The N System -- Natural Music Notation Method

Why is the piano keyboard built non-homogenously? Why do adjacent (white) keys produce full note (e.g., C=>D), or half note (e.g., E=>F)?
Why do one get into transposition complications when he wants to "sing" just a little higher?

Music has evolved from primitive instruments and writing methods, and kept **traditional and "backward compatibility"** over hundreds of years.
The current system and methods of music basics are a result of such evolution, and any newcomer must fit into such schema.

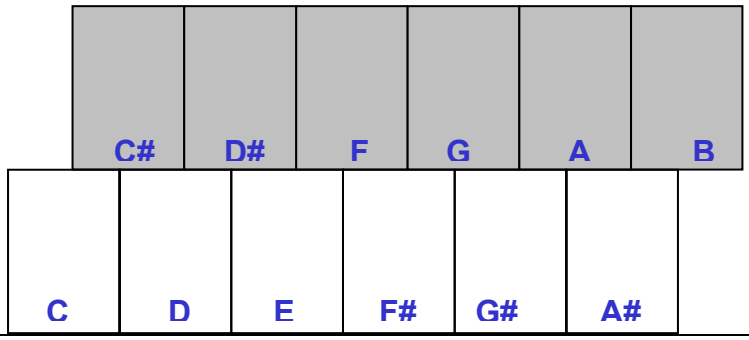
However, an independent 'engineering' look on today's music logic shows that each Octave (twice the frequency) is divided to into 12 equal tones, evenly. (in logarithmic scale: any two adjacent half-tone notes are $2^{1/12}$ apart).
So how would we design a "new" modern piano keyboard?

Probably, first choice will use 12 keys in a row, evenly separated (half tone):

C	C#	D	D#	E	F	F#	G	G#	A	A#	B

In such a simplified system, if keys are denoted 1-12, the melody such as "2-6-4-3-3-3-5" can be easily transposed up or down (e.g., full tone up will add 2 to each key number, resulting in "4-8-6-5-5-5-7").
Since playing octave with a single hand is quite common, and normal key size depends on hand shape and finger size, this may look too long for some players:

Therefore, a two row seems to be more reasonable structure:



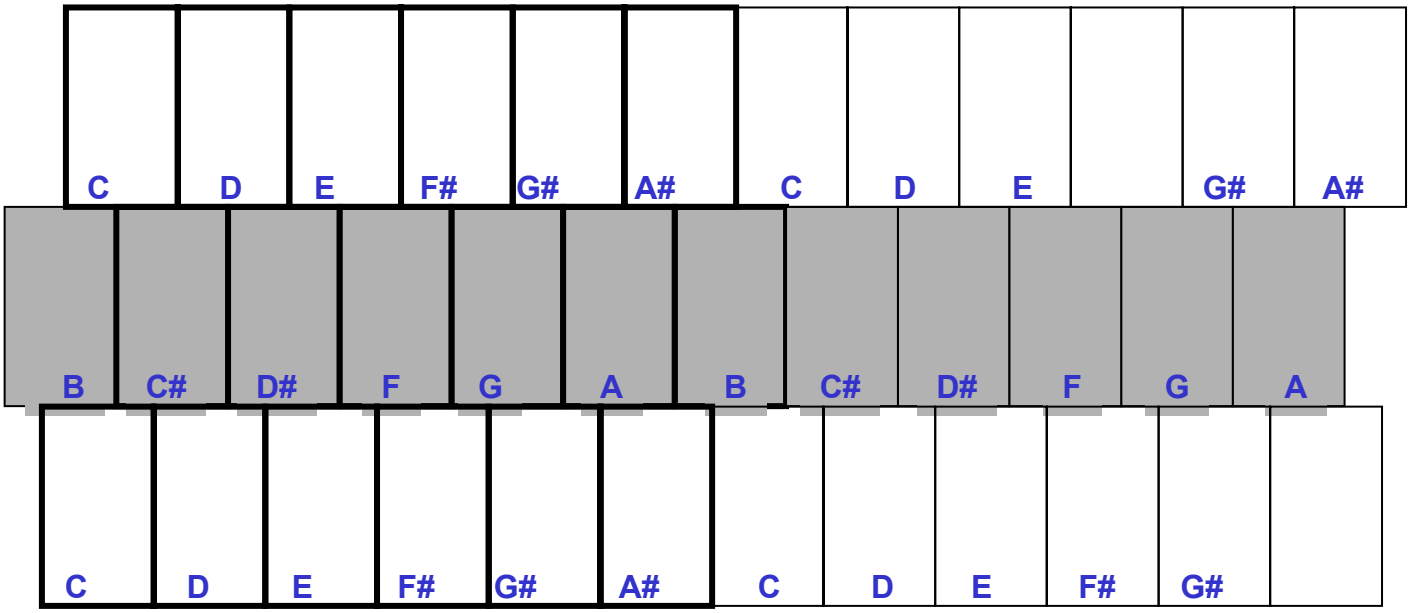
This keyboard has an octave span even shorter than a common keyboard (6 keys long, as compared to 8 keys long in the current system).
In this keyboard, all “white” keys are evenly separated (full tone), as are the “black” keys. Any adjacent white-to-black is separated half tone (and vice versa).

This keyboard system was first introduced by Paul von **Janko** (born 1856) , a Hungarian engineer (!), and he called his harmonic keyboard a **Janko Keyboard**. He has built such pianos, with mechanical keyboard. Today, such electronic keyboards are sold in Japan as **Chromatic keyboard**.

What are the characteristics of such a keyboard?

Playing a specific tune has the same fingering, **whichever** the starting key selected: just move your hand, and play the *same way* – and you get a higher (or lower) pitch.
This follows the same simplicity you get when you sing:
No sharps. No flats.
No transposition. (How many non-professional can play a tune half a tone higher than it is written ..??)
Moreover, chords becomes much simpler: there's only one single positioning for each chord: see details bellow/

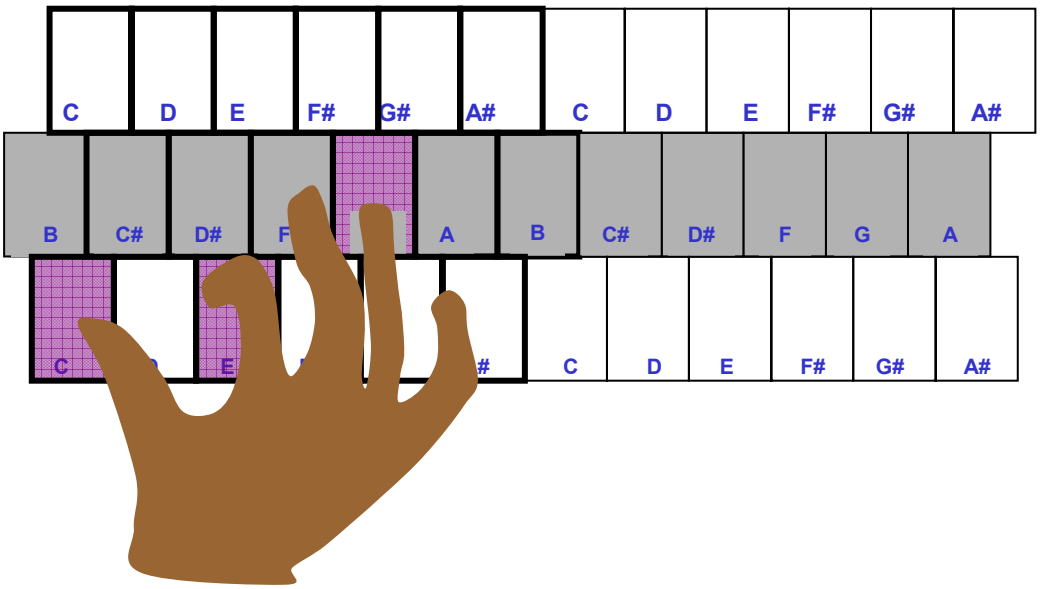
Now, in order to allow same fingering for half tone distance (e.g.,, from C to C#), a third row of keys, similar to the first row, may be added: this way, the same fingering position is used for ANY tune or chord:



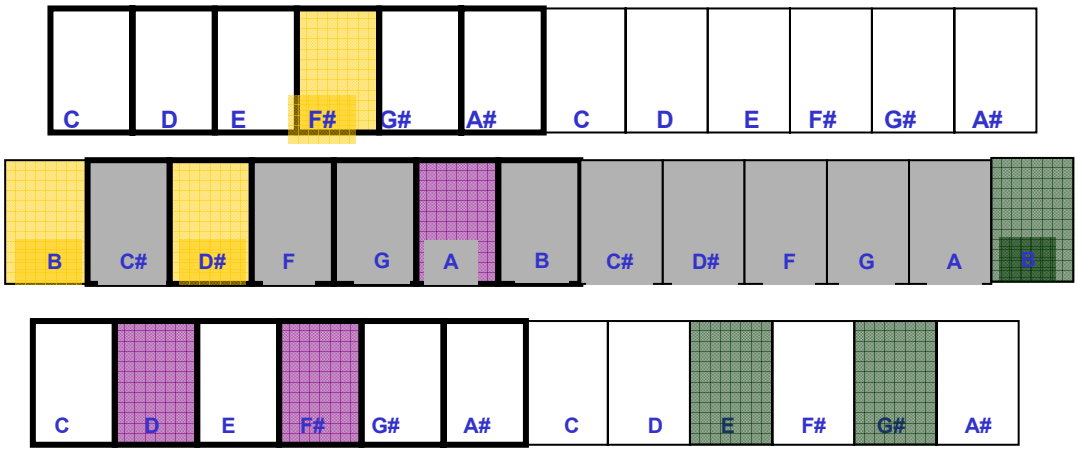
Note that the keyboard shows two octaves, and one octave is emphasized for simplicity of explanation.

How is fingering position determined?

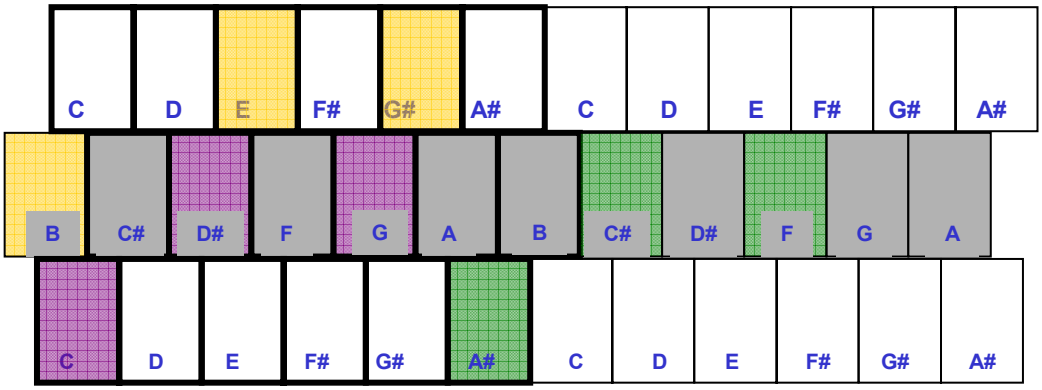
Player need to learn **only one** positioning of each chord type: One for Major. One for Minor. One for Septa-chord, etc:



ALL major fingering will use the same fingering position: just move your hand along the keyboard, and you hit the various majors.



Examples of D (purple), E (green), and B (yellow) chords



Examples of Cm (purple), A#m (green), and Bm (yellow) chords

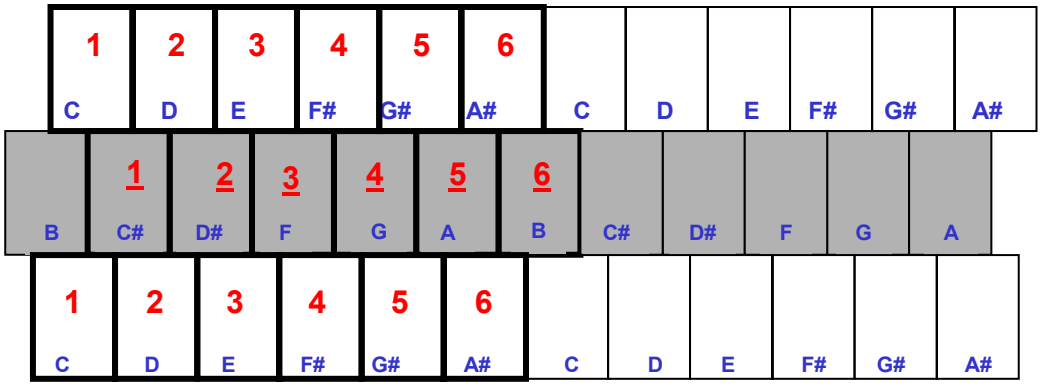
Music Notation Method

Today's notation method follows the logic of the (old) keyboard: the physical distance between any two adjacent notes does not represent music pitch distance
For example, the pitch between C and D is full tone, and it is represented by half line distance when written on the 5 lines: however, the pitch between E and F is half tone, and it is represented by same half line distance when written on the 5 lines.
This results in the sharp/flat 'patching' system, in order to overcome this 'abnormality'.

What is the 'natural' way to notate 12 even notes?

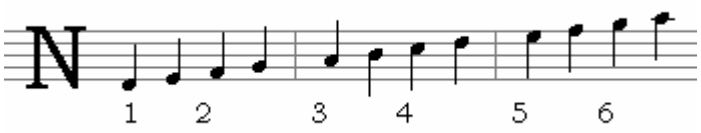
Assuming that we keep the timeline presentation of the current method, 6 lines would better represent the 12 notes. However, the eye can better manage with 5 lines, and the revolution is smaller if we keep the 5 lines.

Now that we have 6 basic notes (plus six half notes), let mark them as 1, 2…6, as follows ('Natural notes' are marked in Red):
:



Let's call it the N System.

Here is how a chromatic scale looks in the N System (starting with C, or 1 in the N System):
-



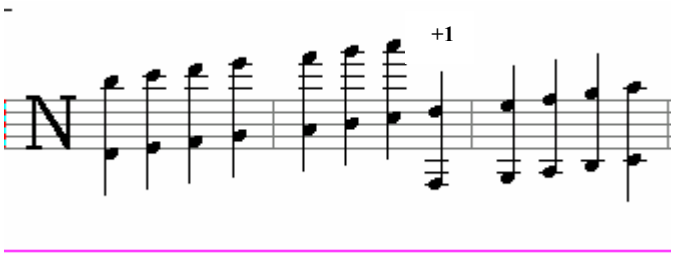
All full distance notes (numbered 1 to 6) appears between the lines (marked).

All half notes (numbered 1 to 6) appears on the lines (not marked).

Notice also the clef “N”, stands for “Natural”, and replacing any other clefs (e.g., G, or Sol).

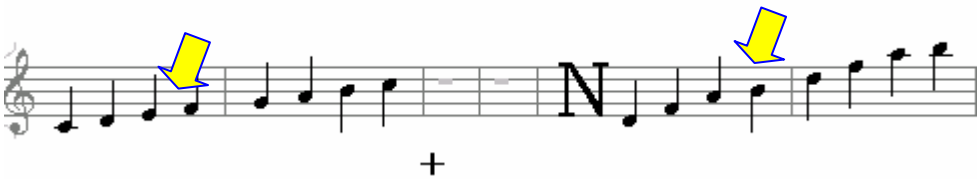
Notice that the dynamic range [or the written interval between adjacent notes] of the N scale is smaller than the common one (distance between notes in the 5 lines is grater than the common one, since no additional signs (“#” or “b”) are being used). On the other hand, the distance between notes represents the pitch between them.

If we add the one octave up/down notes, we'll notice that the octave in the N systems requires more 'distance' than the common system:



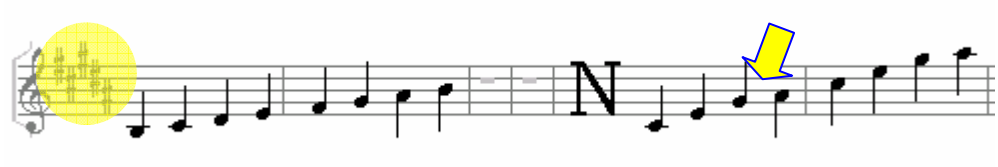
Notice that the too high notes may be eliminated using the +1 or –1 sign, representing octave shift, thus most notes are made easier to read (“modulo octave” presentation).

Lets look at the common major C scale, as compared to the N system:



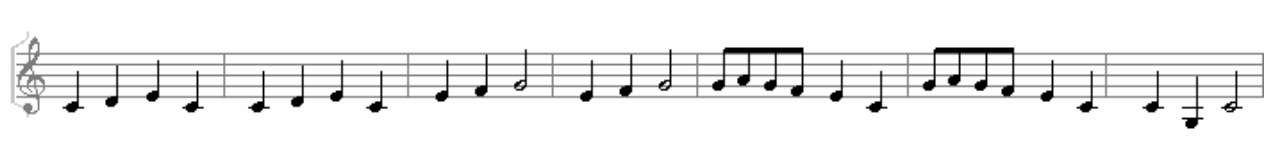
Notice that the dynamic range is better in the current method, however, the pitch representation in the N system is better (notice the 4th note in both systems).

The advantage of the N System is emphasized when we need some transposition: for example, consider a half tone down transposition of the above. The results in the common and N System are:



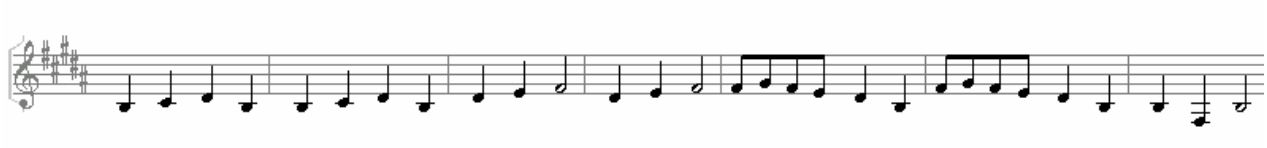
Notice that the in the N system the notes look exactly the same as the previous ones, shifted half tone down, the half tone of the 4th note shows very clearly. No sharp or flat signs are required.
Consider the complexity of both left and right hand side to complete such a “simple” task.

Now let's look at a common tune, **Frere Jacque**. In it's "natural" pitch it starts with C and looks as:

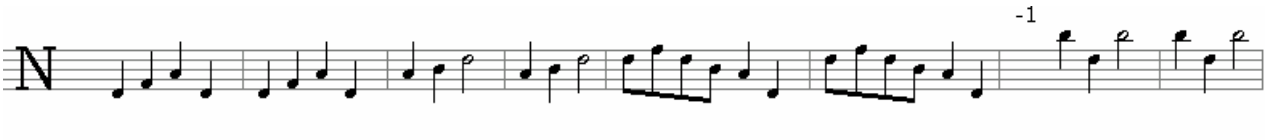


It really looks very clear and neat.

However, if all we need is some pitch shift, say down shift by half tone, the result are:

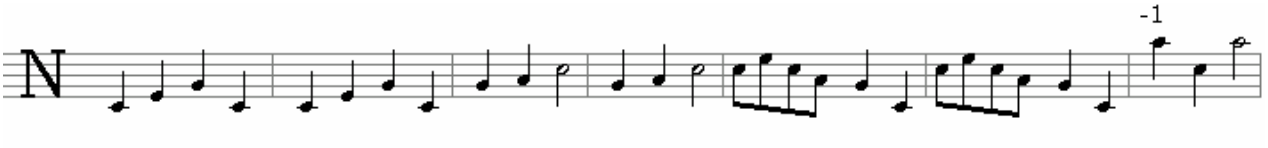


The same two pieces will look at the N Systems as follows:



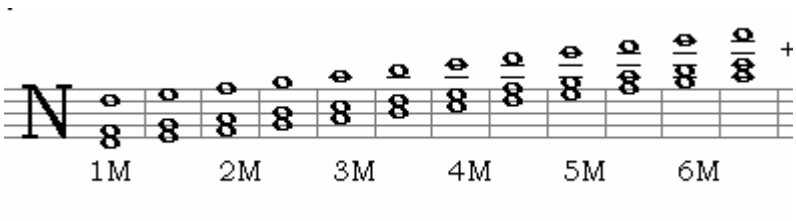
Notice the larger "range" the tune uses, and that the two last bars has been moved up to ease reading, and the sign "-1" is added.

Now the shifted tune is:

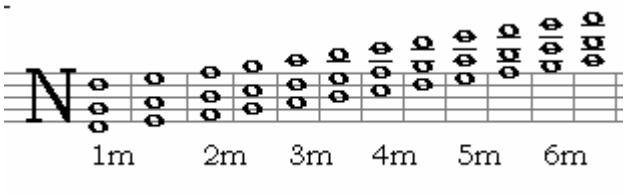


Chords

In the N system, chords becomes much an easier task: there is only one chord you need to learn for each type, and it is applied to any tone. Hence, Major chords looks as:



And the Minor chords are:



Notice that ALL Major (or minor) chords looks the same, except of the linear shift along the lines, representing the pitch shift:
no “#”, no “b” signs are required any more.

Summary

The N System presents a new, natural way to represent music notes.
It provides a representation, which coincides with the music pitch, and allows smoothly shifting (or transposition) between notes.
As a results, flats and sharps are not required, complex transposition is eliminated, chords becomes much easier (only one per type is required) – and music learning curve is shortened significantly.