

Daily Log

Monday September 2

I created a recursive algorithm that fingers each note based on the previous note's fingering. I also made a method that calculates all the fingering possibilities based on a previous fingering.

Tuesday September 3

The algorithm can successfully finger a C pentatonic scale. I looked at several basic pieces and came up with 3 possible cases that will give the algorithm the basic information it needs to analyze the piece in sections.

Static: The note falls within the pentatonic range of the hand position. No changes necessary.

Minor Alteration: The hand needs to reach a local min/max note that falls outside of the pentatonic range (e.g. A5 is one note outside the range of a hand with thumb on C5). No crossovers necessary, the hand is just realigned. Hand position is dictated by the thumb (if going up) or the pinky (if going down).

Major Alteration (Crossover): Same conditions as minor alteration (reaching a local min/max), AND more than five notes are being played in one direction (e.g. in a C scale, C6 out of range of C5 AND 8 notes are going up = needs at least one break).

Fingering an entire 8-note scale is more difficult than I originally imagined: how would the algorithm know where to do the crossover? I'm thinking that instead of doing each note in order (e.g. starting on C5 and fingering each note until C6, I will do a pre-scan that determines where the break is necessary, then the algorithm fills everything else in after that). Interestingly, if I parse it backward, starting from a 5 on C6, it almost gets there, but it's not optimal yet. I found a basic piece that requires several minor alterations and no crossovers, so I might work on that first before switching back to the major scales.

Thursday September 5

I wrote script covering the static case today. The algorithm can finger very basic pieces that don't require the hand to move (e.g. pentatonic scales, Mary Had A Little Lamb). I'm working on adapting the algorithm to minor alterations now, specifically the leap from G5 to E6 and F6 in Can You Feel The Love Tonight. Right now, the plan is to calculate the original hand position as well as the new hand position based on the local max/min note. Any intermediate note that falls outside of the original hand position will be covered by the new hand position. This solution isn't entirely satisfactory, because it will give rise to awkward fingering in more complex pieces, but I will refine that later.

Timeline

Date	Goal	Met
August 29th	Download Sibelius and create MIDI file test cases	Yes, I created several major scales as test cases.
September 5th	Convert MIDI to text file and write script to extract all necessary information	Yes, I created an array of arrays, with the larger outer array representing the entire piece and each inner array representing a note or rest.
September 12th	Write script to finger C, G, D, A, E, major scales	The algorithm can write script to finger pentatonic scales and basic pieces like "Mary Had A Little Lamb" that don't require hand movement.
September 19th	Write script that can adjust to minor alterations and finger a C Major Scale	

Reflection

Given any piece of music that doesn't require changes in hand position, my algorithm can successfully write in fingering. It can also identify circumstances in which changes in hand position are necessary and categorize them appropriately. Attached is an excerpt from "Mary Had A Lamb," as well as an array with the fingering placed in.



Fingered Array: [[[128, 69, 3], [128, 67, 2], [128, 65, 1], [128, 67, 2], [128, 69, 3], [128, 69, 3], [256, 69, 3], [128, 67, 2], [128, 67, 2], [256, 67, 2], [128, 69, 3], [128, 72, 5], [256, 72, 5]]]

Next week, I will work on the category of hand position changes I termed "minor alterations." If my algorithm is successful in fingering pieces like "Can You Feel The Love Tonight," I will move on to the 12 major scales.