

Definition: Note Integer Notation

- Is a notational system which maps the letter names for notes in the western system of music to an integer:

C	\cdot	D	\cdot	E	F	\cdot	G	\cdot	A	\cdot	B	C
\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow	\updownarrow
$\hat{0}$	$\hat{1}$	$\hat{2}$	$\hat{3}$	$\hat{4}$	$\hat{5}$	$\hat{6}$	$\hat{7}$	$\hat{8}$	$\hat{9}$	$\widehat{10}$	$\widehat{11}$	$\hat{0}$

- The hat is added to denote that we are talking about the pitch produced by playing this note on a device which creates sound.
- We may also denote which octave band we are within by writing

$$\hat{9}_4$$

Which represents an A4, the sound generated with a frequency of 440Hz

- We may consider elements such as $\widehat{12}, \widehat{-1}$ by moving circularly, so that $\widehat{12} \leftrightarrow C$ and $\widehat{-1} \leftrightarrow B$. But you can refer to any note using the elements in the initial mapping, so it is standard to use those numbers instead.
 - In other words, without considering which octave a note is in, we have the following equivalence for any $k \in \mathbb{Z}$ and $x \in \{0, \dots, 12\}$

$$\hat{x} = x + \widehat{12} \cdot k$$

Which says if you add 12 semitones to any note, it will be the same note differing by an integer number of octaves