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Local Grammar Graphs

Eric Laporte



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Outline

Concordance

Local grammar of dates

Invoking a subgraph

Lexical masks

Dictionaries of a text



Concordance of a word

rman Fowler, said Mr. Major's job was safe.{S} "He
licy changes."{S} Mr. Major's hold on power may hir
RITAIN--PARLIAMENT{S} MAJOR, JOHN{S} CHIDGEY, DAVII
lots at SAS and other major companies were not taki
th insurance took two major strides forward in the
health advocates as a major setback for the tobacc
yamira of Burundi and Major General{S} Juv?nal Haby
an War{S} Headline 2: Major Jean-Guy Plante, left,
rror show continues," Major General Romeo Dallaire
vy fighting along the major highways.{S} General Da
forces is one of the major problems which the army



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Concordance: diversity

cers, Thomas found the commanders a bit disturbed. {S} "en found. {S} "And, mon colonel," the officer said, "eveghting on Omaha Beach, Captain Joseph {S} Dawson, introdere as a veteran. {S} A captain in the 101st {S} Airborne t D. Eisenhower, their commander, the day's accomplishm recalled the feat of {S} Lieutenant Colonel James E. Rudd feat of {S} Colonel James E. Rudder and his a Long, Long Time." {S} General Orwin Clark Talbott, who ne attack, the militia commander, Lam Horm, and his men ter, in the morning, a general, one of 2,000 in the 140 eeing soldiers killing generals, generals selling food,



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Concordance: sequences

Text: {S} A senior government official charged Wednesday
Abel {S} Olopai, a government official who was 10 years
regrets," a German government official said. {S} Key Wor
WILLIAM J. (U.S. GOVERNMENT OFFICIAL) {S} U.S.--ARMED
WILLIAM J. (U.S. GOVERNMENT OFFICIAL) {S} U.S.--ARMED
te Gatete, a local government official from southern Rwanda
collapse in 1991, a government official said Sunday. {S}
pens next month, a government official said. {S} Until t
bund," said a U.S. government official. {S} He said Wash
WILLIAM J. (U.S. GOVERNMENT OFFICIAL) {S} Internationa
of the century, a government official said. {S} "We wan



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Concordancers

Objective

Explore a linguistic phenomenon

Explore a text

Query language

A major criterion of quality

Allow diversity and sequences at the same time: graphs



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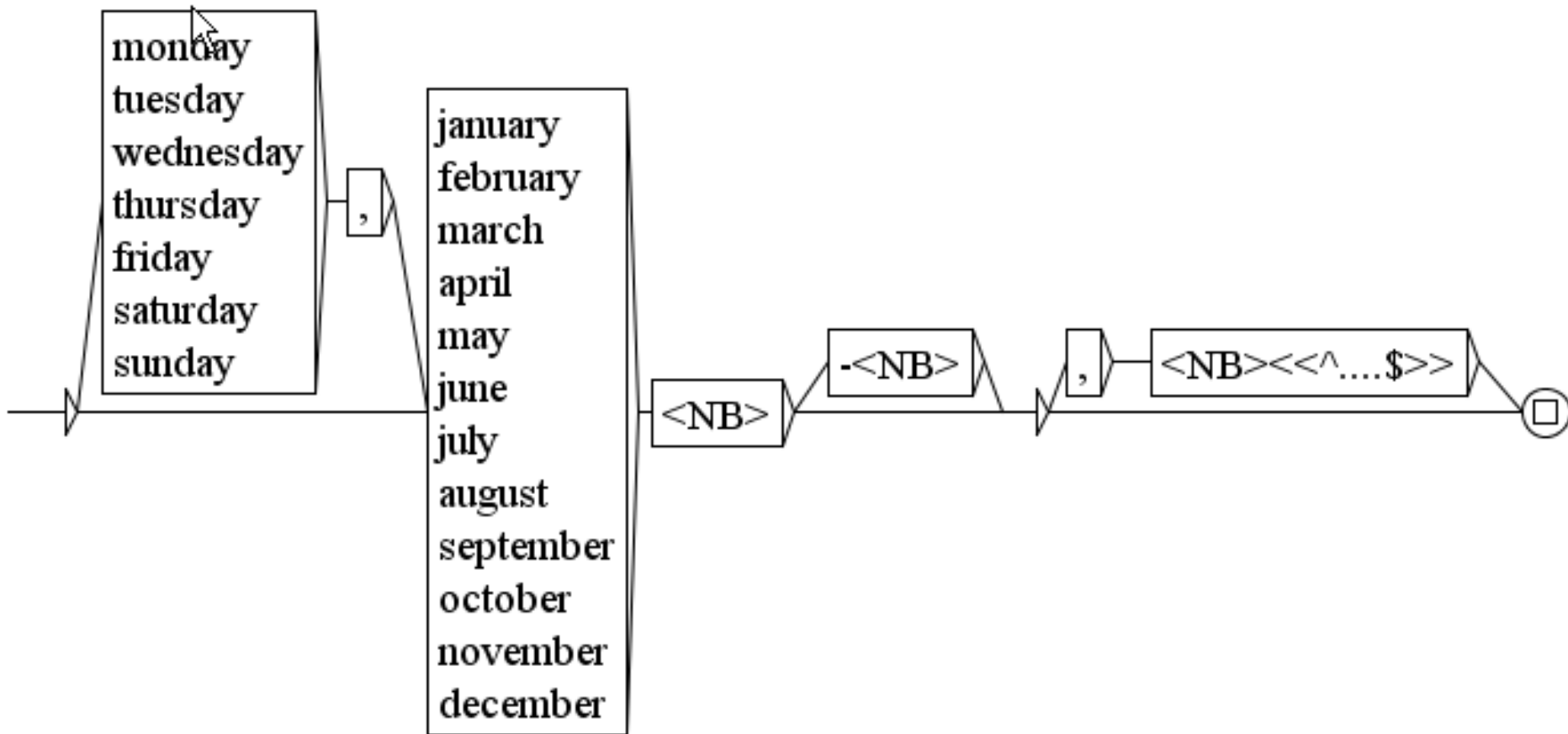
Dates in English

: Hong Kong after the [July 1, 1997](#), handover
ole candidate for the [April 1995](#) presidential
up of drivers for the [July 3](#) race would be ma
asily blurred, as the [June 6](#) anniversary show
as been as bad as the [April 26](#) crash of the T
which organizes the [June 26](#) regional electi
chairmen have set the [July 4](#) recess as the de
airlines have put the [July 4](#)th weekend on sal
been mandated by the [June 26](#) election, the G
worked, helping make [June 6, 1944](#), the bigge
began a hunger strike [May 25](#) after two of the



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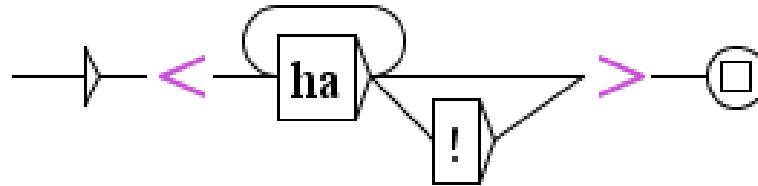
Query for dates in English





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Finite automata and regular expressions

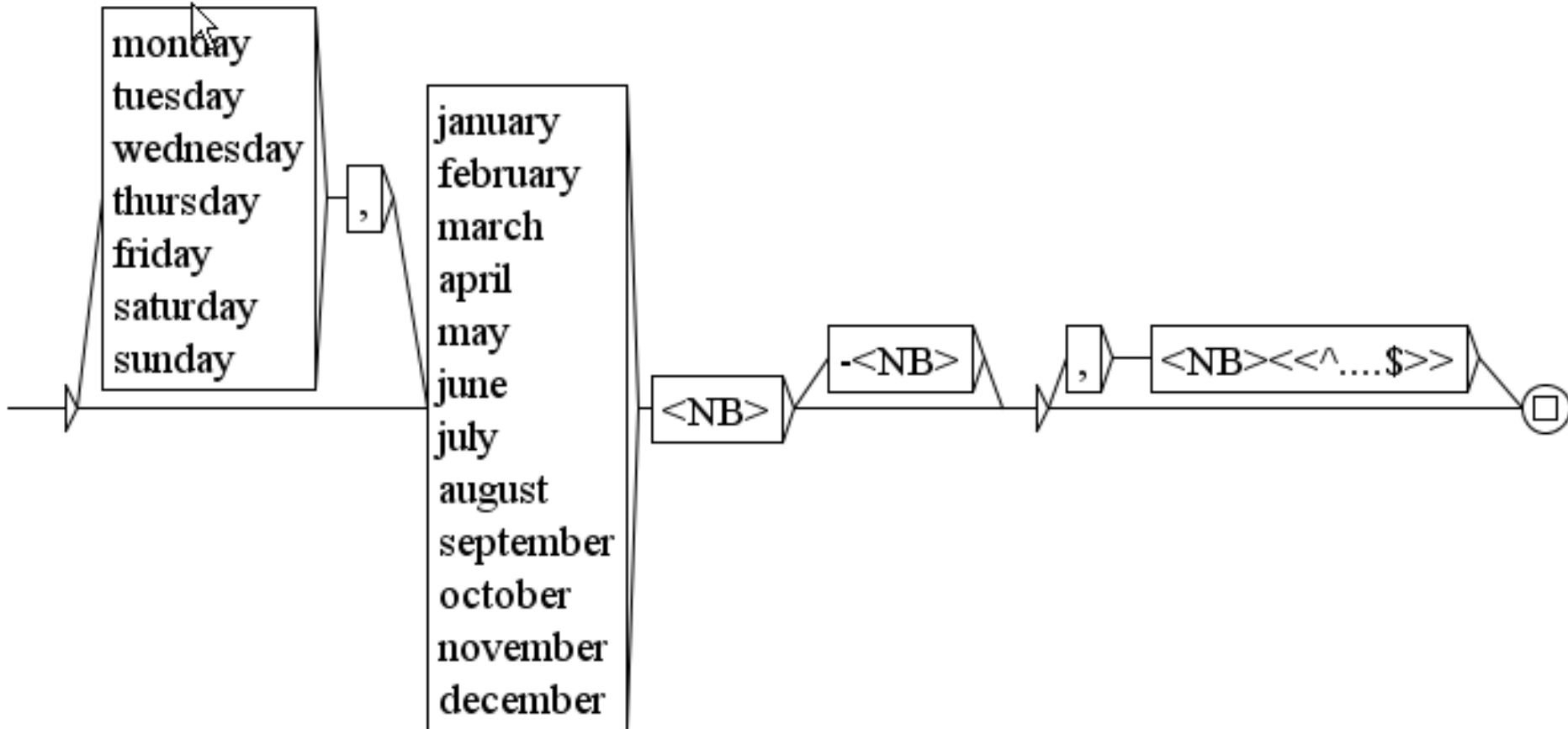


Equivalent regular expression:
 $(ha)^+!?$



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Imagine the regular expression for this one





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Beyond concordances

Such graphs are also used in NLP applications:
indexation
information extraction
annotation



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How to edit a graph with Unitex/Gramlab

So that you can play around if I'm boring
Menu FSGraph > New

Create a box

Ctrl-click where you want to create the box
Fill in the field above the graph
Validate with Enter

Create a transition

Click once on the source box
Click once on the target box



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How to edit a graph with Unitex/Gramlab

Select a box

Click once on it
It becomes blue

Unselect a box

Click on the white background of the graph

Double-clicking on a box

Same as clicking twice
Creates a transition from the box back to it (loop)

Select several boxes

Draw a rectangle around them
You can move, delete, copy, paste them together



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How to edit a graph with Unitex/Gramlab

Delete a box

Select it

Press Delete

Validate with Enter

Initial and final boxes

You cannot remove them

You cannot create new ones

Delete a transition

Click once on the source box

Click once on the target box

Create a transition

Click once on the source box

Click once on the target box



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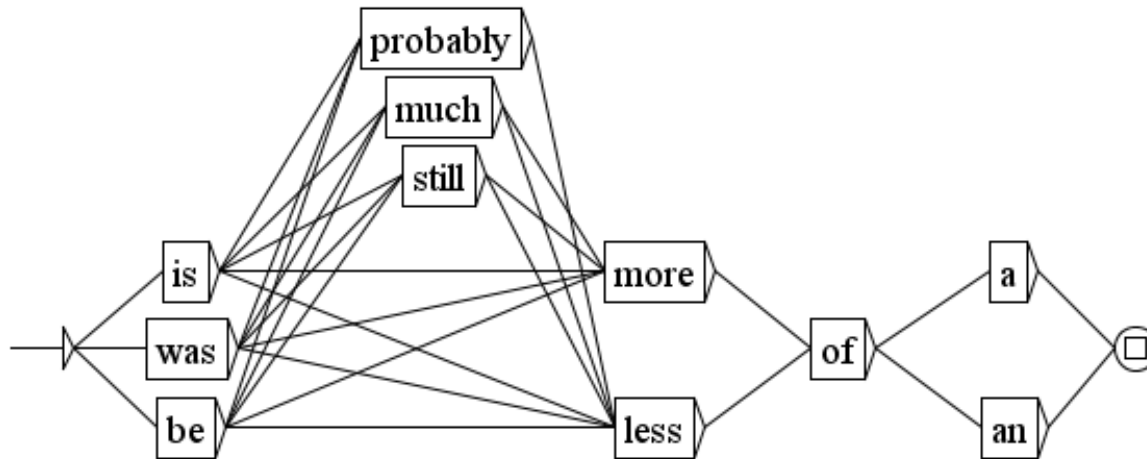
Invoking a subgraph

Lexical masks

Dictionaries of a text



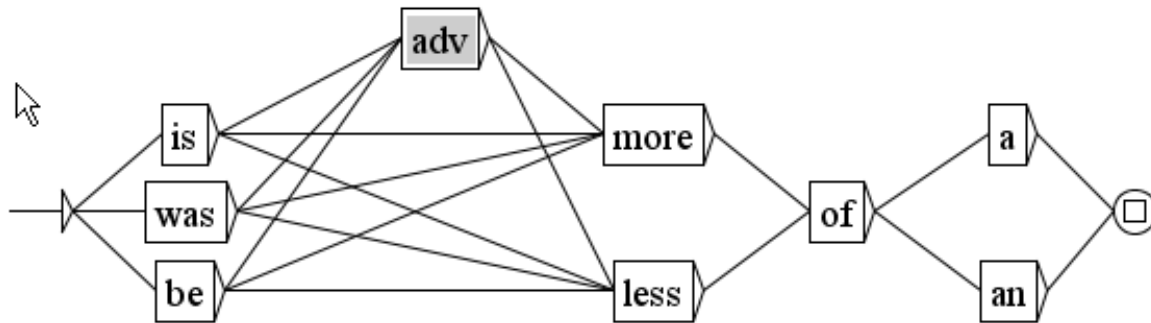
A graph



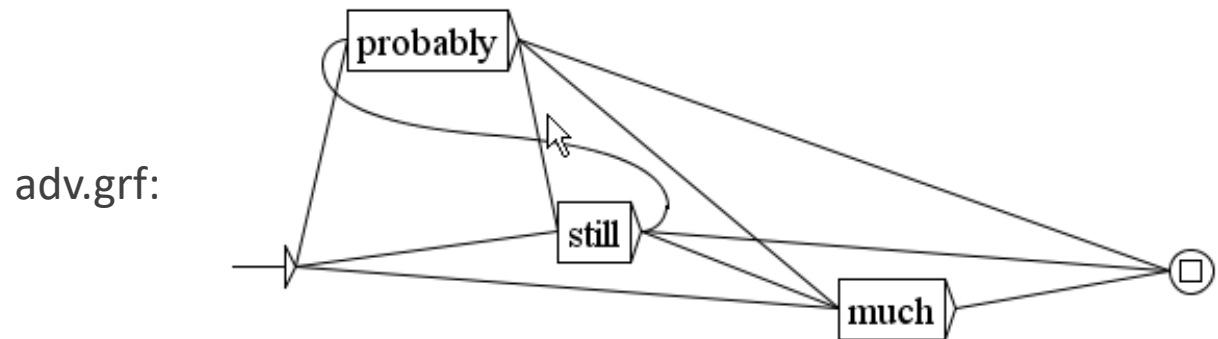
.l rising, it is probably less of a problem politically than it was
The new guru was less of a showman and more of a technician who be
"and there is much less of a feeling of impending crisis here th
said, "There is less of a sense among juries that it is other peop
sun proved to be more of a menace than soccer hooligans at the firs
change would be more of a threat. (S) But the prevailing belief in
s. (S) K mart is more of a runaway scraper; its stock is off 40 perc
on, he would be more of a provocation to the British, officials sa
or individual is still more of an art than a science," the former C



Invoking a subgraph from a node



The adv node invokes the adv.grf graph
Equivalent to substituting the graph for the node





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Invoking a subgraph from a node

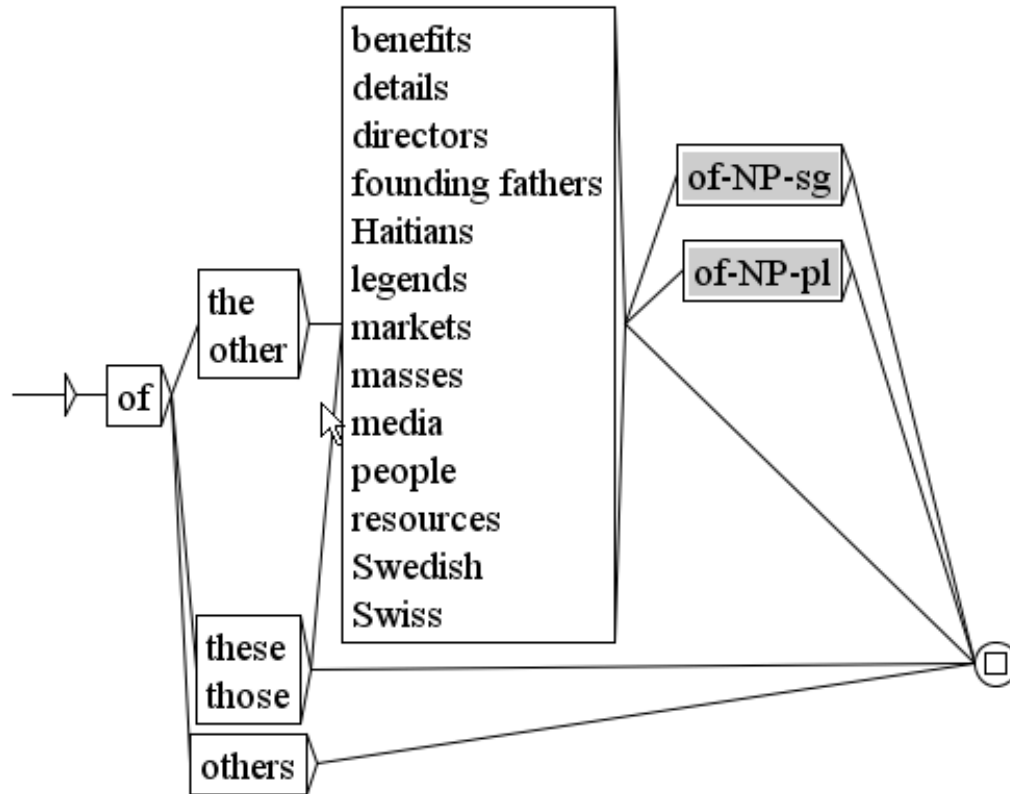
Objectives

Use the same graph in various contexts

Distribute a description in several graphs



Invoking a subgraph from a node



A graph can invoke itself



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Local grammars

A graph and its subgraphs describing a set of expressions
little dependent from the rest of syntax

Local grammar graphs (LGG)

A type of language resources

Used to recognise and process the expressions

Can be included in a production chain



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A vintage area of NLP

GROSS, Maurice. 1997. The Construction of Local Grammars. *Finite-State Language Processing*, The MIT Press, pp. 329-352.

(<http://books.google.fr/books?id=q4URKd5XKo0C&pg=PA329>)

GROSS, Maurice. 2000. A Bootstrap Method for Constructing Local Grammars. *Contemporary Mathematics. Proceedings of the Symposium*. University of Belgrade, p. 231-249.

(<http://halshs.archives-ouvertes.fr/docs/00/27/83/19/PDF/BELG.pdf>)

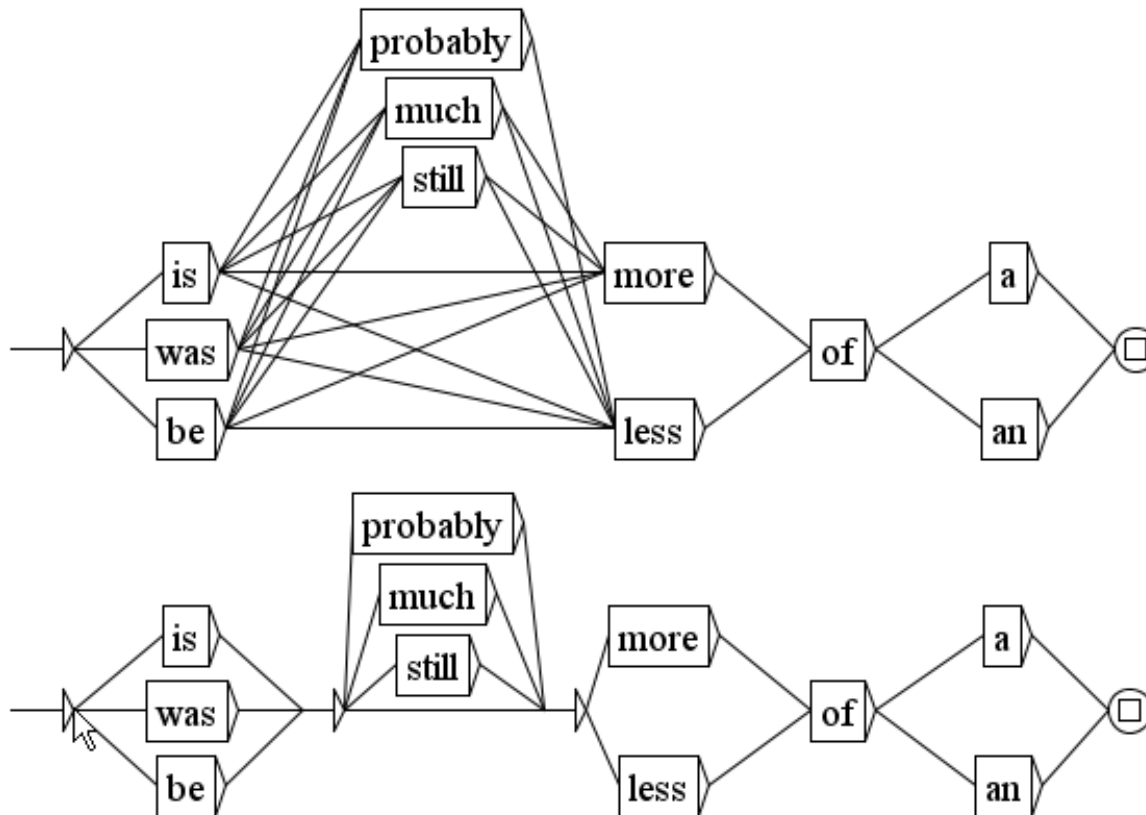
PAUMIER, Sébastien. 2002. *Unitex. User Manual*. Revision: 2014. <http://igm.univ-mlv.fr/~unitex/UnitexManual3.1.pdf>

SILBERZTEIN, Max. 1993. *Dictionnaires électroniques et analyse automatique de textes : le système INTEX*. 240 p., Paris : Masson.



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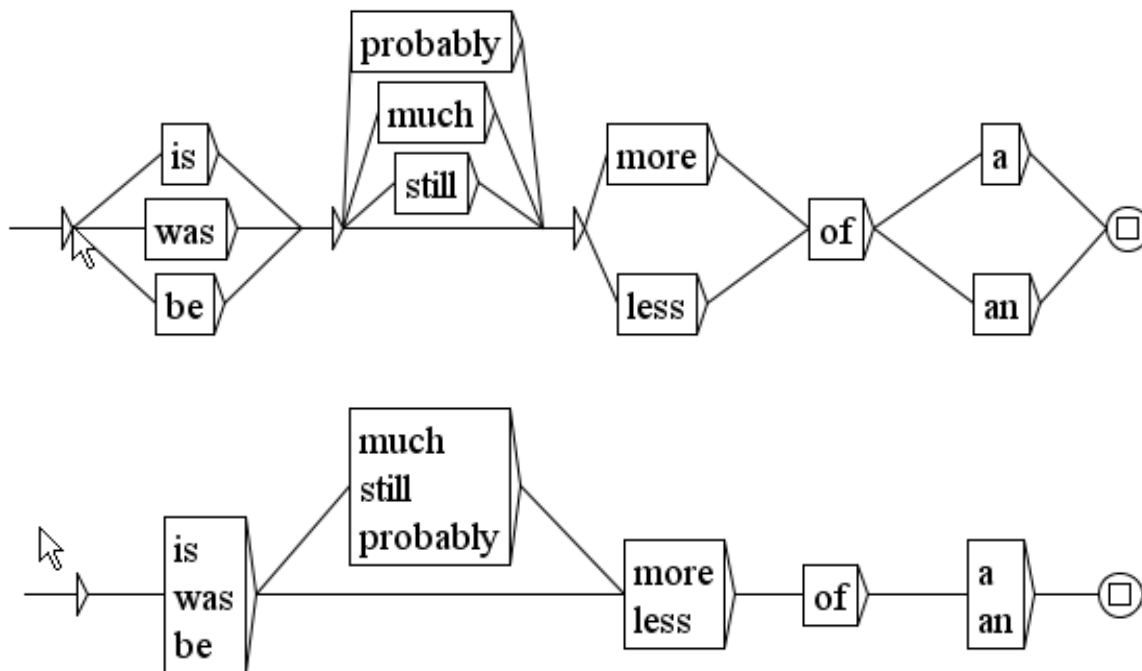
Empty nodes



An empty node can serve as an intermediate step between two others



Forms in parallel in a node



A graphical convention

Select the box, type the content of the first line, type "+"

Type the content of the next line, etc.

Validate with Enter



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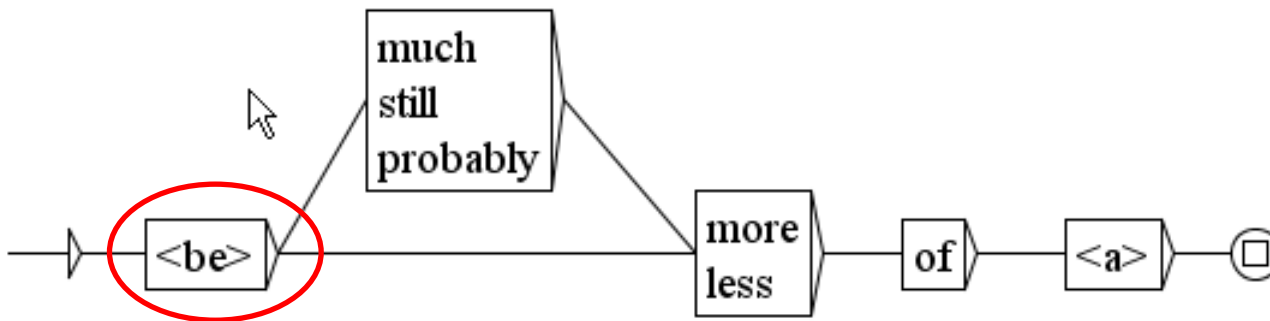
Dictionaries of a text



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Inflection and derivation

The same meaning conveyed by words with different suffixes
collect collects collected collecting collector collection
Increase the recall automatically





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Inflection and derivation

Inflection

collect collects collected collecting

<collect> automatically includes the inflected forms

Derivation

collection collector collective collectivism

Automatically including derived forms would be more
adventurous



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Lexical masks

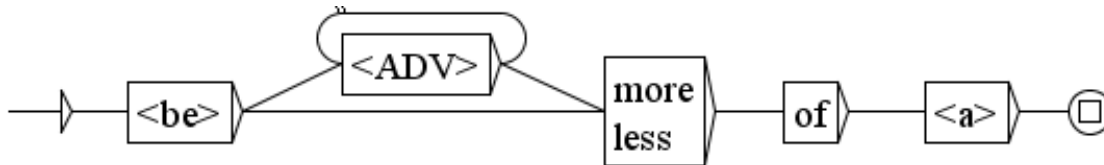
<collect> recognises automatically any inflected form of
collect

<WORD> any simple word

<FIRST> any simple word with capitalized first letter

<NB> any contiguous sequence of digits

<V> any word marked as V in the lexicon (verbs)





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Lexical masks

Key that recognises a set of linguistic forms on the basis of formal features

Can be used in graphs and regular expressions



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Dictionaries of a text

Lexical entries for the
simple words in the text

Lexical entries for the
multiword units
occurring in the text

The screenshot displays a software window titled "Word Lists in D:\unitex3.1beta\English\Corpus\htjun94_snt". It is divided into three main sections:

- DLF: 40501 simple-word lexical entries**: A list of words with their grammatical categories, such as "goalmouth, .N:s", "goalpost, .N+Conc:s", "goalposts, goalpost.N+Conc:p", "goals, goal.N+Abst:p", "goals, goal.N+Hum:p", "goals, goal.V:P3s", "goalscoring, .N:s", "goaltender, .N:s", "goat, .N+Anl:s", and "goatee, .N+Conc:s".
- DLC: 9262 compound lexical entries**: A list of multiword units with their grammatical categories, such as "go-slow, .A+z1", "go-slow, .N+XN+z1:s", "goal area, .N+XN+z1:s", "goal line, .N+XN+z1:s", "goal mouth, .N+XN+z1:s", "God-fearing, .A+z1", "going-away, .A+z1", "going-on, .N+XN+NX+z1:s", "Golan Heights, .N+XN+z1:p", and "Gold Coast, .N+XN+z1:s".
- ERR: 12455 un**: A list of error messages, including "Gluck", "GLYNDEBOU", "Glyndebou", "Glynn", "GM", "GMBH", "GmbH", "GMT", "Gnassingb", "GNI", "GNP", "Goal111111", "Gobet", "Godard", "GOEJ", "Goej", "Goering", "Goethe", "Goey", "Gogh", "Gohr", and "Gogogoba".

There are also navigation buttons and a "Filter unkr" checkbox in the top right corner.



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Dictionaries of a text

Word Lists in D:\unitex3.1beta\English\Corpus\htjun94_snt

DLF: 40501 simple-word lexical entries

- goalmouth, .N:s
- goalpost, .N+Conc:s
- goalposts, goalpost.N+Conc:p
- goals, goal.N+Abst:p
- goals, goal.N+Hum:p
- goals, goal.V:P3s
- goalscoring, .N:s
- goaltender, .N:s
- goat, .N+Anl:s
- goatee, .N+Conc:s

DLC: 9262 compound lexical entries

- go-slow, .A+z1
- go-slow, .N+XN+z1:s
- goal area, .N+XN+z1:s
- goal line, .N+XN+z1:s
- goal mouth, .N+XN+z1:s
- God-fearing, .A+z1
- going-away, .A+z1
- going-on, .N+XN+NX+z1:s
- Golan Heights, .N+XN+z1:p
- Gold Coast, .N+XN+z1:s

ERR: 12455 unknown simple words

Filter unknown words with tags.ind

- Gluck
- GLYNDEBOURNE
- Glyndebourne
- Glynn
- GM
- GMBH
- GmbH
- GMT
- Gnassingb
- GNI
- GNP
- Goal111111
- Gobet
- Godard
- GOEJ
- Goej
- Goering
- Goethe
- Goey
- Gogh
- Gohr
- Coiscesha

← The words in the text
not found in the
dictionaries



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Thanks

CONTACT

ERIC LAPORTE

+33 1 60 95 75 52

ERIC.LAPORTE@UNIV-EIFFEL.FR