

# ACE View

## an ontology and rule editor based on controlled English



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### Introduction

**ACE View** is a novel ontology and rule editor that simplifies the exploration and editing of expressive and syntactically complex **OWL 2** ontologies and **SWRL** rulesets by basing the user interface on **Attempto Controlled English (ACE)**. This makes ACE View radically different from current OWL and SWRL editors which use formal logic syntaxes and general purpose graphical user interface widgets (trees, checkboxes, etc.), and which are often seen as too complicated and confusing for domain experts with no background in formal methods. ACE View integrates two mappings, **ACE→OWL/SWRL** and **OWL→ACE**, and is implemented as a plug-in for **Protégé 4**.

### Motivation

The OWL 2 specification describes several serialization syntaxes for OWL ontologies. Some of these syntaxes are oriented towards machines and are thus inherently difficult to read and write for humans. Others have been designed for logicians and programmers, but lack the features that would bring OWL closer to domain experts who are often not well-trained in formal methods. Some of the problems that users encounter when working with OWL ontologies are purely semantic (e.g. caused by misunderstanding the open world reasoning and the unique name assumption). Many problems, however, are rooted in the nature of current OWL syntaxes.

Some knowledge bases also require a rule component, often expressed in SWRL. The proposed SWRL syntax, however, is completely different from the OWL syntaxes. Query languages introduce yet another set of syntaxes.

### ACE vs OWL/SWRL. Which is more readable?

One possible solution is to work with knowledge bases via a **controlled natural language** like ACE. ACE is a formal logic that is syntactically a fragment of English, thus making the reading and writing of logic formulas more user-friendly. Compare:

ACE	OWL, SWRL, DL-Query
Every employee that does not own a car owns a bike.	$employee \sqcap \neg (\exists own\ car) \sqsubseteq \exists own\ bike$
Every man that owns a car likes the car.	$man(?x) \wedge own(?x, ?y) \wedge car(?y) \rightarrow like(?x, ?y)$
Which car does John own?	$car \sqcap \exists own \{John\}$

### ACE views

ACE View provides a set of views that present the knowledge base as a set of ACE snippets. Each snippet is a sequence of one or more ACE sentences and corresponds to an OWL or SWRL axiom, or a DL-Query. The user can add, modify and delete snippets. Snippets can also be generated by interacting with standard Protégé views (e.g. the sub class hierarchy tree). Furthermore, interaction with a reasoner (question answering, entailment generation and explanation) is also based on ACE.

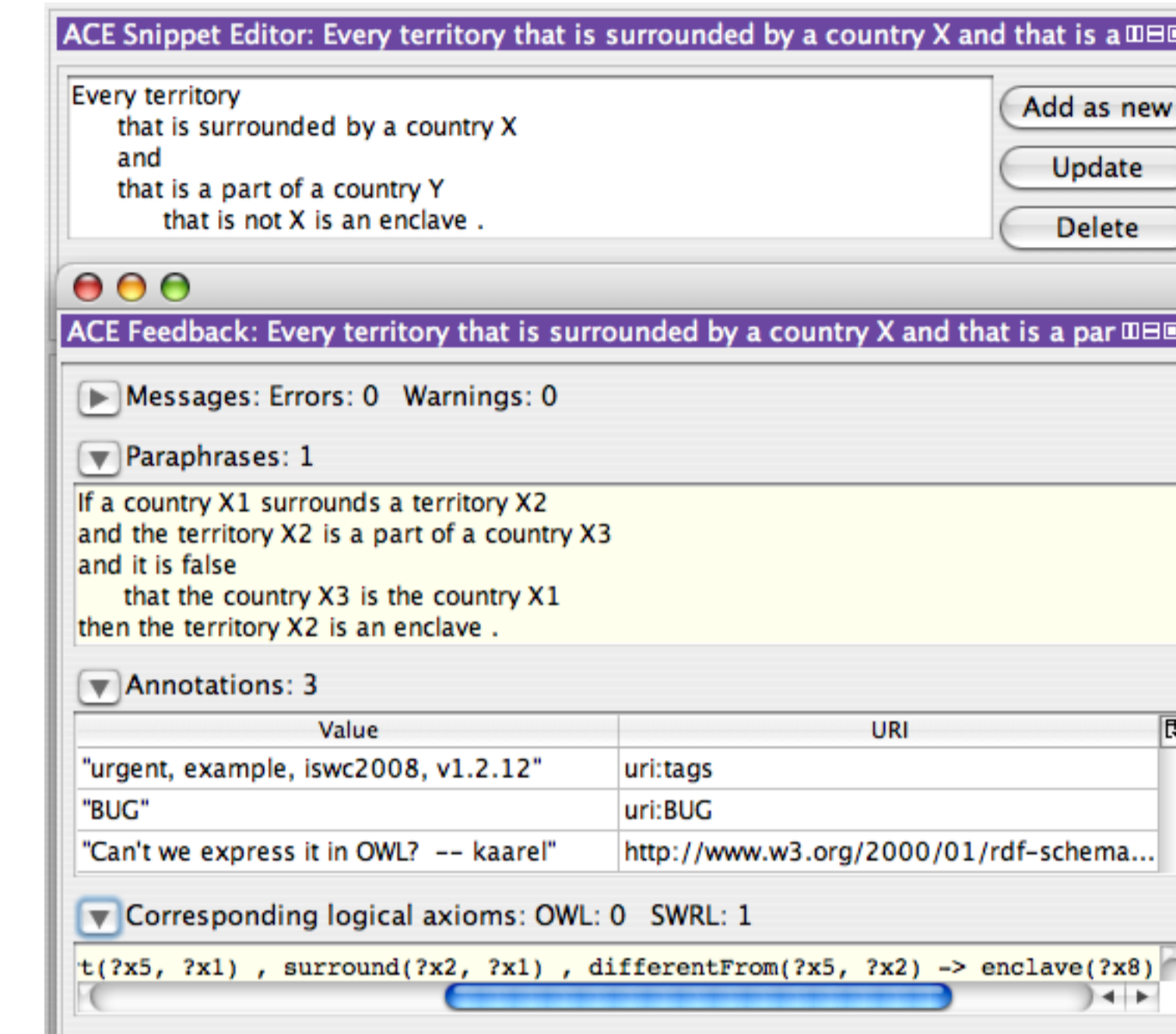
### Download ACE View at

<http://attempto.ifi.uzh.ch/aceview/>

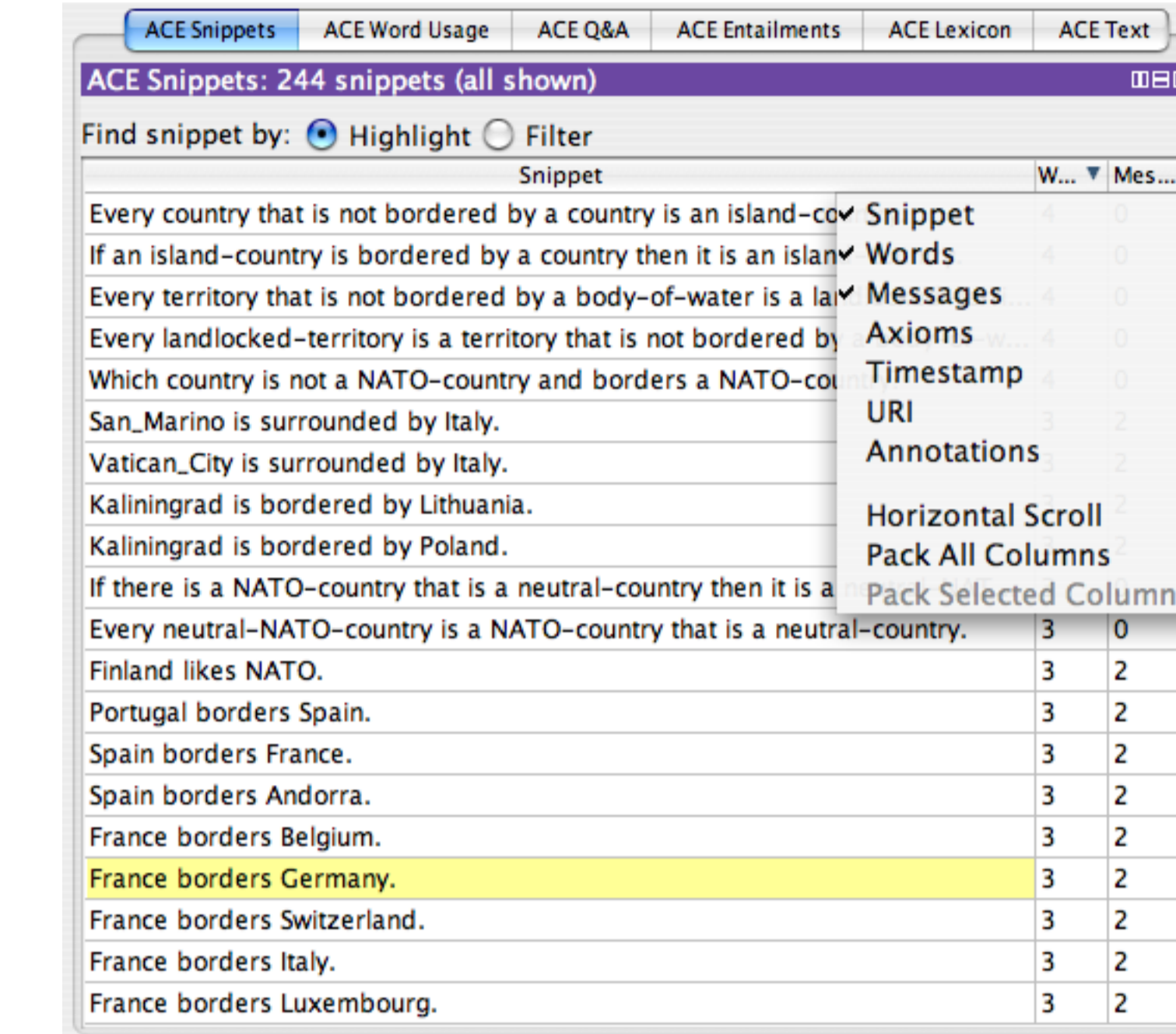
### Learn the ACE language at

<http://attempto.ifi.uzh.ch/>

### Snippet and its properties



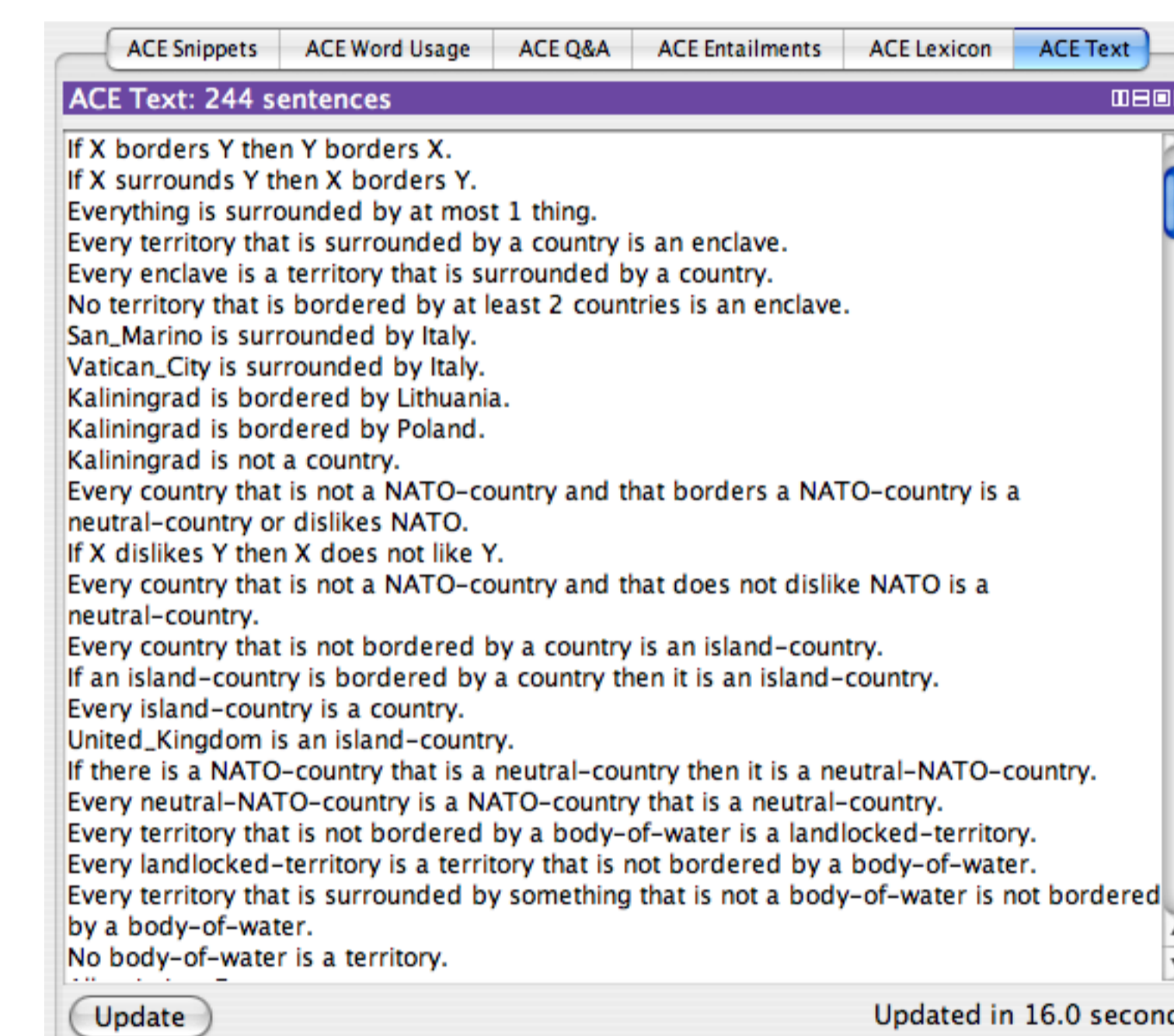
### KB = Set of ACE snippets



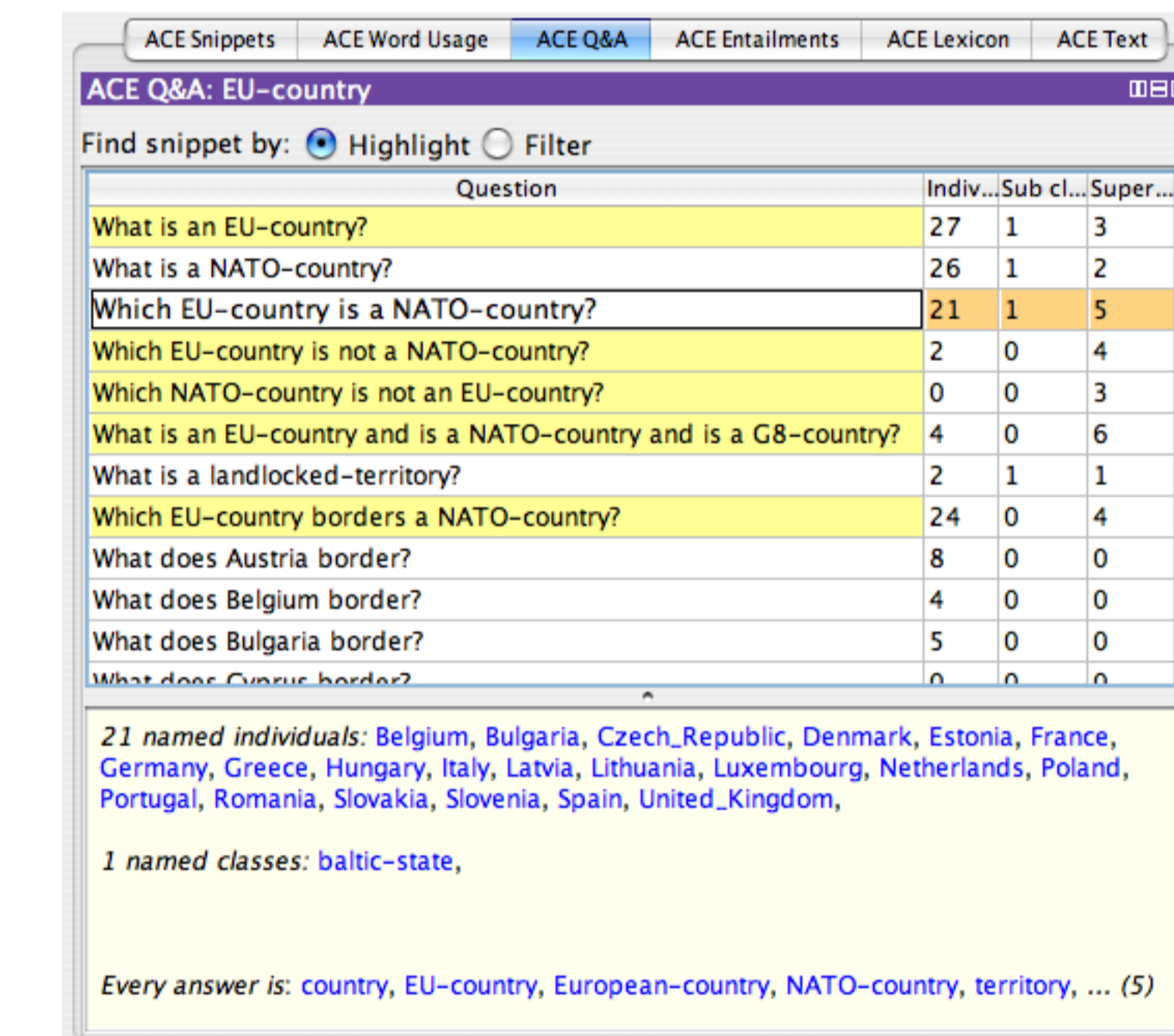
### OWL entities vs ACE words

Entity	Type	Singular	Plural	P. participle	Frequency
Bulgaria	PN	Bulgaria			8
Canada	PN	Canada			2
contain	TV	contains	contain	contained	2
country	CN	country	countries		22
Croatia	PN	Croatia			5
Cyprus	PN	Cyprus			3
Czech_Republic	PN	Czech_Republic			8
Denmark	PN	Denmark			4
dislike	TV	dislikes	dislike	disliked	3
EU-country	CN	EU-country	EU-countries		36
European-country	CN	European-country	European-countries		24
Finland	PN	Finland			7
France	PN	France			12
G8-country	CN	G8-country	G8-countries		9
enclave	CN	enclave	enclaves		6
Estonia	PN	Estonia			5
Europe	PN	Europe			2
Georgia	PN	Georgia			2
Germany	PN	Germany			13
Greece	PN	Greece			7

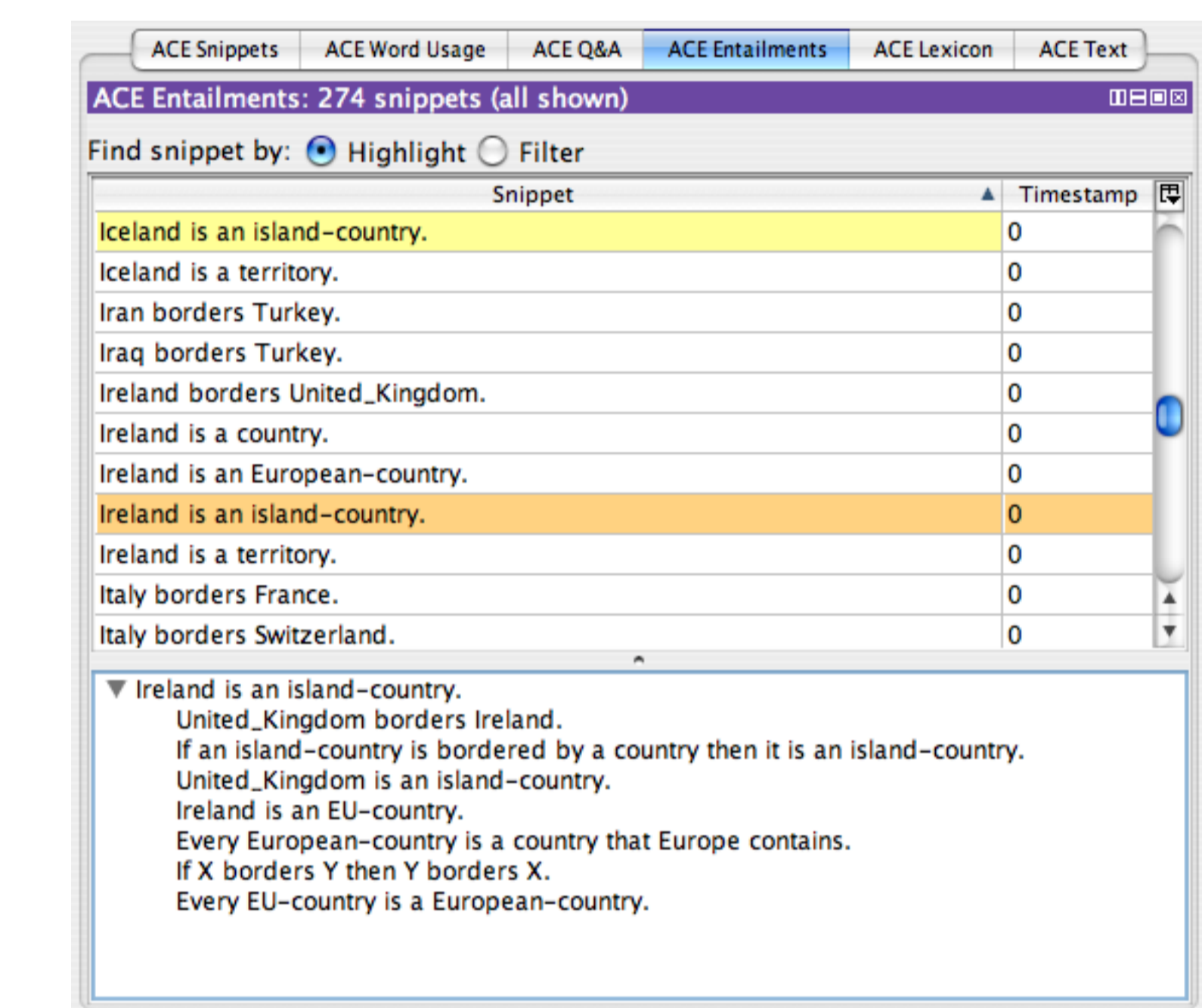
### Free-form editing



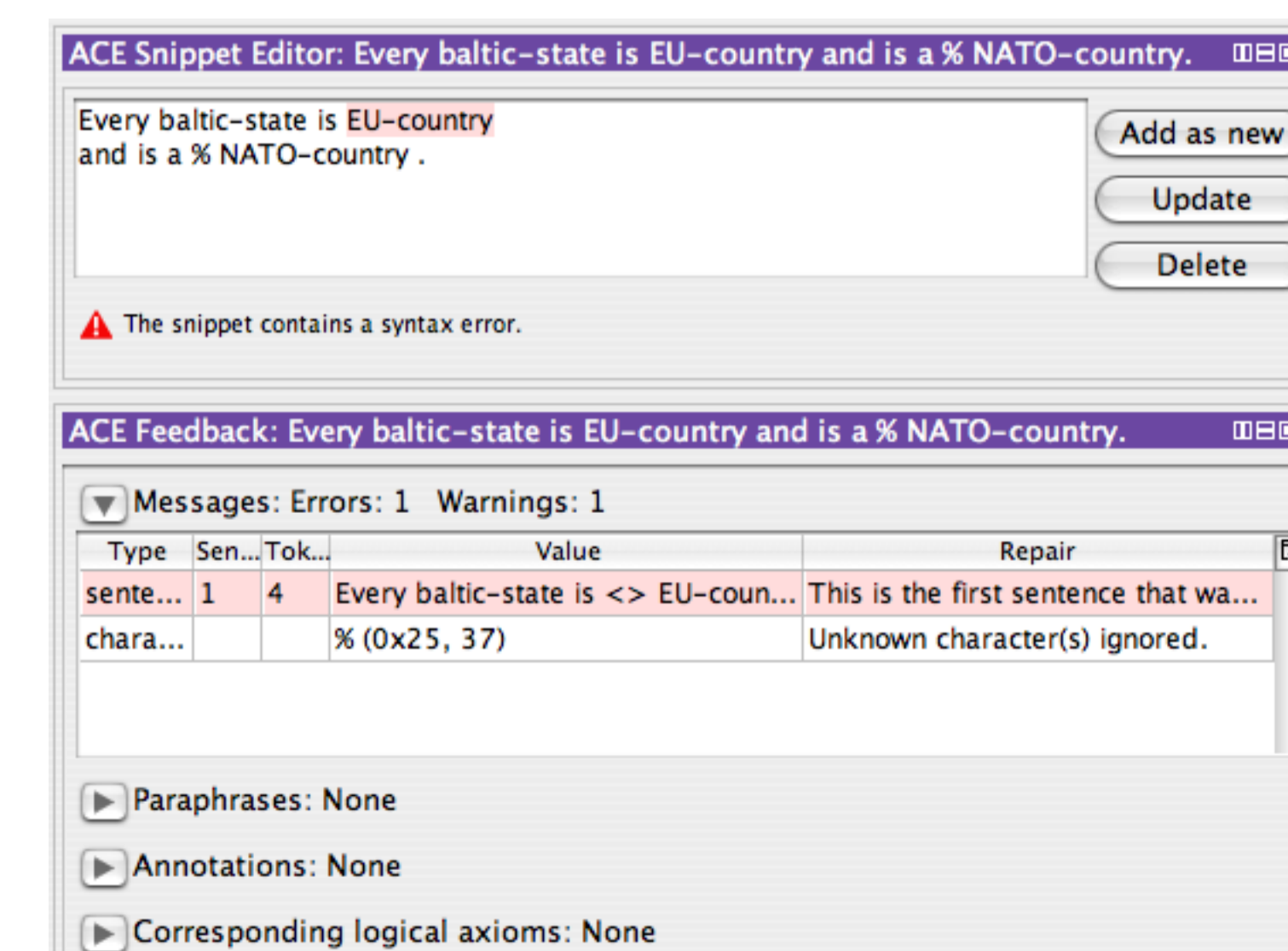
### Questions and answers



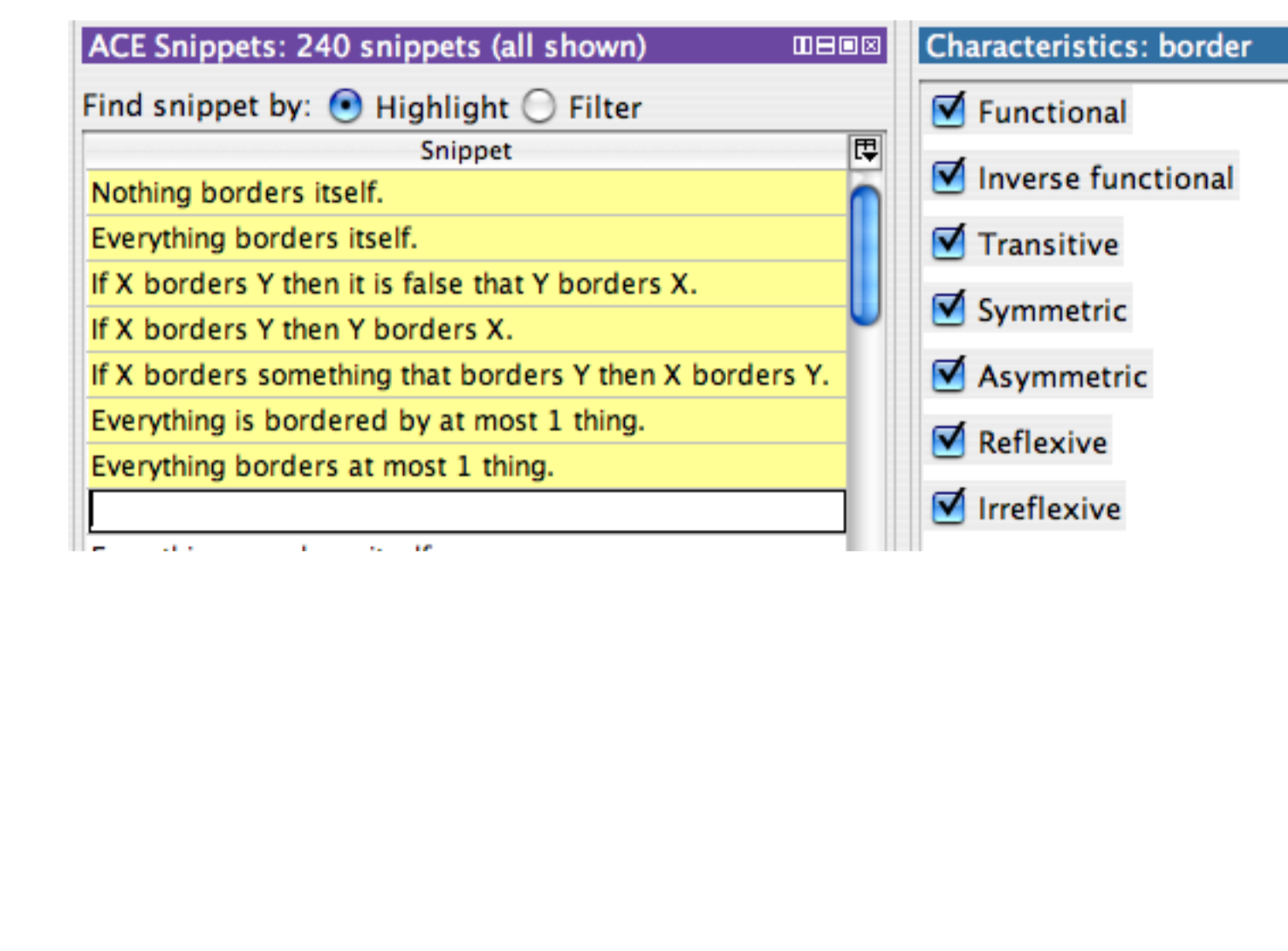
### Entailments and explanations



### Syntax error pinpointing



### Working together with Protégé



### Linguistic metrics

Metric	Count
Snippets	244
Sentences	244
Questions	42
SWRL snippets	0
Non OWL/SWRL snippets	0
Unverbalized axioms	0
Snippets that contain nothing but	1
Content words	77
Common nouns	13
Transitive verbs	5
Proper names	59
Unused content words	0
Wordforms	100
Ambiguous wordforms	0
Ambiguous wordforms in the same wordclass	0