convert frequency to keyboard note

Asked 13 years, 8 months ago Modified 10 years ago Viewed 5k times

3

I'm trying to write an audio application.

I can play a cin wave from a frequency of 20 to 20K to hear sounds. my question is how can i convert frequencies to keyboard notes in order to create a virtual keyboard (or piano) ? is there some kind of formula to achieve this ?

The programming language that I use is not important because I don't want to use other tools that calculate it for me. i want to write it myself so i need to understand the math behind it. thanks

update

i found the following url: http://www.reverse-engineering.info/Audio/bwl_eq_info.pdf

that contains the octave prequency chart. do i need to store that list or is there a formula that can be used instead ?

audio frequency-analysis

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edited Jun 20, 2020 at 9:12

Community Bot

1 • 1

asked Apr 25, 2011 at 14:03

ufk

32k • 74 • 248 • 409

4 Answers

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5

There are a few different ways to tune instruments. The most commonly used for pianos is the 12 tone equal temperament, a formula for which can be found here. The idea is that each pair of adjacent notes has the same frequency ratio.

See also equal temperament on Wikipedia.

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edited Apr 25, 2011 at 14:38

answered Apr 25, 2011 at 14:12

Flash

16.6k • 15 • 73 • 99

+1 for mentioning that equal temperament isn't the "only" system out there. – C. K. Young Apr 25, 2011 at 14:13

If you are doing this is a musical context at all, you will definitely need to use a GLUT (general lookup table) against the even tempered scale, otherwise it will sound out of tune in various keys. – J_Y_C Apr 25, 2011 at 14:15

@J_Y_C: Are you referring to the wolf interval? That seems to affect meantone temperament, not the 12-tone equal temperament. – C. K. Young Apr 25, 2011 at 14:20

2 Indeed, I have to ask the same question. So, as far as I understand (and I'm no music theory expert), meantone temperament sounds great for some keys, and terrible for others (due to the wolf interval). Equal temperament sounds slightly terrible for all keys, but eliminates the wolf interval. – C. K. Young Apr 25, 2011 at 14:56

5

You can calculate frequency of a tone as

f = 440 * exp(x*ln(2)/12)

where x is number of semitones above A in the middle of the piano keyboard.

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answered Apr 25, 2011 at 14:09

xofon

654 ● 4 ● 9

1 f = 440 * (2 ** (x/12)) – user1261273 Feb 11, 2017 at 21:32

2

First, you need to know about A440. This is the "standard" pitch to tune everything else against.

Double the frequency to raise an octave; halve the frequency to drop an octave. It's clear from this that the tones are logarithmic relative to the frequencies.

There are multiple systems for deciding where on the logarithmic line the rest of the notes fall. A straightforward approach is to [divide the semitones geometrically along the logarithmic scale] (which is the approach xofon's answer uses), but there may be better ways.

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edited Apr 25, 2011 at 14:22

answered Apr 25, 2011 at 14:09

C. K. Young

223k ● 47 ● 390 ● 443

0

full reference of P2F F2P conversion functions. i use 69 instead of 57 though. [http://musicdsp.org/showone.php?id=125]

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answered Nov 28, 2014 at 14:37

bandybabboon

2,336 ● 1 ● 25 ● 36