

LeadMuse – a new experimental music notation software (under construction)
based on a new simple and practical numerical musical notation system (NMNS)
and a modular periodic bilinear (musical) staff (MPBS)

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Wiki-like transdisciplinary article (Open development interval: 2017 - ?)

- working paper preprint^[1] -

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Important note: The latest (free) version of this article can be downloaded from this [URL](#)

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1st Motto: „Where words fail, music speaks.” ([Hans Christian Andersen](#), Danish writer) ([URL](#))

2nd Motto: „Music is a moral law. It gives soul to the universe, wings to the mind, flight to the imagination, and charm and gaiety to life and to everything.” ([Plato](#), philosopher in Classical Greece and the founder of the Academy in Athens, the first institution of higher learning in the Western world) ([URL](#))

3rd Motto: „Music is the mediator between the spiritual and the sensual life.” ([Ludwig van Beethoven](#), German composer and pianist) ([URL](#))

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[2] Andrei-Lucian Dragoi research pages on: [ResearchGate](#), [Academia.edu](#), [Vixra](#), [GSJournal](#);

Abstract

This paper presents “**LeadMuse**” (**LM**), a new experimental [music notation software](#) (under construction) for rapid writing of [music lead sheets](#) aka [fake sheets](#) (containing notes, chords and lyrics), created by the author in [Visual Basic 6 \(VB6\)](#). LM proposes a new simple and practical [numerical \(/numbered/integer/cipher\) musical notation system \(NMNS\)](#) [[URL16](#), [URL2](#), [URL3](#), [URL4](#), [URL5](#), [URL6](#), [URL7](#)] (for rapid [music lead sheets \(LSs\)](#) writing on any [desktop](#) or [mobile device](#)) and a **modular periodic bilinear (musical) staff (MPBS)** based on the [microtonalist Leo de Vries’ “diatonic twinline” musical staff](#) (proposed in 1986) with cancellation of both musical clefs, alterations signs and keys and unification of both vocal and all instrumental musical notation systems. 4 sample lead sheets edited in LM are also included in this paper.

Keywords: LeadMuse (**LM**), [Visual Basic 6 \(VB6\)](#), numerical (/numbered/integer/cipher) musical notation system (**NMNS**), music lead sheets, desktop, mobile device, modular periodic bilinear (musical) staff (**MPBS**), [Leo de Vries’ “diatonic twinline” musical staff](#), cancellation of both musical clefs, alterations signs and keys; unification of both vocal and all instrumental musical notation systems;

Important note (1). This atypical [URL](#)-rich paper (which maximally exploits the layer of hyperlinks in this document), chooses to use Wikipedia links for all the important terms used. The main motivation for this approach was that each Wikipedia web-article contains all the main reference (included as endnotes) on the most important terms used in this paper: it simply the most practical way to cite entire collections of important articles/books without using an overwhelming list of footnote/endnote references. The secondary motivation (for using Wikipedia hyperlinks directly included in keywords) was to assure a “click-away“ distance to short encyclopedic monographs on all the (important) terms used in this paper, so that the flow of reading to be minimally interrupted.

Important note (2). This paper also exploits the advantages of the hierarchic tree-like model of presenting informational content, which is very easy to be kept updated and well organized.

I. A short presentation of LeadMuse with both its numerical musical notation system (NMNS) and its modular periodic bilinear (musical) staff (MPBS)

1) Introduction to LeadMuse v1.0 and Visual Basic 6. The author of this paper has built a very practical software called “LeadMuse v1.0” (still under construction as a 1.0 beta version) for rapid writing of [music lead sheets](#) aka [fake sheets](#) (containing notes, chords and lyrics): LM was developed with a portable version of [Microsoft Visual Basic 6 \(VB6\)](#).

- Although now considered obsolete, VB6 is very practical and very easy to learn (and teach!), still offering the possibility to rapidly create a very large palette of portable small/medium-sized software applications (which may prove both stable and feasible, even when run directly on USB sticks/cards), mainly for personal use (as the author also uses VB6).
- VB6 portable applications have the advantage of being compatible with all [Microsoft Windows](#) variants (from [Windows XP](#) to [Windows 10](#)).
- VB6 is also advantageous for programming beginners because it has [many existing derivatives](#), like [Visual Basic for Applications \(VBA\)](#) which can be learned quickly and can be used to create complex macros in Microsoft Office applications like Word or Excel.
- VB6 has also two special visual ([WYSIWYG](#)-type) derivatives for creating Android applications: [DroidBasic](#) (created by [KBasic Software company](#)) and [B4A](#) (abbreviation from “Basic for Android”; created by [Anywhere Software company](#)).

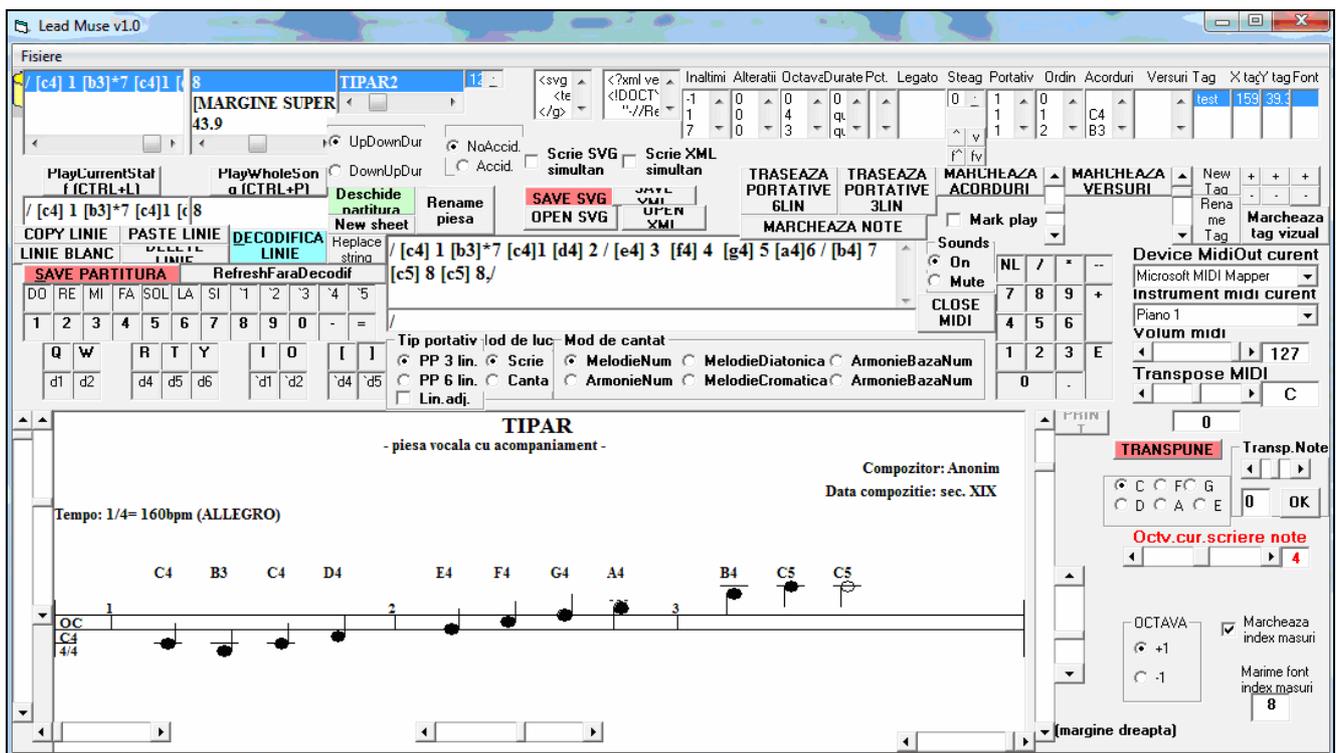


Figure I-1. Print screen of the LeadMuse (LM) version 1.0 main form: (1) the VB lists from the top-left corner of the form contain the list of songs, song content and song formatting options; (2) the VB list from the top-center of the form contain the [MusicXML](#) and the [SVG](#) variants of the song (written and exportable by LM); (3) the VB lists from the top-right corner of the form contain all the song notes (extracted from the text box from the center of the form); (4) the center-left of the form contains a small 2-octaves keyboard (for sound emission directly from the keyboard) and all the necessary buttons for song saving and decoding; (5) the center of the form contains the main text box for rapid writing of music in alphanumeric ASCII format (as explained next); (6) the right-center and bottom of the form contains various [MIDI](#) settings; (7) the VB picture box covering almost all the bottom half of the form displays the score based on a modular bilinear staff (as explained next)

2) LM uses 2 major “tools”:

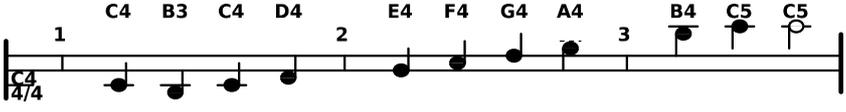
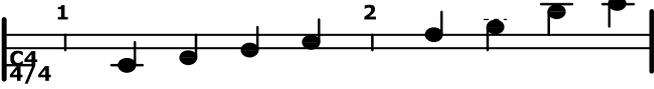
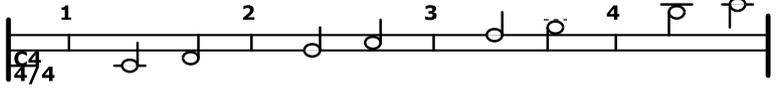
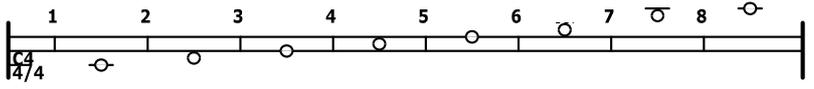
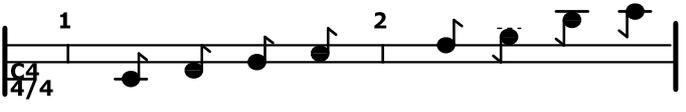
a. [1] A numerical musical notation system (NMNS) called LeadMuse Numerical (Notation) System (LMNS) which uses numbers instead of the seven standard diatonic steps/notes of the [well-tempered tonal \(European\) musical notation system \(TMNS\)](#): [1] for the [central C \[C4\]](#) (natural [central do \[C4\]](#): the 1st step of the [C major diatonic scale \[CMDS\]](#)), [2] for D (natural re: the 2nd step of CMDS), [3] for E (natural mi: the 3rd step of CMDS), [4] for F (natural fa: the 4th step of CMDS), [5] for G (so: the 5th step of CMDS), [6] for A (la: the 6th step of CMDS) and [7] for B (natural ti, not flat ti: the 7th step of CMDS) ^[URL1]. NMNS additionally includes notation numbers: [8] (for natural [octave C\(5\)](#) or do(5), which is one [octave](#) above the [central C](#)); [9] (for natural [octave D\(5\)](#) or re(5), which is one [octave](#) above the [central D](#)); [0] for musical pause (with various durations)

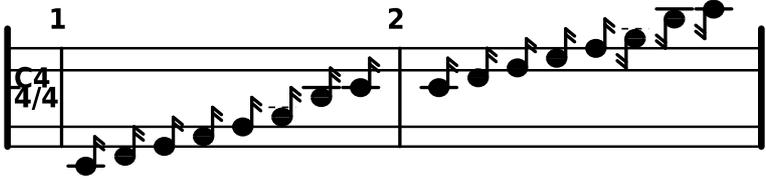
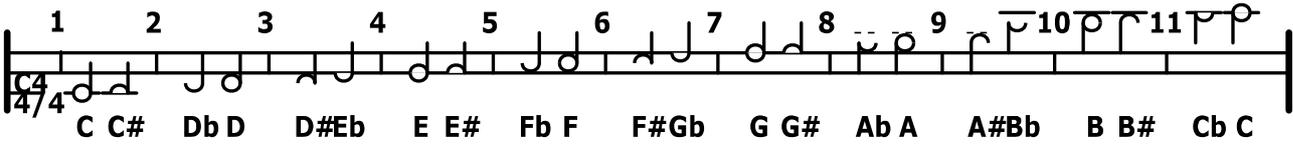
- i. Note (1). This number-to-note(/step) correspondence is also used in a subtype of NMNS widely spread in music publications in China, especially for the notation of monophonic melodies which are a “rule” in Chinese traditional music: there are also similar NMNSs also used to some extent in Japan, Indonesia, Australia, Ireland, UK, US and the English-speaking Canada.
- ii. Note (2). LMNS has also some similitudes with [ABC \(musical\) notation](#)^[URL2, URL3, URL4, URL5], [GUIDO music notation](#)^[URL2, URL3] (as LM works similarly to [GUIDO NoteServer](#)) and [LilyPond](#)^[URL2] (which all use letters instead of numbers for musical notes/steps), but LMNS reserves letters for writing chords, lyrics, alternation signs and other comments (text tags).
- iii. Note (3). LMNS was conceived not only to rapidly write lead sheets (LSs), but also for LSs to can be easily read and played even directly from LMNS (and not necessary from standard graphic notation of music). Each note step N (0-9) used by LM in a lead sheet marks a step N (or a rest “0”) with a [quarter](#) duration. LM also uses additional non-numerical symbols for various musical notations like:
 1. **Pitch**. “:” (used before or after a note N to specify that note N is an octave higher than N; when followed by “:” it marks that all the following notes starting with N are an octave higher than noted), “::” (used before or after a note N to specify that note N is a double-octave higher than N; when followed by “:” it marks that all the following notes starting with N are a double-octave higher than noted), “*” (used before or after a note N to specify that note N is an octave lower than N; when followed by “:” it marks that all the following notes starting with N are an octave lower than noted), “**” (used before or after a note N to specify that note N is a double-octave lower than N; when followed by “:” it marks that all the following notes starting with N are a double-octave lower than noted), “%:” (used before or after a note N to specify that note N is from the central octave; when followed by “:” it marks that all the following notes starting with N are in the central octave).
 2. **Durations**. “/” (for [measure/bar lines](#) marking the start/finish of a measure), “,” (for prolonging a note N or a rest with a [quarter](#) duration), “-” (used before or after a note N to specify that note N has an [eighth](#) duration), “=” (used before or after a note N to specify that note N has a [sixteenth](#) duration), “.” (used after a note N to prolong its duration with half of its initial duration), “..” (used after a note N to prolong its duration with half-and-a-quarter of its initial duration).
 3. **Simultaneous notes**. “()” (used to enclose two or more notes N that are played simultaneously).

4. **Chords and lyrics.** “[]” (used before any note N for enclosing the [chord](#) that harmonizes the group of notes starting with that specific N note), “{ }” (used before any note N for enclosing the word or syllable of the lyrics corresponding to that note N); both “[]” and “{ }” can be used also used for any other text/symbol tagging of each note in part (in both musical and educational purpose).
- b. [2] **A modular periodic bilinear (musical) staff (MPBS) which used modules composed from (just) the first two lines of the [standard/traditional 5-lines musical staff](#) (as numbered from down to up), with the possibility of “compressing” all the 7 steps of European tonal music on a single module of this MPBS.**
 - i. MPBS is based on the [“diatonic twinline” musical staff](#) (proposed in 1986 by [microtonalist Leo de Vries](#)): (1) a distinct feature of MPBS is that it uses a “dead line” (which isn’t used for notes, but only for musical pauses and the notation of la [A]): this “dead line” (which is sketched when noting the A note) assures that all the notes will maintain the same graphical staff position pattern, no matter the octave (a staff with 2 or more is in fact a “periodical staff”, much easier to be read than the standard [5-lines staff](#) or the [grand staff](#)); (2) another distinct feature of MPBS is the notation of notes (avoiding sharps and flats), which has some resemblances with de Vries’ notations in his “diatonic twinline” but also some advantages, as MPBS clearly differentiates [enharmonics](#) (for example a D sharp [D#] note from an E flat [Eb] note) which is essential in [tonal music](#).
- 3) There are also some software similar to LM, but which use the Chinese subtype of NMNS (aka [jianpu](#)): [S-Music Alpha version](#), [JP-Word](#), [Composer Master](#), [SimpErhu freeware package for Microsoft Word](#) etc. The advantage of LMNS is that it includes only standard [ASCII characters](#) which can be used from any desktop or mobile device with a minimal text editor: the musical files saved as text can then be imported in LM to be also converted to MPBS-based graphical form and then exported as [MIDI \(Musical Instrument Digital Interface\)](#), [MusicXML](#) or [SVG \(Scalable Vector Graphics\)](#).
- 4) **Present LM capabilities:**
 - a. **LM contains:** (1) VB lists with songs, song content and song formatting options; (2) VB lists containing the MusicXML and the SVG variants of the song (written and exportable by LM); (3) VB lists containing all the song notes; (4) a small 2-octaves keyboard (for sound emission directly from the keyboard) and all the necessary buttons for song saving and decoding; (5) a main VB text box for rapid writing of music in alphanumeric ASCII format (as explained next); (6) VB frames containing various MIDI settings; (7) a VB picture box displaying the score based on a modular bilinear staff (as explained next)
 - b. LM uses a notation system called [LeadMuse Numerical \(Notation\) System \(LMNS\)](#). LMNS can easily be used on any mobile device, as the both the numbers (0-9) and adjuvant symbols (/ , - = : ‘ * etc) used can be found on the numerical keyboard of any mobile device: the numerical lead sheet edited on that device can be then imported with copy&paste functions in LM.
 - c. LMNS doesn’t use [sharp \(#\)](#) and [flat \(b\)](#) symbols, but uses special half-heads for sharp/flat notes (which are noted with d for sharp and b for flat only in the numerical variant of the lead sheet)
 - d. LM uses standard American [chords notation system](#).
 - e. LM can play both the melody and the chords of the lead sheet: LM reads the succession of chords and generates an audio midi accompaniment by using various predefined harmonic and rhythmic patterns.
 - f. LM uses a set of VB sliders for proper pagination and proper distribution of note into (numbered measures).

- g. LM can export lead sheets in formats like: [SVG](#) (vectorial format: high quality), [bmp](#) (low quality), [jpg](#) (low quality).
- h. The [MusicXML](#) export function is still in its initial stages, under construction.
- i. The [MIDI](#) export function is still in its initial stages, under construction.
- j. **Important note.** MusicXML and MIDI exporting functions weren't considered a priority in building LM, as LM offers the possibility of direct [SVG](#) generation and printing of reasonable quality lead sheets using a modular periodic bilinear (musical) staff (MPBS) (MPBS isn't offered by any other software).

5) Music notation samples created in LM, with explanations:

Numerical notation variant in LM	Music notation variant using MPBS in LM
The diatonic C scale in central octave (starting with C4 and also including B3 note) in quarter notes : /[C4]1 [B3]*7 [C4]1 [D4]2 / [E4]3 [F4]4 [G4]5 [A4]6 / [B4]7 [C5]8 [C5]8,/	
Do-re-mi-fa-sol-la-ti-do, all in quarter durations: /1234 /5678/	
Do-re-mi-fa-sol-la-ti-do, all in half durations: /1,2,/3,4, /5,6,/7,8,/	
Do-re-mi-fa-sol-la-ti-do, all in whole durations: /1,,,/2,,,/3,,,/4,,,/5,,,/6,,,/7,,,/8,,,/	
Do-re-mi-fa-sol-la-ti-do, all in eighth durations: /1-2-3-4/5-6-7-8/	
Do-re-mi-fa-sol-la-ti-do, all in sixteenth durations: /1=2=3=4=5=6=7=8/	

<p>The diatonic C scale in the low and central octave (from C3 to C5), all sixteenth notes: /*:1=2=3=4=5=6=7=8/ %:1=2=3=4=5=6=7=8/</p>	
<p>The chromatic C scale in central octave (starting with C4, each note with both sharp and flat and including enharmonics) in half notes: /{C}1,{C#}d1,{Db}b2,{D}2,/ {D#}d2,{Eb}b3,{E}3,{E#}d3,/ {Fb}b4,{F}4,/{F#}d4,{Gb}b5,/ {G}5,{G#}d5,/{Ab}b6,{A}6,/ {A#}d6,{Bb}b7,/{B}7,{B#}d7,/ {Cb}b8,{C}8,/</p>	<p>See next row.</p>
 <p>1 2 3 4 5 6 7 8 9 10 11 12</p> <p>C C# Db D D#Eb E E# Fb F F#Gb G G# Ab A A#Bb B B# Cb C</p>	

(see next page)

b. “[Hora Unirii](#)” ^[URL2] (title English translation: “The [Hora](#) of unity”): a Romanian song with music by the Romanian composer [Alexandru Flechtenmacher](#) and lyrics by Romanian poet [Vasile Alecsandri](#) written in 1856; it is sung and danced especially on January 24, when [Romanian United Principalities](#) was created in 1859); see next LS edited in LM (in both ASCII and SVG format)

- i. [C]{Hai}1,{sa}3/[C]{dam}6,{ma-}5/[G]{-na}4,{cu}3/[G]{ma-}2, {-na}3/[G7]{Cei}4,{cu}5/[G7]{i-}3,{-ni-}2/[C]{ma_}2{ }1{ro-}3/[C]{-ma-}5,{-na}5 /
- ii. [C]{Sa-n-}1,{var-}3/[C]{-tim}6,{ho-}5/[G]{-ra}4,{fra-}3/[G]{-ti-}2, {-ei}3/[G7]{Pe}4,{pa-}5/[G7]{-man-}3,{-tul}2/[C]{Ro-}2{ }1{-ma-}*7/[C]{-ni-}1,{-ei!}1 /
- iii. /[C]{Un-}5,{-de-i}1/[C]{u-}1,{-nul-}1/[G]{-nu-}1{ }1{-u-i}*7{pu-}*6/[G]{-te-}*7, {-re}2/[G7]{La}4,{ne-}4/[G7]{-voi}3,{si}2/[C]{la-}2{ }1{du-}3/[C]{-re-}5,{-re}5 /
- iv. /[C]{Un-}5,{-de-s}1/[C]{doi}1,{pu-}1/[G]{-te-}1{ }1{*7{-rea}*6/[G]{cres-}*7, {te}2/[G7]{Si}4,{dus-}4/[G7]{-ma-}3,{-nul}2/[C]{Nu-}2{ }1{spo-}*7/[C]{-res-}1,{-te!}1 /

HORA UNIRII (THE HORA OF UNITY)

- Romanian song composed in 1856-

Tempo: 140bpm (ALLEGRO)

Music: Alexandru Flechtenmacher

Lyrics: Vasile Alecsandri

The musical score is presented in four systems, each with a treble clef and a 3/4 time signature. Chord symbols (C, G, G7) are placed above the staff at the beginning of measures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, and 32. The melody consists of quarter and eighth notes. The lyrics are written below the staff, aligned with the notes.

1 Hai sa dam ma- -na cu ma-na Cei cu i- -ni- ma_ ro- -ma-na

9 Sa-n-var- -tim ho- -ra fra- -ti- -ei Pe pa- -man-tul Ro-__ -ma- -ni--ei!

17 Un-de-i u--nul- -nu--u-ipu- -te--re La ne- -voi si la_ _ du- -re--re

25 Un-de-s doi pu- -te_ _ -rea cres-te Si dus- -ma-nul Nu_ _ spo- -res-te!

- c. “[Drag mi-e jocul romanesc](#)” (approximate title English translation: “My dear Romanian Dance”): an anonymous Romanian song from the children’s folklore; see next LS edited in LM (in both ASCII and SVG format)

- i. [C]{Drag}1{mi-e}3 / [C]{jo-}5{-cul}5 / [C]{ro-}5{-ma-}5 / [C]{nesc}5, / [F]{Dar}6 {nu}7 / [F]{stiu}1 {cum}6 / [C]{sa-l}6 {por-}5/[C]{nesc}5, /
- ii. [F]{Hei}1, / [G7]{tra}7 {la,} 6 / [C]{la,}6 {la,}5 / [C] {la}5, / [G]{la,}5 {la,}4 {la,} / [G7] 3 {la,}2/[C]{la,}1 {la,}1 / [C]{la!}1, /

DRAG MI-E JOFUL ROMANESC

- anonymus Romanian song from the children's folklore-

Arrangement in LeadMuse: Andrei Lucian Dragoi

Tempo: 160bpm (ALLEGRO)

1 2 3 4 5 6 7 8

C C C C F F C C

Drag mi-e jo- -cul ro- -ma- nesc Dar nu stiu cum sa-l por- nesc

9 10 11 12 13 14 15

F G7 C C G G7 C C

Hei tra la, la!

- d. “[Jesu, Joy of Man's Desiring](#)”: a piece of music derived from the 10th and last movement of the cantata “Herz und Mund und Tat und Leben” (BWV 147) (“Heart and Mouth and Deed and Life”), composed by Johann Sebastian Bach between 1716-1723; this LS is the 1st page 1 from the viola part of a violin-violata duo arrangement of this musical piece; see next LS edited in LM (in both ASCII and SVG format)

- i. *5.5.3. / 7.3.*3./*6.*7.1./2.*2.2./5.3.1./7.3.2./1.d1.2. / *5.*5.*5./
- ii. 5.d4.3./d4.3.2/3.d4.5/2.*2.2/d4.2.*2./5.d4.3./7.7.d4./1.2.2./5.5.3./7.3.*3./
- iii. *6.*7.1./2.*2.2./5.3.1./7.3.2./1.d1.2./5.d4.3./d4.3.2./3.d4.5./*2.*2.2./
- iv. d4.2.*2./5.d4.3./7.*7.3./1.2.2./5.5.3./7.3.*3./6.7.1./2.*2.2./5.3.1./
- v. 7.3.2./1.d1.2./*5.*55-d4-d4-3-/2.1.*7./6.6-.5-.4-.3-./2.7.3./6.4.2./1.4.3./2.d2.3/
- vi. 6.*6.7./1.6.3./4.2.5./1.3.1./4.2.5./1.1 -1 *7 2-/5.*5.3./*7.3.*3./*6.*7.1./2.,2./
- vii. d4.2.d4./5.d4.3./7.*7.3./1.2.2./d4.2.d4./5.d4.3./7.*7.3./1.2.2./
- viii. *7.3.*3./*6.*7.1./2.*2.2./5.3.1./7.3.2./1.d1.2./*5.*5.*5./

JESUS, JOY OF MAN DESIRING

- violin-viola duet (viola part - 1st page extract) -

Composer: J.S. Bach

LeadMuse arr.: A.L.Dragoi

Tempo: 140bpm (ALLEGRO)

1 2 3 4 5 6 7 8

C4
9/8

9 10 11 12 13 14 15 16 17 18

C4
9/8

19 20 21 22 23 24 25 26 27

C4
9/8

28 29 30 31 32 33 34 35 36

C4
9/8

37 38 39 40 41 42 43 44 45

C4
9/8

46 47 48 49 50 51 52 53 54 55

C4
9/8

56 57 58 59 60 61 62 63

C4
9/8

64 65 66 67 68 69 70

C4
9/8

7) **Future capabilities to be implemented in LM:**

- a. [ties](#) and [slurs](#) between [musical notes](#);
- b. [beams](#) to indicate the rhythm grouping of [musical notes](#);
- c. Fully functional [MusicXML](#) and [MIDI](#) exporting functions.
- d. Etc.

8) **Conclusions.**

- a. Given its numerical musical notation system (NMNS) and its modular periodic bilinear (musical) staff (MPBS), LeadMuse has a significant educational potential, offering a much more quicker and easier way of teaching and learning music and musical notation.

9) **Final notes.**

- a. LM is functional but still under periodic refinement for future online selling.
- b. A mobile [Android](#) LM variant is also in plan for the future.
- c. A [macro](#) for [Microsoft Word](#) to implement rapid lead sheet (and playing) writing directly in this advanced [text editor](#) (like Word is).
- d. A [JavaScript plug-in](#) to implement rapid lead sheet (and playing) on any public web page.

II. Endnote reference (listed in the order of apparition in the text)

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