Natural

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

ACE supports a wide range of natural language constructs:

- **Proper names:** Switzerland, United Nations, Nile
- **Nouns:** country, person, event
- **Of-constructs:** part of, child of, owner of
- **Verbs:** border, contain, overlap with
- **Transitive adjectives:** located in, registered at, fond of
- **Plural:** exactly 5 customers, at most 3 countries
- **Relative phrases:** ... that borders Germany
- **Anaphoric references:** the country, the island
- **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.

Expressive

ACE is a formal language that is translatable into logic and other languages, for example OWL. Some examples of OWL-compliant sentences:

- ▷ Every country that borders no sea is a landlocked-country.
- ▷ Switzerland borders exactly 5 countries.
- ▷ Antarctica is a continent that contains no country.
- ▷ No city that is located in Europe is controlled by the USA.
- ▷ If X borders Y then Y borders X.

ACE is more expressive than OWL. You can express complex statements (e.g. rules) that are beyond OWL:

- ▷ No country borders every country.
- ▷ If Liechtenstein is a country then Andorra is a country.
- ▷ If a country contains an area and does not control the area then the country is an unstable-country.

ACE supports also questions which are used in AceWiki to state queries:

- ▷ Which continents contain more than 10 countries?
- ▷ Zurich is a part of what?
- ▷ Which cities overlap with more than 1 continent?
- ▷ Switzerland borders which country that borders Spain?
- ▷ Which rivers flow through a city that is located in Switzerland?

Thus, ACE is an all-in-one language.

ALL-IN-ONE
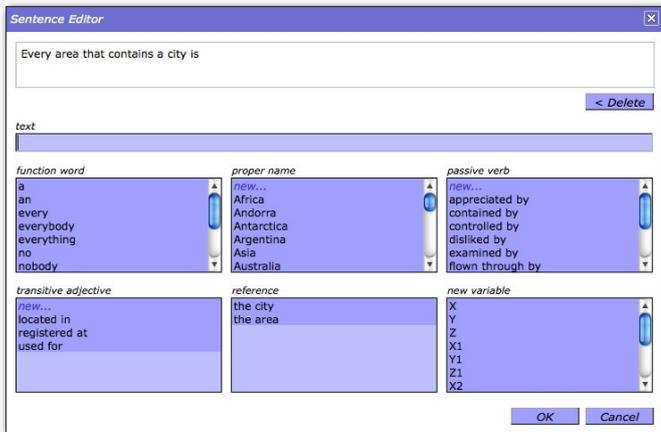
- ✔ Ontology Language
- ✔ Rule Language
- ✔ Query Language

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Easy to Use

AceWiki is not only easy to read and understand, but also easy to modify and extend. Users do not need to understand the details of ACE. A predictive editor helps them word-by-word to create sentences that comply with the ACE syntax:

A usability experiment proved that AceWiki is easy to learn:

- 20 participants were asked to add knowledge to AceWiki
- No instructions how to use the interface
- They created in total 186 sentences
  - 80% were correct and sensible
  - 61% were complex (using negation or implication)

Reasoning

AceWiki integrates the OWL reasoner Pellet that considers all OWL-compliant sentences of the wiki. It ensures 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.

The reasoner infers class memberships:

- ▷ Switzerland is an area.
- ▷ Switzerland is a country.
- ▷ Switzerland is a landlocked-country.
- ▷ Switzerland is an object.

And class hierarchies:

Upward

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

Downward

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

Furthermore, the reasoner answers questions:

- ▷ Which cities are a part of Switzerland?
  - Berne
  - Geneva
  - Lucerne
  - Zurich

AceWiki