Numerical Notation: A Simple Notation for Singers and Songwriters

Numerical Notation (or NN for short) is a simple and adaptable way of transcribing music, useful for learning songs, sketching melodies and understanding harmony and song craft. If you and I were sitting together at a piano, you'd easily grasp the logic and conventions of NN in a few minutes. This guide is written for those with no background in music theory. Experienced musicians can skim over it to get a functional overview.
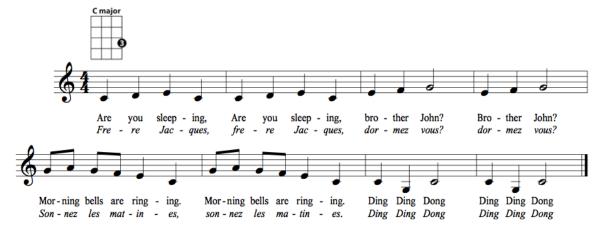
I developed Numerical Notation as a learning tool in my quest to understand and teach vocal harmony, both in theory and practice. NN is based on music theory. If you're anxious at the mere mention of music theory, fear not! This presentation only involves the most basic elements of theory.

NN is useful as an alternative or supplement to standard musical notation. Take a few minutes to familiarize yourself with the simple conventions of NN. It's easy to pick up, whether or not you're able to read standard music notation.

Let's start with an example of a familiar song. Look below at the well known round "Frere Jacques (Are You Sleeping?)" in the key of C major

Are You Sleeping/Frere Jacques
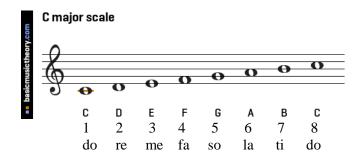
[4 part round]
traditional

```
/ 1      2     3   1 / 1     2     3   1 / 3    4    5—   / 3   4     5—    /
  Are    you   sleep- ing  Are   you   sleep-ing * Bro-ther John— Bro- ther John—? *
```

```
/ -5  -6  -5  -4  3   1 / -5  -6  -5  -4  3   1 / 1    5   1—   / 1   5   1—    /
Mor-ning bells are ring-  ing Mor-ning bells are ring-ing* Ding Ding Dong— Ding Ding Dong— *
```

Dimension 1: The Notes

The numbers above the lyrics notate the melody. The numbers are the "scale degrees" of each sung note. In the key of C major, for instance, the scale degree numbers are as follows:

C major scale

C	D	E	F	G	A	B	C
1	2	3	4	5	6	7	8
do	re	me	fa	so	la	ti	do

Note that 1 and 8 are actually the same note, C, an octave apart. (It's more accurate to visualize the musical scale as a spiral staircase than as a ladder! More on that later.) The notes sung or played in a NN transcription changes when a song is transposed to a new key. But the numbers remain the same! The chart below shows the equivalence of notes and numbers in the key of G Major:

G Major Scale (with note names and scale degree numbers)

G	A	B	C	D	E	F#	G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)

The numbers 1 thru 8 can notate a melody in a single octave, but many melodies travel across two octaves. When a melody extends beyond an octave, NN had two ways of notating. As notes ascend above the 8, the numbers keep rising:

1 2 3 4 5 6 7 8 9 10 11 12 etc.
C D E F G A B C D E F G etc.
do re me fa so la ti do re me fa so etc

A transcription with a bunch of double digit numbers can be hard to read. In practice, NN transcriptions rarely go beyond an occasional 10 or 11. I fins it clearer to notate a lower octave underlining the notes in that octave. Thus, in the key of C, a two octave range is notated as follows:

C D E F G A B C D E F G A B C
1 2 3 4 5 6 7 1 2 3 4 5 6 7 8
do re me fa so la ti do re me fa so la ti do

Note, for example, that in "Are You Sleeping" the 5 in the last two octaves is *below* the 1, not above it.

Dimension 2: Time and Rhythm

Every note has both a pitch and a duration. NN shows the time value of notes as well.

Here's how the dots and dashes shown in the example above indicate the time values of notes. As much as possible, NN parallels the conventions used in standard music notation. For example, as in regular music notation, a dotted note is 1½ times as long as an undotted note.

```
3——            whole note
3—             half note
3—.            dotted half note
3              quarter note
3.             dotted quarter note
-3             eighth note
-3.            Dotted eighth note
=3             sixteenth note
-3 –           eighth note tied to a half note
/ 1  2 3  1  /   A slash marks the beginning and end of each measure.
```

Dimension 3: Chords and Chord Progressions

It's empowering to understand the chord structure that underlies a song. Here's the chord progression to "Are You Sleeping":

```
-------------------------------------------------------------------------------------------------------------
/ C      G7   C      / C      G7   C      / C  G7  C      / C  G7   C        /
/ I      V7   I      / I      V7   I      / I  V7  I      / I  V7   I        /
/ 1      2    3   1  / 1      2    3   1  / 3  4   5—     / 3  4    5—       /
  Are    you  sleep- ing  Are you  sleep-ing * Bro-ther John—  Bro- ther John—? *

/ -5  -6  -5  -4  3   1  / -5  -6  -5  -4  3   1  / 1    5   1—   / 1    5   1—   /
Mor-ning bells are ring-ing   Mor-ning bells are ring-ing * Ding Ding Dong— Ding Ding Dong— *
-------------------------------------------------------------------------------------------------------------
```

Just above the numbers, chords are notated with Roman numerals. This is a common convention in music theory. Upper case Roman numerals (IV) are major chords, lower case (iv) are minor chords. Above the roman numerals, I show the chord progression in a specific key. In all the songs in this songbook I've notated keys that are accessible for most voices and comfortable to play on guitar or uke. However, in many circumstances a singer or musician might choose a different key than what I've indicated. Using Roman numerals aids a guitarist or other accompanist to easily transpose the key a song is played/sung in. Often, as with "Frere Jacques", I only display the chords over the song's first line, since the following lines have the same progression. In these instances, the lines of dashes (--------) directly above and below the transcription indicate that each line thus framed follows the same chord progression.

When a song is in the key of C Major, the range of chords most commonly used is as follows:

```
        C     Dm   Em   F    G    Am   B dim. C
        I     ii   iii  IV   V    vi   VII dim. I
        5     6    7    1    2    3    4       5
        3     4    5    6    7    1    2       3
        1     2    3    4    5    6    7       1
```



```
        I     ii   iii  IV   V    vi   vii°
```

(Explaining why a given chord in this sequence is major or minor requires going further into music theory than is needed here. To dig deeper into music theory, a good basic website is www.musictheory.net. Also, Hooktheory.com is a brilliant interactive website/book/toolkit for musicians and composers. www.hooktheory.com)

The most common major keys have the following chord spectrums:

I	ii	iii	IV	V	vi	VII dim.	I
F	Gm	Am	Bb	C	Dm	E dim.	F
G	Am	Bm	C	D	Em	F# dim.	G
A	Bm	C#m	D	E	F#m	G# dim.	A
D	Em	F#m	G	A	Bm	C# dim.	D
E	F#m	G#m	A	B	C#m	D# dim.	E

This sequnce of chords is not the only harmonic palette used in songs! It's not uncommon to have, say, an E major chord (III) instead of E minor (iii) in the key of C, so notice whether the Roman numerals are upper or lower case. And it's pretty common to find flattened chords too, say a Bb chord in the key of C major. In Roman numerals that's a bVII.

OK let's consider a more complex example. Here's the opening line of "Baby It's Cold Outside":

```
-------------------------------------------------------------------------------------------------------------------------
   / D9         D6              / DMaj7  D6     / Em9       A9            / Em9  A9
   / I9         I6              / IMaj7  D6     / ii9       V9            /  ii9  V9
 -5 / -3  -2 -1    -5—              /—      (--.)  -5 / -4  -3  -2  -5—           /—       (--.)
   I real-ly can't stay——————————                  I've  got to go 'way—
                    But ba-by it's cold— out-side                 Ba-by it's cold— out-side
   / (--.)          -5 -3 -2 -1   -3 /-- -1  1.  (--) / (—)           -4 -3 -2 -4 /-- -2  2
-------------------------------------------------------------------------------------------------------------------------
```

Again, note the line of dashes (--------) above and below the chords and notation. This is the equivalent of what's known as a "system" in standard notation. This indicates that the two lines are sung simultaneously and that the chords above the lyrics apply to each line.

Notice also that some notes in this song are held beyond a measure. In these cases a dash attached to the word indicates that the note is sustained into the next measure. The convention on sustained notes and slurs is explained below.

The chords here are modified by the addition of numbers. This is a standard musical convention. A D9 chord includes the 9th note in the chord's scale. That would be an "E". A D6 chord includes the 6th note in the scale. That would be a "B". And so on.

Details and Finer Points:

What about rests?
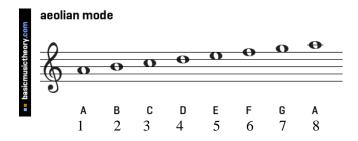
Rests are enclosed in parentheses, as follows:

(——)	whole rest
(—)	half rest
(—.)	dotted half rest
(--)	quarter rest
(--.)	dotted quarter rest
(-)	eighth rest
(-.)	dotted eighth rest
(=)	sixteenth rest

How are multipart harmonies shown?

With harmony lines, I always place the melody directly above the lyrics. Higher harmonies are above the melody, and lower harmonies are below the lyrics, as in this example from "Amazing Grace":

```
E /        / E7        / A        / E        / E          / E          / E7   /
I /        / I7        / IV       / I        / I          / I          / V7   /
1 / 3— 5  / 5—      5  / 4—   4  / 3—   1   / 3—    -5 -3 / 5—   -5 -8 / 7—. /—
5 / 1— 3  / 3—      2  / 1—   6  / 5—   5   / 1—    -3 -1 / 3—   -2 -5 / 5—. /—
A-ma—zing grace— how sweet the sound— that  saved— a—   wretch like— me———
3 / 3— 5  / b7—     7  / 6—   4  / 3—  -3 -5 / 5—    -1 -5 / 1—    1     / 2—. /—
```

What about minor scales?

With songs in minor keys, the idea is the same, though the scale pattern is different. Here's the equivalence for the key of A minor (also known as the aeolian mode):

The chord patterns in minor keys can have more idiosyncrasies than those in major keys. In part this is because there are several variations on the minor scale: "melodic minor" and "harmonic minor" to start with. Again, visit a music theory website to learn all the details. For now, here's the range of chords typically used in minor keys:

	i	ii	III	iv	v	VI	VII
Roman Numerals:	i	ii	III	iv	v	VI	VII
Chords in key of A minor:	Am	Bm	C	Dm	Em	F	G
Chords in key of D minor:	Dm	Em	F	Gm	Am	Bb	C
Chords in key of E minor:	Em	F#m	G	Am	Bm	C	D
Chords in key of G minor:	Gm	Am	Bb	Cm	Dm	Eb	F

How are time signatures indicated?

If a song is in a time signature other than 4/4 time (4 beats per measure) this is indicated in brackets at the top of the transcription. Thus 3/4 time is indicated as [3/4]. If there's no bracket, the song is in 4/4 time.

How are tied notes and slurs indicated?

Notes that are sustained (tied) across measures are notated with an extended dash, as in the opening line of "Blue Skies" by Irving Berlin, below:

```
    / 1—    5—/—  -4 -3   4 / 5——/—  -4 -3   4 / 5—   7—/—  -7 1 / 3—— /
    Blue— skies—  smi-ling at   me———  No-thing but  blue— skies—  do I   see—
```

As for slurs, i.e. two or more notes that are sung over one syllable, the convention is similar. Lyrics are ar-ti-cu-la-ted with hyphens. If one syllable is sung with several notes, that syllable is followed by a long dash— (this is the equivalent of a "slur" in regular notation). Here's an example from Hank Williams' "I Saw the Light":

```
/ 3  3—   2  / 3  2  1—  / 3   3—     2  / 3  2  1—   /
 I  saw  the  light——    I  saw     the  light——
```

Here, the word "light" is sung for a full measure with a slur of two quarter notes followed by a half note. The dash after light—— indicates that all three notes are sung unbroken over the word.

How are triplets notated?

Triplets are enclosed in 3 point brackets (Get it? Triplet? 3 point bracket?)
{-3 -5 -8 }   triplet of three eighth notes (such triplets are equal in time value to 2 regular eighth notes)
{2 4 2 }   triplet of three quarter notes (such triplets are equal in time value to 2 regular quarter notes)

How are accidentals notated?

If a song or melody includes accidentals—notes that are not part of the diatonic scale of the song's key—those notes are marked with #'s and b's. A note with a # (e.g. #3) is raised a half step. A note with a b (e.g. b3) is lowered a half step. As in regular music notation, this "accidental designation" on a note applies for the duration of the measure it occurs in. In subsequent measures the accidental "expires" unless reapplied. (Since there is no equivalent to the "natural" sign on the computer keyboard, in a case in which an accidental is followed by a "natural" in the same measure, the natural note is marked with an "n".)

About Notation of Rounds:

The asterisks (*) inserted in the lyrics of rounds are the points in the round that a new voice can enter. (See "Are You Sleeping" for an example) Throughout this songbook I've chosen to not number these entrance points. To the left of the round's title, I note how many parts a given round could be sung in. For example: [4 part round.] On longer rounds, with parts that take several lines to transcribe, I've used different type faces on the different parts of the round to distinguish them (See **God Danced** as an example.)

Frequently Asked Questions About Numerical Notation

What's the easiest way to get the hang of NN?

The quickest way to get adept at reading Numerical Notation is to sing songs in the collection that you know by heart while scanning the notation above the lyrics.

I can already read music. Why bother learning this new format?
Here's a few of the benefits of NN:

Easy transcription and key changes: I initially developed NN as a simple shorthand I used when learning songs by ear from recording. I'd sing along phrase by phrase while plunking on a piano. I'd double check the notes I was singing, and then jot down the numbers to retain my findings. Initially I just wrote down the notes by name (e.g. E F# G# B). Often when sharing these songs with singing friends, we'd discover that it worked better for us to sing in a different key. So I switched to jotting down the scale degrees instead of the specific notes. I quickly came to prefer

the simple adaptiability of NN over standard notation. With NN you can accurately make song transcriptions or jot down musical ideas without a blank staff or music software.

Compact. NN allows notation of melody and harmony lines without the large amount of space that a musical staff takes up. This allows song sheets and songbooks to hold more songs. Songbooks can be lighter!

Deepening understanding of music theory and harmony. Transcribing songs into NN provides a sort of x-ray into a song's harmonic structure. It reveals the intrinsic shape and relationship of melody, harmony and chord structure. It's already common amongst musicians to refer to notes and chords by their scale degrees or Roman numerals. So NN helps illuminate the relationship between music theory and actual music.

Numerical Notation is still evolving. You may notice variations in the formatting of different songs. Any feedback and suggestions on how to make NN more accessible and useful are welcome.

Cross-cultural and Historical Note

There are two existing notation systems that are similar to NN: Tonic Sol-fa was developed in the 19th century by Sarah glover and John Curwen. It was widely adopted throughout the British Empire as an effective tool for teaching music but lost favor in the 20th century (though it is still commonly used in South African hymnals.) The Numbered Musical Notation, better know as Jianpu is widely used in today in China. Jianpu is close to NN in look and format, The logic of all three systems is similar. Familiarity with one gives easy comprehension of the others. You may ask: if NN is similar to existing notations, why add a new one? NN has two advantages over either of these systems: it more readily allows one to to transcribe or compose music with only a regular computer keyboard. In addition, it fully integrates chord notation and music theory. You can learn more about both Tonic Sol-fa and Jianpu on Wikipedia.