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Language - Logic Toolkit (LLTK)

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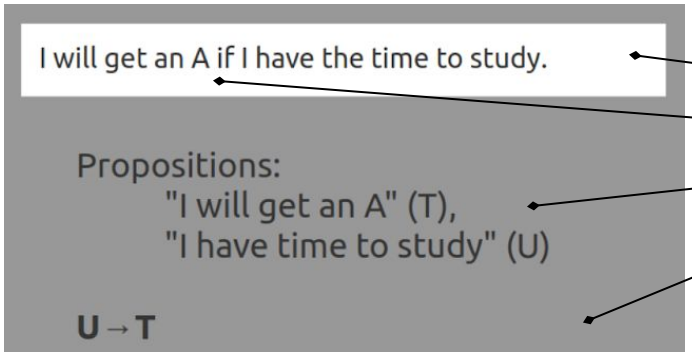
Translating Sentences into Symbolic Logic

Design a script where, given a sentence, can identify prepositional phrases and breakdown its structure in order to output the symbolic logic of the statement.



How It Works

1. Tokenize the sentence
2. Identify structure
3. Expand the phrases
4. Export to symbols

Motivation

Once broken into symbolic logic, a solution or verification of the statement(s) would be more computation friendly and therefore more consistent and efficient than human processing.

A toolkit of this nature would be a base to software that could solve logic heavy puzzles such as LSAT questions.

Command Line Interface

```
language-logic-exploration$ python3 lltk.py -ilr "Forneybot
s were found to malfumction if and only if they suffer wate
r damage or overheard a logical paradox."

Forneybots were found to malfumction if and only if they su
ffer water damage or overheard a logical paradox.
_iff_
A: Forneybots were found to malfumction
C: they suffer water damage
D: overheard a logical paradox
A ⇔ C ∨ D
```

Sentence parsing and organization with Natural Language Toolkit (NLTK). **NLTK is a python library that assists in the separation and tagging words in the given string.

Categorize the words into propositional statements by looking for conditional indications.

Conversion to symbolic logic from the modified output of NLTK, and create symbolic statement from this linked list of prepositional statements.

Output to standard output. This is so this tool can be easily implemented for any sort of application.

Functionality

if-then/where conditionals • if-and-only-if conditionals • recognize negation • recognize and/or • comb through nested and/or statements • expand lists • command line input • standard output • custom toolkit options

NLTK Citation: Bird, Steven, Edward Loper and Ewan Klein (2009), Natural Language Processing with Python. O'Reilly Media Inc.