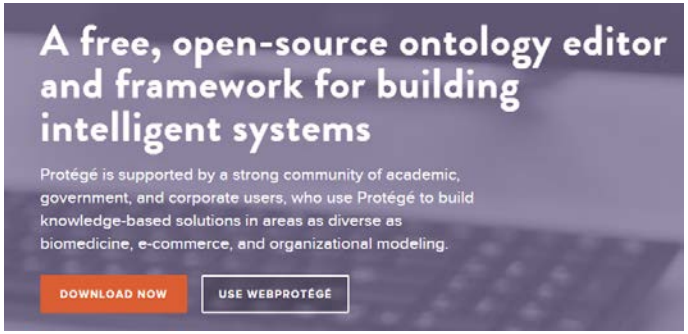
Knowledge Modeling (I) - Protege

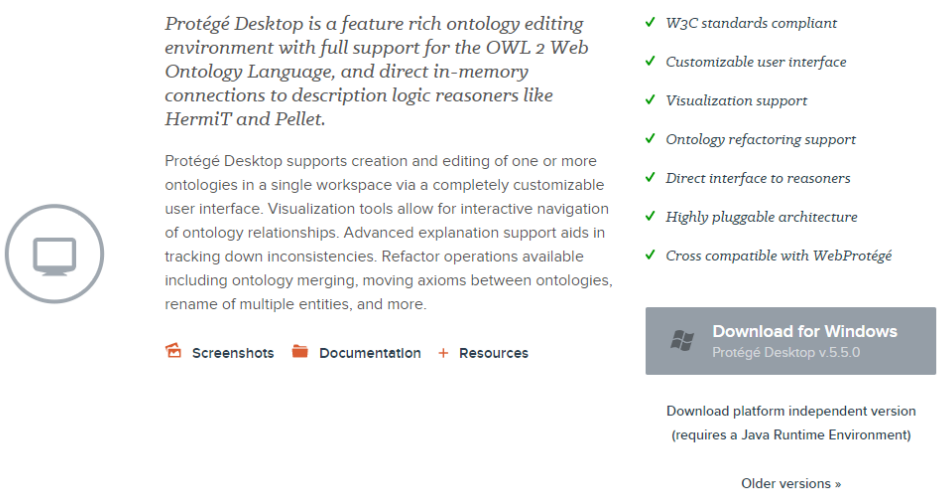
一、下载配置

Protege配置

主页：

https://protege.stanford.edu/





【此处示例采用windows版本】

点击 Download Now 进入下载页面

点击 Download for Windows 下载软件包

得到 Protege Desktop v.5.5.0 版本的压缩包

Protege配置

Mac版本下载

打开链接：

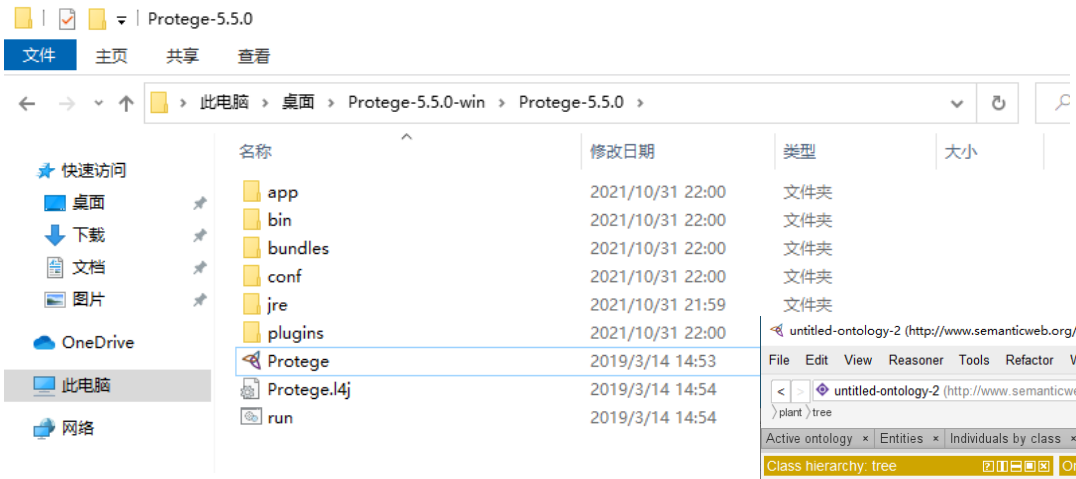
https://github.com/protegeproject/protege-distribution/releases

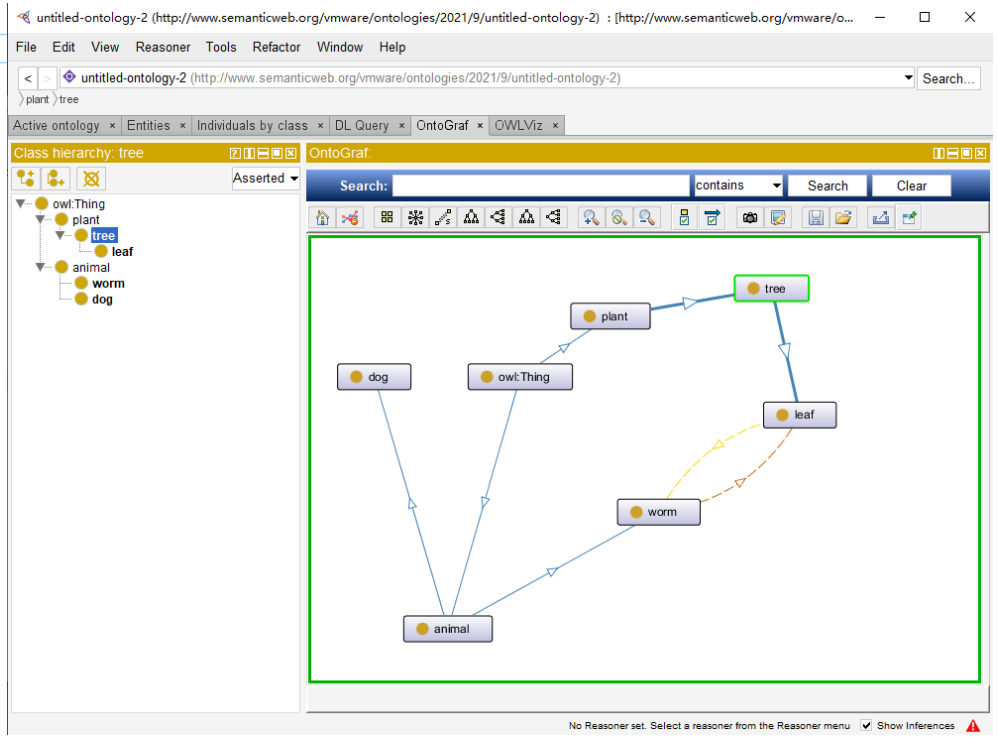
下载 Protege-5.5.0-os-x.zip

解压后只有一个.app文件，拷贝到应用程序后，即视为安装完成

Protege配置

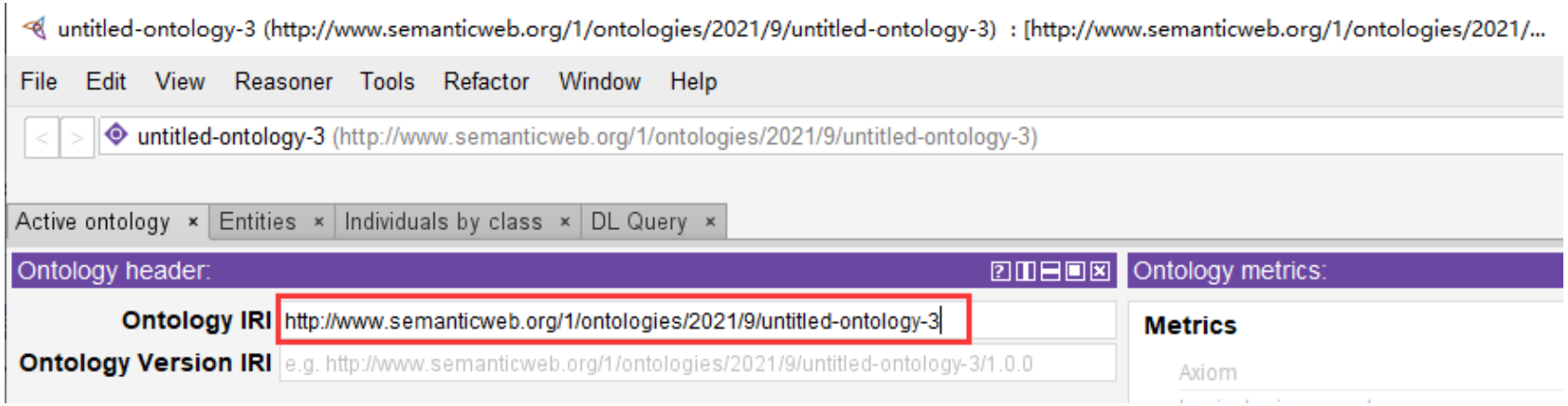
解压完成后直接打开Protege.exe即可正常使用





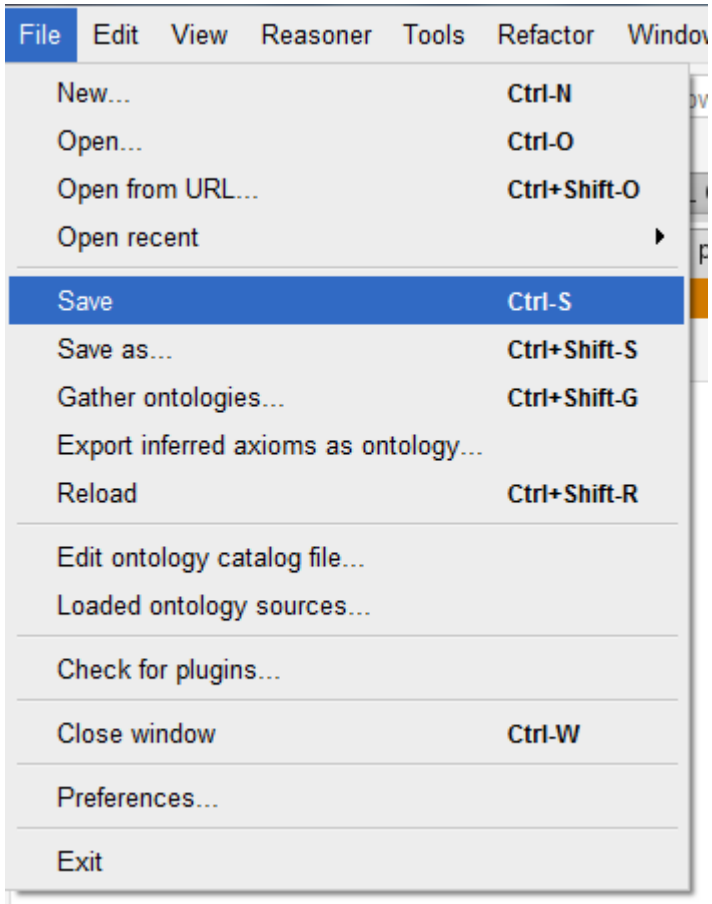
二、知识（本体）建模示例

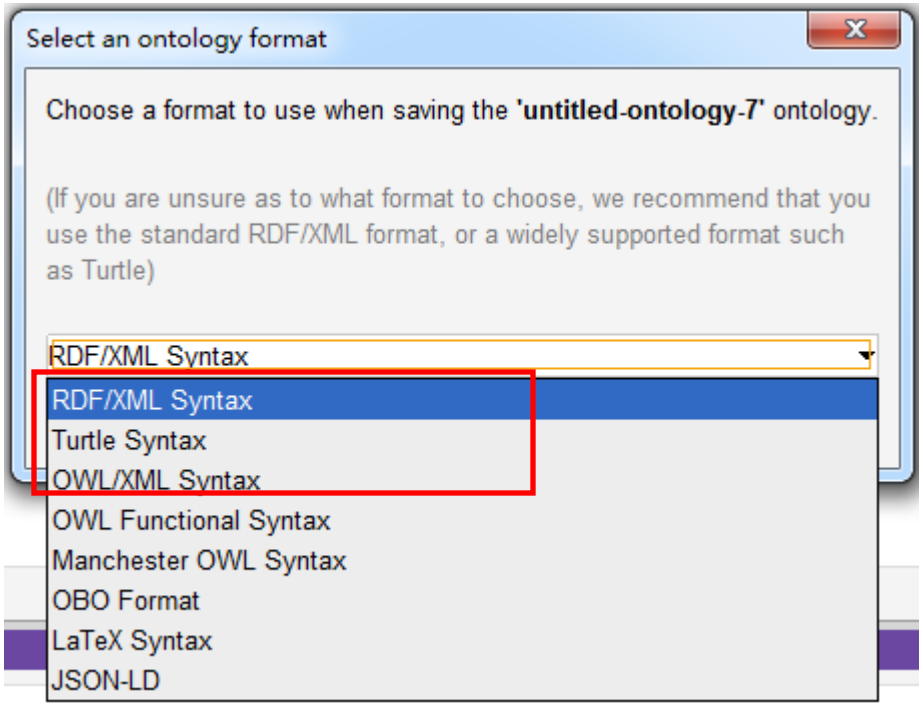
设置本体IRI



设置为：http://www.seu.edu.cn/ontologies/pizza.owl

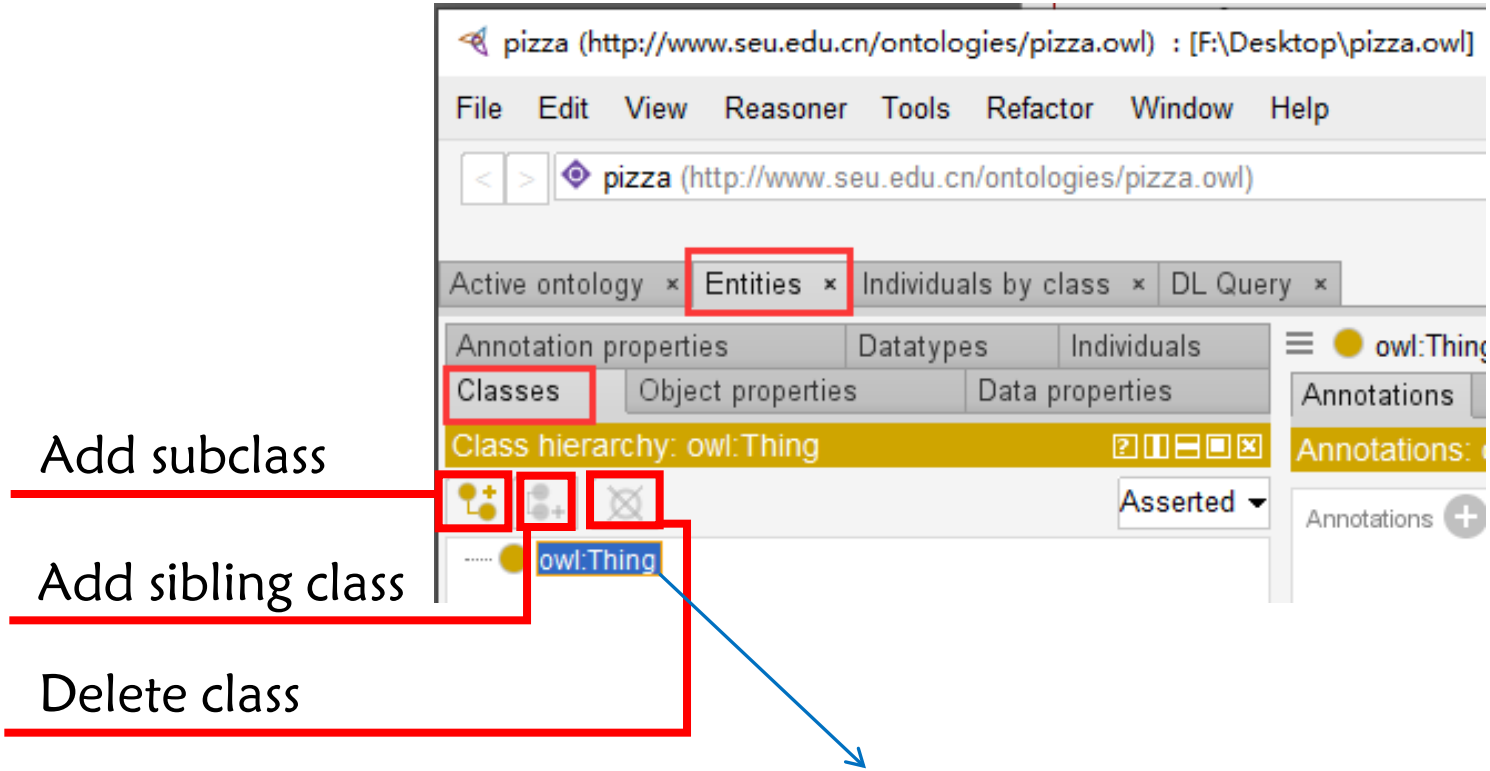
设置保存格式


File
Edit
View
Reasoner
Tools
Refactor
Windo
New... Ctrl-N
Open... Ctrl-O
Open from URL... Ctrl+Shift-O
Open recent
Save Ctrl-S
Save as... Ctrl+Shift-S
Gather ontologies... Ctrl+Shift-G
Export inferred axioms as ontology...
Reload Ctrl+Shift-R
Edit ontology catalog file...
Loaded ontology sources...
Check for plugins...
Close window Ctrl-W
Preferences...
Exit


Select an ontology format
Choose a format to use when saving the 'untitled-ontology-7' ontology.
(If you are unsure as to what format to choose, we recommend that you use the standard RDF/XML format, or a widely supported format such as Turtle)
RDF/XML Syntax
RDF/XML Syntax
Turtle Syntax
OWL/XML Syntax
OWL Functional Syntax
Manchester OWL Syntax
OBO Format
LaTeX Syntax
JSON-LD

创建Class

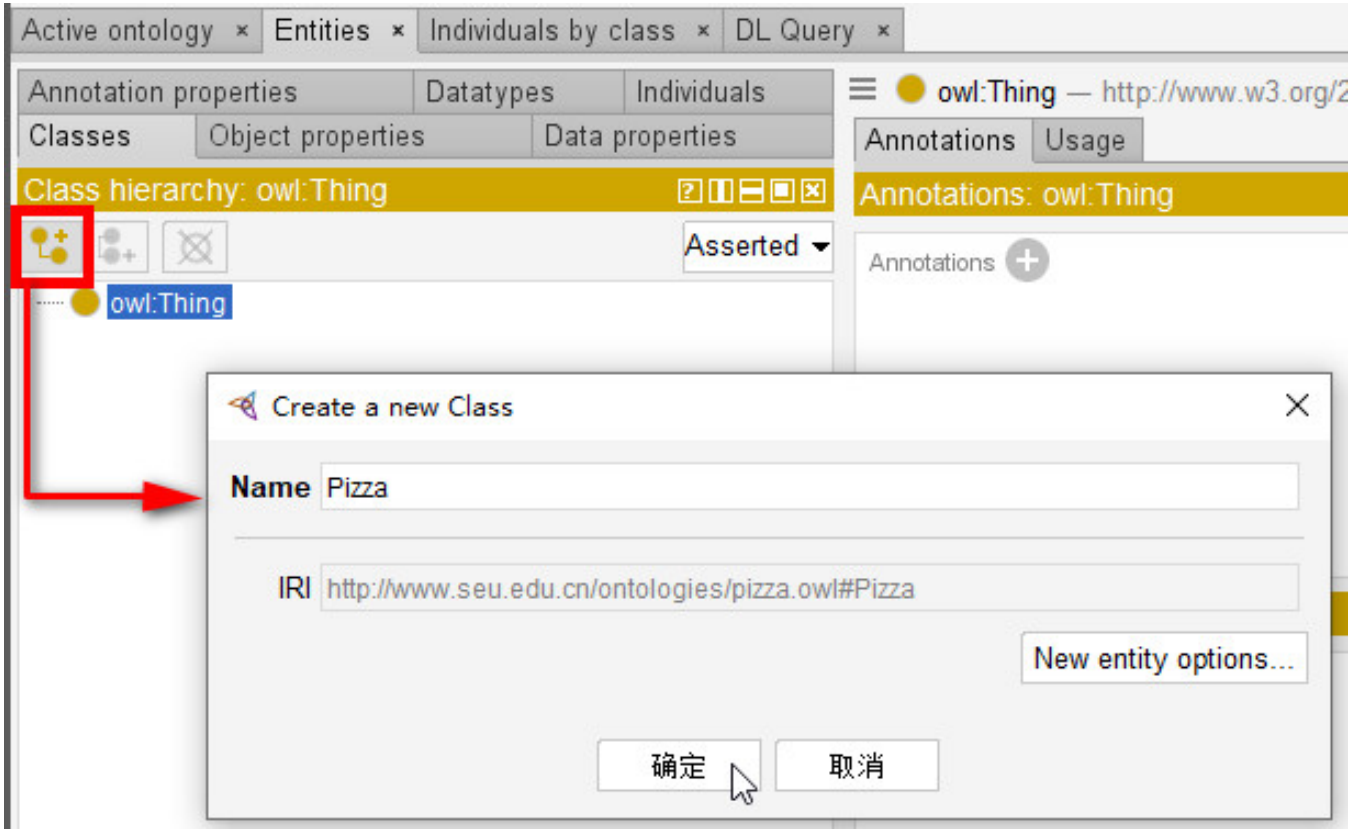
选择 “Entities” → “Classes”，创建Classes



初始的class hierarchy tree

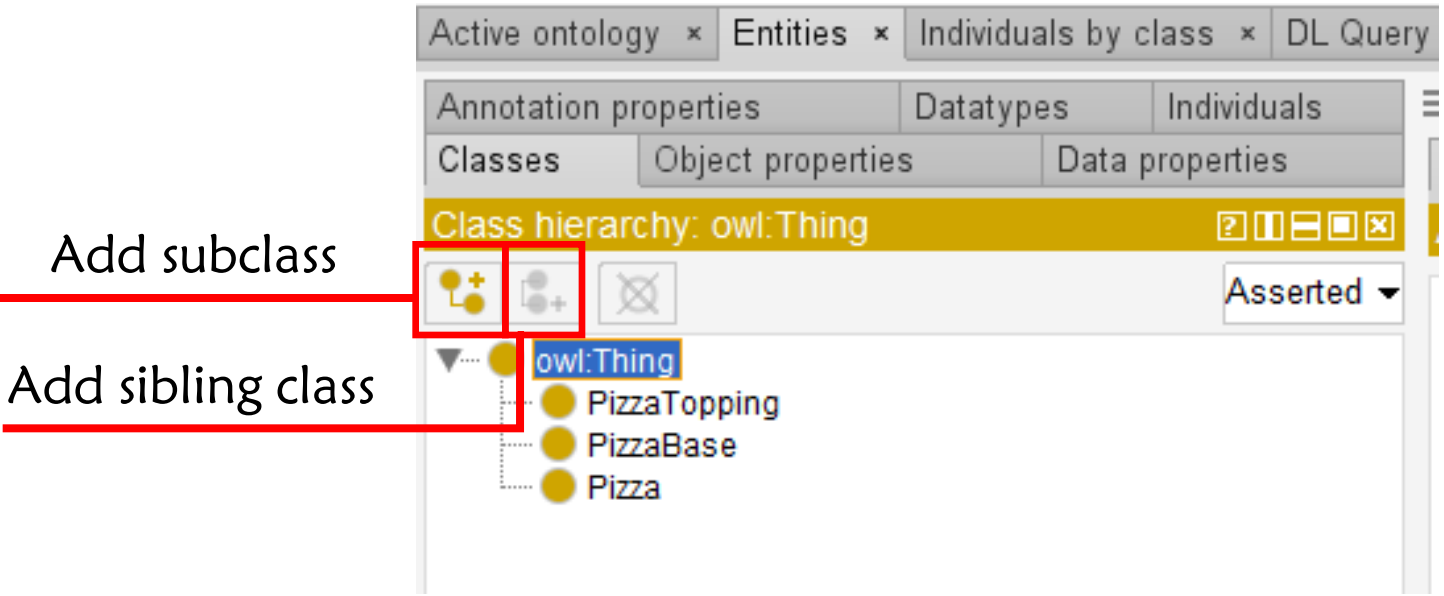
创建Class

选中“owl: Thing”，创建其subclass “Pizza”



创建Class

创建“owl: Thing”的subclass “PizzaTopping”与“PizzBase”

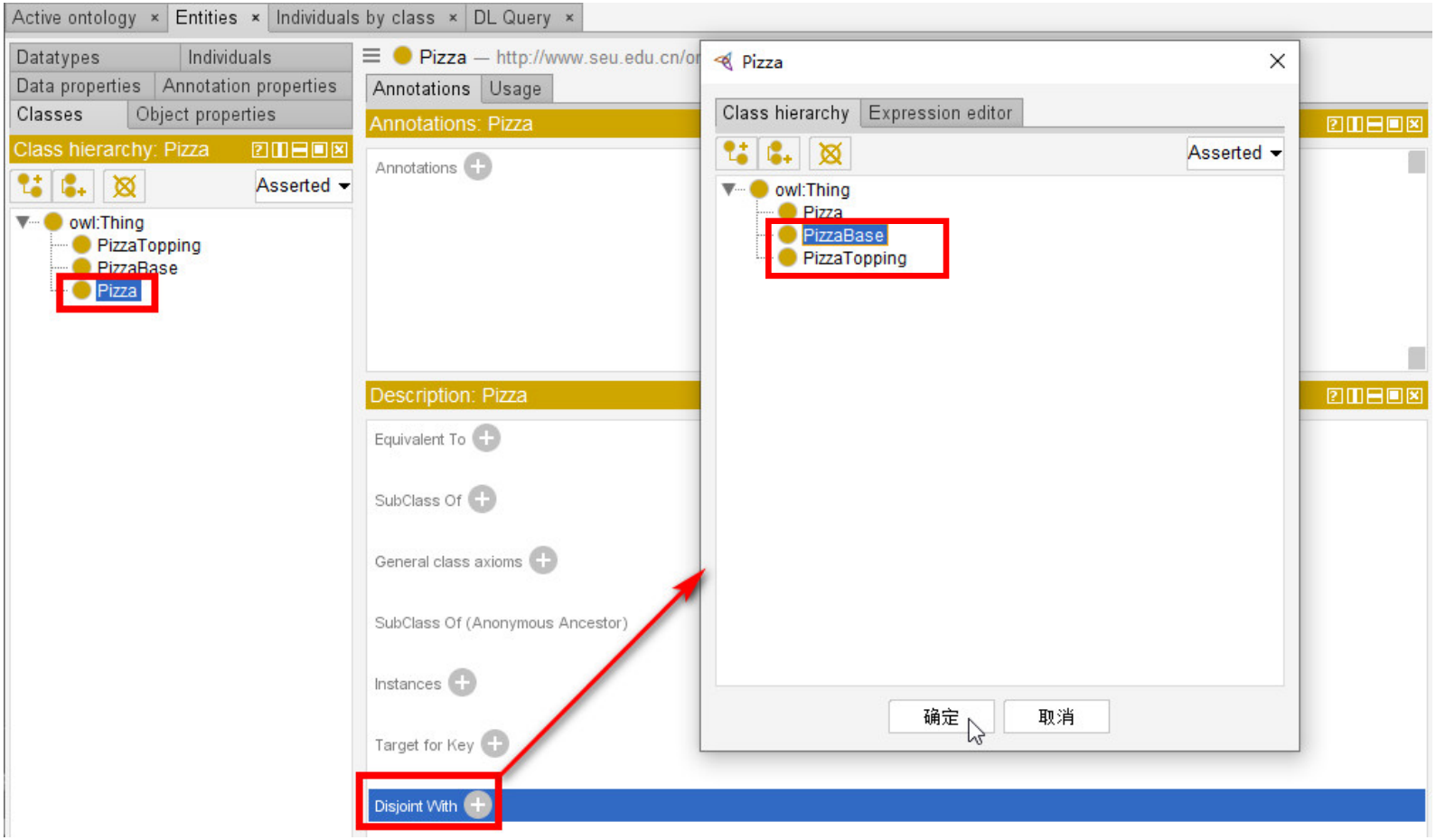


小练习

创建“Pizza”的subclass “CheesePizza”,与“Pizza”、“PizzaBase”、“PizzaTopping”的superclass “Food”,同时也是“owl:Thing”的subclass。

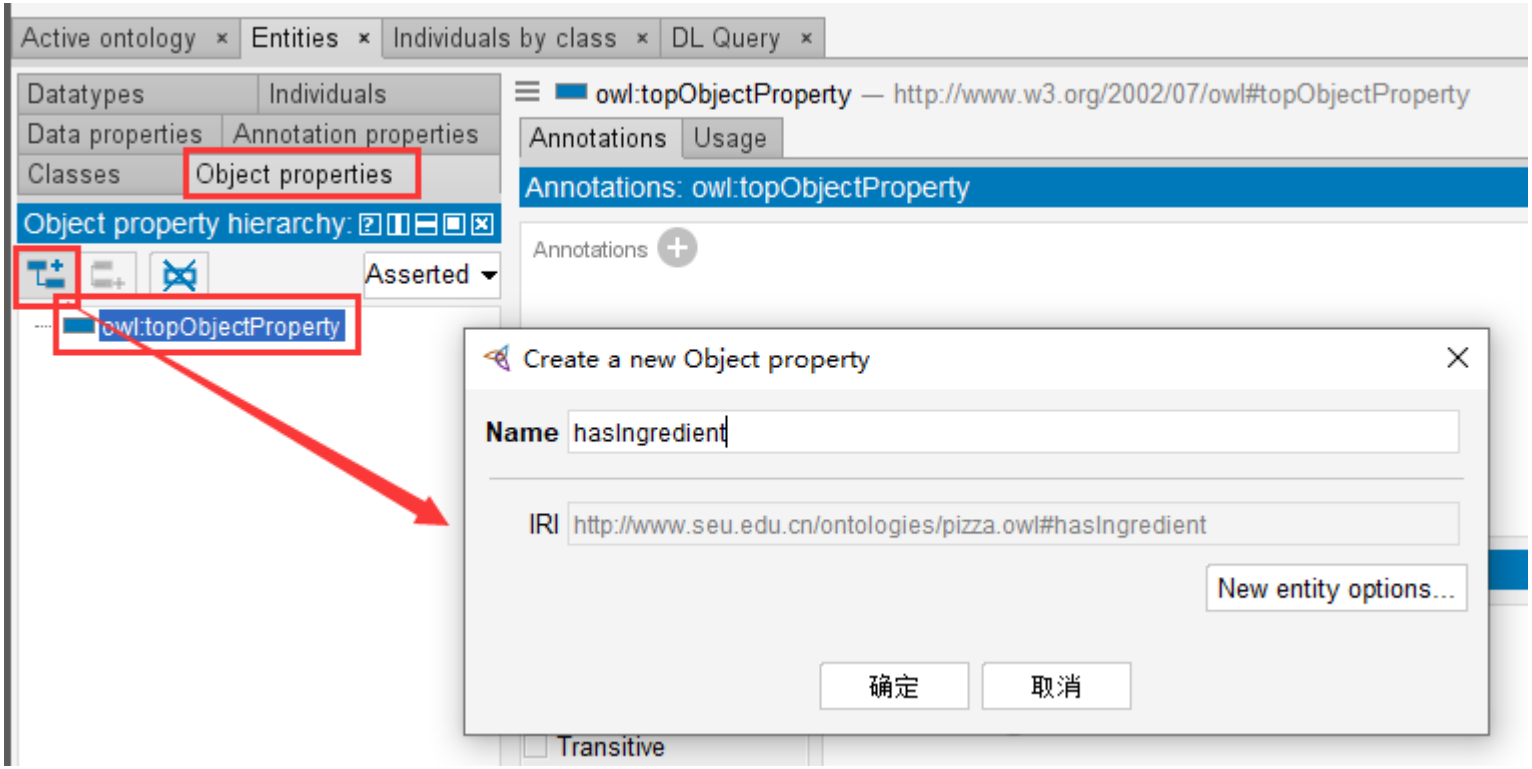
创建disjoint关系

为“Pizza”同时选择多个disjoint class，则两两均disjoint



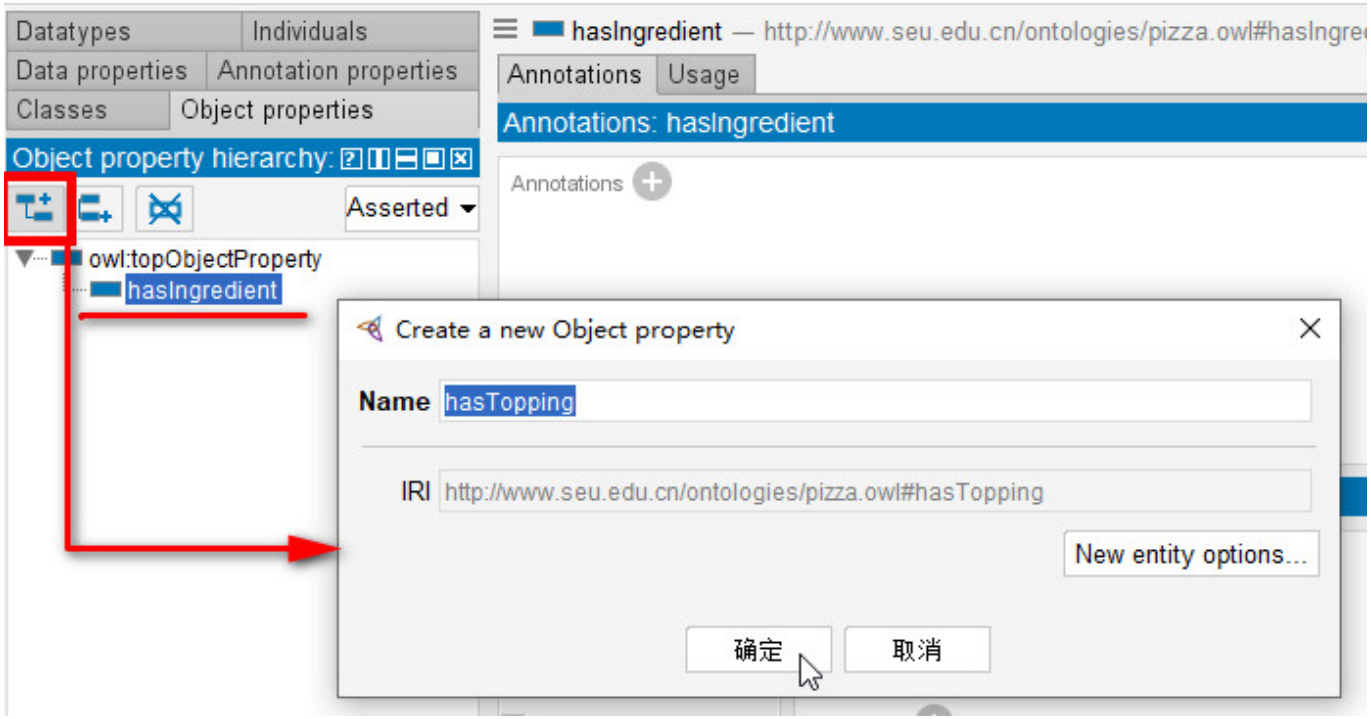
创建Object Property (properties between individuals)

选择“Entities”→“Object properties”，创建“owl:topObjectProperty”的subproperty“hasIngredient”



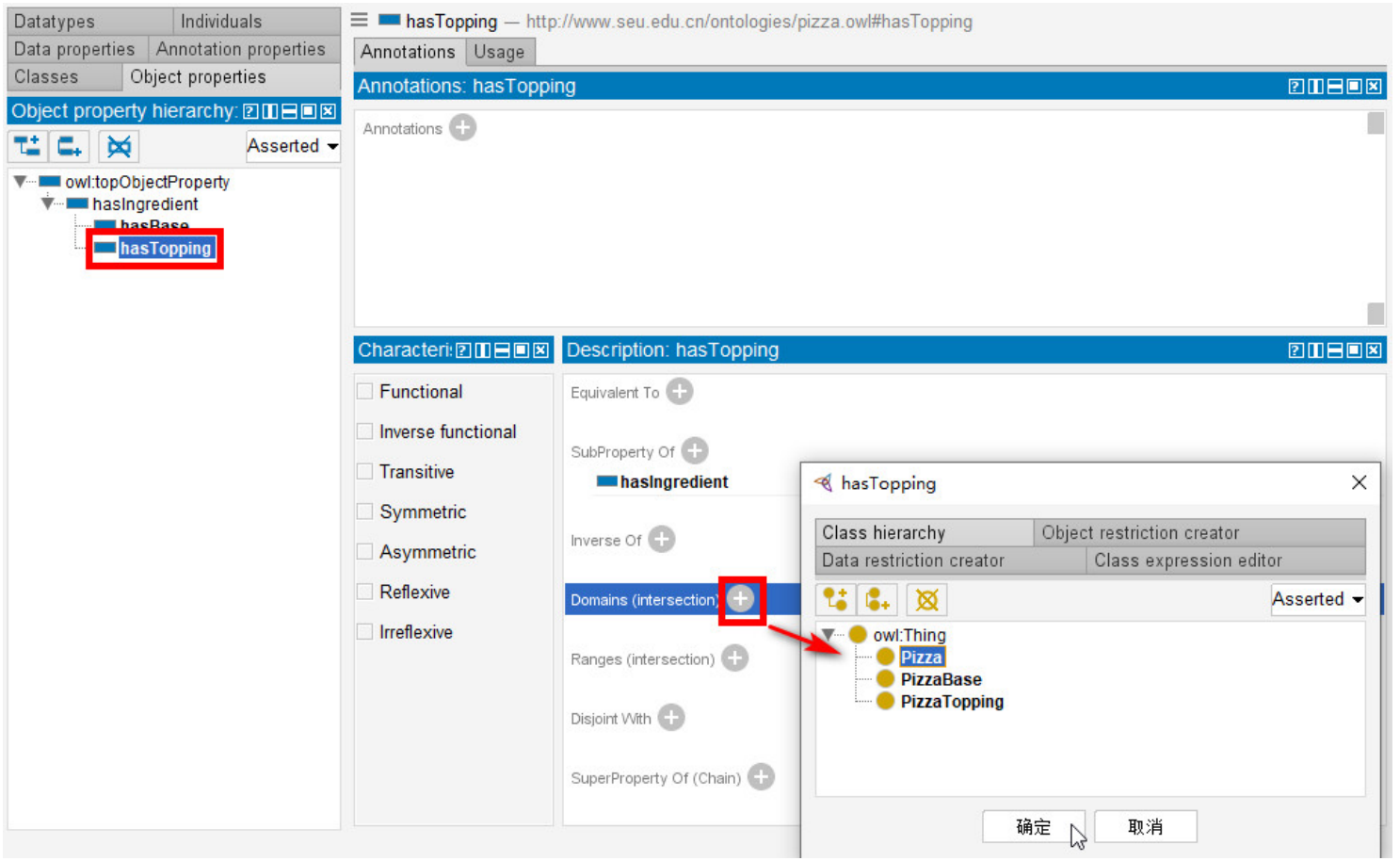
创建Object Property

创建“hasIngredient”的subproperty “hasTopping”与 “hasBase”



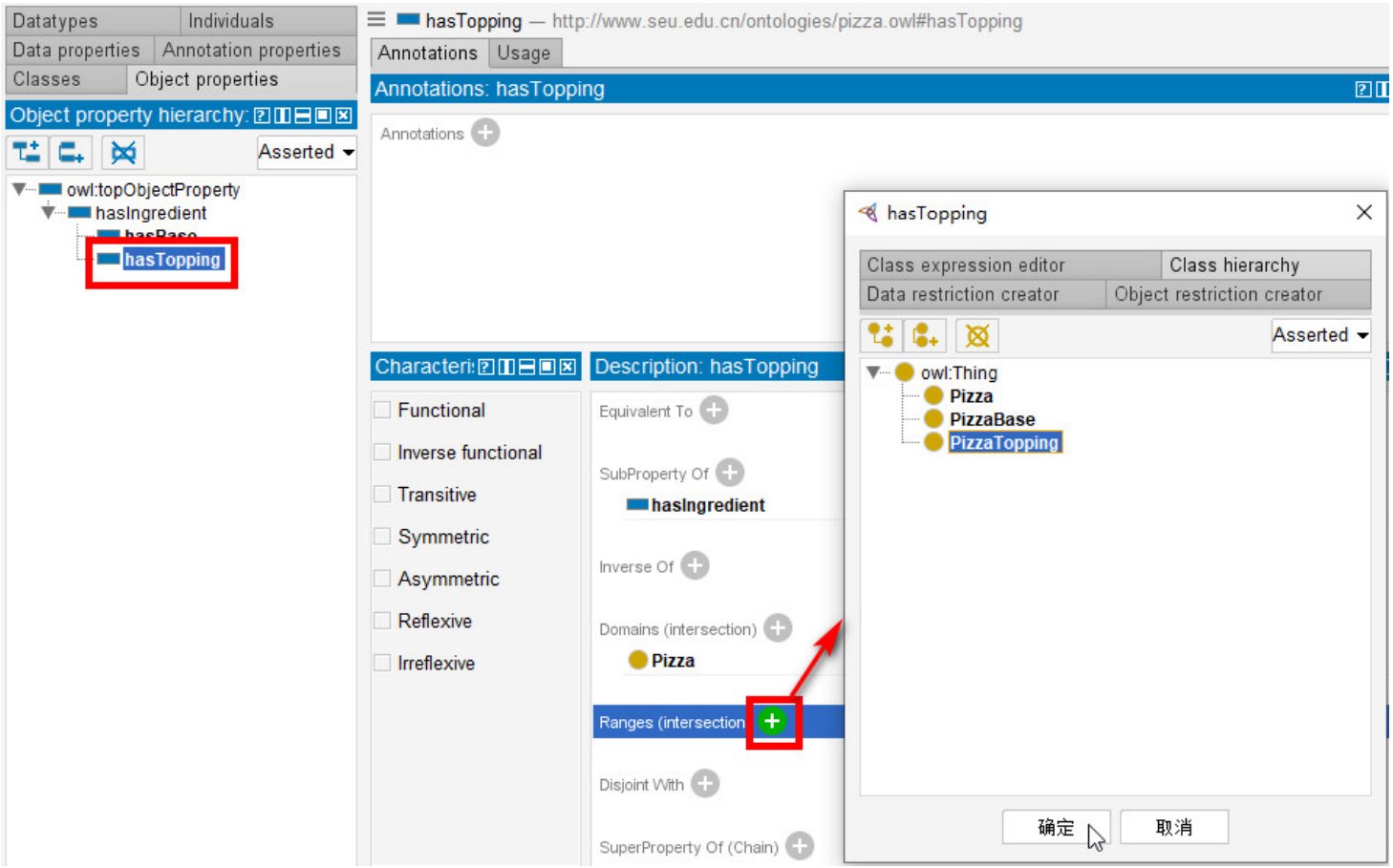
设置Object Property的domain

设置“hasTopping”的domain为“Pizza”



设置Object Property的range

设置“hasTopping”的range为“PizzaTopping”

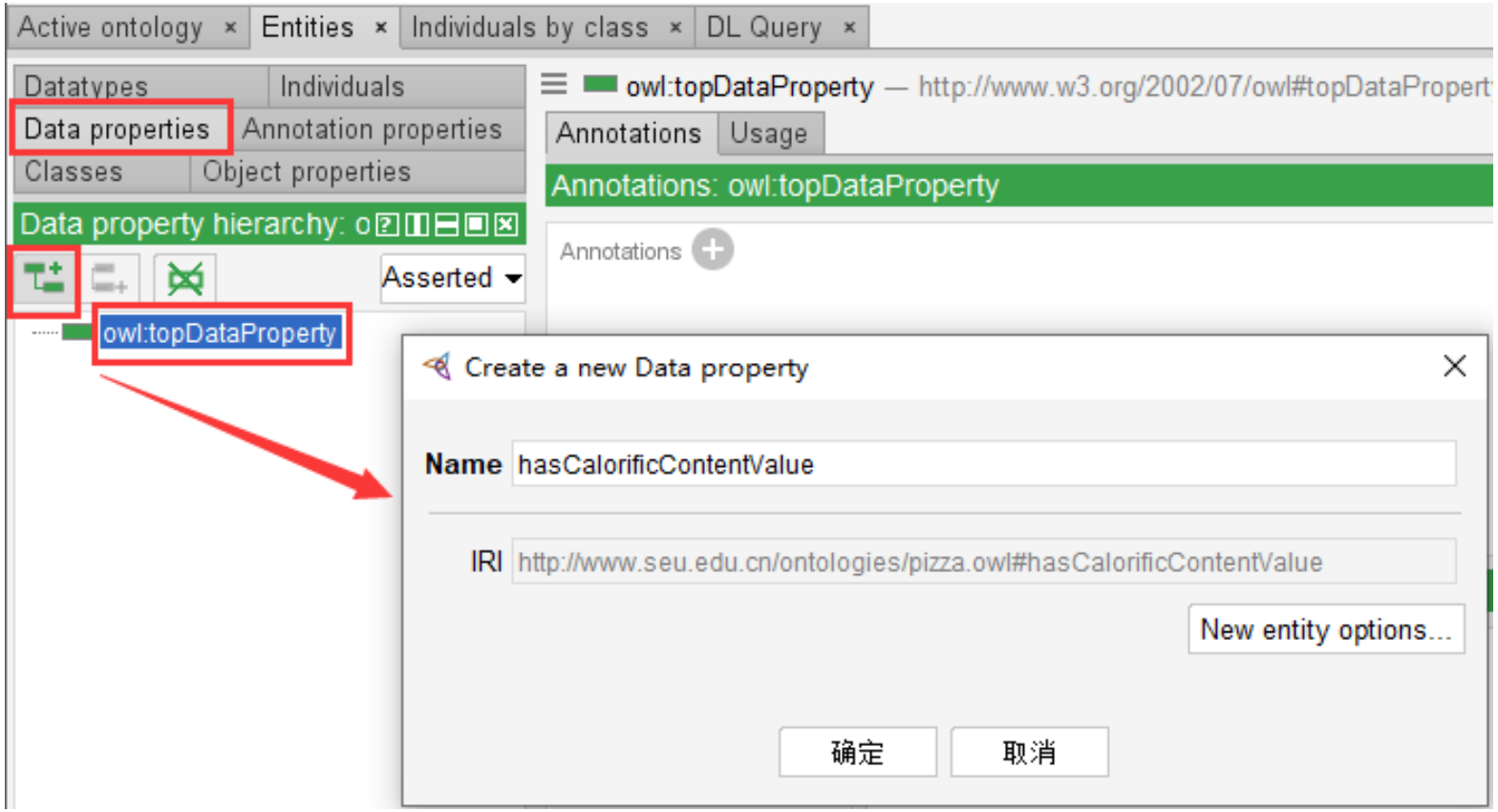


小练习

创建Class “PizzaFlavor”，
创建Object Property “Flavor”，domain为“Pizza”，Range为“PizzaFlavor”

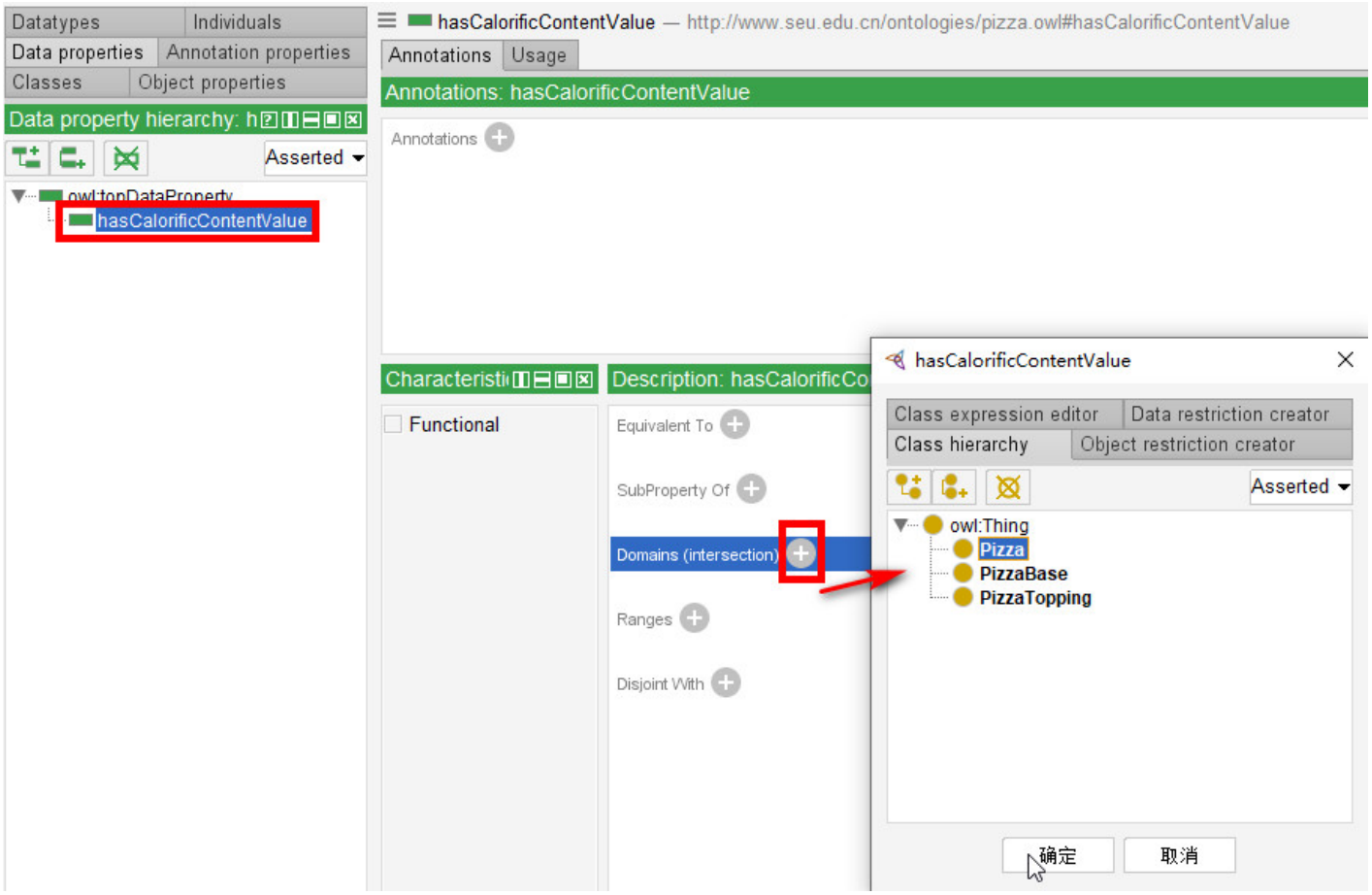
创建Data Property (the property between an individual and a literal)

选择“Entities”→“Data properties”，创建“owl:topDataProperty”的subproperty“hasCalorificContentValue”



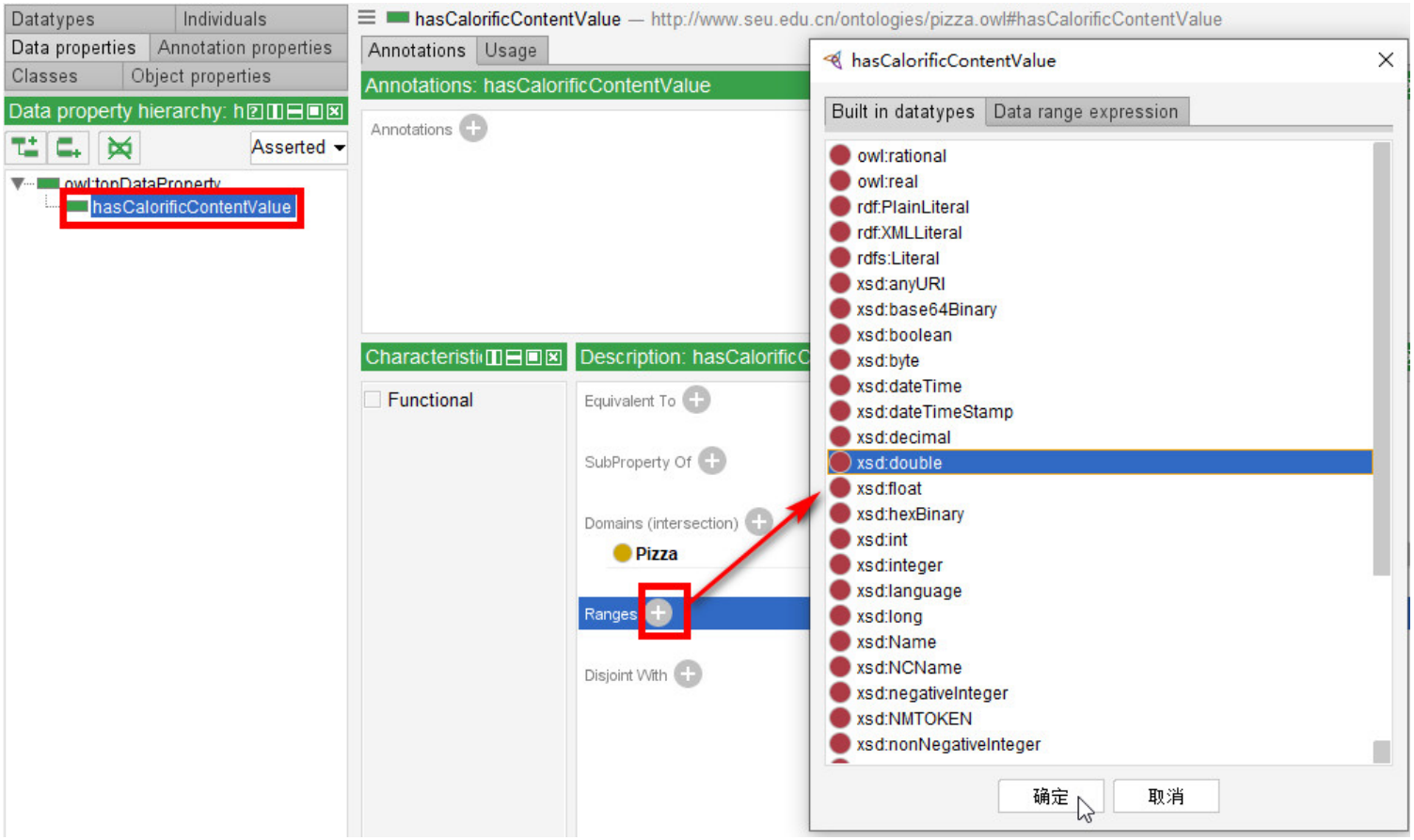
设置Data Property的domain

设置“hasCalorificContentValue”的domain为“Pizza”



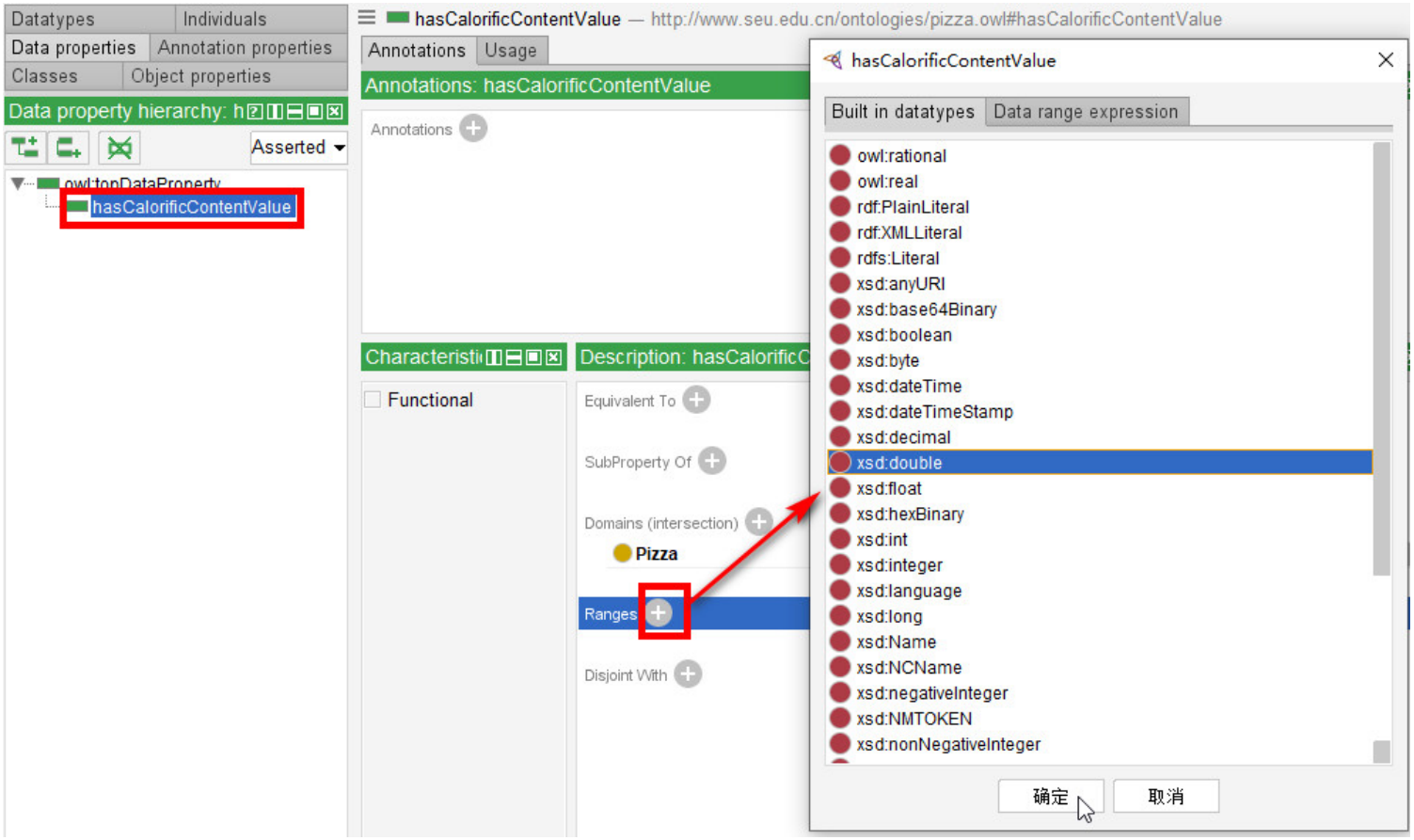
设置Data Property的range

设置“hasCalorificContentValue”的range为“xsd:double”



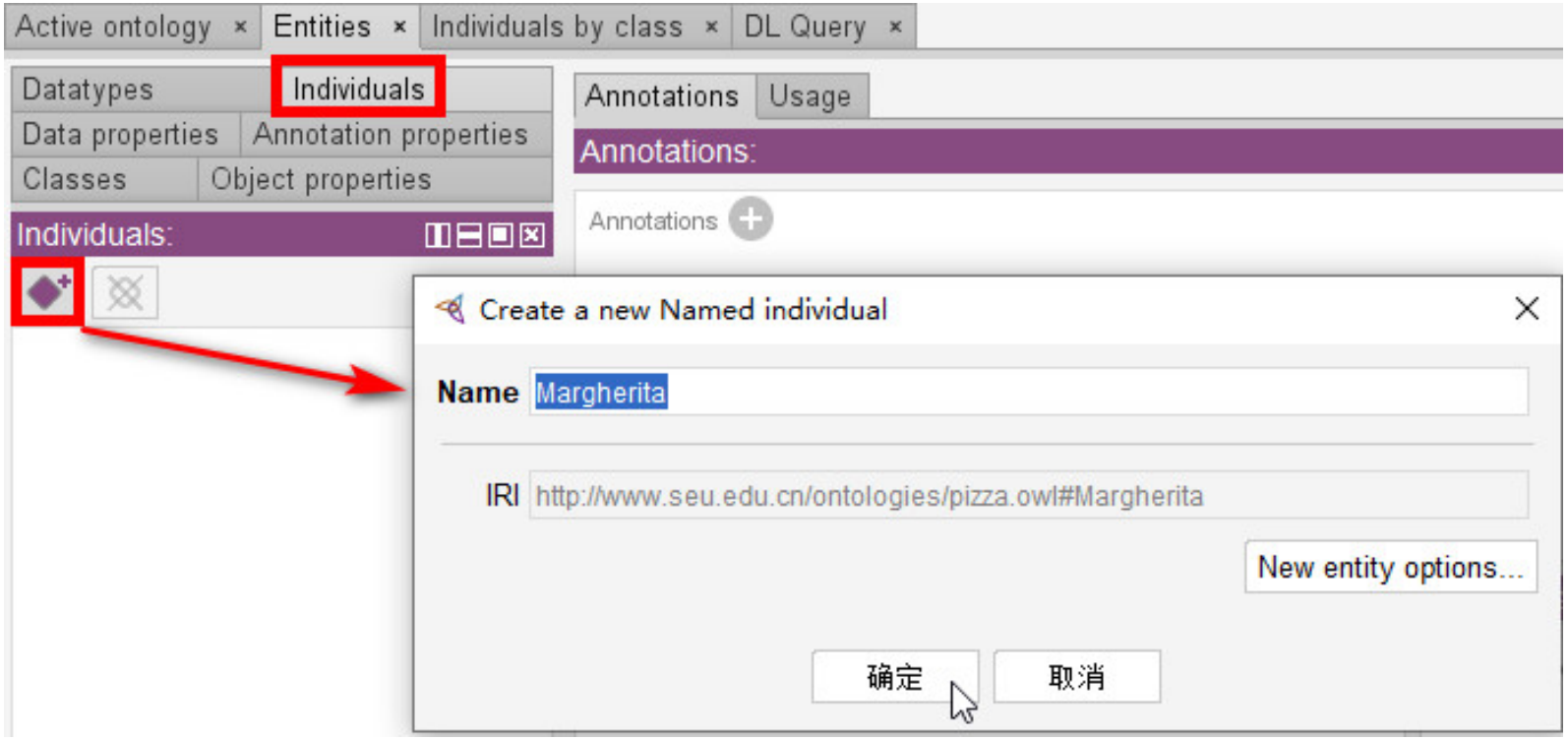
设置Data Property的range

设置“hasCalorificContentValue”的range为“xsd:double”



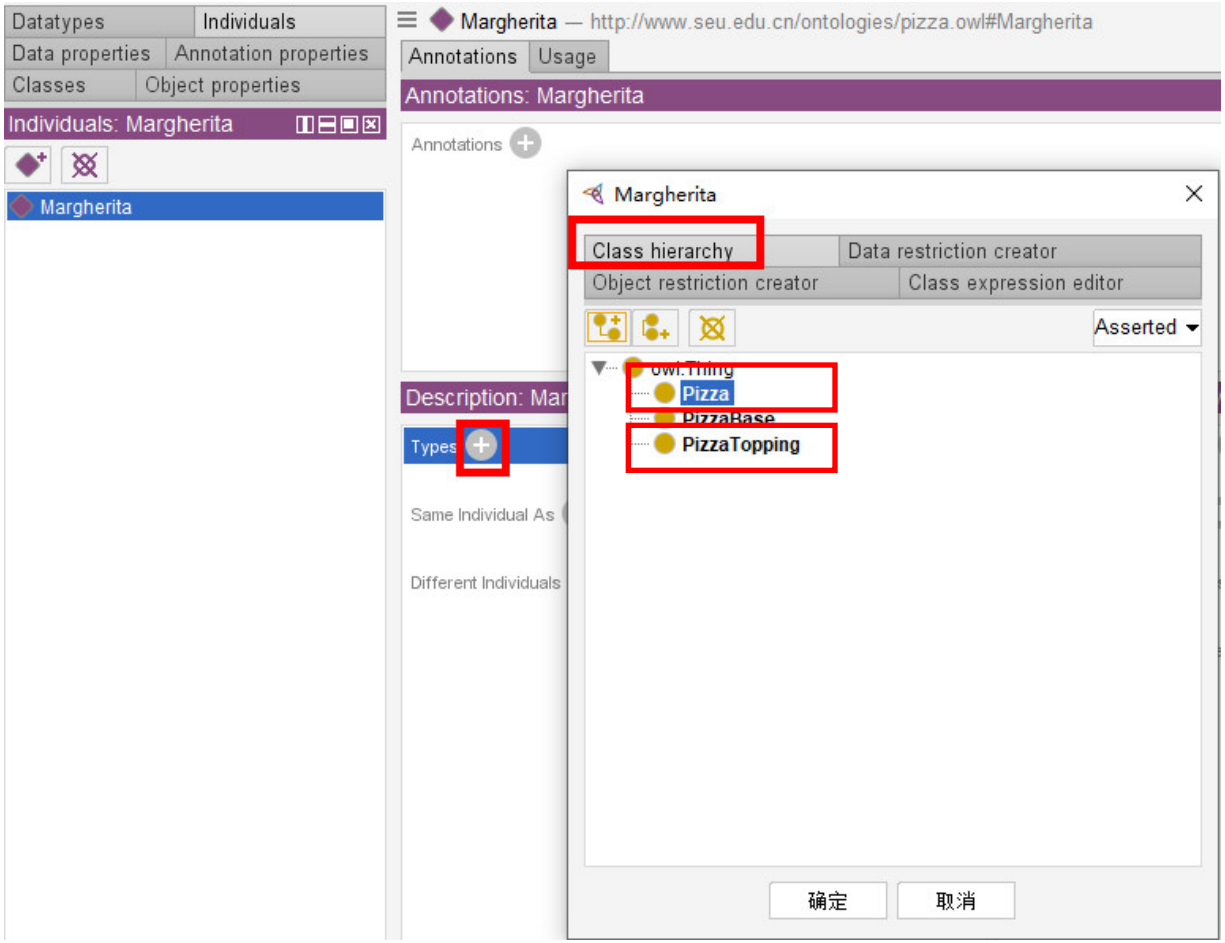
创建Individual

设置“Entities” → “Individuals”，创建Individual “Margherita”



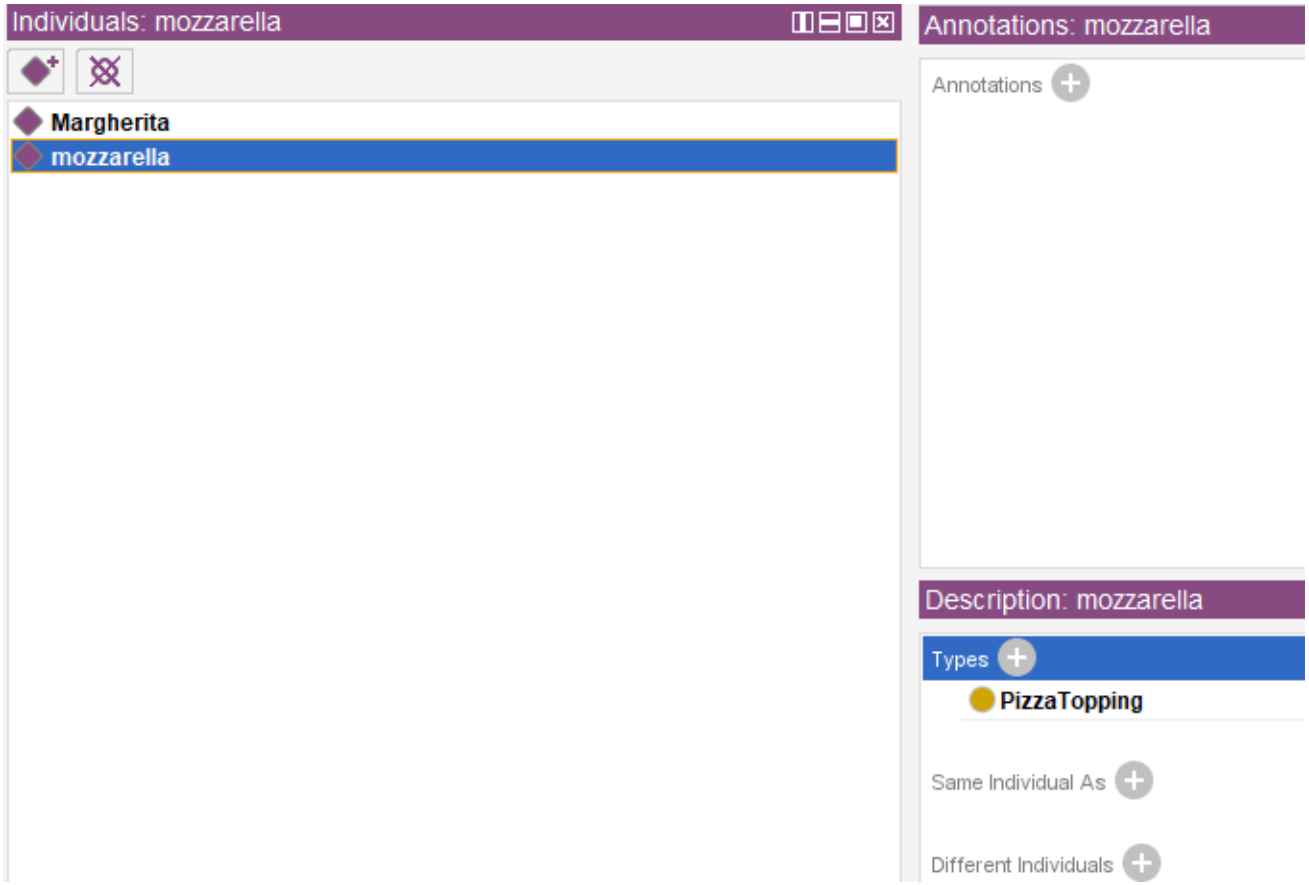
设置Individual Types

选择“Margherita”的Type为“Pizza”与“PizzaTopping”



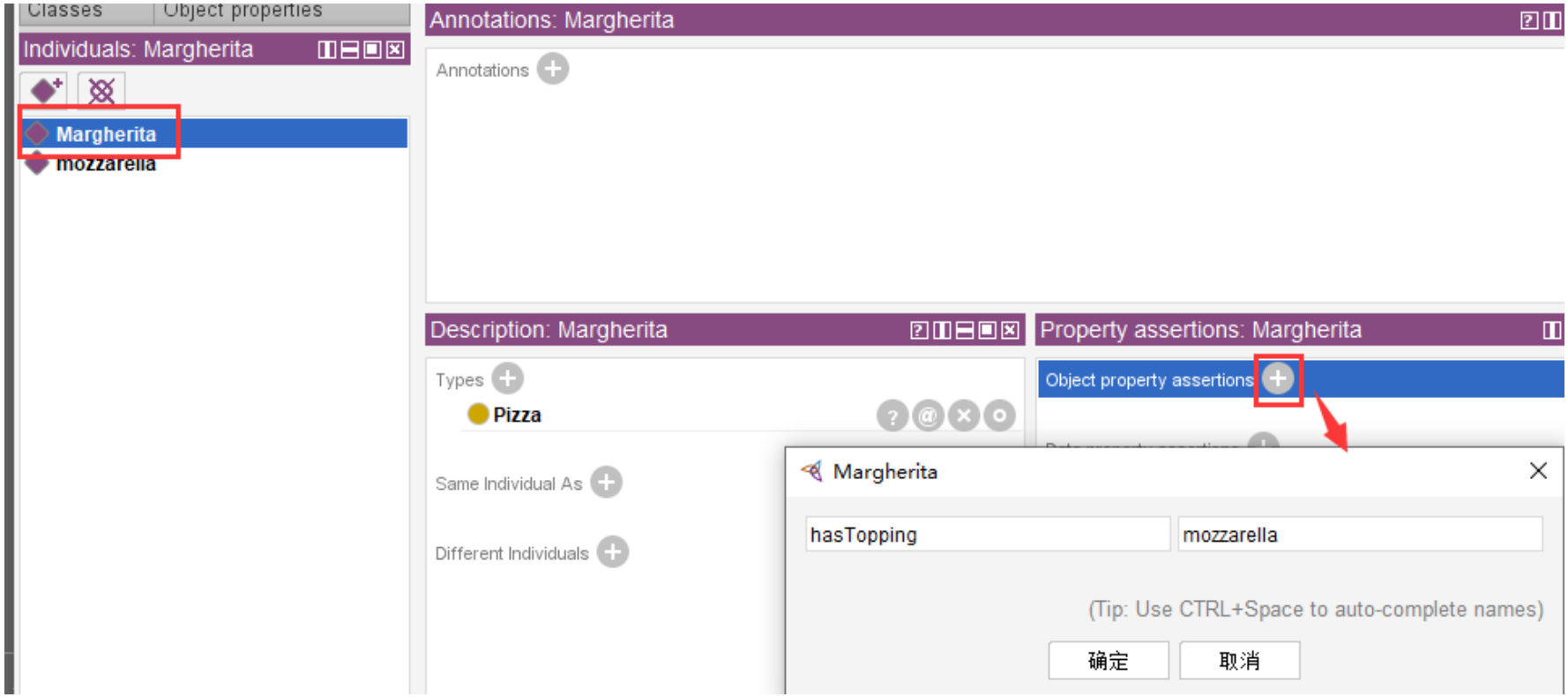
创建Individual

类似地，创建Individual “mozzarella”，设置其Type为“PizzaTopping”



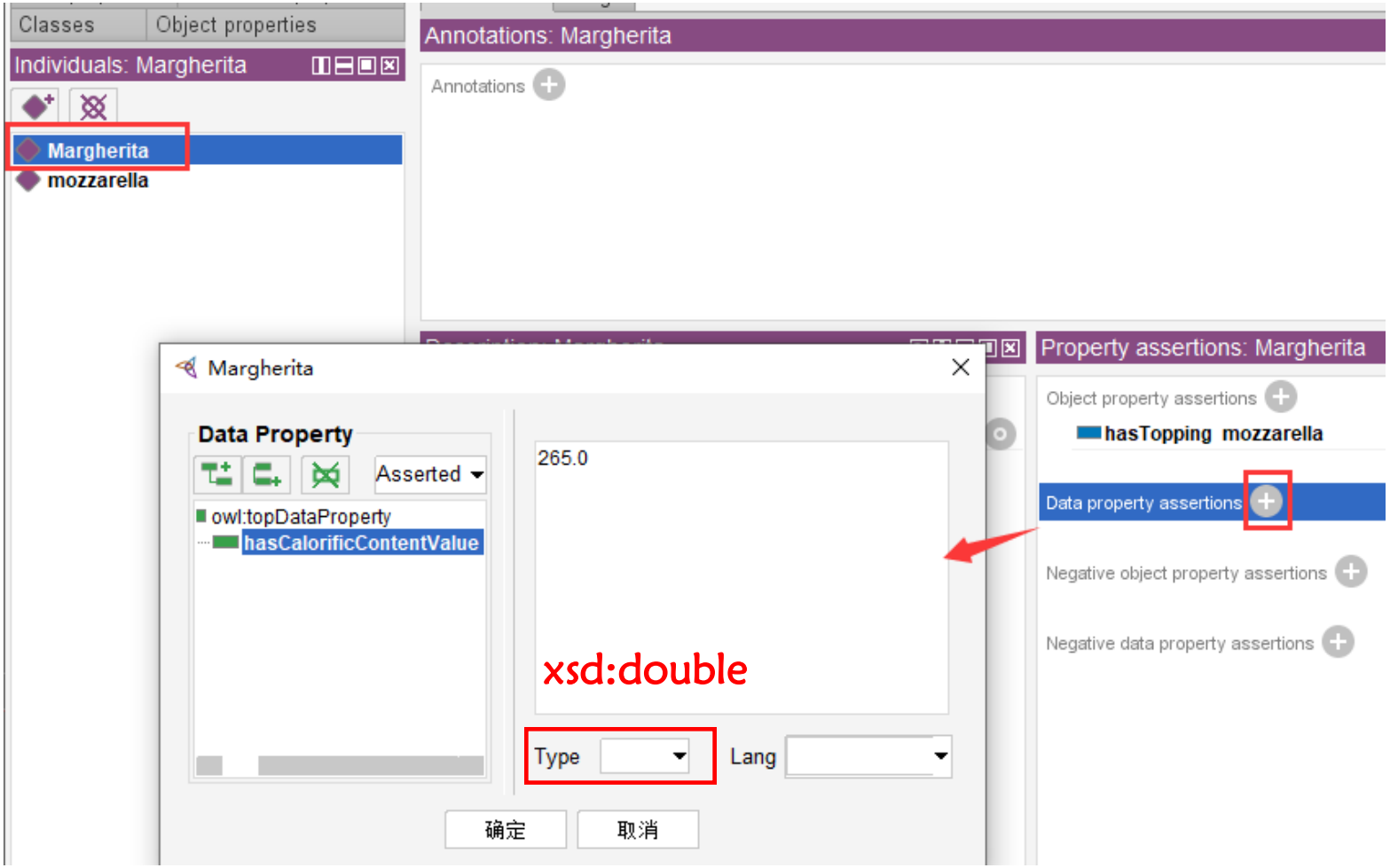
创建关于Individual的面向object property的assertion

“Margherita” “hasTopping” “mozzarella”



创建关于Individual的面向data property的assertion

“Margherita” “hasCalorificContentValue” “265.0”

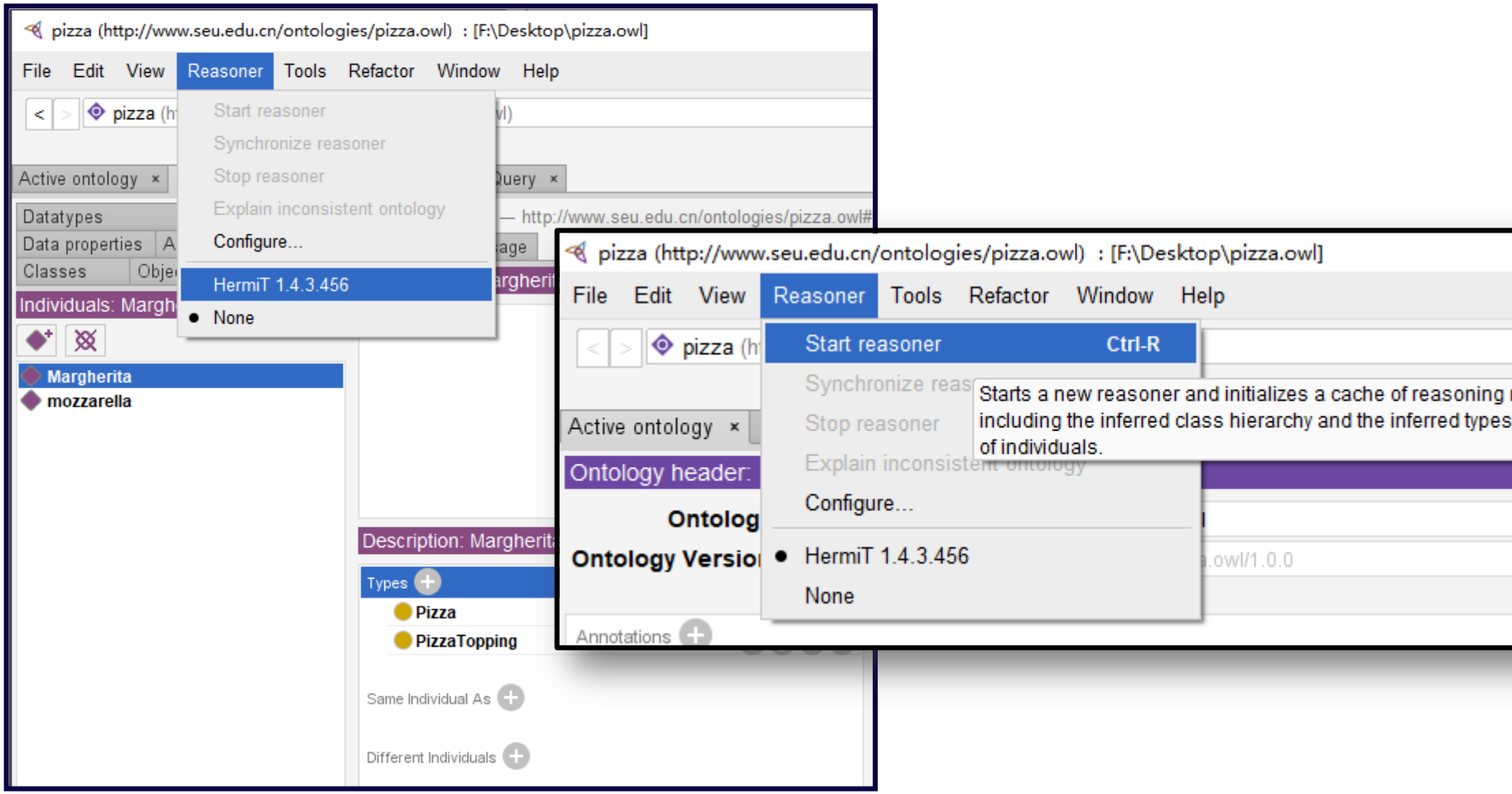


小练习

创建“Pepperoni” “hasCalorificContentValue” “185.2”

推理

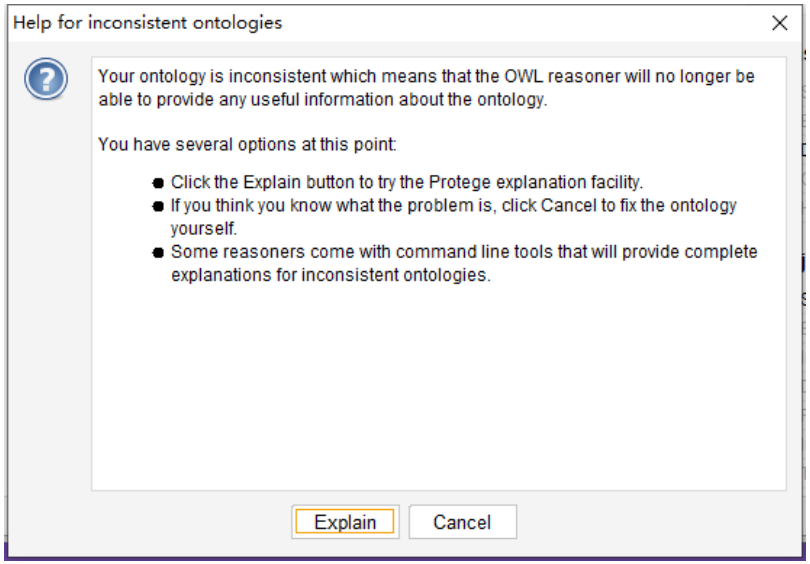
先选择“HermiT 1.4.3.456”，再选择“Start reasoner”

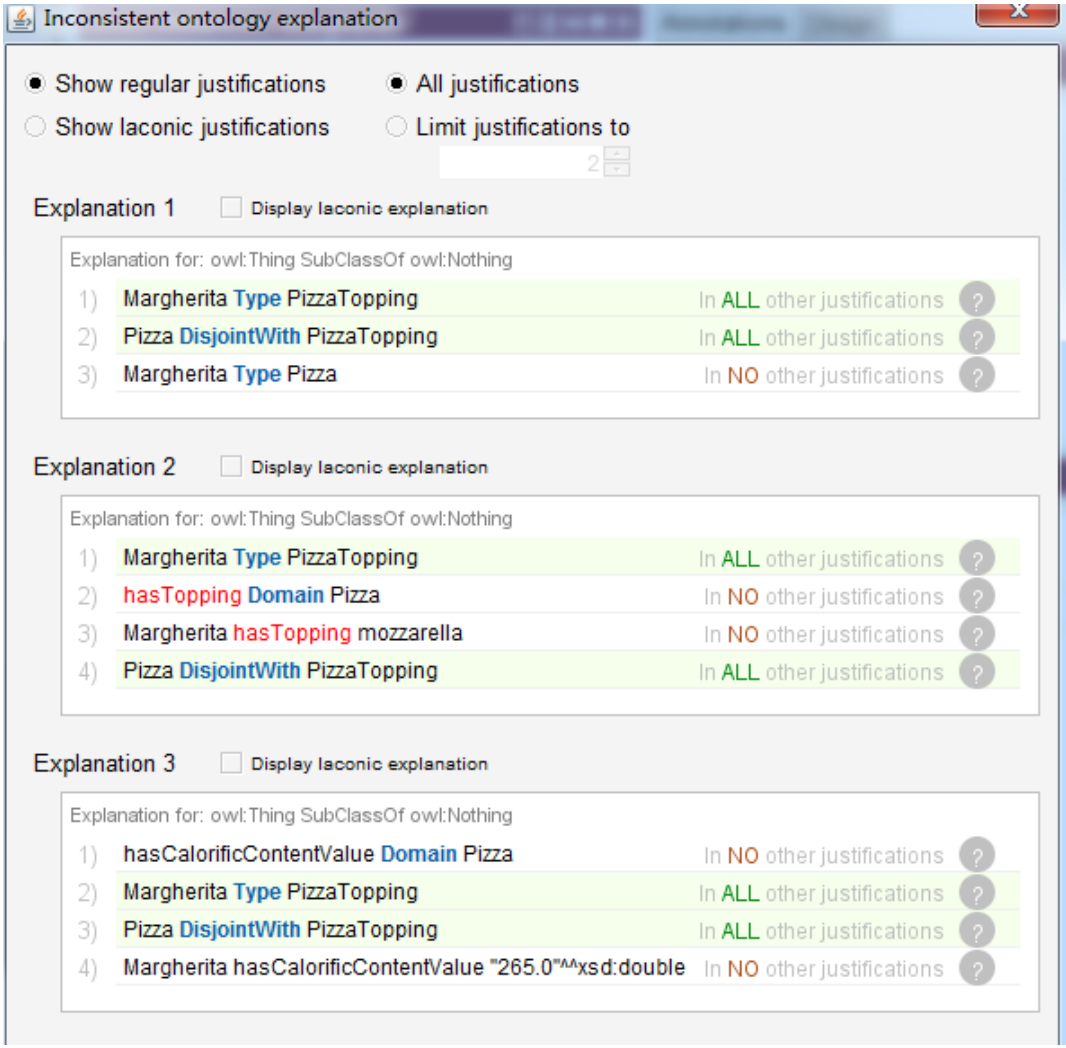


推理

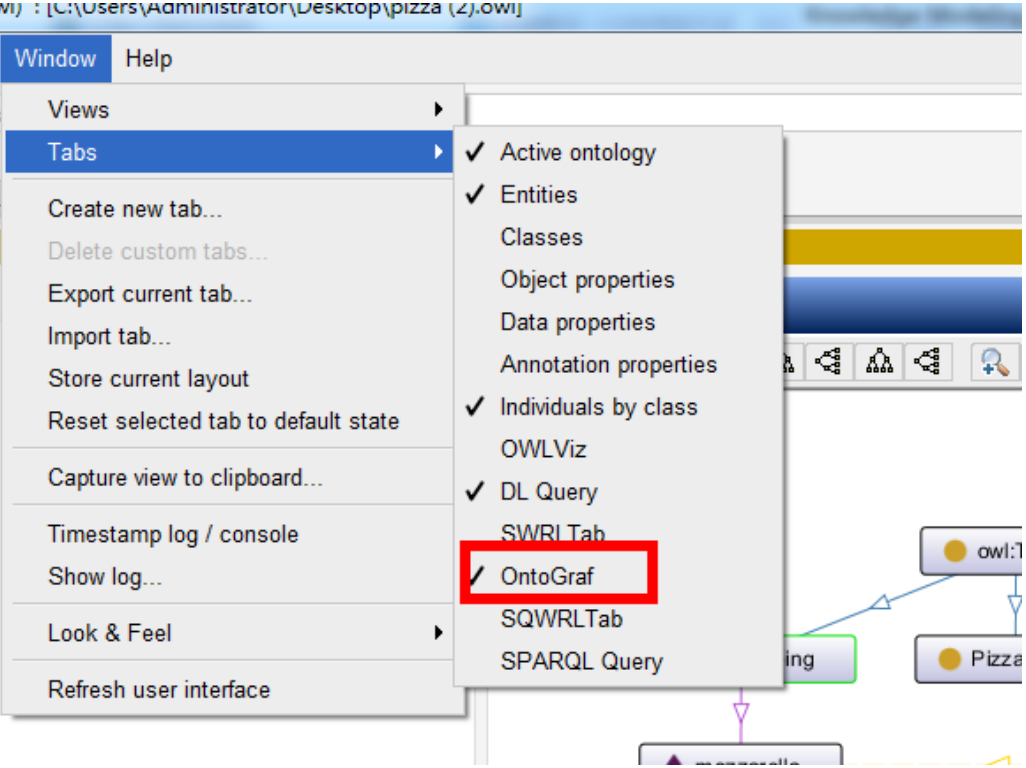
Inconsistent Ontology

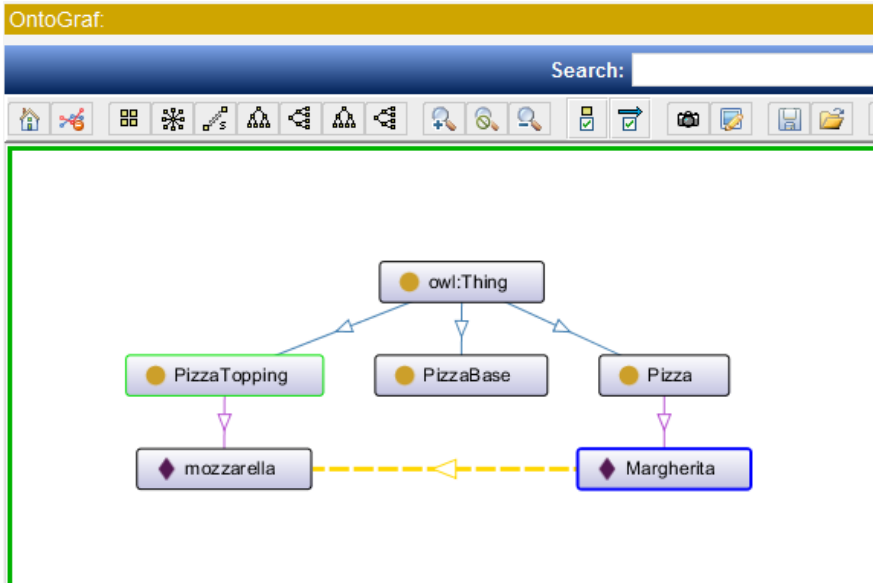
选择Explain





可视化


Window
Help
Views
Tabs
Create new tab...
Delete custom tabs...
Export current tab...
Import tab...
Store current layout
Reset selected tab to default state
Capture view to clipboard...
Timestamp log / console
Show log...
Look & Feel
Refresh user interface
Active ontology
Entities
Classes
Object properties
Data properties
Annotation properties
Individuals by class
OWLViz
DL Query
SWRLTab
OntoGraf
SQWRLTab
SPARQL Query


OntoGraf:
Search:
owl:Thing
PizzaTopping
PizzaBase
Pizza
mozzarella
Margherita

三、课堂作业

创建一个包含axioms和assertions的consistent ontology（任选感兴趣的领域），要求：

1）包含Class、Individual、Object Property、Data Property
2）定义Property Domain、Range、Individual Type
3）最终以Turtle形式导出，三元组数量不低于25条