Name: Joseph White

Course: CSC375

Industry: Jazz Compositions

Problems to Solve: Writing music, particularly for Jazz, has always been almost a nightmare to learn, especially for beginner composers. However, like many other music genres, it can be broken down into two basic building blocks, notes and tempo. The types of notes to play and how fast to play them is a concept enforce, not just starting a piece, but also while writing a piece, and after when reviewing the piece. With a select amount of midi data, find the following properties of Jazz music:

- Average Tempo
- Range of Notes (Lowest vs Highest)
- Most played semitone of notes (C, C#,…)
- Most played note in any octave

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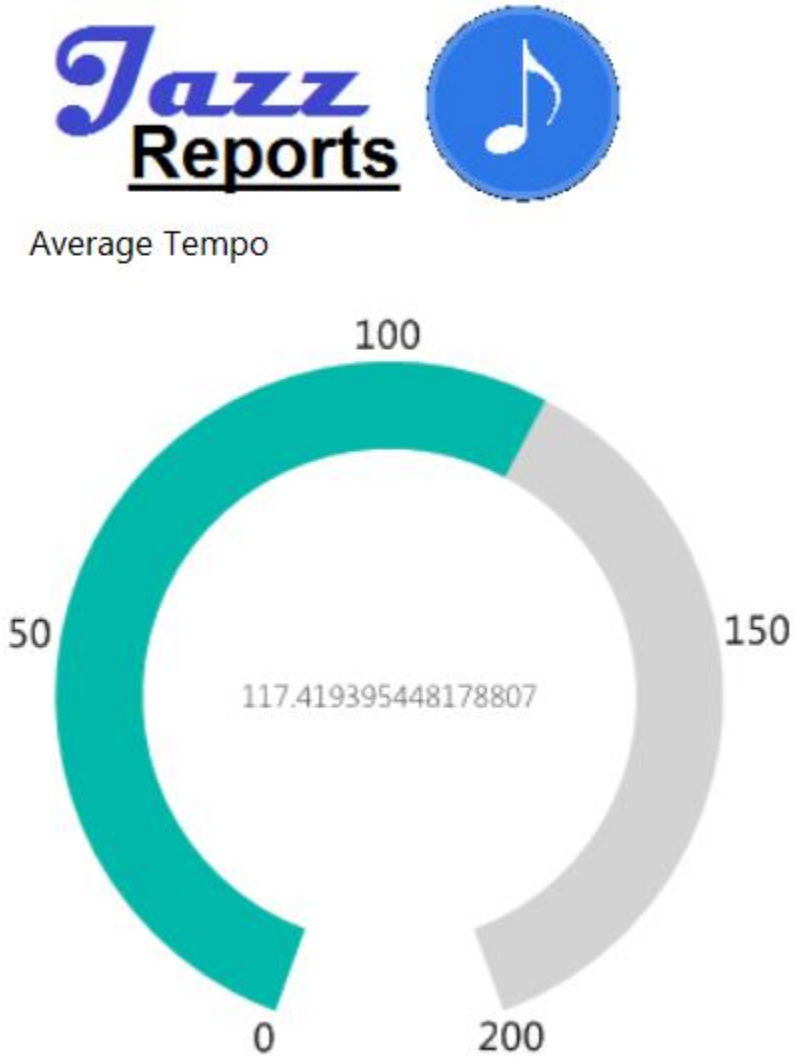
Question: One of the most basic components to music, besides notes, is tempo. The tempo of a song is the measure of time it takes to cycle through a number of beats, hence why it is measured in beats per minute, or bpm. Given a large amount of jazz piano midi files, find the average tempo of all the files.

Hypothesis: Jazz music tends to have a range of tempos, from slow beats for fox trotting, to fast bebop. My theory is that the average tempo for jazz will be a tad faster than 120 bpm, which is the “default” medium tempo.

Conclusion: The average tempo of the jazz piano files was approximately 117 bpm. This is ultimately surprising as it goes against my hypothesis of a faster tempo. However, given that 117 bpm is close to the default tempo, it is reasonable to assume the sample size included a variable number of tempos that only slightly favors slower tempos.



QUERY:

```
CREATE PROCEDURE usp_AverageTempo as
SELECT AVG(Tempo)
FROM Songs
```

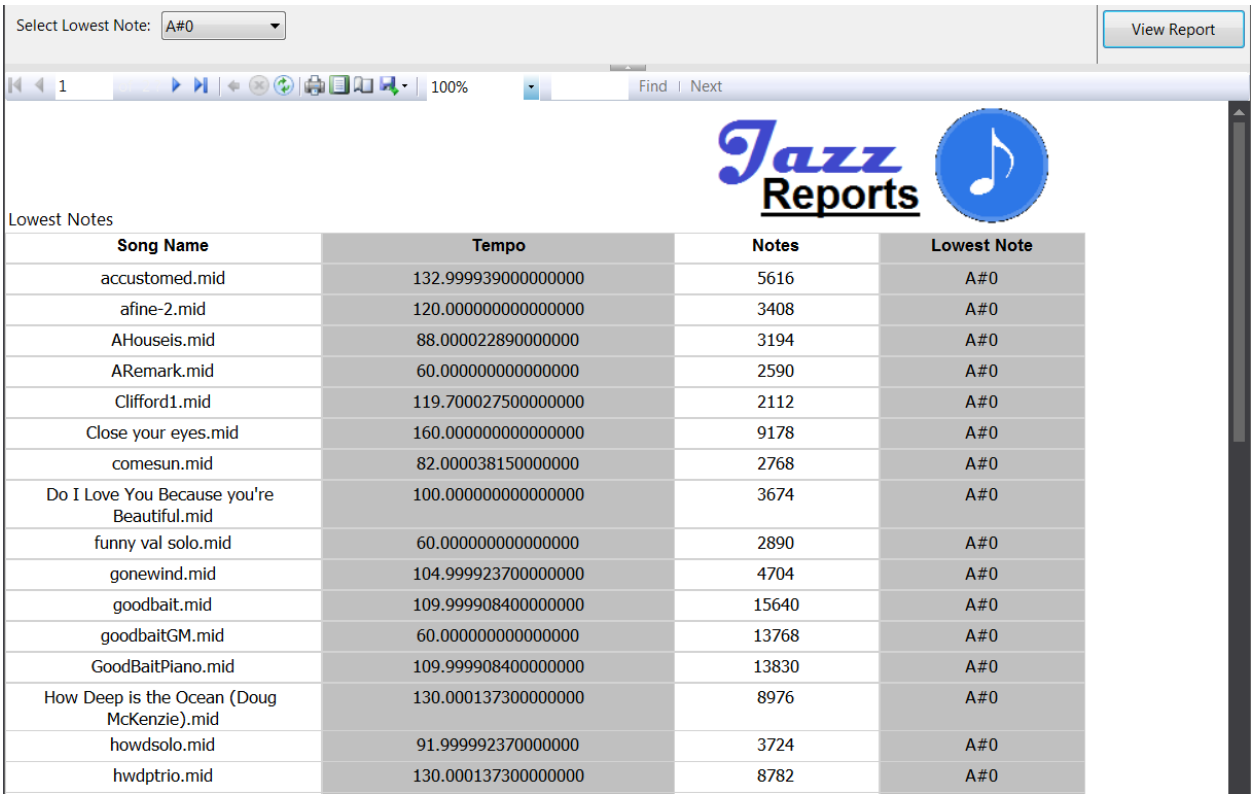
Question: When composing any kind of music, a factor that usually must be considered is the range of notes, or the distance between the lowest note and the highest note. While some prefer the openness of using all keys on the keyboard, others will say it helps to focus on melody when using a smaller range. Given the data, find the most used highest note and lowest note.

Hypothesis: Given that jazz uses a more style of piano playing that would involve gestures that are more sporadic, I would assume the range of the notes would be greater than two octaves. However, I would also guess that each song would still anchor in the mid-range of octaves. My prediction is that the range would be C2 for lowest note and B6 for highest notes.

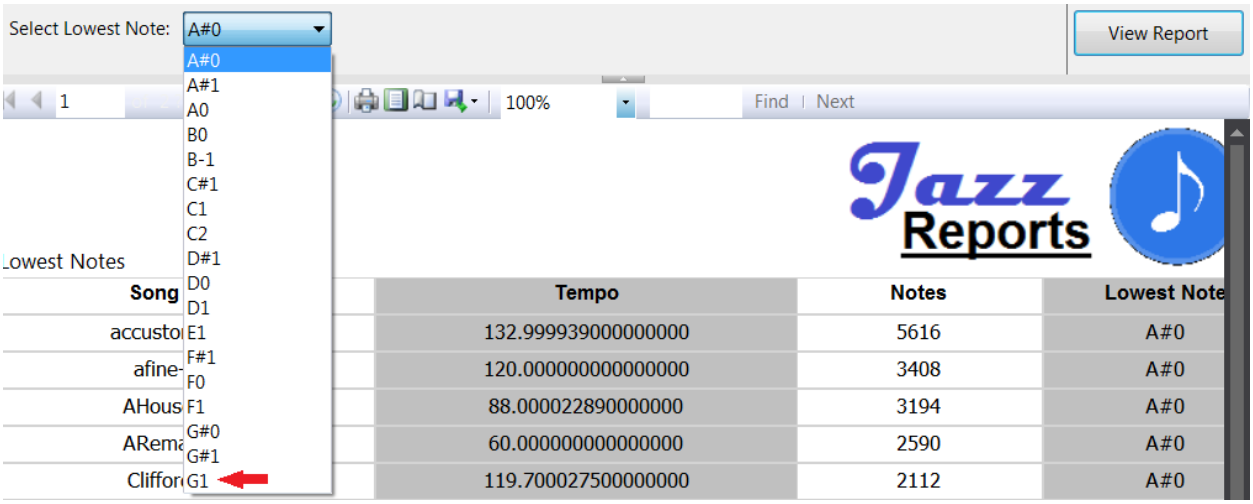
Conclusion: The most used range of notes from the data are the notes between C1 and C8. What this shows is that Jazz, while having a big range of 7 entire octaves, Jazz still tends to stay away from notes that become less melodic as they become too high or low in pitch.

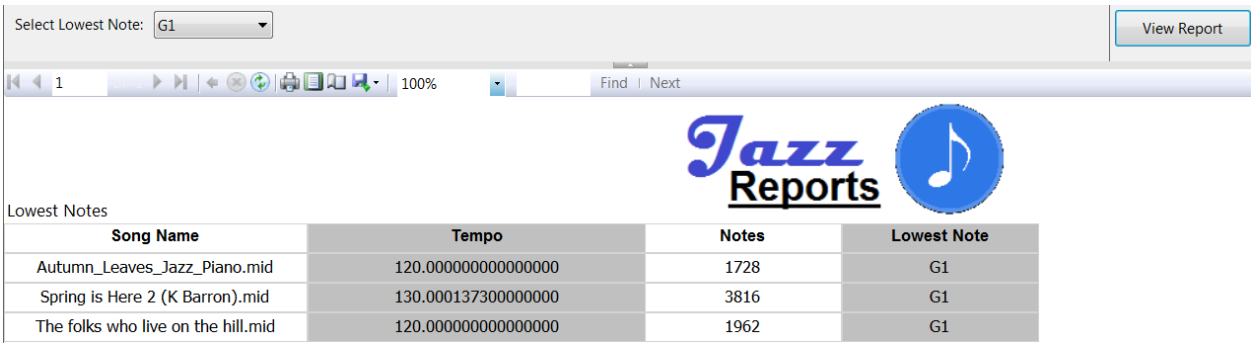
(Two dashboards with drop downs can be used to view each song's name, tempo, and total number of notes based on their highest or lowest note. Just select the note in the top left drop down menu and click "View Report".)

Lowest Notes Dashboard:



Song Name	Tempo	Notes	Lowest Note
accustomed.mid	132.999939000000000	5616	A#0
afine-2.mid	120.000000000000000	3408	A#0
AHouseis.mid	88.000022890000000	3194	A#0
ARemark.mid	60.000000000000000	2590	A#0
Clifford1.mid	119.700027500000000	2112	A#0
Close your eyes.mid	160.000000000000000	9178	A#0
comesun.mid	82.000038150000000	2768	A#0
Do I Love You Because you're Beautiful.mid	100.000000000000000	3674	A#0
funny val solo.mid	60.000000000000000	2890	A#0
gonewind.mid	104.999923700000000	4704	A#0
goodbait.mid	109.999908400000000	15640	A#0
goodbaitGM.mid	60.000000000000000	13768	A#0
GoodBaitPiano.mid	109.999908400000000	13830	A#0
How Deep is the Ocean (Doug McKenzie).mid	130.000137300000000	8976	A#0
howdsolo.mid	91.999992370000000	3724	A#0
hwdptrio.mid	130.000137300000000	8782	A#0


Select Lowest Note:
A#0
A#0
A#1
A0
B0
B-1
C#1
C1
C2
D#1
D0
D1
E1
F#1
F0
F1
G#0
G#1
G1
View Report
1
100%
Find | Next
Jazz Reports
Lowest Notes
Song
Tempo
Notes
Lowest Note
accusto
132.999939000000000
5616
A#0
afine-
120.000000000000000
3408
A#0
AHous
88.000022890000000
3194
A#0
ARema
60.000000000000000
2590
A#0
Cliffor
119.700027500000000
2112
A#0


Select Lowest Note:
G1
View Report
1
100%
Find | Next
Jazz Reports
Lowest Notes
Song Name
Tempo
Notes
Lowest Note
Autumn_Leaves_Jazz_Piano.mid
120.000000000000000
1728
G1
Spring is Here 2 (K Barron).mid
130.000137300000000
3816
G1
The folks who live on the hill.mid
120.000000000000000
1962
G1

Lowest Note Queries:

```
CREATE PROCEDURE usp_param_GetLowNotesDistinct
as
SELECT DISTINCT LowestNote
FROM Songs


CREATE PROCEDURE usp_FindLowestNote
	@lownote	nvarchar(50)
as
SELECT s.SongName, s.Tempo, s.Notes, s.LowestNote
FROM Songs s
WHERE LowestNote = @lownote


CREATE PROCEDURE usp_LowestNotes
as
SELECT
	SUM(case when LowestNote = 'C-1' then 1 else 0 end) as CNeg1,
	SUM(case when LowestNote = 'C#-1' then 1 else 0 end) as C#Neg1,
	SUM(case when LowestNote = 'D-1' then 1 else 0 end) as DNeg1,
	SUM(case when LowestNote = 'D#-1' then 1 else 0 end) as D#Neg1,
	SUM(case when LowestNote = 'E-1' then 1 else 0 end) as ENeg1,
	SUM(case when LowestNote = 'F-1' then 1 else 0 end) as FNeg1,
	SUM(case when LowestNote = 'F#-1' then 1 else 0 end) as FSharpNeg1,
	SUM(case when LowestNote = 'G-1' then 1 else 0 end) as GNeg1,
	SUM(case when LowestNote = 'G#-1' then 1 else 0 end) as GSharpNeg1,
	SUM(case when LowestNote = 'A-1' then 1 else 0 end) as ANeg1,
	SUM(case when LowestNote = 'A#-1' then 1 else 0 end) as ASharpNeg1,
	SUM(case when LowestNote = 'B-1' then 1 else 0 end) as BNeg1,

	SUM(case when LowestNote = 'C0' then 1 else 0 end) as C0,
	SUM(case when LowestNote = 'C#0' then 1 else 0 end) as C#0,
	SUM(case when LowestNote = 'D0' then 1 else 0 end) as D0,
	SUM(case when LowestNote = 'D#0' then 1 else 0 end) as D#0,
	SUM(case when LowestNote = 'E0' then 1 else 0 end) as E0,
	SUM(case when LowestNote = 'F0' then 1 else 0 end) as F0,
	SUM(case when LowestNote = 'F#0' then 1 else 0 end) as FSharp0,
	SUM(case when LowestNote = 'G0' then 1 else 0 end) as G0,
	SUM(case when LowestNote = 'G#0' then 1 else 0 end) as GSharp0,
	SUM(case when LowestNote = 'A0' then 1 else 0 end) as A0,
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	SUM(case when LowestNote = 'C1' then 1 else 0 end) as C1,
	SUM(case when LowestNote = 'C#1' then 1 else 0 end) as C#1,
	SUM(case when LowestNote = 'D1' then 1 else 0 end) as D1,
	SUM(case when LowestNote = 'D#1' then 1 else 0 end) as D#1,
	SUM(case when LowestNote = 'E1' then 1 else 0 end) as E1,
	SUM(case when LowestNote = 'F1' then 1 else 0 end) as F1,
	SUM(case when LowestNote = 'F#1' then 1 else 0 end) as FSharp1,
	SUM(case when LowestNote = 'G1' then 1 else 0 end) as G1,
	SUM(case when LowestNote = 'G#1' then 1 else 0 end) as GSharp1,
	SUM(case when LowestNote = 'A1' then 1 else 0 end) as A1,
	SUM(case when LowestNote = 'A#1' then 1 else 0 end) as ASharp1,
	SUM(case when LowestNote = 'B1' then 1 else 0 end) as B1,
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SUM(case when LowestNote = 'C#2' then 1 else 0 end) as C#2,
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SUM(case when LowestNote = 'D#2' then 1 else 0 end) as D#2,
SUM(case when LowestNote = 'E2' then 1 else 0 end) as E2,
SUM(case when LowestNote = 'F2' then 1 else 0 end) as F2,
SUM(case when LowestNote = 'F#2' then 1 else 0 end) as FSharp2,
SUM(case when LowestNote = 'G2' then 1 else 0 end) as G2,
SUM(case when LowestNote = 'G#2' then 1 else 0 end) as GSharp2,
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SUM(case when LowestNote = 'F3' then 1 else 0 end) as F3,
SUM(case when LowestNote = 'F#3' then 1 else 0 end) as FSharp3,
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SUM(case when LowestNote = 'D#4' then 1 else 0 end) as D#4,
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SUM(case when LowestNote = 'A#4' then 1 else 0 end) as ASharp4,
SUM(case when LowestNote = 'B4' then 1 else 0 end) as B4,

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SUM(case when LowestNote = 'C#5' then 1 else 0 end) as C#5,
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SUM(case when LowestNote = 'D#5' then 1 else 0 end) as D#5,
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SUM(case when LowestNote = 'F5' then 1 else 0 end) as F5,
SUM(case when LowestNote = 'F#5' then 1 else 0 end) as FSharp5,
SUM(case when LowestNote = 'G5' then 1 else 0 end) as G5,
SUM(case when LowestNote = 'G#5' then 1 else 0 end) as GSharp5,
SUM(case when LowestNote = 'A5' then 1 else 0 end) as A5,
SUM(case when LowestNote = 'A#5' then 1 else 0 end) as ASharp5,
SUM(case when LowestNote = 'B5' then 1 else 0 end) as B5,

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SUM(case when LowestNote = 'E6' then 1 else 0 end) as E6,
SUM(case when LowestNote = 'F6' then 1 else 0 end) as F6,
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        SUM(case when LowestNote = 'G6' then 1 else 0 end) as G6,
        SUM(case when LowestNote = 'G#6' then 1 else 0 end) as GSharp6,
        SUM(case when LowestNote = 'A6' then 1 else 0 end) as A6,
        SUM(case when LowestNote = 'A#6' then 1 else 0 end) as ASharp6,
        SUM(case when LowestNote = 'B6' then 1 else 0 end) as B6,

        SUM(case when LowestNote = 'C7' then 1 else 0 end) as C7,
        SUM(case when LowestNote = 'C#7' then 1 else 0 end) as C#7,
        SUM(case when LowestNote = 'D7' then 1 else 0 end) as D7,
        SUM(case when LowestNote = 'D#7' then 1 else 0 end) as D#7,
        SUM(case when LowestNote = 'E7' then 1 else 0 end) as E7,
        SUM(case when LowestNote = 'F7' then 1 else 0 end) as F7,
        SUM(case when LowestNote = 'F#7' then 1 else 0 end) as FSharp7,
        SUM(case when LowestNote = 'G7' then 1 else 0 end) as G7,
        SUM(case when LowestNote = 'G#7' then 1 else 0 end) as GSharp7,
        SUM(case when LowestNote = 'A7' then 1 else 0 end) as A7,
        SUM(case when LowestNote = 'A#7' then 1 else 0 end) as ASharp7,
        SUM(case when LowestNote = 'B7' then 1 else 0 end) as B7,

        SUM(case when LowestNote = 'C8' then 1 else 0 end) as C8,
        SUM(case when LowestNote = 'C#8' then 1 else 0 end) as C#8,
        SUM(case when LowestNote = 'D8' then 1 else 0 end) as D8,
        SUM(case when LowestNote = 'D#8' then 1 else 0 end) as D#8,
        SUM(case when LowestNote = 'E8' then 1 else 0 end) as E8,
        SUM(case when LowestNote = 'F8' then 1 else 0 end) as F8,
        SUM(case when LowestNote = 'F#8' then 1 else 0 end) as FSharp8,
        SUM(case when LowestNote = 'G8' then 1 else 0 end) as G8,
        SUM(case when LowestNote = 'G#8' then 1 else 0 end) as GSharp8,
        SUM(case when LowestNote = 'A8' then 1 else 0 end) as A8,
        SUM(case when LowestNote = 'A#8' then 1 else 0 end) as ASharp8,
        SUM(case when LowestNote = 'B8' then 1 else 0 end) as B8,

        SUM(case when LowestNote = 'C9' then 1 else 0 end) as C9,
        SUM(case when LowestNote = 'C#9' then 1 else 0 end) as C#9,
        SUM(case when LowestNote = 'D9' then 1 else 0 end) as D9,
        SUM(case when LowestNote = 'D#9' then 1 else 0 end) as D#9,
        SUM(case when LowestNote = 'E9' then 1 else 0 end) as E9,
        SUM(case when LowestNote = 'F9' then 1 else 0 end) as F9,
        SUM(case when LowestNote = 'F#9' then 1 else 0 end) as FSharp9,
        SUM(case when LowestNote = 'G9' then 1 else 0 end) as G9,
        SUM(case when LowestNote = 'G#9' then 1 else 0 end) as GSharp9,
        SUM(case when LowestNote = 'A9' then 1 else 0 end) as A9,
        SUM(case when LowestNote = 'A#9' then 1 else 0 end) as ASharp9,
        SUM(case when LowestNote = 'B9' then 1 else 0 end) as B9
FROM Songs
```
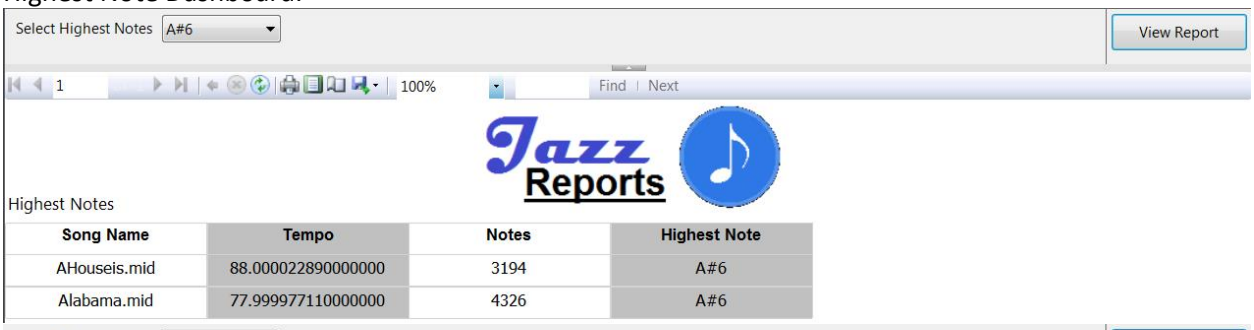
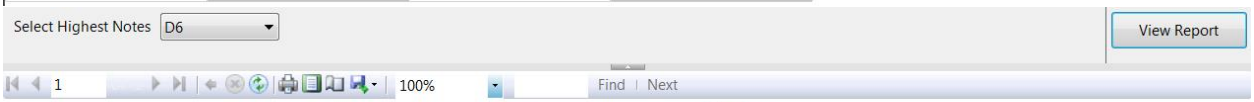

Highest Note Dashboard:



Highest Notes

Song Name	Tempo	Notes	Highest Note
AHouseis.mid	88.000022890000000	3194	A#6
Alabama.mid	77.999977110000000	4326	A#6



Highest Notes

Song Name	Tempo	Notes	Highest Note
Autumn_Leaves_Jazz_Piano.mid	120.000000000000000	1728	D6

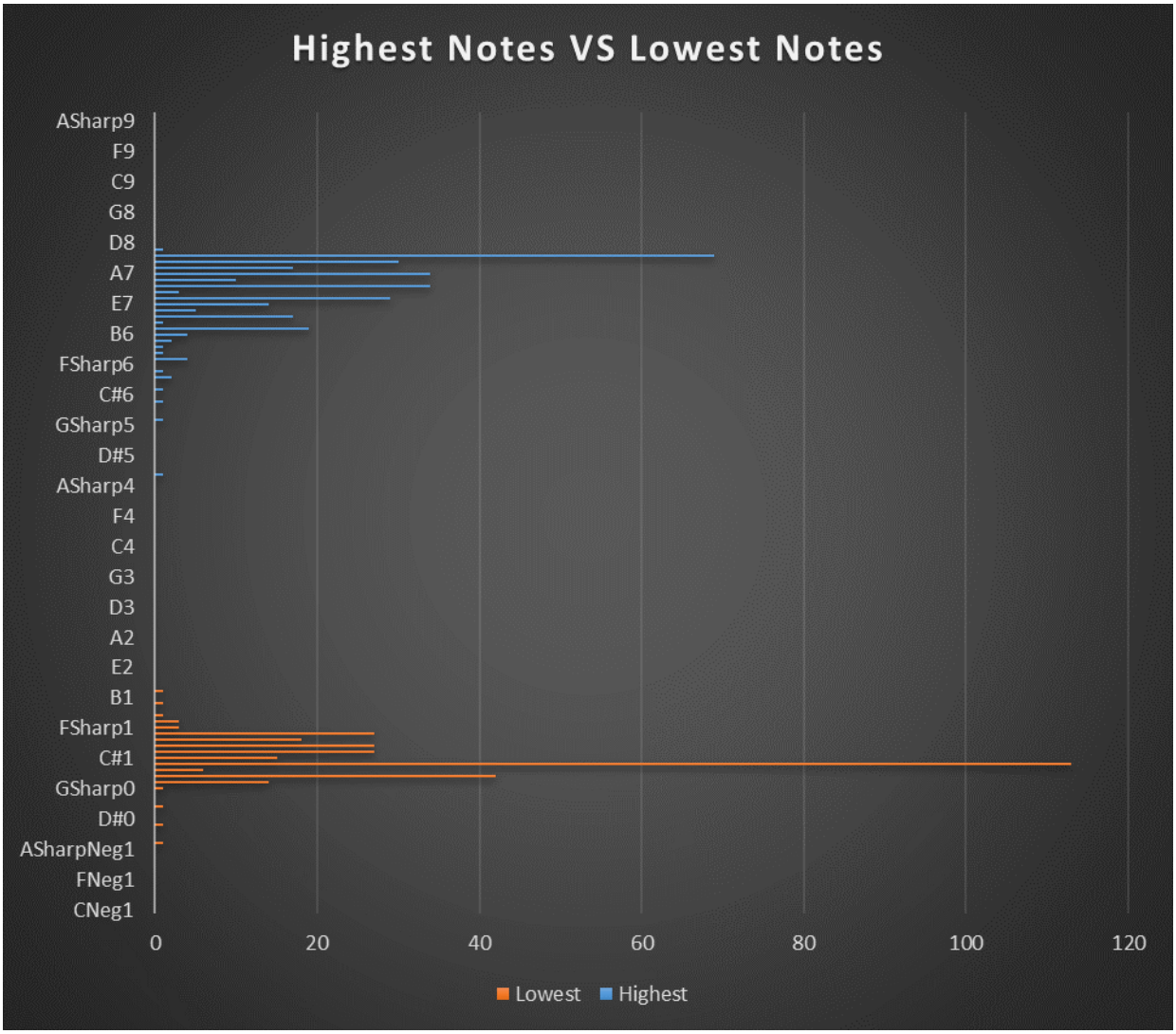
Highest Note Queries:

```
CREATE PROCEDURE usp_param_GetHighNotesDistinct
as
SELECT DISTINCT HighestNote
FROM Songs


CREATE PROCEDURE usp_FindHighestNote
	@highnote	nvarchar(50)
as
SELECT s.SongName, s.Tempo, s.Notes, s.HighestNote
FROM Songs s
WHERE HighestNote = @highnote


CREATE PROCEDURE usp_HighestNotes
as
SELECT
	SUM(case when HighestNote = 'C-1' then 1 else 0 end) as CNeg1,
	SUM(case when HighestNote = 'C#-1' then 1 else 0 end) as C#Neg1,
	SUM(case when HighestNote = 'D-1' then 1 else 0 end) as DNeg1,
	SUM(case when HighestNote = 'D#-1' then 1 else 0 end) as D#Neg1,
	SUM(case when HighestNote = 'E-1' then 1 else 0 end) as ENeg1,
	SUM(case when HighestNote = 'F-1' then 1 else 0 end) as FNeg1,
	SUM(case when HighestNote = 'F#-1' then 1 else 0 end) as FSharpNeg1,
	SUM(case when HighestNote = 'G-1' then 1 else 0 end) as GNeg1,
	SUM(case when HighestNote = 'G#-1' then 1 else 0 end) as GSharpNeg1,
	SUM(case when HighestNote = 'A-1' then 1 else 0 end) as ANeg1,
	SUM(case when HighestNote = 'A#-1' then 1 else 0 end) as ASharpNeg1,
	SUM(case when HighestNote = 'B-1' then 1 else 0 end) as BNeg1,

	SUM(case when HighestNote = 'C0' then 1 else 0 end) as C0,
	SUM(case when HighestNote = 'C#0' then 1 else 0 end) as C#0,
	SUM(case when HighestNote = 'D0' then 1 else 0 end) as D0,
	SUM(case when HighestNote = 'D#0' then 1 else 0 end) as D#0,
	SUM(case when HighestNote = 'E0' then 1 else 0 end) as E0,
	SUM(case when HighestNote = 'F0' then 1 else 0 end) as F0,
	SUM(case when HighestNote = 'F#0' then 1 else 0 end) as FSharp0,
	SUM(case when HighestNote = 'G0' then 1 else 0 end) as G0,
	SUM(case when HighestNote = 'G#0' then 1 else 0 end) as GSharp0,
	SUM(case when HighestNote = 'A0' then 1 else 0 end) as A0,
	SUM(case when HighestNote = 'A#0' then 1 else 0 end) as ASharp0,
	SUM(case when HighestNote = 'B0' then 1 else 0 end) as B0,

	SUM(case when HighestNote = 'C1' then 1 else 0 end) as C1,
	SUM(case when HighestNote = 'C#1' then 1 else 0 end) as C#1,
	SUM(case when HighestNote = 'D1' then 1 else 0 end) as D1,
	SUM(case when HighestNote = 'D#1' then 1 else 0 end) as D#1,
	SUM(case when HighestNote = 'E1' then 1 else 0 end) as E1,
	SUM(case when HighestNote = 'F1' then 1 else 0 end) as F1,
	SUM(case when HighestNote = 'F#1' then 1 else 0 end) as FSharp1,
	SUM(case when HighestNote = 'G1' then 1 else 0 end) as G1,
	SUM(case when HighestNote = 'G#1' then 1 else 0 end) as GSharp1,
	SUM(case when HighestNote = 'A1' then 1 else 0 end) as A1,
	SUM(case when HighestNote = 'A#1' then 1 else 0 end) as ASharp1,
	SUM(case when HighestNote = 'B1' then 1 else 0 end) as B1,
```

```
SUM(case when HighestNote = 'C2' then 1 else 0 end) as C2,
SUM(case when HighestNote = 'C#2' then 1 else 0 end) as C#2,
SUM(case when HighestNote = 'D2' then 1 else 0 end) as D2,
SUM(case when HighestNote = 'D#2' then 1 else 0 end) as D#2,
SUM(case when HighestNote = 'E2' then 1 else 0 end) as E2,
SUM(case when HighestNote = 'F2' then 1 else 0 end) as F2,
SUM(case when HighestNote = 'F#2' then 1 else 0 end) as FSharp2,
SUM(case when HighestNote = 'G2' then 1 else 0 end) as G2,
SUM(case when HighestNote = 'G#2' then 1 else 0 end) as GSharp2,
SUM(case when HighestNote = 'A2' then 1 else 0 end) as A2,
SUM(case when HighestNote = 'A#2' then 1 else 0 end) as ASharp2,
SUM(case when HighestNote = 'B2' then 1 else 0 end) as B2,

SUM(case when HighestNote = 'C3' then 1 else 0 end) as C3,
SUM(case when HighestNote = 'C#3' then 1 else 0 end) as C#3,
SUM(case when HighestNote = 'D3' then 1 else 0 end) as D3,
SUM(case when HighestNote = 'D#3' then 1 else 0 end) as D#3,
SUM(case when HighestNote = 'E3' then 1 else 0 end) as E3,
SUM(case when HighestNote = 'F3' then 1 else 0 end) as F3,
SUM(case when HighestNote = 'F#3' then 1 else 0 end) as FSharp3,
SUM(case when HighestNote = 'G3' then 1 else 0 end) as G3,
SUM(case when HighestNote = 'G#3' then 1 else 0 end) as GSharp3,
SUM(case when HighestNote = 'A3' then 1 else 0 end) as A3,
SUM(case when HighestNote = 'A#3' then 1 else 0 end) as ASharp3,
SUM(case when HighestNote = 'B3' then 1 else 0 end) as B3,

SUM(case when HighestNote = 'C4' then 1 else 0 end) as C4,
SUM(case when HighestNote = 'C#4' then 1 else 0 end) as C#4,
SUM(case when HighestNote = 'D4' then 1 else 0 end) as D4,
SUM(case when HighestNote = 'D#4' then 1 else 0 end) as D#4,
SUM(case when HighestNote = 'E4' then 1 else 0 end) as E4,
SUM(case when HighestNote = 'F4' then 1 else 0 end) as F4,
SUM(case when HighestNote = 'F#4' then 1 else 0 end) as FSharp4,
SUM(case when HighestNote = 'G4' then 1 else 0 end) as G4,
SUM(case when HighestNote = 'G#4' then 1 else 0 end) as GSharp4,
SUM(case when HighestNote = 'A4' then 1 else 0 end) as A4,
SUM(case when HighestNote = 'A#4' then 1 else 0 end) as ASharp4,
SUM(case when HighestNote = 'B4' then 1 else 0 end) as B4,

SUM(case when HighestNote = 'C5' then 1 else 0 end) as C5,
SUM(case when HighestNote = 'C#5' then 1 else 0 end) as C#5,
SUM(case when HighestNote = 'D5' then 1 else 0 end) as D5,
SUM(case when HighestNote = 'D#5' then 1 else 0 end) as D#5,
SUM(case when HighestNote = 'E5' then 1 else 0 end) as E5,
SUM(case when HighestNote = 'F5' then 1 else 0 end) as F5,
SUM(case when HighestNote = 'F#5' then 1 else 0 end) as FSharp5,
SUM(case when HighestNote = 'G5' then 1 else 0 end) as G5,
SUM(case when HighestNote = 'G#5' then 1 else 0 end) as GSharp5,
SUM(case when HighestNote = 'A5' then 1 else 0 end) as A5,
SUM(case when HighestNote = 'A#5' then 1 else 0 end) as ASharp5,
SUM(case when HighestNote = 'B5' then 1 else 0 end) as B5,

SUM(case when HighestNote = 'C6' then 1 else 0 end) as C6,
SUM(case when HighestNote = 'C#6' then 1 else 0 end) as C#6,
SUM(case when HighestNote = 'D6' then 1 else 0 end) as D6,
SUM(case when HighestNote = 'D#6' then 1 else 0 end) as D#6,
SUM(case when HighestNote = 'E6' then 1 else 0 end) as E6,
SUM(case when HighestNote = 'F6' then 1 else 0 end) as F6,
```

```
        SUM(case when HighestNote = 'F#6' then 1 else 0 end) as FSharp6,
        SUM(case when HighestNote = 'G6' then 1 else 0 end) as G6,
        SUM(case when HighestNote = 'G#6' then 1 else 0 end) as GSharp6,
        SUM(case when HighestNote = 'A6' then 1 else 0 end) as A6,
        SUM(case when HighestNote = 'A#6' then 1 else 0 end) as ASharp6,
        SUM(case when HighestNote = 'B6' then 1 else 0 end) as B6,

        SUM(case when HighestNote = 'C7' then 1 else 0 end) as C7,
        SUM(case when HighestNote = 'C#7' then 1 else 0 end) as C#7,
        SUM(case when HighestNote = 'D7' then 1 else 0 end) as D7,
        SUM(case when HighestNote = 'D#7' then 1 else 0 end) as D#7,
        SUM(case when HighestNote = 'E7' then 1 else 0 end) as E7,
        SUM(case when HighestNote = 'F7' then 1 else 0 end) as F7,
        SUM(case when HighestNote = 'F#7' then 1 else 0 end) as FSharp7,
        SUM(case when HighestNote = 'G7' then 1 else 0 end) as G7,
        SUM(case when HighestNote = 'G#7' then 1 else 0 end) as GSharp7,
        SUM(case when HighestNote = 'A7' then 1 else 0 end) as A7,
        SUM(case when HighestNote = 'A#7' then 1 else 0 end) as ASharp7,
        SUM(case when HighestNote = 'B7' then 1 else 0 end) as B7,

        SUM(case when HighestNote = 'C8' then 1 else 0 end) as C8,
        SUM(case when HighestNote = 'C#8' then 1 else 0 end) as C#8,
        SUM(case when HighestNote = 'D8' then 1 else 0 end) as D8,
        SUM(case when HighestNote = 'D#8' then 1 else 0 end) as D#8,
        SUM(case when HighestNote = 'E8' then 1 else 0 end) as E8,
        SUM(case when HighestNote = 'F8' then 1 else 0 end) as F8,
        SUM(case when HighestNote = 'F#8' then 1 else 0 end) as FSharp8,
        SUM(case when HighestNote = 'G8' then 1 else 0 end) as G8,
        SUM(case when HighestNote = 'G#8' then 1 else 0 end) as GSharp8,
        SUM(case when HighestNote = 'A8' then 1 else 0 end) as A8,
        SUM(case when HighestNote = 'A#8' then 1 else 0 end) as ASharp8,
        SUM(case when HighestNote = 'B8' then 1 else 0 end) as B8,

        SUM(case when HighestNote = 'C9' then 1 else 0 end) as C9,
        SUM(case when HighestNote = 'C#9' then 1 else 0 end) as C#9,
        SUM(case when HighestNote = 'D9' then 1 else 0 end) as D9,
        SUM(case when HighestNote = 'D#9' then 1 else 0 end) as D#9,
        SUM(case when HighestNote = 'E9' then 1 else 0 end) as E9,
        SUM(case when HighestNote = 'F9' then 1 else 0 end) as F9,
        SUM(case when HighestNote = 'F#9' then 1 else 0 end) as FSharp9,
        SUM(case when HighestNote = 'G9' then 1 else 0 end) as G9,
        SUM(case when HighestNote = 'G#9' then 1 else 0 end) as GSharp9,
        SUM(case when HighestNote = 'A9' then 1 else 0 end) as A9,
        SUM(case when HighestNote = 'A#9' then 1 else 0 end) as ASharp9,
        SUM(case when HighestNote = 'B9' then 1 else 0 end) as B9
FROM Songs
```

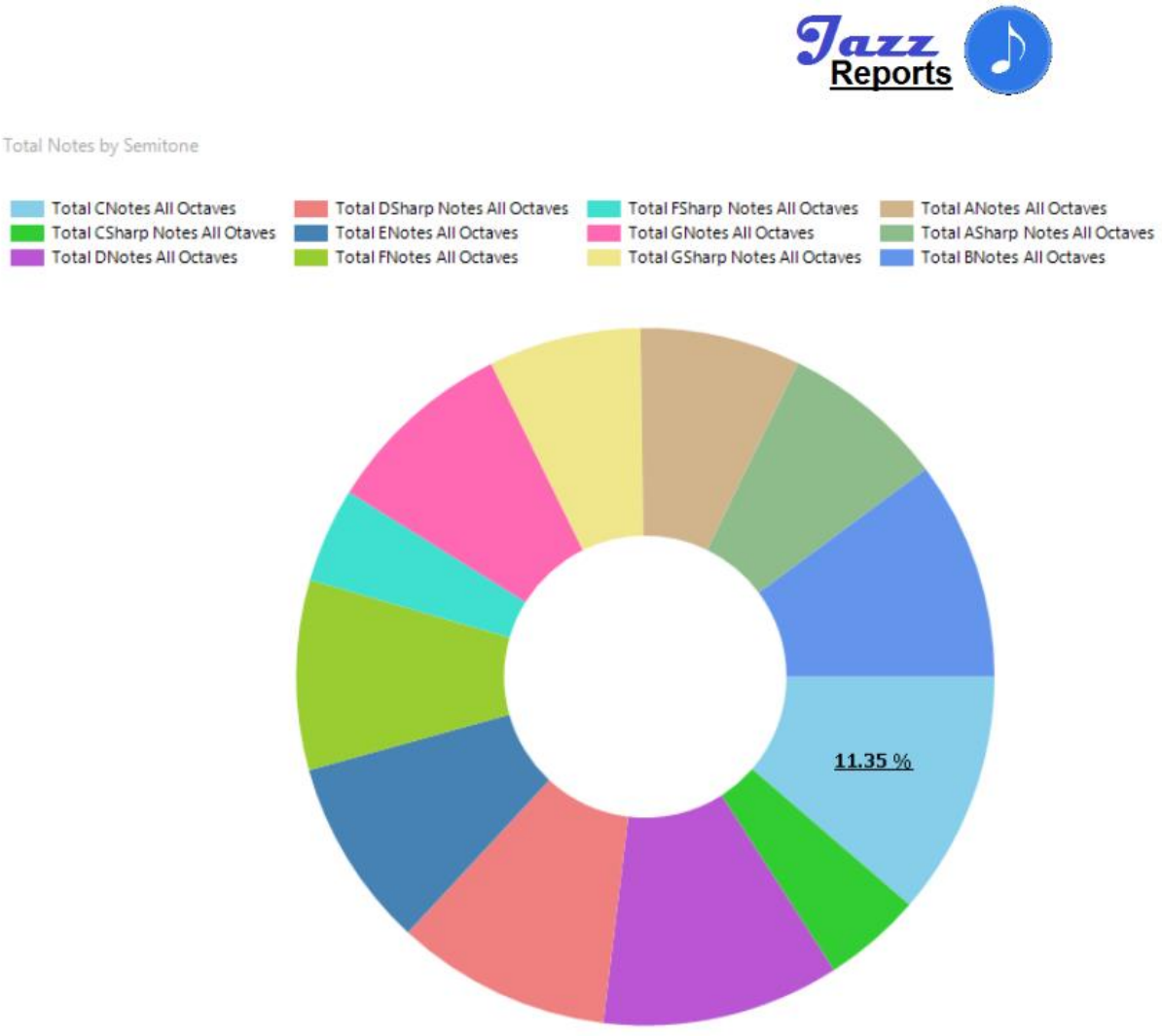
Highest Notes vs Lowest Notes (Made in Excel to display range):



Question: With many different octaves to group many different pitches, most notes are described by 12 semitones (C, C#, D, D#, E, F, F#, G, G#, A, A#, B). Out of all the total notes, find the **three** most used semitones.

Hypothesis: In the key of C, the most common key, the first major chord is the C chord, which includes semitones C, E, and G. As such, they would also be the top 3 played semitones.

Conclusion: The top three most used notes are C, D, and B. While the chord they create is very awkward one, individually, they make sense as they are and close to the start of each octave, which is C. B is one semitone down from C and D is two semitones up from C.



Query for Total Notes by Semitone:

```
CREATE PROCEDURE usp_GetTotalNotesByOctave
as
SELECT
	SUM(CNeg1 + C0 + C1 + C2 + C3 + C4 + C5 + C6 + C7 + C8 + C9) AS
TotalCNotesAllOctaves,
	SUM(CSharpNeg1 + CSharp0 + CSharp1 + CSharp2 + CSharp3 + CSharp4 + CSharp5 +
CSharp6 + CSharp7 + CSharp8 + CSharp9) AS TotalCSharpNotesAllOtaves,
	SUM(DNeg1 + D0 + D1 + D2 + D3 + D4 + D5 + D6 + D7 + D8 + D9) AS
TotalDNotesAllOctaves,
	SUM(DSharpNeg1 + DSharp0 + DSharp1 + DSharp2 + DSharp3 + DSharp4 + DSharp5 +
DSharp6 + DSharp7 + DSharp8 + DSharp9) AS TotalDSharpNotesAllOctaves,
	SUM(ENeg1 + E0 + E1 + E2 + E3 + E4 + E5 + E6 + E7 + E8 + E9) AS
TotalENotesAllOctaves,
	SUM(FNeg1 + F0 + F1 + F2 + F3 + F4 + F5 + F6 + F7 + F8 + F9) AS
TotalFNotesAllOctaves,
	SUM(FSharpNeg1 + FSharp0 + FSharp1 + FSharp2 + FSharp3 + FSharp4 + FSharp5 +
FSharp6 + FSharp7 + FSharp8 + FSharp9) AS TotalFSharpNotesAllOctaves,
	SUM(GNeg1 + G0 + G1 + G2 + G3 + G4 + G5 + G6 + G7 + G8 + G9) AS
TotalGNotesAllOctaves,
	SUM(GSharpNeg1 + GSharp0 + GSharp1 + GSharp2 + GSharp3 + GSharp4 + GSharp5 +
GSharp6 + GSharp7 + GSharp8 + GSharp9) AS TotalGSharpNotesAllOctaves,
	SUM(ANeg1 + A0 + A1 + A2 + A3 + A4 + A5 + A6 + A7 + A8 + A9) AS
TotalANotesAllOctaves,
	SUM(ASharpNeg1 + ASharp0 + ASharp1 + ASharp2 + ASharp3 + ASharp4 + ASharp5 +
ASharp6 + ASharp7 + ASharp8 + ASharp9) AS TotalASharpNotesAllOctaves,
	SUM(BNeg1 + B0 + B1 + B2 + B3 + B4 + B5 + B6 + B7 + B8 + B9) AS
TotalBNotesAllOctaves
FROM Songs
```

Question: Averaging the use of every note in every octave from every song, find the most played note?

Hypothesis: C4, or “Middle C” is the note that is the most medium pitch. My guess is that C4 will also be the most played note as well.

Conclusion: The most played average unique note is B3. B3 is one-half step below C4, which is known as “Middle C”. This and the surrounding keys having high values suggest that playing notes around C4 is very popular.

Notes\Octaves	-1	0	1	2	3	4	5	6	7	8	9
C	0	0	5	150	69	260	141	69	14	0	0
C#	0	0	1	72	23	109	54	21	3	0	0
D	0	0	2	186	68	253	121	51	8	0	0
D#	0	0	3	63	284	172	71	27	3	0	0
E	0	0	10	146	67	209	84	28	3	0	0
F	0	0	12	55	173	196	83	27	3	0	0
F#	0	0	8	76	77	70	30	11	1	0	0
G	0	0	28	81	157	176	84	24	2	0	0
G#	0	0	17	177	121	76	39	10	0	0	0
A	0	0	26	50	173	130	69	16	1	0	0
A#	0	0	48	82	169	115	49	12	0	0	0
B	0	0	129	32	367	65	33	7	0	0	0

(Graph was created in Excel for creating a 2 dimensional heat map.)

Query for Average Song:

```
CREATE PROCEDURE usp_AverageSong
as
SELECT AVG(CNeg1) AS AvgCNeg1,
       AVG(CSharpNeg1) AS AvgCSharpNeg1,
       AVG(DNeg1) AS AvgDNeg1,
       AVG(DSharpNeg1) AS AvgDSharpNeg1,
       AVG(ENeg1) AS AvgENeg1,
       AVG(FNeg1) AS AvgFNeg1,
       AVG(FSharpNeg1) AS AvgFSharpNeg1,
       AVG(GNeg1) AS AvgGNeg1,
       AVG(GSharpNeg1) AS AvgGSharpNeg1,
       AVG(ANeg1) AS AvgANeg1,
       AVG(ASharpNeg1) AS AvgASharpNeg1,
       AVG(BNeg1) AS AvgBNeg1,
       AVG(C0) AS AvgC0,
       AVG(CSharp0) AS AvgCSharp0,
       AVG(D0) AS AvgD0,
       AVG(DSharp0) AS AvgDSharp0,
       AVG(E0) AS AvgE0,
       AVG(F0) AS AvgF0,
       AVG(FSharp0) AS AvgFSharp0,
       AVG(G0) AS AvgG0,
       AVG(GSharp0) AS AvgGSharp0,
       AVG(A0) AS AvgA0,
       AVG(ASharp0) AS AvgASharp0,
       AVG(B0) AS AvgB0,
       AVG(C1) AS AvgC1,
       AVG(CSharp1) AS AvgCSharp1,
       AVG(D1) AS AvgD1,
       AVG(DSharp1) AS AvgDSharp1,
       AVG(E1) AS AvgE1,
       AVG(F1) AS AvgF1,
       AVG(FSharp1) AS AvgFSharp1,
       AVG(G1) AS AvgG1,
       AVG(GSharp1) AS AvgGSharp1,
       AVG(A1) AS AvgA1,
       AVG(ASharp1) AS AvgASharp1,
       AVG(B1) AS AvgB1,
       AVG(C2) AS AvgC2,
       AVG(CSharp2) AS AvgCSharp2,
       AVG(D2) AS AvgD2,
       AVG(DSharp2) AS AvgDSharp2,
       AVG(E2) AS AvgE2,
       AVG(F2) AS AvgF2,
       AVG(FSharp2) AS AvgFSharp2,
       AVG(G2) AS AvgG2,
       AVG(GSharp2) AS AvgGSharp2,
       AVG(A2) AS AvgA2,
       AVG(ASharp2) AS AvgASharp2,
       AVG(B2) AS AvgB2,
       AVG(C3) AS AvgC3,
       AVG(CSharp3) AS AvgCSharp3,
       AVG(D3) AS AvgD3,
       AVG(DSharp3) AS AvgDSharp3,
       AVG(E3) AS AvgE3,
       AVG(F3) AS AvgF3,
```

```
AVG(FSharp3) AS AvgFSharp3,
AVG(G3) AS AvgG3,
AVG(GSharp3) AS AvgGSharp3,
AVG(A3) AS AvgA3,
AVG(ASharp3) AS AvgASharp3,
AVG(B3) AS AvgB3,
AVG(C4) AS AvgC4,
AVG(CSharp4) AS AvgCSharp4,
AVG(D4) AS AvgD4,
AVG(DSharp4) AS AvgDSharp4,
AVG(E4) AS AvgE4,
AVG(F4) AS AvgF4,
AVG(FSharp4) AS AvgFSharp4,
AVG(G4) AS AvgG4,
AVG(GSharp4) AS AvgGSharp4,
AVG(A4) AS AvgA4,
AVG(ASharp4) AS AvgASharp4,
AVG(B4) AS AvgB4,
AVG(C5) AS AvgC5,
AVG(CSharp5) AS AvgCSharp5,
AVG(D5) AS AvgD5,
AVG(DSharp5) AS AvgDSharp5,
AVG(E5) AS AvgE5,
AVG(F5) AS AvgF5,
AVG(FSharp5) AS AvgFSharp5,
AVG(G5) AS AvgG5,
AVG(GSharp5) AS AvgGSharp5,
AVG(A5) AS AvgA5,
AVG(ASharp5) AS AvgASharp5,
AVG(B5) AS AvgB5,
AVG(C6) AS AvgC6,
AVG(CSharp6) AS AvgCSharp6,
AVG(D6) AS AvgD6,
AVG(DSharp6) AS AvgDSharp6,
AVG(E6) AS AvgE6,
AVG(F6) AS AvgF6,
AVG(FSharp6) AS AvgFSharp6,
AVG(G6) AS AvgG6,
AVG(GSharp6) AS AvgGSharp6,
AVG(A6) AS AvgA6,
AVG(ASharp6) AS AvgASharp6,
AVG(B6) AS AvgB6,
AVG(C7) AS AvgC7,
AVG(CSharp7) AS AvgCSharp7,
AVG(D7) AS AvgD7,
AVG(DSharp7) AS AvgDSharp7,
AVG(E7) AS AvgE7,
AVG(F7) AS AvgF7,
AVG(FSharp7) AS AvgFSharp7,
AVG(G7) AS AvgG7,
AVG(GSharp7) AS AvgGSharp7,
AVG(A7) AS AvgA7,
AVG(ASharp7) AS AvgASharp7,
AVG(B7) AS AvgB7,
AVG(C8) AS AvgC8,
AVG(CSharp8) AS AvgCSharp8,
AVG(D8) AS AvgD8,
AVG(DSharp8) AS AvgDSharp8,
```

```
        AVG(E8) AS AvgE8,
        AVG(F8) AS AvgF8,
        AVG(FSharp8) AS AvgFSharp8,
        AVG(G8) AS AvgG8,
        AVG(GSharp8) AS AvgGSharp8,
        AVG(A8) AS AvgA8,
        AVG(ASharp8) AS AvgASharp8,
        AVG(B8) AS AvgB8,
        AVG(C9) AS AvgC9,
        AVG(CSharp9) AS AvgCSharp9,
        AVG(D9) AS AvgD9,
        AVG(DSharp9) AS AvgDSharp9,
        AVG(E9) AS AvgE9,
        AVG(F9) AS AvgF9,
        AVG(FSharp9) AS AvgFSharp9,
        AVG(G9) AS AvgG9,
        AVG(GSharp9) AS AvgGSharp9,
        AVG(A9) AS AvgA9,
        AVG(ASharp9) AS AvgASharp9,
        AVG(B9) AS AvgB9
FROM Songs
```