

HOW BRAILLE WORKS ELECTRONICALLY



AMERICAN
PRINTING
HOUSE





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Goals

1. Define three terms
 - braille ASCII
 - braille font
 - smart quotes
2. Explain the difference between “dressing” text in a braille font and print-to-braille transcription
3. Describe a new method for opening a BRF



ASCII

“braille ASCII” (or “ASCII braille”), Examples

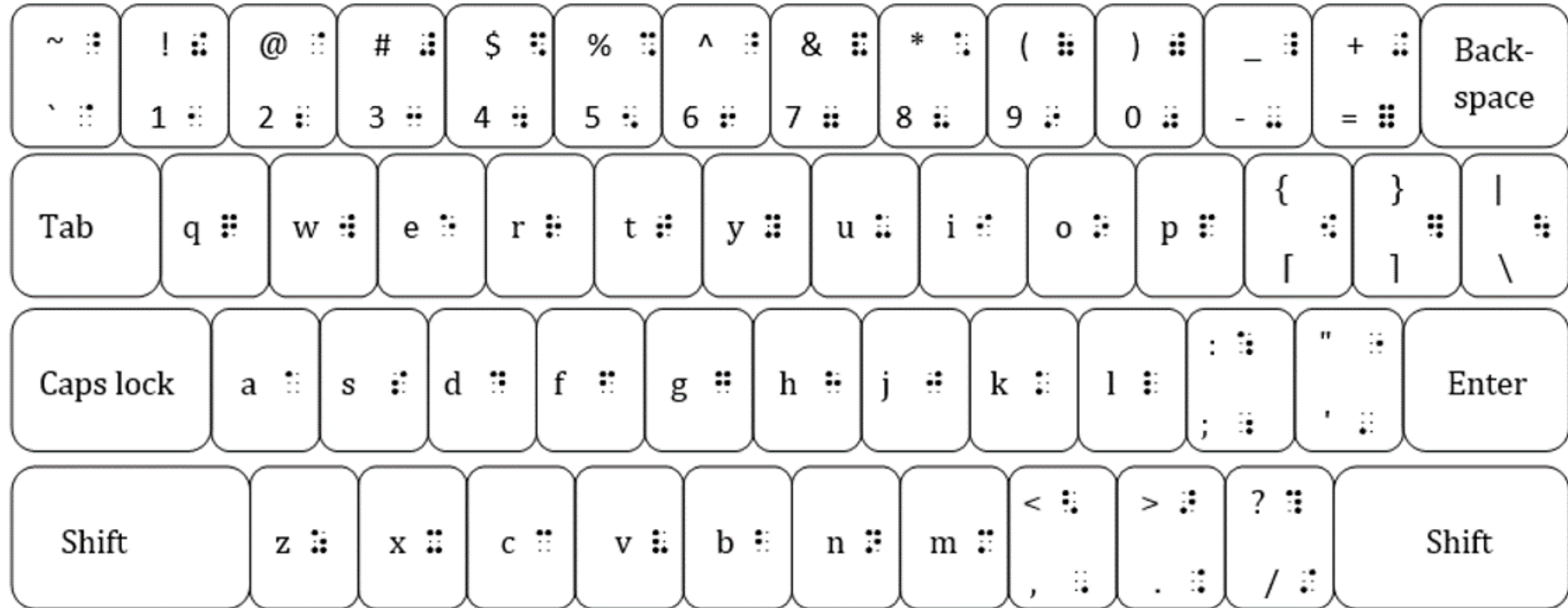
& ⠠ (dots 12346)

f ⠠ (dots 124)

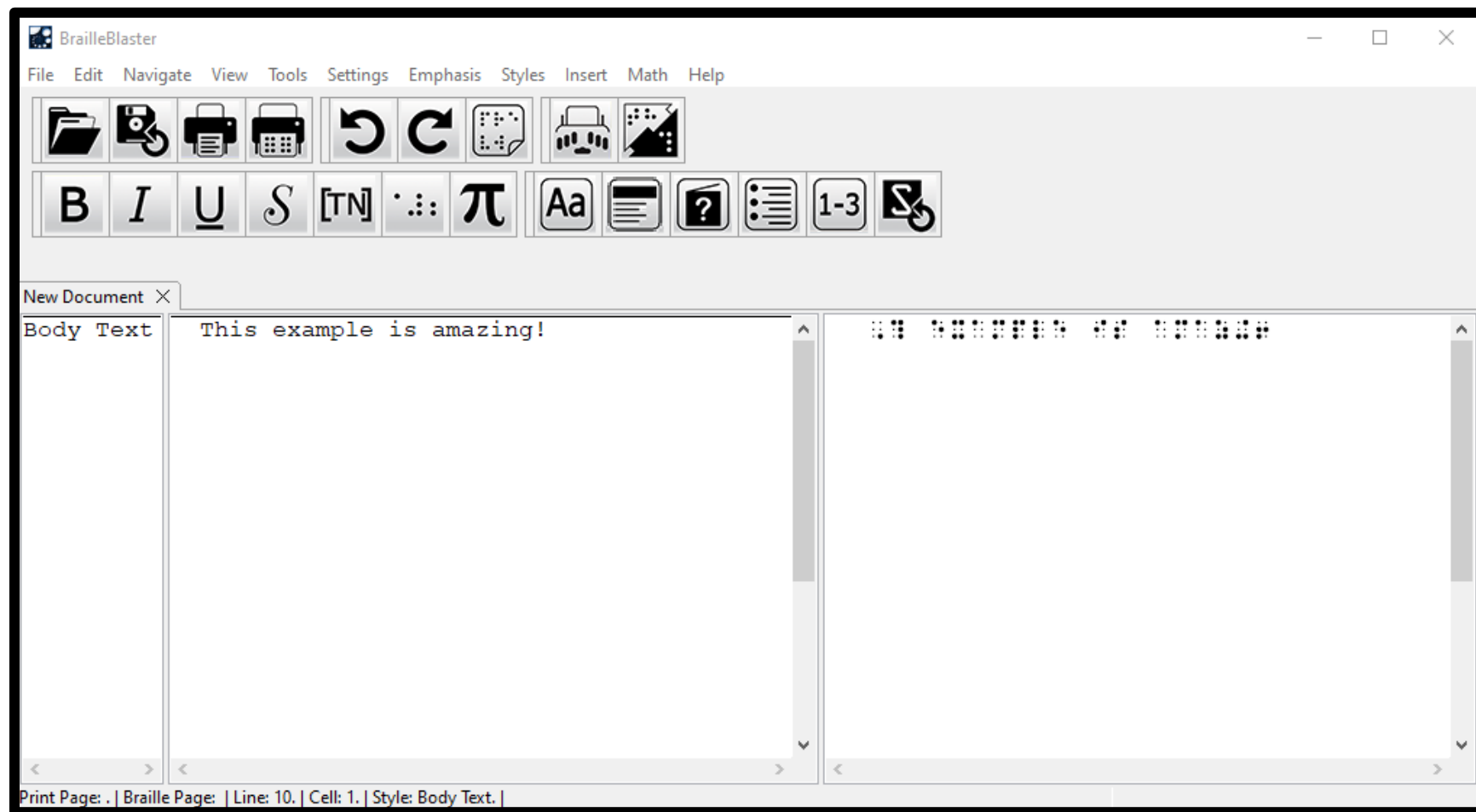
6 ⠠ (dots 235)

, ⠠ (dot 6)

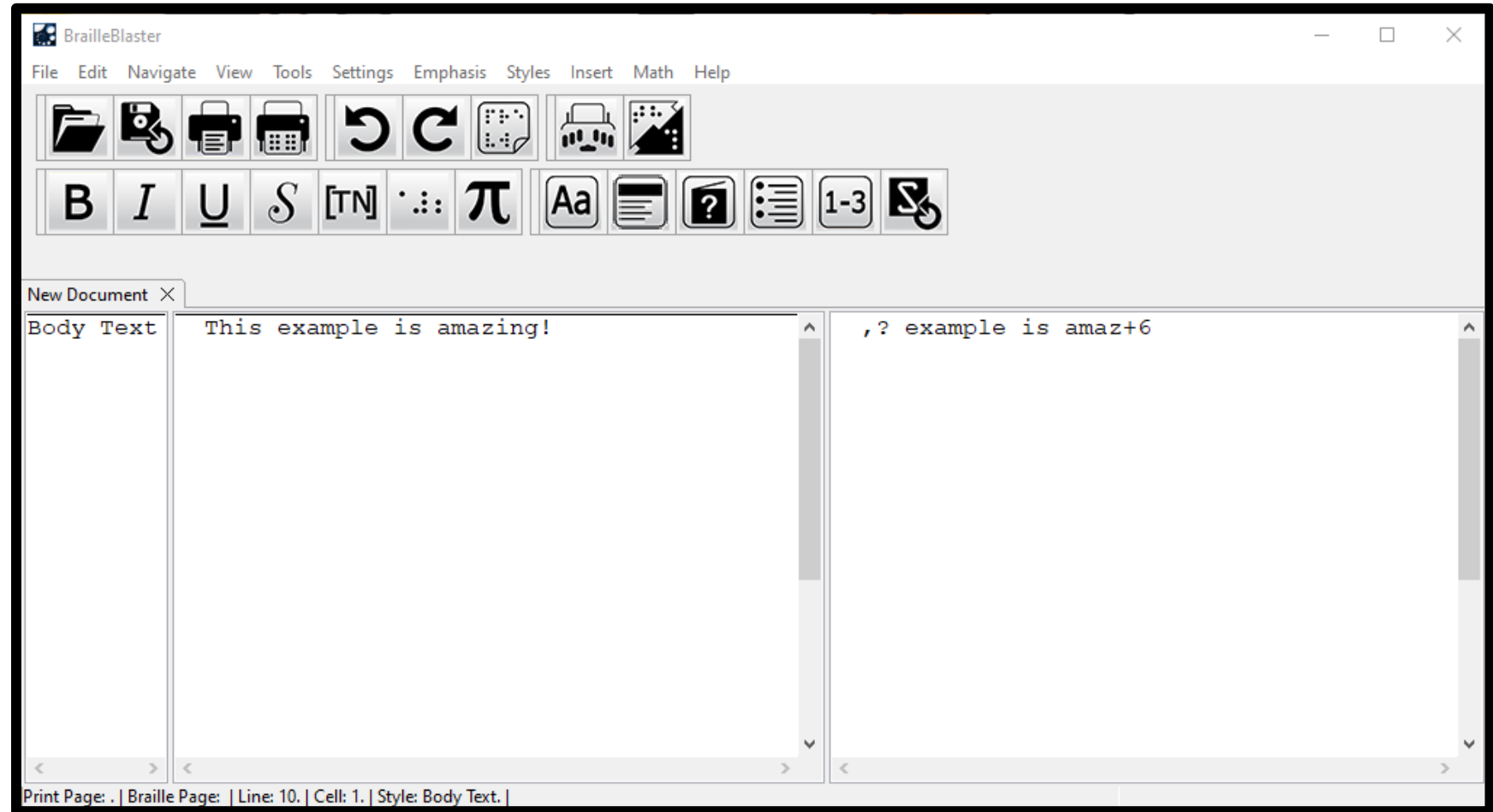
ASCII and QWERTY Keyboard



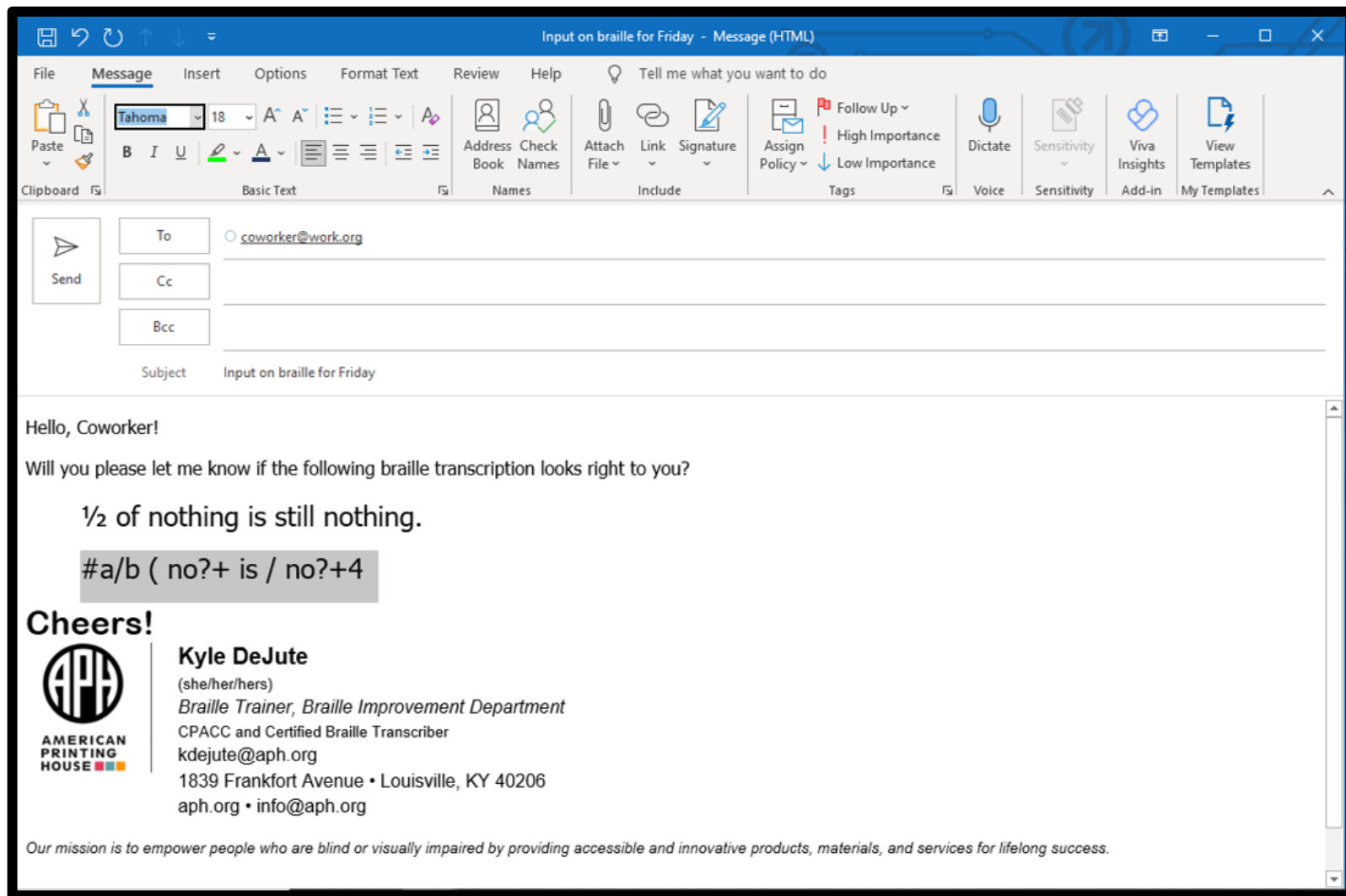
Braille ASCII at Work in BrailleBlaster “dressed” in a braille font



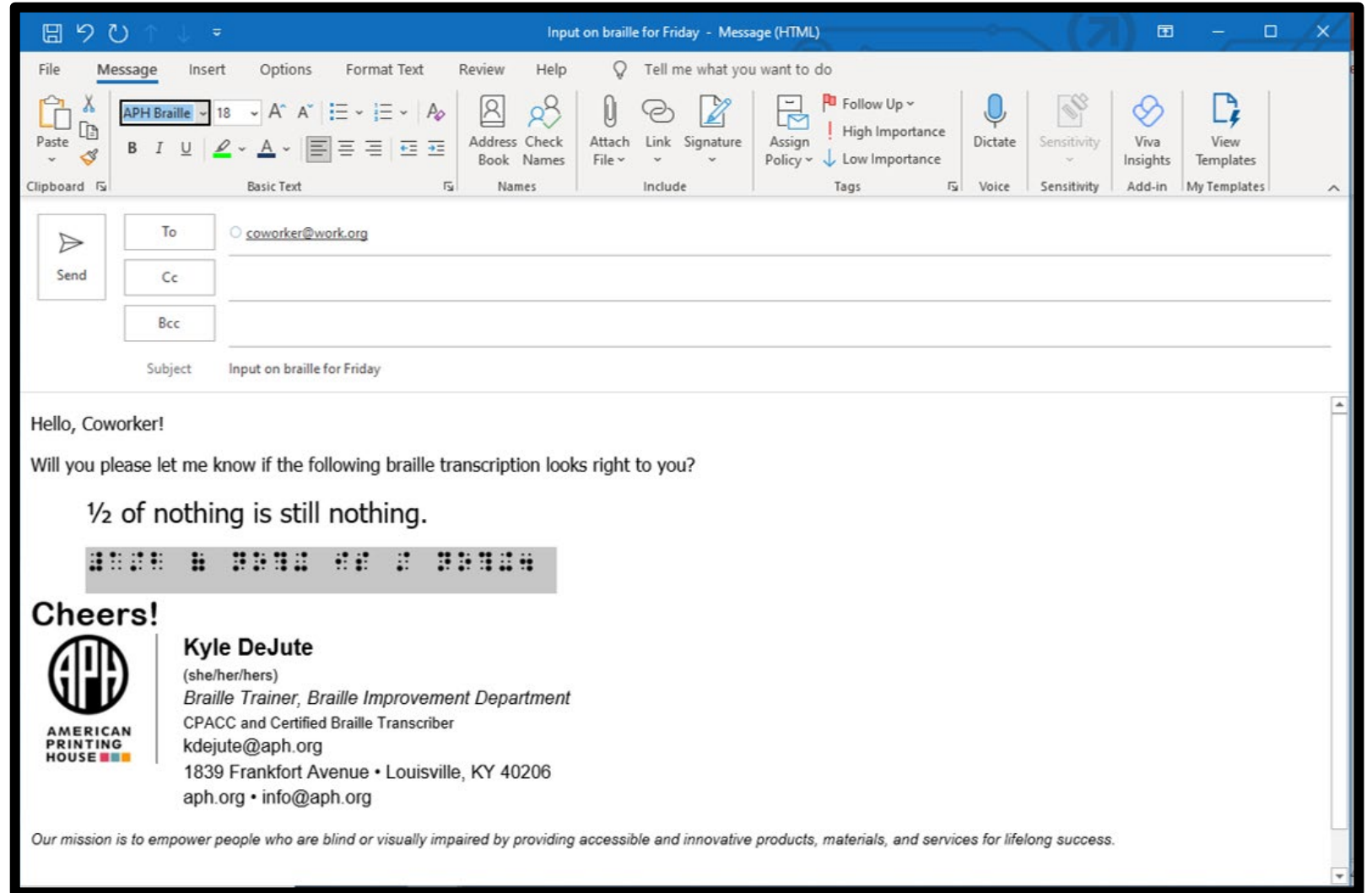
Braille ASCII at Work in BrailleBlaster



Braille ASCII at Work in email



Braille ASCII at Work in email “dressed” in font APH Braille Shadows





BRAILLE FONTS

What does a braille font do?

A braille font “dresses” ASCII characters so that they look like their corresponding braille cell configurations.



[Simulated] Braille Font Applied to ASCII braille

Braille is literacy!

⠠⠠⠠⠠ ⠠⠠ ⠠⠠⠠⠠⠠⠠⠠⠠

- Translated and shown in ASCII braille:

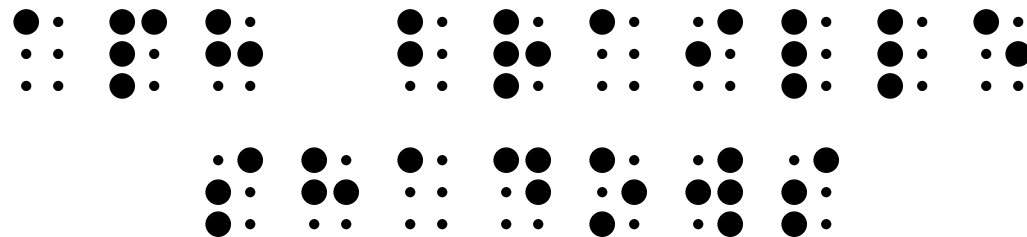
➤ ,brl is lit]acy6

- Translated and then dressed in braille font:

➤ ⠠⠠⠠⠠ ⠠⠠ ⠠⠠⠠⠠⠠⠠⠠⠠

APH Braille Shadows Font

- font designed at APH
- available for free from the [Building on Patterns website](#)
 - in Prekindergarten page, with TEACHER RESOURCES, under the heading Parent Letters



A Poll! #1



Poll #1

Which of the following shows braille ASCII?

A. My friend can swim.

B. ,my fr c swim4

A. ⠠⠠ ⠠⠠⠠⠠⠠⠠⠠⠠ ⠠⠠⠠⠠
⠠⠠⠠⠠⠠

B. ⠠⠠⠠ ⠠⠠ ⠠ ⠠⠠⠠⠠⠠⠠



ASCII BRAILLE, LIMITATIONS

Many Print Symbols are Not Part of the Braille ASCII Set



- →
- 😊
- “
- 爱
- ...

Quotation Marks and ASCII

& ⠠⠠⠠⠠⠠⠠ (dots 12346)

f ⠠⠠⠠ (dots 124)

6 ⠠⠠⠠ (dots 235)

, ⠠⠠⠠ (dot 6)

" ⠠⠠⠠ (dot 5)

' ⠠⠠⠠ (dot 3)

“ no correspondence

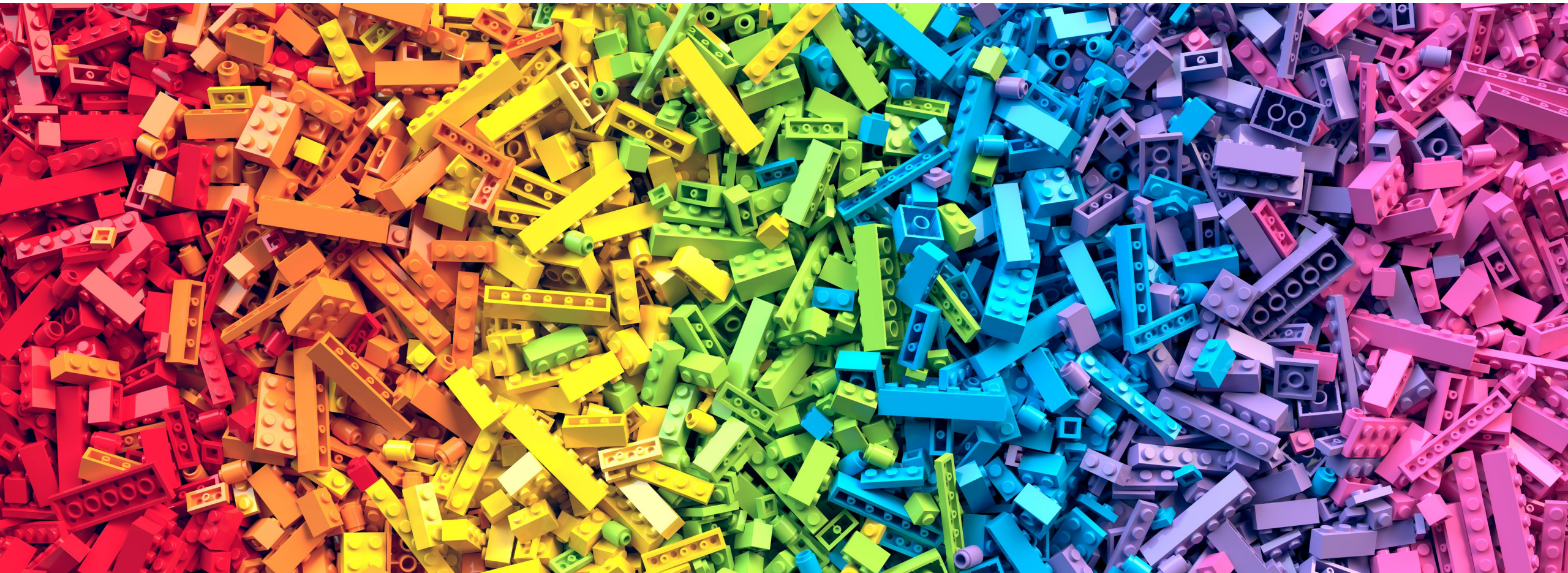
” nothing

‘ nope

’ not a single cell



Unicode Braille Patterns





WHY WOULD I NEED BRAILLE TRANSLATION SOFTWARE, IF I HAVE A BRAILLE FONT?



Braille TRANSCRIPTION is More Than Just Braille TRANSLATION

Braille transcription prepares text with not only the translation but also with formatting information.



BRAILLE TRANSCRIPTION SOFTWARE

A Poll! #2




Poll #2

What braille transcription software do you use most often?

- A. Braille2000
- B. BrailleBlaster
- C. Duxbury Braille Translator
- D. Other

How Does Software Do Braille Translation?

- Each word gets processed through a series of decisions
 - 
 - | | |
|---|---|
| A | B |
| C | D |
 - ...
- Decisions start with unique possibilities and proceed toward letter-for-letter translation
- Note: Multiple groups maintain braille translation tables

How Does Braille Transcription Happen?

- *beyond* braille translation
- elements arranged based on file markup
- human touch makes possible
braille that is widely and deeply accurate
 - ✓ contextually logical formatting, translation
 - ✓ herding cats



OPENING BRFS

BRF – Braille Ready File

- No codes or styles
- Hard spaces, line breaks, page breaks, ASCII characters
- Often for embosser
- Easily readable by multiple software programs, including text editors



Using Various Programs to Open a BRF

1. Duxbury
2. Braille2000
3. Braille Zephyr
4. BrailleBlaster
5. Web browser
6. Notepad

A Poll! #3



Poll #3

How can smart quotes interfere with applying a braille font to ASCII?

A. Smart quotes keep changing; they are not static

B. Directional quotes do not correspond to any braille cell configuration

C. There is no such thing as a braille quotation mark



SCREEN READERS

How Do Screen Readers Create Braille?

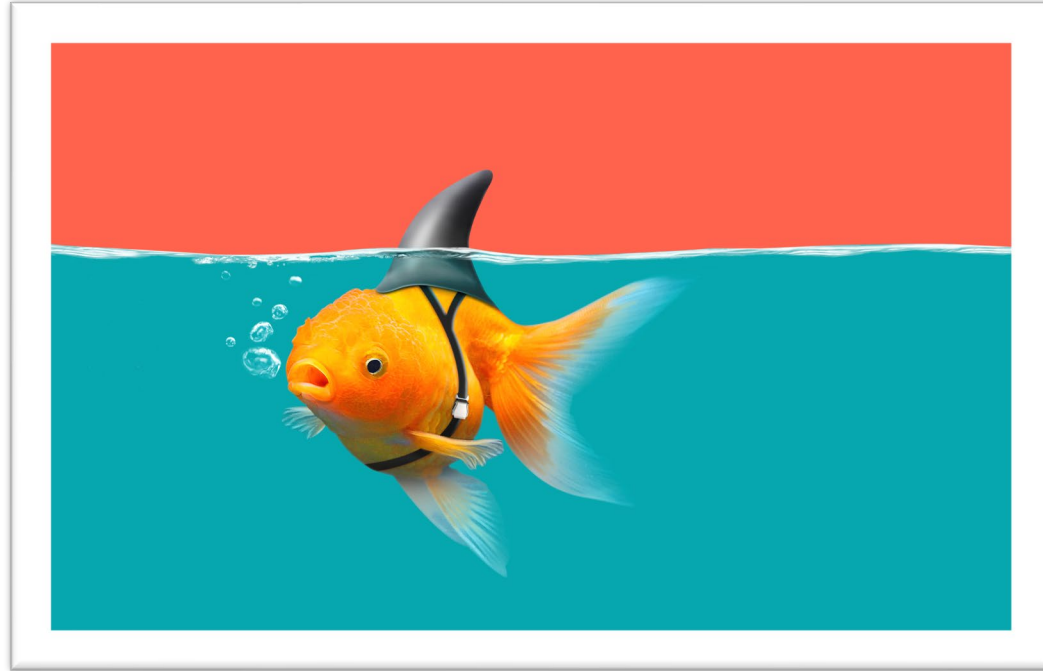
- via braille displays
 - and that means drivers



Challenges of Using Screen Readers with Braille

- Support between refreshable braille display and screen reader
- Octopus syndrome
- Bajillion hot keys available
- and more

Is a Screen Reader Enough?



Even though screen readers are important tools for access, they do not provide literacy experience.



EMAIL SIGNATURES

How to Create Your Accessible Braille Email Signature



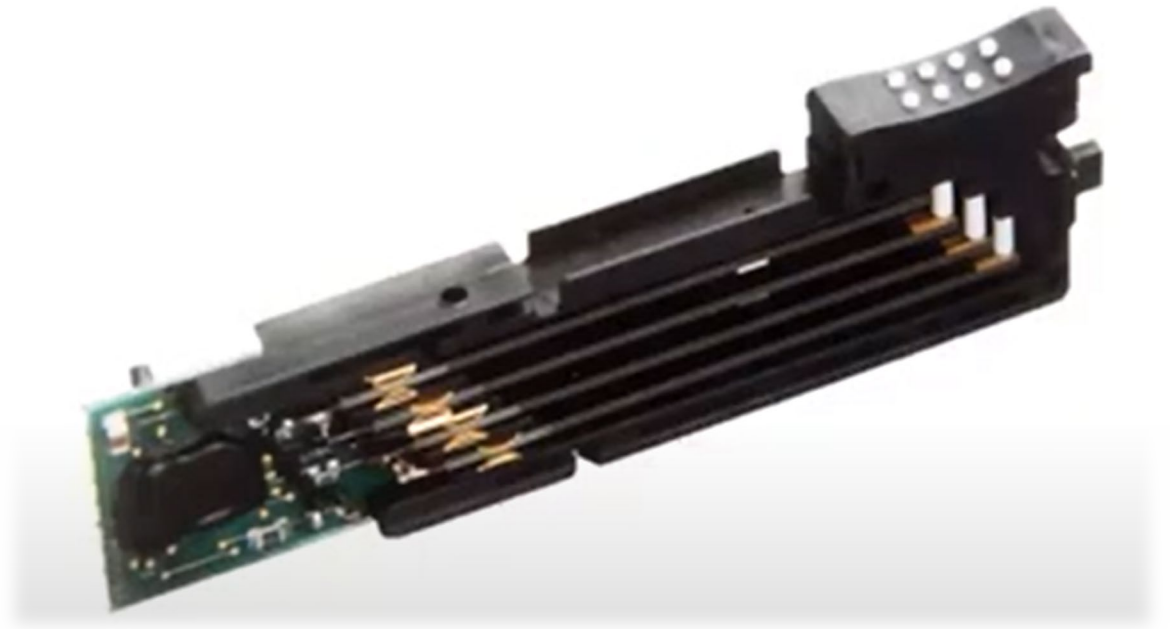
1. Six-key your name in an Exercise box within one of APH Tech's braille tutorials
 - [Nemeth Tutorial](#), [UEB Math Tutorial](#)
2. Copy/paste your name into a word processor
3. Apply a simulated braille font to your name
4. Adjust the size of your name
5. Take a picture of that part of your screen
 - [Win + Shift + S](#) in Windows 10
 - [Shift, Command, and 4](#) for Mac
6. Paste the picture into your email signature
7. Add alt text to the picture (e.g., simulated braille of Jane Doe)



REFRESHABLE BRAILLE DISPLAYS

“Nuts and bolts” of refreshable braille displays

- Each cell is a multi-part unit.
- Piezoelectric braille cells are the most popular cells in use today. Though, there are more designs.
- Some cell designs require power both to push a pin up and to keep it up.



Struggles with Refreshable Braille Displays

- Print text displayed without transcription
- Rigid BRF
- Use of ASCII braille
- No formatting
- Linear user interface
- ...

Benefits of Refreshable Braille Displays

- Digital buttons for typing
- Consistent quality of dots
- One line at a time
- Audio reinforcement via screen readers and TTS



A Poll! #4



Poll #4

What does a “driver” do?

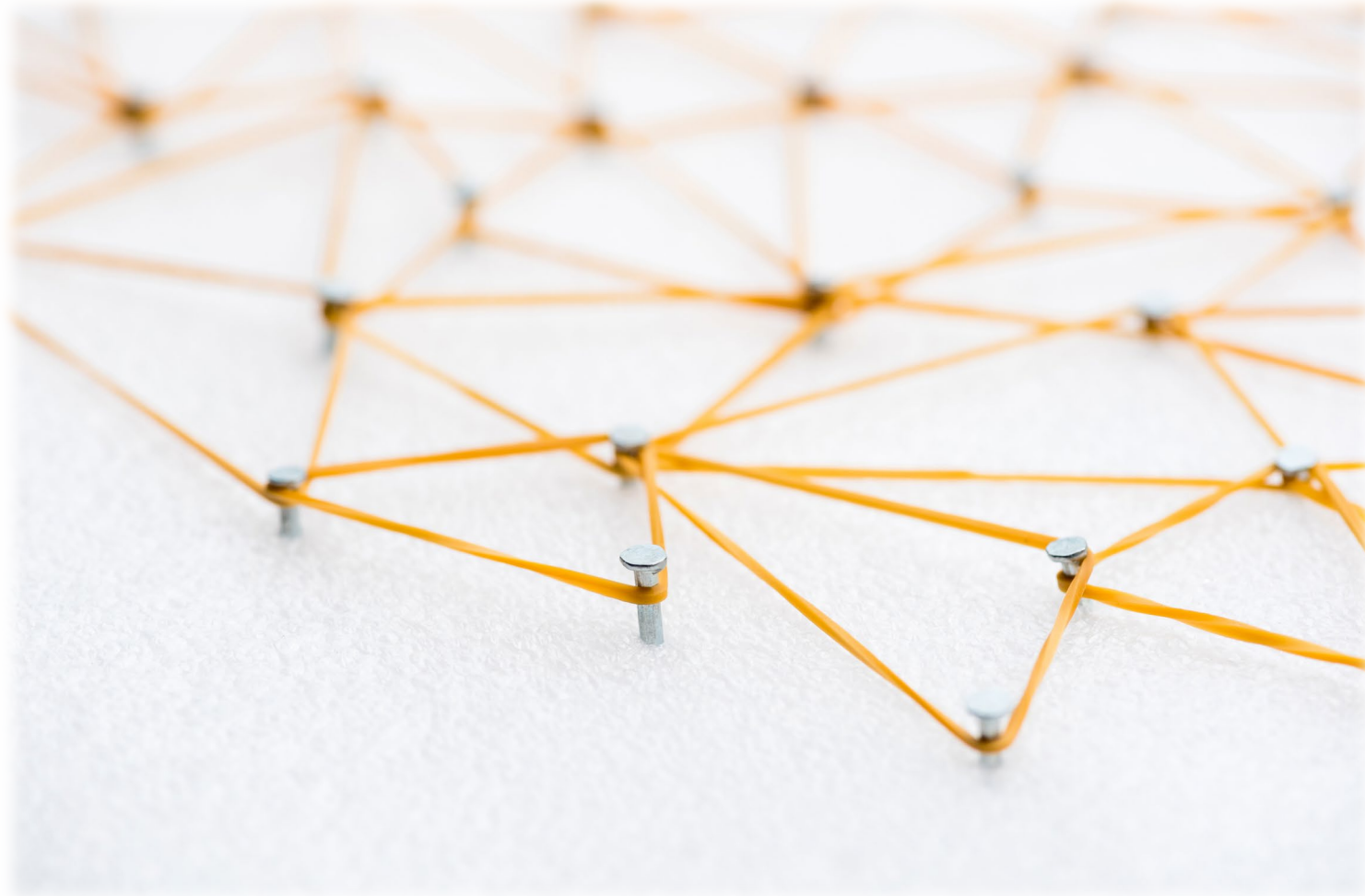
- A. Drives up the efficiency of hardware
- B. Takes control of all the technology in your life and keeps you a prisoner of the machines
- C. Helps pieces of hardware communicate



eBRF

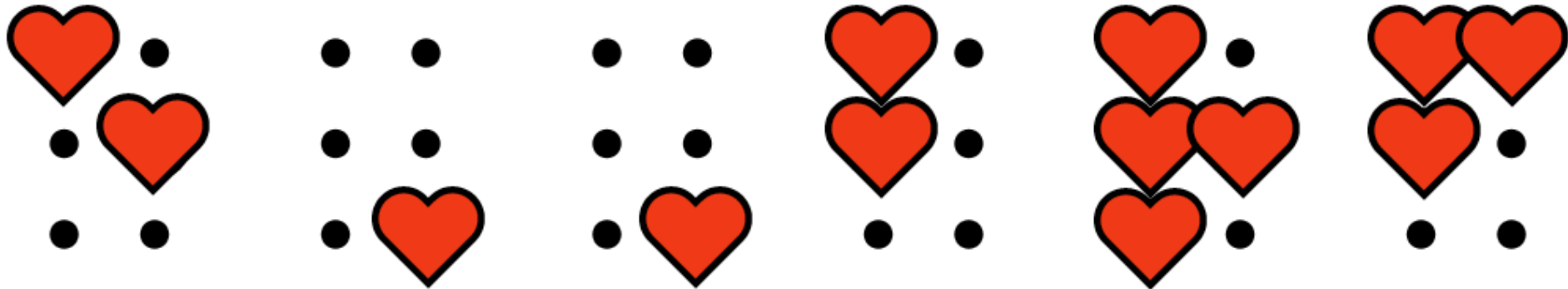
exciting New Horizons!

What is an eBRF?



Benefits of eBRF

- Navigation!
- Dynamic content!



Status of eBRF, March 2022

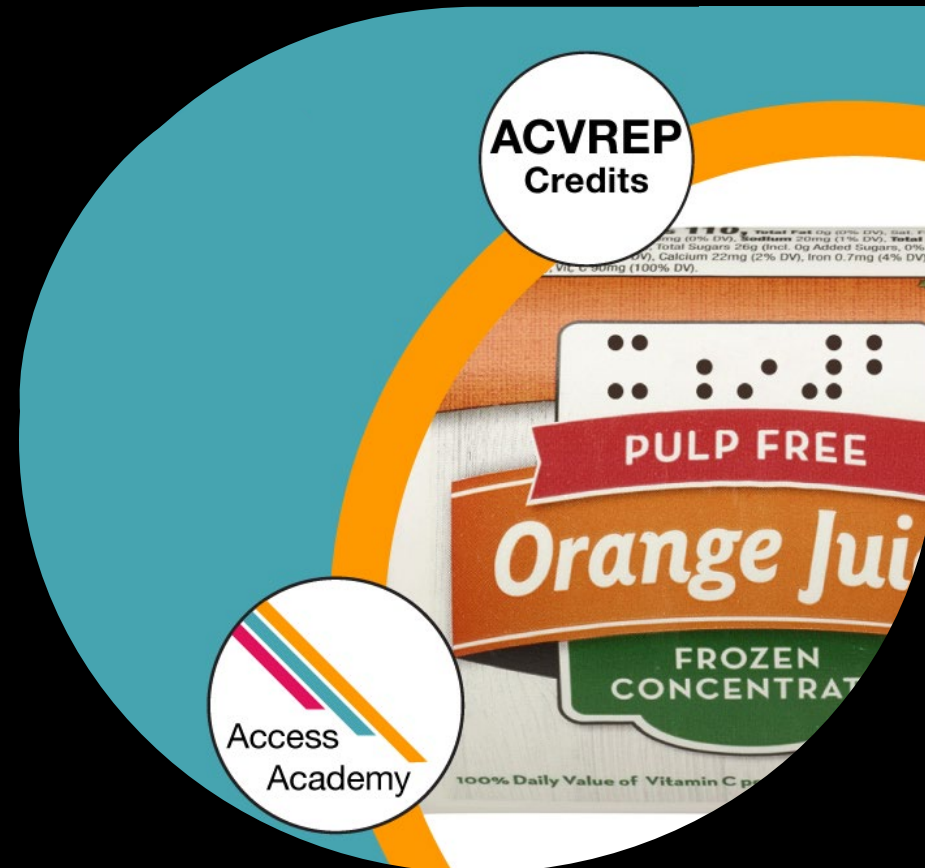
- 2.0 draft has gone to international partners for feedback
- Once draft is complete, will complete first standard (for BANA rules)
- Then we can make the first eBRF

Join us in March for

UEB Math/Science: Frozen Juice Concentrate

Mar 28th (Monday)

12:00-1:30 ET



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Summary

- Define three terms
 1. braille ASCII
 2. braille font
 3. smart quotes
- explain difference between “dressing” text in a braille font and print-to-braille transcription
- describe a new method for opening a BRF
- BONUS: create accessible, beautiful braille email signature
- BONUS: learn about eBRFs



BONUS MATERIAL

if we have time

Other Braille Files

- BRL
- PEF
- DXB
- ABT
- BBZ
- ...

Smart Quotes

- “Smart” quotes are directional, not "straight."
- Directional quotes do not correspond to any braille cell configuration.



How to Turn Off Smart Quotes

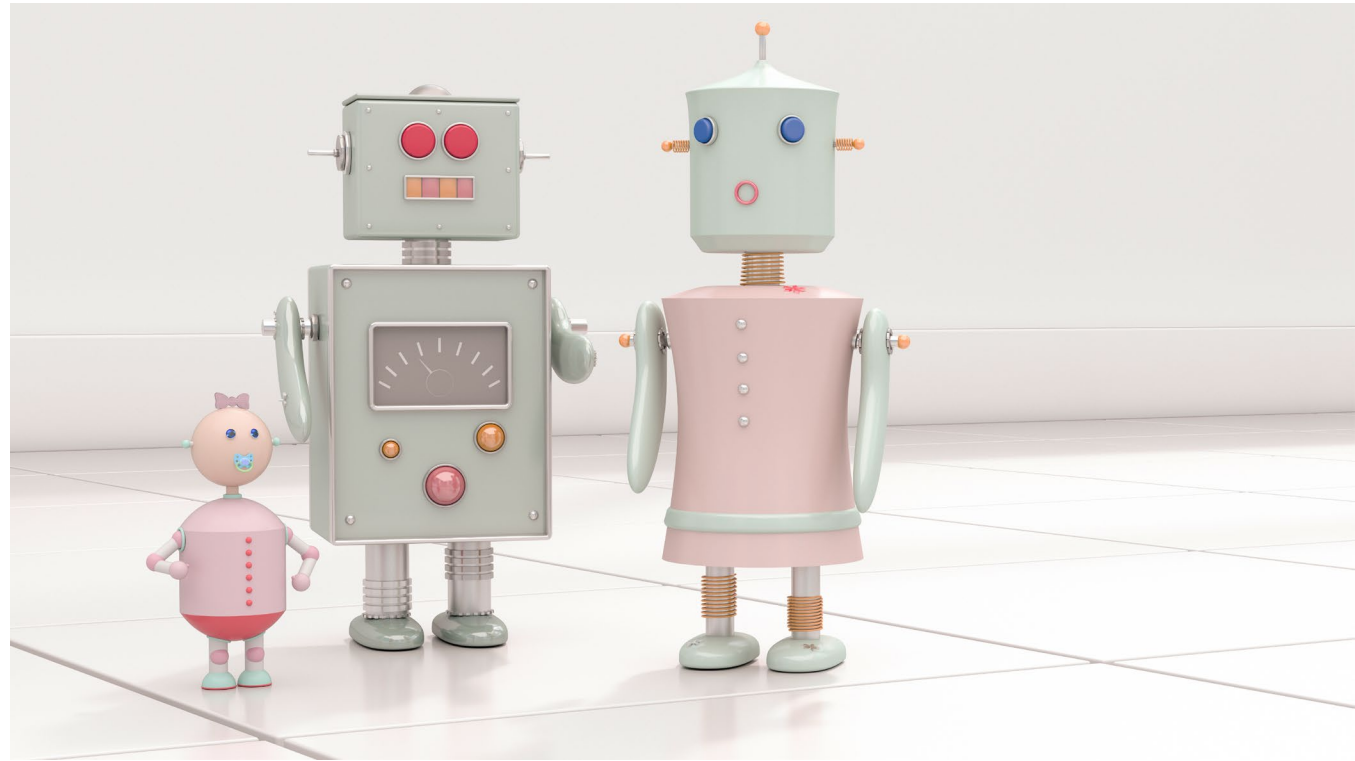
- in Microsoft Word & PowerPoint
 - File > Options > Proofing > AutoCorrect Options > AutoFormat > Replace straight quotes with smart quotes
- in Google Docs & Google Slides
 - Tools > Preferences > Use smart quotes

Or

- “Undo” (Ctrl+z) right after the autoformatting takes place

Brains of Refreshable Braille Displays

- How do they know what dots to raise?
 - ASCII to braille cell correspondence, same as simulated braille fonts
- What file types can they open?
 - to read?
 - to edit?



Various Kinds and Sizes of Refreshable Braille Displays

- Notetaker
 - suite of apps (including braille translation)
 - browser and email client
- Hybrid
 - basic apps (including braille translation)
 - local functionality
- Terminal Only

Six-key entry on a QWERTY keyboard

Can I six-key on my keyboard?

- Information from UEB Online:
<https://uebonline.org/getting-started/using-your-keyboard/>
- Keyboard check from APH Tech:
<https://nemeth.aphtech.org/sixdot>

What is “n-key rollover?”



In-depth exploration of Wikipedia's table of braille ASCII values

Braille ASCII values [\[edit \]](#)

The following table shows the arrangement of characters, with the [hexadecimal](#) value, corresponding ASCII character, binary notation matching the [standard dot order](#), Braille Unicode glyph, and general meaning (the actual meaning may change depending on context).^{[9][10]}

ASCII hex	ASCII glyph	Braille dots	Braille glyph	Unicode Braille glyph	Braille meaning
20	(space)	000000			(space)
21	!	011101			the
22	"	000010			(contraction)
23	#	001111			(number prefix)

Overarching Goal



share (and really explain) concepts to help y'all describe struggles and imagine solutions related to sharing and accessing braille electronically