ChattyInfty, the Version 3 Series Manual

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Not-for-Profit Organization, Science Accessibility Net

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1. Introduction

Welcome to ChattyInfty! ChattyInfty is a mathematical document editor to provide speech-output access while reading, editing or authoring math/scientific documents. Furthermore, since this new version, "ChattyInfty, Ver.3 (ChattyInfty3)" has many new features such as DAISY/accessible-EPUB3 output capability, you can produce various types of accessible   e-books with it.

This software has been developed by "the InftyProject" and "the Not-for-Profit Organization: Science Accessibility Net (sAccessNet)." Our organizations also offer other software and many services to help print-disabled people with accessing math/scientific information. Please visit our web site: http://www.sciaccess.net/en/index.html
For more detailed information.

1.1 Original Features of ChattyInfty

* Math expressions or scientific documents ranging from secondary education to higher education levels can be written or edited by using the keyboard with speech output.

* Files made with ChattyInfty can be saved in various accessible formats: LaTeX, MathML, PDF, HTML or Microsoft Word XML. An original format: IML (Infty Markup Language) is essentially XML and is completely compatible with other Infty software: the math OCR software, "InftyReader" and the Math-document editor for sighted people, "InftyEditor."

* Information displayed on the main window of ChattyInfty is completely equivalent to that of InftyEditor. All of math expressions are displayed in the ordinary print style. ChattyInfty reads aloud not only texts but also those math expressions. Print-disabled students can access, edit or author math/scientific documents including math expressions with speech output. They, therefore, can share the same educational materials with their sighted classmates. Their teachers can easily prepare those materials by making effective use of InftyReader and InftyEditor. Furthermore, the teachers can directly read documents that visually disabled students draw up even if they are not familiar with Braille.

1.2   What's New in ChattyInfty3

* In ChattyInfty3, Multimedia DAISY and accessible EPUB3 is officially adopted as output format.   In the accordance with this improvement, we upgraded thoroughly software itself.   Thus, it becomes also useful for people with low vision or dyslexia.   In the software, as for the previous version, a blind user can read and author mathematical documents with speech output.   A low-vision reader can improve contrast or magnify the displayed content for ease of reading.   Visual tracking and synchronized speech allow a dyslexic reader to maintain focus on a document.

* Since a result recognized by InftyReader can be imported directly, both the sighted and print-disabled can produce mathematical DAISY (accessible EPUB3) books easily from printed/PDF materials by making use of Infty software only.   ChattyInfty3 is very useful as authoring tools to produce accessible e-books.

1.3   System Requirements

The operating system should be either Windows 7 or later.   The Microsoft Internet Explorer 9 or later must be installed.   Microsoft speech API version 5 must be installed.

2.   Installation and Activation

Perform setting.exe in the ChattyInfty3 folder and follow the instructions.   You have to select a language used in the installation process.   It will be also a default language in the software.   After installation, you will be asked to complete an online activation.   You can find more detailed information about them on our web site:

> http://www.sciaccess.net/en/.

3.   Getting Started

3.1   How to Input

The window of ChattyInfty3 is divided into two parts: an index window and a main window, in a similar way to other popular DAISY browsers.   The index window has a tree structure to show a table of contents in a style similar to that of Windows Explorer.   This gives a user random access to a document displayed in the main window.   Pressing the F6 or the Ctrl + F6 key, one can easily switch the active window.   Otherwise, by pressing the Enter key at a certain entry in the index window, the cursor moves to a corresponding position in the main window.

Remark:

If the other windows were opened such as the Last Reading bar, pressing the F6 or the Ctrl + F6 key would get the cursor to move among all of them one by one.

In order to input something in a document, at first, you have to move to the main window. When starting the software, the cursor is located at the heading in the index window. At that time, ChattyInfty says "Index level 1. Input title, here." By pressing the Enter key, it moves to the first line of the main window. Since the first line is regarded automatically as the heading; that is, the statement: "Input title, here" is a default heading that is written in the first line. You can change it as you like; then, top of the index window will be changed automatically. Please input a content from the next line to it.

In the main window, ChattyInfty3 is started with "Text (input) mode." In this mode, you can write or edit literary texts with the keyboard. To input math expressions, press the Ctrl + the Space key to switch to the "Math (input) mode." By using this key stroke, you can switch between the Text and the Math input modes altenately.

Remark:

You can change this shortcut to switch them, using setting menu.

3.2　Using Math Input Mode

To input characters or symbols which are not on the keyboard, ChattyInfty provides two methods as follows:

3.2.1　Keyboard-based input method

Enter "¥" followed by a specific name (a TeX command) and convert it with the Space key or the Enter key. Then, a math symbol corresponding to the command is input at the cursor position. For instance, if you want to input Greek letter alpha, enter ¥alpha with keyboard and then press the Space (or the Enter) key. When you start inputting the command, the list of candidates that have the same initial letters is displayed; so, you can choose an appropriate one in it.

3.2.2　Menu-operation-based input method

Select from the Context menu that pops up by pressing the Application key (or right click). More detailed instructions for it will be given later.

Up to five Characters/symbols recently selected are displayed in the Context menu. It may be convenient when you want to input same things repeatedly. See "Input reference" (List of characters and symbols) in the Help menu for the character/symbol commands and their classification.

Other than Math-mode symbols, special characters such as extended Latin character sets in Text mode are also available with the symbol lists that pops up by pressing the Application key (or right click).

3.3 Creating Math Formulas

3.3.1 Superscript and Subscript
ChattyInfty provides an intuitive manner to input various math formulas. For instance, super/subscripts can be written in the following way.

Example1: Superscript/Power
To write an x squared, do the following:
1. Type the base letter, "x".
2. Press the Up Arrow key or Input ^ (hat). The cursor will move to the superscript position, and ChattyInfty will say "power."
3. Type the 2 and press the Enter key. The cursor will return to the base line.

Example2: Subscript
To write a x with a subscript, n, do the following:
1. Type the base letter, "x".
2. Press the Down Arrow key or _ (Under-bar). The cursor will move to the subscript position, and ChattyInfty will say "sub."
3. Type the "n" and press the Enter key. The cursor will return to the base line.

Remark:
Using the setting menu, you can change the setting so that, instead of the Up/Down arrow keys, the Ctrl + Up/Down arrow keys moves the cursor to the super/subscript position. At that time, the Up/Down arrow key simply moves the cursor to the previous/next line.

3.3.2 Inputting Special Characters
As was mentioned previously, math characters that are not on the keyboard can be input from the Context menu that pops up by pressing the Application key on the keyboard. It also appears by pressing the Shift plus F10 or right-clicking the mouse. In the Character/Symbol set, there is a list of many special characters/symbols. Some examples are shown below.

Example1:
To write a Greek letter, alpha, do the following:
1. Press the Application key to open the Context menu. ChattyInfty says "Context menu."
2. Press the Down Arrow key several times to find an item, "Character, Symbol."
3. Press the Right Arrow key to move to the submenu; then, ChattyInfty says "Greek."
4. Press the Right Arrow key to move to the entry list of the Greek letters.

5. Select alpha and press the Enter key. Be sure that the entry list begins with capital letters.

Example2:
To write a symbol of "is greater than or equal to", do the following:
1. Press the Application key to open the Context menu. ChattyInfty says "Context menu."
2. Press the Down Arrow key several times to find the item, "Character, Symbol."
3. Press the Right Arrow key to move to the submenu.
4. Press the Down Arrow key to find an item, "Relative Symbol."
5. Press the Right Arrow key to move to the entry list of the relative Symbols.
6. Select the symbol of "is greater than or equal to" and press the Enter key.

3.3.3 Math Syntax

Besides the superscript and the subscript, there are many special notations in mathematics. We call them "Mathematical syntaxes." They can be also input from the Context menu. To input characters/symbols in a place other than a base line such as a fraction made of a denominator and a numerator, a radical in which characters and symbols are written in certain layout or other math syntax with super/subscript around symbols (a summation, for instance), the following two methods are provided.

A. Keyboard-based Input Method
First, enter ¥ followed by a certain syntax name (a TeX command) and press the space (or the Enter) key. Then, an empty syntax is input at the original cursor position, and the cursor moves to inside of it automatically. You can enter characters and symbols in it to make up a formula. If you need to enter super/subscript area in the syntax (the index in radicals, for instance), press the right/Left Arrow keys after entering the base characters; then, the cursor moves to the positions that need to be input.

B. Menu-Operation-based Input Method
Select the syntax from the Context menu that pops up by pressing the Application key (or the right click). Then, an empty syntax is input at the original cursor position, and the cursor moves to inside of it. You can enter characters and symbols in it to make up a formula.

You can refer to "Input quick reference" (Mathematical Syntax List) in the Help menu to check each command and input method.

Example1:
To write the fraction, "one over two" do the following:
1. Press the Application key to open the Context menu. ChattyInfty says "Context menu."

2. Press the Down Arrow key several times to find an item, "Formulas."
3. Press the Right Arrow key to move to the submenu.   ChattyInfty says "Frac."
4. Press the Enter key.   An empty fraction is placed at the original position of cursor.   The cursor moves to its numerator position automatically.   ChattyInfty says "Numerator."

* Instead of the steps 1-4, you can do the same thing by inputting ¥frac (or simply ¥f) and pressing the Enter key.

5. Type "1" and press the Right Arrow key to move the cursor to the denominator position.   ChattyInfty says "Denominator."
6. Type "2" and press the Right Arrow key and the cursor will move out of the fraction to the next position on the base line.

Remark:
Pressing the Enter key also moves the cursor to the denominator position or outside of the fraction; however, no messages will be spoken.

Example2:
To write the square root of 2, do the following:
1. Press the Application key to open the Context menu.   ChattyInfty says "Context menu."
2. Press the Down Arrow key several times to find the item, "Formulas."
3. Press the Right Arrow key to move to the submenu.
4. Press the Down Arrow key once; then, ChattyInfty says "Square Root."
5. Press the Enter key.   An empty radical is inserted at the original position of cursor.   The cursor is located inside the radical.   ChattyInfty will say "Inside Radical."
 * Or you may input ¥sqrt (or simply¥r) and press the Enter key, instead of the steps 1 - 5.
6. Type "2" and press the Right Arrow key to get out of the radical.

Remark:
If you want to input a general radical, you may use another command: "Radical."   Be sure that radicals in ChattyInfty have three areas: the radical index area, a main area and a superscript area, or the power for the entire radical.   Using the Context menu, you can write many of other special mathematical notations.

3.3.4   Other keyboard shortcuts
Here, some other keyboard shortcuts to input math syntaxes are shown below.

* Summation-Type syntax:
  Those syntaxes are listed in "Formula with Under and Over Areas" in the Context menu.
  For Instance, in terms of the summation, instead, you may input ¥sum (or simply ¥s).
* Limit-Type syntax:

They are listed in the "Formula with Under Area."

For the limit, you may input ¥lim.

* Integral-type Syntax:

They are listed in "Integral."

Otherwise, input ¥int (or simply ¥i).

* Accent Mark:

They are listed in "Accent."

For instance, in terms of drawing a overline, input ¥overline.

Note: Extended Latin letters in text area (e.g. accent and cedilla of French) are not assumed as the accent marks in mathematical syntax in the Math mode. They can be displayed in font as Latin letters in text mode. Also, accent marks for math expressions do not work in the text mode.

(See the Symbol list of Latin 1 and Latin 2 in the Context menu.)

* Matrix-type syntax:

A matrix-type syntax cannot be input with the Context menu. A manner to input big (multi-line) enclosing symbols for matrices, simultaneous equations and so on is as follows:

Input ¥ followed by one of [, {, (, |, || from the keyboard. By pressing the Enter key, an empty matrix-type formula enclosed with the indicated symbols is input at the cursor position. The cursor moves to inside of it, automatically.

Remark:

If the closing symbol is not necessary (in the case of Simultaneous equations, for instance), press the Right Arrow key after completing to enter the content, to let the cursor move to the position just in front of the closing symbol. (At that time, the cursor is located at the same height as the closing symbol.) Then, delete the closing symbol with the Delete key.

The width and length of the enclosed area is automatically adjusted depending on the size of content; however, the elements are not aligned automatically. You need to align them manually for yourself by using spaces or tabs.

3.3.5 Table

In the previous version of ChattyInfty, a table should be authored in a different pop-up window that was not necessarily accessible enough. On the other hand, it can be directly authored in the ChattyInfty3 main window.

Pressing the Ctrl + the Shift + T or Performing "Insert Table" command in the Edit menu, users get into a dialog to create a new table. The numbers of columns and rows can be chosen freely. By pressing OK button, an empty table of the specified size is inserted at the

cursor position of an original document.   In addition, a given (simple) table in Microsoft Excel can be cut out and pasted into a ChattyInfty3 document via Windows Clipboard.

Remark:
A format specified in Microsoft Excel such as combining cells, however, would not be necessarily preserved with this operation.

In terms of browsing in a table with speech output, users can do it with usual cursor and tab operations.   The cursor moves character by character inside the cell with the Left/Right key. It, however, would go to the next cell with the same operations if it were located at the top/end of the item in the cell.   Tab/Shift + Tab or Ctrl + Left/Right Arrow keys can also change the cursor location to the next cell.   You can move the cursor vertically with the Up/Down Arrow key.   Thus, print-disabled people can read it cell by cell horizontally or vertically as they like.   Technical content of each cell is read out in the ordinary manner of ChattyInfty.

In addition, when reading aloud a table, ChattyInfty says the address of a cell first and then, reads out its content.   In the default setting, the address is represented as "A2" that means "the column A and the row 2."   As will be explained later, by editing ReadSetting_SAPI5_en.txt, users could change how to express the address in speech if necessary.

Print-disabled people can edit the content of a table in an intuitive manner.   Any formulas or texts can be input in a table cell in the ordinary method of ChattyInfty.   Furthermore, by pressing the Application key (or right-clicking) inside the table, various special commands to modify table style such as adding a column can be done.   The "Table Setting" command in the context menu allows users to get into the table editor.   Using the table editor, they could customize the table layout more flexibly if necessary.

The following shortcuts are also available in the table environment.

Shift + Enter	Adding a new column under the current cell
Ctrl + Shift + Enter	Adding a new row at the right of the current cell

(When adding a column or a row, the cursor moves automatically to the new position.)

Shift + Del	Deleting a column at the current cell
Ctrl + Shift + Del	Deleting a row at the current cell

Remark:
However, a column or a row could not be deleted if their number became less than one with that operation.

The flush-left, centering or flush-right shortcuts such as Ctrl + L are also available even in the

table cell to change the horizontal position of an item in the cell.   Their vertical position in the cell can be also customized with the table editor.

3.3.6   Inserting Figures and Other images

ChattyInfty, itself has no functionality to draw/edit a figure.   However, you can embed an tiff/jpg image file into it.   For instance, you can cut out a figure as an image from a PDF file and paste it in ChattyInfty.   At that time, the resolution the image should be set 600DPI.

3.4   How to Input from Math OCR

Using ChattyInfty, people with print disabilities can access math/scientific documents in print or PDF including math expressions.   In order to use this function, you need to install our math OCR system named "InftyReader, Ver. 3 series (InftyReader3)" as well.   Since it can recognize not only special characters but also various technical notations such as a fraction, a radical etc. and export the results into ChattyInfty, you can access or edit them with speech output.

3.4.1   What Is InftyReader?

InftyReader is OCR software for scientific documents, which was also developed and provided by sAccessNet.   InftyReader recognizes scanned page images of English documents including math expressions.   From each page image, figure areas, table areas and text areas are segmented automatically.

Download site of InftyReader is:
   http://www.sciaccess.net/en/.

3.4.2   System Requirements

InftyReader runs on Windows7 or later.

3.4.3   Language

The current version (English edition) can recognize only printed/PDF documents in English. Be aware that it does not recognize Japanese characters at all.   However, combining InftyReader with the FineReader Plug-in, it becomes able to recognize other many European languages using extended Latin characters.   Please look at our web site:
   http://www.sciaccess.net/en/
for more detailed information about this point.

See the manual of InftyReader for more detailed information.   You can also perform OCR from the menu of ChattyInfty.   At that case, you may use "Import" in the File menu.

3.4.4   How to Use the Sheet View Window

When the recognized result is displayed on the main frame of ChattyInfty, the "Sheet View

window" pops up to show the original page image. Since the original scanned image that exactly corresponds to an area around the cursor position is displayed, sighted people can easily check any errors of the recognition.

It is remarkable that information on the Sheet View window is also available for visually disabled people. By pressing F4 key, the focus moves to the Sheet View window. If you had a certain sophisticated tactile-graphic tool such as View Plus embossers, you could output the image directly from this window as tactile graphics. So, even if you were totally blind, you could grasp and correct recognition errors for yourself with the tactile graphics. Printing the Sheet View window is supposed to be done from the own File menu of this special window. The focus will be back to the main window when you move the cursor with Arrow keys.

4. Speech Output and Speech Setting

4.1 Speech Engine

Since ChattyInfty uses Microsoft speech API (SAPI), the version 5 as the speech engine, it must be installed. If a SAPI5 voice is already installed, ChattyInfty will speak automatically when it is started.

4.2 Reading Aloud

ChattyInfty reads aloud texts and also math expressions. You can access, write or edit scientific documents including math expressions with speech output.

4.2.1 Reading of Text
In the text part of the document, operations concerning aloud reading are almost same as other screen readers. When the cursor is moved to the next or previous line with the Down or Up Arrow key, ChattyInfty reads aloud the content of line from the beginning to the end. When the cursor is moved to right or left, ChattyInfty reads aloud the one character that is just located at the right hand side of the cursor. You can read the text in a word-by-word manner by pressing Ctrl + the Right/Left Arrow key.

Remark:
By using "Read Out" menu, ChattyInfty reads out automatically an indicated part of document without cursor operations. At that time, the cursor keeps its original position.

By pressing Ctrl + F1 key, you can hear a line number where the cursor is currently located.

Using the "Speech Setting" in Setting menu, you can change the kind of SAPI5 voices, their

pitch and speaking rate. The voices and pitches for the text and math parts could be different from each other.

4.2.2　Reading of Math Expressions

You can also browse a math expression with the cursor operations; however, you should be careful because the behavior of cursor when pressing Arrow keys is different from that in text. For instance, if you pressed the Up Arrow key, the cursor would move to its superscript position, not to the previous line.   To move to the previous line, you need to press Ctrl + the Up Arrow key.   Also to move the cursor to the next line in the math expression, you need to press Ctrl + the Down Arrow key.   If you find this confusing, this function can be changed so that the Ctrl + Up/Down arrow key moves the cursor to the super/subscript position.   In this case, the cursor goes simply to the previous/next line by pressing the Up/Down key only.

Remark:

As was mentioned previously, by using "Read Out" menu, ChattyInfty reads out automatically math expressions without cursor operations.   At that time, the cursor keeps its original position.

4.2.3　Details about Reading Math Expressions Aloud

ChattyInfty has a defined way to read aloud each math symbol.   They are classified into several groups and listed in the Context menu.   If necessary, this defined way of aloud reading can be changed in the Setting menu described later in this manual.

Corresponding to various types of the print disabled, their demands or necessities, we provide three types of aloud reading for math formulas.   "How a math formula should be read aloud" does depend on the characteristics of the reader's disability.   For blind users, extra messages for which there are no corresponding print symbols explicitly in a math formula should be provided to show the structure of that formula exactly.   For instance, they do need messages such as "Begin Fraction" and "End Fraction."   The manner of "aloud reading" originally defined in ChattyInfty was essentially of this style.   However, for other print-disabled people who can "see" the math expression up to a certain level, dyslexic users for instance, those extra messages actually disturb their understanding.   They are often confused with the messages that do not have corresponding print symbols.   Furthermore, even for blind users, when reading material repeatedly, they tend to want to skip those messages as well.

Thus, we implemented a new function in ChattyInfty3 so that three different types of "aloud reading" for math syntaxes can be selected.   "Plain-Reading mode" is based on one which may be most widely used in English-speaking countries.   It is natural; however, a spoken math expression is often ambiguous.   We assume that people with low vision and dyslexia use it.   In "Smooth-Reading mode," minimum-necessary speech guides for blind users to

grasp the structure of a math formula correctly are added.   "Detailed-Reading mode" is assumed to be used when a blind user wants to know the math-formula structure in the most detail.   Pressing Ctrl + F5 key switches these three modes; or you can also change the mode in the Setting menu.

In terms of math symbols, as same as the previous version, each of them is assigned two different manners of aloud reading: the Plain reading and the Detailed reading.   In the Detailed Reading, all of the character's attributes such as "capital" are read aloud.   Those two modes are applied in the Plain/Smooth Reading mode and in the Detailed Reading mode, respectively.   That is, the manner of aloud-reading math symbols in the Smooth Reading mode is as same as the Plain Reading mode.

Here are some examples of aloud reading of math formulas in the Smooth Reading mode that is default in ChattyInfty3.

Example1: Superscript/Power (1)
"x squared" is read aloud in these ways:
   a. When reading it straight through, it is "x squared"
   b. When reading it character by character from beginning to end, it is "x power 2, end power"
   c. When reading it character by character from end to beginning, "power 2, left super, x"

Here, "left super" indicates a superscript area on the left hand side of x.   This area is skipped in the case b.   If there were letters in this area, they would be read with a rising intonation before the base character in the case a.

Example2: Superscript/Power (2)
"e to the i theta power" is
   a. When reading it straight through, "e to the i theta power"
   b. When reading it character by character from the beginning to the end, "e, power i, theta, end power"
   c. When reading it character by character from end to beginning, "power, theta, i, left super, e"

Example3: Subscript
"x with the subscript n" is read aloud in these ways:
   a. When reading it straight through, " x sub n"
   b. When reading it character by character from beginning to end, "x, sub n, end sub."
   c. When reading it character by character from end to beginning, "sub, n, left sub, x"

Here, "left sub" indicates a subscript area on the left hand side of x. This area is skipped in the case b. If there were letters in this area, they would be read with the rising intonation before the base character in the case a.

Example4: Fraction

Fraction, a plus b over c is read aloud in the following ways:
    a. When reading it straight through, "frac a+b over c"
    b. When reading it character by character from beginning to end, "frac, numerator a, plus b, end numerator, denominator c, end denominator"
    c. When reading it character by character from end to beginning, "denominator, c, numerator, b, plus, a, frac"

Example5: Simple Radical

The square root of 2 is read aloud in these ways:
    a. When reading it straight through, "square root of 2"
    b. When reading it character by character from beginning to end, "radical, inside radical 2, end inside radical."
    c. When reading it character by character from end to beginning, "inside radical, 2, radical"

Example6: General Radical

The nth root of a is
    a. When reading it straight through, "index n root of a"
    b. When reading it character by character from beginning to end, "radical, radical index n, end radical index, inside radical a, end inside radical."
    c. When reading it character by character from end to the beginning, "inside radical, a, radical index, n, radical"

Example7: Special Symbols with Superscript and/or Subscript (1)

A summation from k=1 to n is read aloud in the following ways:
    a. When reading it straight through, "summation from k=1 to n of"
    b. When reading it character by character from beginning to end, "summation, under k, =, 1, end under, over n, end over"
    c. When reading it character by character from end to beginning, "over, n, under, 1, =, k, summation"

Example8: Special Symbols with Superscript and/or Subscript (2)

An integral from a to b is read aloud in the following ways:
    a. When reading it straight through, "integral from a to b of"
    b. When reading it character by character from beginning to end, "integral, sub, a, end sub, super, b, end super"
    c. When reading it character by character from end to beginning, "super, b, sub, a, integral"

Example9: Special Symbols with Superscript and/or Subscript (3)
A limit of x approaching 0 is read aloud in the following ways:
    a. When reading it straight through, "limit as x right-pointing Arrow 0 of."
    b. When reading it character by character from beginning top to end, "limit, under, x, right-pointing Arrow, 0, end under."
    c. When reading it character by character from end to beginning, "under, 0, right-pointing Arrow, x, limit"

Example10: Matrix
A 2 times 2 matrix enclosed with parentheses is read aloud in the following ways:
    a. When reading it straight through, "left paren, line of 1 a b, line of 2 c d, right paren"
    b. When reading it character by character from beginning to end, "left paren, a, b, new line, c, d, new line, right paren"

The message "new line" indicates a special line break in the array representation. You can move the cursor not only horizontally but also vertically in the matrix to browse it.

4.3   Speech Setting and Related Commands

Some commands in the Setting menu allow users to customize the setting concerning speech output.

4.3.1   Voice Setting

If several kinds of SAPI5 voices were installed in your PC, you could change the default voice for each of a text and math parts with the "Speech Setting" in the Setting menu. You can also change the volume, the pitch and the rate of aloud reading.

4.3.2   Other Settings and Commands Concerning math Reading

If "Read Menu" in the Setting menu were not checked, menu items such as the symbol list would not be read out.

You can suppress speech output of "space" and "return" by pressing Ctrl + F8 key or using "Read Aloud Line Break Marks" in the Setting menu.

If "Read Entire Line" in the menu were checked, entire contents up to a carriage return line feed would be read out when the cursor would come to that line.

If "Automatically Reading Mode" were checked, the cursor would move ahead automatically, and contents would be read out without cursor operations.

Remark:

With "Read Out" menu commands, you could also listen to a content without cursor operations.　However, in this case, the cursor would keep its original position.

Using a shortcut: the Ctrl + Alt + H, you can check the font style such as bold, italic. Incidentally in math expressions all alphanumeric letters are math italic.

In the Setting menu, there are also other useful commands such as ones concerning highlighting, etc.

4.3.3　Aloud-Reading Table Editor

Using this editor, you can change a way in which each symbol is read aloud.　The "Default" button cancels all of the customization made by the user.　You may save a customized table in another name and apply it with "Select Reading Table" in the Setting menu.

4.3.4　Edit Math Reading

You can edit how to read math syntaxes are read aloud from beginning to end (not character-by-character). The default definition file named "ReadSetting_SAPI5_En.txt" is located in:

　　　　C:¥Program Files¥sAccessNet¥ChattyInfty3¥language¥ReadSetting¥.

You may edit it by using any text editor.　You can customize all of the three types of aloud reading for math syntaxes.　In addition, the manner of aloud reading of each math symbol also can be edited on this text file.　The result is automatically reflected in the definition table of them.

4.3.5　Reload Math Reading

While ChattyInfty is running, the new definitions can be reload with this command.

4.3.6　Assigning Another Manner of Aloud Reading

There are many math formulas that have ambiguity in reading out them.　For instance, a mixed fraction could be read as the product of an integer and a fraction.　X squared could be read as the second component of a vector.　We often have to assign them an appropriate manner of aloud reading, according to their context.　Unfortunately, however, since it is impossible to assign the appropriate aloud-reading to them automatically, we do need a new way to handle how to read out each symbol or math formula locally according to their context. We refer to this new concept of assigning a pronunciation as "Yomi" (a Japanese word that means "a manner of aloud reading").　We actually give a concrete method to assign Yomi to math expressions in ChattyInfty3.

After selecting a certain part of a math formula, press the Shift + Ctrl + Down key; then, a dialog to assign Yomi will appear.　You can give any word description for the part with it. You also can open the Yomi dialog with "Open Yomi Setting" in the Format menu.

Remark:

Instead of Yomi, pressing the Shift + Ctrl + Up key opens a "Ruby Setting" dialog. Ruby is similar to Yomi; however, a word description assigned as Ruby is displayed explicitly by the side of an original formula while Yomi is not. Ruby is very useful in a Japanese text; however, we do not think it would also need in English.

5. View Menu

5.1 Last Reading Bar

"Last Reading Bar" is a one-line window to show a character string of sentence that ChattyInfty has just spoken. You can open this window with the View menu and move to it with the F6 or Ctrl + F6 key.

5.2 LaTeX Source Bar

"LaTeX Source Bar" is a one-line window to display a character string of LaTeX source that corresponds to the line the cursor is currently located. You can open this window with the View menu and move to it with the F6 or Ctrl + F6 key.

6. Setting Menu

There are many useful commands available with the Setting menu other than ones described up to now.

6.1 Standard Font Selection

The user can select the font and the size to be used by ChattyInfty. It will be applied to the entire document.

6.2 Option Setting

Using the "Text/Math Change Shortcut," you can choose one of the following 2 ways to switch the Text/Math modes:
   a. Ctrl Key   You can switch the Text/Math modes by pressing the Ctrl key only,
   b. Ctrl + Space key   You can switch the Text/Math modes by pressing a Space key together with the Ctrl key.

Using the "Backslash Command in Text mode," you can choose the role of backslash key in the text mode. It could be either the symbol of backslash itself or the prefix of LaTeX

commands.

Using "Cursor Order in fraction," you can if cursor will move first to the numerator or the denominator.

When the "Space Mark" for "Text mode space," "Math mode space" or TeX mode space are checked, spaces will be marked in color so the reader will know their location.

If "Ctrl + Up/Down to Super" were checked, the Ctrl + the Up Arrow key would be a shortcut to move the cursor to the superscript position. Pressing the Up Arrow key alone would simply move the cursor to the previous line.

6.3 Convert Options

6.3.1 Import Group
In this group, you can choose the formats to be imported to ChattyInfty. Only the checked items will appear in the Import command in the File Menu.

The choices are
   a. LaTeX Source Import - a LaTeX formatted file can be converted IML format and be loaded to ChattyInfty. A LaTeX command that ChattyInfty cannot convert is imported as in TeX mode.
   b. OCR-file(KML) Import - a recognition result file of ChattyInfty, KML file, can be loaded to ChattyInfty.

6.3.2 OCR Import Group
In this group, you can choose sources which can be recognized by ChattyInfty and set some parameters for the recognition.
   a. Import from Scanner   You can recognize documents by ChattyInfty via a scanner.
   b. Import from Image File   You can recognize documents as page image files.
These items appear in the Import command of File menu if you checked them.
   c. Delete KML after OCR   ChattyInfty saves recognition results in a KML file.
If you check this option, ChattyInfty deletes the KML file after recognition.
   d. Include Image Areas   ChattyInfty saves images included by a recognized document in a KML file.

6.3.3 Export Group
In this group, you can choose some kinds of formats to be converted from edited documents by ChattyInfty. Only checked items appear in the Export] command of File menu.
   a. LaTeX Output   An edited document can be saved in LaTeX format.
   b. HTML Output   An edited document can be saved in HTML and each mathematical expression will be saved as an image file.

c. MathML Output　　An edited document can be saved in MathML.

d. Human Readable TeX Output　　An edited document can be saved in Human Readable TeX (HR-TeX).　In the HR-TeX, mathematical expressions are described in LaTeX format, but some LaTeX commands that are not needed to describe context of a document (e.g. environmental commands, layout comments, etc.) are omitted.

e. Karlsruhe AMS-notation Output - Karlsruhe AMS (ASCII Mathematik Schrift) is developed in Karlsruhe University to describe mathematical expressions only using ASCII characters.

6.4　Math Level

The math levels are:

　　Junior high school math,

　　Senior high school math,

　　University math,

　　Professional math.

Since ChattyInfty provides many symbols for highly technical materials, setting the correct level limits the choices of symbols.

7.　Using ChattyInfty with Other Screen Readers

7.1　Using ChattyInfty with JAWS

Since the current version of ChattyInfty could read out all the contents and menus, you might not need to utilize another screen reader with ChattyInfty if you hoped math access with speech output only.　However, if you would like to make use of a Braille display, you would have to use a screen reader such as JAWS along with ChattyInfty since it has no function to output Braille directly.　When ChattyInfty is used with JAWS, some conflicts between their speech outputs will take place.

In order to avoid the speech conflictions, we prepared JAWS's script files for ChattyInfty.　If necessary, please install them in the following manner.

Put three script files included in the package of ChattyInfty into the setting folder of JAWS for each local language.　For instance, the setting folder in English OS might be:

　　　C:¥users¥"YourAccount"¥AppData¥Roaming¥Freedom-Scientific¥JAWS¥14.0¥settings¥ENG¥.

Remark:

Since Windows7, JAWS scripts installed in a certain user's account does not work for the

other users.

7.2　Output to Braille Display

The script files for ChattyInfty not only suppress JAWS's speech but also send the content of TeX-source-bar window to the Braille display via JAWS.　In order to use this function, you need to open this window with the View menu.

Remark:
The LaTeX Source Bar only shows a character string of the LaTeX source that corresponds to the line the cursor is currently located.　The position of cursor is not indicated. Furthermore, you may need to tune the setting of your Braille display to show the content correctly.

8.　Operations concerning LaTeX

8.1　About TeX Environment

The document created by ChattyInfty can be exported into LaTeX format. You can compile it and preview the DVI file on ChattyInfty.　Furthermore, the DVI file can be converted into PS (PostScript) file or PDF (Adobe Portable Document Format) file.　However, to use these functions (except for exporting LaTeX), you must install TeX environment in your PC.　You can download an archive file of LaTeX installer package including all the necessary tools to use LaTeX functions in ChattyInfty from the site: http://www.inftyproject.org/en/download.html

8.2　Description of Operations concerning LaTeX

8.2.1　Exporting LaTeX
You can export the document created by ChattyInfty into LaTeX format by selecting the item "LaTeX Output" from the TeX menu.

8.2.2　Editing Source
You can edit the LaTeX source file just created, by selecting the item "Edit Source" from the TeX menu.

8.2.3　Compiling LaTeX Source
You can compile the LaTeX source file by selecting the item "Compile" from the TeX menu.

8.2.4　Previewing DVI File
You can preview the DVI file by selecting the item "Show DVI File" from the TeX menu.

8.2.5 Opening Log File

You can open the LOG file output after LaTeX compiling by selecting the item "Show LOG File" from the TeX menu.

8.2.6 Converting to PS

You can convert the DVI file to PostScript(PS) file by selecting the item "DVI -> PS Convert" from the TeX menu.

8.2.7 Converting to PDF

You can convert the DVI file to PDF file by selecting the item "DVI -> PDF Convert" from the TeX menu.

8.3 Setting concerning LaTeX Output

8.3.1 Preamble Setting

By selecting the item "Preamble" from the TeX menu, the dialog box "Setting TeX" appears. You can design the preamble to be output in the heading of LaTeX source file. The preamble design can also be read from existing LaTeX source in user's PC, by clicking the "Input from" button in the dialog box.

8.3.2 Treatment of Spaces and Line Feeds

You must select one of the two modes in the conversion of ChattyInfty source to LaTeX source. One is "quasi-WYSIWYG mode" that converts each line feed in the ChattyInfty source file to a double line feed in the LaTeX source file, and outputs so that the screen and the printing are almost the same. You can select this mode by clicking the check box in the dialog box opened by selecting the item "LaTeX Output Option" from the TeX menu. The other one is "LaTeX source editing mode" that outputs spaces and line feeds in the ChattyInfty source file to LaTeX source file without changing. Please see the next subsection about the control of spacing and line feeds in "LaTeX source editing mode".

8.4 Input Guide for LaTeX Source Editing Mode

In writing a source file using LaTeX, the treatment of spaces and line feeds are different from writing text with usual word processors. The following hints will help avoid problems:

8.4.1 Treatment of Spaces

In LaTeX, the spaces are automatically treated, and the spaces in the source file are ignored when printing. If you want to place blank intentionally, you must specify it explicitly in the source file as follows:
  a. Space in horizontal direction: ¥+space, ¥quad, ¥hspace{1.5cm}, etc.
  b. Space in vertical direction: ¥bigskip, ¥medskip, ¥vspace{3cm} , etc.

8.4.2 Line Feeds

Line feeds at the end of each line in LaTeX source files are ignored when printing. If you need to start a new line, insert a blank line at the position where you want to do so. Another way is to use line feed command, "¥par". Since these two line feeds mean the end of a paragraph, the line following them is automatically indented. If you want to change a line without the indent, use "¥¥" command instead of "¥par or the blank line. You may also use "¥noindent" command.

Note that users should adopt the above two rules with "LaTeX source editing mode". ChattyInfty displays the formula, bold/Italic, centering, etc. on the screen in the print style as much as possible. However, to ensure that you can write freely without sacrificing LaTeX's power for expressions, the controls of spacing and line feeds in "LaTeX source editing mode" are defined according to the above two rules.

8.4.3 Half size Spacing

You can insert a half size space by Shift + space. The half size space in "LaTeX source editing mode" is converted to "¥" in LaTeX source file.

8.4.4 Formulas and Text

Each mathematical formula written within other texts is output between the single $ commands: $ ... $ in LaTeX source file. On the other hand, if you center the line which consists only of mathematical formula, it is output between the double $ commands: $$ ... $$ as the display style formula in LaTeX. The centered line of formula is treated as independent one when you start the new line with Enter key; however, if you use Shift + Enter instead, successive lines are treated as one display style formula.

8.5 Enhanced Command Input

ChattyInfty provides "TeX Mode" in both of "quasi-WYSIWYG mode" and "LaTeX source editing mode" so that you can use other symbols not available in ChattyInfty. Many other convenient commands of LaTeX such as ¥section, ¥subsection, ¥label, ¥begin{figure}, ¥begin{enumerate}, etc. are also provided. By selecting "TeX Mode" from the Format menu, you get into "TeX Mode". Then, keyboard input strings are not converted automatically even if they include ¥ sign; they are displayed as strings of TeX commands. The characters input in "TeX Mode" in Text area is displayed in red (default). The characters input in "TeX mode" in Math area is displayed in brown (default).

9. File Operations

9.1 Available File Formats for Import

File formats that ChattyInfty3 can open are:

* XML file especially created with Infty software (*.imlx)
You can open IMLX files by selecting the item "Open" from the File menu. You can save the documents created in ChattyInfty3 as a special Infty XML file (*.imlx) by selecting the item "Save" from the File menu (or Ctrl + S).   You can also save the documents created in ChattyInfty3 as IMLX file with new filename by selecting the item "Save As" from File menu.

Remark:
In the old version, ChattyInfty2, the Infty original format was IML. An IML file can be imported into ChattyInfty3, and an IMLX file can be output as an IML file.

* LaTeX Source file (*.tex)
You can open a LaTeX file by selecting the item "Import LaTeX" from "Import" in the File menu.

9.2   Available File Formats for Export

Output formats other than IML such as LaTeX, HTML, MathML, "Human Readable TeX", spoken text and Microsoft Word xml were available in the previous version, ChattyInfty2. In ChattyInfty3, besides them, accessible e-book formats: DAISY (2 or 3), Accessible EPUB3 and ChattyBook are also available as export format.

* Exporting to LaTeX
You can export the document created in ChattyInfty into LaTeX format by selecting the item "LaTeX" from "Export" in the File menu (or Shift + Ctrl + T).

* Exporting to HTML
You can export the document created in ChattyInfty into HTML format by selecting the item "HTML" from "Export" in the File menu (or Shift + Ctrl + H). Mathematical expressions will be inserted as PNG format images.

* Exporting to MathML
You can export the document created in ChattyInfty into MathML format (*.xml) by selecting the item "MathML" from "Export" in the File menu (or Shift + Ctrl + L). Mathematical expressions will be inserted not as images but as MathML.

* Exporting to Human Readable TeX
You can export the document created in ChattyInfty into "Human Readable TeX" format (*.txt), which is an alternative simpler syntax for people with print disabilities who are

familiar with LaTeX.　Export by selecting the item "Human Readable TeX" from "Export" in the File menu (or Shift + Ctrl + X).

* Exporting to Spoken Text
You can export the document created in ChattyInfty into a text file consisting of a spoken text by performing "Spoken Text" command from "Export" in the File menu.　Since, inn this file, all math expressions are replaced with their word descriptions, you can read it with another screen reader.

* Exporting to Microsoft Word 2007 (or later) XML
You can export a document created in ChattyInfty as a Microsoft Word 2007 (or later) XML document.　In that Word file, all the math expressions are represented in Word math objects. You can edit them with the math editor in the Word; however, you cannot with ChattyInfty3, again.

Remark:
If another software: "MathType" were also installed, you could convert a Microsoft math object into a MathType object.　Then, you could edit them with MathType.

9.3　DAISY, Accessible EPUB3 and ChattyBook Export

As is well known, The Digital Accessible Information System (DAISY) is now becoming a standard format of accessible e-books.　Furthermore, the International Digital Publishing Forum (IDPF) decided to adopt DAISY XML as a part of EPUB3 standards in 2011. DAISY and accessible EPUB3 are excellent solutions for making printed content more accessible to people with various print disabilities.　In the previous version, DAISY2, a mathematical expression was treated as an image with an alternative text.　Since MathML is officially adopted in the current version, DAISY3 and EPUB3 (DAISY4), we would become able to produce a text-based/multimedia mathematical content, in which one could access a math formula character by character, symbol by symbol with speech synthesis.　A blind user can read mathematical documents with speech output.　A low-vision reader can improve contrast or magnify the displayed content for ease of reading.　Visual tracking and synchronized speech allow a dyslexic reader to maintain focus on a document.

Since, in ChattyInfty3, DAISY, Ver.2 and 3 and accessible EPUB3 are officially adopted as export formats, math/scientific contents produced with ChattyInfty3 can be converted into accessible e-books in DAISY/EPUB3.　The index structure or other settings such as Yomi in ChattyInfty will be preserved in DAISY/EPUB3 contents.　Now, you can use ChattyInfty3 as excellent authoring tools to produce accessible e-books.　"Export DAISY" and "Export EPUB3" commands in the File menu allow you to do that.

Remark:

In addition to that, with the "Export ChattyBook" command, you can convert a ChattyInfty3 document into a DAISY-like HTML5 file.   You can browse it with any browser.   You do not need a DAISY/EPUB3 player.

9.4   Page Setting and Printing

You can set the page property by selecting the item "Page Setup" from the File menu.   The standard page properties in ChattyInfty are as follows:

a. Paper size: A4, A5 and Japanese-own standard sizes, B4 (10 by 14 inches) and B5 (7 by 10 inches)
b. orientation: Vertical, Horizontal
c. Margin
d. Page layout: Single or Two columns, Output page numbers
e. Page title

If the document contains 2 or more pages, page numbers will be shown in the footer automatically.   You can also select no-page-number output mode.

9.5   Control of Page Break

As will be seen later, inserting a page break and combining two pages are supposed to be done with the Index menu.

10.   Index Menu

Editing the index can be done in an intuitive manner.   The head line of each page is automatically treated as a top item in the index.   It appears on the first level of a tree diagram in the index window.   Using "Index" menu, a user can perform various commands concerning the DAISY index.   "Page Break" and "Join" commands are used to divide a page into two pages and to combine multiple pages, respectively.   When performing the Page-Break command, the top line of a new page is automatically treated as the first-level item in the index.

"Add Index" and "Remove Index" commands are used to create a new index item and to delete some items, respectively.   Performing the Add-Index command after selecting a certain part in the document such as the title of a subsection, users can add it onto the second level of the index.   It appears at the right-hand side of the top level in the index window.

Index items can be moved from a certain level to a higher level or vice versa with "Level Up" or "Level Down" commands in the Index menu.   On the other hand, "Order Ahead" and

"Order Behind" commands in the Index menu are used to move items within the same index level.

11. Other Menus

11.1 Edit Menu

From the Edit menu, operations listed below are available:
* Undo: (U)   [or Ctrl + Z]
     It undoes up to 10 steps back to the previous status.
* Redo: [or Ctrl + Y]
     It redoes the undone steps.
* Cut: (T)   [or Ctrl + X]
     It cuts the selected range and holds that item on the clipboard.
* Copy: (C)   [or Ctrl + C]
     It copies the selected range and holds that item on the clipboard.
* Paste: (P)   [or Ctrl + V]
    It pastes the item cut or copied. You can also paste a character string copied in the ChattyInfty file (*.iml) to other applications through Windows clipboard. If it includes mathematical expressions, they will be pasted in the LaTeX format. You can paste a character string written by other text editor with math expressions in the LaTeX format to ChattyInfty files.
* Delete: (D)   [or Del]
     It deletes the selected range.

NOTE: The above six commands can be also performed from the Context menu that pops up by pressing the Application key on the keyboard or the right click.

* Select All: [or Ctrl + A]
     It selects all the content in the currently opened document.
* Insert Image (figures, charts and images):
    It inserts a figure, a chart or other images as image into the iml file.   In order to insert images, you have to prepare image files in one of the following formats:
        .bmp, .jpeg (.jpg), .png and .tif (without lzh compression).
    If you select "Image Position" from the Context menu, you can select the image layout and its size.   Note that it is not possible to insert images into super/subscript positions.
* Copy of math expressions as Images: [or Ctrl + Shift + C]
    Using this command, you can paste math expressions made in ChattyInfty to other software in alternative form other than LaTeX.   Since math expressions written in ChattyInfty can be copied as images into the clipboard of Windows, they can be pasted into various Windows applications such as Microsoft Word, PowerPoint and so on.

11.2　Format　Menu

From the Format menu, operations listed below, etc. are available.

* Text mode　(T)

* Math mode　(M)

* TeX mode　(X)

* Footnote mark:

　　When entering a footer text in a scientific document, select whether it should be superscript or subscript within an original line height (level).

* Font Style:

　　Italic and Bold commands emphasize the selected range with each style.　Characters that can have Italic or Bold styles are limited to Numeric, Roman, German, Latin and Latin2. Pressing Ctrl + I key changes the style to Italic, and Ctrl + B key changes it to Bold.　You can check out the style of already-entered character by pressing Ctrl + Alt + H.

* Frame line:

　　When you want to insert a blank box, enter spaces first, select them and choose "frame line" command; then, the box is entered at that position.　Note that these blank boxes are currently incompatible with LaTeX output.

* Font size:

　　A standard size is established by the Setting menu.　The standard size set here indicates the "Medium" in "font size" in the Format menu (actual size: F3 in the list).　From this standard size, "large" and "ultra large" commands enlarge the size by 2 and 4 points, respectively. "small" and "ultra small" commands reduce it by 2 and 4 points, respectively. These 5 levels in total become the optional font sizes.　The font size can be changed with the Format menu.

　　When you want to change the font size for the line already entered, move the cursor to the line and select new size from the menu.　The same size will be applied to all lines in the paragraph concerned.

　　Since only one standard size is effective in one file, if you change the setting of standard size in the middle of it, the standard size (Medium:　F3) will be changed for the entire file.

* Centering:

　　Character layout can be changed for paragraphs as a unit by the following commands: Left align, Centering, Right align

11.3　Find Menu

You can Find and Replace character strings not only in the Text mode but also in the Math mode.　Commands listed below are available.

* Find in Text   [or F3],
* Replace in Text,
* Find in Formula   [or Ctrl + F3],
* Replace in Formula.

12.   Contact Information

Contact information can be found on our web site,
URL   http://www.sciaccess.net/en/index.html.