

Prof. Hafner's Elementary Music Tutorial  
Fall 2007, for CSU 370

As we have discussed in class, a Voice is a sequence of Notes. For those who are not familiar with musical notation, this tutorial provides a brief explanation for the naming and numbering of Notes, which describes their Pitch.

The naming and numbering of notes is based on the piano keyboard, part of which is shown above. There are 88 notes on a standard piano, including both white and black keys. The keys on the left have the lowest **pitch** (or sound frequency), rising in frequency as we move to the right. The white keys have names going from A to G, and then repeating over and over. However, strangely it is C that is considered the first key, so the actual sequence of notes is: C,D,E,F,G,A,B and not A through G. (This is important for translating notes to numbers.) The black keys have names such as A# (pronounced "A-sharp") which is one key higher than A, or Bb (pronounced "B-flat") which is one key lower than B. Note that A# and Bb are actually the same note. Each group of notes is called an "octave", and there are 12 notes in each octave (7 white keys and 5 black keys).

So, in order to identify a note, we need to know both its name and its octave. There is a special note called "middle C" (the middle note on a standard piano), which has octave 4, and is sometimes referred to as C4. (C is always just to the left of the two black keys.) The C to the left of middle C (one octave lower) is C3, the C to the right of middle C (one octave higher) is C5. However, the key immediately to the left of C4 is numbered B3, not B4. (remember, I mentioned that C is considered the beginning of the sequence), and the keys to the right of C4 are numbered D4, E4, F4, G4, A4, B4, C5.

In the computer music world (in particular, the MIDI music representation system), each note has a unique number, with middle C having the number 60 by convention. Therefore, C3 has the number 48, and C5 has the number 72, etc. This sequence of numbers include both white and black keys, so moving right from middle C, Db4 = C#4 = 61, D4 = 62, Eb4 = D#4 = 63, E4 = 64, F4 = 65, Gb4 = F#4 = 66, etc.

Going from notes to their frequencies: A1 has the frequency of 55 Hz, A2 has 110, A3 has 220, etc. In other words, each octave has notes with frequency double that of next lower octave. So, if C4 (middle C) has frequency 261.625, what does C5 have? 523.25. In Assignment 2 you will find a formula for computing the frequency of each note.