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Voicings Generator

Advanced Coding Tools and Methodologies

Computer Music Representations and Models

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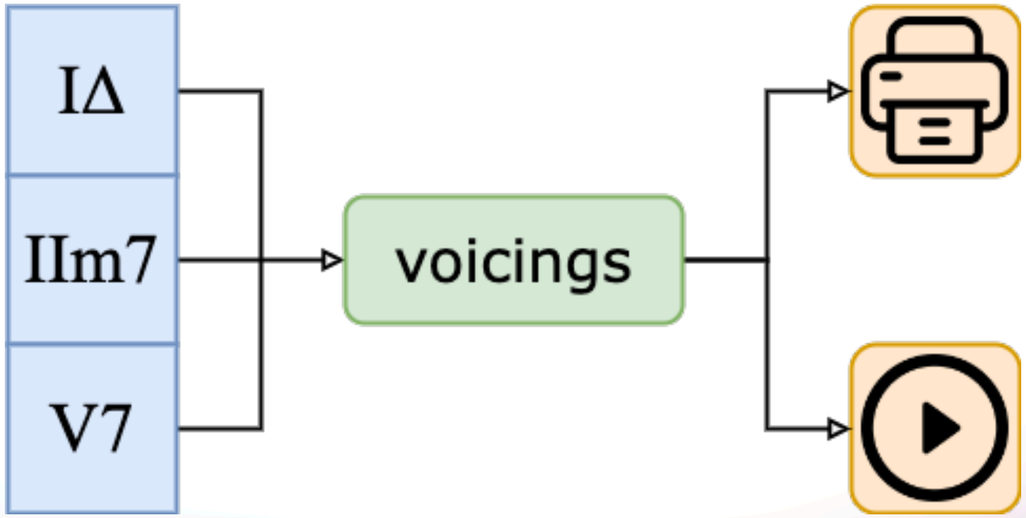
Introduction

Voicings Generator is a tool which is able to create the right set of voicings from a sequence of chords chosen by the user, following rules that apply to specific, Jazz-standard voicing types.



Application Flow

1. Choose the Chords Sequence
2. Choose Root Key and Modal Scale
3. Modify audio parameters and modalities
4. **Voicings are Calculated**
5. Play or Print the Chords Sequence

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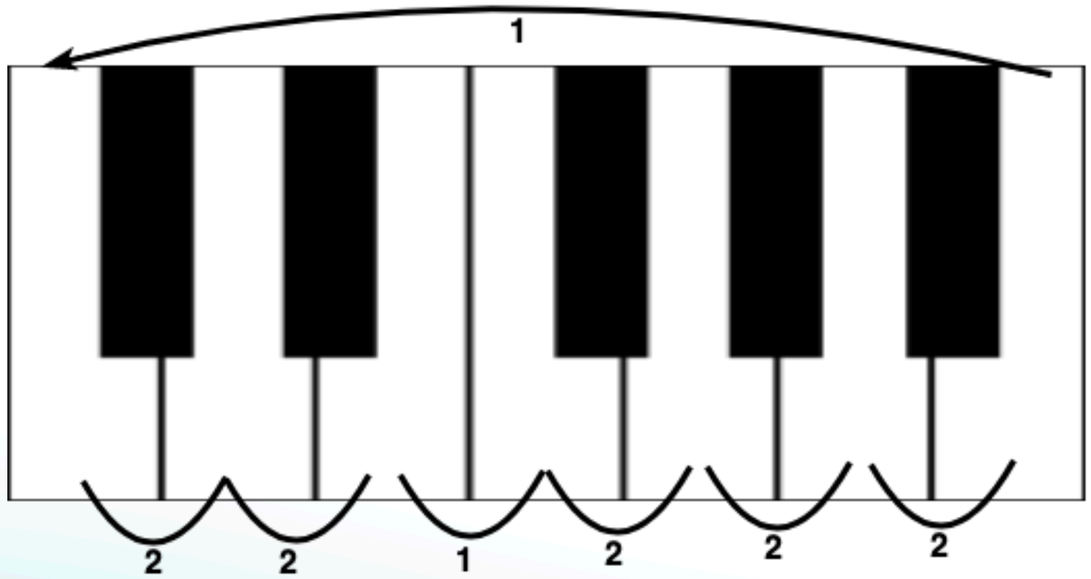
Modal Scales Generation

Modes Generation

- Each scale has **intervals**
- Each scale is generated from the **ionian mode** by changing the starting point
- If I play all white notes of a piano keyboard starting from note *x* to note *x* + *one octave* I get a modal scale
- Modal Scales are constructed **iteratively**

Modes Generation

- Let’s have a look at the **intervals** of the ionian scale:

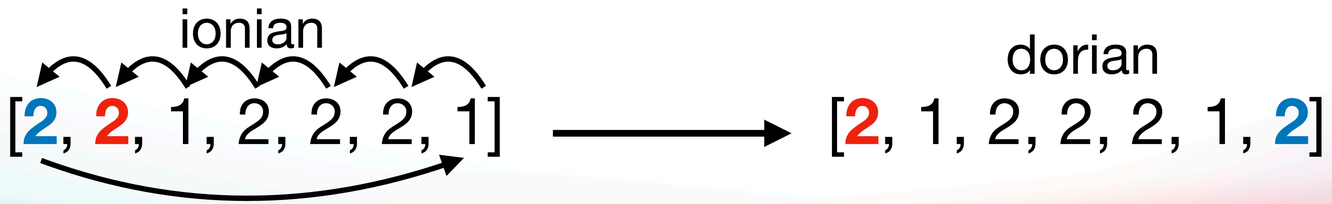


- We can write them in **array** form**:**

[2, 2, 1, 2, 2, 2, 1]

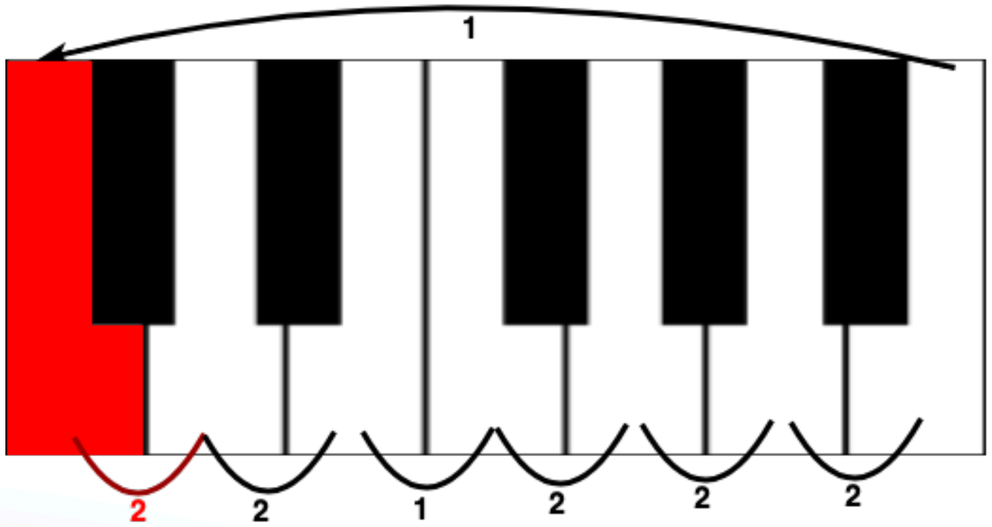
Modes Generation

- We can now build the array of intervals for **all the other scales** starting from the array of ionian intervals
- It comes down to **circular shifting** the array a number of times to get the desired modal scale
- *Example:*



Modes Generation

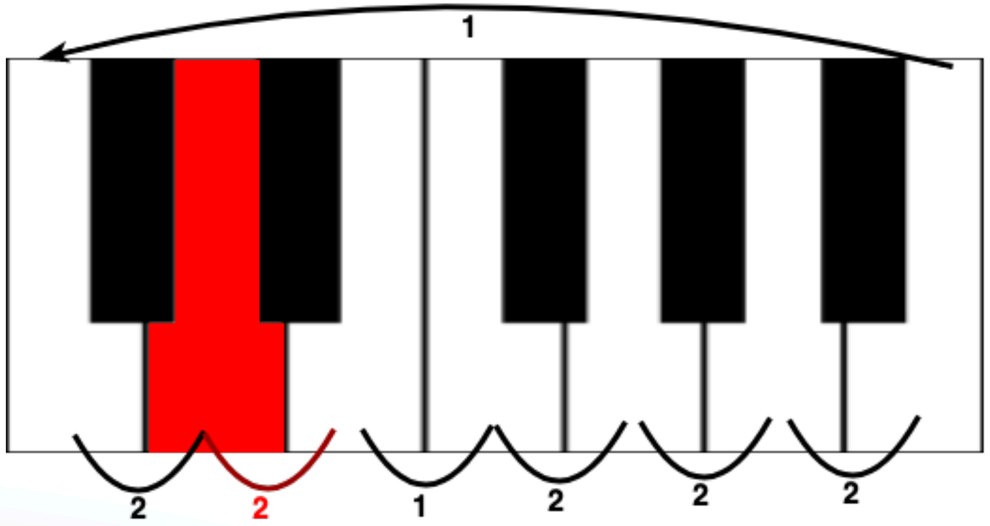
- **Ionian**



[**2**, 2, 1, 2, 2, 2, 1]

Modes Generation

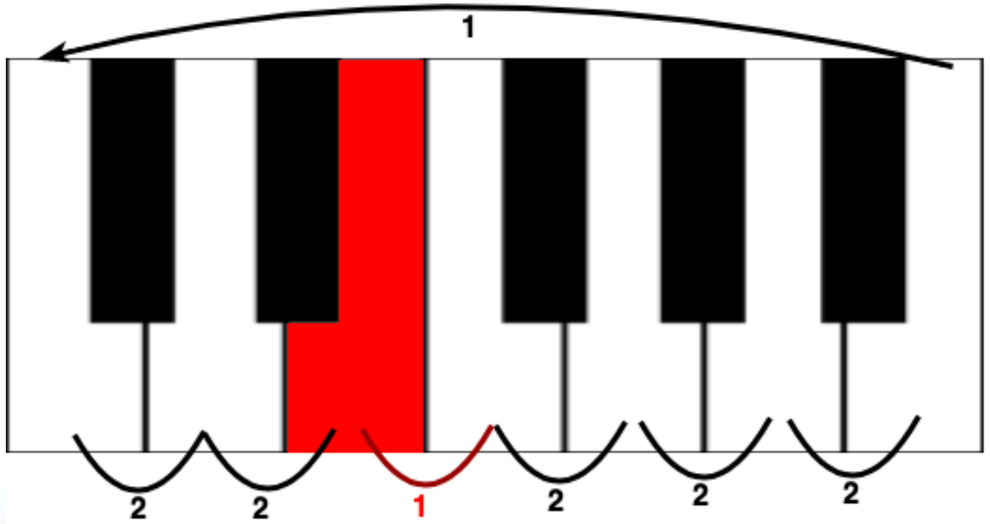
- **Dorian**



[2, **2**, 1, 2, 2, 2, 1]

Modes Generation

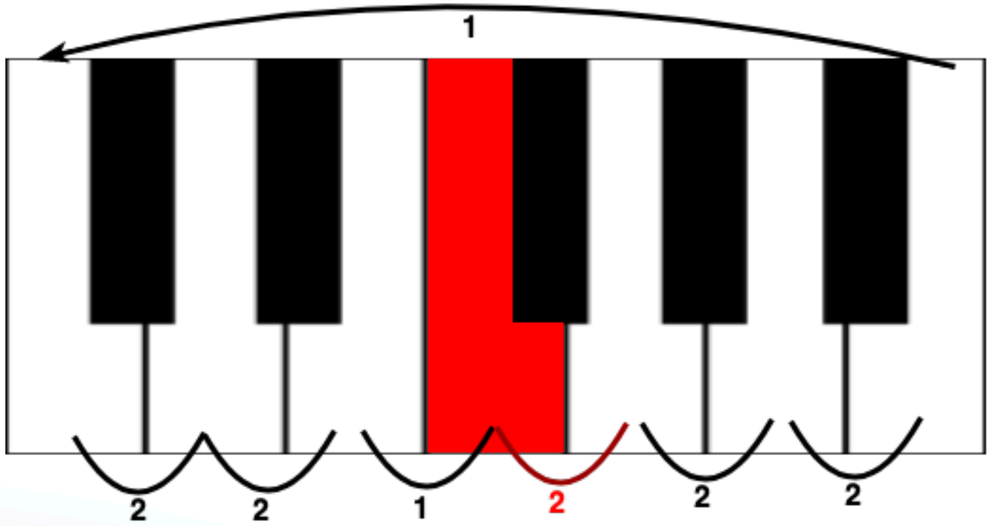
- **Phrygian**



[2, 2, **1**, 2, 2, 2, 1]

Modes Generation

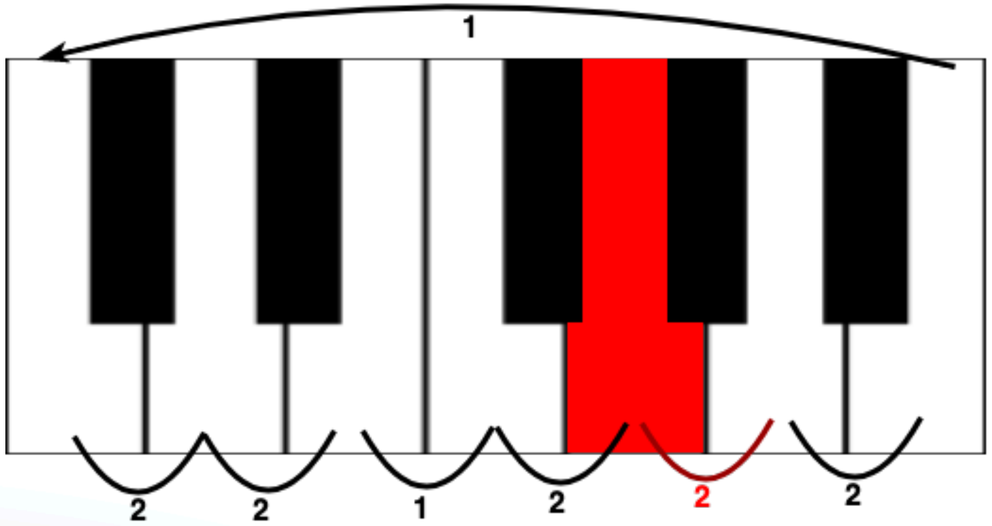
- **Lydian**



[2, 2, 1, **2**, 2, 2, 1]

Modes Generation

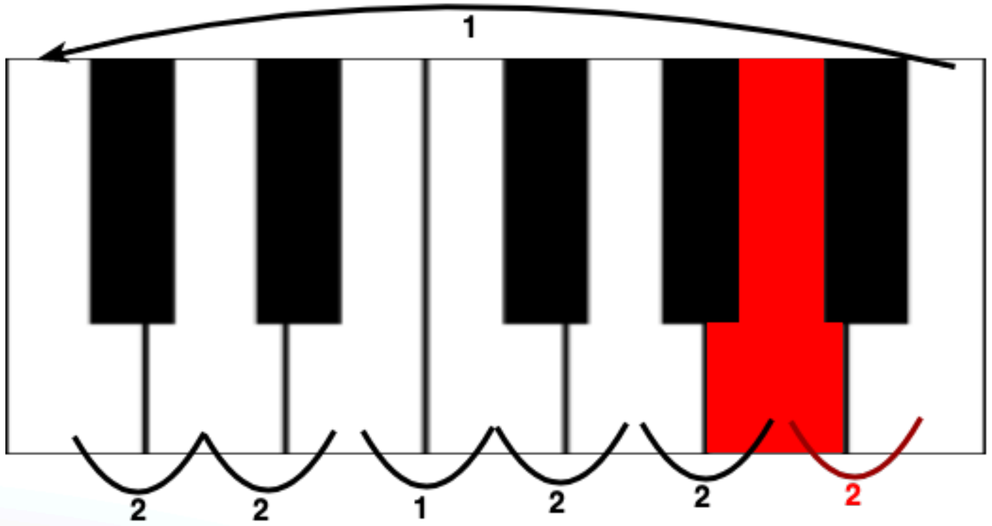
- **Mixolydian**



[2, 2, 1, 2, **2**, 2, 1]

Modes Generation

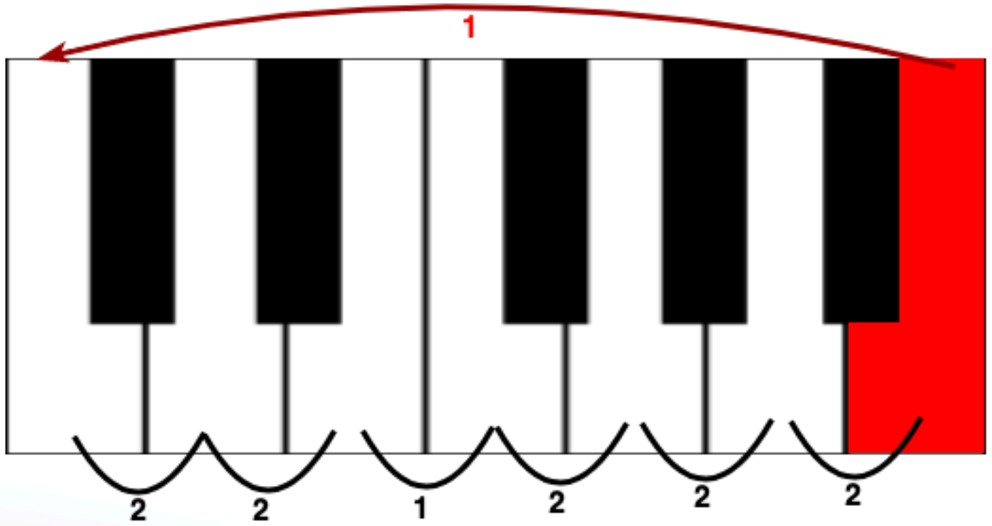
- **Aeolian**



[2, 2, 1, 2, 2, **2**, 1]

Modes Generation

- **Locrian**



[2, 2, 1, 2, 2, 2, **1**]

Modes Generation

- **All modes intervals**

[**2**, 2, 1, 2, 2, 2, 1]
[2, **2**, 1, 2, 2, 2, 1]
[2, 2, **1**, 2, 2, 2, 1]
[2, 2, 1, **2**, 2, 2, 1]
[2, 2, 1, 2, **2**, 2, 1]
[2, 2, 1, 2, 2, **2**, 1]
[2, 2, 1, 2, 2, 2, **1**]

Grades-Modes Correlation

- Same thing holds true for the intervals of the **grades** of a modal scale

Ionian Scale

[**2**, 2, 1, 2, 2, 2, 1]	1st grade
[2, **2**, 1, 2, 2, 2, 1]	2nd grade
[2, 2, **1**, 2, 2, 2, 1]	3rd grade
[2, 2, 1, **2**, 2, 2, 1]	4th grade
[2, 2, 1, 2, **2**, 2, 1]	5th grade
[2, 2, 1, 2, 2, **2**, 1]	6th grade
[2, 2, 1, 2, 2, 2, **1**]	7th grade

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Voicings Generation

Array of Summed Intervals

- In order to facilitate the usability and understandability of the code, a new **array** has been introduced
- It contains the intervals of the grades referred to a modal scale ordered in a more practical way
- The array is structured as follows:

[**0**, **0**, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14]

$nX \in \mathbb{N}$

Array of Summed Intervals

- The array contains the value you have to sum to the chord's fundamental in order to obtain the desired interval of the chord
- Let's chord this array **a** and the chord's fundamental **f:**

f + **a**[1] = 1st of the chord

f + **a**[2] = 2nd of the chord

f + **a**[3] = 3rd of the chord

…

f + **a**[14] = 14th of the chord

The **first** of the chord is the fundamental of the chord itself, hence why the **first two positions of the array have 0** as values

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Voicings Types

Rootless

- As the name suggests, these chord voicing exclude the root note.
- Instead of the root, and sometimes the 5th, the chord tension is played.

Type 1	Type 2
Major and minor chords 3rd, 5th, 7th, 9th	Major and minor chords 7th, 9th, 3rd, 5th
V7 chords 3rd, 7th, 9th, 13th	V7 chords 3rd, 13th, 7th, 9th

Monk

- Thelonious Monk is a Bebop Pianist known for his dissonant.
- These are **proto-chords** that exist just to create a general “feel” of a particular key.

Type 1
Tonic major chords 7th, 1st, 3rd
Every other chord 3rd, 4th, 6th

Powell

- In jazz, it’s possible to omit the less important notes to create a shell chord.
- These types of voicing only contain two or three notes.
- Perfect for Bebop

Type 1	Type 2	Type 3	Type 4
1st, 3rd	1st, 6th	1st, 7th	1st, 10th

Three Notes

- 3rd and 7th notes are called “**guide tones**” since they determinate the quality of the chord.

Type 1	
Left Hand Fundamental	Right Hand 3rd, 7th

Four Notes

- Take the basic **shell chord** and adding one other note, usually the 5th

Type 1	
Left Hand Fundamental	Right Hand 3rd, 5th, 7th

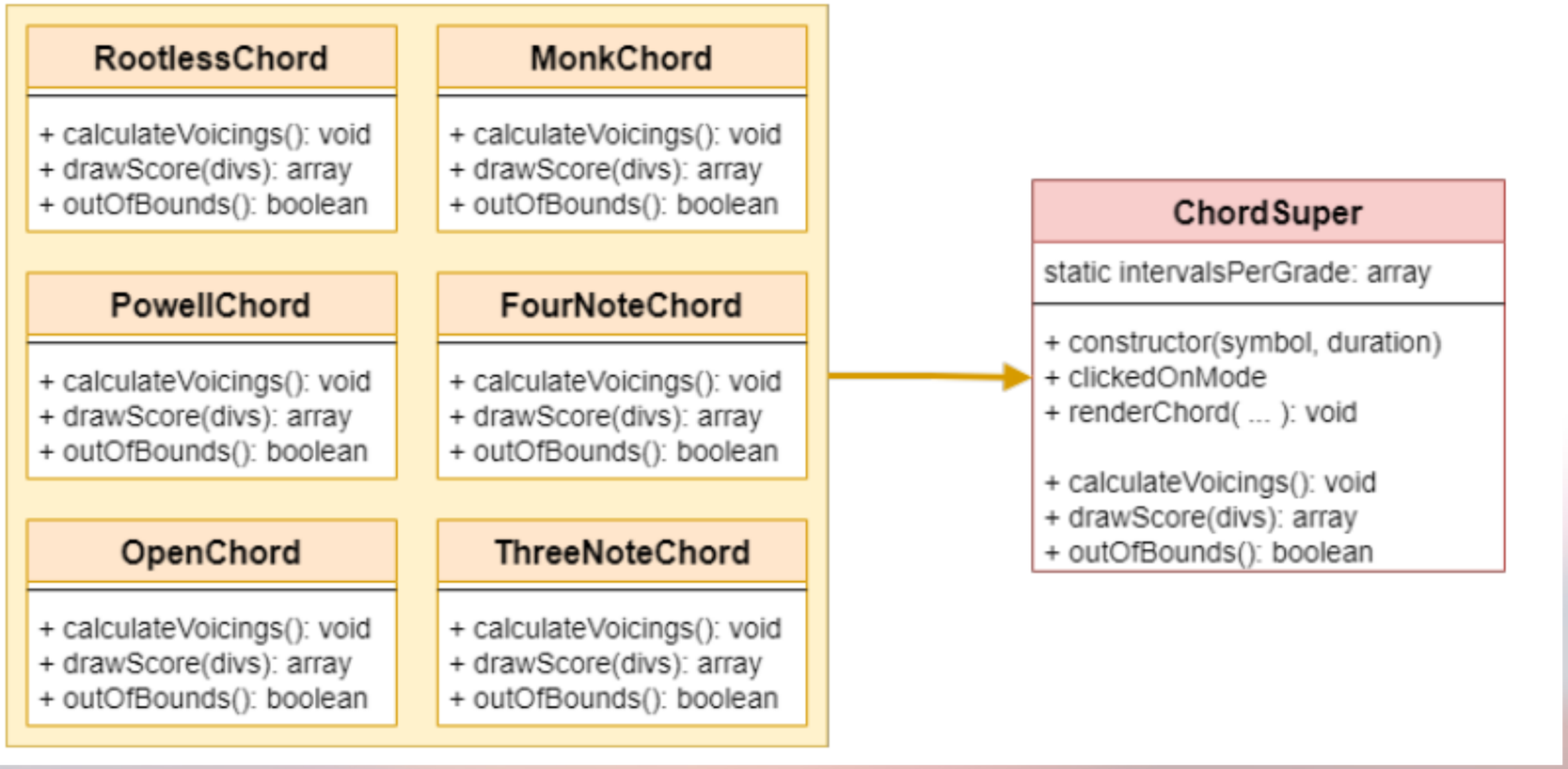
Open Chord

- Played in “**open harmony**” in order to have a richer and more balanced sound.

Type 1		Type 2	
Left Hand 1st, 10th	Right Hand 5th, 7th	Left Hand 1st, 7th	Right Hand 3rd, 5th

Factory Pattern

- In order to achieve a high flexibility in terms of adding new Voicings Types or removing existing ones, the Voicings Algorithm has been implemented following a simplified **Factory Pattern.**



Controls and dynamic shifting

Static controls

- Voicings are built in fixed range (specially voicings with one hand).
- To avoid going out of range, we have built controls that allow you to shift chords down or up

Dynamic shifting

- An important feature is to reduce the movement of the hand
- We reduce the “distance” between neighboring voicings

Future improvements

- Adding change of tonality
- Adding change of time
- Combining voicings and comping voicings
- Automatically associate voicings given a melody

Thank you for your attention

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