Built off tonic on 1st string

### 3) No Stretch D Major

String/Fret position II or if in scale degrees (Key of D) 0 - 1 7 - 5  $\leftarrow$  root = "D"

6	2	3 4	5	C	7 1	2	2 - 2	1 - 6
5	C	7 1	2	3 4	5	C	4 - 3	11 - 7
4	4	5	6	7 1	2	3 4	5 - 4	
3	1	2	3 4	5	6	7 1		
2	5	6	7 1	2	3 4	5		
1	2	3 4	5	C	7 1	2		
	1 2 3 4							

• Built off tonic on 2nd string

↳ finger 4 @ fret 5

## 4) Pinky Stretch A major

→ position or if in scale degrees (Key of A) 0 - 1 7 - 5  
 ↓ Str: 1 Fret 0 1 2 3 4 5 C → 9 10 11 12

6	5	C	7	1	2	3 4	5
5	2	3 4	5	C	7 1	2	
4	7	1	2	3 4	5	6	
3	4	5	6	7	1	2	
2	1	2	3 4	5	6	7 1	
1	5	C	7	1	2	3 4	
						5	
						4	
						3	
						2	
						1	
						5	

→ root = "A"

2 - 2 1 - 6  
 4 - 3 11 - 7  
 5 - 4

- Built off tonic
- or 1<sup>st</sup> string

↳ finger 4 @ fret 5

## Preferences:

- 2<sup>nd</sup> position, then 3<sup>rd</sup>,
- no stretch
- depending on which octave, prefer tonic w/ finger from left to right (want left finger on tonic)  
 (high to low)  
 (1 to 4)

## First Approach

Key center is notes 1 and  
 key where you go up 1 gravity

Fret-Tonic Minimization (?)

Tonic Reduction / Tonic Minimization  
 (?)



- the primary focus is the relationship between ~~fret and finger~~
- the idea is to position fingers ~~first and final~~

such that the lowest / leftmost possible

finger plays tonic - in other words, position our hand such that the important notes are reachable

We split the fretboard along the gap between 3rd and 4th string to so that make 2 three string guitars the



most important note is most easily played

If the melodic line is primarily

in the low guitar, prefer a configuration w/ tonic leftmost on "G" or "B"

Position 4  $\rightarrow$  3  $\rightarrow$  2  $\rightarrow$  1

("E string" will require position shift as there are no strings below it)

1: prefer if notes of lower pitch than tonic 2 to 2

2: prefer if notes of higher pitch than tonic and if 4th is omitted  
G to C (stretch)

if primarily high guitar, we

don't mind going downward

onto G  $\rightarrow$  B  $\rightarrow$  E strings

- left most foot is stronger
- position shifting has higher penalty

position 1 > 2 > 3 > 4

- 1 to 4 is best top to best bottom,  
so it is the best shift

↳ even though they  
are the worst for entire  
since they contain stretches,  
those are avoided on  
position shift between them

\* 2<sup>nd</sup> iteration should

factor in prominent chromatic  
notes, tensions, chord extension  
tones, <sup>^(blue note)</sup> prominent scales outside major/minor  
such as whole tone, half tone,  
blues, chromatic,  
harmonic major, etc...

