CSE 6390E Computational Linguistics Project
Winter 2010
“CL Book”

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1. Introduction

Ever tried learning a foreign language? Have you noticed how the books you *could* read were often boring? And were the books you *wanted* to read just that bit too hard to understand? Did you wish for a quick translation of a complex passage? Or wished there was a quick way to learn English for beginners?

With paper books, you're pretty much stuck. But e-books—with the right combination of software and open formats—can help keep you reading and learning in the new language.

In this project we designed a system that helps as English grammar learning software for beginners as well as translation software for ebooks.

1.1 Motivation

Grammar learning through real examples – Most of the texts provided for learning grammar are boring and feel artificial. How about being able to choose your own text and have the reader software automatically highlight the structures you are learning this week, whether it is proper nouns, present perfect constructions or conjugations of the irregular verb 'to be'? With the material being presented completely in context, the rules will be easier to understand and recall. And even if you are rereading the last week's passage, you are learning something new, as the highlighted parts will change.

Parallel texts – Intermediate and advanced readers appreciate being able to read original text, while still having a good translation available a glance away.

Paper books like this do exist, but just a few, due to a high cost of production and distributed target market. For e-books, the ever decreasing price of the storage makes the size of the download irrelevant – slashing the cost of physical production. And with electronic distribution, the market reach is as wide as the internet itself.

1.2 Challenges

In this project, we use free available Stanford POS tagger library and Google Translate library for some processing. This means the accuracy of the results of our program is dependent on the accuracy of the libraries we use. However, with Stanford POS tagger's 96.92% accuracy and Google translate's pretty high accuracy, our program gives good results overall.

1.3 Outline of the report

The report starts by describing the system and the implementation details in section 2. It covers the data structures and the algorithms used. It also describes in detail the Grammar learning and the Translation parts of the program. Section 3 includes sample output of the program with brief descriptions. Section 4 contains the concluding remarks and ideas about future work. Section 5 outlines the System Manual and section 6 annotates the references. Lastly, section 7 contains an appendix.

2. System

Our system CL Book has two major components: English Grammar Learning and Translating. We examine each component below.

2.1 English Grammar

The program provides several English grammar topics for beginners. These have been adapted from a level 1 English grammar topics [3][4]. The lessons include Adjectives, Adverbs, Determiners, Nouns, Pronouns, Passive Voice, Possessive, Conjunction and Verbs.

This part of the program can be broken down into steps such as:

- Preprocessing text
  - Removing Newline Characters from Paragraphs as explained in section Algorithms.

- Using MaxentTagger from Stanford POS Tagger API
  - Stanford POS Tagger: A Part-Of-Speech Tagger (POS Tagger) is a piece of software that reads text in some language and assigns parts of speech to each word (and other token), such as noun, verb, adjective, etc., although generally computational applications use more fine-grained POS tags like 'noun-plural'. Stanford POS Tagger software is a Java implementation of the log-linear part-of-speech taggers described in [1] and [2]. The tag notation is taken from the Penn Tree Bank POS tagset described in [5], table 2 ,page 317. Refer Appendix POS tagset.
  - We use the already trained *left3words-wsj-0-18.tagger* model for tagging. This model uses only left sequence information but less unknown words and lexical features. Its accuracy was 96.92% on Penn Treebank WSJ secs [1][2].
  - The input to the tagger is a simple String e.g. *I wonder if I shall fall right through the earth!*
  - The output tagged text can be produced in several styles. The tags can be separated from the words by a character, which you can specify (this is the default, with an underscore as the separator), or you can get two tab-separated columns (good for spreadsheets or the Unix `cut` command), or you can get ouptput in XML. We use the format <word_POStag> e.g. *I_PRP wonder_VBP if_IN I_PRP shall_MD fall_VB right_JJ through_IN the_DT earth_NN !_.*

- Processing the tagged output for each lesson topic
  - We separate the word and the tag by tokenizing the String using the underscore delimiter.
  - Then we find the start and last index of the word in the entire String. This will be used later when highlighting the text in the reader.
  - The indices and the tag are then stored in a Map.

2.2 Translating from English to other languages

The program provides translation facility by tapping into the Google Translate API. The text can be translated from English to any language that is supported by Google Translate e.g. Arabic, Chinese, French, German, Hindi, Italian, Persian, Polish, Russian, Belarusian, Serbian, Thai and Swahili to name a few.

2.3 Implementation

2.3.1 System Requirements

- Java 1.6+
- 120+ MB of RAM
- Internet connection to the Google Translate server for translating

2.3.2 Data Structures

We have used a small number of Data Structures in our implementation of CL Book. They are used for tasks, such as:

1. Keeping the Loaded Book in Memory
   - When a book is loaded, we need to break it up into pages. The source ebook file is a plain text file, with newline characters at the end of each line. We take 24 lines of text and combine them into one book page. We store each book page as a String, and a Vector of Strings contains all the book pages.
2. Word Tagging Data for Current Page
   - The output from the tagger is a String of words and their tags. This is tokenized to retrieve the first and last index of each word as it appears in the original text. This first and last index pair is called a Tuple. Finally, a Map of type <Tuple,String> is used to save the results. This makes it easier when we need to highlight the words in the display. Furthermore, two arrays are used: one of type Tuple and the other of type String. These save the Tuples and tags respectively. This is needed when we check the tags of the previous or next few words for computing dependency between words as in the lesson "Passive Voice".

2.3.3 Algorithms

There are various algorithms used throughout CL Book project.

1. Loading Book to Memory
   - To load a book, which is given in a plain text format, we read the file one line at a time. Every 24 lines are concatenated into a page, and the page is added to a Vector of Strings containing all the pages.

2. Removing Newline Characters from Paragraphs
   - After a book is loaded, each page consists of 24 lines of text. There are newline characters within paragraphs. For multiple reasons, we must remove those newline characters before further analysis of the text. To do so, an algorithm is employed. It looks through each line of text, and adds it to the current block. When it sees that the next line is blank, it knows the current paragraph is over, so it finishes the current block and starts a new one.

3. Processing Text with POS tagger
   - For each entry in the Map, we check the value i.e. the POS tag. Depending on what lesson the user has selected, we create a list of Tuples (start and end indices of words to highlight) that correspond to the selected lesson. For e.g. if the user selects the lesson "proper nouns", then all proper nouns will be highlighted in the text currently displayed

on the screen. For general part of speech such as nouns, verbs, pronouns, the tagger's tags are pretty straightforward. For more complex lessons such as comparative adjectives, comparative adverbs, passive voice, possession, we need to take into account the neighbouring words' dependencies.

  - In a phrase such as "more beautiful", the tagger tags "more" as *JJR* (syntax for comparative adjective) and "beautiful" as *JJ* (syntax for adjective). So when we would like to display all the examples containing "comparative adjectives", we need to highlight not only "more" which the tagger tagged correctly, but also "beautiful". In order to do that, we need to check whether the next tag after *JJR* is *JJ*. Similary we can compute comparative adverbs.
  - For passive voice, we first look for a tag *VBN* which stands for past participle form of a verb. Then we check if the preceding word is either *VBG* (gerund form) or *VBZ* (third person singular present) or VBD (past tense) of verb "TO". If yes, then the phrase can be classified as passive voice structure.

4. Adding Newline Characters to Balloon Tooltips
   - When displaying Balloon Tooltips, HTML is used to specify the font face, size, as well as the newlines. Without line breaks, the entire tooltip ends up being too long and doesn't fit on the screen. However, the source text for a tooltip comes with no newline characters (because they've already been removed earlier). So an algorithm is used to recreate these newline breaks, by adding the <br> HTML tag at appropriate locations. It scans through the source text one character at a time, and when it counts 80 characters within the same paragraph, it adds a <br> tag. It repeats this process until the entire source text is converted.

5. Translate with Preserved Formatting
   - Unfortunately, our translator service drops any formatting in the source text when returning the translated result. Thus, an algorithm that counteracts this had to be created. Otherwise, all paragraphs merged into one, without any line breaks in between, which was unacceptable. In order to solve this, an algorithm similar to the "Removing Newline Characters from Paragraphs", but with some intermediate steps added. It begins by breaking up the text into blocks. Next, it translates each block separately, one by one. Afterwards, it reassembles all the translated paragraphs into one final combined result.

2.3.4 Resources/Files

Lessons Description File

We have used a custom file format to describe all of our grammar lessons that you find available within CL Book. The file is named "CL Lessons.txt" and resides in the root folder of the CL Book project.

The format of this file is as follows. For each lesson, the first line of text is the lesson name (e.g. "Lesson 1: Adjectives"). The second line of text is the internal id of the lesson (e.g. "adjective"). The following lines of text, up until a blank line, is the HTML description of the lesson.

This is a better solution than hard-coding all that information due to the extra flexibility it affords. It has allowed us to continue adding lessons, and modifying their description without having to edit code, working outside of the Java project. Refer Appendix CL Lessons.txt.

2.3.5 Alternative implementation ideas

We preferred using Java language since the two libraries (Stanford POS tagger and Google translate) that we're using have Java APIs. But an alternative would be to use C++ and OpenGL for better visual rendering. Moreover, currently the program may use upto 100 MB of memory. Coding in C++ *might* make it use less memory.

As for the algorithms, we would have liked to design a better idea for processing tagged String. Currently, we check each tag and its neighbouring words' tags individually by looping over them and using AND and OR conditions. However, we would like to improve it by using an idea where you could search for a tag in some given range of a word. For e.g. if a word is tagged as a "past participle", you'd like to know the tags of the previous and the next three to five words. A possible data structure could be a multi-map.

3. Examples of Output

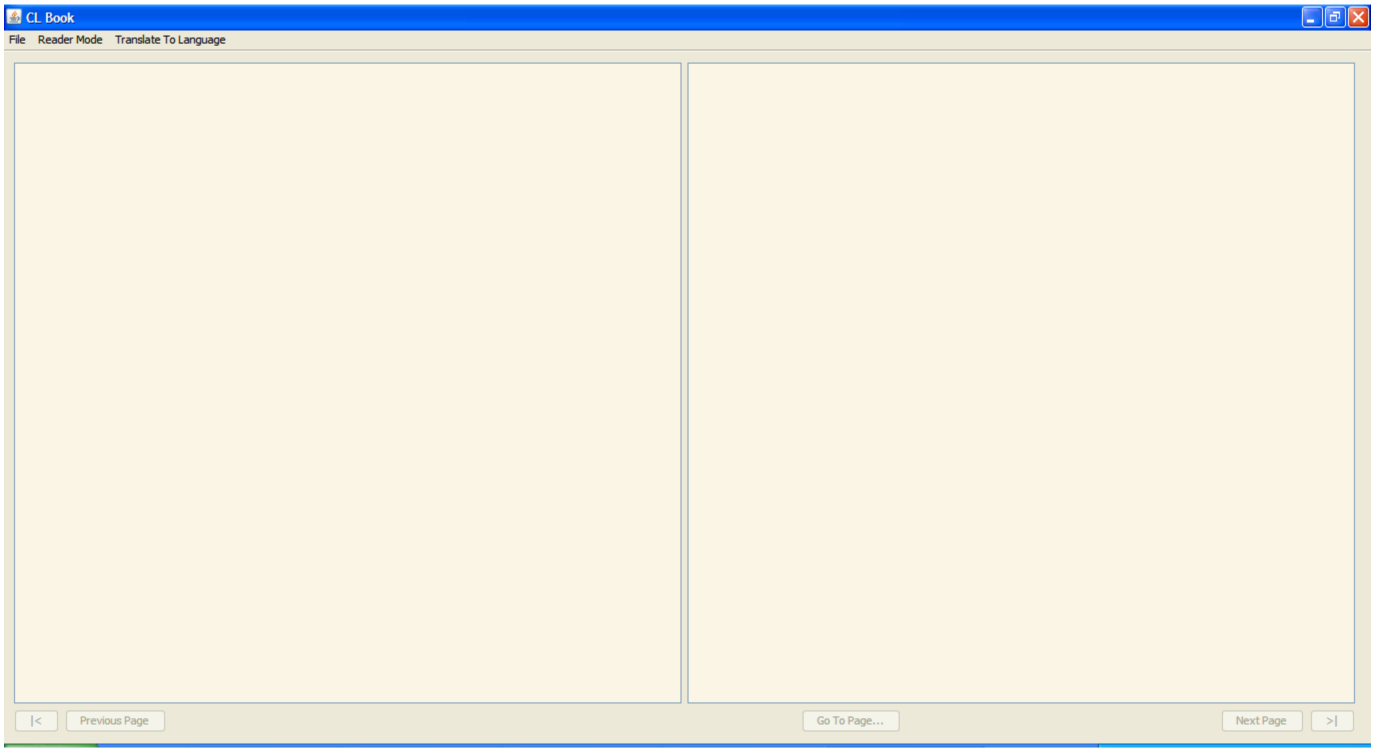
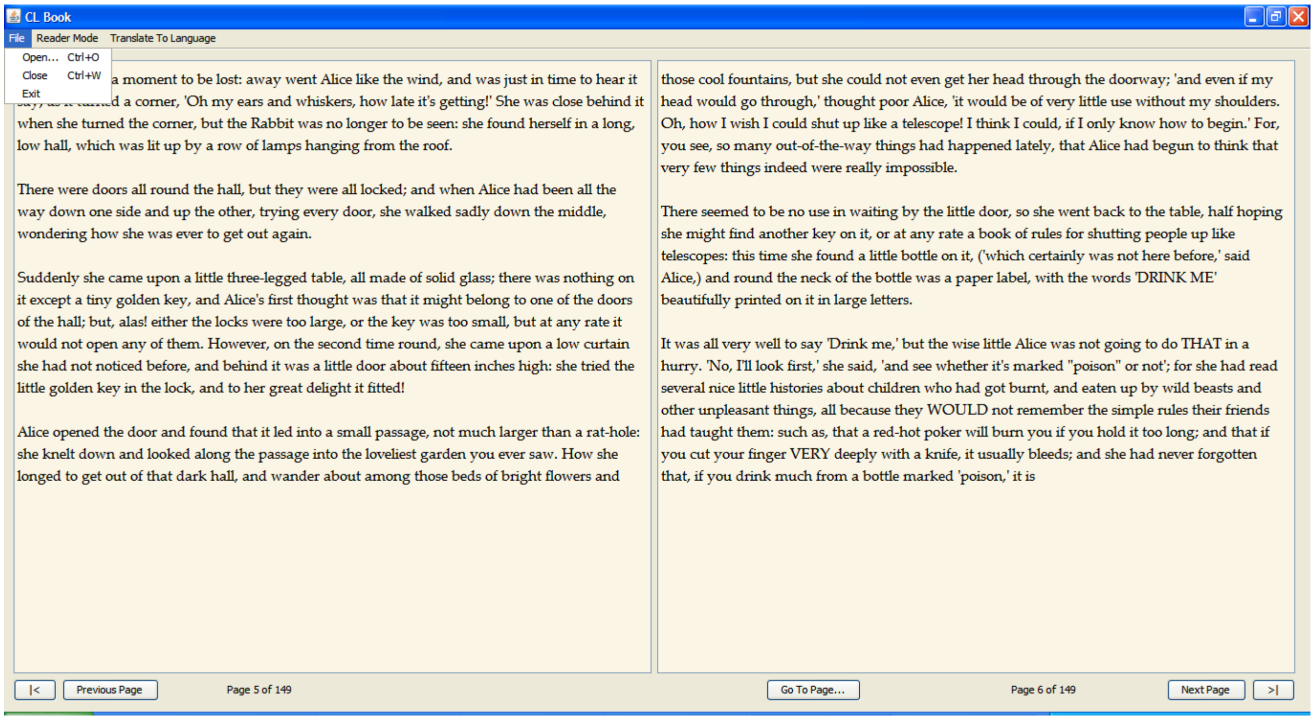


Figure 1. Blank Canvas

This is what the CL Book reader program looks like upon launching. You are presented with a big window, but no book is opened yet.



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There seemed to be no use in waiting by the little door, so she went back to the table, half hoping she might find another key on it, or at any rate a book of rules for shutting people up like telescopes: this time she found a little bottle on it, ('which certainly was not here before,' said Alice,) and round the neck of the bottle was a paper label, with the words 'DRINK ME' beautifully printed on it in large letters.

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Figure 2. File Menu

The file menu. It allows the user to Open, Close a book, as well as to Exit the application.

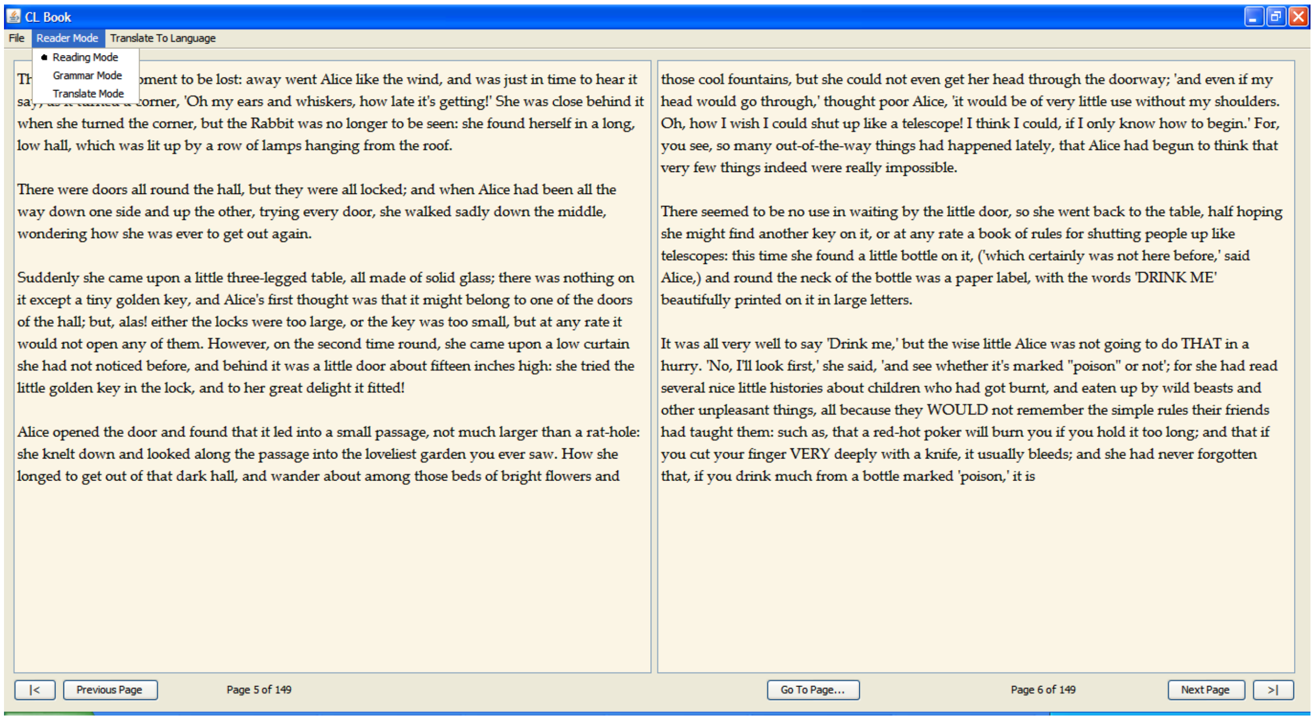

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Figure 3. Mode Menu

There are three modes of operation altogether in CL Book: Reading Mode, Grammar Mode, and Translation Mode. This menu allows you switch between them.

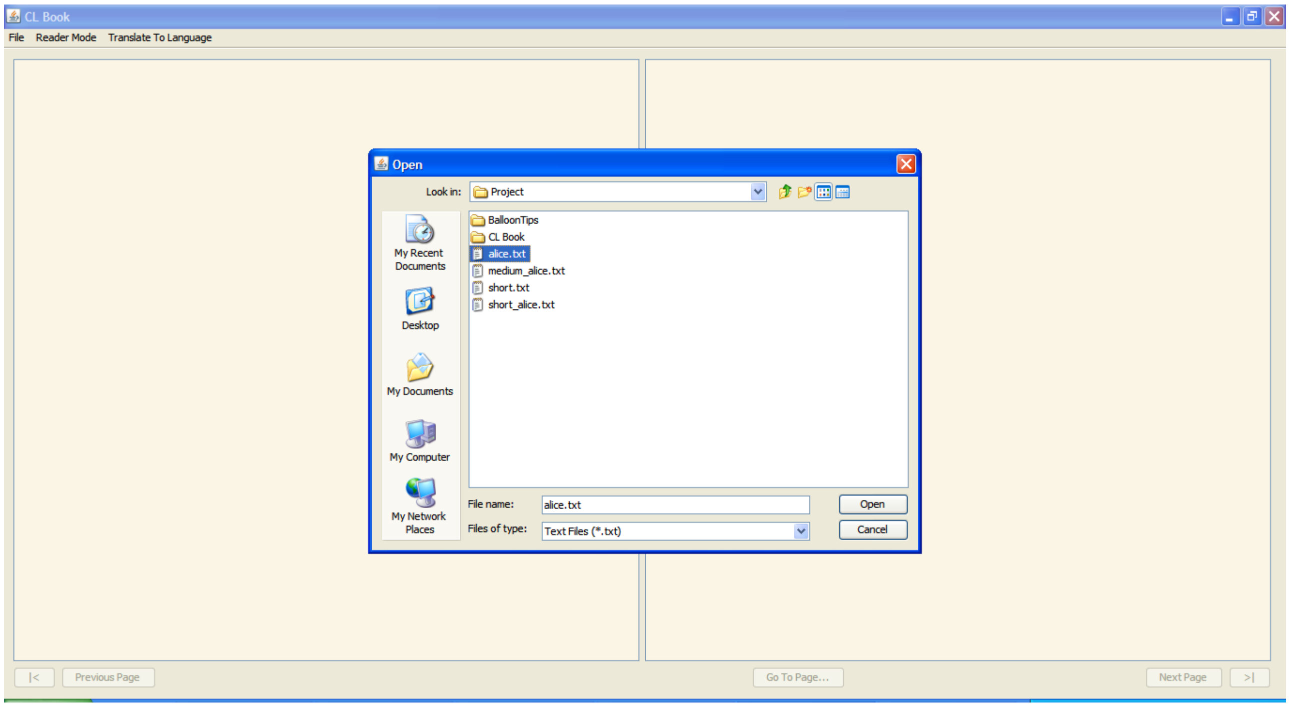
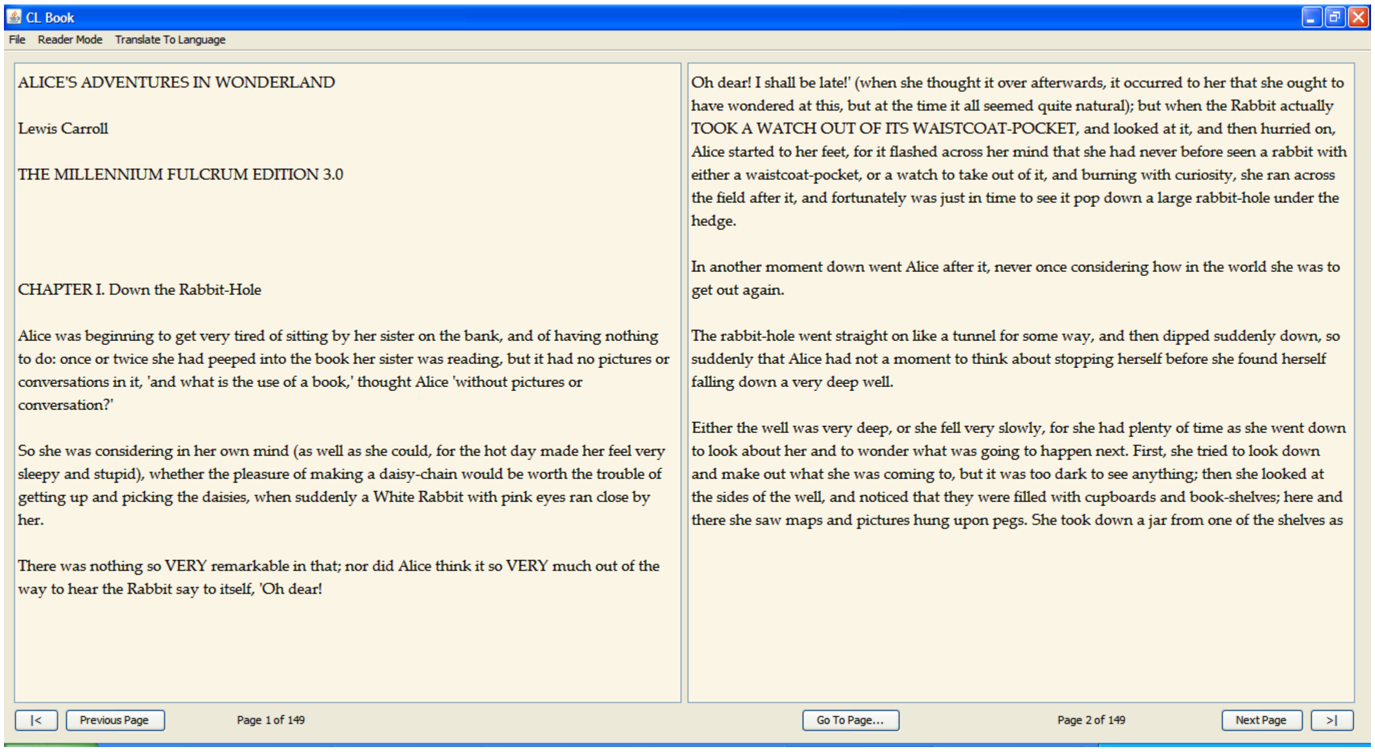


Figure 4. Open Book Dialog

This is the Open book dialog. It is accessible by pressing Ctrl+O or by going under the File menu, and selecting Open. You can choose the book of your choice, in a *.txt plain text file format.



ALICE'S ADVENTURES IN WONDERLAND

Lewis Carroll

THE MILLENNIUM FULCRUM EDITION 3.0

CHAPTER I. Down the Rabbit-Hole

Alice was beginning to get very tired of sitting by her sister on the bank, and of having nothing to do: once or twice she had peeped into the book her sister was reading, but it had no pictures or conversations in it, 'and what is the use of a book,' thought Alice 'without pictures or conversation?'

So she was considering in her own mind (as well as she could, for the hot day made her feel very sleepy and stupid), whether the pleasure of making a daisy-chain would be worth the trouble of getting up and picking the daisies, when suddenly a White Rabbit with pink eyes ran close by her.

There was nothing so VERY remarkable in that; nor did Alice think it so VERY much out of the way to hear the Rabbit say to itself, 'Oh dear!

Oh dear! I shall be late!' (when she thought it over afterwards, it occurred to her that she ought to have wondered at this, but at the time it all seemed quite natural); but when the Rabbit actually TOOK A WATCH OUT OF ITS WAISTCOAT-POCKET, and looked at it, and then hurried on, Alice started to her feet, for it flashed across her mind that she had never before seen a rabbit with either a waistcoat-pocket, or a watch to take out of it, and burning with curiosity, she ran across the field after it, and fortunately was just in time to see it pop down a large rabbit-hole under the hedge.

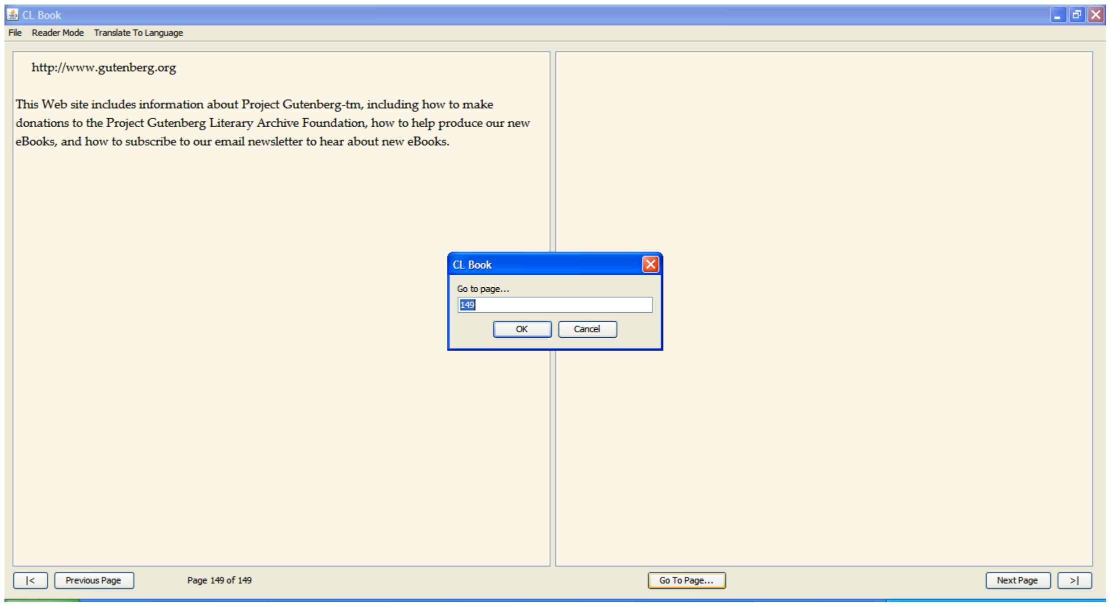
In another moment down went Alice after it, never once considering how in the world she was to get out again.

The rabbit-hole went straight on like a tunnel for some way, and then dipped suddenly down, so suddenly that Alice had not a moment to think about stopping herself before she found herself falling down a very deep well.

Either the well was very deep, or she fell very slowly, for she had plenty of time as she went down to look about her and to wonder what was going to happen next. First, she tried to look down and make out what she was coming to, but it was too dark to see anything; then she looked at the sides of the well, and noticed that they were filled with cupboards and book-shelves; here and there she saw maps and pictures hung upon pegs. She took down a jar from one of the shelves as

Figure 5. Sample Book Opened (Reading Mode)

This is the default view after opening a book. The mode visible here is the Reading Mode, and it acts most similarly to any standard eBook reader. It displays two pages of the book at a time, and allows the user to read the book as is, without any guides or augmentations.

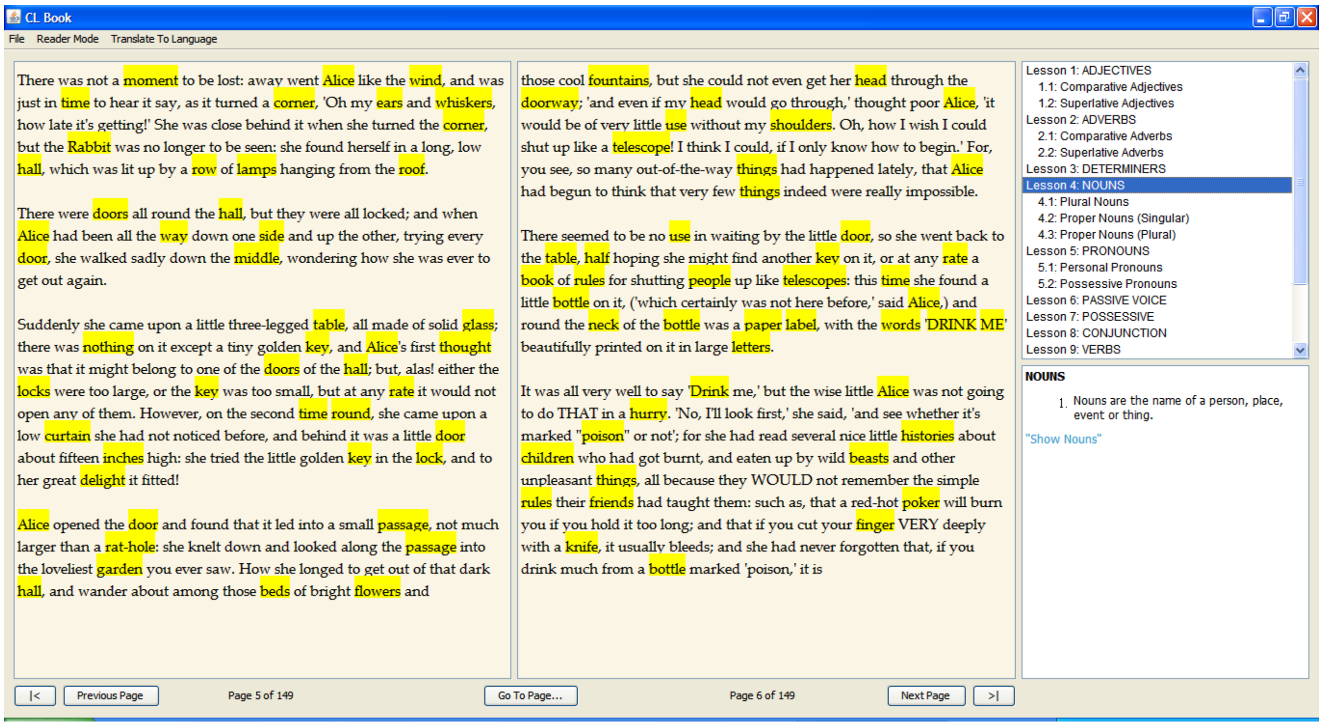


http://www.gutenberg.org

This Web site includes information about Project Gutenberg-tm, including how to make donations to the Project Gutenberg Literary Archive Foundation, how to help produce our new eBooks, and how to subscribe to our email newsletter to hear about new eBooks.

Figure 6. Go To Page Dialog

To complete the eBook reading experience, there are buttons to go to the beginning or the end of the book. There are buttons to go to the previous and next page. There is also a button to go to a specific page, as shown here. Upon clicking, it prompts the user for the page number he or she wishes to jump directly to.



There was not a moment to be lost: away went Alice like the wind, and was just in time to hear it say, as it turned a corner, 'Oh my ears and whiskers, how late it's getting!' She was close behind it when she turned the corner, but the Rabbit was no longer to be seen: she found herself in a long, low hall, which was lit up by a row of lamps hanging from the roof.

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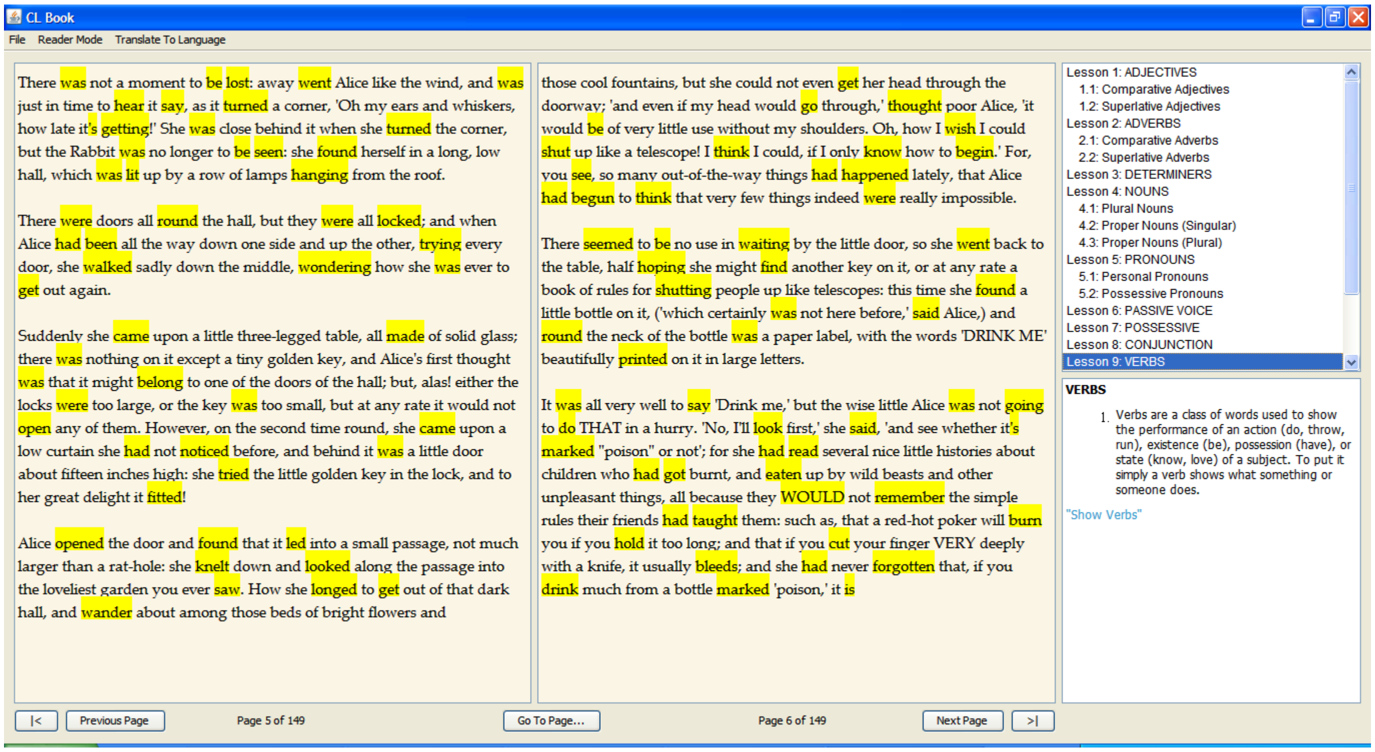
NOUNS

1. Nouns are the name of a person, place, event or thing.

"Show Nouns"

Figure 7. Grammar Mode, Nouns Lesson

The Grammar Mode brings in a sidebar with a list of lessons on the right. There are a number of grammar lessons that help the user identify examples of said lessons within the text they are currently reading. In this screenshot, the Nouns lesson is active, and it highlights the occurrences of nouns.



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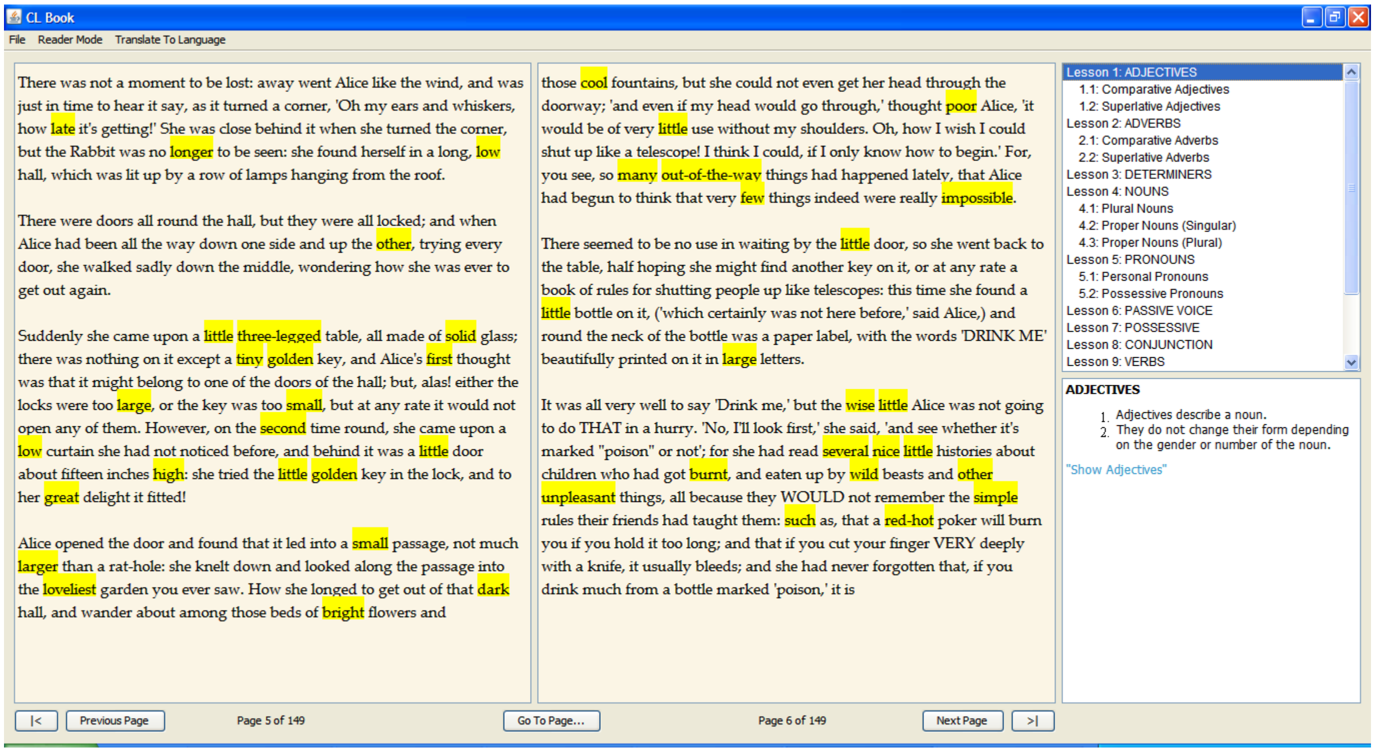
VERBS

1. Verbs are a class of words used to show the performance of an action (do, throw, run), existence (be), possession (have), or state (know, love) of a subject. To put it simply a verb shows what something or someone does.

"Show Verbs"

Figure 8. Grammar Mode, Verbs Lesson

The Verbs lesson highlights the occurrences of verbs.



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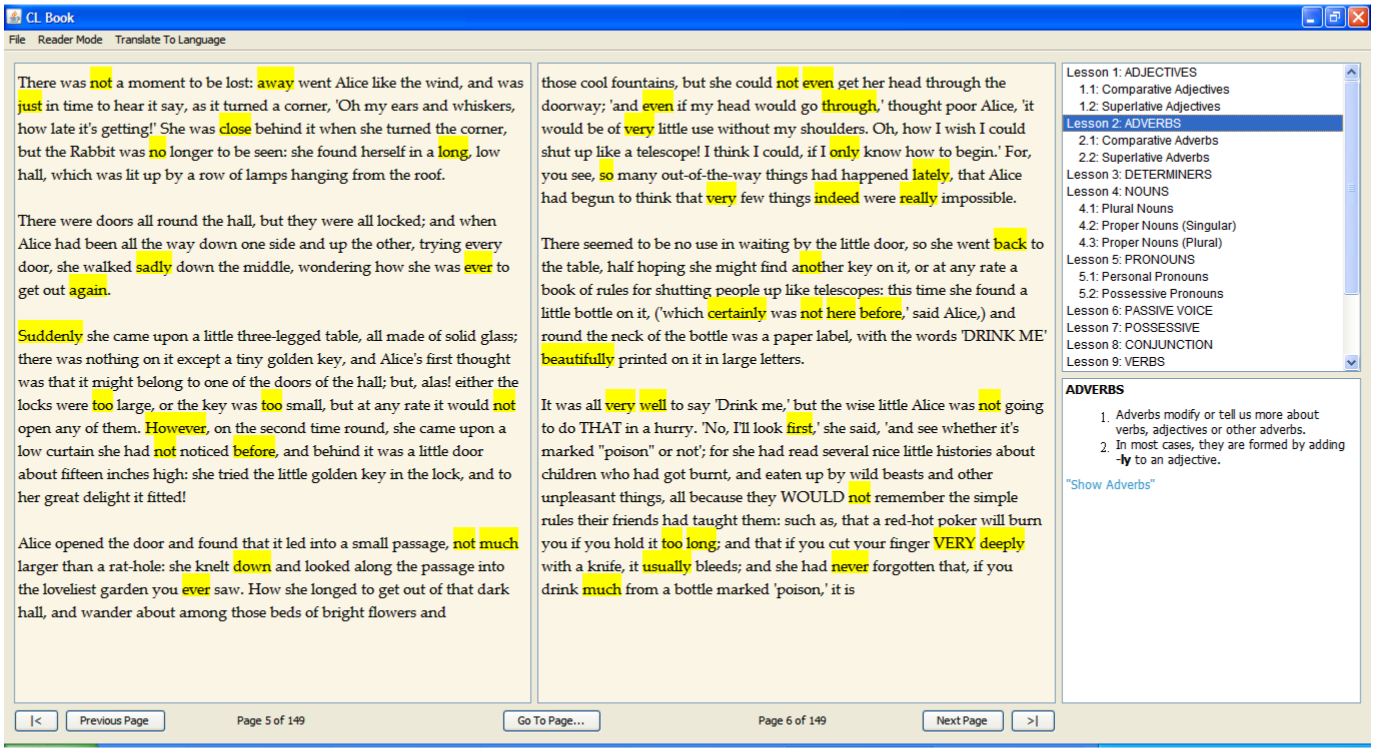
ADJECTIVES

1. Adjectives describe a noun.
2. They do not change their form depending on the gender or number of the noun.

"Show Adjectives"

Figure 9. Grammar Mode, Adjectives Lesson

The Adjectives lesson highlights the occurrences of adjectives.



There was not a moment to be lost: away went Alice like the wind, and was just in time to hear it say, as it turned a corner, 'Oh my ears and whiskers, how late it's getting!' She was close behind it when she turned the corner, but the Rabbit was no longer to be seen: she found herself in a long, low hall, which was lit up by a row of lamps hanging from the roof.

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1.2: Superlative Adjectives
Lesson 2: ADVERBS
2.1: Comparative Adverbs
2.2: Superlative Adverbs
Lesson 3: DETERMINERS
Lesson 4: NOUNS
4.1: Plural Nouns
4.2: Proper Nouns (Singular)
4.3: Proper Nouns (Plural)
Lesson 5: PRONOUNS
5.1: Personal Pronouns
5.2: Possessive Pronouns
Lesson 6: PASSIVE VOICE
Lesson 7: POSSESSIVE
Lesson 8: CONJUNCTION
Lesson 9: VERBS

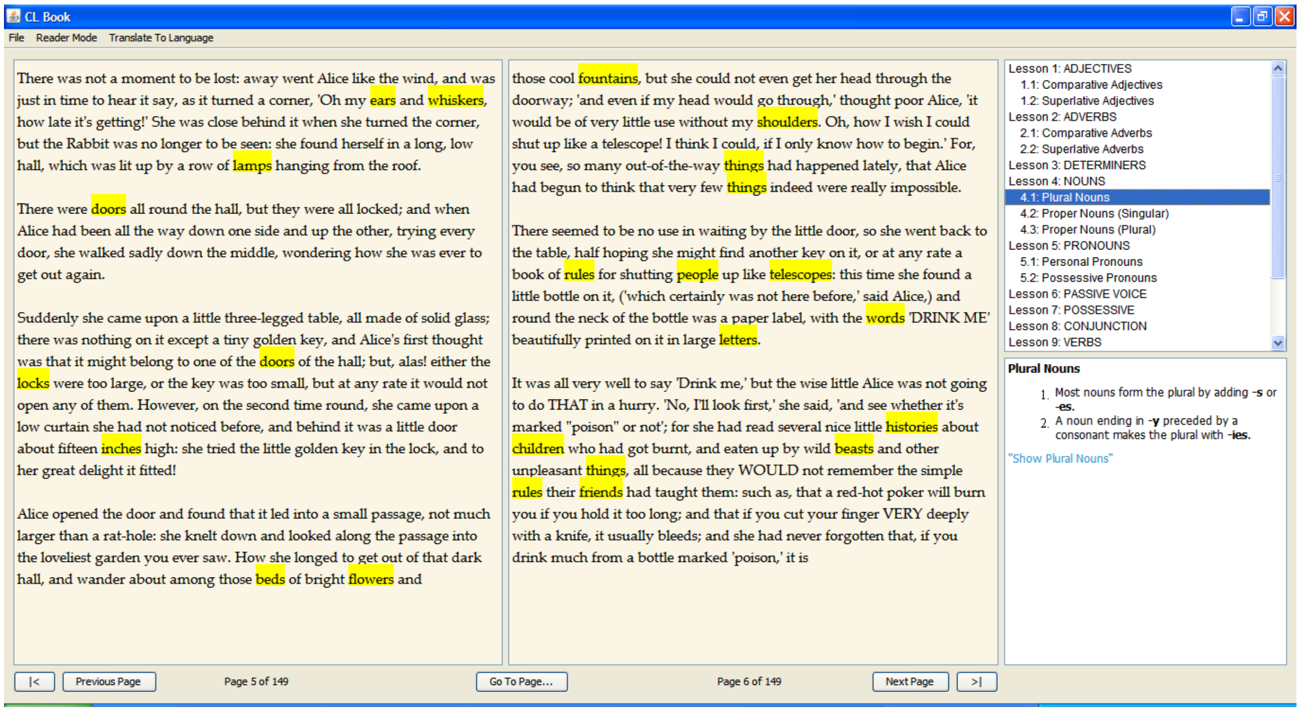
ADVERBS

1. Adverbs modify or tell us more about verbs, adjectives or other adverbs.
2. In most cases, they are formed by adding **-ly** to an adjective.

"Show Adverbs"

Figure 10. Grammar Mode, Adverbs Lesson

The Adverbs lesson highlights the occurrences of adverbs.



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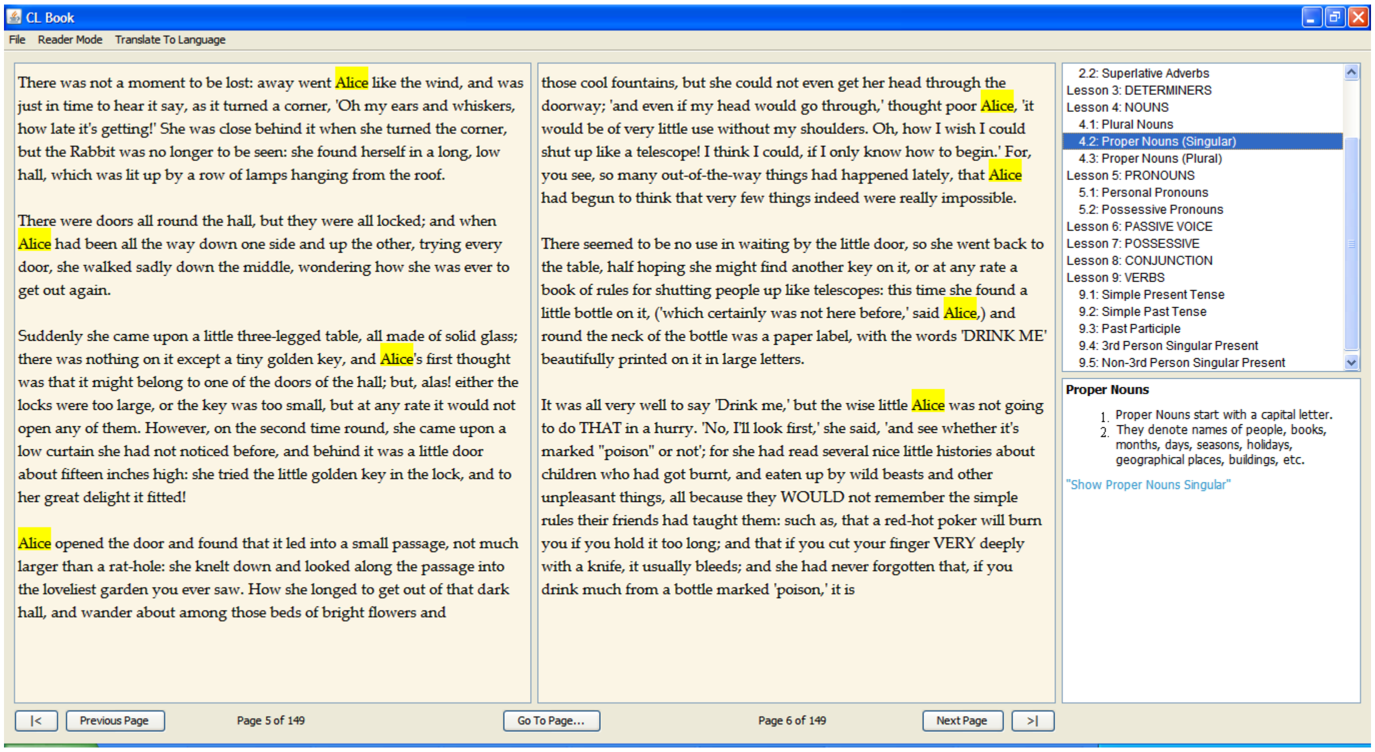
Plural Nouns

1. Most nouns form the plural by adding **-s** or **-es.**
2. A noun ending in **-y** preceded by a consonant makes the plural with **-ies.**

"Show Plural Nouns"

Figure 11. Grammar Mode, Plural Nouns Lesson

This is an example of a sub-lesson, which further expands on a given topic. In the Plural Nouns lesson, only the plural nouns are highlighted.



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Lesson 8: CONJUNCTION
Lesson 9: VERBS
9.1: Simple Present Tense
9.2: Simple Past Tense
9.3: Past Participle
9.4: 3rd Person Singular Present
9.5: Non-3rd Person Singular Present

Proper Nouns

1. Proper Nouns start with a capital letter.
2. They denote names of people, books, months, days, seasons, holidays, geographical places, buildings, etc.

"Show Proper Nouns Singular"

Figure 12. Grammar Mode, Proper Nouns (Singular) Lesson

In the Proper Nouns (Singular) lessons, only the singular proper nouns are highlighted.

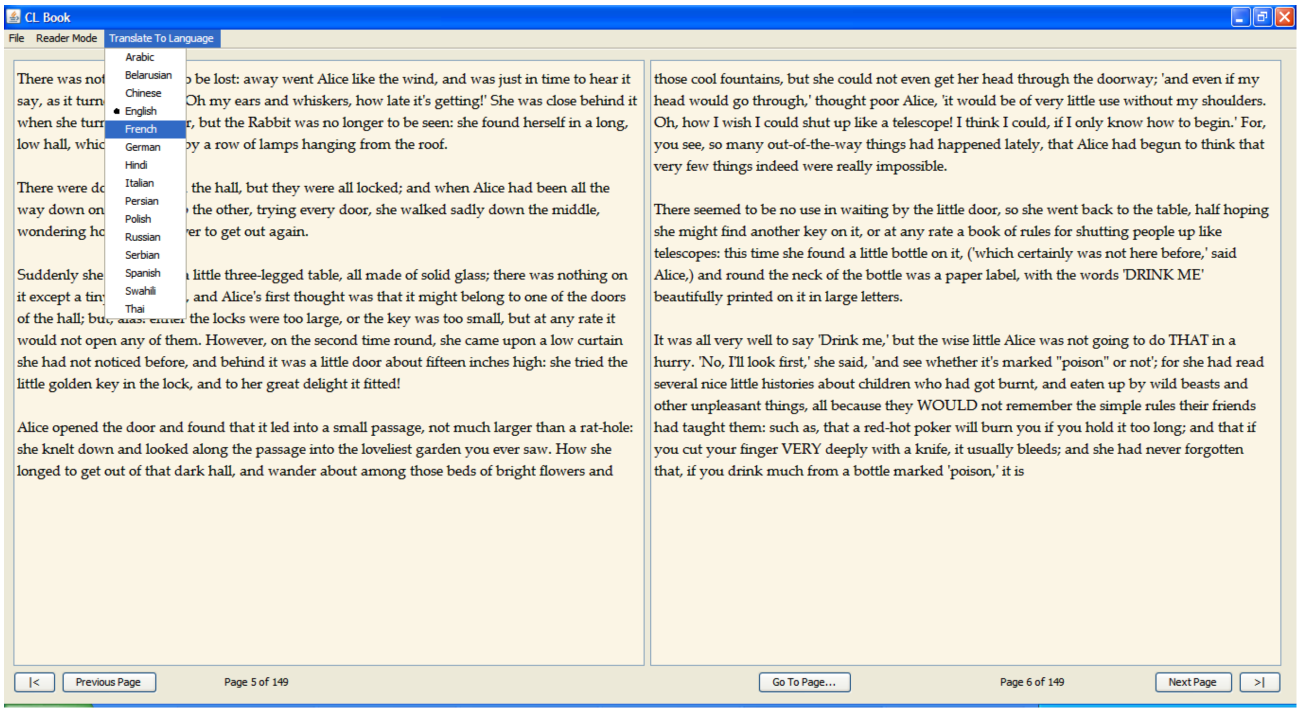

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Figure 13. Language Menu

This is the Translate To Language menu, and it allows the user to choose from one of 15 languages. When translation tools are used (shown below), this will be the target language of the translation.

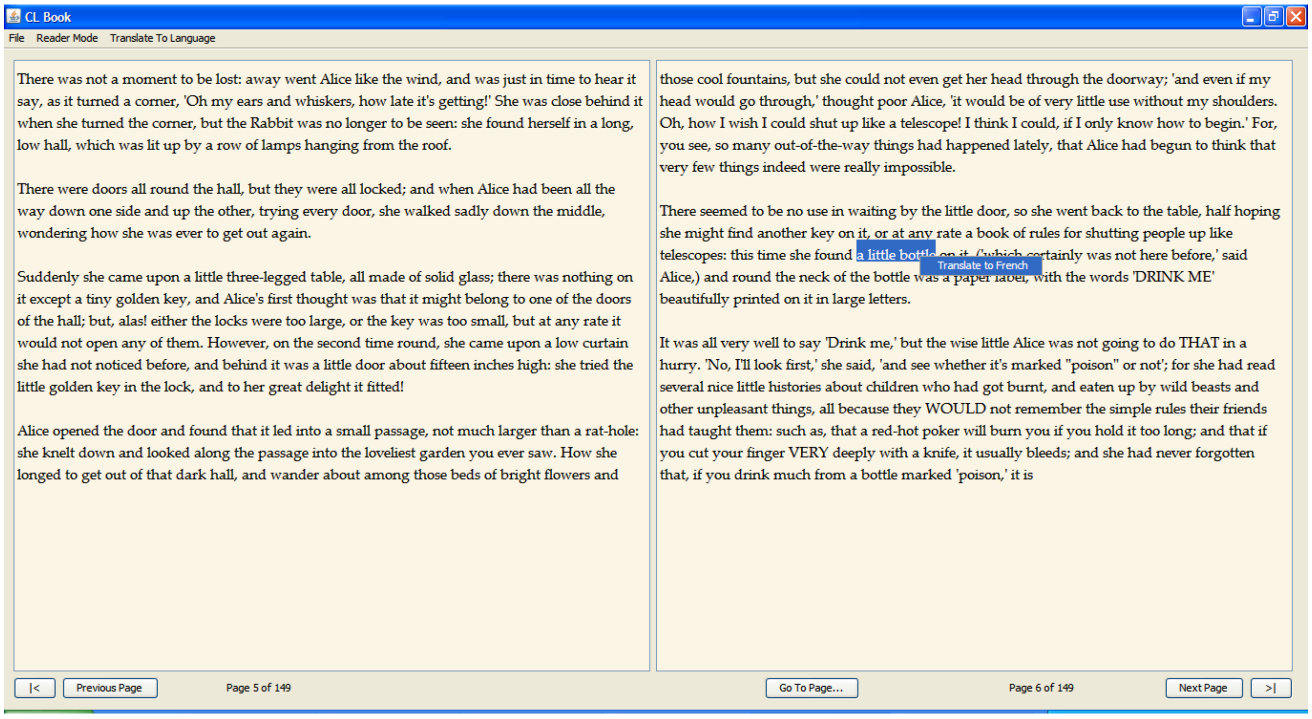

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Figure 14. Right Click Context Menu, Quick Translation

This is a translation tool that is always available to the user, no matter which of three modes of operation he or she is currently in. By right clicking on a word, or a selection, a context menu appears and allows you to quickly see a translation of the selected word or sentences.

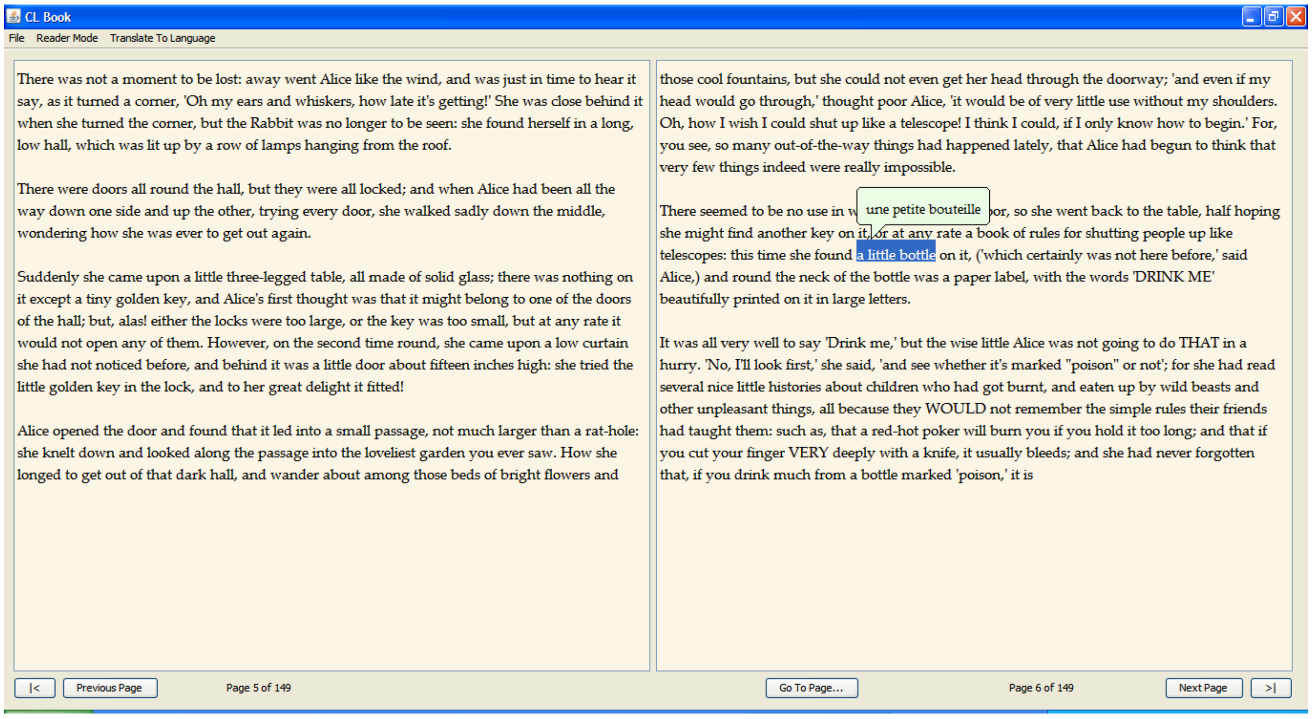

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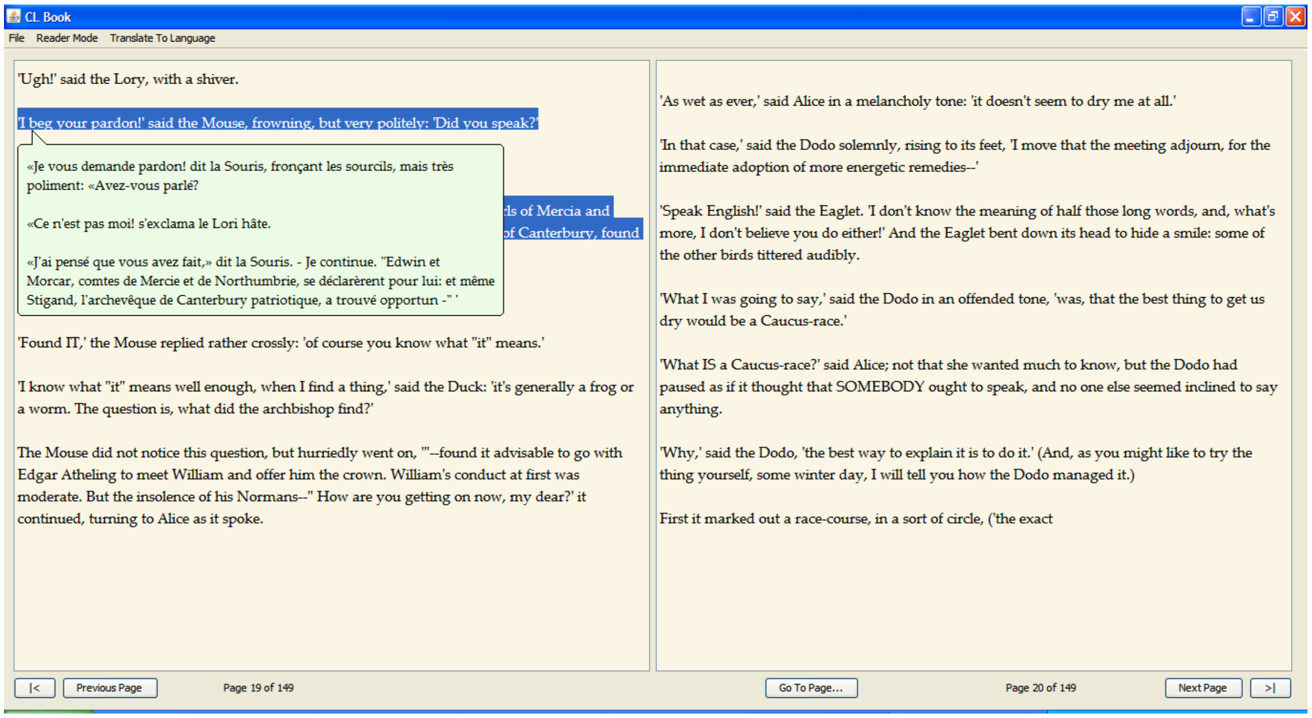
Figure 15. Quick Translation in a Balloon Tooltip

This is how the translated text appears. Clicking anywhere makes the balloon tooltip disappear.



'Ugh!' said the Lory, with a shiver.

'I beg your pardon!' said the Mouse, frowning, but very politely: 'Did you speak?'

«Je vous demande pardon! dit la Souris, fronçant les sourcils, mais très poliment: «Avez-vous parlé?

«Ce n'est pas moi! s'exclama le Lori hâte.

«J'ai pensé que vous avez fait,» dit la Souris. - Je continue. "Edwin et Morcar, comtes de Mercie et de Northumbrie, se déclarèrent pour lui: et même Stigand, l'archevêque de Canterbury patriotique, a trouvé opportun -" '

ds of Mercia and
of Canterbury, found

'Found IT,' the Mouse replied rather crossly: 'of course you know what "it" means.'

'I know what "it" means well enough, when I find a thing,' said the Duck: 'it's generally a frog or a worm. The question is, what did the archbishop find?'

The Mouse did not notice this question, but hurriedly went on, '"--found it advisable to go with Edgar Atheling to meet William and offer him the crown. William's conduct at first was moderate. But the insolence of his Normans--" How are you getting on now, my dear?' it continued, turning to Alice as it spoke.

'As wet as ever,' said Alice in a melancholy tone: 'it doesn't seem to dry me at all.'

'In that case,' said the Dodo solemnly, rising to its feet, 'I move that the meeting adjourn, for the immediate adoption of more energetic remedies--'

'Speak English!' said the Eaglet. 'I don't know the meaning of half those long words, and, what's more, I don't believe you do either!' And the Eaglet bent down its head to hide a smile: some of the other birds tittered audibly.

'What I was going to say,' said the Dodo in an offended tone, 'was, that the best thing to get us dry would be a Caucus-race.'

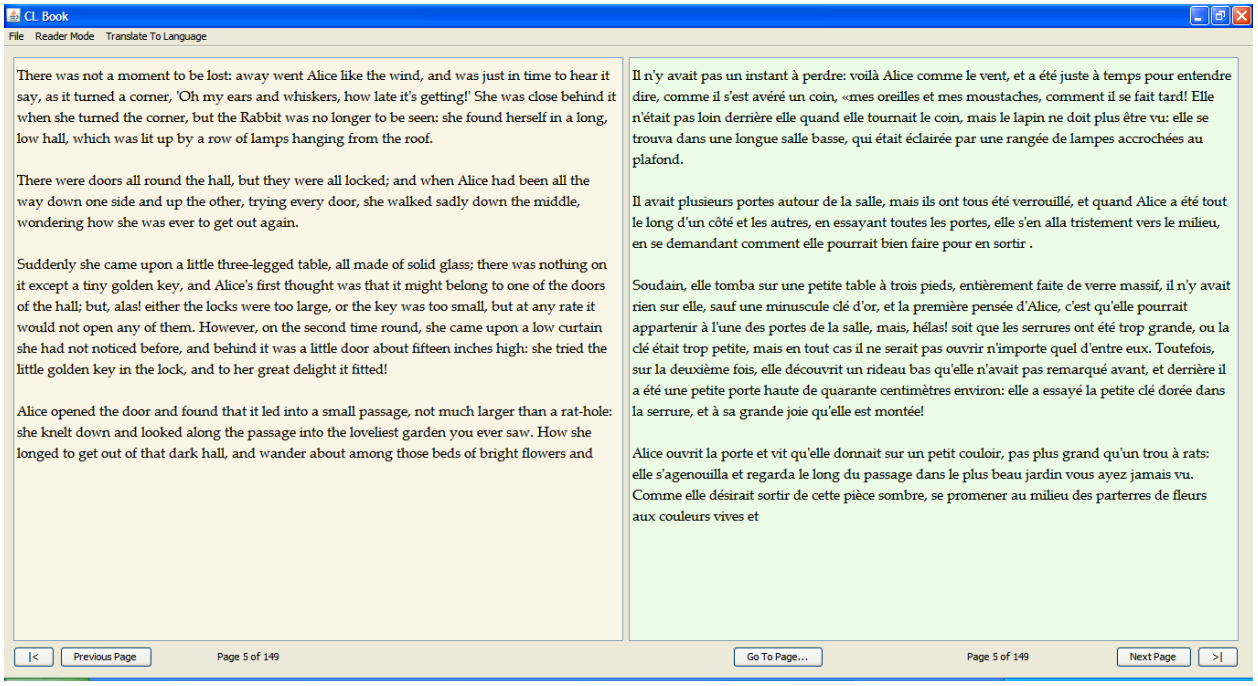
'What IS a Caucus-race?' said Alice; not that she wanted much to know, but the Dodo had paused as if it thought that SOMEBODY ought to speak, and no one else seemed inclined to say anything.

'Why,' said the Dodo, 'the best way to explain it is to do it.' (And, as you might like to try the thing yourself, some winter day, I will tell you how the Dodo managed it.)

First it marked out a race-course, in a sort of circle, ('the exact

Figure 16. Quick Translation of a Larger Text Section

This translation tool can be used to translate larger blocks of text, while preserving the formatting of the text.



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Il n'y avait pas un instant à perdre: voilà Alice comme le vent, et a été juste à temps pour entendre dire, comme il s'est avéré un coin, «mes oreilles et mes moustaches, comment il se fait tard! Elle n'était pas loin derrière elle quand elle tournait le coin, mais le lapin ne doit plus être vu: elle se trouva dans une longue salle basse, qui était éclairée par une rangée de lampes accrochées au plafond.

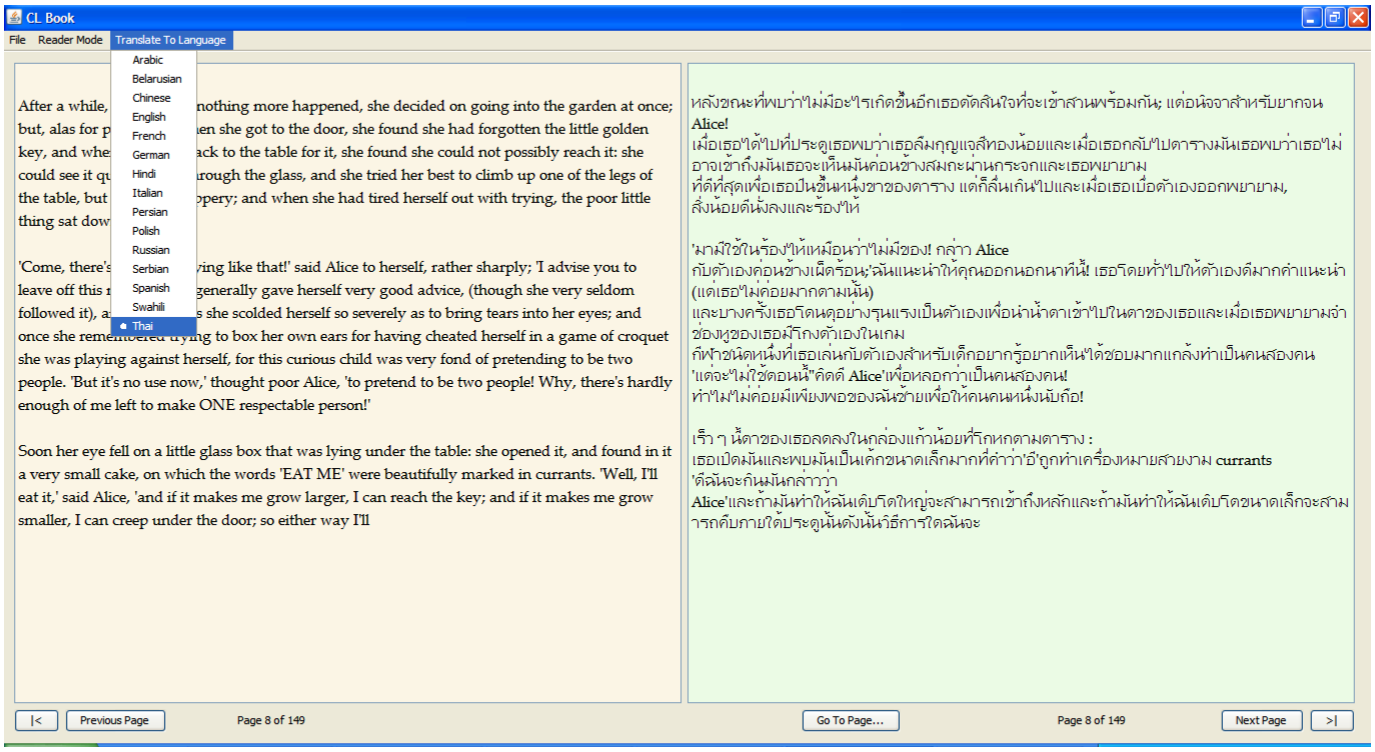
Il avait plusieurs portes autour de la salle, mais ils ont tous été verrouillé, et quand Alice a été tout le long d'un côté et les autres, en essayant toutes les portes, elle s'en alla tristement vers le milieu, en se demandant comment elle pourrait bien faire pour en sortir .

Soudain, elle tomba sur une petite table à trois pieds, entièrement faite de verre massif, il n'y avait rien sur elle, sauf une minuscule clé d'or, et la première pensée d'Alice, c'est qu'elle pourrait appartenir à l'une des portes de la salle, mais, hélas! soit que les serrures ont été trop grande, ou la clé était trop petite, mais en tout cas il ne serait pas ouvrir n'importe quel d'entre eux. Toutefois, sur la deuxième fois, elle découvrit un rideau bas qu'elle n'avait pas remarqué avant, et derrière il a été une petite porte haute de quarante centimètres environ: elle a essayé la petite clé dorée dans la serrure, et à sa grande joie qu'elle est montée!

Alice ouvrit la porte et vit qu'elle donnait sur un petit couloir, pas plus grand qu'un trou à rats: elle s'agenouilla et regarda le long du passage dans le plus beau jardin vous ayez jamais vu. Comme elle désirait sortir de cette pièce sombre, se promener au milieu des parterres de fleurs aux couleurs vives et

Figure 17. Translate Mode (to French)

The third mode of operation is the Translate Mode. It allows for permanent translation of the given text to one of 15 supported languages. It translates a page at a time, displaying the original page on the left and the translated version on the right. In this example, the English text is translated to French.



After a while, nothing more happened, she decided on going into the garden at once;
but, alas for p en she got to the door, she found she had forgotten the little golden
key, and whe ack to the table for it, she found she could not possibly reach it: she
could see it qu rough the glass, and she tried her best to climb up one of the legs of
the table, but ppery; and when she had tired herself out with trying, the poor little
thing sat dow

'Come, there's ying like that!' said Alice to herself, rather sharply; 'I advise you to
leave off this r generally gave herself very good advice, (though she very seldom
followed it), a s she scolded herself so severely as to bring tears into her eyes; and
once she reme ng to box her own ears for having cheated herself in a game of croquet
she was playing against herself, for this curious child was very fond of pretending to be two
people. 'But it's no use now,' thought poor Alice, 'to pretend to be two people! Why, there's hardly
enough of me left to make ONE respectable person!'

Soon her eye fell on a little glass box that was lying under the table: she opened it, and found in it
a very small cake, on which the words 'EAT ME' were beautifully marked in currants. 'Well, I'll
eat it,' said Alice, 'and if it makes me grow larger, I can reach the key; and if it makes me grow
smaller, I can creep under the door; so either way I'll

หลังขณะที่พบว่าไม่มีอะไรเกิดขึ้นอีกเธอตัดสินใจที่จะเข้าสานพร้อมกัน; แต่อนิจจาสำหรับยากจน
Alice!
เมื่อเธอได้ไปที่ประตูเธอพบว่าเธอลืมกุญแจสีทองน้อยและเมื่อเธอกลับไปตารางมันเธอพบว่าเธอไม่
อาจเข้าถึงมันเธอจะเห็นมันค่อนข้างสมถะผ่านกระจกและเธอพยายาม
ที่ดีที่สุดเพื่อเธอปีนขึ้นหนึ่งขาของตาราง แต่ก็ลื่นเกินไปและเมื่อเธอเบื่อตัวเองออกพยายาม,
สิ่งน้อยดีนั่งลงและร้องไห้

'มามีใช้ในร้องไห้เหมือนว่าไม่มีของ! กล่าว Alice
กับตัวเองค่อนข้างเผ็ดร้อน;'ฉันแนะนำให้คุณออกนอกนาทีนี้! เธอโดยทั่วไปให้ตัวเองดีมากคำแนะนำ
(แต่เธอไม่ค่อยมากตามนั้น)
และบางครั้งเธอโดนดุอย่างรุนแรงเป็นตัวเองเพื่อนำน้ำตาเข้าไปในตาของเธอและเมื่อเธอพยายามจำ
ช่องหูของเธอมีโกงตัวเองในเกม
กีฬาชนิดหนึ่งที่เธอเล่นกับตัวเองสำหรับเด็กอยากรู้อยากเห็นได้ชอบมากแกล้งทำเป็นคนสองคน
'แต่จะไม่ใช้ตอนนี้"คิดดี Alice'เพื่อหลอกว่าเป็นคนสองคน!
ทำไมไม่ค่อยมีเพียงพอของฉันซ้ายเพื่อให้คนคนหนึ่งนับถือ!

เร็ว ๆ น้ำตาของเธอลดลงในกล่องแก้วน้อยที่โกหกตามตาราง :
เธอเปิดมันและพบมันเป็นเค้กขนาดเล็กมากที่คำว่า'อี'ถูกทำเครื่องหมายสวยงาม currants
'ดีฉันจะกินมันกล่าวว่า
Alice'และถ้ามันทำให้ฉันเติบโตใหญ่จะสามารถเข้าถึงหลักและถ้ามันทำให้ฉันเติบโตขนาดเล็กจะสาม
ารถคืบภายใต้ประตูนั้นดังนั้นวิธีการใดฉันจะ

Figure 18. Translate Mode (to Thai)

Here, the same text is translated to Thai.

4. Conclusion and Future Work

In this project, we have designed and built a system that allows the user to read books while augmenting their experience using various computational linguistics methods. The user is able to quickly translate any part of the text into one of sixteen languages. The program also allows beginners to learn English grammar by visualizing lessons and examples from their favourite e-book. This puts the examples in context and makes learning intuitive and fun.

We would like to extend our system to include a dictionary as well as voice reader.

Dictionary bundling – Continuing with the theme of practically unlimited storage, we can easily imagine a book being bundled with a look-up dictionary that is capable of providing a translation of *every* word and expression in the text.

Voice reader – With a text-to-speech translator, we could have an option where the software automatically reads out the e-book.

5. System Manual

5.1 Deployment

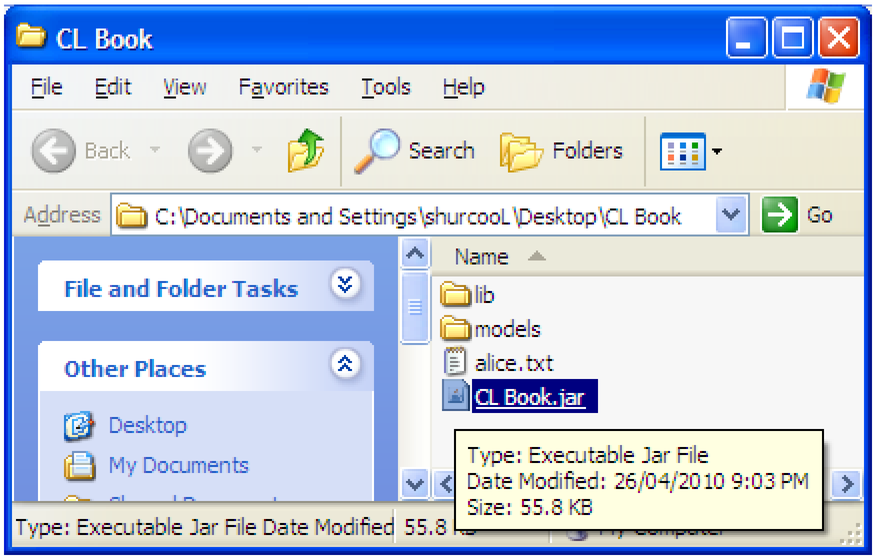
5.1.1. As Java Web-Start application

The program is distributed as a Java Web-Start application accessible over the Internet. Click "Launch" button at the following url http://www.cse.yorku.ca/~ameeta/CLBook/launch.html to launch the application.

Requirements: A compatible version of the Java Runtime Environment (JRE) installed on the client machine. The installation of the Java Development Kit (JDK) is not required.

5.1.2. As Java Desktop application

- Please download and extract the "CL_Book.zip" archive.
- Extract it to any folder and navigate there.
- Double click the CL_Book.jar file to start the program.



C:\Documents and Settings\shurcooL\Desktop\CL Book

lib
models
alice.txt
CL Book.jar

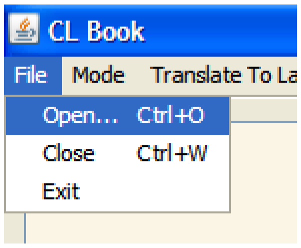
Type: Executable Jar File
Date Modified: 26/04/2010 9:03 PM
Size: 55.8 KB

Type: Executable Jar File Date Modified 55.8 KB

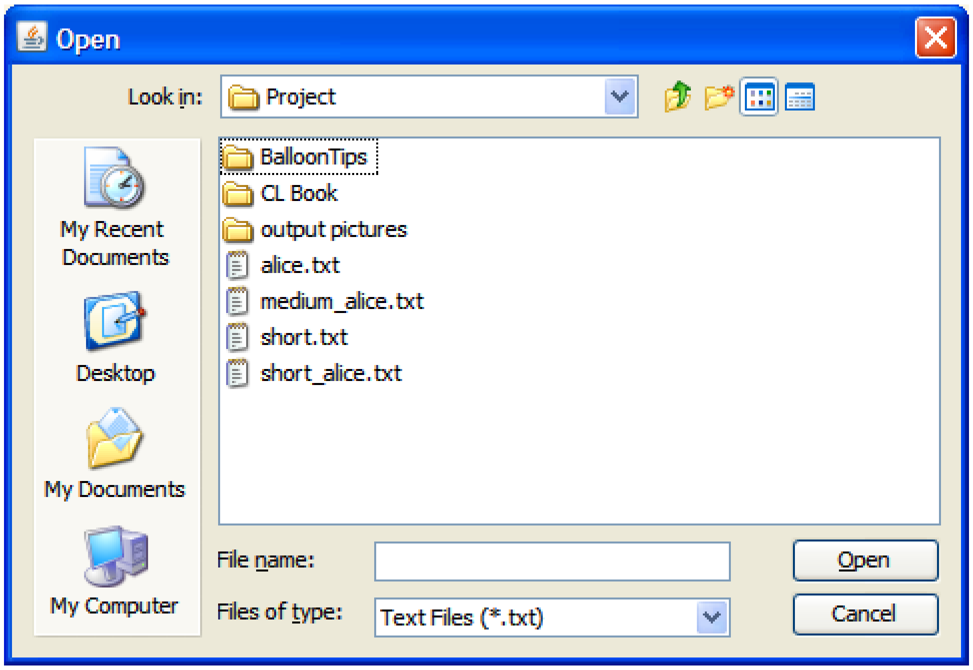
5.2 Functionality

5.2.1 Opening a book

In order to open a book, select File from the menu bar, and click Open. Alternatively, you can use the Ctrl+O shortcut.



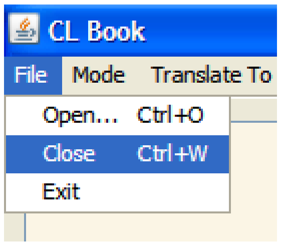
This will bring up an Open dialog.



Navigate to the folder where your eBook resides. Note that the CL Book program only supports books in plain text format at this time. They must have .txt extension. You can choose All Files from "Files of type" if your file has a different extension. Click Open or double-click your book to load it.

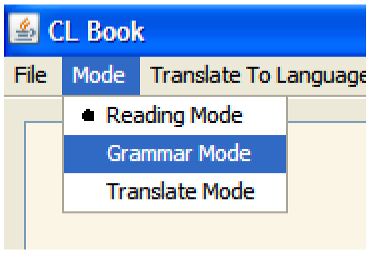
5.2.2 Closing a book

To close a book, select File from the menu bar, and click Close. You can also use the Ctrl+W shortcut. Additionally, you can open another book directly.



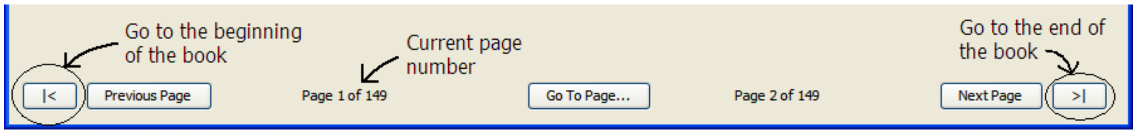
5.2.3 Changing mode of operation

To change the mode of operation, select Mode from menu bar. This allows you to choose between the three modes.



5.2.3.1 Using the Reading Mode

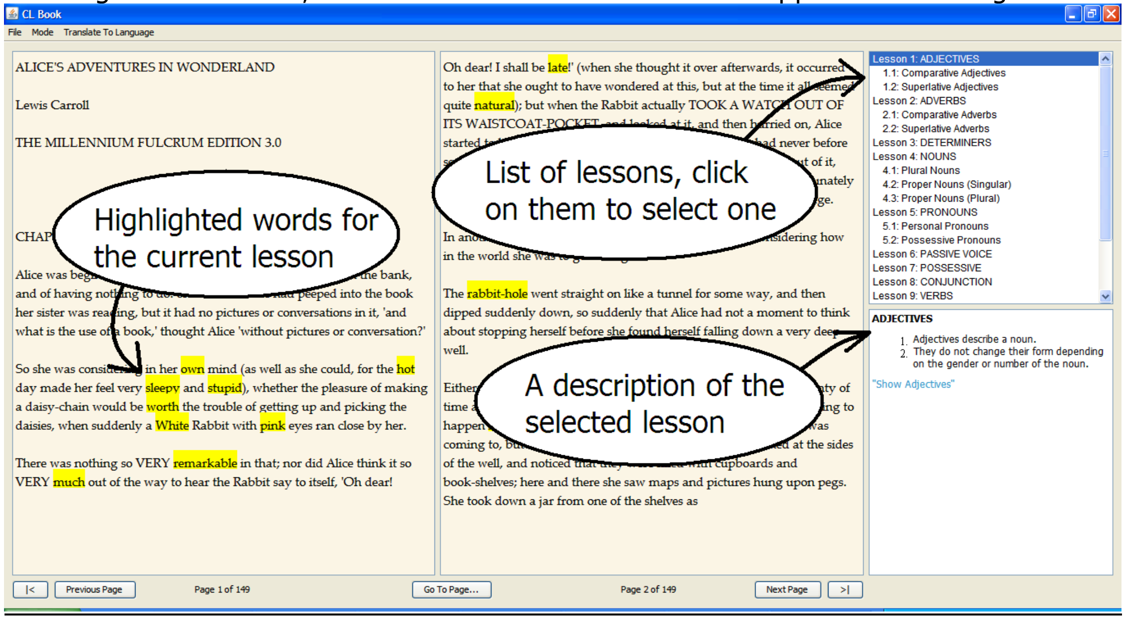
This Mode offers simple eBook reading functionality. The page navigation controls are at the bottom. When a book is loaded, they become enabled.



There are buttons to go to the beginning/end of the book. There are also buttons to go to the next/previous pages. It shows you the current page number underneath each page, and there is a "Go To Page" button in the middle.

5.2.3.2 Using the Grammar Mode

In the grammar mode, a sidebar with the list of lessons appears on the right.



CL Book
File
Mode
Translate To Language
Highlighted words for the current lesson
List of lessons, click on them to select one
A description of the selected lesson
|<
Previous Page
Page 1 of 149
Go To Page...
Page 2 of 149
Next Page
>|

ALICE'S ADVENTURES IN WONDERLAND

Lewis Carroll

THE MILLENNIUM FULCRUM EDITION 3.0

CHAP

Alice was beg the bank,
and of having not peeped into the book
her sister was rea ing, but it had no pictures or conversations in it, 'and
what is the use of a book,' thought Alice 'without pictures or conversation?'

So she was consid in her own mind (as well as she could, for the hot
day made her feel very sleepy and stupid), whether the pleasure of making
a daisy-chain would be worth the trouble of getting up and picking the
daisies, when suddenly a White Rabbit with pink eyes ran close by her.

There was nothing so VERY remarkable in that; nor did Alice think it so
VERY much out of the way to hear the Rabbit say to itself, 'Oh dear!

Oh dear! I shall be late!' (when she thought it over afterwards, it occurred
to her that she ought to have wondered at this, but at the time it all seemed
quite natural); but when the Rabbit actually TOOK A WATCH OUT OF
ITS WAISTCOAT-POCKET, and looked at it, and then hurried on, Alice
started t had never before
s t of it,
nately
ge.

In ano sidering how
in the world she was to g

The rabbit-hole went straight on like a tunnel for some way, and then
dipped suddenly down, so suddenly that Alice had not a moment to think
about stopping herself before she found herself falling down a very deep
well.

Either ty of
time a ng to
happen was
coming to, bu ed at the sides
of the well, and noticed that they cupboards and
book-shelves; here and there she saw maps and pictures hung upon pegs.
She took down a jar from one of the shelves as

Lesson 1: ADJECTIVES
1.1: Comparative Adjectives
1.2: Superlative Adjectives
Lesson 2: ADVERBS
2.1: Comparative Adverbs
2.2: Superlative Adverbs
Lesson 3: DETERMINERS
Lesson 4: NOUNS
4.1: Plural Nouns
4.2: Proper Nouns (Singular)
4.3: Proper Nouns (Plural)
Lesson 5: PRONOUNS
5.1: Personal Pronouns
5.2: Possessive Pronouns
Lesson 6: PASSIVE VOICE
Lesson 7: POSSESSIVE
Lesson 8: CONJUNCTION
Lesson 9: VERBS

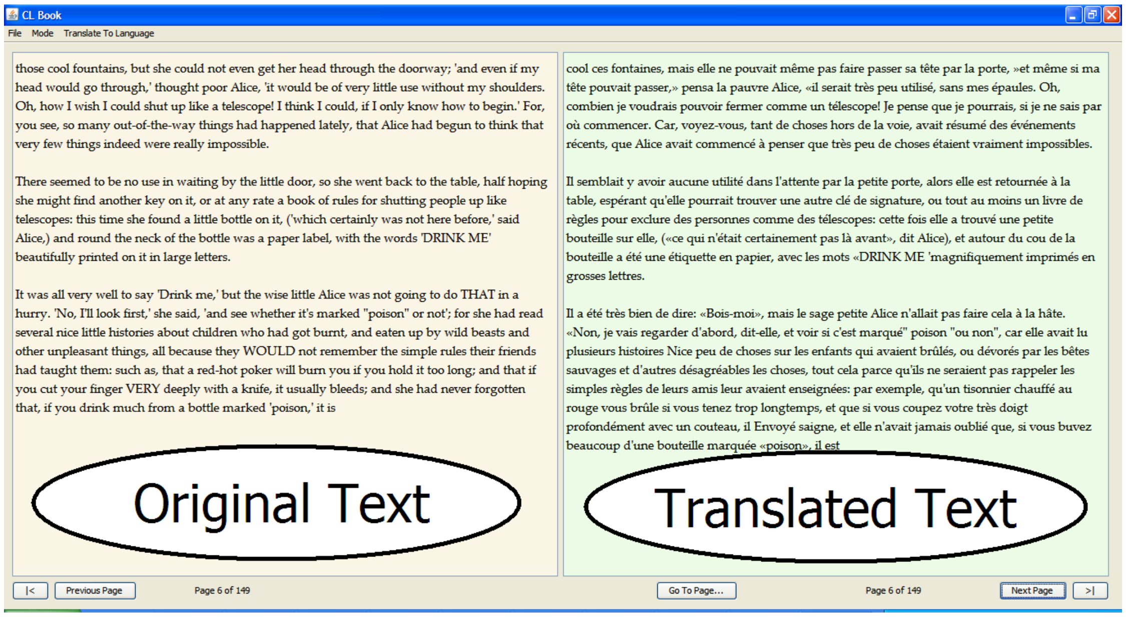
ADJECTIVES

1. Adjectives describe a noun.
2. They do not change their form depending on the gender or number of the noun.

"Show Adjectives"

5.2.3.3 Using the Translate Mode

In the Translate Mode, the left hand side shows one page of the original book, and the right hand side shows the translated version.



those cool fountains, but she could not even get her head through the doorway; 'and even if my head would go through,' thought poor Alice, 'it would be of very little use without my shoulders. Oh, how I wish I could shut up like a telescope! I think I could, if I only know how to begin.' For, you see, so many out-of-the-way things had happened lately, that Alice had begun to think that very few things indeed were really impossible.

There seemed to be no use in waiting by the little door, so she went back to the table, half hoping she might find another key on it, or at any rate a book of rules for shutting people up like telescopes: this time she found a little bottle on it, ('which certainly was not here before,' said Alice,) and round the neck of the bottle was a paper label, with the words 'DRINK ME' beautifully printed on it in large letters.

It was all very well to say 'Drink me,' but the wise little Alice was not going to do THAT in a hurry. 'No, I'll look first,' she said, 'and see whether it's marked "poison" or not'; for she had read several nice little histories about children who had got burnt, and eaten up by wild beasts and other unpleasant things, all because they WOULD not remember the simple rules their friends had taught them: such as, that a red-hot poker will burn you if you hold it too long; and that if you cut your finger VERY deeply with a knife, it usually bleeds; and she had never forgotten that, if you drink much from a bottle marked 'poison,' it is

cool ces fontaines, mais elle ne pouvait même pas faire passer sa tête par la porte, »et même si ma tête pouvait passer,» pensa la pauvre Alice, «il serait très peu utilisé, sans mes épaules. Oh, combien je voudrais pouvoir fermer comme un télescope! Je pense que je pourrais, si je ne sais par où commencer. Car, voyez-vous, tant de choses hors de la voie, avait résumé des événements récents, que Alice avait commencé à penser que très peu de choses étaient vraiment impossibles.

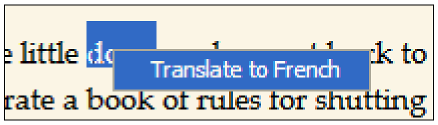
Il semblait y avoir aucune utilité dans l'attente par la petite porte, alors elle est retournée à la table, espérant qu'elle pourrait trouver une autre clé de signature, ou tout au moins un livre de règles pour exclure des personnes comme des télescopes: cette fois elle a trouvé une petite bouteille sur elle, («ce qui n'était certainement pas là avant», dit Alice), et autour du cou de la bouteille a été une étiquette en papier, avec les mots «DRINK ME 'magnifiquement imprimés en grosses lettres.

Il a été très bien de dire: «Bois-moi», mais le sage petite Alice n'allait pas faire cela à la hâte. «Non, je vais regarder d'abord, dit-elle, et voir si c'est marqué" poison "ou non", car elle avait lu plusieurs histoires Nice peu de choses sur les enfants qui avaient brûlés, ou dévorés par les bêtes sauvages et d'autres désagréables les choses, tout cela parce qu'ils ne seraient pas rappeler les simples règles de leurs amis leur avaient enseignées: par exemple, qu'un tisonnier chauffé au rouge vous brûle si vous tenez trop longtemps, et que si vous coupez votre très doigt profondément avec un couteau, il Envoyé saigne, et elle n'avait jamais oublié que, si vous buvez beaucoup d'une bouteille marquée «poison», il est

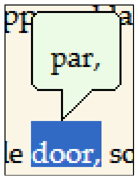
You can control the language to translate to from the menu bar, under the Language To Translate menu.

5.2.4 Using the right-click quick translate tool

If you want to quickly translate a word or any amount of text in the reader, you can simply right click on a word or a selection to bring up a context menu.



Click on "Translate to Language" (note that you can control the target language from the menu bar).



A translation appears. Click anywhere on the text again to close the balloon tooltip.

6. References

[1] Kristina Toutanova, Dan Klein, Christopher Manning, and Yoram Singer. 2003. Feature-Rich Part-of-Speech Tagging with a Cyclic Dependency Network. In *Proceedings of HLT-NAACL 2003*, pp. 252-259.
[2] Kristina Toutanova and Christopher D. Manning. 2000. Enriching the Knowledge Sources Used in a Maximum Entropy Part-of-Speech Tagger. In *Proceedings of the Joint SIGDAT Conference on Empirical Methods in Natural Language Processing and Very Large Corpora (EMNLP/VLC-2000)*, pp. 63-70.
[3] List of grammar topics: http://www.learnenglish.de/grammarpage.htm, accessed on Apr 26, 2010
[4] List of grammar topics: http://www.edufind.com/english/grammar/grammar_topics.php, accessed on Apr 26, 2010
[5] Building a Large Annotated Corpus of English: The Penn Treebank, Mitchell P. Marcus, Mary Ann Marcinkiewicz, Beatrice Santorini

7. Appendix

7.1. The Penn Treebank POS tagset

1. CC Coordinating conjunction
2. CD Cardinal number
3. DT Determiner
4. EX Existential *there*
5. FW Foreign word
6. IN Preposition/subordinating participle conjunction
7. JJ Adjective
8. JJR Adjective, comparative
9. JJS Adjective, superlative
10. LS List item marker
11. MD Modal
12. NN Noun, singular or mass
13. NNS Noun, plural
14. NNP Proper noun, singular
15. NNPS Proper noun, plural
16. PDT Predeterminer
17. POS Possessive ending
18. PRP Personal pronoun
19. PRP$ Possessive pronoun
20. RB Adverb
21. RBR Adverb, comparative
22. RBS Adverb, superlative
23. RP Particle
24. SYM Symbol (mathematical or scientific)
25. TO *to*
26. UH Interjection
27. VB Verb, base form
28. VBD Verb, past tense
29. VBG Verb, gerund/present
30. VBN Verb, past participle
31. VBP Verb, non-3rd ps. sing. Present
32. VBZ Verb, 3rd ps. sing. present
33. WDT *wh*-determiner
34. WP *wh*-pronoun
35. WP$ Possessive *wh*-pronoun
36. WRB *wh*-adverb
37. # Pound sign
38. $ Dollar sign
39.. Sentence-final punctuation

40. , Comma
41. : Colon, semi-colon
42. (Left bracket character
43.) Right bracket character
44. " Straight double quote
45. ' Left open single quote
46. " Left open double quote
47. ' Right close single quote
48. " Right close double quote

7.2 CL Lessons.txt

```
Lesson 1: ADJECTIVES
adjective
<font face="Tahoma" size=3>
<strong>ADJECTIVES</strong>
<ol>
<li>Adjectives describe a noun.</li>
<li>They do not change their form depending on the gender or number of the noun.</li>
</ol>
<font color="#3399CC">"Show Adjectives"</font><br>
</font>

   1.1: Comparative Adjectives
adjectiveComp
<font face="Tahoma" size=3>
<strong>Comparative Adjectives</strong>
<ol>
<li>Comparative Adjectives: To show adjective in the comparative form <i>more +
adjective</i>.</li>
</ol>
<font color="#3399CC">"Show Comparative Adjectives"</font><br>
</font>

   1.2: Superlative Adjectives
adjectiveSuper
<font face="Tahoma" size=3>
<strong>Superlative Adjectives</strong>
<ol>
<li>Superlative Adjectives: To show adjective in the superlative form <i>most + adjective</i>.</li>
</ol>
<font color="#3399CC">"Show Superlative Adjectives"</font><br>
</font>

Lesson 2: ADVERBS
adverb
<font face="Tahoma" size=3>
<strong>ADVERBS</strong>
<ol>
<li>Adverbs modify or tell us more about verbs, adjectives or other adverbs.</li>
<li>In most cases, they are formed by adding <b>-ly</b> to an adjective.</li>
</ol>
<font color="#3399CC">"Show Adverbs"</font><br>
</font>
```