## Natural



### AceWiki is a semantic wiki using the controlled natural language ACE (Attempto Controlled English).

<u>``</u>	<back forward=""> Refresh</back>
	Article Noun References Individuals Hierarchy planet
avigation: Main Page Index Random Article Search: ctions: New Word Export	<ul> <li>We use here the definition of "planet" according to the International Astronomical Union (see http://www.iau.org ) without the restriction to solar planets.</li> <li>Every planet is a clearatial-body.</li> <li>No planet is a star.</li> <li>The distinction between planet and dwarf-planet has been introduced by the International Astronomical Union in 2006.</li> <li>No planet is a more start is a star.</li> <li>Every planet orbits a star.</li> <li>Every planet orbit the Sun is an extrasolar planet.</li> <li>Which planets orbit the Sun?</li> <li>Earth</li> <li>Jupiter</li> <li>Mars</li> <li>Mercury</li> <li>Neptune</li> <li>Statum</li> <li>Uranus</li> <li>Verus</li> <li>Every planet is a terrestrial planet or is a gas glant.</li> </ul>

ACE supports a wide range of natural language constructs:

- Proper names, Nouns, Verbs, Adjectives
- Of-constructs: part of, child of, owner of
- Number restrictions: at most 3 countries
- Relative phrases: ... that orbits the Sun
- Anaphoric references: the country, the planet
- Existential and universal quantifiers: a, every
- Negation: no, does not, is not, it is false that
- Pronouns: something, everybody, what
- Conditional sentences: if ... then ...
- ... and much more.

ACE is a formal language that is translatable into logic and other languages, for example OWL. AceWiki is designed to seamlessly integrate a reasoner (currently Pellet). The reasoner is used to ensure that the ontology is always consistent:

- Every country is a part of exactly 1 continent.
- Every country that borders Switzerland is a part of Europe.
- Germany borders Switzerland.
- Germany is a part of Asia.

Because ACE is more expressive than OWL, one can express complex statements that are beyond OWL (currently not used for reasoning):

- No ocean borders every continent.
- Every person that has a car owns the car or leases the car.
- If Berlin is a capital then Germany is a stable country.
- Every trip that starts at X and that ends at X is a round trip.

Questions in ACE can be used to express queries that are answered by the reasoner:

- Which cities are located in a country that borders Switzerland? - Berlin
- Milano

AceWiki

- Paris
- Rome

The reasoner is used to infer class memberships and class hierarchies:

### <u>Upward</u>

- Every country is an area.
- Every country is an object.

#### <u>Downward</u>

- Every baltic state is a country.
- Every city-state is a country.
- Every landlocked-country is a country.

Website: attempto.ifi.uzh.ch/acewiki Language: Java License: LGPL Version: 0.2.13 (alpha)

# Usable

AceWiki makes it easy to add and modify ACE sentences. A predictive editor helps the users to create sentences that comply with the ACE syntax:

Sentence Editor X				
Every city that is located in a country that is				
text		< Delete		
function word an every everybody everything no nobody transitive adjective freew located in registered at used for	proper name Pretw Africa Andorra Andarra Antarettica Argentina Asia Australia reference the country the city	passive verb merv controlled by examined by liocated by managed by new variable X Y Z X1		
		Z X1 Y1 Z1 X2 OK Cancel		

Two usability experiments showed that AceWiki is easy to learn and use. Untrained subjects were told to collaboratively create a knowledge base using AceWiki:

- 78%–81% of the sentences were correct and sensible
- 61%-70% of them were complex (containing negations, implications, disjunctions, or number restrictions)
- Creation of a correct sentence every 5-6 minutes
- Definition of a new word every 5-7 minutes

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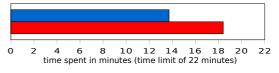
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## Understandable

We performed an understandability experiment that compares the understandability of ACE to a comparable common formal language: MLL, a language that is heavily inspired by the Manchester OWL Syntax.

During the experiment, the subjects had to classify 10 statements in ACE/MLL as true or false according to a situation depicted by a diagram. Our results show that ACE was understood significantly better:





After the experiment, the subjects stated that ACE was more understandable:

