

ACCESSIBILITY FOR MUSIC NOTATION



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AGENDA

- What kind of software facilitates the conversion of printed/digital music scores into braille music notation?
 - Is there any specific workflow established in terms of converting a printed/digital score into braille notation?
 - Resources & Organizations





BRAILLE MUSIC NOTATION

- Invented in the early 19th century
- Consisted of literary + Nemeth + music braille
- Six-position cell system
- Pitches are represented by different letters than literary braille!
- Braille music symbols are universal
- There are different layout formats depending on the genre of music

Up the hill and down a-gain, / Hol-di-ri-di-a, hol-di-ri-a.

Lyrics:

melody notes

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melody notes

Vocal Music example provided by braille music transcriber: Moya Michalakis
 Source: Garmo, M.T. (2005). Introduction to Braille Music Transcription

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Source: Garmo, M.T. (2005). Introduction to Braille Music Transcription.

The image shows a musical score for a vocal line and piano accompaniment. The vocal line is on a single staff with a treble clef, a key signature of one sharp (F#), and a 6/8 time signature. It begins with a measure containing a whole note chord (F#4, A4, C5) and is followed by four measures of eighth notes: F#4, A4, C5, F#4, A4, C5, F#4, A4, C5, F#4, A4, C5. The piano accompaniment is on a grand staff (treble and bass clefs) with the same key signature and time signature. It features a whole note chord (F#3, A3, C4) in the first measure, followed by a long rest for the first two measures, and then another whole note chord (F#3, A3, C4) in the third measure. The first two notes of the vocal line (F#4 and A4) are highlighted in yellow, and their corresponding piano accompaniment notes (F#3 and A3) are also highlighted in yellow. The piano accompaniment notes are marked with fingerings: '1' for F#3 and '2' for A3.

The image shows the Braille transcription of the musical score. It consists of three systems of Braille. The first system is a right-hand (RH) and left-hand (LH) system, with the RH and LH labels in blue. The second system is a single-line Braille system. The third system is another RH and LH system. The Braille notation for the piano accompaniment notes (F#3 and A3) in the second and third systems is highlighted in yellow, corresponding to the yellow highlights in the musical score. The Braille notation for the vocal line notes (F#4, A4, C5) is also present in the first and third systems.

EXISTING TECHNOLOGIES FOR **DIRECT** CONVERSION TO BRAILLE MUSIC NOTATION

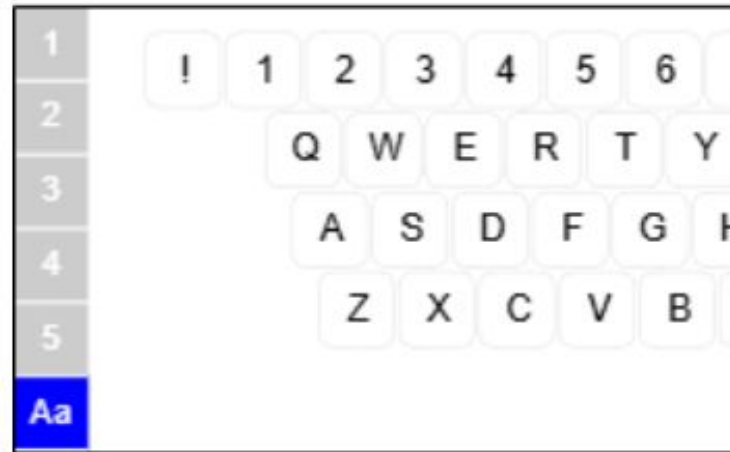
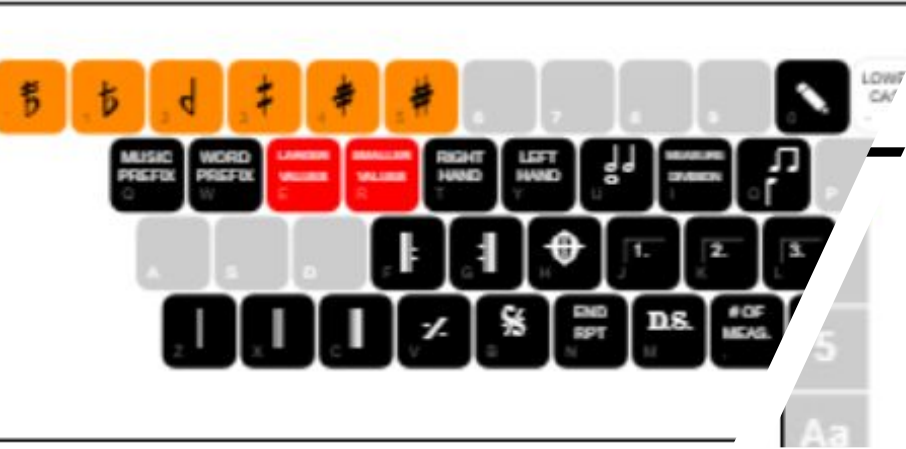
- Braille Music Editor, Braille Music Notator
- Other software does not support direct conversion to braille



BRAILLE MUSIC NOTATOR

- Online tool for creating braille music scores
- Created by Dr. Toby W. Rush
- Characters automatically translated into musical symbols
- Scores produced by sighted users (not braille notation knowledge required)
- End users are visually impaired people





BRAILLE MUSIC NOTATOR

2/19/2025



ACCESSIBILITY IN COMMERCIAL TECHNOLOGIES AND SOFTWARE

Limited accessibility features in most commercial technologies and software

Music is harder to be interpreted in braille music notation comparing to simple text

Complex music elements or styles may be hard to be translated into braille music notation



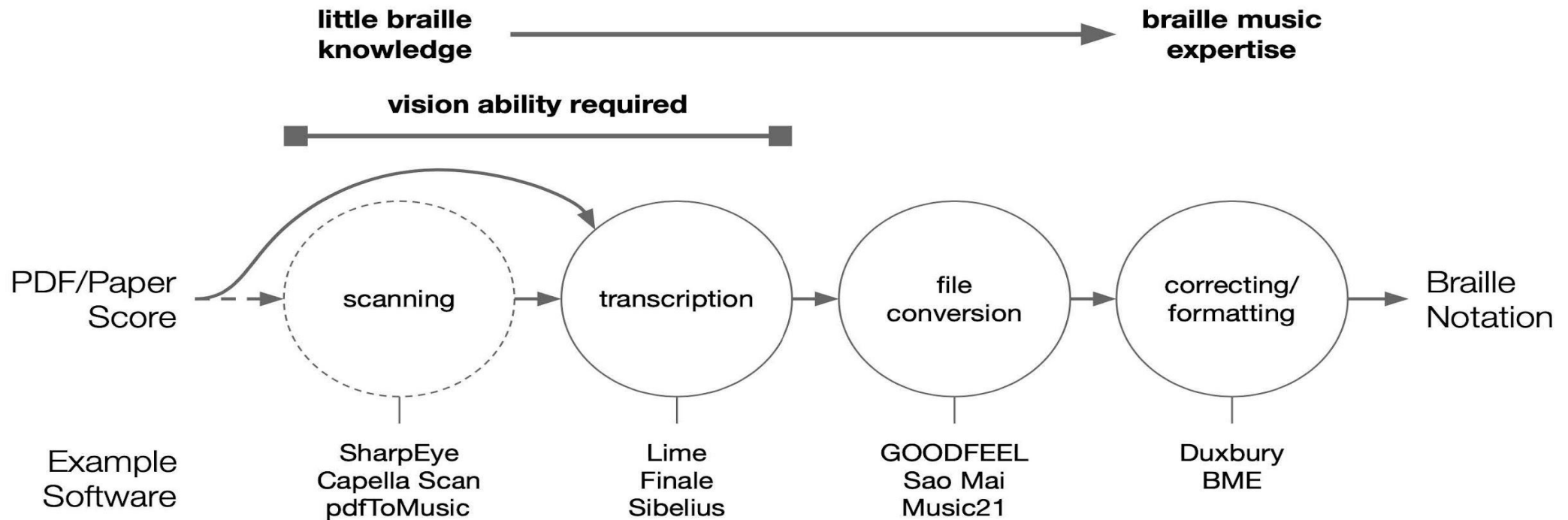


PROCESS OF CONVERTING A PRINTED/DIGITAL SCORE TO BRAILLE

- Complicated process and requires the effort of sighted people
- Includes several steps: scan, export to an XML file, convert to braille, correct and edit
- BANA: Braille Authority of North America

Provides standardization rules for music braille transcriptions

Music Braille Code



PAYNE, W., AHMED, F., GARDELL, M., DUBOIS, R. L., & HURST, A. (2022). SOUNDCELLS: DESIGNING A BROWSER-BASED MUSIC TECHNOLOGY FOR BRAILLE AND PRINT NOTATION. IN PROCEEDINGS OF THE 19TH INTERNATIONAL WEB FOR ALL CONFERENCE, W4A 2022 ARTICLE 14 (PROCEEDINGS OF THE 19TH INTERNATIONAL WEB FOR ALL CONFERENCE, W4A 2022).

WY BRAND INDUSTRIES BRAILLE DEPARTMENT

SharpEye to
convert TIFF files
into MRO for print
editing

Save as Niff to
open in LIME for
further
editing/clarifications

Further editing in
Goodfeel

Final editing in
Braille 2000

PITFALLS (1)

- Converting print music into editable notation files (OCR/OMR) results very often in characters errors which are essential to be fixed in a notation software before an MusicXML file is exported in to be processed for conversion to braille music notation
- Because of the percentage of the mistakes depending on the quality of the input, sometimes it is preferable to type out the music in notation software, therefore, skip the OMR step
- Music Notation Editors do not always capture the full range of music elements or make errors in capturing those elements
- If the xml is incorrect, then the Braille notation will be too

PITFALLS (2)

- Compatibility with specific devices (e.g. Dancing Dots products only oriented for Windows)
- Complications with assistive technologies
- Accessibility scripts or features may not be compatible with the software they support when the software updates





DAISY CONSORTIUM

- Formed in 1996 by talking book libraries to lead worldwide transition from analog to Digital Talking Books
- Leads the development of software used around the world in the creation, conversion and validation of accessible publications
- Provides software solutions, standardization practices and accessibility projects

DAISY CONSORTIUM – MUSIC BRAILLE

- Active music division: <https://daisy.org/activities/projects/music-braille/>
- Goal: "to make more music braille scores are available more easily to more blind musicians worldwide"
- Involves many parties worldwide and it consists of a cross-sector collaboration
- Aims to improve file conversions, file format standards and international file-sharing
- Focus
 - 1) "Input files need to be as good as they can be at the start"
 - 2) "Conversion and mark-up tools need to be accurate & reliable, for agencies and end-users"
 - 3) "Good access is needed to existing intermediary files"
 - 4) "Good teaching, learning and promotional materials are needed"
- Provides information on software, tools, workflows, guidelines



NATIONAL LIBRARY SERVICE FOR THE BLIND AND PRINT DISABLED (NLS) - DIVISION OF LIBRARY OF CONGRESS

- More than 300,000 audio and braille titles
 - One of the Nation's largest collection of braille and large-print music scores and recorded instruction and educational material
 - Music material available via: BARD (Braille and Audio Reading Download)
 - NLS does not host in-house conversion of scores to braille notation
 - **However, it contracts out with certified braille music transcribers**
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- The NLS is currently in the process of digitizing their entire

NLS DIGITIZATION

Photos credit:

National Library for
The Blind and Print
Disabled, Library of
Congress



German Scanner



Russian Scanner

NLS DIGITIZATION

PHOTOS CREDIT: NATIONAL LIBRARY SERVICE FOR THE BLIND AND PRINT DISABLED,
LIBRARY OF CONGRESS



Gilbert Busch, braille music specialist

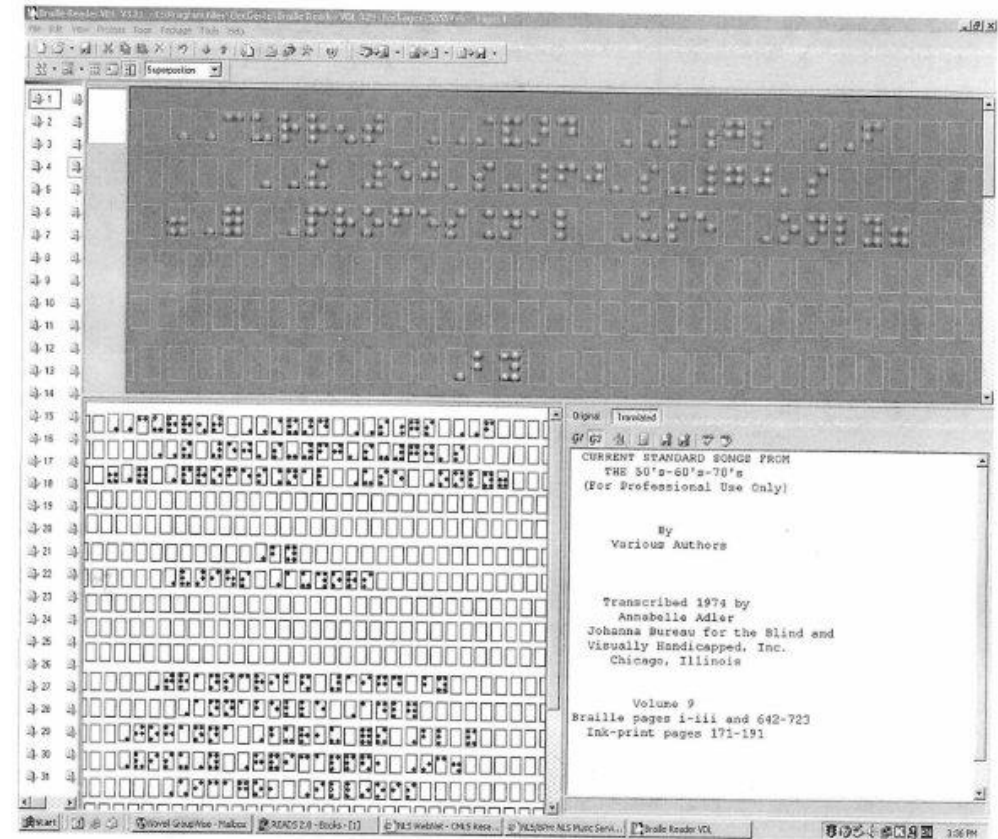


Photo of the editing screen for the Russian scanner

NATIONAL BRAILLE ASSOCIATION (NBA) - MUSIC TRANSCRIBERS

A list of music transcribers is provided under the Resources page of
the NBA



UK ASSOCIATION FOR ACCESSIBLE FORMATS MUSIC SUBJECT AREA (MSA)

- <https://www.ukaaf.org/sectors/#music>
- Has published in collaboration with the Royal National Institute of Blind People (RNIB)
"Introduction to automated braille music transcription"
- Detailed about each of software solutions, used in the process of music transcription presenting their pros and cons

FILOMEN M. D'AGOSTINO

GREENBERG MUSIC SCHOOL

- Staff members use notation software to transcribe music and convert into braille
- Software by Dancing Dots: a company led by a blind developer who has been developing accessible music technology for over 20 years and maintains relationship with the school.



Photo Credit: National Library
Service for the Blind and Print
Disabled, Library of Congress



BIBLIOGRAPHY

- Payne, W. C. (2023). Sounds and (braille) cells: Co-designing music technology with blind and visually impaired people. Available from ProQuest Dissertations & Theses Global; Sociological Abstracts.
- Payne, W., Ahmed, F., Gardell, M., Dubois, R. L., & Hurst, A. (2022). SoundCells: Designing a Browser-Based Music Technology for Braille and Print Notation. In Proceedings of the 19th International Web for All Conference, W4A 2022 Article 14 (Proceedings of the 19th International Web for All Conference, W4A 2022).

Association for Computing Machinery, Inc. <https://doi.org/10.1145/3493612.3520462>

- Payne, W. C., Xu, A. Y., Ahmed, F., Ye, L., & Hurst, A. (2020, October). How blind and visually impaired composers, producers, and songwriters leverage and adapt music technology. In Proceedings of the 22nd International ACM SIGACCESS Conference on Computers and Accessibility <https://sils.unc.edu/people/william-willie-payne/>
- Willie Payne page <https://williepayne.com/>

RESOURCES

National Library Service for the Blind and Print Disabled (NLS) – Library of Congress Division

[NLS page](#)

[NLS Services & Resources page](#)

National Braille Association (NBA)

[NBA page](#)

[NBA - Music Transcribers page](#)

Filomen M. D'Agostino Greenberg Music School (FMDG Music School)

[FMDG School](#)

The DAISY Consortium

[The DAISY Consortium page](#)

UK Association for Accessible Formats (UKAAF)

[UKAAF - Music Subject Area \(MSA\)](#)

PRODUCTS & SOFTWARE LINKS

- [Duxbury](#)
- [Dancing Dots page](#)
- [Dancing Dots Products & Services](#)
- [capella-scan](#)
- [PDFtoMusic](#)
- [MuseScore](#)
- [BrailleMuse](#)
- [Sao Mai Braille \(SMB\)](#)
- [Toby W. Rush page](#)