

# EXPANSION OF SEMFIS PLUGIN FROM PROTÉGÉ 4.X TO PROTÉGÉ 5.X.

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- From Protégé 4.x
- To Protégé 5.x
- The plug-in
- Implementation

- Protégé 4.x
- ADOxx
- Semfis

- new features of OWL2
- very similar overall structure
- RDF/XML, other syntaxes, Direct and RDF-Based semantics
- all previous Ontologies remain valid

More expressive:

- Metamodeling capabilities (Punning)
- Syntactic sugar (DisjointUnion)
- improvements in search, annotation viewing editing, hierarchy viewing, ontology loading saving, accessibility, logging and performance
- user interface improvement

# THE PLUG-IN

The screenshot displays a software interface with three main components:

- Class Hierarchy (Left):** A tree view showing a hierarchy of classes. The 'pizza' class is selected, and its subclasses are listed, including toppings like 'RosemaryTopping', 'FruitTopping', and 'MeatSausageTopping', as well as base classes like 'Food' and 'Ingredient'.
- Properties Dialog (Center):** A dialog box titled 'pizza' with the following sections:
  - Update:** Buttons for 'Update', 'Select', 'Mark for Export', and 'Un-mark for Export'.
  - Load into Plugin:** Buttons for 'Load into Plugin', 'Select all', 'Mark selection', and 'Un-mark selection'.
  - Model name:** 'pizza', **Version:** '1', **Save as:** 'pizza.xml'.
  - Classes:** A list of checked items:
    - RosemaryTopping
    - FruitTopping
    - MeatSausageTopping
    - Pizza
    - Spice
    - PizzaBase
    - SpinachTopping
    - GreenPepperTopping
    - Mushroom
    - Soho
    - ThinCrustPizza
    - GarganolaTopping
    - RocketTopping
    - Food
    - PrawnTopping
    - American
    - HanTopping
    - Cajun
    - SauceTopping
    - Parmesan
    - FourCheesesTopping
    - PettifoneTopping
    - BeefPepperTopping
  - Properties:** A list of checked items:
    - versionInfo
    - label
    - comment
    - idBaseOf
    - hasTopping
    - hasIngredient
    - hasCountryOfOrigin
    - isIngredientOf
    - hasBase
    - hasSpices
    - isToppingOf
  - Individuals:** A list of checked items:
    - Italy
    - Germany
    - France
    - England
    - America
- Button Grid (Right):** A grid of buttons representing different instances or actions. The top row contains buttons labeled 'C' (Class) for 'RosemaryTopping', 'FruitTopping', 'MeatSausageTopping', 'Pizza', 'SpinachTopping', 'GreenPepperTopping', 'Mushroom', 'Soho', 'ThinCrustPizza', 'GarganolaTopping', 'RocketTopping', 'Food', 'PrawnTopping', 'American', 'HanTopping', 'Cajun', 'SauceTopping', 'Parmesan', 'FourCheesesTopping', 'PettifoneTopping', and 'BeefPepperTopping'. The bottom row contains buttons labeled 'P' (Property) for 'idBaseOf', 'hasTopping', 'hasIngredient', 'hasCountryOfOrigin', 'isIngredientOf', 'hasBase', 'hasSpices', and 'isToppingOf'. The bottom row also includes buttons labeled 'I' (Individual) for 'Italy', 'Germany', 'France', 'England', and 'America'.

## Namespace

### Classes

- Label
- Inheritance
- Comments
- complementOf
- disjointWith
- intersectionOf
- oneOf
- unionOf
- Restrictions

### Data Properties

- subclassOf
- PropertyType
- Domain
- Range
- Comments
- inverseOf
- Functional
- InverseFunctional
- Symmetric
- Transitive

## Annotation Properties

- subClassOf
- PropertyType
- Domain
- Range
- Comments
- inverseOf
- Functional
- InverseFunctional
- Symmetric
- Transitive

## Individuals

- sameAs
- differentFrom
- comments
- Type
- Objectproperties
- Dataproperties



## Disjoint Union of Classes

```
DisjointUnion := 'DisjointUnion' '(' axiomAnnotations Class  
                  disjointClassExpressions ')'
```

```
disjointClassExpressions := ClassExpression ClassExpression  
                           { ClassExpression }
```

## Changes from Protégé 4 to Protégé 5

- Protégé 4
  - Java 5
  - Apache ant
  - OWL API version 3.5
- Protégé 5
  - Java 8
  - Maven
  - OWL API version 4.2.5

# DISJOINT UNION IN PROTÉGÉ 5

Description: VegetarianPizza

Equivalent To +  
● Pizza  
and (not (hasTopping some FishTopping))  
and (not (hasTopping some MeatTopping))

SubClass Of +

General class axioms +

SubClass Of (Anonymous Ancestor)  
● hasBase some PizzaBase

Instances +

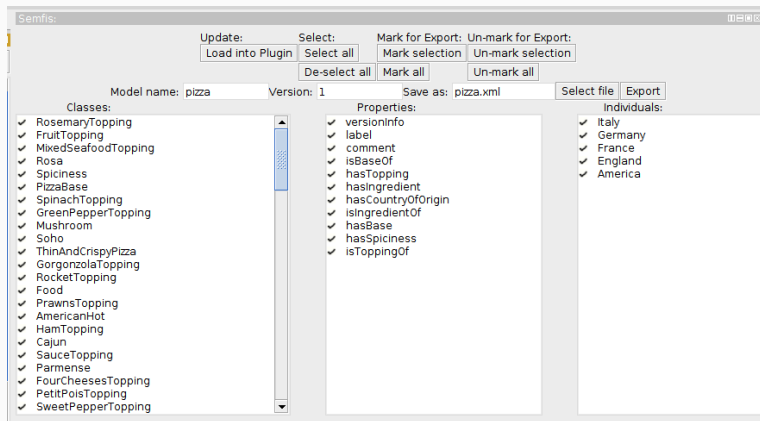
Target for Key +

Disjoint With +  
● NonVegetarianPizza

**Disjoint Union Of +  
● VegetarianPizzaEquivalent1, VegetarianPizzaEquivalent2**

Synchronising

# SEMFIS PLUG-IN DESIGN



# ADOXML PLUG-IN OUTPUT

```
-<INTERREF name="owl:disjointWith">
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="NonVegetarianPizza"/>
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="VegetarianPizza"/>
</INTERREF>
-<INTERREF name="owl:disjointUnionOf">
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="VegetarianPizza"/>
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="VegetarianPizzaEquivalent1"/>
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="VegetarianPizzaEquivalent2"/>
</INTERREF>
-<INTERREF name="owl:intersectionOf">
  <IREF type="objectreference" tmodeltype="Ontology Model" tmodelname="pizza 1" tmodelver="1" tclassname="Class"
  tobjname="OperatorClass_97"/>
</INTERREF>
</INSTANCE>
-<INSTANCE name="OperatorClass_102" class="Class">
  <ATTRIBUTE name="Position" type="STRING">NODE x:10.0cm y:30.0cm w:2.39cm h:1.39cm</ATTRIBUTE>
-<RECORD name="Restrictions">
```

# SEMFIS IN ADOXX

The screenshot displays the ADOXX interface for the class `VegetarianPizzaEquivalent1`. The main window shows the class definition with the following structure:

```
owl:disjointUnionOf:

- VegetarianPizzaEquivalent1 pizza 1
- VegetarianPizzaEquivalent2 pizza 1

```

The right-hand pane shows a grid of class and operator classes. The `VegetarianPizzaEquivalent1` class is highlighted in red. The grid is organized as follows:

Class	OperatorClass	OperatorClass
Class_125	OperatorClass_126	OperatorClass_127
Class_133	OperatorClass_134	OperatorClass_135
Class_139	OperatorClass_141	HerbSpiceTopping
Class_148	OperatorClass_149	LaReine
Class_158	OperatorClass_159	SpicyPizza
Class_165	OperatorClass_164	VegetarianTopping
VegetarianPizzaEquivalent1	OperatorClass_176	OperatorClass_175

- Protégé setup in Eclipse  
<https://github.com/protegeproject/protege/wiki/Setup-in-Eclipse>
- Migration changes  
<https://github.com/owlcs/owlapi/wiki/Migrate-from-version-3.4-and-3.5-to-4.0>
- developing Protégé plugins guide  
[http://protegewiki.stanford.edu/wiki/PluginAnatomy#The\\_Plugin\\_Instance](http://protegewiki.stanford.edu/wiki/PluginAnatomy#The_Plugin_Instance)
- OWL Ontology methods documentation  
[http://owlcs.github.io/owlapi/apidocs\\_4\\_2\\_3/org/semanticweb/owlapi/model/OWLAxiomIndex.html](http://owlcs.github.io/owlapi/apidocs_4_2_3/org/semanticweb/owlapi/model/OWLAxiomIndex.html)

QUESTIONS?