

**COMPUTER
BRAILLE
CODE**
Revised 2000

Developed Under the Sponsorship of the
BRAILLE AUTHORITY OF NORTH AMERICA

2000

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FOREWORD

As our society's dependence on computing technology grows, computers become increasingly important to the blind and visually impaired. Those who read braille in order to learn about computers and to communicate with them have an urgent need for a braille computer code that is unambiguous, and that makes possible the faithful transcription into braille of computer-related text in print. In 1972, BANA recognized this need by adopting The Provisional Braille Code for Computer Notation. It was a preliminary code that left many problems unsolved, but its adoption allowed braille readers and braille transcribers to accumulate a body of experience on which to base a more efficient code. The code presented and explicated in this volume has been made possible by that experience.

The Computer Braille Code utilizes the sixty-four combinations of dots that can be formed in the braille cell, and assigns to these dot patterns the same meanings assigned to them by North American manufacturers of computer braille equipment. However, an effective braille code must be capable of representing the 128 characters in the ASCII code, and must provide a few additional symbols that transcribers need in order to achieve faithful braille transcriptions. To meet these requirements, two meanings must be assigned to many of the sixty-four dot patterns, and a way of indicating the meaning that is intended must be provided. In the Computer Braille Code, the differentiation between the two meanings assigned to a dot pattern is accomplished by means of a prefix consisting of dots 456.

The Computer Braille Code Committee has studied a large and diverse sample of current computer materials, and has worked diligently to make the Computer Braille Code a realistic code, capable of unambiguous representation of current computer notation, but flexible enough to respond to changing and expanding needs. Feedback from braille readers, transcribers, and publishers has been solicited, and is reflected in this edition.

BANA and this Committee recognize that the code does not address important issues, such as the transcription of flow charts and graphics. However, we are pleased to publish it in its present form, and trust that a future revision will deal with such issues. We welcome suggestions and comments from the field.

BANA wishes to thank Dr. T. V. Cranmer (Chairman of the Computer Braille Code Committee), and Dr. Emerson Foulke, Mrs. Priscilla Harris, Miss Donna Pastore, Dr. Sandra Ruconich, Dr. Lawrence Scadden, and Mr. Joseph Sullivan (committee members), for their work.

FOREWORD TO THE 2000 EDITION

Since the 1987 publication of the Computer Braille Code, the use of the internet has become commonplace. This edition contains some new, internet-related examples which did not exist in 1987.

The numbering of rules and examples has changed to reflect the BANA document developed in 1998, SPECIFICATIONS FOR THE PRODUCTION OF BRAILLE AND PRINT PUBLICATIONS FOR THE BRAILLE AUTHORITY OF NORTH AMERICA. Each section stands alone, making future additions easier.

Section 3.6, the rule that deals with the placement of embedded computer notation, has been clarified to address the issue of where to begin a passage of embedded computer notation which requires more than one braille line.

The new examples and the clarified rule are listed on page ix, and an index has been added to the code for easier reference.

BANA COMPUTER TECHNICAL COMMITTEE

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**CHANGES AND CLARIFICATIONS
TO THE COMPUTER BRAILLE CODE IN 2000**

Example 1.3.1d changed

Example 1.7.2 new

Example 2.3.3 new

Example 2.3.6 new

Example 3.4.2 new

Example 3.5.1 new

Section 3.6 clarified rule

Example 3.6.3 new

Example 3.6.4 changed

Example 4.3.2 new

Example 6.3.2 new

Example 10.2.2 new

Example 11.2.2 new

Example 13.1.2 new

1.0 GUIDELINES FOR IDENTIFYING COMPUTER NOTATION

The Computer Braille Code is entered when precise representation is essential. Thus, material such as programs, program lines, computer commands, and filenames should be transcribed in Computer Braille Code. The following guidelines may be helpful in the identification of computer notation. Because languages and situations the transcriber may encounter will doubtless vary widely, these guidelines are offered merely as suggestions and not as all-inclusive, binding rules.

- 1.1 A note at the beginning of a work may describe how computer notation is represented. Even if no such note exists, stylistic practices (e.g., type styles different from surrounding text—dot matrix print, for instance) may indicate the presence of computer notation.

Example 1.1.1: Note in Text

Your console displays both what you type and the computer response. This book uses the following convention to differentiate between output from the computer and data typed at the keyboard: All operator input is underlined, while computer-generated output is not.

Here is an example:

A> DIR *.COM<cr>

A: FORMAT.COM:MBASIC.COM:PIP.COM:ED.COM

```

A> DIR *.COM<cr>
A:   FORMAT.COM:MBASIC.COM:PIP.COM:ED.COM

```

Example 1.1.2: Dot Matrix Print

DOS READY

The Braille representation of 'DOS READY' consists of two rows of six Braille characters each. The first row contains the characters for 'D', 'O', 'S', 'R', 'E', and 'A'. The second row contains the characters for 'A', 'D', 'Y', 'Y', 'A', and 'S'.

- 1.2 Program lines are generally relatively short and sometimes begin with numbers. Often these lines are indented in a systematic way which distinguishes them from mathematics or regular text.

Example 1.2.1: Short Program Lines Identified by Numbers

```

10 PRINT "HOW OLD ARE YOU?"
20 INPUT A
30 PRINT "THANK YOU!"
40 PRINT "YOU CAN RETIRE"
50 PRINT "IN" ; 65-A ; "YEARS."
60 END

```

The Braille representation of the program code in Example 1.2.1 shows six lines of code. Each line starts with a number (10, 20, 30, 40, 50, 60) followed by a space and the command. The text is enclosed in double quotes, and the semicolon is used for concatenation. The Braille characters are arranged in a way that visually represents the indentation and structure of the code.

Example 1.2.2: Systematic Indentation of Program Lines

```

for I := 1 to NoOfLines do
begin
  ReadLn(Line);
  if Length(Line) < Limit then
    ShortLines := ShortLines + 1
  else
    LongLines := LongLines + 1
end;

```

- 1.3 Comments sometimes explain what is happening in a program. These comments are frequently distinguished from surrounding material by characteristic symbols or words [e.g., /* ... */, (* ... *), REM, OUTPUT, etc.].

1.5 Horizontal signs of comparison (e.g., <=, ==, :=) may be present.

Example 1.5.1: Horizontal Sign of Comparison

if (inword == 0)



Example 1.5.2: Horizontal Sign of Comparison

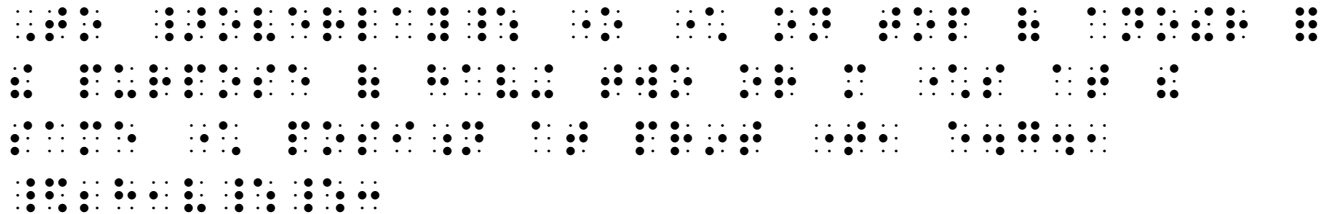
(ev ~= evNull)=>



1.6 Superimposed symbols (e.g., a circle with a slash inside) may appear.

Example 1.6.1: Superimposed Symbol

To OVERLAY one character on top of another for the purpose of having two or more characters at the same character position at print time, e.g., ≠:



Note: The shape indicators enclose 2h1v to describe the shape consisting of two horizontal lines and one vertical line.

2.0 COMPUTER BRAILLE CODE SYMBOLS AND USAGE

- 2.1 The Computer Braille Code is based on ASCII (American Standard Code for Information Interchange), a code used by virtually all computer-related braille devices distributed in North America. Printable symbols from other codes (e.g., EBCDIC and BAUDOT) can also be represented using Computer Braille Code symbology. The Computer Braille Code makes communication with braille devices possible while simultaneously providing for the precise transcription of computer-related materials in braille. A table of Computer Braille Code symbols appears at the end of this code.
- 2.2 Although in certain instances many braille devices use one braille symbol to represent two different print characters (e.g., upper case A and lower case a are both brailled as dot 1), the Computer Braille Code avoids this ambiguity. Standard alphabetic characters (a-z) are used for lower case letters. The same symbols, preceded by dots 456, are used to represent upper case letters. Braille symbols used in this dual manner include single upper case (A) and lower case (a) letters, at sign (@) and grave accent (`), up arrow/circumflex (^) and tilde (~), left bracket ([) and left brace ({), right bracket (]) and right brace (}), and backslash (\) and vertical bar (|). The underscore symbol (_) has a separate identity.
- 2.3 The Computer Braille Code is a separate, secondary code, which may be used in conjunction with the primary code in which the text is transcribed—whether that code be English Braille, Braille Formats, Nemeth, or Braille Music. Material such as numbers, abbreviations, acronyms, contractions, and punctuation marks should be transcribed in this primary code unless there is good reason to enter Computer Braille Code. Thus, technical-appearing abbreviations and acronyms such as "IBM" and "ASCII" occurring within an English Braille transcription should be transcribed in English Braille. Computer Braille Code is entered when precise representation is essential; for this reason, Computer Braille Code material is transcribed character for character (i.e., no contractions are used), and the contractions to, into, and by may not be used before any Computer Braille Code indicator. Computer Braille Code numbers are transcribed in the lower two-thirds of the cell and are not preceded by number signs. Programs and other computer notation set off from the body of the text and computer input in which every letter must be typed precisely in the manner shown are examples of material which should be transcribed in Computer Braille Code. When in doubt, Computer Braille Code should be used. Likewise, the transcriber must also judge or seek advice as to the significance of vertical and horizontal spacing within the text. When in doubt, assume spacing is significant.

COMPUTER BRAILLE CODE

Example 2.3.1: Technical-Appearing Text (English Braille)

There were many complaints about the size of BCDIC, and IBM introduced Extended BCDIC with System/360.

There were many complaints about the size of BCDIC, and IBM introduced Extended BCDIC with System/360.

Example 2.3.2: Text with Embedded Computer Notation (English Braille and Computer Braille Codes)

The test criterion compares j to the term value (2) 3000 (\neq tests for inequality).

The test criterion compares j to the term value (2) 3000 (\neq tests for inequality).

Note: The (2) refers to a second item of previously discussed material.

Example 2.3.3: Text with Embedded Web Site Address (English Braille and Computer Braille Codes) (5-00)

Engine trouble? Know the difference between search engines and directories. Directories, such as Yahoo! Canada (www.yahoo.ca) and a2z (www.a2z.lycos.com), have lists of sites you can browse by subject.

Know the difference between search engines and directories. Directories, such as Yahoo! Canada (www.yahoo.ca) and a2z (www.a2z.lycos.com), have lists of sites you can browse by subject.

Example 2.3.4: Computer Program (Computer Braille Code)

```
struct nlist *np, *lookup();
char *strsave(), *alloc();
int hashval;
```

Braille representation of the code above, using the Computer Braille Code indicator.

Example 2.3.5: Nonuse of to, into, and by Preceding Computer Braille Code Indicator

This number divided by 0FF₁₆ is the fraction of the symbol table used.

Braille representation of the sentence above, using the Computer Braille Code indicator.

Note: This example is in hexadecimal notation. In this notation, the numbers are the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and the letters A, B, C, D, E, F. Therefore, the example shows the number 0FF not the word OFF.

Example 2.3.6: Nonuse of to, into, and by Preceding Computer Braille Code Indicator (5-00)

CASTLES UNLIMITED: For an insight into old castles and past times, head to www.castles-of-britain.com.

Braille representation of the sentence above, using the Computer Braille Code indicator.

3.0 FORMAT

- 3.1 Computer Braille Code transcriptions should use the longest possible braille line allowed by production and duplication considerations. Current line length is typically 40 or 41 cells.
- 3.2 A transcriber's note at the beginning of each volume of a book should state the year of adoption of the Computer Braille Code, as well as the primary code in which the book is transcribed. If a book requires more than two codes, all codes employed should be listed. (For other information required on the Transcriber's Notes Page, see also 4.1, 10.2, 13.4, 14.1, and 14.2).
- 3.3 Symbols which the transcriber has devised or those assigned special usage should be explained or drawn on a "Special Symbols" page. These symbols should be transcribed in accordance with the rules of the Braille Formats Code. Neither standard Computer Braille Code symbols nor symbols of other adopted codes which are used in accordance with the rules of the applicable code(s) should be included on the "Special Symbols" page, except as may be required by applicable codes.
- 3.4 A blank line should precede and follow programs and computer notation set off from the body of the text. Transcription of such material should begin in cell 1 of the appropriate line, with runovers beginning in cell 2 of the following line(s). (See Sections 6.0, 7.0, and 9.0 for more information about runovers.)

Example 3.5.1: Program with Identifying Label (5-00)

Program 3-5
"Guess the Number" Program

```
% The "Guess the Number" program
% Chooses a random number between 1 and 99
% and allows you to guess it
randomize
var hidden, guess: int
var reply: string(1)
put "Guess the hidden number"
put "It is between 1 and 99 inclusive"
loop
  var count: int := 0
  put "Do you want to play? Answer y or n" ..
  get reply
  exit when reply = "n"
  % Choose a random number between 1 and 99
  randint (hidden, 1, 99)
  loop
    put "Enter your guess (any number between 1 and 99)" ..
    get guess
    count := count + 1
    if guess < hidden then
      put "You are low"
    elseif guess > hidden then
      put "You are high"
    else
      put "You got it in ", count, " guesses"
      exit
    end if
  end loop
end loop
```


4.0 UPPER AND LOWER CASE DESIGNATION

- 4.1 Unless otherwise indicated, the Computer Braille Code assumes that letters and words contained in computer notation are lower case. When computer notation is predominantly or exclusively upper case (e.g., a BASIC text), the transcriber may elect to use single-cell letters to indicate upper case and letters preceded by dots 456, the shift indicator, to designate lower case. If computer notation throughout a text is exclusively upper case, a transcriber's note to this effect should appear on the "Transcriber's Notes" page. (Examples 1.1.2, 1.2.1, 1.3.1d, 1.4.1, 1.7.1, 5.1.1, 6.3.1, 8.1.1, 9.1.1, and 14.2.1 would include such a note.) If computer notation throughout a text is not exclusively upper case, the transcriber's note should immediately precede the material to which it applies.

Example 4.1.1: Single BASIC Program Transcribed without Case Indicators

```
10 INPUT "YOUR FIRST NAME";A$
20 INPUT "YOUR MIDDLE NAME";B$
30 INPUT "YOUR LAST NAME";C$
```

- 4.2 Shift Indicator ⠠ (456)

The shift indicator precedes a single upper case letter appearing in embedded computer notation and/or computer notation set off from the body of the text which is otherwise in lower case. Two or more upper case letters occurring in predominantly lower case text—whether these letters appear consecutively or are separated by numbers, punctuation, etc.—must be preceded by the caps lock indicator (see Section 4.3.).

7.0 INDENTED MATERIAL

- 7.1 When successive levels of indentation occur in print, braille lines should also be indented. Each braille level of indentation should begin two spaces to the right of the previous level, regardless of the print spacing used. Thus, successive levels of braille indentation begin in cells 1, 3, 5, etc. When in doubt, consider spaces at the left as levels of indentation, not countable spaces.

- 7.2 Runovers should always begin in cell 2, regardless of the current depth of indentation.

Example 7.2.1: Indented Material

```

results() /* print table using array pointers */
{
    extern int *pA1,*pA2,*pA3;
    int i;
    printf("\n%10s%10s%10s%10s\n\n","i","A1[i]","A2[i]","A3[i]");
    for(i = 0;i <= MAX-1;i++)
        printf("%10d%10d%10d%10d\n",i, pA1[i],pA2[i],pA3[i]);
}

```

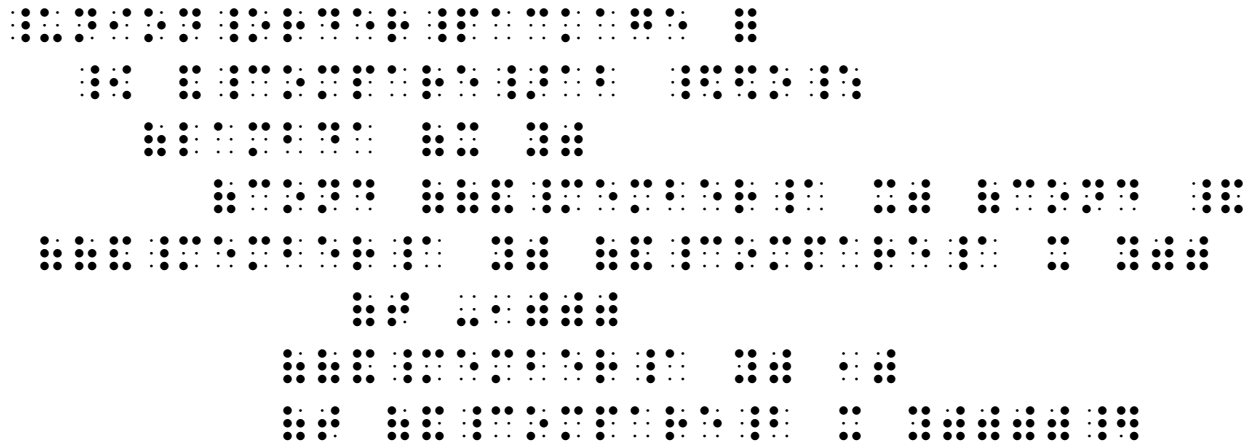
The Braille representation of the code above shows indentation levels corresponding to the C code. The first line is at cell 1. The opening curly brace is at cell 3. The line 'extern int *pA1,*pA2,*pA3;' starts at cell 5. The line 'int i;' starts at cell 7. The line 'printf(...)' starts at cell 9. The 'for' loop body starts at cell 11. The closing curly brace is at cell 13. The final line of the code is at cell 1.

Example 7.2.2: Indented Material

```

UnionOrderPackage =
  { &CompareAB →
    (lambda (x y)
      (cond ((&MemberA x) (cond ((&MemberA y) (&CompareA x y))
                               (t -1)))
            ((&MemberA y) 1)
            (t (&CompareB x y))))}

```



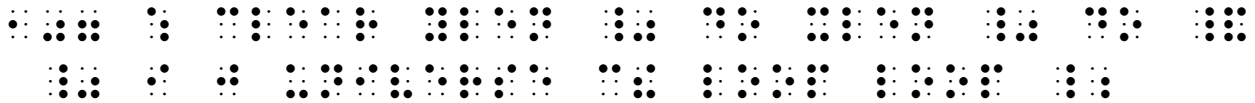
Note: The symbol for the right-pointing arrow was selected from the Nemeth Code and enclosed within the shape indicators.

8.0 ISOLATED LOWER-CELL SIGNS


8.1 When a lower-cell sign is isolated (i.e., preceded and followed by a space or line end), dots 456 must immediately precede this sign. The lower-cell sign may be a single-digit number, quotation mark, apostrophe, comma, hyphen/minus sign, or semicolon. The resulting two-cell symbol signifies a single print character.

Example 8.1.1: Isolated Lower-Cell Signs

107 : CLEAR YLEN 0 DO XLEN 0 DO 0 I J UNIVERSE C! LOOP LOOP ;



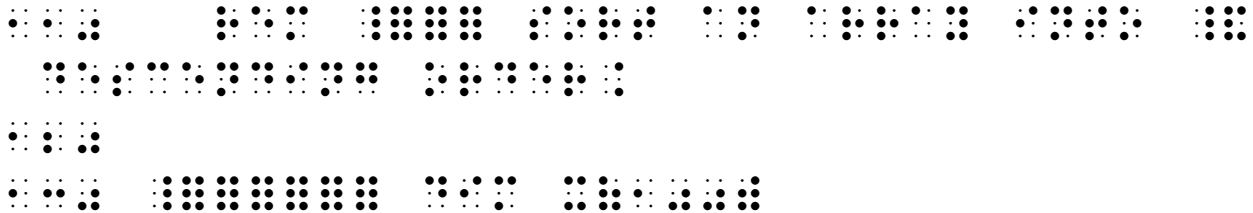
9.0 COUNTABLE SPACES

- 9.1 Countable Spaces Indicator  (456), followed immediately by at least two full cells (123456, 123456)

The countable spaces indicator is used when any series of five or more spaces within a print line is significant (e.g., when specific material which is surrounded by spaces must begin on a particular space within a line). These significant spaces, which are important to an accurate understanding of the material being transcribed, are called countable spaces. The first and last spaces of a countable space sequence are transcribed as empty cells (i.e., spaces), with a countable spaces indicator filling the remainder of the spaces to be counted. Each cell of a countable spaces sequence counts as one space, as does each of the spaces surrounding it.

Example 9.1.1: Countable Spaces Indicator

```
110    REM          SORT AN ARRAY INTO DESCENDING ORDER.
120
130          DIM X(100)
```



Example 9.2.2: Countable Spaces Beginning on Runover Line

```

6 : <A>      0 0 HERE 1+ CONVERT DROP DROP  ( extract variable # )
7           [COMPILE] LITERAL              ( make it a literal )
8           COMPILE <ADDR> ;                ( dynamic part of address )
9 1 WIDTH !  ( set significant characters in name )
10 : @X      ( --- value ) ( fetch contents of variable X )

```

The following is a Braille representation of the text in the previous block. Each character is represented by a Braille cell (a 2x3 grid of dots). The spacing is preserved as much as possible, with some adjustments for alignment and readability. The text is as follows:

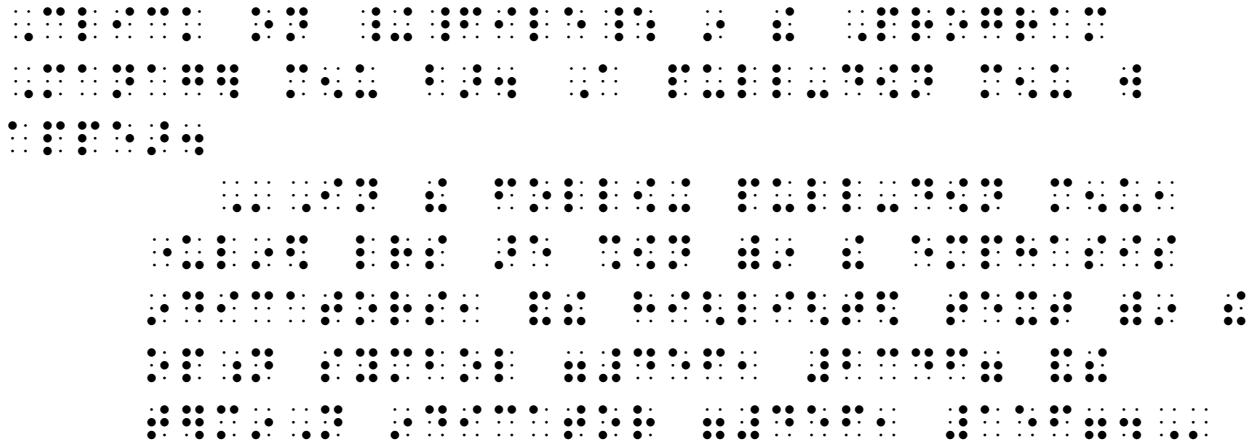
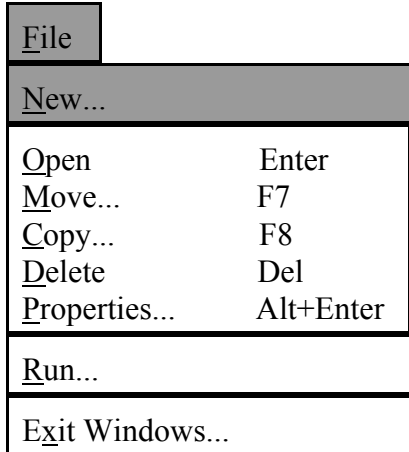
```

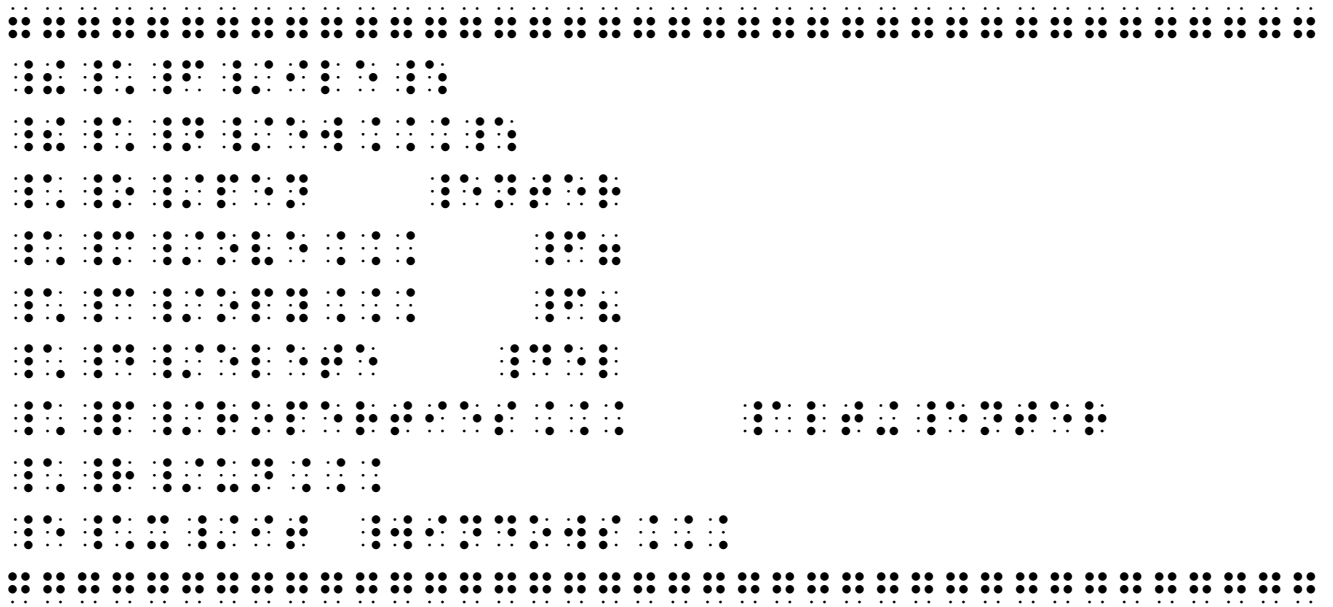
6 : <A>      0 0 HERE 1+ CONVERT DROP DROP  ( extract variable # )
7           [COMPILE] LITERAL              ( make it a literal )
8           COMPILE <ADDR> ;                ( dynamic part of address )
9 1 WIDTH !  ( set significant characters in name )
10 : @X      ( --- value ) ( fetch contents of variable X )

```


Example 10.2.2: Emphasis Indicators with More Than One Type Style (5-00)

Click on **File** in the Program Manager menu bar. A pull-down menu will appear.





Note: Since guide dots and empty column fill are not represented in the Computer Braille Code, print column form is not maintained. Where items are present in column 2 they are separated from items in column 1 by 3 spaces.

12.0 NEMETH CODE INDICATORS

12.1 Begin Nemeth Code Indicator ⠠⠠ (456, 146)

End Nemeth Code Indicator ⠠⠠ (456, 156)

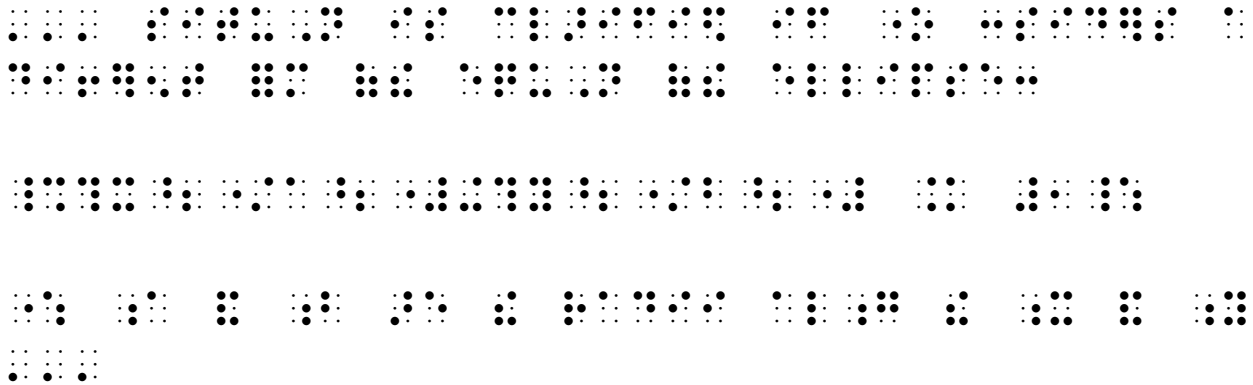
Nemeth Code may be necessary when purely mathematical expressions (e.g., formulas, equations, the multiplication symbol when represented by a dot, etc.) are to be transcribed or when no appropriate Computer Braille Code symbol exists (e.g., there is no horizontal fraction indicator in Computer Braille Code). However, Nemeth Code should be resorted to only rarely, and a Nemeth Code expert should be consulted before the transcription is undertaken. If frequent use of Nemeth Code seems necessary, the primary code in which the text is transcribed may need to be changed.

Example 12.1.2: Nemeth Code Indicators with Horizontal Fraction Line

... situation is clarified if one considers a different form of the equation of the ellipse:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

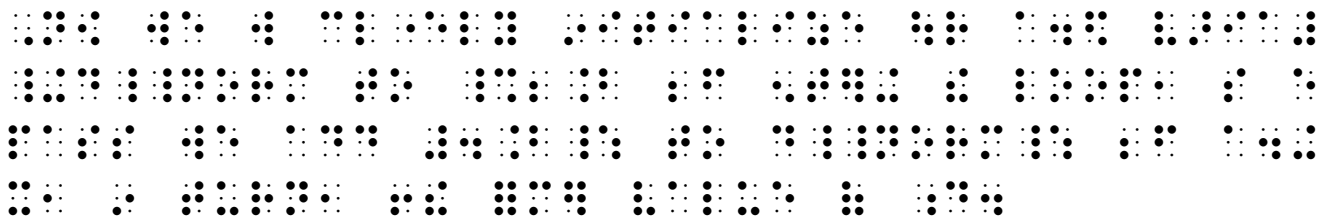
where a and b are the radii along the x and y ...




12.2 Nemeth Code indicators should be written unspaced from the material they enclose. Within Nemeth Code indicators, Nemeth Code notation and rules should be followed. If a long passage includes several Nemeth Code expressions, the begin Nemeth Code indicator should precede the first Nemeth expression. The end Nemeth Code indicator should be written after the last Nemeth expression in the passage has been transcribed. However, Computer Braille Code indicators should enclose computer notation within Nemeth Code expressions. The end Nemeth Code indicator returns the transcription to the baseline of writing.

Example 12.2.1: Nemeth Code Indicators within Computer Braille Code

Now we will cleverly initialize our added variable d_norm to 2β before entering the loop, so every pass we add 4β to d_norm before adding it, in turn, to the former value of d.



13.0 SHAPE INDICATORS

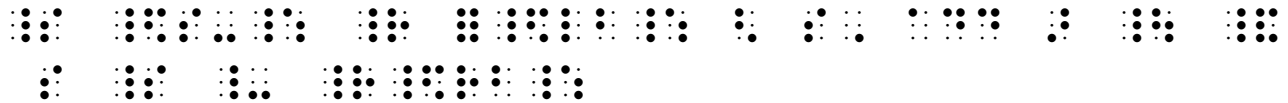
13.1 Begin Shape Indicator  (456, 1246)

End Shape Indicator  (456, 156)

Shape indicators are used to enclose a brief series of symbols describing a shape not represented in the Computer Braille Code.


Example 13.1.1: Shape Indicators

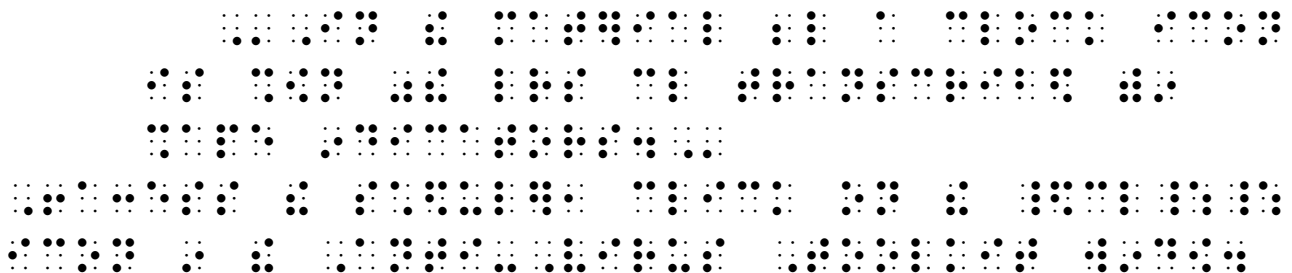
$S \boxminus R = [\langle s, \text{add} \rangle | s S - R]$



Note: The shape for the square with an interior minus was transcribed as an s followed by a minus and enclosed within the shape indicators. The left and right double-barred brackets were transcribed as lb and rb within the shape indicators.


Example 13.1.2: Shape Indicators (5-00)


To access the scheduler, click on the  icon in the Anti-Virus Toolkit window.



13.2 When keys on a computer keyboard are depicted, the begin shape indicator should be followed by the letter k, the key legend, and the end shape indicator.

14.0 TRANSCRIBER'S OPTION SYMBOLS

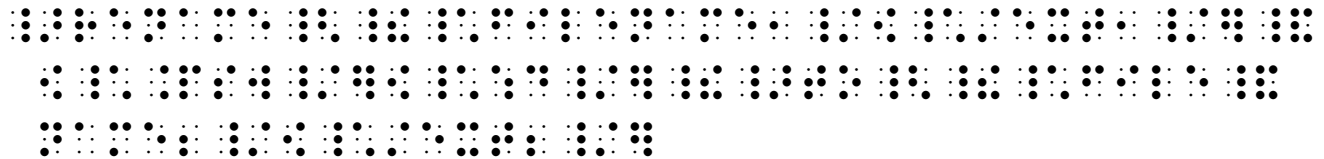
14.1 Primary Transcriber's Option Symbol  (456, 2346)

Secondary Transcriber's Option Symbol  (456, 46)

When a character not represented by the Computer Braille Code occurs in a transcription with great frequency, the transcriber may use a transcriber's option symbol to represent that character. The minimum number of spaces required to produce the character is thus reduced from five to two. Transcriber's option symbols should be explained in a transcriber's note.


Example 14.1.1: Transcriber's Option Symbol Representing Non-ASCII Character (b)


RENAME**bf***filename1*[/*ext1*][.*psw*][:*d*]**TObf***filename2*[/*ext2*]



14.2 When the print text does not include a character used by the Computer Braille Code but does include a character not represented by the Computer Braille Code, the meaning of an unused Computer Braille Code character may be changed during that transcription (e.g., in an EBCDIC transcription, the unused Computer Braille Code tilde could represent the frequently used EBCDIC "not" sign). A transcriber's note should explain such substitutions.

Example 14.2.1 Transcriber's Substitution (ASCII Tilde Becomes EBCDIC "Not" Sign)

EX = (P  NULL);



15.0 HALF-LINE SHIFTS

15.1 Half-Line Shift Up ⋮⋮⋮ (456, 3456)

Half-Line Shift Down ⋮⋮⋮ (456, 1456)

End Half-Line Shift ⋮⋮⋮ (456, 156)

Half-line shifts up represent superscripts—and in some cases exponentiation—which typically appear within text. If exponentiation within text is indicated by the up arrow, the up arrow symbol (dots 45 ⋮) should be transcribed. Half-line shifts up terminate either with a termination indicator (see Section 16.0) or at the next space. When the superscript is not followed immediately by a space, the termination indicator must be used.

15.2 Half-line shifts down are used for transcribing subscripts and expressions in which the number base appears below normal line level. Half-line shifts down terminate either with a termination indicator (see Section 16.0) or at the next space. When the subscript is not followed immediately by a space, the termination indicator must be used.

COMPUTER BRAILLE CODE SYMBOLS: ASCII ORDER

Note: Upper case letters may be transcribed as shown in the table, preceded by dots 456, or preceded by the caps lock indicator; applicable Computer Braille Code rules determine transcription method. "Reserved" designates currently unassigned symbols which are reserved for future use.

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------------------------|
| | | | space |
| ! | ⠁ | 2346 | exclamation point |
| " | ⠆ | 5 | quotation marks, double quotes |
| # | ⠃ | 3456 | number sign, pound sign (weight) |
| \$ | ⠵ | 1246 | dollar sign |
| % | ⠏ | 146 | percent sign |
| & | ⠤ | 12346 | ampersand |
| ' | ⠄ | 3 | apostrophe, single quote |
| (| ⠸ | 12356 | left parenthesis |
|) | ⠸ | 23456 | right parenthesis |
| * | ⠼ | 16 | asterisk, multiplication sign |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|-----------------------|
| + | ⠠ | 346 | plus sign |
| , | ⠨ | 6 | comma |
| - | ⠤ | 36 | hyphen, minus sign |
| . | ⠠ | 46 | period, decimal point |
| / | ⠨ | 34 | slash, division sign |
| 0 | ⠠ | 356 | 0 |
| 1 | ⠠ | 2 | 1 |
| 2 | ⠠ | 23 | 2 |
| 3 | ⠠ | 25 | 3 |
| 4 | ⠠ | 256 | 4 |
| 5 | ⠠ | 26 | 5 |
| 6 | ⠠ | 235 | 6 |
| 7 | ⠠ | 2356 | 7 |

CBC SYMBOLS: ASCII ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| 8 | ⠠ | 236 | 8 |
| 9 | ⠡ | 35 | 9 |
| : | ⠆ | 156 | colon |
| ; | ⠤ | 56 | semicolon |
| < | ⠨ | 126 | less than |
| = | ⠐ | 123456 | equals |
| > | ⠩ | 345 | greater than |
| ? | ⠏ | 1456 | question mark |
| @ | ⠠ | 4 | at |
| A | ⠁ | 1 | A |
| B | ⠃ | 12 | B |
| C | ⠉ | 14 | C |
| D | ⠙ | 145 | D |
| E | ⠑ | 15 | E |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| F | ⠠ | 124 | F |
| G | ⠡ | 1245 | G |
| H | ⠢ | 125 | H |
| I | ⠠ | 24 | I |
| J | ⠡ | 245 | J |
| K | ⠢ | 13 | K |
| L | ⠠ | 123 | L |
| M | ⠡ | 134 | M |
| N | ⠢ | 1345 | N |
| O | ⠠ | 135 | O |
| P | ⠡ | 1234 | P |
| Q | ⠢ | 12345 | Q |
| R | ⠠ | 1235 | R |
| S | ⠠ | 234 | S |

CBC SYMBOLS: ASCII ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| T | ⠞ | 2345 | T |
| U | ⠦ | 136 | U |
| V | ⠪ | 1236 | V |
| W | ⠡ | 2456 | W |
| X | ⠬ | 1346 | X |
| Y | ⠮ | 13456 | Y |
| Z | ⠵ | 1356 | Z |
| [| ⠠ | 246 | left bracket |
| \ | ⠤ | 1256 | backslash |
|] | ⠡ | 12456 | right bracket |
| ↑ | ⠤ | 45 | up arrow/caret |
| — | ⠤⠤ | 456, 456 | underscore |
| ` | ⠤⠤ | 456, 4 | grave accent |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| a | ⠁ | 1 | a |
| b | ⠃ | 12 | b |
| c | ⠉ | 14 | c |
| d | ⠙ | 145 | d |
| e | ⠑ | 15 | e |
| f | ⠋ | 124 | f |
| g | ⠎ | 1245 | g |
| h | ⠓ | 125 | h |
| i | ⠏ | 24 | i |
| j | ⠗ | 245 | j |
| k | ⠅ | 13 | k |
| l | ⠇ | 123 | l |
| m | ⠍ | 134 | m |
| n | ⠝ | 1345 | n |

CBC SYMBOLS: ASCII ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| o | ⠏ | 135 | o |
| p | ⠏ | 1234 | p |
| q | ⠏ | 12345 | q |
| r | ⠏ | 1235 | r |
| s | ⠏ | 234 | s |
| t | ⠏ | 2345 | t |
| u | ⠏ | 136 | u |
| v | ⠏ | 1236 | v |
| w | ⠏ | 2456 | w |
| x | ⠏ | 1346 | x |
| y | ⠏ | 13456 | y |
| z | ⠏ | 1356 | z |
| { | ⠏⠏ | 456, 246 | left brace |
| | ⠏⠏ | 456, 1256 | vertical bar |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| } | ⠠⠠⠠ | 456, 12456 | right brace |
| ~ | ⠠⠠⠤ | 456, 45 | tilde |

Additional Computer Braille Code Symbols

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|-----------------------------|
| | ⠠⠠⠠ | 456, 2346 | transcriber's option symbol |
| | ⠠⠠⠤ | 456, 46 | transcriber's option symbol |
| | ⠠⠠⠠ | 456, 3456 | half-line shift up |
| | ⠠⠠⠠ | 456, 1456 | half-line shift down |
| | ⠠⠠⠤ | 456, 156 | end half-line shift |
| | ⠠⠠⠠ | 456, 1246 | begin shape indicator |
| | ⠠⠠⠤ | 456, 156 | end shape indicator |
| | ⠠⠠⠠ | 456, 346 | begin Computer Braille Code |
| | ⠠⠠⠤ | 456, 156 | end Computer Braille Code |

CBC SYMBOLS: ASCII ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|---------------------------------------------------|------------------------------------------------|
| | ⠠⠠ | 456, 146 | begin Nemeth Code |
| | ⠠⠡ | 456, 156 | end Nemeth Code |
| | ⠠⠢ | 456, 12346 | continuation indicator |
| | ⠠⠣ | 456, 12356 | reserved |
| | ⠠⠤ | 456, 23456 | reserved |
| | ⠠⠥ | 456, 123456 | reserved |
| | ⠠⠦ | 456, 16 | begin emphasis |
| | ⠠⠧ | 456, 34 | end emphasis |
| | ⠠⠨ | 456 | shift indicator, isolated lower-cell indicator |
| | ⠠⠩ | 456, 345 | caps lock indicator |
| | ⠠⠪ | 456, 126 | caps release indicator |
| | ⠠⠫⠠⠫ | (space) 456, 123456, 123456, ... (space) | countable spaces indicator |

COMPUTER BRAILLE CODE SYMBOLS: BRAILLE ORDER

Note: Upper case letters may be transcribed as shown in the table, preceded by dots 456, or preceded by the caps lock indicator; applicable Computer Braille Code rules determine transcription method. "Reserved" designates currently unassigned symbols which are reserved for future use.

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| | | | space |
| A or a | ⠁ | 1 | A or a |
| B or b | ⠃ | 12 | B or b |
| C or c | ⠉ | 14 | C or c |
| D or d | ⠙ | 145 | D or d |
| E or e | ⠑ | 15 | E or e |
| F or f | ⠋ | 124 | F or f |
| G or g | ⠎ | 1245 | G or g |
| H or h | ⠏ | 125 | H or h |
| I or i | ⠗ | 24 | I or i |
| J or j | ⠗ | 245 | J or j |
| K or k | ⠅ | 13 | K or k |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| L or l | ⠠ | 123 | L or l |
| M or m | ⠡ | 134 | M or m |
| N or n | ⠢ | 1345 | N or n |
| O or o | ⠣ | 135 | O or o |
| P or p | ⠤ | 1234 | P or p |
| Q or q | ⠥ | 12345 | Q or q |
| R or r | ⠦ | 1235 | R or r |
| S or s | ⠧ | 234 | S or s |
| T or t | ⠨ | 2345 | T or t |
| U or u | ⠩ | 136 | U or u |
| V or v | ⠪ | 1236 | V or v |
| X or x | ⠬ | 1346 | X or x |
| Y or y | ⠮ | 13456 | Y or y |
| Z or z | ⠯ | 1356 | Z or z |

CBC SYMBOLS: BRAILLE ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|-------------------------------|
| & | ⠠ | 12346 | ampersand |
| = | ⠠ | 123456 | equals |
| (| ⠠ | 12356 | left parenthesis |
| ! | ⠠ | 2346 | exclamation point |
|) | ⠠ | 23456 | right parenthesis |
| * | ⠠ | 16 | asterisk, multiplication sign |
| < | ⠠ | 126 | less than |
| % | ⠠ | 146 | percent sign |
| ? | ⠠ | 1456 | question mark |
| : | ⠠ | 156 | colon |
| \$ | ⠠ | 1246 | dollar sign |
|] | ⠠ | 12456 | right bracket |
| \ | ⠠ | 1256 | backslash |
| [| ⠠ | 246 | left bracket |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------------------------|
| W or w | ⠠⠺ | 2456 | W or w |
| 1 | ⠠ | 2 | 1 |
| 2 | ⠠ | 23 | 2 |
| 3 | ⠠ | 25 | 3 |
| 4 | ⠠ | 256 | 4 |
| 5 | ⠠ | 26 | 5 |
| 6 | ⠠ | 235 | 6 |
| 7 | ⠠ | 2356 | 7 |
| 8 | ⠠ | 236 | 8 |
| 9 | ⠠ | 35 | 9 |
| 0 | ⠠ | 356 | 0 |
| / | ⠠ | 34 | slash, division sign |
| + | ⠠ | 346 | plus sign |
| # | ⠠ | 3456 | number sign, pound sign (weight) |

CBC SYMBOLS: BRAILLE ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|------------------------------------------------|
| > | ⠠ | 345 | greater than |
| ' | ⠨ | 3 | apostrophe, single quote |
| - | ⠤ | 36 | hyphen, minus sign |
| @ | ⠠ | 4 | at |
| ↑ | ⠠ | 45 | up arrow/caret |
| | ⠠ | 456 | shift indicator, isolated lower-cell indicator |
| A | ⠠ | 456, 1 | A |
| B | ⠠ | 456, 12 | B |
| C | ⠠ | 456, 14 | C |
| D | ⠠ | 456, 145 | D |
| E | ⠠ | 456, 15 | E |
| F | ⠠ | 456, 124 | F |
| G | ⠠ | 456, 1245 | G |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|----------------|
| H | ⠠⠏⠞⠏ | 456, 125 | H |
| I | ⠠⠏⠞⠏ | 456, 24 | I |
| J | ⠠⠏⠞⠏ | 456, 245 | J |
| K | ⠠⠏⠞⠏ | 456, 13 | K |
| L | ⠠⠏⠞⠏ | 456, 123 | L |
| M | ⠠⠏⠞⠏ | 456, 134 | M |
| N | ⠠⠏⠞⠏ | 456, 1345 | N |
| O | ⠠⠏⠞⠏ | 456, 135 | O |
| P | ⠠⠏⠞⠏ | 456, 1234 | P |
| Q | ⠠⠏⠞⠏ | 456, 12345 | Q |
| R | ⠠⠏⠞⠏ | 456, 1235 | R |
| S | ⠠⠏⠞⠏ | 456, 234 | S |
| T | ⠠⠏⠞⠏ | 456, 2345 | T |
| U | ⠠⠏⠞⠏ | 456, 136 | U |

CBC SYMBOLS: BRAILLE ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|------------------------------------------------------|-----------------------------|
| V | ⠠⠧ | 456, 1236 | V |
| X | ⠠⠭ | 456, 1346 | X |
| Y | ⠠⠽ | 456, 13456 | Y |
| Z | ⠠⠵ | 456, 1356 | Z |
| | ⠠⠠⠠ | 456, 12346 | continuation indicator |
| | ⠠⠠⠠⠠ | 456, 123456 | reserved |
| | ⠠⠠⠠⠠⠠ | (space) 456, 123456, 123456, ... (space) | countable spaces indicator |
| | ⠠⠠⠠⠠ | 456, 12356 | reserved |
| | ⠠⠠⠠⠠ | 456, 2346 | transcriber's option symbol |
| | ⠠⠠⠠⠠ | 456, 23456 | reserved |
| | ⠠⠠⠠ | 456, 16 | begin emphasis |
| | ⠠⠠⠠ | 456, 126 | caps release indicator |

COMPUTER BRAILLE CODE

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|---------------------------|
| | ⠠⠠ | 456, 146 | begin Nemeth Code |
| | ⠠⠠⠠ | 456, 1456 | half-line shift down |
| | ⠠⠠⠠⠠ | 456, 156 | termination indicator |
| | ⠠⠠⠠⠠⠠ | 456, 156 | end Computer Braille Code |
| | ⠠⠠⠠⠠⠠⠠ | 456, 156 | end Nemeth Code |
| | ⠠⠠⠠⠠⠠⠠⠠ | 456, 156 | end shape indicator |
| | ⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 156 | end half-line shift |
| | ⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 1246 | begin shape indicator |
| } | ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 12456 | right brace |
| | ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 1256 | vertical bar |
| { | ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 246 | left brace |
| W | ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 2456 | W |
| | ⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠⠠ | 456, 34 | end emphasis |

CBC SYMBOLS: BRAILLE ORDER

| <u>Print</u> | <u>Braille</u> | <u>Dots</u> | <u>Meaning</u> |
|--------------|----------------|-------------|--------------------------------|
| | ⠠⠠⠠ | 456, 346 | begin Computer Braille Code |
| | ⠠⠠⠠⠠ | 456, 3456 | half-line shift up |
| | ⠠⠠⠠ | 456, 345 | caps lock indicator |
| ` | ⠠⠠⠠ | 456, 4 | grave accent |
| ~ | ⠠⠠⠠ | 456, 45 | tilde |
| _ | ⠠⠠⠠ | 456, 456 | underscore |
| | ⠠⠠⠠ | 456, 46 | transcriber's option symbol |
| . | ⠠⠠ | 46 | period, decimal point |
| " | ⠠⠠ | 5 | quotation marks, double quotes |
| ; | ⠠⠠ | 56 | semicolon |
| , | ⠠⠠ | 6 | comma |

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