

BANA UEBC SAMPLER 1

CCC

Prepared under the auspices of the
Braille Authority of North America

CCC

April 2001



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Introduction

BANA is the Braille Authority of North America. Its purpose is to promote and facilitate the use, teaching and production of braille. It publishes codes and interprets and renders opinions pertaining to braille in all existing and future codes. Its mission is to assure literacy for tactile readers through the standardization of braille and tactile graphics. At present BANA is made up of 14 organizations:

American Council of the Blind	The Canadian National Institute for the Blind
American Foundation for the Blind	The Clovernook Center for the Blind
American Printing House for the Blind	National Braille Association
Associated Services for the Blind	National Braille Press
Association for Education and Rehabilitation of the Blind and Visually Impaired	National Federation of the Blind
Braille Institute of America	National Library Service for the Blind and Physically Handicapped, Library of Congress
California Transcribers and Educators of the Visually Handicapped	Royal New Zealand Foundation for the Blind (associate member)

UEBC is the Unified English Braille Code Research Project, the purpose of which is to make one braille code which would be used for all reading, e.g. cookbooks, novels, computer manuals, magazines, and mathematics, except music which is an international code. UEBC is based on literary braille with additional symbols for technical materials. BANA initiated the project in 1991. In 1993 the International Council on English Braille (ICEB) accepted BANA's proposal to internationalize the research project under ICEB. This meant that the goal of the project changed from developing one code for North America to developing one code for the English-speaking world. The working committees from Canada and the United States were increased to include braille experts from Australia, New Zealand, Nigeria, South Africa, and the United Kingdom. Their tasks were to: extend the base (literary) code to include technical symbols and write the reading rules; consider the impact on contractions;

ensure interface with foreign language codes; standardize format (the set-up of the braille page) where practical; and write transcribing rules.

What brought the English speaking braille authorities together in this exciting research project?

The literary braille code used in North America and New Zealand differs only slightly from its counterpart in the United Kingdom and the rest of the English-speaking world. UEBC is very similar to these codes--a prime goal of the project. This ensures the vast holding of English literary braille in the libraries around the world will remain available to braille readers who wish to read these titles.

But for technical material there are many different codes. In North America, a braille user must learn three different codes to read math, computer notation and chemistry. And these codes are completely different from the technical braille codes used in the United Kingdom; a person from North America cannot read any of the UK technical material without learning their codes.

UEBC provides one code which includes the symbols for all technical materials. This will make learning braille much easier for everyone. And material in UEBC could be shared by all English-speaking countries.

Braille materials in developing countries are very scarce and are often donated from other countries in their own codes. UEBC will enable braille readers to take full advantage of donated materials regardless of their origin.

Each UEBC symbol is unambiguous—a print symbol is represented by the same braille symbol regardless of the subject. This design feature will make it easier for a braille reader to work independently using computer translation and be assured of the accuracy of both print and braille.

Each country participating in the UEBC project conducted a lengthy evaluation of the basic code in 1997B98. In North America evaluation packages were sent to everyone who volunteered to participate (over 500 in the United States). There was general agreement on the concept of a unified braille code but not on all the suggested changes. Modifications were made to the code as a result of the evaluations.

Purpose of the Sampler

The working committees should be finished their work in 2001. Their reports will go to the UEBC Project Committee. Each of the participating countries has one vote. In January 2002, the ICEB Executive Board will meet and decide if the code should be presented to the ICEB General Assembly being held in Canada in 2003. If UEBC gains approval at each of these steps, each participating country's braille authority will consider its adoption.

The purpose of the sampler is to put material in the hands of readers, educators and braille producers that shows how it appears in UEBC. BANA wants you to have an opportunity to assess for yourself the changes UEBC proposes in the way braille looks and feels.

Eight contractions found in English Braille American Edition (EBAE), the literary code, are not used in UEBC. Six are brailled letter-for-letter: **ble**, **com**, **dd**, **ally**, **to**, **by**; and two are brailled with a contraction: **into** and **ation**. All other 181 contractions, wordsigns and shortforms are unchanged.

Print format has been followed in preparing these samples, as UEBC has not finalized braille formats. These samples have not been chosen to illustrate format.

The algebra sample follows the existing format of the Nemeth Code, the BANA code for mathematics and science.

UEBC recognizes print spacing. Mathematical signs of operation are spaced or unspaced according to print.

The Samplers

The UEBC examples are presented in two Samplers: Sampler 1 for literary materials and Sampler 2 for technical materials. Each is available in embossed and simulated braille.

Sampler 1 (literary materials) includes excerpts taken from published materials from a number of countries (which results in some spelling variations). A specially composed story, AA Day in the Life,[@] illustrates as many UEBC changes as possible.

A list of basic mathematics compares the way each example would be brailled in UEBC, EBAE, Nemeth Code and BAUK (as brailled using the code of the Braille Authority of the United Kingdom). There is also a sample of algebra.

At the beginning of each sample there is a list of the UEBC new or changed symbols you will encounter.

If you would like to have a copy of the original print on which Sampler 1 is based, please contact:

The American Foundation for the Blind
National Literacy Center
Contact: Frances Mary D'Andrea
404-525-2303 or AFB's Information Center 800-232-5463
E-mail: literacy@afb.net

Those who wish a simulated braille copy of Sampler 1 (which includes the print) should request it from The American Foundation for the Blind also.

Sampler 2 (technical material in two braille volumes) includes published works of elementary arithmetic, algebra, calculus, chemistry and computer notation. Each sample is presented in UEBC and either Nemeth Code, Computer Code or Chemistry Code as it would be brailled in North America today.

To help those who are not familiar with these codes there is a list of symbols required to read the material which precedes each sample.

To receive a copy of the BANA UEBC Sampler 2 please contact:

Eileen Curran, BANA Chair
National Braille Press
88 St. Stephen Street
Boston, MA 02115
888-965-8965 #17 or 617-266-6160 #17
fax: 617-437-0456
ecurran@nbp.org

The Questionnaire

BANA wants your comments and has prepared a short list of questions as a guide (to get you started). It is at the end of this Sampler. You will find the contact person's name and address there. You may respond in braille, print, on audio tape or by e-mail.

Thank you for reading the Sampler and for sending your comments to BANA. You will be able to get up-to-date information on UEBC by visiting the BANA web site at <http://www.brailleauthority.org>

Sample 1

Twice as Nice Coconut Rice

This fragrant rice tastes great
under stir-fried vegetables

If you're tired of serving
plain, ol' white rice with a
meal, but don't have time to
prepare anything too
fancy, this doubly delicious
recipe will rice to the
occasion.

After you,
I insist.



- 1 tsp canola or vegetable oil**
- 2 tsp grated gingerroot**
- 1 clove garlic, minced**
- 1-1/2 cups uncooked, long-grain white rice**
- 3/4 cup light coconut milk**
- 1 tsp each honey and grated lemon zest**
- 1/2 tsp salt**

- Heat oil in a medium, non-stick saucepan over medium heat. Add gingerroot and garlic. Cook and stir for 1 minute. Add rice and cook for 1 more minute.
- Stir in coconut milk, 2-1/4 cups water, honey, lemon zest, and salt. Bring to a boil. Reduce heat to medium-low. Cover and simmer for 20 minutes, or until liquid is absorbed and rice is tender.
- Fluff rice with a fork and serve immediately.

Makes 6 servings

bullet

[illegible]

Sample 2

“There are over 100 recording companies in Canada. Of these, the 12 foreign-owned companies do 90% of the total business. At the other extreme, the 47 smallest companies do less than 1% of the total business. These companies are all Canadian-owned.

“Canadian independent companies cannot compete against the multi-nationals for several reasons. MNCs can share many costs of production with their American parent companies. The independent companies have to pay *all* the costs of production. The MNCs use mainly foreign talent; less than 10% of their releases have Canadian content. The independents discover and develop Canadian talent; their releases have almost 60% Canadian content. Since they use unknown talent, Canadian recording companies tend to be high-risk businesses. Less than one in ten albums makes money. Fig. 27–11 illustrates the problem.

New and Changed Symbols



italic word



end capitalization within a word



percent sign

The following text demonstrates the use of the new and changed Braille symbols. The symbols are used to format the text as shown in the original document.

The following text demonstrates the use of the new and changed Braille symbols. The symbols are used to format the text as shown in the original document.

Sample 3

In Ede's imagining of them, all factories were fiery furnaces into which the poor and the despairing were driven, only to emerge with tormented spirits and broken bodies. She subscribed to Blake's image of *dark, satanic mills*, where human beings were bonded to diabolical machines—machines that were capable of killing them. The accounts Ede had read in the papers of industrial accidents had left her terrified and nauseated. *GIRL'S ARMS TORN OFF BY GIN-WHEEL! WORKER DECAPITATED IN PIANO FACTORY! MAN CRUSHED BY STEEL PRESS!* Why would one go willingly to such a place to be shown its *wonders*?

Beside her, Lily was already sleeping. Leaning down, Ede pulled some strands of hair from the child's mouth and kissed her on the cheek.

There had been no seizures now for a fortnight. Two weeks of freedom—two weeks of peace. And tomorrow . . .

Ede rolled away and watched the snow falling through the light of the street lamps beyond the windows.


The best thing about tomorrow—the most reassuring thing—was the prospect of Lizzie's presence. Ede had asked that he be there for Lily's sake. *Children give other children confidence*, she had told Frederick. *And Lizzie is such a gentle child.*


He's not a child any more, Edith.


How old is he, then?


Fifteen.


New and Changed Symbols


italic word

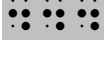
begin italic passage

 (before a space) end italic passage

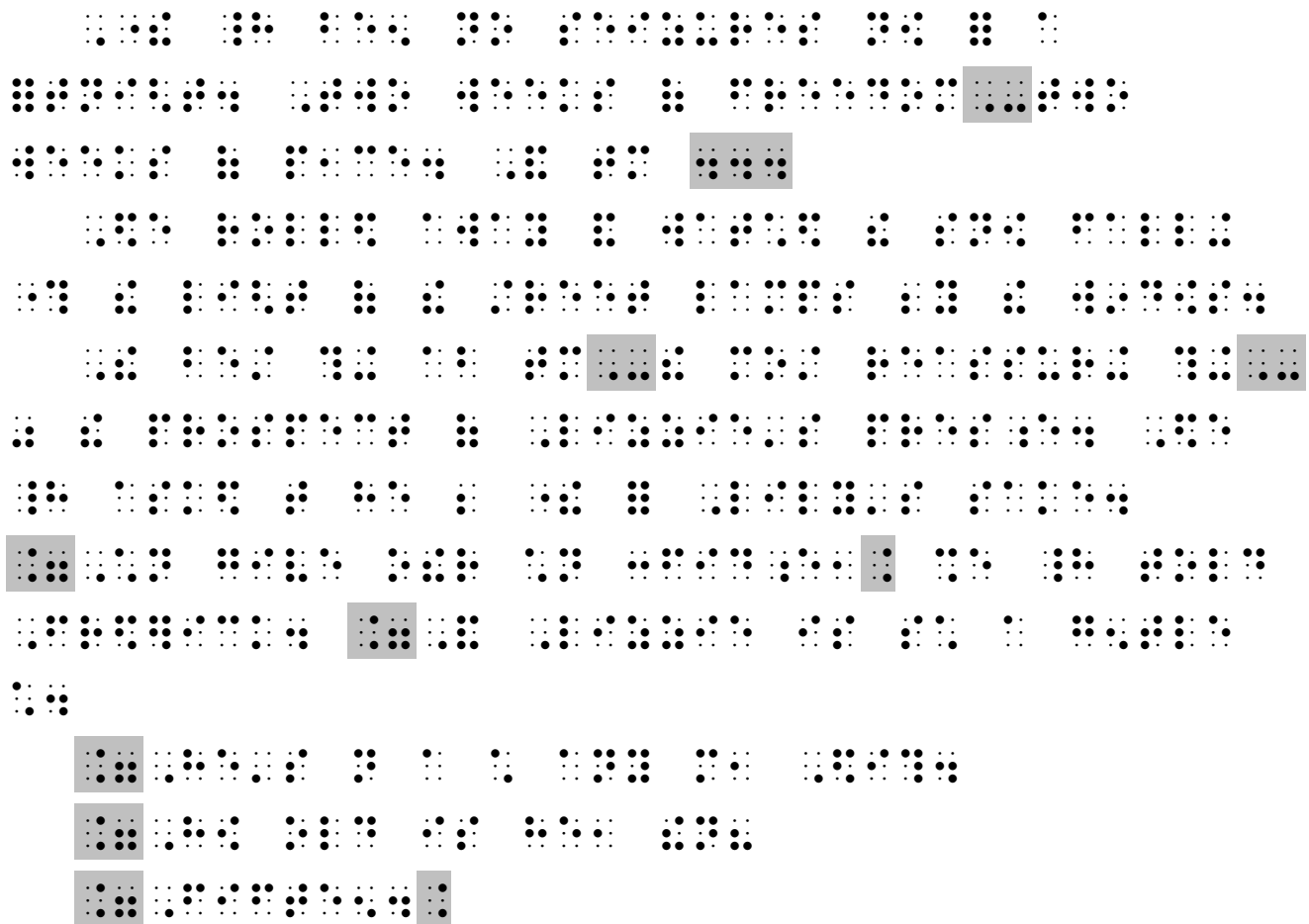
begin capitalized passage

 (before a space) end capitalized passage

dash

ellipsis

the first of the three main parts of the book is a history of the
the second part is a history of the
the third part is a history of the
the fourth part is a history of the
the fifth part is a history of the
the sixth part is a history of the
the seventh part is a history of the
the eighth part is a history of the
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the twenty-sixth part is a history of the
the twenty-seventh part is a history of the
the twenty-eighth part is a history of the
the twenty-ninth part is a history of the
the thirtieth part is a history of the
the thirty-first part is a history of the
the thirty-second part is a history of the
the thirty-third part is a history of the
the thirty-fourth part is a history of the
the thirty-fifth part is a history of the
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the thirty-eighth part is a history of the
the thirty-ninth part is a history of the
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the forty-fourth part is a history of the
the forty-fifth part is a history of the
the forty-sixth part is a history of the
the forty-seventh part is a history of the
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the forty-ninth part is a history of the
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the seventy-sixth part is a history of the
the seventy-seventh part is a history of the
the seventy-eighth part is a history of the
the seventy-ninth part is a history of the
the eightieth part is a history of the
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the eighty-second part is a history of the
the eighty-third part is a history of the
the eighty-fourth part is a history of the
the eighty-fifth part is a history of the
the eighty-sixth part is a history of the
the eighty-seventh part is a history of the
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the ninetieth part is a history of the
the ninety-first part is a history of the
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the ninety-third part is a history of the
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the ninety-fifth part is a history of the
the ninety-sixth part is a history of the
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the ninety-eighth part is a history of the
the ninety-ninth part is a history of the
the hundredth part is a history of the










Sample 4

Tidal Energy

Tidal power is an excellent example of using a local resource to meet local needs. A demonstration plant opened in 1984 near Annapolis, N.S. (Fig. 25-7). Its purpose was to show that the very high tides of the Bay of Fundy (as high as 17 m – the highest in the world) could be used to generate electricity. This small plant produces enough electricity to meet the needs of about 1000 families. Two larger plants further up the Bay of Fundy, where tides are higher, could produce more electricity than is currently generated by all means in New Brunswick, Nova Scotia and P.E.I. The cost of these plants, if they were built today, would be more than \$30 000 000 000. This makes them uneconomical with energy costs at their current level, but possible in the future as energy prices increase.

New and Changed Symbols

	begin bold passage
	(before a space) end bold passage
	opening parenthesis
	closing parenthesis
	dash
	dollar sign
	numeric space

Sample 5

The Electronic Media: Television

Television is part of nearly everyone's life. Almost all Canadian households have a television and over half have more than one. During an average day, 80 percent of Canadians watch one or more of the over 100 Canadian television stations at least once. Canadians also have access to many American stations.


According to the research firm of A. C. Nielsen Company of Canada Ltd., Canadians between the ages of 12 and 17 watch 2 hours and 15 minutes of television per day. Those over 18 watch more!

Television stations are either part of a *network* (CBC, CTV, or Global) or are independent, such as MITV in the Maritimes.


Advertising on network television is arranged centrally so that a national advertiser runs an ad over the network in the same time slot, usually on the same day, everywhere in the country. This takes a great deal of planning. Advertising schedules for the national television networks are booked over one year in advance, on noncancellable contracts.

The broadcasting day is divided into time slots called **dayparts**. The daypart with the largest audience is called **prime time**. Prime time lasts from 7 p.m. to 11 p.m. It is dominated by those shows with the highest **ratings**. Ratings are the way the television industry measures the success of a program. The most popular shows have the greatest number of people watching them.


New and Changed Symbols




italic word




bold word




begin bold passage




(before a space) end bold passage




opening parenthesis



closing parenthesis



begin capitalized passage



(before a space) end capitalized passage

Braille text sample consisting of several lines of Braille characters.

[illegible]







Sample 6

The rate of cooling varies according to the moisture content of the air. When the air has a relative humidity of 100%, **condensation** begins, and this affects the cooling rate:

- When condensation is *not* occurring, an air mass loses 1.0C° for every 100 m it rises.
- When condensation *is* occurring, an air mass loses heat at a rate of only 0.6C° for every 100 m.

Let's explore why this difference occurs. When water vapour condenses into liquid water, heat is given off. Thus, when air is rising and condensation is occurring, two opposing changes are taking place. The rising air is cooled by expansion while it is heated by condensation of its water vapour. The result is a lower rate of cooling.

New and Changed Symbols

	bold word
	italic word
	percent sign
	bullet
	decimal point
	degrees sign

[illegible]

The image displays a 10x10 grid of 100 small 5x5 dot patterns. Each pattern is a unique 25-bit binary code, where the dots represent '1' and the empty spaces represent '0'. The patterns are arranged in a grid that visually represents the binary sequence from 0000000000 to 1111111111. The first row contains patterns 0000000000 through 0000000011, the second row contains 0000000010 through 0000000101, and so on, up to the tenth row which contains 1111111100 through 1111111111. The patterns are arranged in a grid that visually represents the binary sequence from 0000000000 to 1111111111.

Sample 7

DIETS EMPOWER FOOD, NOT PEOPLE

A diet is really just another way to obsess about food. ***Eat this, don't eat that. Avoid anything white. Concentrate on carbohydrates.*** There are a million different ways to deprive yourself, with one thing in common. None of them can help you lose weight and keep it off.

The **ANSWER** to your weight problem lies within. ***It's about stress reduction and re-education and genuine support from people who understand exactly what you're going through.*** There really is a better way to get leaner and healthier than you ever imagined possible. And to rediscover the simple joys each day can offer.

**CALL US, AND LEARN HOW TO CHANGE
YOUR LIFE. 1.800.292.2440.**



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
14 Valencia Road • Hilton Head Island, SC • 29928

800-292-2440 • 843-785-7292

Fax: 843-686-5659 • E-mail: hhhealth@aol.com

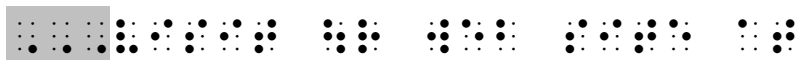
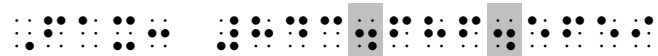
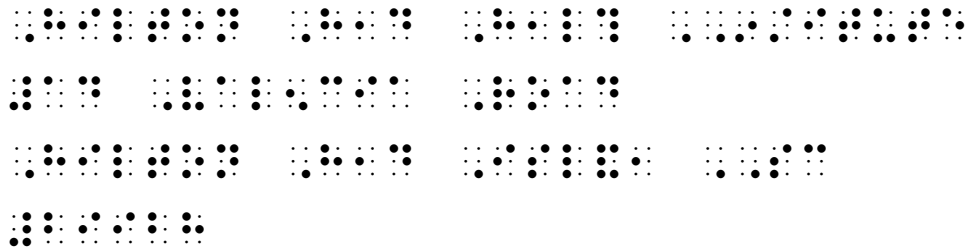
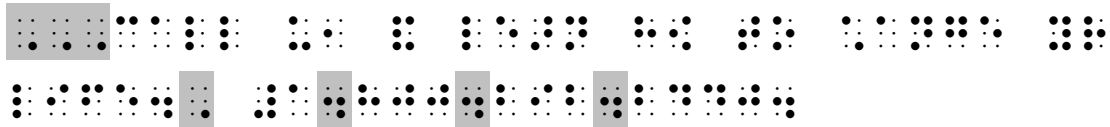
VISIT OUR WEB SITE AT WWW.HHHEALTH.COM

New and Changed Symbols

	begin capitalized passage
	(before a space) end capitalized passage
	italic word
	begin italic passage
	(before a space) end italic passage
	decimal point
	grade one word
	at sign

The image displays a 6x10 grid of Braille characters. The characters are arranged in rows and columns, with the 10th character in the 2nd row highlighted. The highlighted character is the Braille letter 'a' (dots 1, 2, 3).

The image displays a 6x10 grid of Braille characters. The grid is composed of 60 cells, each containing a Braille pattern. The patterns are arranged in a way that demonstrates the 'braille:highlight' property. The highlighted cells are at (2,2), (2,3), (2,4), (5,8), and (6,8). The highlighted cells are shaded gray, while the other cells are white with black dots.



Sample 8

AUDUBON *and the Art of* NATURAL HISTORY



SPECIALIZING IN THE FINEST ORIGINAL
NATURAL HISTORY ART FROM THE
17TH TO 19TH CENTURIES. FEATURING
WORKS BY AUDUBON, REDOUTÉ,
GOULD, BESLER AND MANY OTHERS.

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Established 1969

[illegible]

The figure consists of 10 diagrams arranged in two rows of five. Each diagram shows a pattern of black dots on a grid. The patterns are complex and fractal-like, with the number of dots increasing from left to right. The patterns are composed of small clusters of dots that are arranged in a way that suggests a recursive or self-similar structure. The first diagram in the top row has 10 dots, while the last diagram in the bottom row has 100 dots. The patterns are arranged in a way that suggests a sequence or a progression of some kind.

Sample 9

A DAY IN A LIFE

I was up before everyone else in the house this morning so I phoned the newspaper reading service to see what was in *The Star* yesterday. I made a braille note about a new Internet retailer called COOLeh.com. I already use most of the leading web services (Yahoo!, CNN.com, Amazon.com, E*Trade).

After breakfast, I walked down to the corner plaza. The 1st stop was the hairdresser. Fernando has been cutting my hair for 20 yrs. and he always gives me the first appointment.

2d stop was the bank. I like to go Wed. a.m. because my favorite teller, Ed, works then. He found the 184 error in my check book:

Mar 13/01 75 Popular Science 29.89	2643.19
Mar 13/01 76 Natl Lib Serv 59.75	2583.62

I also went to the 7-11 convenience store to pick up a few things:

8 oz chocolate

35% cream

eggs

travel size shaving cream (just 32 oz.) for my husband, Al

Al is off to the Wimbledon tennis tournament this weekend. He will put one of his business cards in each piece of luggage. They provide the following information: A. S. Friendly, V. P. Sales, CRE8IVE CHILDREN'S GOODS, Unit 17-a, 1241 Denison St, Markham ON L3R 4B4. Phone: 905 555-7473.

For lunch I made myself and the kids tuna fish sandwiches. I couldn't face peanut butter *again*. I gave them banana muffins for a treat. Afterwards, I prepared a mousse for tonight's pot-luck.

Before I knew it, the kids were home from school wanting help with their homework. The youngest child, Beverly, is learning to read BIG numbers such as 10,000,000 and had to count the 0s so I could help her figure it out. Her only problem with spelling was "through": t-h-r-o-u-g-h.

Then the middle one, Leander, reviewed some division facts. He can never remember the sevens, particularly: $56 \div 7 = 8$.

Kennedy, my car-addicted 18-year-old, received permission to use the car and to extend his curfew to 1:00 o'clock. In exchange, he agreed to drive me to the church for the pot-luck and to pick up a 9"X9" pan of vegetable casserole from the café for the family's supper.

My friend, Sally Lancer, met me at the church. We only had a little of this and a little of that but we had to admit that enough's enough and that we had overeaten as always!

Charlene Comfort drove me home in her '89 Chevy. She said she might be forced to give it up, especially if gas continues to be priced at \$1.39/gal. But, as a pensioner, she'll have trouble finding \$5,000 for a good used car.

By the time I got home, Al had returned from walking our dog, Puddles. He wanted to get to sleep right away because of an early meeting tomorrow. I promised to stay awake reading until Kennedy came in. Al teased good-naturedly that the noise of my fingers on the braille was keeping him awake. I said with a grin, "How can that be when your snoring is making it so hard for me to concentrate."

New and Changed Symbols



begin capitalized passage



(before a space) end capitalized passage



end capitalization within a word



italic word



begin italic passage



(before a space) end italic passage



grade one word



opening parenthesis



closing parenthesis



asterisk



dollar sign



slash



decimal point



percent sign



numeric space



times sign



division sign



equal sign



acute accent on following letter



inch sign



dash

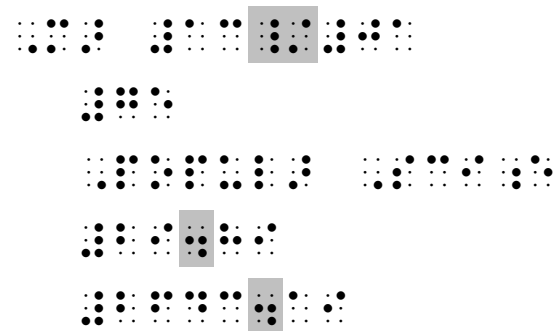
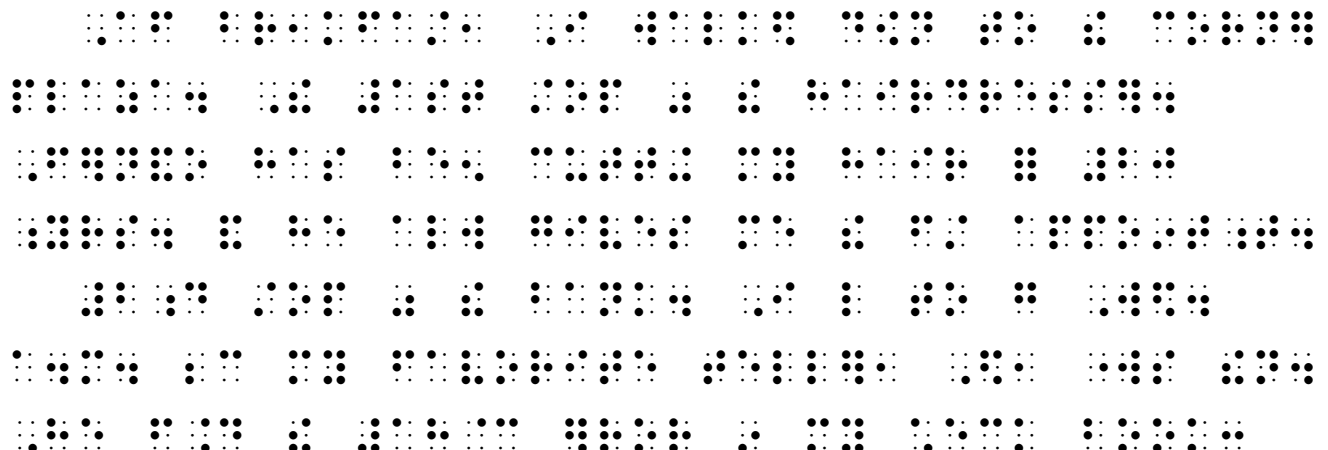
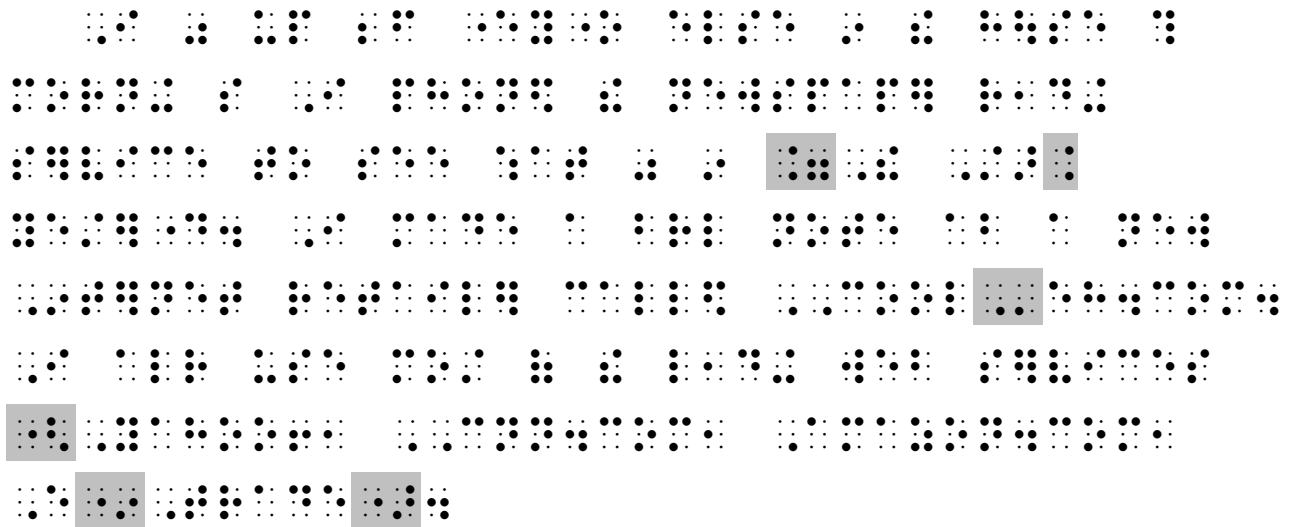


Figure 1 shows three 3x3 grids. The first grid has 6 dots: (1,1), (1,2), (1,3), (2,2), (2,3), and (3,3). The second grid has 7 dots: (1,1), (1,2), (1,3), (2,2), (2,3), (3,2), and (3,3). The third grid has 8 dots: (1,1), (1,2), (1,3), (2,2), (2,3), (3,2), (3,3), and (3,1).

The figure consists of 10 sub-diagrams, each showing a 5x5 grid of dots. Black dots represent the 'on' state of a cell, while white dots represent the 'off' state. The sequence shows a pattern that starts in the top-left corner and grows towards the bottom-right corner. The growth is not strictly linear, with some cells appearing to 'jump' or the pattern expanding in a more complex, fractal-like manner. The final state (diagram 10) shows a large, irregular cluster of black dots occupying the right half of the grid.

Figure 1 shows a 3x3 grid of 3x3 dot patterns. The middle cell is shaded gray and contains a 3x3 grid of dots. The other cells contain various 3x3 dot patterns, some with missing dots.

The figure shows 15 dot patterns in a sequence from left to right. The patterns are as follows:

- Pattern 1: A 2x2 grid of dots.
- Pattern 2: A 3x3 grid of dots.
- Pattern 3: A 4x4 grid of dots.
- Pattern 4: A 5x5 grid of dots.
- Pattern 5: A 6x6 grid of dots.
- Pattern 6: A 7x7 grid of dots.
- Pattern 7: A 8x8 grid of dots.
- Pattern 8: A 9x9 grid of dots.
- Pattern 9: A 10x10 grid of dots.
- Pattern 10: A 11x11 grid of dots.
- Pattern 11: A 12x12 grid of dots.
- Pattern 12: A 13x13 grid of dots.
- Pattern 13: A 14x14 grid of dots.
- Pattern 14: A 15x15 grid of dots.
- Pattern 15: A single dot.

The figure consists of 10 diagrams arranged in two rows of five. Each diagram shows a grid of dots, with some dots being black and others white. The pattern of black dots evolves from left to right. In the first diagram, there is a small cluster of black dots. In the second diagram, the cluster grows. In the third diagram, the cluster becomes more complex. In the fourth diagram, the cluster continues to grow. In the fifth diagram, the cluster is further developed. In the sixth diagram, the cluster is even more complex. In the seventh diagram, the cluster is further developed. In the eighth diagram, the cluster is even more complex. In the ninth diagram, the cluster is further developed. In the tenth diagram, the cluster is the most complex.

The figure consists of 10 5x5 grids arranged horizontally. Each grid contains black dots. The pattern of dots starts on the left side of the first grid and moves progressively to the right in each subsequent grid. A vertical grey bar is located between the third and fourth grids.

The figure consists of eight 5x5 dot grids arranged horizontally. Each grid contains a set of black dots. The pattern of dots changes from one grid to the next, illustrating a sequence of states. The dots are arranged in a way that suggests a wave or a moving front across the grid.

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EBAE:



UEBC:



Nemeth:





BAUK:

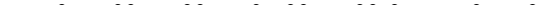
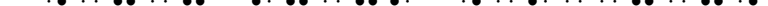
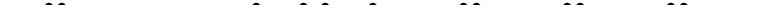
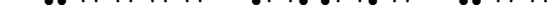
EBAE:  



UEBC:  



Nemeth:  



BAUK:  



EBAE: 
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Nemeth: 
BAUK: 

EBAE: 
UEBC: 
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BAUK: 





EBAE:  

UEBC:  

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BAUK:  

80EF

EBAE: 
UEBC: 
Nemeth: 
BAUK: 

37.5%



EBAE: ⠠⠋⠠⠊⠠⠋⠠⠊



UEBC: ⠠⠊⠠⠋⠠⠊⠠⠋⠠⠊



Nemeth: ⠠⠊⠠⠋⠠⠊⠠⠋⠠⠊



BAUK: ⠠⠊⠠⠋⠠⠊⠠⠋⠠⠊

\$0.89, or 89¢



EBAE:  



UEBC:  



Nemeth:  



BAUK:  

3 cup





EBAE:  



UEBC:  



Nemeth:  



BAUK:  



5N100


EBAE:  **UEBC:** 
Nemeth:  **BAUK:** 


EBAE:  


UEBC:  

Nemeth:  

BAUK:  

UEBC: 

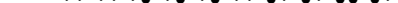
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BAUK: 


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BAUK:

Sample 11 C Algebra

3-7 ADDITION OF FRACTIONS

The algebraic sum of two or more fractions having the same denominator is a fraction with the common denominator and a numerator which is the algebraic sum of the numerators of the fractions considered. This was proved in Problem 13, Article 2-4.

Illustration. $\frac{2x^2}{x-4} - \frac{3x}{x-4} + \frac{5}{x-4} \equiv \frac{2x^2 - 3x + 5}{x-4}.$

To find the algebraic sum of two or more fractions with different denominators, we must replace the fractions with equivalent fractions having the same denominators. It is preferable to use the *least common denominator* (LCD). The LCD of two or more fractions consists of the product of all the unique prime factors in the denominators, each with an exponent equal to the largest exponent with which the factor appears, and is really a result of the following important theorem.

Theorem 3-5. $\frac{a}{b} + \frac{c}{d} \equiv \frac{ad + bc}{bd} \quad (b, d \neq 0).$

Proof. We have

$$\frac{a}{b} + \frac{c}{d} \equiv \frac{ad}{bd} + \frac{bc}{bd},$$

by Theorem 2-8. If we now use Problem 13, Article 2-4, we have

$$\frac{ad}{bd} + \frac{bc}{bd} \equiv \frac{ad + bc}{bd},$$

which is our required result.

Example 1. Find the LCD of the fractions

$$\frac{3x}{x^2 - 4x + 4}, \quad \frac{5x^2}{3(x^2 - 4)}, \quad \frac{2}{2x^2 - x - 6}.$$

Solution. Factoring each denominator, we have

$$x^2 - 4x + 4 \equiv (x - 2)^2,$$

$$3(x^2 - 4) \equiv 3(x + 2)(x - 2),$$

$$2x^2 - x - 6 \equiv (2x + 3)(x - 2).$$

The LCD is $3(x + 2)(x - 2)^2(2x + 3).$

Sample 11A C Algebra in UEBC

UEBC Symbols

⠠⠠⠠⠠	begin capitalized passage
⠠	(before a space) end capitalized passage
⠠⠠	bold word
⠠⠠⠠	begin bold passage
⠠	(before a space) end bold passage
⠠⠠	italic word
⠠⠠⠠	begin italic passage
⠠	(before a space) end italic passage
⠠⠠⠠⠠	begin grade one passage*
⠠	(before a space) end grade one passage
⠠⠠	begin fraction (grade one)
⠠⠠	end fraction (grade one)
⠠⠠⠠	horizontal fraction line
⠠⠠	superscript next item (grade one)
⠠⠠⠠	plus sign
⠠⠠⠠	minus sign
⠠⠠⠠	equivalent sign (3 horizontal bars)
⠠⠠⠠⠠⠠	not equal sign
⠠⠠⠠	opening parenthesis
⠠⠠⠠	closing parenthesis

* The grade one passage indicators delimit sections of braille containing grade one symbols that would otherwise represent literary contractions (in this case, the superscript and fraction indicators).

A 10x10 grid of dots. The dots are arranged in a pattern that resembles a stylized '10'. The first column has 10 dots. The second column has 9 dots, missing the bottom one. The third column has 10 dots. The fourth column has 9 dots, missing the bottom one. The fifth column has 10 dots. The sixth column has 9 dots, missing the bottom one. The seventh column has 10 dots. The eighth column has 9 dots, missing the bottom one. The ninth column has 10 dots. The tenth column has 9 dots, missing the bottom one.

The image displays a 6x10 grid of 60 small 3x3 dot patterns. Each pattern is a unique combination of 9 binary states (dots on/off), representing all possible combinations of 9 bits. The patterns are arranged in 6 rows and 10 columns, with each row containing 10 unique patterns and each column containing 6 unique patterns. The patterns are arranged in a way that each row and column contains a unique set of patterns, ensuring that no two patterns in the same row or column are identical.

The image displays a 10x10 grid of 100 small 5x5 dot patterns. Each pattern is a unique configuration of 25 dots, representing all possible combinations of 25 binary states (each dot is either present or absent). The patterns are arranged in a systematic, row-major order, starting from a single dot in the top-left corner and ending with all 25 dots in the bottom-right corner. This visualizes the concept of a powerset or the total number of possible subsets of a 5x5 grid of dots.

A 10x10 grid of 100 small 3x3 dot patterns, each representing a digit from 0 to 9. The patterns are arranged in rows, with each row containing 10 patterns. The patterns are designed to be easily distinguishable from one another.

A collection of 100 small, irregular black ink blotches scattered across a white background. The blotches vary in size and shape, some appearing as single dots, others as small clusters or elongated streaks. They are distributed across the entire page, with a higher density in the upper half and a more sparse distribution in the lower half. The overall effect is that of a random noise pattern or a corrupted image.

Sample 11B C Algebra in Nemeth Code

Nemeth numbers are brailled in the lower part of the cell. The number indicator is omitted when a number follows other symbols. A punctuation indicator is used when punctuation follows a number.

Nemeth Symbols

⠠⠠⠠	punctuation indicator
⠠⠠⠠⠠	mathematical comma
⠠⠠⠠⠠	begin fraction
⠠⠠⠠⠠	horizontal fraction line
⠠⠠⠠⠠	end fraction
⠠⠠⠠	begin superscript
⠠⠠⠠	return to baseline after superscript
⠠⠠⠠	plus sign
⠠⠠⠠	minus sign
⠠⠠⠠⠠⠠	equivalent sign (3 horizontal bars)
⠠⠠⠠⠠⠠⠠	not equal sign
⠠⠠⠠	opening parenthesis
⠠⠠⠠	closing parenthesis

The figure consists of 10 dot patterns arranged in a single row. Each pattern is a 5x5 grid of dots. The patterns show a progression from a single dot in the center to a complex, fractal-like structure with multiple clusters of dots.

The image displays a 10x10 grid of 100 small 5x5 dot patterns. Each pattern is a unique configuration of 25 dots, representing all possible combinations of 25 binary states (each dot is either present or absent). The patterns are arranged in a grid that is 10 units wide and 10 units high, totaling 100 individual patterns.

The image displays 15 distinct patterns, each composed of a grid of black dots on a white background. The patterns are arranged in a roughly rectangular layout, with some appearing in groups and others in isolation. The patterns are as follows:

- Pattern 1: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 2: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 3: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 4: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 5: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 6: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 7: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 8: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 9: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 10: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 11: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 12: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 13: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 14: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).
- Pattern 15: A 3x3 grid with dots at (1,1), (1,2), (1,3), (2,1), (2,2), (2,3), (3,1), (3,2), and (3,3).

Questionnaire

Directions: Please complete the following questionnaire after reading through the Unified English Braille Code (UEBC) Sampler. Write your answers below, on a separate sheet of paper, or in an e-mail message. Send your completed survey to:

Warren Figueiredo
Louisiana Instructional Materials Center for the Blind
1230 Government Street
Baton Rouge, LA 70802
E-mail responses: UEBCinput@aol.com

Your input will be useful to the BANA Board in studying the UEBC.
Thank you!

Questions about UEBC and Other Issues

1. Before you read this sampler, what were your feelings toward unifying the braille codes?
2. Having read through this sampler, how have your ideas/feelings changed toward a unified braille code?
3. What do you really like about the Unified English Braille Code (UEBC)?
4. What do you really dislike about the UEBC?
5. What issues do you feel the BANA Board should consider in making a decision on adoption of the UEBC?

Optional Background Information

6. What kind of materials do you typically read in braille? Check all that apply.
- a. magazines
 - b. fiction
 - c. nonfiction
 - d. textbooks
 - e. other (list):
7. What math or technical materials do you read? Check all that apply.
- a. textbooks
 - b. technical materials for my job
 - c. computer braille
 - d. chemistry or other scientific notation
 - e. other (list):
8. What math code did you learn in school?
- a. upper numbers (Taylor Code)
 - b. lower numbers (Nemeth)
 - c. upper numbers (BAUK—Braille Authority of the United Kingdom)
 - d. no math code used
9. When did you learn braille?
- a. before age 18
 - b. 18-55 years of age
 - c. 56 and above

Optional Personal Information

Name:

Age:

Gender:

Occupation:

Preferred Literacy Medium:

E-mail address:

Address:

Telephone: