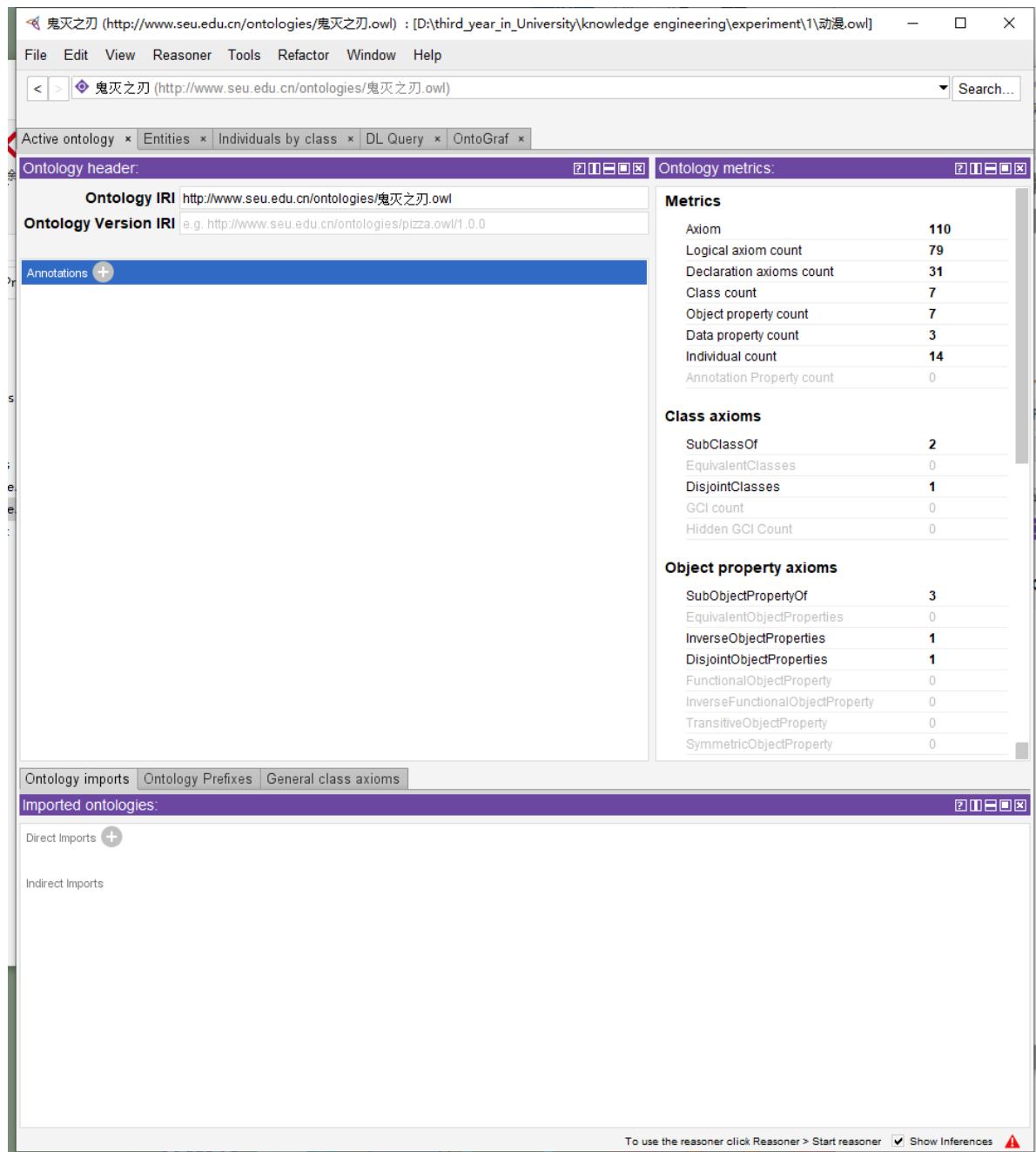


# 实验报告

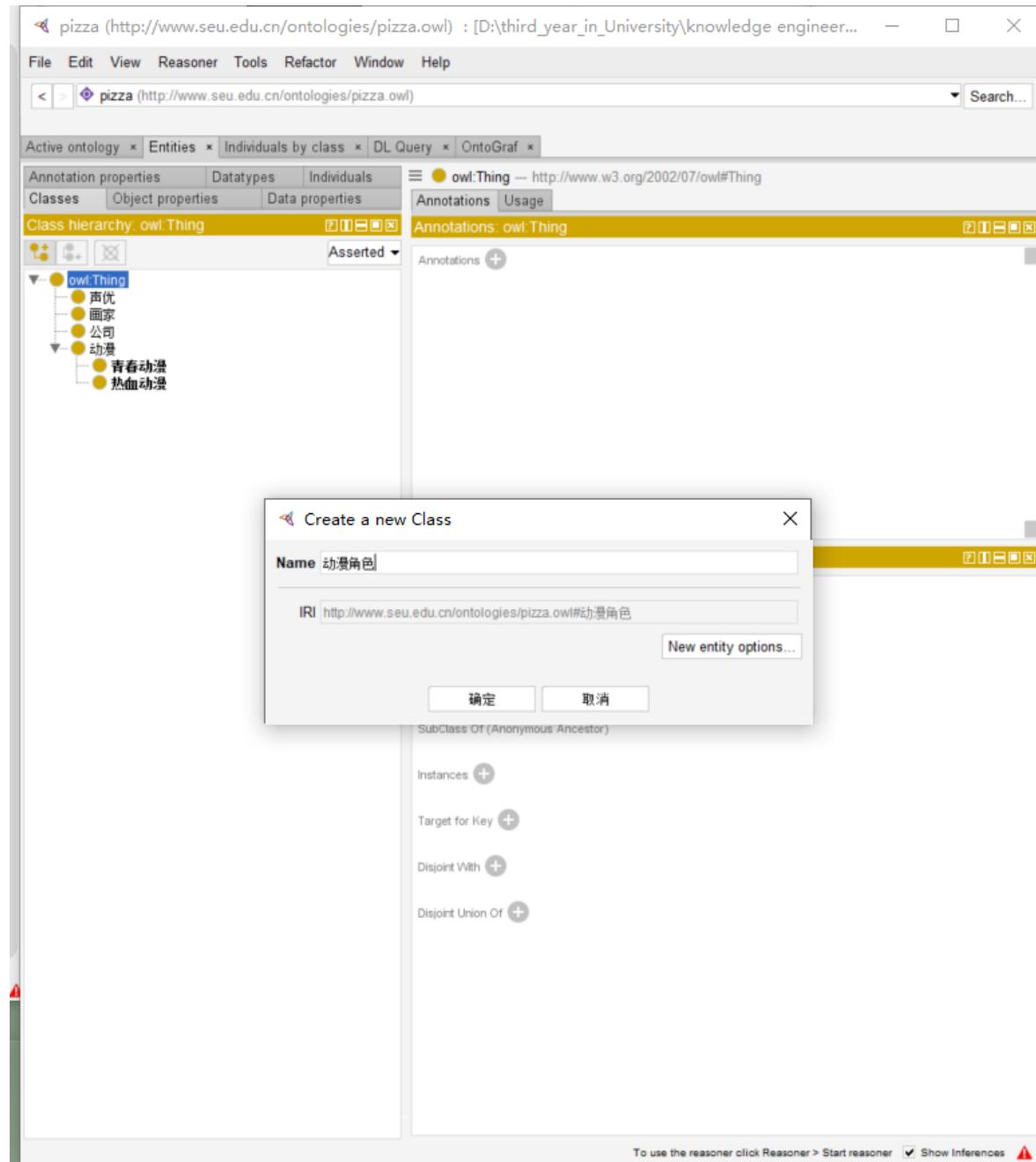
## Week1

- 设置为：<http://www.seu.edu.cn/ontologies/鬼灭之刃.owl>

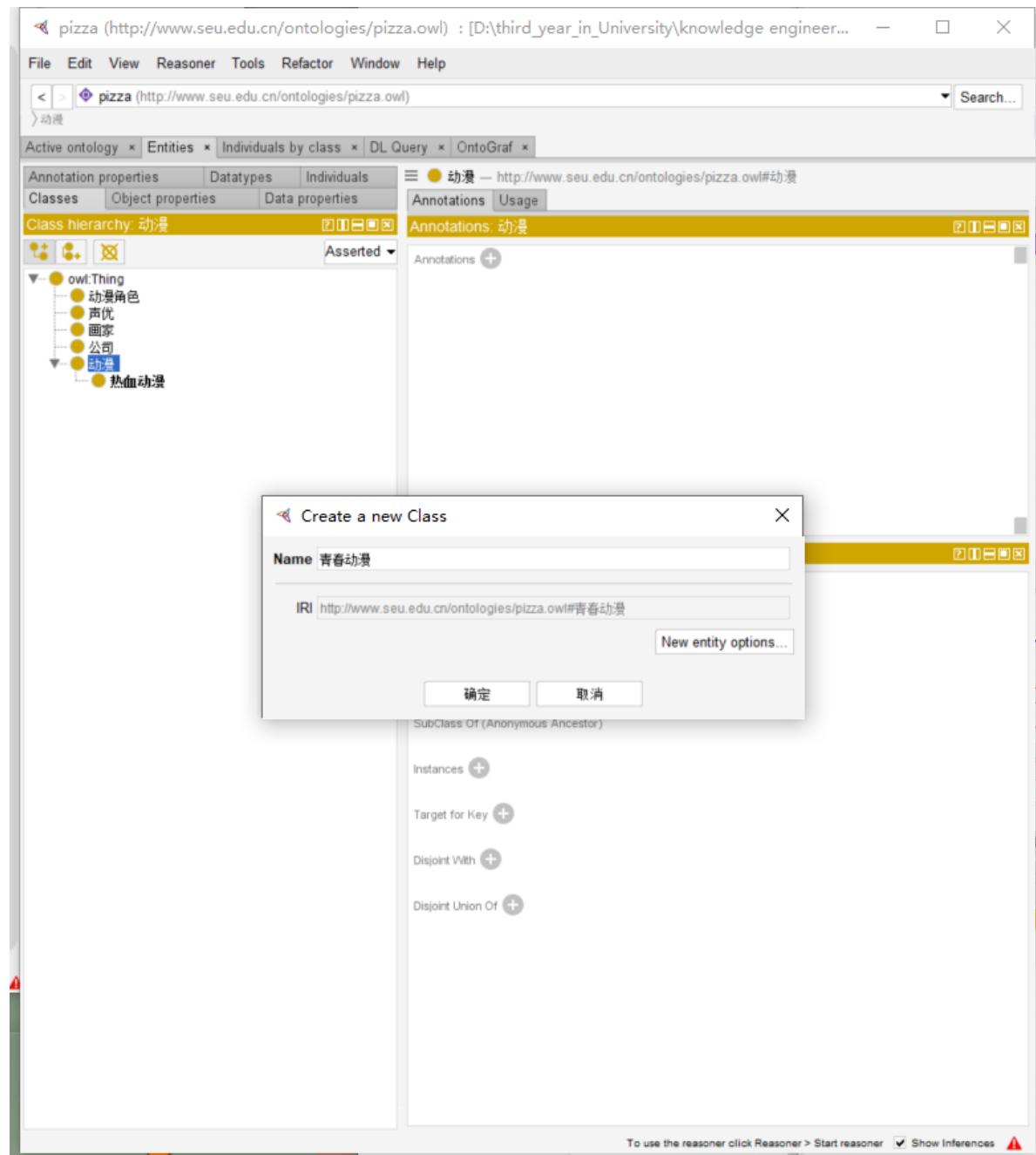


# 创建Class

- 选择“Entities”→“Classes”，创建Classes
  - 创造class：动漫角色

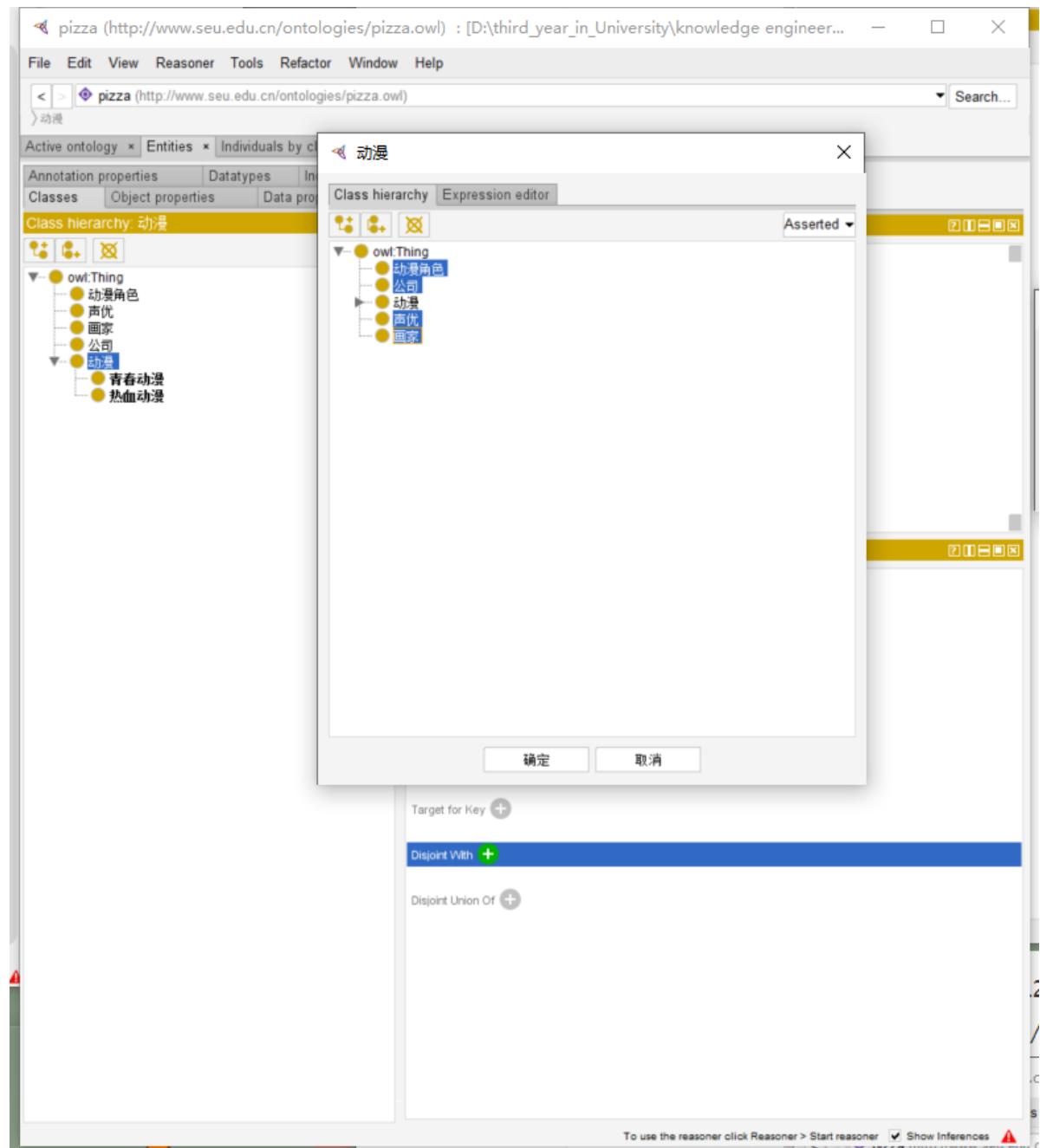


- 创造其子类：青春动漫



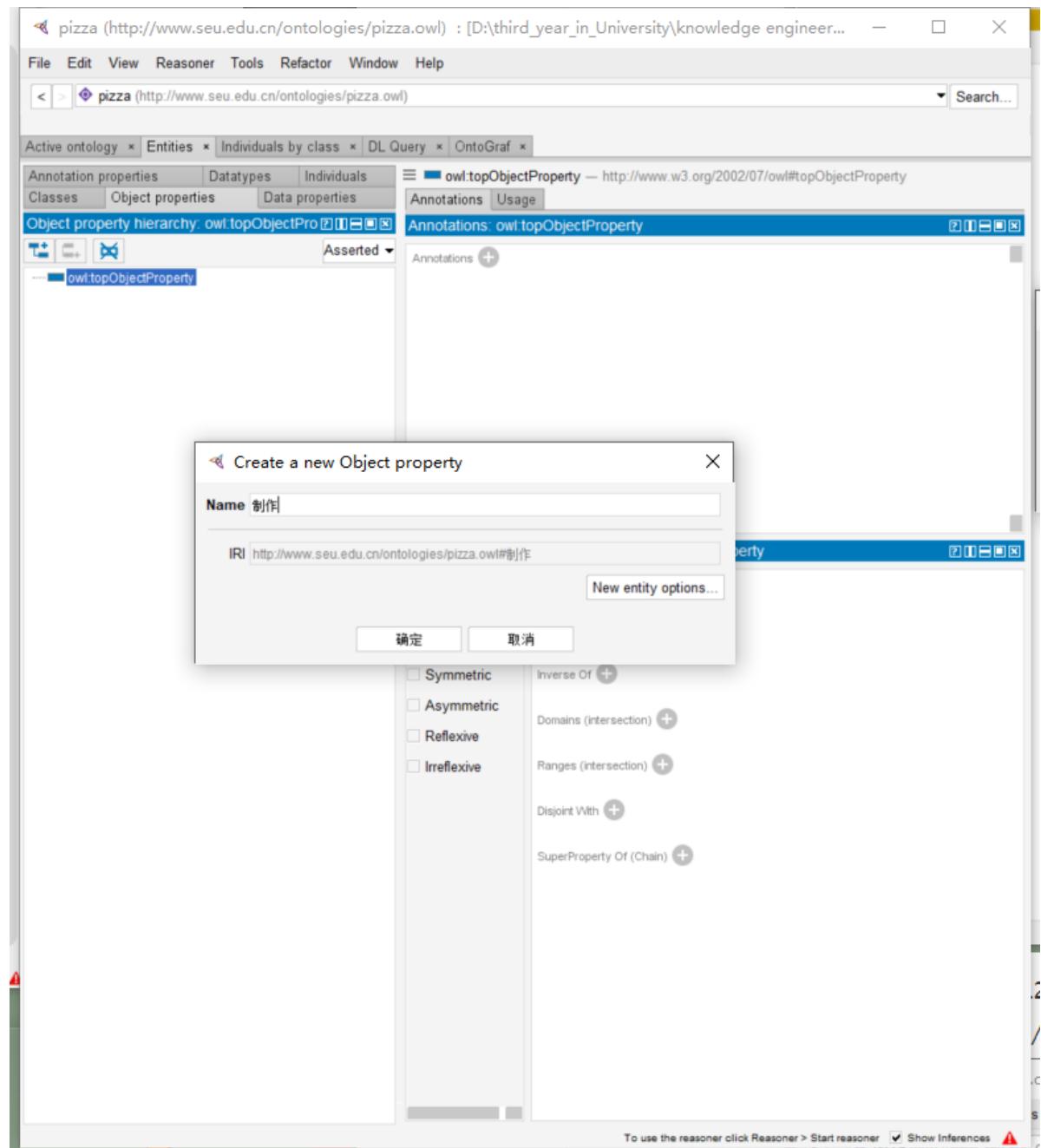
## 设置disjoint

- 动漫与其他类两两disjoint



## 创建Object Property

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

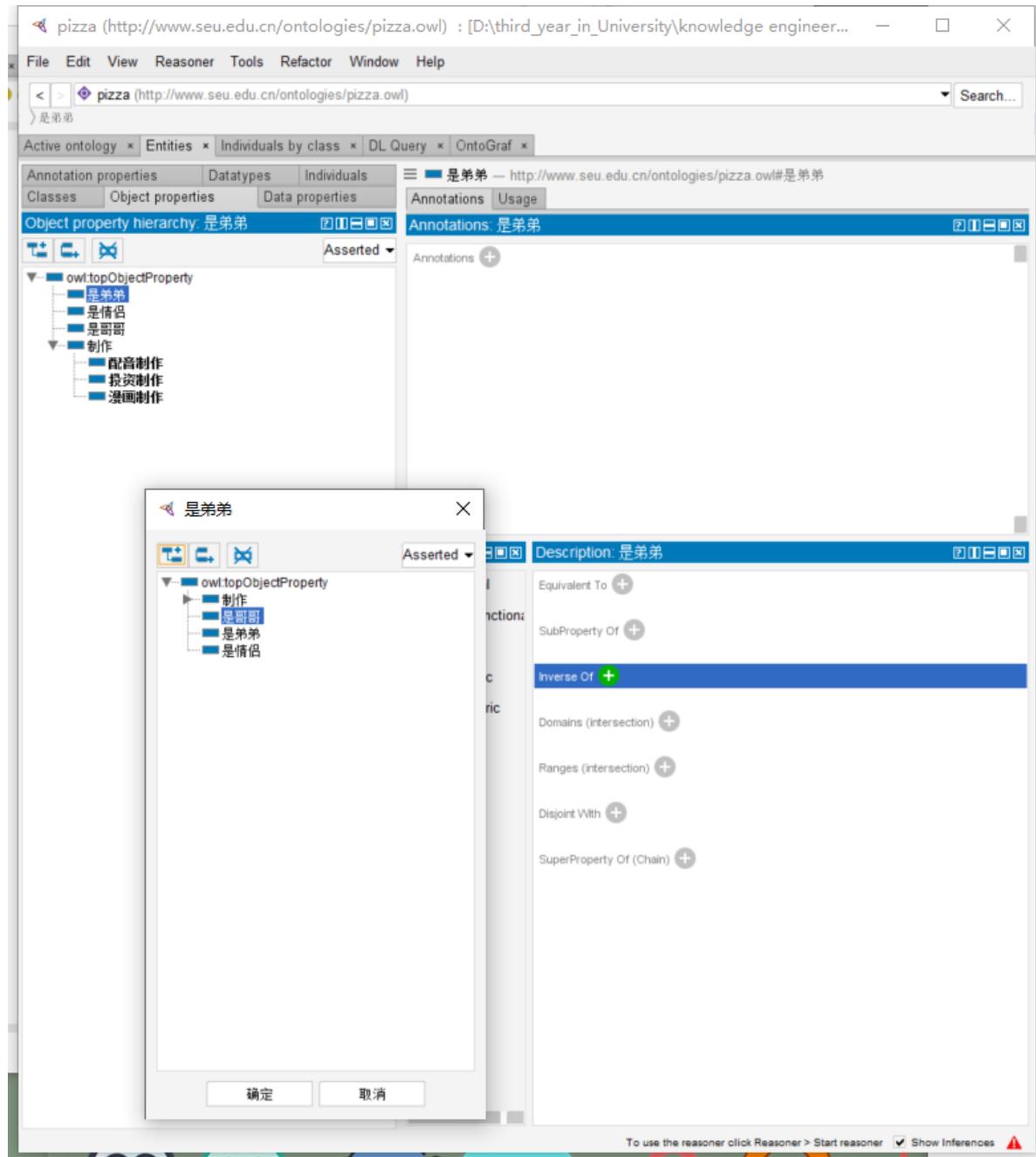


- 创建“制作”的subproperty “**投资制作**”  
、“**漫画制作**”、“**配音制作**”



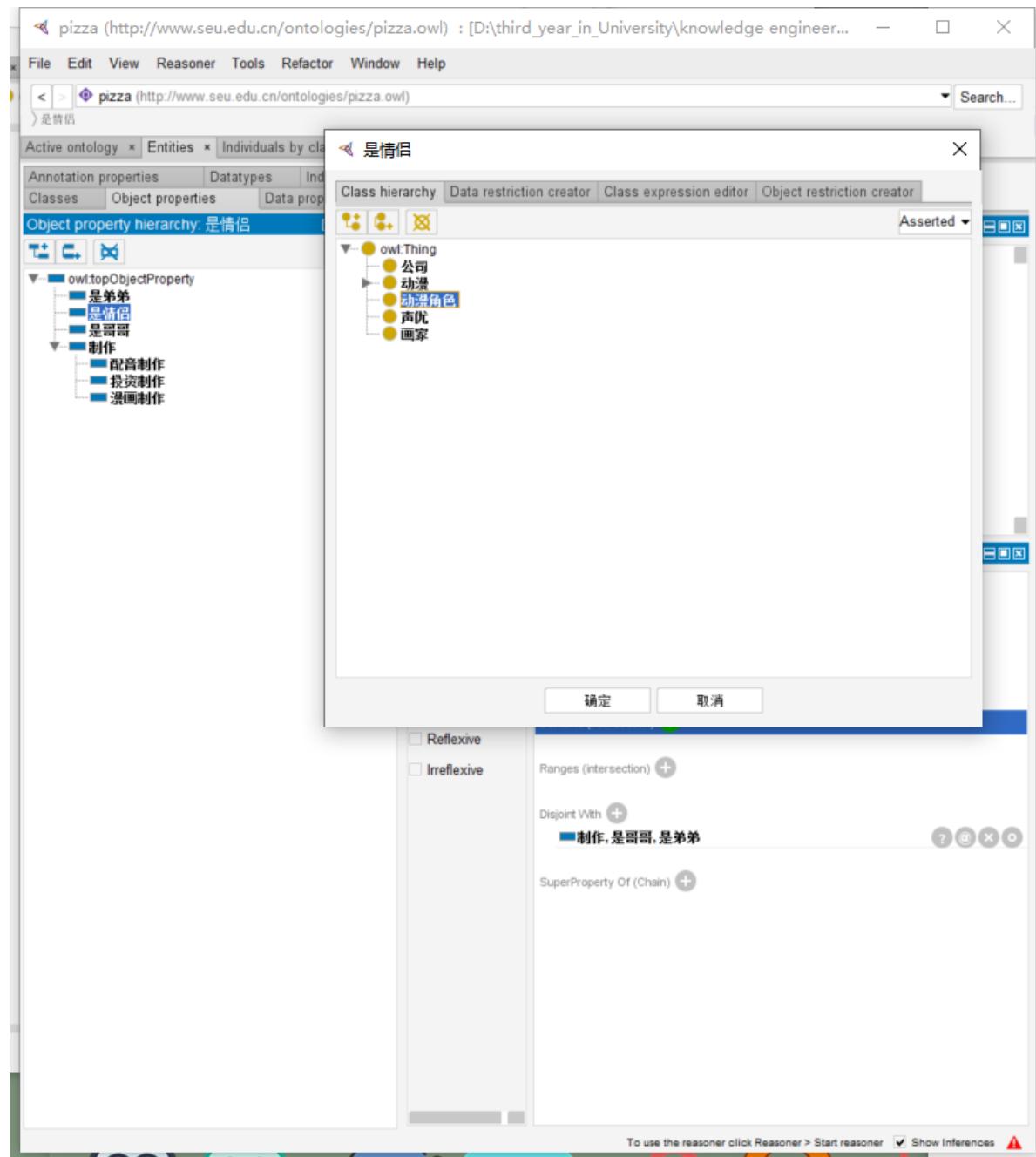
# 设置Object Property的domain

- 设置“是哥哥”的domain为“动漫角色”



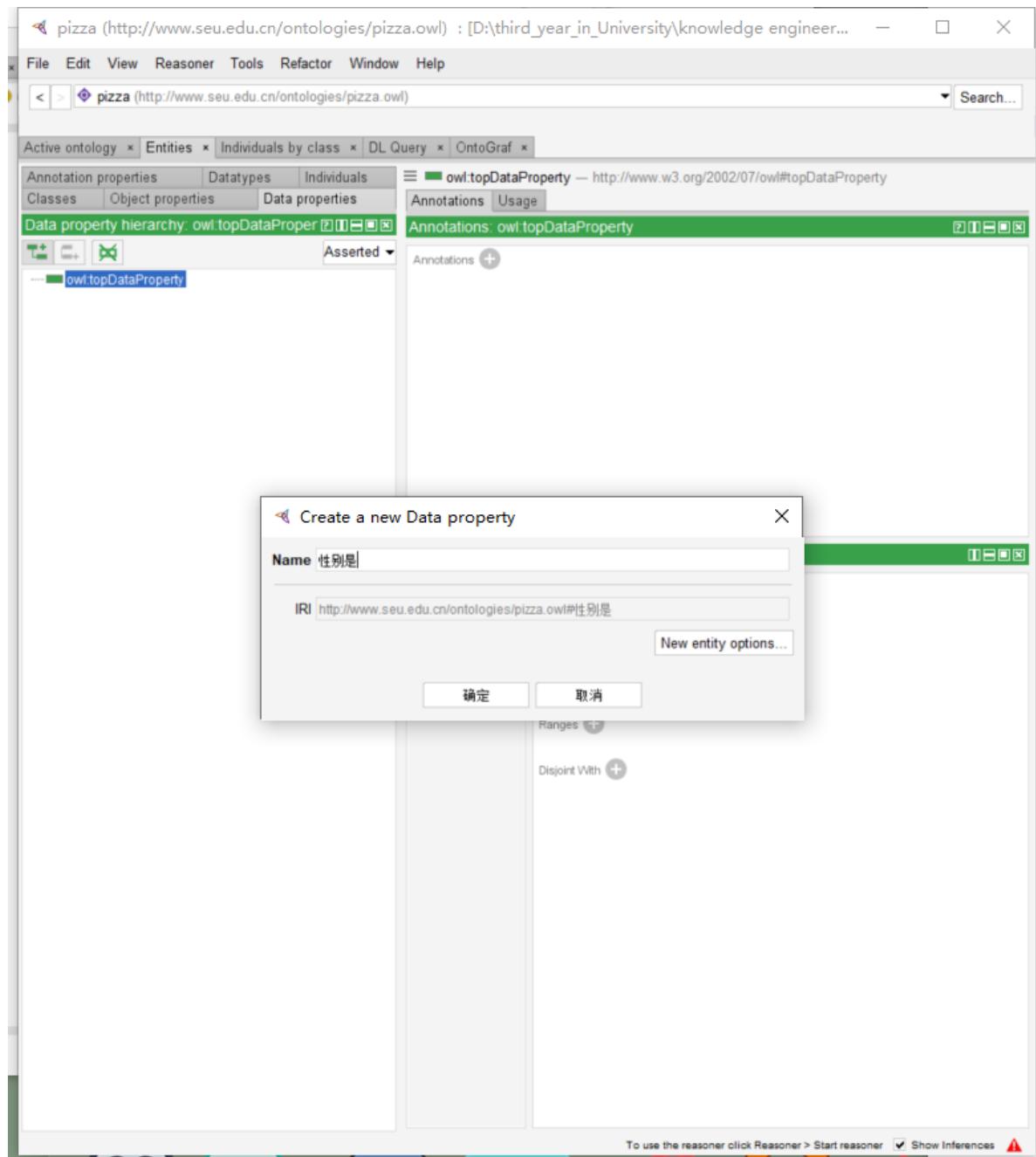
# 设置Object Property的range

- 设置“是情侣”的range为“动漫角色”



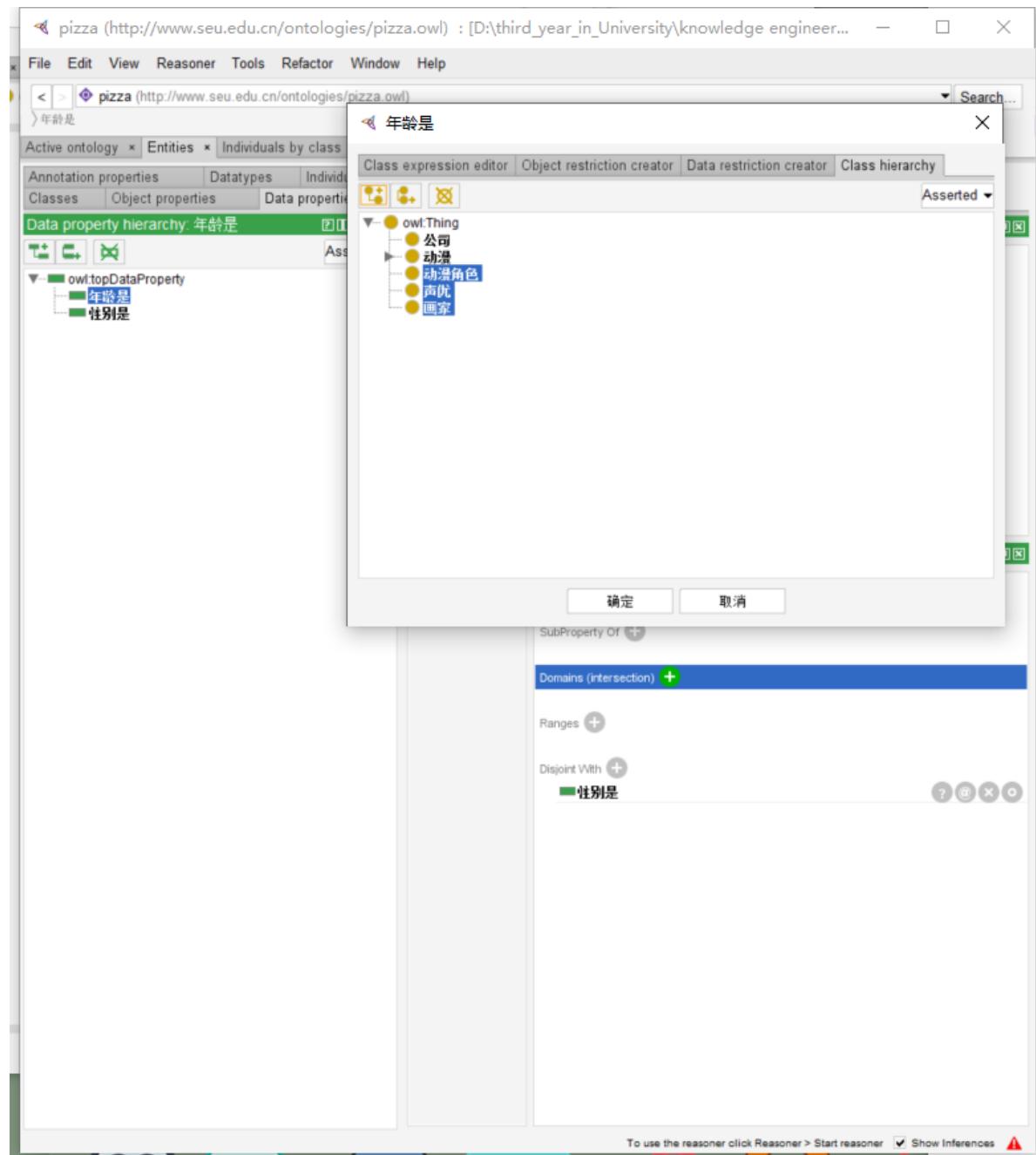
## 创建Data Property

- 选择“Entities”→“Data properties”，创建“owl:topDataProperty”的subproperty  
“性别是”



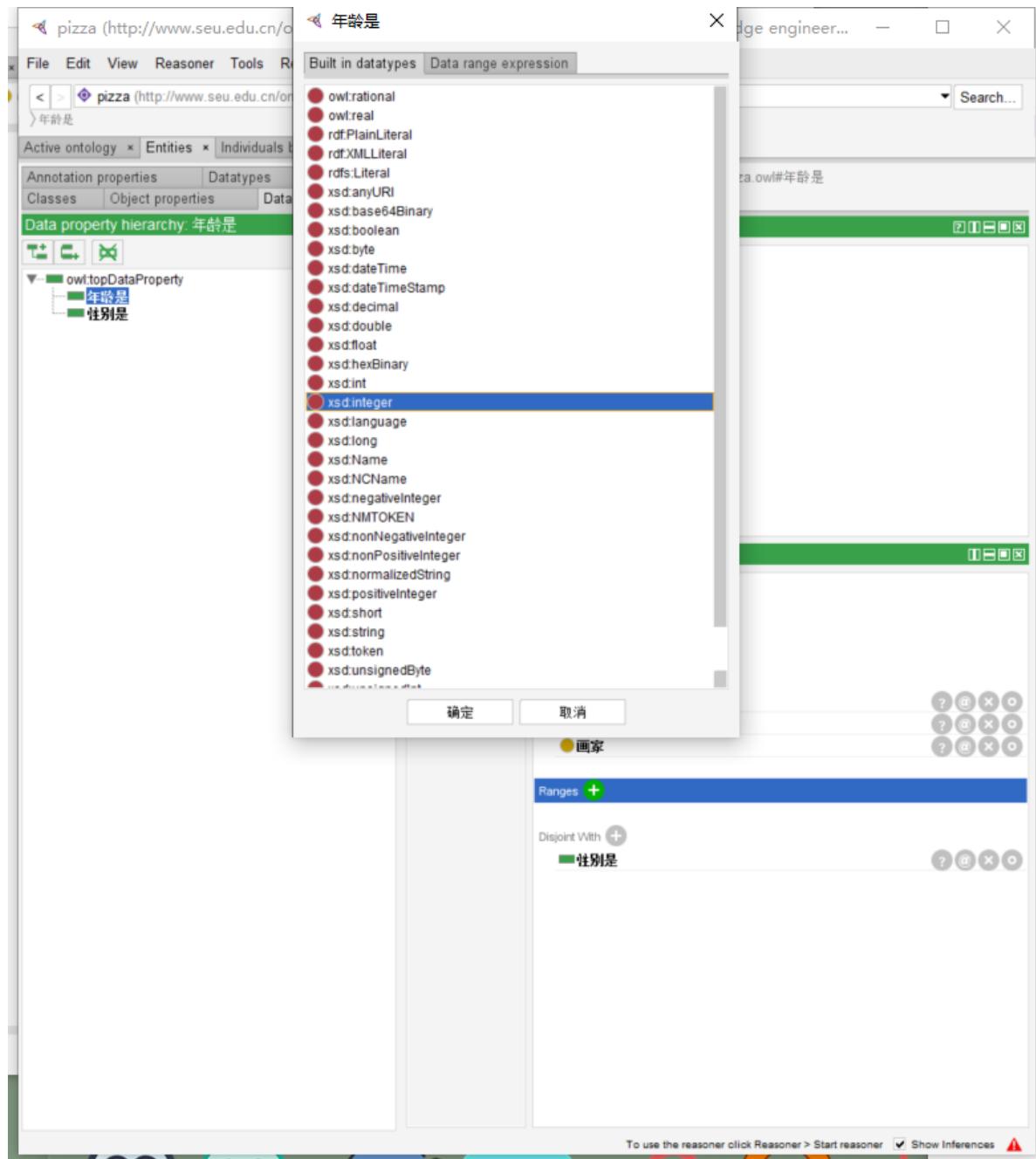
## 设置Data Property的domain

- 设置“性別是”的domain为“动漫角色”、“声优”、“画家”



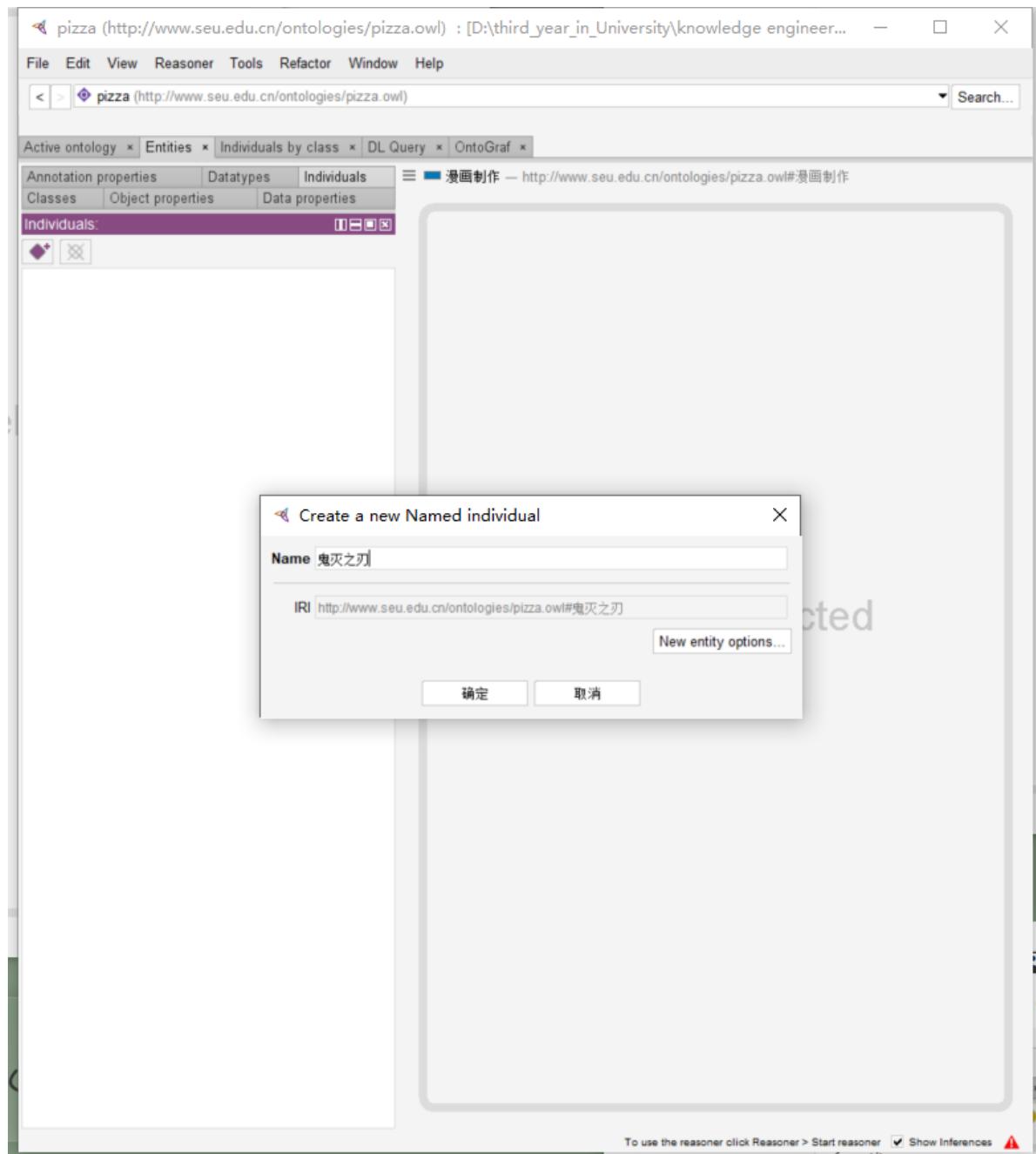
## 设置Data Property的range

- 设置“性别是”的range为 “xsd:string”



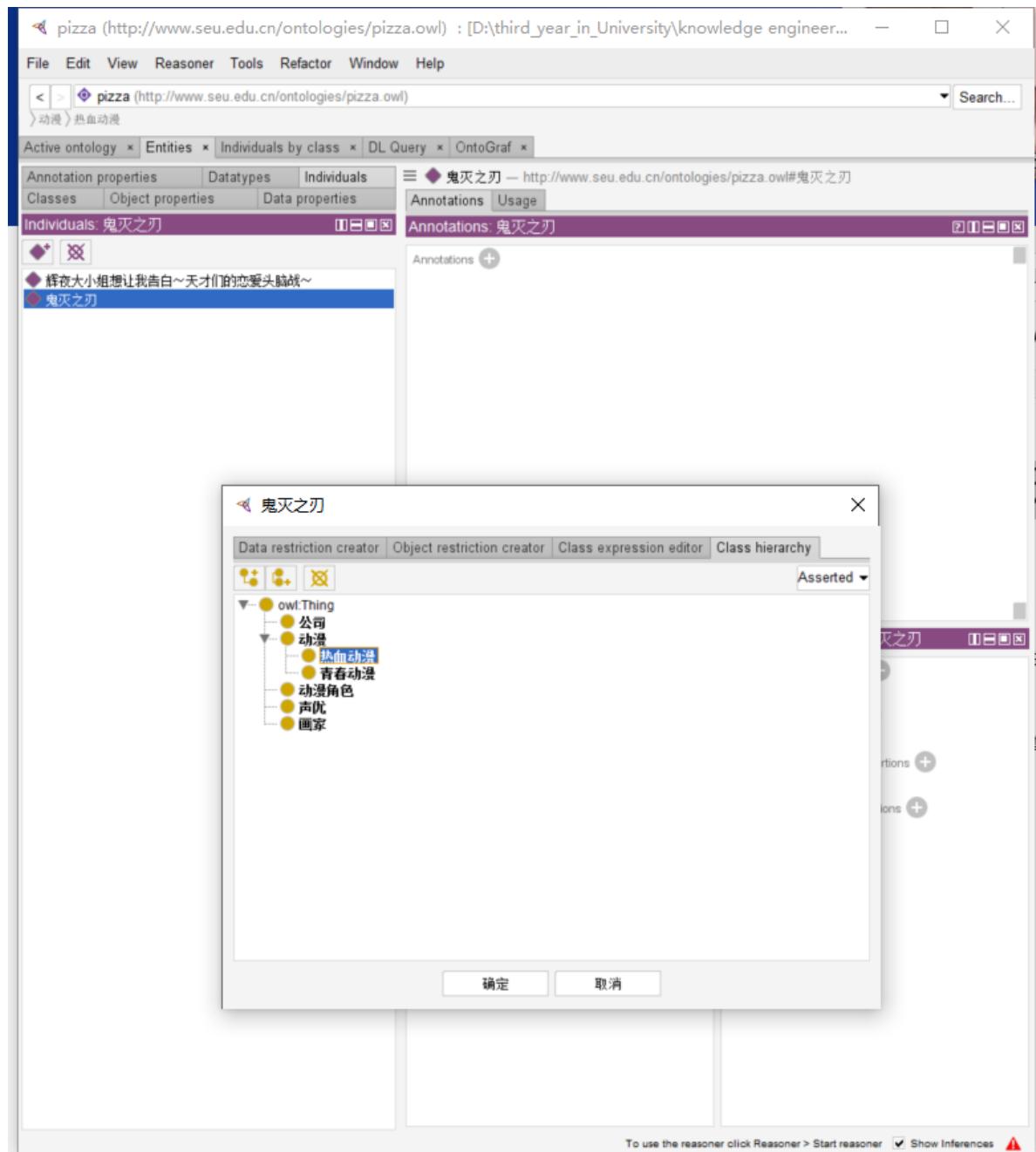
## 创建Individual

- 设置“Entities” → “Individuals”，创建Individual  
“鬼灭之刃”



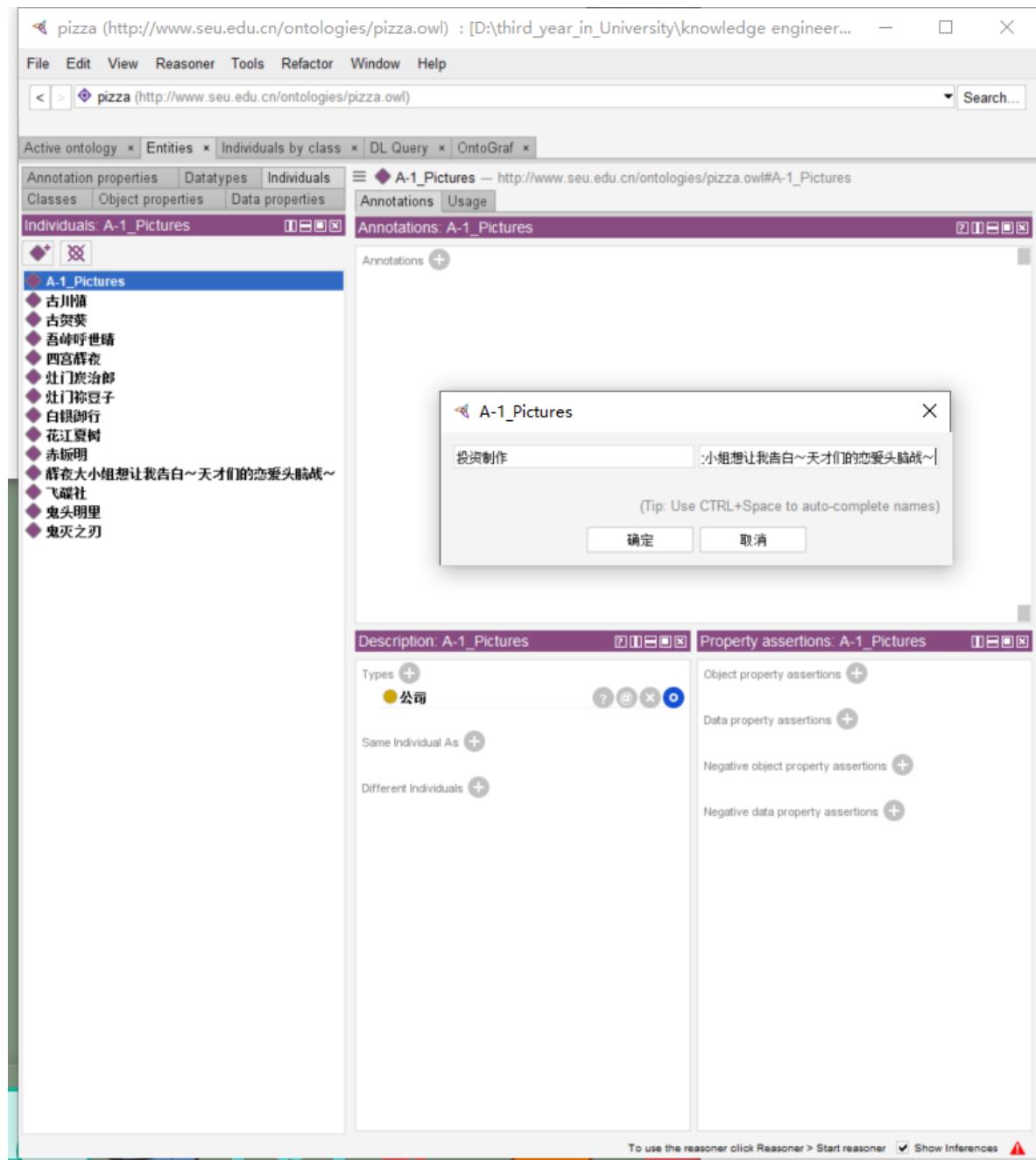
## 设置Individual Types

- 选择“鬼灭之刃”的Type为“热血动漫”



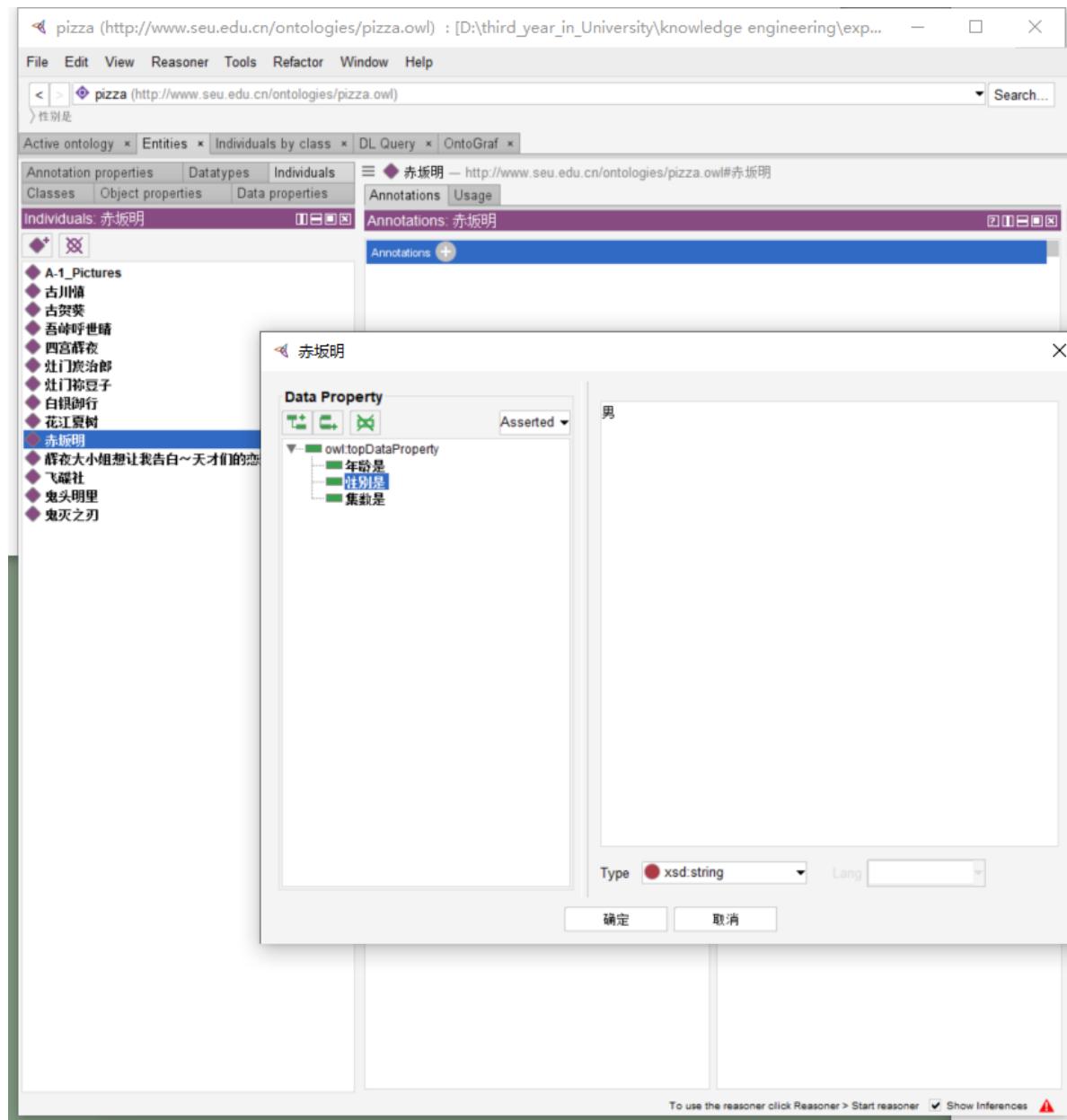
## 创建关于Individual的面向object property的assertion

- “A-1 Pictures” “投资制作” “辉夜大小姐”



## 创建关于Individual的面向data property 的assertion

- “赤坂明” “性别是” “男”



## 推理

- 先选择“Hermit 1.4.3.456”，再选择“Start reasoner”

pizza (<http://www.seu.edu.cn/ontologies/pizza.owl>) : [D:\third\_year\_in\_University\knowledge engineering\exp...]

File Edit View Reasoner Tools Refactor Window Help

Start reasoner Ctrl-R

Synchronize... Starts a new reasoner and initializes a cache of reasoning results including the inferred class hierarchy and the inferred types of individuals.

Stop reasoning Stop reasoning

Explain Explain... Explain the current state of the ontology, including the inferred class hierarchy and the inferred types of individuals.

Configure... Configure the reasoner settings.

Reasoner: Hermit 1.4.3.456

None

Annotations: 飞碟社

Individuals: 飞碟社

A-1\_Pictures

- 古川慎
- 古贺葵
- 吾咲呼世晴
- 四宮群夜
- 灶门炭治郎
- 灶门祢豆子
- 白银御行
- 花江夏树
- 赤坂明
- 群夜大小姐想让我告白~天才们的恋爱头脑战~
- 飞碟社
- 鬼头明里
- 鬼灭之刃

Description: 飞碟社

Types + 公司

Object assertions: 飞碟社

■ 投资制作 鬼灭之刃

Property assertions: 飞碟社

Same Individual As

Different Individuals

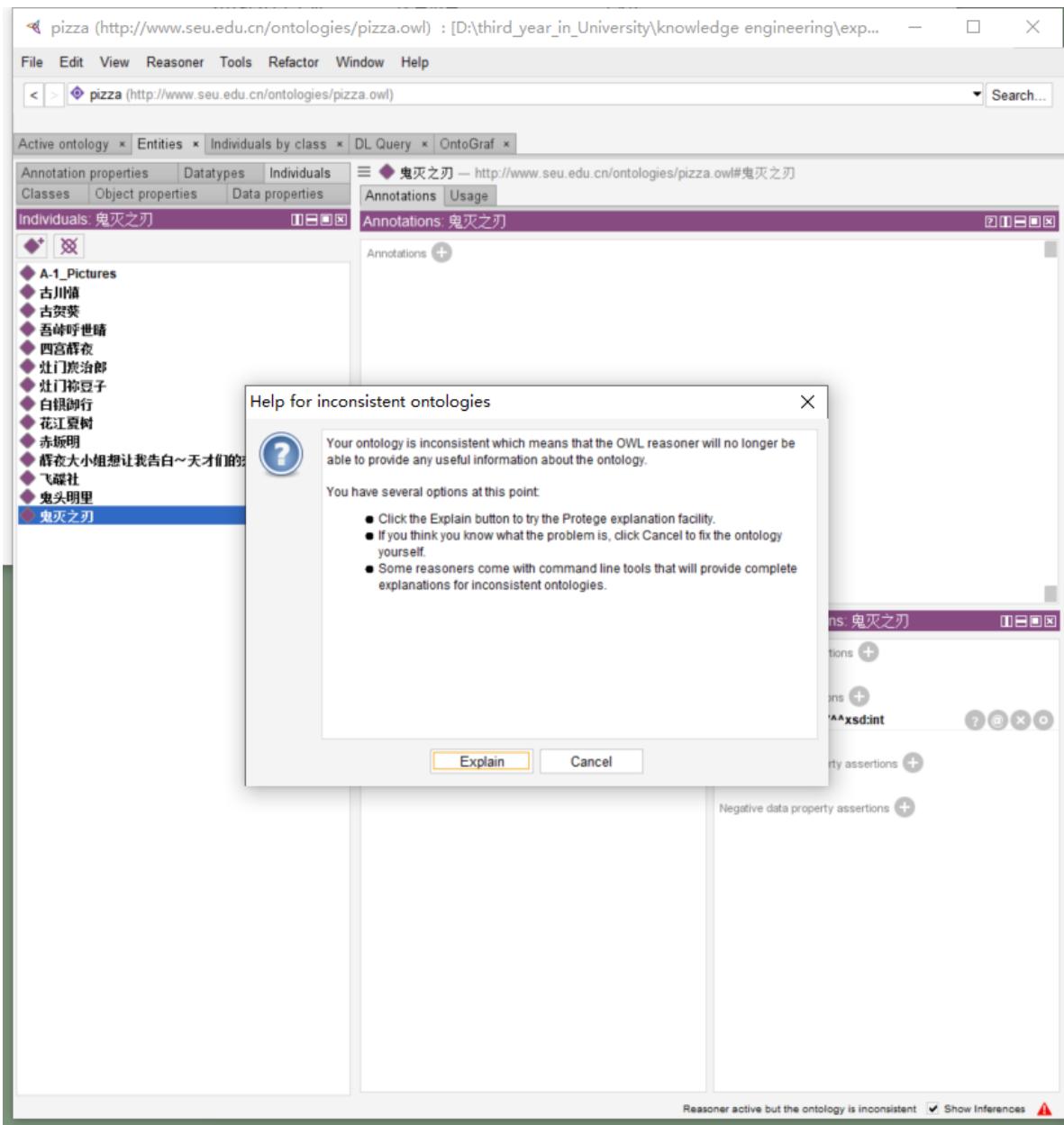
Object property assertions +

Data property assertions +

Negative object property assertions +

Negative data property assertions +

To use the reasoner click Reasoner > Start reasoner ✓ Show Inferences



Inconsistent ontology explanation

Show regular justifications     All justifications  
 Show laconic justifications     Limit justifications to 2

1) 灶门祢豆子 年龄是 "14"^^xsd:int    In 4 other justifications ?  
2) **DisjointClasses:**公司, 动漫, 动漫角色, 声优, 画家    In ALL other justifications ?  
3) 年龄是 Domain 声优    In 11 other justifications ?  
4) 年龄是 Domain 画家    In 11 other justifications ?

Explanation 2  Display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

1) **DisjointClasses:**公司, 动漫, 动漫角色, 声优, 画家    In ALL other justifications ?  
2) 年龄是 Domain 声优    In 11 other justifications ?  
3) 年龄是 Domain 画家    In 11 other justifications ?  
4) 灶门炭治郎 年龄是 "15"^^xsd:int    In 2 other justifications ?

Explanation 3  Display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

1) 四宫辉夜 性别是 "女"^^xsd:string    In 8 other justifications ?  
2) **DisjointClasses:**公司, 动漫, 动漫角色, 声优, 画家    In ALL other justifications ?  
3) 性别是 Domain 声优    In 8 other justifications ?  
4) 性别是 Domain 动漫角色    In 11 other justifications ?

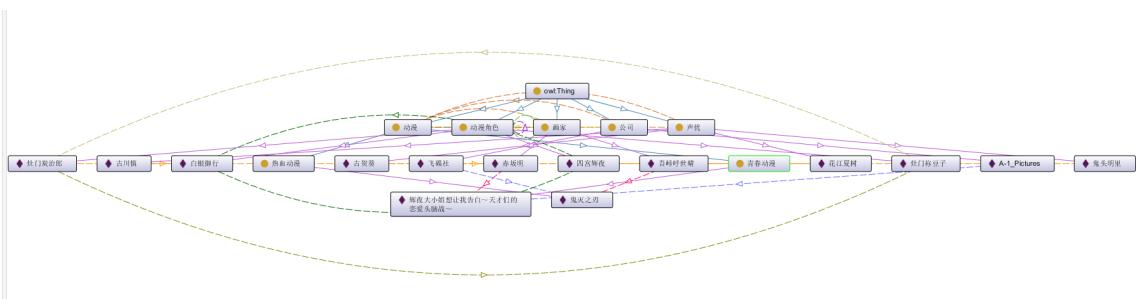
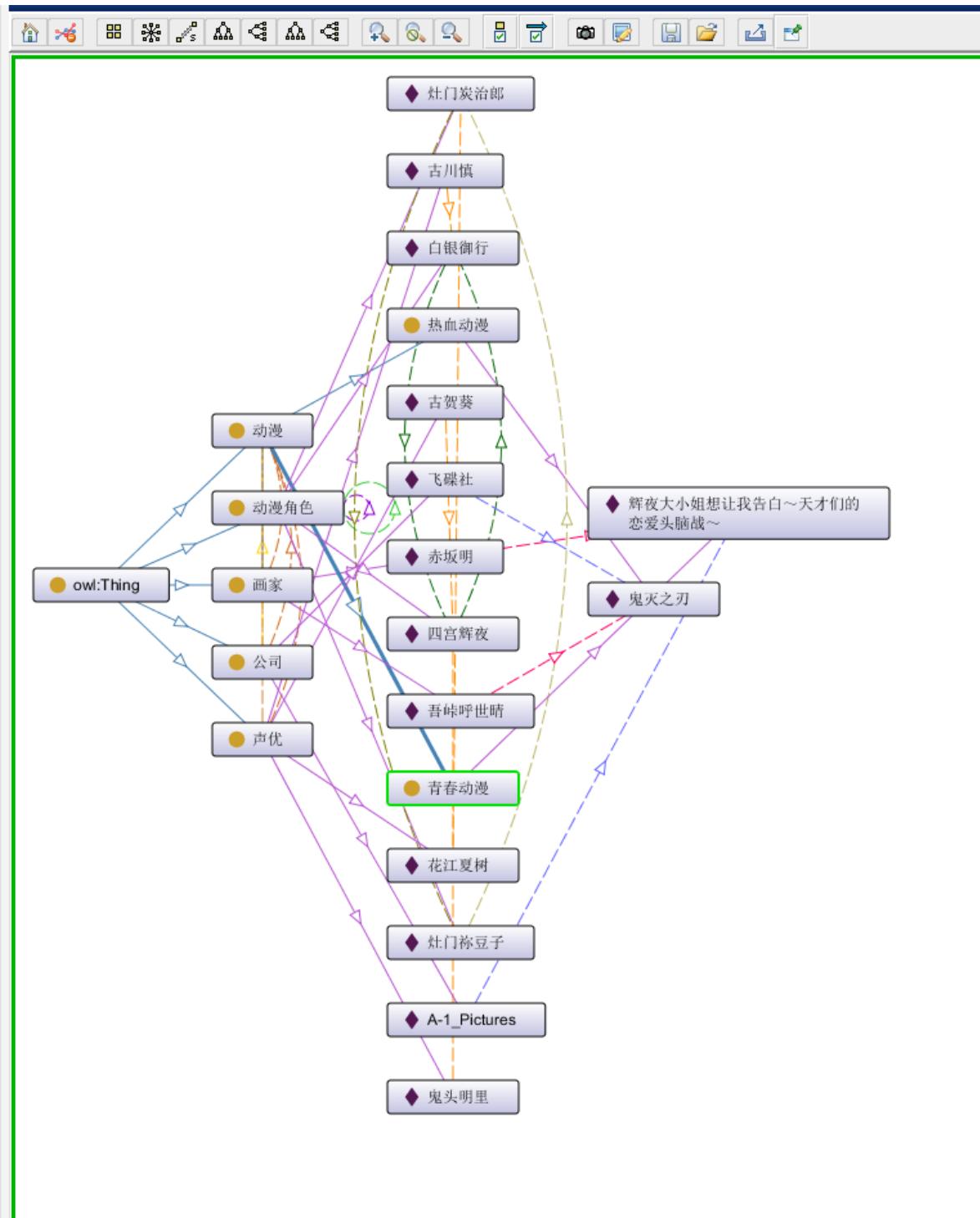
Explanation 4  Display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

1) 年龄是 Domain 动漫角色    In 7 other justifications ?  
2) 灶门祢豆子 年龄是 "14"^^xsd:int    In 4 other justifications ?  
3) **DisjointClasses:**公司, 动漫, 动漫角色, 声优, 画家    In ALL other justifications ?  
4) 年龄是 Domain 声优    In 11 other justifications ?

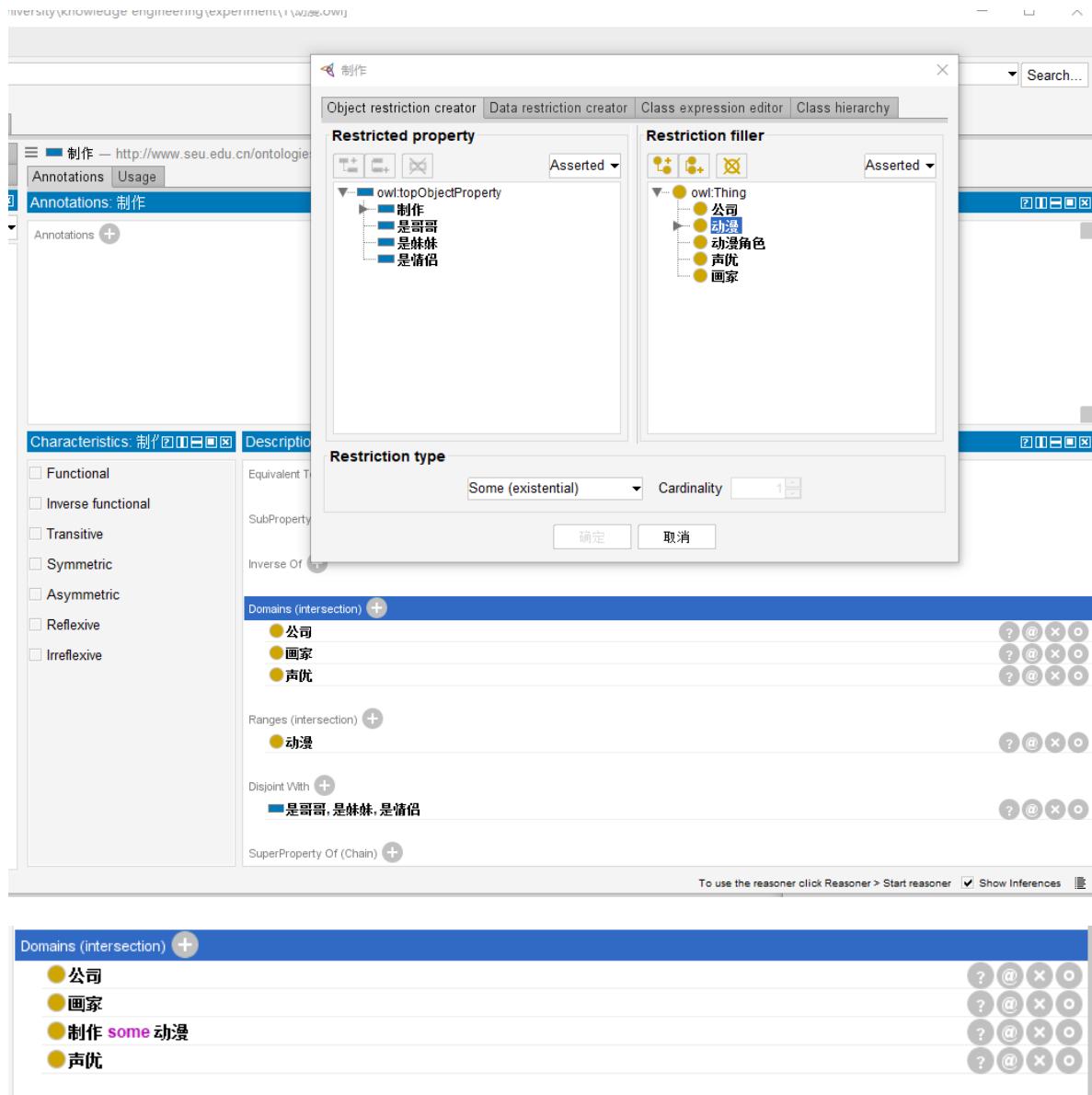
Explanation 5  Display laconic explanation

# 可视化



# 存在量词示例

- 选择“Object properties”中的“制作”；
- 选择Restricted property、Restriction filler、Restriction type



# 全称量词示例

- 选择“Object properties”中的“是哥哥”；
- 选择Restricted property、Restriction filler、Restriction type

Annotations: 是哥哥

Characteristics: 是哥哥 Description: 是哥哥

- Functional
- Inverse functional
- Transitive
- Symmetric
- Asymmetric
- Reflexive
- Irreflexive

Equivalent To: +

SubProperty Of: +

Inverse Of: +

Domains (intersection): +

Ranges (intersection): +

Disjoint With: +

SuperProperty Of (Chain): +

owl:topObjectProperty

- 制作
- 是哥哥
- 是妹妹
- 是情侣

owl:Thing

- 公司
- 动漫
- 动漫角色
- 声优
- 画家

Restriction type: Only (universal) Cardinality: 1

Annotations: 是哥哥

Description: 是哥哥

To use the reasoner click Reasoner > Start reasoner  Show Inferences

Domains (intersection): +

- 动漫角色
- 是哥哥 only 动漫角色

Inconsistent ontology explanation

Show regular justifications  All justifications

Show laconic justifications  Limit justifications to 2

Explanation 1  Display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

- 灶门祢豆子 年龄是 "14"^^xsd:int
- DisjointClasses:** 公司, 动漫, 动漫角色, 声优, 画家
- 年龄是 Domain 声优
- 年龄是 Domain 画家

In 3 other justifications

In ALL other justifications

In 11 other justifications

In 11 other justifications

Explanation 2  display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

- DisjointClasses:** 公司, 动漫, 动漫角色, 声优, 画家
- 年龄是 Domain 声优
- 年龄是 Domain 画家
- 灶门炭治郎 年龄是 "15"^^xsd:int

In ALL other justifications

In 11 other justifications

In 11 other justifications

In 2 other justifications

Explanation 3  Display laconic explanation

Explanation for: owl:Thing SubClassOf owl:Nothing

- DisjointClasses:** 公司, 动漫, 动漫角色, 声优, 画家
- 性别是 Domain 画家
- 声明 性别是 "man"^^xsd:string
- 性别是 Domain 动漫角色

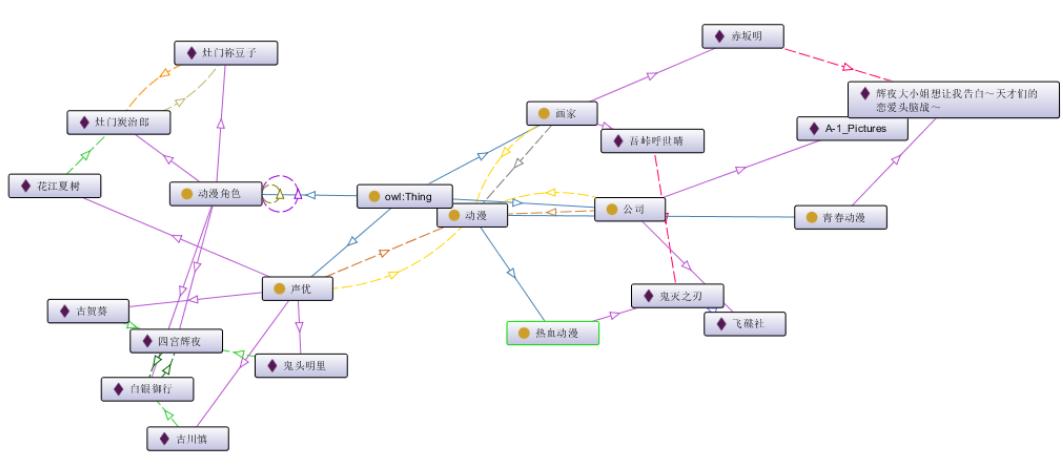
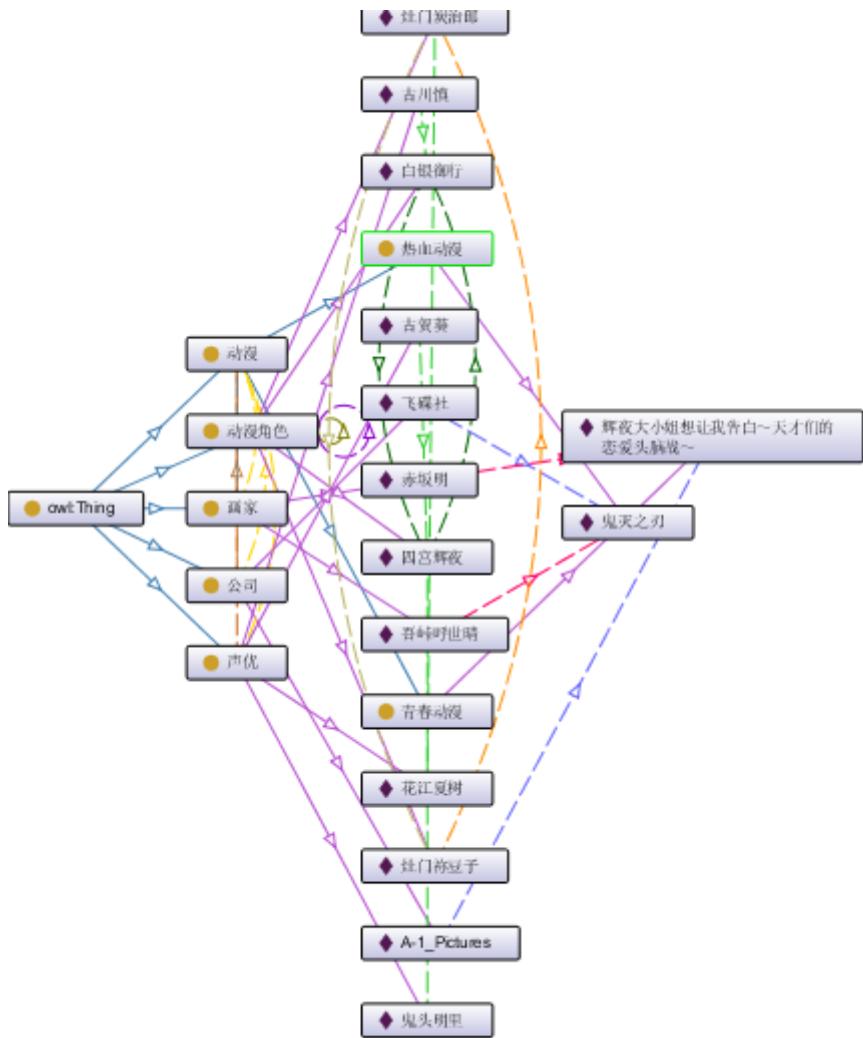
In ALL other justifications

In 11 other justifications

In 2 other justifications

In 10 other justifications

确定



# Week2

## 从Excel表导入本体

- 选择 “Tools” → “Create axioms from Excel workbook”

**打开**

查找(I):  ... ... ... ... ... ...

站点.xlsx  
 知识图谱.xlsx

文件名(N):

文件类型(T): Excel Workbook (.xlsx, .xls)

打开 取消

Cellfile

Target Ontology: untitled-ontology-10 (<http://www.semanticweb.org/administrator/ontologies/2021/10/untitled-ontology-10>)

Workbook (D:\third\_year\_in\_University\knowledge engineering\experiment\2\站点.xlsx)

Sheet1 Sheet2 Sheet3

	A	B	C	D	E	F
1						
2	line3-1	秣陵站	3号线	地铁站	属于	地铁线路
3	line3-2	星火路站	3号线	地铁站	位于	
4	line3-3	东大成贤学院站	3号线	地铁站		
5	秦马路站		S8号线	地铁站		
6	across3-88	秦马路站	3号线			
7	line3-4	天润城站	3号线			
8	line3-5	柳州东路站	3号线			
9	line3-6	上元门站	3号线			
10	line3-7	五塘广场站	3号线			
11	line3-8	小市站	3号线			
12	南京站		1号线			
13	across3-1	南京站	3号线			
14	line3-9	南京林业大学 新庄站	3号线			
15	鸡鸣寺站		4号线			

Transformation Rule Editor

Sheet name: Sheet1  
Start column: A  
End column: F  
Start row: 2  
End row: 173  
Comment:  
Rule:  
Individual:@B\* Types @D\*

Add Edit Delete

Save Rules Save As... Comment

Generate Axioms

Cellfile

Target Ontology: untitled-ontology-10 (<http://www.semanticweb.org/administrator/ontologies/2021/10/untitled-ontology-10>)

Workbook (D:\third\_year\_in\_University\knowledge engineering\experiment\2\站点.xlsx)

	A	B	C	D	E	F
1						
2	line3-1	琳场站	3号线	地铁站	属于	地铁线路
3	line3-2	星火路站	3号线	地铁站	位于	
4	line3-3	东大成贤学院站	3号线	地铁站		
5		泰山路站	S8号线	地铁		
6	across3-s8	泰山路站	3号线	地铁		
7	line3-4	天河城站	3号线	地铁		
8	line3-5	柳州东站	3号线	地铁		
9	line3-6	上元门站	3号线	地铁		
10	line3-7	五塘广场站	3号线	地铁		
11	line3-8	小市站	3号线	地铁		
12		南京站	1号线	地铁		
13	across3-1	南京站	3号线	地铁		
14	line3-9	南京林业大学 新庄站	3号线	地铁		
15	line3-10	鸿鸣寺站	4号线	地铁		

Transformation Rule Editor

Sheet name: Sheet1  
Start column: A  
End column: F  
Start row: 2  
End row: 173  
Comment:  
Rule:  
Individual:@C\* Types:@F2

Add Edit Delete

Transformation Rules

Generate Axioms

Cellfile

Target Ontology: untitled-ontology-10 (<http://www.semanticweb.org/administrator/ontologies/2021/10/untitled-ontology-10>)

Workbook (D:\third\_year\_in\_University\knowledge engineering\experiment\2\站点.xlsx)

	A	B	C	D	E	F
1						
2	line3-1	琳场站	3号线	地铁站	属于	地铁线路
3	line3-2	星火路站	3号线	地铁站	位于	
4	line3-3	东大成贤学院站	3号线	地铁站		
5		泰山路站	S8号线	地铁		
6	across3-s8	泰山路站	3号线	地铁		
7	line3-4	天河城站	3号线	地铁		
8	line3-5	柳州东站	3号线	地铁		
9	line3-6	上元门站	3号线	地铁		
10	line3-7	五塘广场站	3号线	地铁		
11	line3-8	小市站	3号线	地铁		
12		南京站	1号线	地铁		
13	across3-1	南京站	3号线	地铁		
14	line3-9	南京林业大学 新庄站	3号线	地铁		
15	line3-10	鸿鸣寺站	4号线	地铁		

Transformation Rule Editor

Sheet name: Sheet1  
Start column: A  
End column: F  
Start row: 2  
End row: 173  
Comment:  
Rule:  
Individual:@B\* Types:@D\*  
Facts:@E2 @C\*

Add Edit Delete

Transformation Rules

Generate Axioms

Cellfile

Target Ontology: untitled-ontology-10 (<http://www.semanticweb.org/administrator/ontologies/2021/10/untitled-ontology-10>)

Workbook (D:\third\_year\_in\_University\knowledge engineering\experiment\2站点.xlsx)

Sheet1 Sheet2 Sheet3

	A	B	C	D	E	F
1						
2	line3-1	林场站	3号线	地铁站	属于	地铁线路
3	line3-2	星火路站	3号线	地铁站	位于	
4	line3-3	东大成贤学院站	3号线	地铁站	包含	
5						
6	across3-s8	秦马路站	3号线	地铁站		
7	line3-4	天润城站	3号线	地铁站		
8	line3-5	柳州东路站	3号线	地铁站		
9	line3-6	上元门站	3号线	地铁站		
10	line3-7	五塘广场站	3号线	地铁站		
11	line3-8	小市站	3号线	地铁站		
12						
13	across3-1	南京站	3号线	地铁站		
14	line3-9	南京林业大学-新庄站	3号线	地铁站		
15						

Transformation Rule Editor

Sheet name: Sheet1  
Start column: A  
End column: F  
Start row: 2  
End row: 173  
Comment:  
Rule:  
Individual:@B\* Types:@D\*  
Facts:@E3 @A\* (xsd:string)

Add Edit Delete

	Sheet Name	Start Column	End Column
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input type="checkbox"/>	Sheet1	A	F

Save As... Comment

Generate Axioms

Cellfile

Target Ontology: untitled-ontology-10 (<http://www.semanticweb.org/administrator/ontologies/2021/10/untitled-ontology-10>)

Workbook (D:\third\_year\_in\_University\knowledge engineering\experiment\2站点.xlsx)

Sheet1 Sheet2 Sheet3

	A	B	C	D	E	F
1						
2	line3-1	林场站	3号线	地铁站	属于	地铁线路
3	line3-2	星火路站	3号线	地铁站	位于	有支线
4	line3-3	东大成贤学院站	3号线	地铁站	包含	
5						
6	across3-s8	秦马路站	3号线	地铁站		
7	line3-4	天润城站	3号线	地铁站		
8	line3-5	柳州东路站	3号线	地铁站		
9	line3-6	上元门站	3号线	地铁站		
10	line3-7	五塘广场站	3号线	地铁站		
11	line3-8	小市站	3号线	地铁站		
12						
13	across3-1	南京站	1号线	地铁站		
14	line3-9	南京林业大学-新庄站	3号线	地铁站		
15						

Generated Axioms

Cellfile generates 1000 axioms:

- Individual: S1号线
- Individual: S3号线
- Individual: S7号线
- Individual: S8号线
- Individual: S9号线
- Individual: 三山街站
- Individual: 上元门站
- Individual: 上海路站
- Individual: 下马坊站

View Log Save Rules Save As... Comment

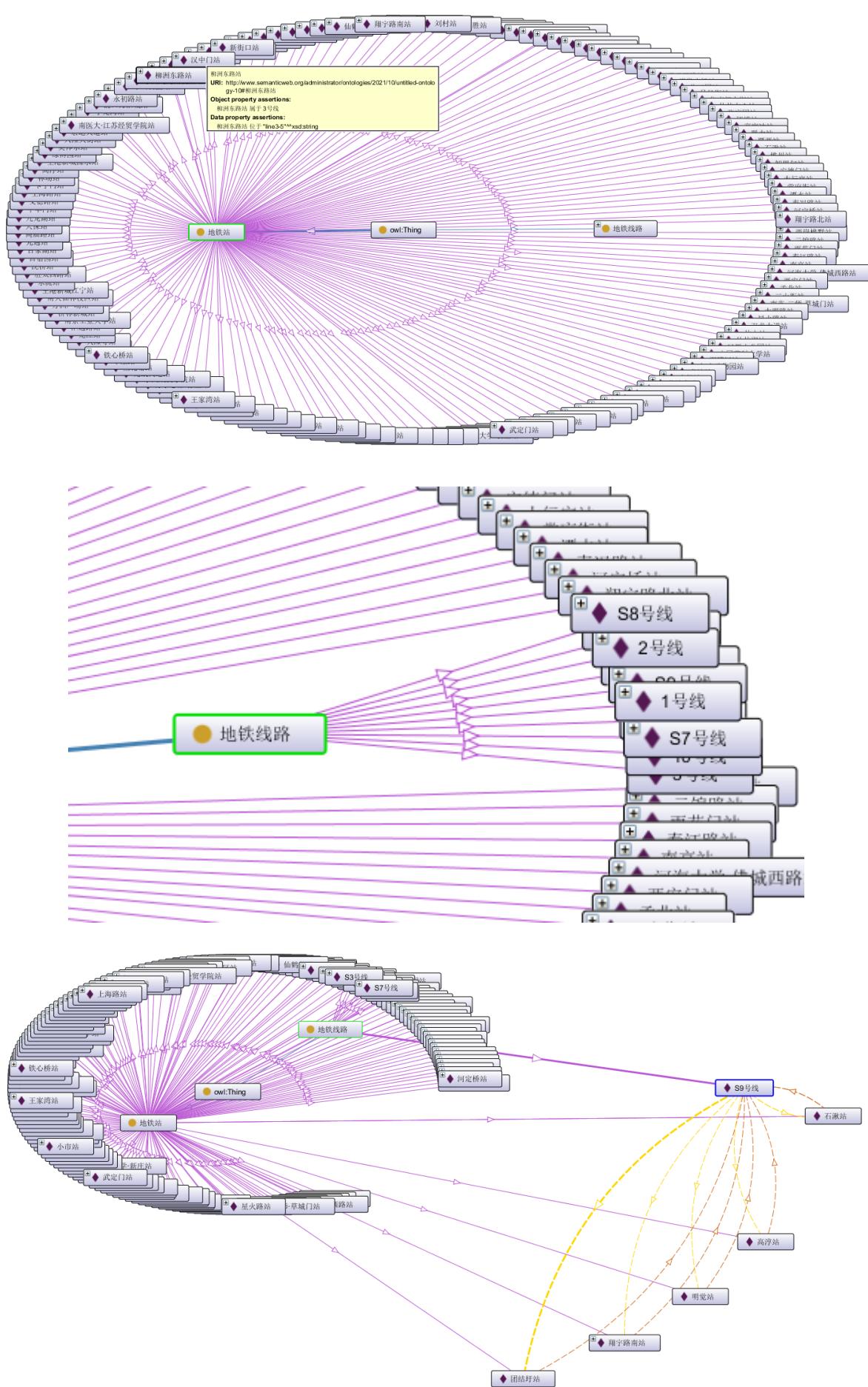
Add Edit Delete

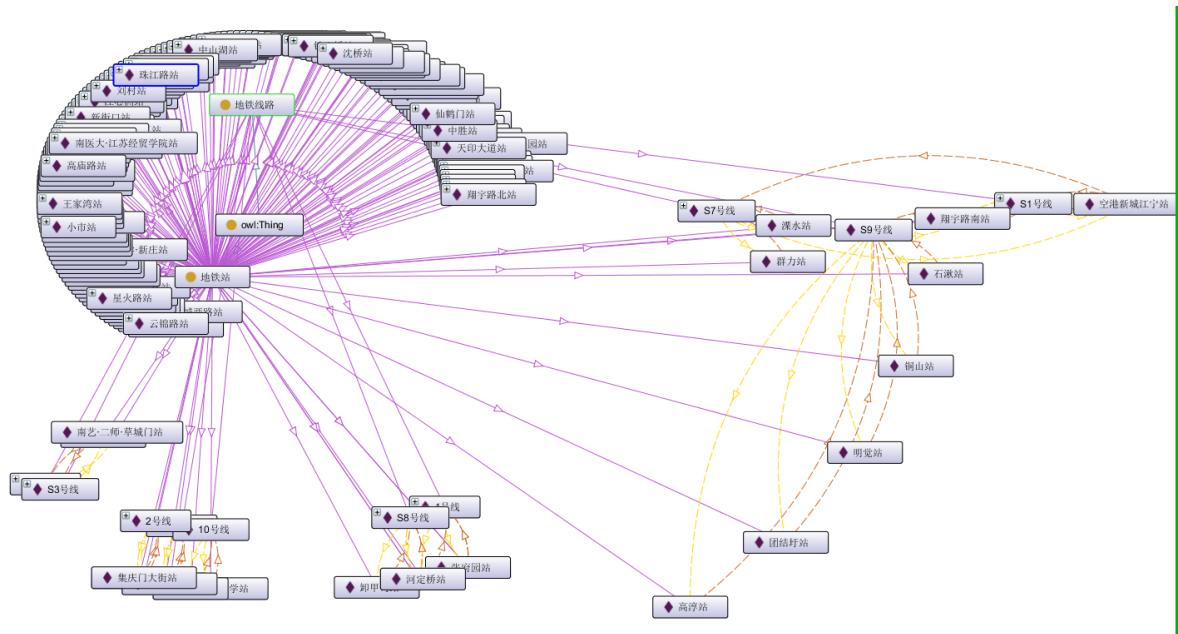
	Sheet Name	Start Column	End Column
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F
<input checked="" type="checkbox"/>	Sheet1	A	F

Cancel Add to a new ontology Add to current ontology

Generate Axioms

# 可视化





## Week3

### Task1 finance

- 阅读程序Demo\_finance.java源码，分别注释本体和规则的部分，观察推理结果的变化；

### 刚开始运行结果

```

查询时间: 2ms
原有的三元组总数量为10个
推理过后的三元组总数量为24个
推理出来的三元组总数量为14个
程序运行时间: 3ms
查询时间: 2ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 26.311065673828125M

Process finished with exit code 0

```

### 原来的代码：

```
1 store.importOntology(ontology);
2 store.importFiles(new File[] {dataFile});
3 store.importFiles(new File[] {ruleFile});
```

## delete ontology

```
1 //注释掉 store.importOntology(ontology);
2 store.importFiles(new File[] {dataFile});
3 store.importFiles(new File[] {ruleFile});
```

```
// store.importOntology(ontology);
// store.importFiles(new File[] {dataFile});
// store.importFiles(new File[] {ruleFile});
```

查询时间: 1ms

原有的三元组总数量为10个

推理过后的三元组总数量为18个

推理出来的三元组总数量为8个

程序运行时间: 2ms

查询时间: 1ms

当前JVM占用的内存总数: 121.0M

已经使用内存: 25.636817932128906M

```
Process finished with exit code 0
```

## delete rule

```
1 store.importOntology(ontology);
2 store.importFiles(new File[] {dataFile});
3 //注释掉: store.importFiles(new File[] {ruleFile});
```

```
查询时间: 1ms
原有的三元组总数量为10个
推理过后的三元组总数量为16个
推理出来的三元组总数量为6个
程序运行时间: 2ms
查询时间: 1ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 26.423324584960938M
```

```
Process finished with exit code 0
```

## add new rule

- 撰写Datalog规则进行推理，观察新的推理结果（对应“实验课代码\src\main\resources\data\finance\_rule.txt”）：

### 1.1.5.1 rule 1

- 如果A是B的子类，B是C的子类，那么A是C的子类（对应 finance\_data.nt 中的谓词“subClassOf”）

```
1 PREFIX p: <http://www.example.org/kse/finance#>
2
3 p:hold_share(?X,?Y) :- p:control(?X,?Y) .
4 p:conn_trans(?Y,?Z) :- p:hold_share(?X,?Y),
5   p:hold_share(?X,?Z) .
6 p:subClassof(?X,?Z) :- p:subClassof(?X,?Y),
7   p:subClassof(?Y,?Z) .
```

```
查询时间: 2ms
原有的三元组总数量为10个
推理过后的三元组总数量为25个
推理出来的三元组总数量为15个
程序运行时间: 3ms
查询时间: 2ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 26.294837951660156M
```

```
Process finished with exit code 0
```

## rule2

- 如果A的类型是PublicCompany，那么PublicCompany的任意父类也是A的类型（对应finance\_data.nt 中的谓词“type”）。

```
1 PREFIX p: <http://www.example.org/kse/finance#>
2 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-
syntax-ns#>
3
4 p:hold_share(?X,?Y):- p:control(?X,?Y) .
5 p:conn_trans(?Y,?Z):- p:hold_share(?X,?Y),
p:hold_share(?X,?Z) .
6 p:subClassof(?X,?Z):- p:subClassof(?X,?Y),
p:subClassof(?Y,?Z) .
7 rdf:type(?B,?A):- rdf:type(?A,p:PublicCompany),
p:subClassof(p:PublicCompany,?B) .
```

```
查询时间: 2ms
原有的三元组总数量为10个
推理过后的三元组总数量为27个
推理出来的三元组总数量为17个
程序运行时间: 3ms
查询时间: 2ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 26.294692993164062M
```

```
Process finished with exit code 0
```

# Legal

- 撰写Datalog规则进行推理，观察新的推理结果（对应“实验课代码\src\main\resources\data\legal\_rule.txt”）：

## add rule

- 如果案件A关联事件B,事件B的发生时间是案件A的关键节点（对应legal\_data.nt 中的谓词“Relate”和“Time”）

```
查询时间: 2ms
原有的三元组总数量为16个
推理过后的三元组总数量为23个
推理出来的三元组总数量为7个
程序运行时间: 2ms
查询时间: 2ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 8.084281921386719M

Process finished with exit code 0
```

```
1 PREFIX p: <http://www.reason/legal#>
2
3 p:BelongTo(?B,?A) :- p:Relate(?A,?B) .
4 p:Steal(?Z,?S) :- p:Relate(?X,?Y), p:Person(?Y,?
5   ?Z), p:Thing(?Y,?S) .
6 p:KeyPoints(?A,?C) :- p:Relate(?A,?B), p:Time(?B,
7   ?C) .
```

```
查询时间: 2ms
原有的三元组总数量为16个
推理过后的三元组总数量为25个
推理出来的三元组总数量为9个
程序运行时间: 3ms
查询时间: 2ms
当前JVM占用的内存总数: 121.0M
已经使用内存: 8.084365844726562M

Process finished with exit code 0
```

# Week4

## 故障诊断领域知识推理

- 撰写规则，观察新的推理结果（对应“实验课代码（二）\RDFox-win64-

3.1.1\examples\Java\tech\oxfordsemantic\jrdfox\data\diagnosis\_rule.txt”：

- 已知Pa转换为Kpa的转换公式 ( $1\text{KPa}=1000\text{Pa}$ )，求设备的进出口压差为多少Kpa？（对应diagnosis\_data.nt 中的谓词“进出口压差 (Pa) ”）

```
1 PREFIX p: <http://www.example.org/kse/diagnosis#>
2
3 p:进出口温差 (°C) [?X,?Z] :- p:进出口温差 (°F) [?X,?Y], 
BIND ((?Y - 32) / 1.8 AS ?Z) .
4 p:故障[?X,p:冷凝设备脏堵] :- p:类型[?X,p:冷凝设备] , p:
进出口温差 (°C) [?X,?Z] , FILTER(?Z < 20) .
5 p:进出口压差 (Kpa) [?X,?Z] :- p:进出口压差 (Pa) [?X,?
Y] , BIND(?Y / 1000 AS ?Z) .
```

```
=====
<http://www.example.org/kse/diagnosis#类型> * 1
<http://www.example.org/kse/diagnosis#进出口温差 (°F)> * 1
<http://www.example.org/kse/diagnosis#进出口压差 (Pa)> * 1
<http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> * 1
<http://www.example.org/kse/diagnosis#故障> * 1
<http://www.example.org/kse/diagnosis#进出口温差 (°C)> * 1
-----
The number of rows returned: 6
=====

Exporting facts to file './final-facts11556453401606211480.ttl' ... done.
This is the end of the example!
```

```
Process finished with exit code 0
```

```
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口温差 (°C)> "25"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> "10"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口压差 (Pa)> "1000"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口压差 (°F)> "77"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#类型> <http://www.example.org/kse/diagnosis#冷凝设备> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#故障> <http://www.example.org/kse/diagnosis#冷凝设备脏堵> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口温差 (°C)> "15"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> "30"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口压差 (Pa)> "3000"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口压差 (°F)> "59"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#类型> <http://www.example.org/kse/diagnosis#冷凝设备> .
```

- 某冷凝设备进出口压差大于20KPa，该冷凝设备存在“冷凝设备压差过大”故障。（对应diagnosis\_data.nt 中的谓词“进出口压差（KPa）”和“type”）

```

1 PREFIX p: <http://www.example.org/kse/diagnosis#>
2
3 p:进出口温差 (°C) [?X,?Z] :- p:进出口温差 (°F) [?X,?Y], ,
4 BIND ((?Y - 32) / 1.8 AS ?Z) .
5 p:故障[?X,p:冷凝设备脏堵] :- p:类型[?X,p:冷凝设备] , p:
6 进出口温差 (°C) [?X,?Z] , FILTER(?Z < 20) .
7 p:进出口压差 (Kpa) [?X,?Z] :- p:进出口压差 (Pa) [?X,?
8 Y] , BIND(?Y / 1000 AS ?Z) .
9 p:故障[?X,p:冷凝设备压差过大] :- p:类型[?X,p:冷凝设备] ,
10 p:进出口压差 (Kpa) [?X,?Z] , FILTER(?Z > 20) .

```

```

=====
<http://www.example.org/kse/diagnosis#类型> * 1
<http://www.example.org/kse/diagnosis#进出口温差 (°F)> * 1
<http://www.example.org/kse/diagnosis#进出口压差 (Pa)> * 1
<http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> * 1
<http://www.example.org/kse/diagnosis#故障> * 1
<http://www.example.org/kse/diagnosis#进出口温差 (°C)> * 1
-----
The number of rows returned: 6
=====

Exporting facts to file '.\final-facts16028768873491975841.ttl' ... done.
This is the end of the example!

Process finished with exit code 0

```

```

<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> "10"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口温差 (°C)> "25"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口压差 (Pa)> "10000"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#进出口温差 (°F)> "77"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器1> <http://www.example.org/kse/diagnosis#类型> <http://www.example.org/kse/diagnosis#冷凝设备> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#故障> <http://www.example.org/kse/diagnosis#冷凝设备脏堵> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#故障> <http://www.example.org/kse/diagnosis#冷凝设备压差过大> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口温差 (°C)> "15"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口压差 (Kpa)> "30"^^<http://www.w3.org/2001/XMLSchema#decimal> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口压差 (Pa)> "30000"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#进出口温差 (°F)> "59"^^<http://www.w3.org/2001/XMLSchema#integer> .
<http://www.example.org/kse/diagnosis#冷凝器2> <http://www.example.org/kse/diagnosis#类型> <http://www.example.org/kse/diagnosis#冷凝设备> .

```

## 金融领域知识推理

- 阅读程序源码，解除JRDFoxDemo\_finance.java中141-146 的注释，观察在推理过程中新插入三元组后推理结果的变化，理解否定失败非单调的性质。

```
<http://www.example.org/kse/finance#张三> <http://www.example.org/kse/finance#employeeOf> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#张三> <http://www.example.org/kse/finance#worksFor> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#李四> <http://www.example.org/kse/finance#contractorFor> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#李四> <http://www.example.org/kse/finance#worksFor> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#fullName> "PeterGreen" .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#lastName> "Green" .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#firstName> "Peter" .
```

```
<http://www.example.org/kse/finance#张三> <http://www.example.org/kse/finance#employeeOf> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#张三> <http://www.example.org/kse/finance#worksFor> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#李四> <http://www.example.org/kse/finance#employeeOf> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#李四> <http://www.example.org/kse/finance#worksFor> <http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#fullName> "PeterGreen" .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#lastName> "Green" .
<http://www.example.org/kse/finance#peter> <http://www.example.org/kse/finance#firstName> "Peter" .
```

- 注释前:

```
1 <http://www.example.org/kse/finance#李四>
  <http://www.example.org/kse/finance#contractorFor>
  <http://www.example.org/kse/finance#万达集团> .
```

- 注释后:

```
1 <http://www.example.org/kse/finance#李四>
  <http://www.example.org/kse/finance#employeeOf>
  <http://www.example.org/kse/finance#万达集团> .
```

- 代码注释后，导入以下数据:

```
1 <http://www.example.org/kse/finance#张三>
  <http://www.example.org/kse/finance#worksFor>
  <http://www.example.org/kse/finance#万达集团> .
  <http://www.example.org/kse/finance#李四>
  <http://www.example.org/kse/finance#worksFor>
  <http://www.example.org/kse/finance#万达集团> .
  <http://www.example.org/kse/finance#张三>
  <http://www.example.org/kse/finance#employeeOf>
  <http://www.example.org/kse/finance#万达集团> .
  <http://www.example.org/kse/finance#peter>
  <http://www.example.org/kse/finance#firstName>
  "Peter" .
  <http://www.example.org/kse/finance#peter>
  <http://www.example.org/kse/finance#lastName>
  "Green" .
```

- 代码注释前，新加了一条数据：

```

1 <http://www.example.org/kse/finance#李四>
<http://www.example.org/kse/finance#employeeof>
<http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#张三>
<http://www.example.org/kse/finance#worksFor>
<http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#李四>
<http://www.example.org/kse/finance#worksFor>
<http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#张三>
<http://www.example.org/kse/finance#employeeof>
<http://www.example.org/kse/finance#万达集团> .
<http://www.example.org/kse/finance#peter>
<http://www.example.org/kse/finance#firstName>
"Peter" .
<http://www.example.org/kse/finance#peter>
<http://www.example.org/kse/finance#lastName>
"Green" .

```

- 这将触发否定规则：

```

1 q:contractorFor[?X,?Y] :- q:worksFor[?X,?Y], NOT
q:employeeof[?X,?Y] .

```

- 注释后因为检测到，李四worksFor万达集团，但缺乏李四  
employeeof万达集团，所以进行推理，生成李四是  
contractorFor万达集团，李四是employeeof万达集团；
- 注释前因为检测到，李四worksFor万达集团，以及李四  
employeeof万达集团，所以李四不是contractorFor万达集团，  
李四是employeeof万达集团。

## Week5

- 运行环境：

NVIDIA GeForce RTX 2080 Ti  
ID: q8NxK6

● 运行中 停止并释放 更多 ▾

● 长时间运行推荐使用SSH。该链接非长期有效链接，偶尔会因网络问题而变更，请留意炬池云通知。

SSH 链接: ssh -p 28359 root@hz-t3.matpool.com 复制密码 重置密码

JupyterLab 链接: <https://hz.matpool.com:27773?token=Wa3VgIVxGA>

硬件信息 GPU: NVIDIA GeForce RTX 2080 Ti 每秒浮点运算次数: 13.13 TFLOPS 显卡内存: 11 GB

租用配置 镜像: Pytorch 1.6.0 镜像描述: 预装: Python 3.7, CUDA 10.2,... 挂载: /mnt

计费: ¥0.74 + 折扣价: ¥ 3.00/小时 原价: ¥ 5.99/小时 余额还够租用: ~ 3小时

- TranseE运行:

- 数据集: “WN18RR”

## 代码调整

### Transe

```
1 def set_interact_args():
2     parser = argparse.ArgumentParser()
3         parser.add_argument('--margin', default=5.0,
4             type=float, required=False, help='Margin loss中
5             margin值')
6         parser.add_argument('--nbatches', default=100,
7             type=int, required=False, help='Batch size')
8         parser.add_argument('--dim', default=100,
9             type=int, required=False, help='Embedding size')
10        parser.add_argument('--p_norm', default=1,
11            type=int, required=False, help='能量函数为1范数形式')
12        parser.add_argument('--train_times',
13            default=1, type=int, required=False, help='epoch-
14            训练轮次')
15        parser.add_argument('--alpha', default=1,
16            type=float, required=False, help='学习率')
17        return parser.parse_args()
```

## 原始实验：

```
1 #脚本命令
2 Date=`date +%y%m%d`
3 echo "1.sh back begin at `date +%H:%M:%S`" >>
out.log
4 nohup python -u train_transe_FB15K237.py --margin=5 --nbatches=100 --dim=100 --p_norm=1 --train_times=1000 --alpha=1 >
logs='./result/transe/transe(5,100,100,1,1000,1).log'
5 echo "1.sh back end at `date +%H:%M:%S`" >>
out.log
```

- 效果呈现：

```
2007 Epoch 997 | loss: 0.207091: 100%|██████████| 998/1000 [10:49<00:01, 1.56it/s]
2008 Epoch 998 | loss: 0.213130: 100%|██████████| 998/1000 [10:49<00:01, 1.56it/s]
2009 Epoch 998 | loss: 0.213130: 100%|██████████| 999/1000 [10:49<00:00, 1.56it/s]
2010 Epoch 999 | loss: 0.210327: 100%|██████████| 999/1000 [10:50<00:00, 1.56it/s]
2011 Epoch 999 | loss: 0.210327: 100%|██████████| 1000/1000 [10:50<00:00, 1.56it/s]
2012 Epoch 999 | loss: 0.210327: 100%|██████████| 1000/1000 [10:50<00:00, 1.54it/s]
```

```
2013
2086 100%|██████████| 3120/3134 [00:07<00:00, 452.21it/s]
2087 100%|██████████| 3134/3134 [00:07<00:00, 406.18it/s]
2088 no type constraint results:
2089 metric:      MRR      MR      hit@10    hit@3      hit@1
2090 l(raw):     0.138370    5158.203613   0.419272    0.226548    0.000319
2091 r(raw):     0.159494    3496.497559   0.477026    0.247926    0.006063
2092 averaged(raw): 0.148932    4327.350586   0.448149    0.237237    0.003191
2093
2094 l(filter): 0.193350    5134.768555   0.451181    0.367581    0.001276
2095 r(filter): 0.210217    3491.129883   0.493618    0.384812    0.010530
2096 averaged(filter): 0.201783    4312.949219   0.472399    0.376197    0.005903
2097 0.472399
2098 0.4723994731903076
```

## 改变margin为4

```

1 Date=`date +%y%m%d`
2 echo "2.sh back begin at `date +%H:%M:%S`" >>
out.log
3 nohup python -u train_transe_FB15K237.py --
margin=4 --nbatches=100 --dim=100 --p_norm=1 --
train_times=1000 --alpha=1 >
logs='./result/transe/transe(4,100,100,1,1000,1).1
og'
4 echo "2.sh back end at `date +%H:%M:%S`" >>
out.log

```

Epoch	loss	Time	Speed
2006	0.065870	[10:54<00:01,	1.52it/s]
2007	0.065870	[10:54<00:01,	1.52it/s]
2008	0.069522	[10:55<00:01,	1.52it/s]
2009	0.069522	[10:55<00:00,	1.53it/s]
2010	0.068871	[10:56<00:00,	1.53it/s]
2011	0.068871	[10:56<00:00,	1.54it/s]
2012	0.068871	[10:56<00:00,	1.52it/s]

Epoch	loss	Time	Speed
2088	100%	3134/3134 [00:07<00:00,	395.70it/s]
2089	no type constraint results:		
2090	metric: MRR MR hit@10 hit@3 hit@1		
2091	l(raw): 0.133139 5983.143555 0.407467 0.220485 0.000000		
2092	r(raw): 0.149238 3621.848145 0.458519 0.233567 0.004467		
2093	averaged(raw): 0.141189 4802.496094 0.432993 0.227026 0.002234		
2094	l(filter): 0.189913 5959.667969 0.434269 0.366305 0.001276		
2095	r(filter): 0.199787 3616.461670 0.471602 0.375877 0.005105		
2096	averaged(filter): 0.194850 4788.064941 0.452936 0.371091 0.003191		
2097	0.452936		
2098	0.4529355466365814		

- 虽然loss降得很低，但是测试结果却发生了一定下降，所以该参数条件下造成了过拟合

## 改变p\_norm为2

Epoch	loss	Time	Speed
2004	400.414801	[10:56<00:02,	1.58it/s]
2005	400.414801	[10:56<00:01,	1.55it/s]
2006	400.444719	[10:56<00:01,	1.55it/s]
2007	400.444719	[10:56<00:01,	1.54it/s]
2008	400.467891	[10:57<00:01,	1.54it/s]
2009	400.467891	[10:57<00:00,	1.53it/s]
2010	400.370608	[10:58<00:00,	1.53it/s]
2011	400.370608	[10:58<00:00,	1.51it/s]
2012	400.370608	[10:58<00:00,	1.52it/s]

```

2095 | 99%|██████████| 3118/3134 [00:08<00:00, 468.29it/s]
2096 | 100%|██████████| 3134/3134 [00:08<00:00, 367.20it/s]
2097 no type constraint results:
2098 metric:      MRR      MR      hit@10    hit@3      hit@1
2099 l(raw):     0.028054   6113.328613  0.057435    0.029036   0.012125
2100 r(raw):     0.064897   4102.169922  0.127632    0.066369   0.034142
2101 averaged(raw): 0.046476   5107.749023  0.092534    0.047703   0.023133
2102
2103 l(filter):  0.042108   6095.167969  0.073389    0.043714   0.024888
2104 r(filter):  0.069423   4098.048340  0.130504    0.069241   0.039566
2105 averaged(filter): 0.055766   5096.608398  0.101946    0.056477   0.032227
2106 0.101946
2107 0.1019463986158371
2108

```

- 用 $l_2$ 范数发现效果显著下降，这说明 $l_2$ 范数明显不适合此次实验

## 变维数为200

```

1 Date=`date +%y%m%d` 
2 echo "5.sh back begin at `date +%H:%M:%S`" >>
out.log
3
4 nohup python -u train_transe_FB15K237.py --
margin=5 --nbatches=200 --dim=100 --p_norm=1 --
train_times=1000 --alpha=1 >
logs='./result/transe/transe(5,200,100,1,1000,1).log'
5 echo "5.sh back end at `date +%H:%M:%S`" >>
out.log

```

```

2005 Epoch 996 | loss: 0.051217: 100%|██████████| 997/1000 [13:39<00:02, 1.22it/s]
2006 Epoch 997 | loss: 0.048420: 100%|██████████| 997/1000 [13:39<00:02, 1.22it/s]
2007 Epoch 997 | loss: 0.048420: 100%|██████████| 998/1000 [13:39<00:01, 1.22it/s]
2008 Epoch 998 | loss: 0.053169: 100%|██████████| 998/1000 [13:40<00:01, 1.22it/s]
2009 Epoch 998 | loss: 0.053169: 100%|██████████| 999/1000 [13:40<00:00, 1.22it/s]
2010 Epoch 999 | loss: 0.053974: 100%|██████████| 999/1000 [13:41<00:00, 1.22it/s]
2011 Epoch 999 | loss: 0.053974: 100%|██████████| 1000/1000 [13:41<00:00, 1.22it/s]
2012 Epoch 999 | loss: 0.053974: 100%|██████████| 1000/1000 [13:41<00:00, 1.22it/s]
2013

```

```

2101 | 97%|██████████| 3036/3134 [00:09<00:00, 339.45it/s]
2102 | 98%|██████████| 3072/3134 [00:09<00:00, 343.01it/s]
2103 | 99%|██████████| 3116/3134 [00:09<00:00, 368.96it/s]
2104 | 100%|██████████| 3134/3134 [00:09<00:00, 326.01it/s]
2105 no type constraint results:
2106 metric:      MRR      MR      hit@10      hit@3      hit@1
2107 l(raw):      0.131014    6682.884277   0.408424    0.216018    0.000000
2108 r(raw):      0.147385    3212.349121   0.454052    0.228462    0.004148
2109 averaged(raw): 0.139199    4947.616699   0.431238    0.222240    0.002074
2110
2111 l(filter):   0.189673    6659.300781   0.434588    0.365029    0.001595
2112 r(filter):   0.200265    3206.929443   0.468092    0.376197    0.004786
2113 averaged(filter): 0.194969    4933.115234   0.451340    0.370613    0.003191
2114 0.451340
2115 0.4513401389122009

```

- 200dim效果并不好，且增加计算开销，所以200 dim不适合

## 改变n\_batches为200

```

1 Date=`date +%y%m%d` 
2 echo "5.sh back begin at `date +%H:%M:%S`" >>
out.log
3
4 nohup python -u train_transe_FB15k237.py -- 
margin=5 --nbatches=200 --dim=100 --p_norm=1 -- 
train_times=1000 --alpha=1 > 
logs./result/transe/transe(5,200,100,1,1000,1).1 
og'
5 echo "5.sh back end at `date +%H:%M:%S`" >>
out.log

```

2005	Epoch 996	loss: 0.441036: 100%	██████████	997/1000	[17:54<00:03, 1.09s/it]
2006	Epoch 997	loss: 0.441166: 100%	██████████	997/1000	[17:55<00:03, 1.09s/it]
2007	Epoch 997	loss: 0.441166: 100%	██████████	998/1000	[17:55<00:02, 1.08s/it]
2008	Epoch 998	loss: 0.441047: 100%	██████████	998/1000	[17:56<00:02, 1.08s/it]
2009	Epoch 998	loss: 0.441047: 100%	██████████	999/1000	[17:56<00:01, 1.08s/it]
2010	Epoch 999	loss: 0.437477: 100%	██████████	999/1000	[17:57<00:01, 1.08s/it]
2011	Epoch 999	loss: 0.437477: 100%	██████████	1000/1000	[17:57<00:00, 1.09s/it]
2012	Epoch 999	loss: 0.437477: 100%	██████████	1000/1000	[17:57<00:00, 1.08s/it]
2013					

```

2095 100%|██████████| 3122/3134 [00:08<00:00, 393.27it/s]
2096 100%|██████████| 3134/3134 [00:08<00:00, 361.24it/s]
2097 no type constraint results:
2098 metric:      MRR      MR     hit@10    hit@3    hit@1
2099 l(raw):      0.138690   5034.560547   0.421506   0.228143   0.000319
2100 r(raw):      0.159422   3353.724365   0.475431   0.248883   0.007658
2101 averaged(raw): 0.149056   4194.142578   0.448468   0.238513   0.003989
2102
2103 l(filter):   0.195667   5011.101562   0.451819   0.372048   0.002553
2104 r(filter):   0.209843   3348.364746   0.488832   0.380664   0.012125
2105 averaged(filter): 0.202755   4179.733398   0.470325   0.376356   0.007339
2106 0.470325
2107 0.4703254699707031

```

- 200 batch效果有所下降

## 学习率调为0.5

```

1 Date=`date +%y%m%d`
2 echo "6.sh back begin at `date +%H:%M:%S`" >>
out.log
3
4 nohup python -u train_transe_FB15K237.py --
margin=5 --nbatches=100 --dim=100 --p_norm=1 --
train_times=1000 --alpha=0.5 >
logs './result/transe/transe(5,100,100,1,1000,0.5)
.log'
5 echo "6.sh back end at `date +%H:%M:%S`" >>
out.log

```

2003	Epoch 995   loss: 0.208036: 100%	██████████	996/1000 [10:12<00:02, 1.64it/s]
2004	Epoch 996   loss: 0.205459: 100%	██████████	996/1000 [10:13<00:02, 1.64it/s]
2005	Epoch 996   loss: 0.205459: 100%	██████████	997/1000 [10:13<00:01, 1.62it/s]
2006	Epoch 997   loss: 0.201967: 100%	██████████	997/1000 [10:14<00:01, 1.62it/s]
2007	Epoch 997   loss: 0.201967: 100%	██████████	998/1000 [10:14<00:01, 1.60it/s]
2008	Epoch 998   loss: 0.209225: 100%	██████████	998/1000 [10:14<00:01, 1.60it/s]
2009	Epoch 998   loss: 0.209225: 100%	██████████	999/1000 [10:14<00:00, 1.61it/s]
2010	Epoch 999   loss: 0.207769: 100%	██████████	999/1000 [10:15<00:00, 1.61it/s]
2011	Epoch 999   loss: 0.207769: 100%	██████████	1000/1000 [10:15<00:00, 1.63it/s]
2012	Epoch 999   loss: 0.207769: 100%	██████████	1000/1000 [10:15<00:00, 1.63it/s]

```

2087 | 99%|██████████| 3103/3134 [00:07<00:00, 394.64it/s]
2088 100%|██████████| 3134/3134 [00:07<00:00, 398.11it/s]
2089 no type constraint results:
2090 metric:      MRR      MR      hit@10      hit@3      hit@1
2091 l(raw):      0.139823   5140.723145   0.421187   0.230696   0.000000
2092 r(raw):      0.158415   3528.097412   0.479579   0.250479   0.006063
2093 averaged(raw): 0.149119   4334.410156   0.450383   0.240587   0.003031
2094
2095 l(filter):   0.196255   5117.284180   0.454690   0.370134   0.002872
2096 r(filter):   0.210339   3522.729736   0.494576   0.385769   0.011168
2097 averaged(filter): 0.203297   4320.006836   0.474633   0.377952   0.007020
2098 0.474633
2099 0.47463303804397583

```

- 学习率降低后，效果有一定上升

## epoch调维500

```

1 Date=`date +%y%m%d` 
2 echo "7.sh back begin at `date +%H:%M:%S`" >>
out.log
3
4 nohup python -u train_transe_FB15K237.py --
margin=5 --nbatches=100 --dim=100 --p_norm=1 --
train_times=500 --alpha=1 >
logs='./result/transe/transe(5,100,100,1,500,1).log'
5 echo "7.sh back end at `date +%H:%M:%S`" >>
out.log

```

```

1005 Epoch 496 | loss: 0.265535: 99%|██████████| 497/500 [05:06<00:01, 1.67it/s]
1006 Epoch 497 | loss: 0.271473: 99%|██████████| 497/500 [05:07<00:01, 1.67it/s]
1007 Epoch 497 | loss: 0.271473: 100%|██████████| 498/500 [05:07<00:01, 1.67it/s]
1008 Epoch 498 | loss: 0.268631: 100%|██████████| 498/500 [05:08<00:01, 1.67it/s]
1009 Epoch 498 | loss: 0.268631: 100%|██████████| 499/500 [05:08<00:00, 1.67it/s]
1010 Epoch 499 | loss: 0.251173: 100%|██████████| 499/500 [05:08<00:00, 1.67it/s]
1011 Epoch 499 | loss: 0.251173: 100%|██████████| 500/500 [05:08<00:00, 1.67it/s]
1012 Epoch 499 | loss: 0.251173: 100%|██████████| 500/500 [05:08<00:00, 1.62it/s]

```

```

1086 | 99%|██████████| 3118/3134 [00:07<00:00, 446.40it/s]
1087 100%|██████████| 3134/3134 [00:07<00:00, 405.24it/s]
1088 no type constraint results:
1089 metric:      MRR      MR      hit@10    hit@3      hit@1
1090 l(raw):     0.136213   4858.082520   0.421825   0.218571   0.000000
1091 r(raw):     0.155674   3397.925293   0.473197   0.238034   0.007339
1092 averaged(raw): 0.145943   4128.003906   0.447511   0.228302   0.003669
1093
1094 l(filter):  0.192871   4834.606445   0.454052   0.364071   0.001914
1095 r(filter):  0.207637   3392.539551   0.488832   0.378430   0.012125
1096 averaged(filter): 0.200254   4113.573242   0.471442   0.371251   0.007020
1097 0.471442
1098 0.47144225239753723
1099

```

- 发现训练500 epoch的loss降低了一半，且测试结果与原始条件相差甚微，所以预估训练的最佳epoch在500~1000epochs

## Transh

### 原始条件

```

1 Date=`date +%y%m%d` 
2 echo "8.sh back begin at `date +%H:%M:%S`" >>
out.log
3
4 nohup python -u train_transh_FB15K237.py --
margin=4 --nbatches=100 --dim=100 --p_norm=1 --
train_times=1000 --alpha=0.5 >
logs='./result/transh/transh(4,100,100,1,1000,0.5)
.log'
5 echo "8.sh back end at `date +%H:%M:%S`" >>
out.log

```

```

2119 100% [██████████] 3122/3134 [00:11<00:00, 312.95it/s]
2120 100% [██████████] 3134/3134 [00:11<00:00, 266.22it/s]
2121 no type constraint results:
2122 metric: MRR MR hit@10 hit@3 hit@1
2123 l(raw): 0.134871 6491.286621 0.409700 0.228143 0.000000
2124 r(raw): 0.149951 3728.079102 0.455967 0.240587 0.005105
2125 averaged(raw): 0.142411 5109.682617 0.432833 0.234365 0.002553
2126
2127 l(filter): 0.192379 6467.757324 0.434269 0.374920 0.001595
2128 r(filter): 0.203356 3722.689453 0.467773 0.380664 0.007020
2129 averaged(filter): 0.197868 5095.223633 0.451021 0.377792 0.004308
2130 0.451021
2131 0.45102107524871826

```

## margin改为5

```

1 Date=`date +%y%m%d` echo "9.sh back begin at `date
+H:%M:%S`" >> out.lognohup python -u
train_transh_FB15K237.py --margin=5 --nbatches=100
--dim=100 --p_norm=1 --train_times=1000 --
alpha=0.5 >
logs './result/transh/transh(5,100,100,1,1000,0.5)
.log' echo "9.sh back end at `date +H:%M:%S`" >>
out.log

```

```

2003 Epoch 995 | loss: 0.187397: 100% [██████████] 996/1000 [16:19<00:03, 1.12it/s]
2004 Epoch 996 | loss: 0.178820: 100% [██████████] 996/1000 [16:20<00:03, 1.12it/s]
2005 Epoch 996 | loss: 0.178820: 100% [██████████] 997/1000 [16:20<00:02, 1.13it/s]
2006 Epoch 997 | loss: 0.178085: 100% [██████████] 997/1000 [16:21<00:02, 1.13it/s]
2007 Epoch 997 | loss: 0.178085: 100% [██████████] 998/1000 [16:21<00:01, 1.09it/s]
2008 Epoch 998 | loss: 0.183935: 100% [██████████] 998/1000 [16:22<00:01, 1.09it/s]
2009 Epoch 998 | loss: 0.183935: 100% [██████████] 999/1000 [16:22<00:00, 1.09it/s]
2010 Epoch 999 | loss: 0.183669: 100% [██████████] 999/1000 [16:23<00:00, 1.09it/s]
2011 Epoch 999 | loss: 0.183669: 100% [██████████] 1000/1000 [16:23<00:00, 1.11it/s]
2012 Epoch 999 | loss: 0.183669: 100% [██████████] 1000/1000 [16:23<00:00, 1.02it/s]
2013

```

```

2121 99% [██████████] 3113/3134 [00:11<00:00, 261.95it/s]
2122 100% [██████████] 3134/3134 [00:11<00:00, 263.24it/s]
2123 no type constraint results:
2124 metric: MRR MR hit@10 hit@3 hit@1
2125 l(raw): 0.138006 5210.297852 0.422463 0.228462 0.000000
2126 r(raw): 0.159668 3527.291260 0.477664 0.249840 0.007339
2127 averaged(raw): 0.148837 4368.794434 0.450064 0.239151 0.003669
2128
2129 l(filter): 0.195326 5186.865234 0.451819 0.371729 0.002234
2130 r(filter): 0.212261 3521.917725 0.492342 0.386088 0.012125
2131 averaged(filter): 0.203794 4354.391602 0.472080 0.378909 0.007179
2132 0.472080
2133 0.47208040952682495

```

- 效果强于原始条件，有较大提升

## n\_batches改为200

```
1 Date=`date +%y%m%d`echo "10.sh back begin at `date
+H:M:S`" >> out.lognohup python -u
train_transh_FB15K237.py --margin=4 --nbatches=200
--dim=100 --p_norm=1 --train_times=1000 --
alpha=0.5 >
logs./result/transh/transh(4,200,100,1,1000,0.5)
.log'echo "10.sh back end at `date +H:M:S`" >>
out.log
```

```
2007 Epoch 997 | loss: 0.124270: 100%|██████| 998/1000 [27:44<00:04, 2.47s/it]
2008 Epoch 998 | loss: 0.120987: 100%|██████| 998/1000 [27:46<00:04, 2.47s/it]
2009 Epoch 998 | loss: 0.120987: 100%|██████| 999/1000 [27:46<00:02, 2.35s/it]
2010 Epoch 999 | loss: 0.121911: 100%|██████| 999/1000 [27:48<00:02, 2.35s/it]
2011 Epoch 999 | loss: 0.121911: 100%|██████| 1000/1000 [27:48<00:00, 2.24s/it]
2012 Epoch 999 | loss: 0.121911: 100%|██████| 1000/1000 [27:48<00:00, 1.67s/it]
```

```
2130 100%|██████████| 3134/3134 [00:13<00:00, 228.13it/s]
2131 no type constraint results:
2132 metric: MRR MR hit@10 hit@3 hit@1
2133 l(raw): 0.133892 6120.731445 0.406509 0.224633 0.000000
2134 r(raw): 0.150489 3729.130615 0.447990 0.244097 0.005424
2135 averaged(raw): 0.142190 4924.931152 0.427250 0.234365 0.002712
2136
2137 l(filter): 0.190570 6097.273926 0.431078 0.370453 0.001914
2138 r(filter): 0.202768 3723.750488 0.461391 0.381940 0.007020
2139 averaged(filter): 0.196669 4910.512207 0.446235 0.376197 0.004467
2140 0.446235
2141 0.4462348222732544
```

- 无显著提升，但至少没有过拟合

## dim改为200

```
1 Date=`date +%y%m%d`echo "11.sh back begin at `date
+H:M:S`" >> out.lognohup python -u
train_transh_FB15K237.py --margin=4 --nbatches=100
--dim=200 --p_norm=1 --train_times=1000 --
alpha=0.5 >
logs./result/transh/transh(4,100,200,1,1000,0.5)
.log'echo "11.sh back end at `date +H:M:S`" >>
out.log
```

2005	Epoch 996   loss: 0.030468: 100%	997/1000 [20:40<00:03, 1.11s/it]
2006	Epoch 997   loss: 0.029040: 100%	997/1000 [20:41<00:03, 1.11s/it]
2007	Epoch 997   loss: 0.029040: 100%	998/1000 [20:41<00:02, 1.10s/it]
2008	Epoch 998   loss: 0.031466: 100%	998/1000 [20:42<00:02, 1.10s/it]
2009	Epoch 998   loss: 0.031466: 100%	999/1000 [20:42<00:01, 1.09s/it]
2010	Epoch 999   loss: 0.031822: 100%	999/1000 [20:43<00:01, 1.09s/it]
2011	Epoch 999   loss: 0.031822: 100%	1000/1000 [20:43<00:00, 1.09s/it]
2012	Epoch 999   loss: 0.031822: 100%	1000/1000 [20:43<00:00, 1.24s/it]

```

2190 100%|██████████| 3133/3134 [00:24<00:00, 91.52it/s]
2191 100%|██████████| 3134/3134 [00:24<00:00, 125.39it/s]
2192 no type constraint results:
2193 metric:      MRR      MR     hit@10    hit@3    hit@1
2194 l(raw): 0.125150 7965.114258 0.391512 0.206126 0.000000
2195 r(raw): 0.139344 3804.763184 0.432355 0.223676 0.001595
2196 averaged(raw): 0.132247 5884.938477 0.411934 0.214901 0.000798
2197
2198 l(filter): 0.182157 7941.565918 0.409381 0.355456 0.000957
2199 r(filter): 0.192034 3799.331543 0.441927 0.368220 0.001914
2200 averaged(filter): 0.187096 5870.448730 0.425654 0.361838 0.001436
2201 0.425654
2202 0.4256541132926941

```

- 发生了严重过拟合

## p\_norm改为2

```

1 Date=`date +%y%m%d`echo "12.sh back begin at `date
+%H:%M:%S`" >> out.lognohup python -u
train_transh_FB15K237.py --margin=4 --nbatches=100
--dim=100 --p_norm=2 --train_times=1000 --
alpha=0.5 >
logs./result/transh/transh(4,100,100,2,1000,0.5)
.log'echo "12.sh back end at `date +%H:%M:%S`" >>
out.log

```

2005	Epoch 996   loss: 290.810003: 100%	997/1000 [16:26<00:02, 1.15it/s]
2006	Epoch 997   loss: 290.803325: 100%	997/1000 [16:27<00:02, 1.15it/s]
2007	Epoch 997   loss: 290.803325: 100%	998/1000 [16:27<00:01, 1.15it/s]
2008	Epoch 998   loss: 291.046695: 100%	998/1000 [16:27<00:01, 1.15it/s]
2009	Epoch 998   loss: 291.046695: 100%	999/1000 [16:27<00:00, 1.13it/s]
2010	Epoch 999   loss: 290.985742: 100%	999/1000 [16:28<00:00, 1.13it/s]
2011	Epoch 999   loss: 290.985742: 100%	1000/1000 [16:28<00:00, 1.14it/s]
2012	Epoch 999   loss: 290.985742: 100%	1000/1000 [16:28<00:00, 1.01it/s]

```

2125 100%|██████████| 3134/3134 [00:12<00:00, 258.03it/s]
2126 no type constraint results:
2127 metric: MRR MR hit@10 hit@3 hit@1
2128 l(raw): 0.012927 7268.114746 0.030632 0.012125 0.002553
2129 r(raw): 0.043794 6866.465820 0.082642 0.046586 0.021378
2130 averaged(raw): 0.028360 7067.290039 0.056637 0.029355 0.011966
2131
2132 l(filter): 0.021719 7247.605469 0.042119 0.022655 0.009572
2133 r(filter): 0.046703 6861.593262 0.083599 0.048500 0.025207
2134 averaged(filter): 0.034211 7054.599609 0.062859 0.035578 0.017390
2135 0.062859
2136 0.06285896897315979
2137

```

- 整个模型都坏掉，实在不适合

## epoch改为500

```

1 Date=`date +%y%m%d` echo "13.sh back begin at `date
+%H:%M:%S`" >> out.log nohup python -u
train_transh_FB15K237.py --margin=4 --nbatches=100
--dim=100 --p_norm=1 --train_times=500 --alpha=0.5
>
logs='./result/transh/transh(4,100,100,1,500,0.5).
log'echo "13.sh back end at `date +%H:%M:%S`" >>
out.log

```

Epoch	loss	Time	Progress	ETA	Speed
1006	Epoch 497   loss: 0.080395: 99%	497/500	[08:37<00:02,	1.06it/s]	
1007	Epoch 497   loss: 0.080395: 100%	498/500	[08:37<00:01,	1.05it/s]	
1008	Epoch 498   loss: 0.081110: 100%	498/500	[08:37<00:01,	1.05it/s]	
1009	Epoch 498   loss: 0.081110: 100%	499/500	[08:37<00:00,	1.08it/s]	
1010	Epoch 499   loss: 0.073310: 100%	499/500	[08:38<00:00,	1.08it/s]	
1011	Epoch 499   loss: 0.073310: 100%	500/500	[08:38<00:00,	1.07it/s]	
1012	Epoch 499   loss: 0.073310: 100%	500/500	[08:38<00:00,	1.04s/it]	
1013					

```

1116 | 99%|██████████| 3116/3134 [00:11<00:00, 300.85it/s]
1117 100%|██████████| 3134/3134 [00:11<00:00, 276.56it/s]
1118 no type constraint results:
1119 metric: MRR MR hit@10 hit@3 hit@1
1120 l(raw): 0.131306 6369.646484 0.404595 0.216656 0.000000
1121 r(raw): 0.151146 4088.569580 0.447990 0.240906 0.006382
1122 averaged(raw): 0.141226 5229.107910 0.426292 0.228781 0.003191
1123
1124 l(filter): 0.189459 6346.155762 0.431398 0.366624 0.002553
1125 r(filter): 0.203111 4083.173340 0.460753 0.376516 0.011487
1126 averaged(filter): 0.196285 5214.664551 0.446075 0.371570 0.007020
1127 0.446075
1128 0.44607532024383545

```

- 效果一般，感觉有点欠拟合

# 学习率改为1

```
1 Date=`date +%y%m%d`echo "14.sh back begin at `date
+%H:%M:%S`" >> out.lognohup python -u
train_transh_FB15K237.py --margin=4 --nbatches=100
--dim=100 --p_norm=1 --train_times=1000 --alpha=1
>
logs='./result/transh/transh(4,100,100,1,1000,1).1
og'echo "14.sh back end at `date +%H:%M:%S`" >>
out.log
```

```
2005 Epoch 996 | loss: 0.062057: 100%|██████████| 997/1000 [16:34<00:02, 1.11it/s]
2006 Epoch 997 | loss: 0.060758: 100%|██████████| 997/1000 [16:35<00:02, 1.11it/s]
2007 Epoch 997 | loss: 0.060758: 100%|██████████| 998/1000 [16:35<00:01, 1.12it/s]
2008 Epoch 998 | loss: 0.064736: 100%|██████████| 998/1000 [16:35<00:01, 1.12it/s]
2009 Epoch 998 | loss: 0.064736: 100%|██████████| 999/1000 [16:35<00:00, 1.13it/s]
2010 Epoch 999 | loss: 0.065083: 100%|██████████| 999/1000 [16:36<00:00, 1.13it/s]
2011 Epoch 999 | loss: 0.065083: 100%|██████████| 1000/1000 [16:36<00:00, 1.15it/s]
2012 Epoch 999 | loss: 0.065083: 100%|██████████| 1000/1000 [16:36<00:00, 1.00it/s]
2013 |
```

```
2113 100%|██████████| 3126/3134 [00:10<00:00, 272.02it/s]
2114 100%|██████████| 3134/3134 [00:10<00:00, 287.48it/s]
2115 no type constraint results:
2116 metric: MRR MR hit@10 hit@3 hit@1
2117 l(raw): 0.135098 6139.355469 0.408743 0.228781 0.000000
2118 r(raw): 0.147974 3716.475830 0.449585 0.230696 0.004467
2119 averaged(raw): 0.141536 4927.915527 0.429164 0.229738 0.002234
2120
2121 l(filter): 0.191477 6115.862305 0.432036 0.371729 0.001276
2122 r(filter): 0.199862 3711.073486 0.462029 0.373325 0.005105
2123 averaged(filter): 0.195670 4913.467773 0.447033 0.372527 0.003191
2124 0.447033
2125 0.4470325708389282
2126
```

- 过拟合

## week6

NVIDIA Tesla K80  
ID: wza7GV ● 已释放

<b>硬件信息</b> GPU: NVIDIA Tesla K80 每秒浮点运算次数: 1.37 TFLOPS 显卡内存: 12 GB	<b>租用配置</b> 镜像: Keras 2.2 & Tensorflow 1.13.1 GP... 镜像描述: 预装: Python 3.5, CUDA 10.0,... 挂载: /mnt	<b>总计: ¥5.12</b> 折扣价: ¥ 1.00/小时 原价: ¥ 1.99/小时 租用开始于: 2021-12-06 15:03
--	---	--

# 分别使用EN\_FR\_15K\_V2的split1和 EN\_DE\_15K\_V2的split2来运行MTransE， 记录使用的命令和结果

## EN\_FR\_15K\_V2的split1

```
1 | python main_from_args.py
    ../args/mtranse_args_15K.json EN_FR_15K_V2
    721_5fold/1/
```

```
epoch 177, avg. mapping loss: 0.2076, cost time: 1.6305s
epoch 178, avg. triple loss: 0.2771, cost time: 2.4821s
epoch 178, avg. mapping loss: 0.1956, cost time: 1.6316s
epoch 179, avg. triple loss: 0.2765, cost time: 2.4742s
epoch 179, avg. mapping loss: 0.2093, cost time: 1.6333s
epoch 180, avg. triple loss: 0.2759, cost time: 2.4848s
epoch 180, avg. mapping loss: 0.1992, cost time: 1.5824s
quick results: hits@[1, 5, 10, 50] = [24. 41.6 49.2 67. ]%, time = 0.726 s

== should early stop ==

Training ends. Total time = 785.819 s.
accurate results: hits@[1, 5, 10, 50] = [22.952 41.914 50.6 69.667]%, mrr = 217.770, mrrr = 0.321593, time = 9.100 s
accurate results with csls: csls=10, hits@[1, 5, 10, 50] = [32.648 55.105 64.562 82.933]%, mrr = 67.767, mrrr = 0.433668, time = 12.716 s
Results saved!
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg1_ent_ids saved.
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg2_ent_ids saved.
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg1_rel_ids saved.
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg2_rel_ids saved.
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg1_attr_ids saved.
....../output/results/MTransE/EN_FR_15K_V2/721_5fold/1/20211206105908/kg2_attr_ids saved.
Embeddings saved!
Total run time = 824.684 s.
openEa2@root@58a6f813cf09:/mnt/OpenEA-master/run#
```

> EN_DE_15K_V2\721_5fold\2\202112061...	1   http://dbpedia.org/resource/E245396 0
└ EN_FR_15K_V2\721_5fold\1\202112061...	2   http://dbpedia.org/resource/E292763 2
↳ alignment_results_12	3   http://dbpedia.org/resource/E172224 4
↳ ent_embeds.npy	4   http://dbpedia.org/resource/E206541 6
↳ kg1_attr_ids	5   http://dbpedia.org/resource/E388971 8
↳ kg1_ent_embeds.txt	6   http://dbpedia.org/resource/E204061 10
❸ kg1_ent_ids	7   http://dbpedia.org/resource/E380309 12
↳ kg1_rel_embeds.txt	8   http://dbpedia.org/resource/E269014 14
↳ kg1_rel_ids	9   http://dbpedia.org/resource/E145920 16
↳ kg2_attr_ids	10   http://dbpedia.org/resource/E612528 18
↳ kg2_ent_embeds.txt	11   http://dbpedia.org/resource/E061882 20
↳ kg2_ent_ids	12   http://dbpedia.org/resource/E917119 22
↳ kg2_rel_embeds.txt	13   http://dbpedia.org/resource/E891999 24

✓ MTRANSE	EN_FR_15K_V2 > 721_5fold > 1 > 20211206105908 > kg2_ent_ids
> EN_DE_15K_V2	1   http://fr.dbpedia.org/resource/E294655 1
└ EN_FR_15K_V2\721_5fold\1\202112061...	2   http://fr.dbpedia.org/resource/E791059 3
↳ alignment_results_12	3   http://fr.dbpedia.org/resource/E319827 5
↳ ent_embeds.npy	4   http://fr.dbpedia.org/resource/E924195 7
↳ kg1_attr_ids	5   http://fr.dbpedia.org/resource/E481752 9
↳ kg1_ent_embeds.txt	6   http://fr.dbpedia.org/resource/E098676 11
❸ kg1_ent_ids	7   http://fr.dbpedia.org/resource/E859836 13
↳ kg1_rel_embeds.txt	8   http://fr.dbpedia.org/resource/E313692 15
↳ kg1_rel_ids	9   http://fr.dbpedia.org/resource/E455185 17
↳ kg2_attr_ids	10   http://fr.dbpedia.org/resource/E125020 19
↳ kg2_ent_embeds.txt	11   http://fr.dbpedia.org/resource/E988247 21
❷ kg2_ent_ids	12   http://fr.dbpedia.org/resource/E851859 23
↳ kg2_rel_embeds.txt	13   http://fr.dbpedia.org/resource/E812144 25
↳ kg2_rel_ids	14   http://fr.dbpedia.org/resource/E5767008 27

# EN\_DE\_15K\_V2的split2

```
1 | python main_from_args.py  
    ./args/mtranse_args_15K.json EN_DE_15K_V2  
    721_5fold/2/]
```

```
epoch 1/0, avg. triple loss: 0.0/10, cost time: 2.426/s  
epoch 170, avg. mapping loss: 0.0911, cost time: 1.5808s  
quick results: hits@[1, 5, 10, 50] = [19.533 34.133 42.733 64.067]%, time = 0.746 s  
== should early stop ==  
  
Training ends. Total time = 700.301 s.  
accurate results: hits@[1, 5, 10, 50] = [20.705 37.124 44.99 67.162]%, mr = 179.597, mrr = 0.290044, time = 9.313 s  
accurate results with cscls: cscls=10, hits@[1, 5, 10, 50] = [26.41 45.99 55.219 77.143]%, mr = 98.254, mrr = 0.360881, time = 12.964 s  
Results saved!  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg1_ent_ids saved.  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg2_ent_ids saved.  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg1_rel_ids saved.  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg2_rel_ids saved.  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg1_attr_ids saved.  
....output/results/MTransE/EN_DE_15K_V2/721_5fold/2/20211206111639/kg2_attr_ids saved.  
Embeddings saved!  
Total run time = 742.507 s.  
(openne2) root@58a6f813cf09:/mnt/OpenEA-master/run#
```

MTRANSE	EN_DE_15K_V2 > 721_5fold > 2 > 20211206111639 > kg1_ent_ids
EN_DE_15K_V2\721_5fold\2\202112061...	
alignment_results_12	1 http://dbpedia.org/resource/E156265 0
ent_embeds.npy	2 http://dbpedia.org/resource/E940714 2
kg1_attr_ids	3 http://dbpedia.org/resource/E737899 4
kg1_ent_embeds_txt	4 http://dbpedia.org/resource/E183425 6
kg1_ent_ids	5 http://dbpedia.org/resource/E832030 8
kg1_rel_embeds_txt	6 http://dbpedia.org/resource/E036271 10
kg1_rel_ids	7 http://dbpedia.org/resource/E507224 12
kg2_attr_ids	8 http://dbpedia.org/resource/E004640 14
kg2_ent_embeds_txt	9 http://dbpedia.org/resource/E021511 16
kg2_ent_ids	10 http://dbpedia.org/resource/E095770 18
kg2_rel_embeds_txt	11 http://dbpedia.org/resource/E030112 20
kg2_rel_ids	12 http://dbpedia.org/resource/E805323 22
mapping_mat.npy	13 http://dbpedia.org/resource/E014986 24
rel_embeds.npy	14 http://dbpedia.org/resource/E506020 26
EN_FR_15K_V2	15 http://dbpedia.org/resource/E397777 28
	16 http://dbpedia.org/resource/E537013 30
	17 http://dbpedia.org/resource/E635776 32

TRANSE	EN_DE_15K_V2 > 721_5fold > 2 > 20211206111639 > kg2_ent_ids
EN_DE_15K_V2\721_5fold\2\202112061...	
alignment_results_12	1 http://de.dbpedia.org/resource/E209564 1
ent_embeds.npy	2 http://de.dbpedia.org/resource/E326381 3
kg1_attr_ids	3 http://de.dbpedia.org/resource/E931673 5
kg1_ent_embeds_txt	4 http://de.dbpedia.org/resource/E424305 7
kg1_ent_ids	5 http://de.dbpedia.org/resource/E052472 9
kg1_rel_embeds_txt	6 http://de.dbpedia.org/resource/E402418 11
kg1_rel_ids	7 http://de.dbpedia.org/resource/E994111 13
kg2_attr_ids	8 http://de.dbpedia.org/resource/E058102 15
kg2_ent_embeds_txt	9 http://de.dbpedia.org/resource/E897209 17
kg2_ent_ids	10 http://de.dbpedia.org/resource/E062375 19
kg2_rel_embeds_txt	11 http://de.dbpedia.org/resource/E263036 21
kg2_rel_ids	12 http://de.dbpedia.org/resource/E012750 23
mapping_mat.npy	13 http://de.dbpedia.org/resource/E088518 25
rel_embeds.npy	14 http://de.dbpedia.org/resource/E973424 27
EN_FR_15K_V2\721_5fold\1\202112061...	15 http://de.dbpedia.org/resource/E126902 29
alignment_results_12	16 http://de.dbpedia.org/resource/E599620 31

# mtranse\_args\_15K.json和mtranse\_args\_100K.json有何区别，为什么要设置这种区别，而不是直接写一个mtranse\_args.json？

```
diff --git a/mtranse_args_15K.json b/mtranse_args_100K.json
--- a/mtranse_args_15K.json
+++ b/mtranse_args_100K.json
@@ -19,5 +19,5 @@
      "batch_size": 5000,
@@ -23,5 +23,5 @@
      "batch_threads_num": 2,
@@ -24,5 +24,5 @@
      "test_threads_num": 4,
@@ -26,5 +26,5 @@
      "ordered": true,
```

- 我们发现这两个文件对应训练的规模不同，  
mtranse\_args\_15K.json训练的batch\_size比较小，所以对应的  
阈值也设置比较小；mtranse\_args\_100K.json训练的batch\_size  
比较大，所以对应的阈值也设置比较大

## 什么是earlystop？这个实例中为什么需要earlystop？

```
== should early stop ==
Training ends. Total time = 375.470 s.
accurate results: hits@[1, 5, 10, 50] = [29.714 51.076 60.562 77.457]%, mr = 241.629, mrr
= 0.397836, time = 6.548 s
accurate results with csls: csls=10, hits@[1, 5, 10, 50] = [37.086 61.114 70.2 85.571]%
, mr = 95.185, mrr = 0.481600, time = 10.565 s
```

- earlystop指的是在跑完所有epoch前停止训练；
- 在实例中，由于为防止训练过拟合，当我们发现测试的准确率发  
生明显下降，我们应该停止迭代

# Week7

## Q1

- Who are the creators(including paintings) of Guernica and Sunflowers, respectively

## SPARQL语句

```
1 PREFIX ex: <http://example.org/>
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 SELECT ?s ?p ?n
4 WHERE {
5     ?s ex:creatorOf ?p;
6         foaf:firstName ?n
7     {?p rdfs:label "Guernica".}
8     UNION {?p rdfs:label "Sunflowers".
9 }
```

## code

```
1 public class MYQuery {
2
3     public static void main(String[] args)
4             throws IOException {
5         // Create a new Repository.
6         Repository db = new SailRepository(new
MemoryStore());
7
8         // Open a connection to the database
9         try (RepositoryConnection conn =
db.getConnection()) {
10             String filename = "example-data-
artists.ttl";
```

```

11         try (InputStream input =
MYQuery.class.getResourceAsStream("/" +
filename)) {
12             // add the RDF data from the
inputstream directly to our database
13             conn.add(input, "", 
RDFFormat.TURTLE);
14         }
15
16         // we do a simple SPARQL SELECT-query
that retrieves all resources of type `ex:Artist` ,
17         // and their first names.
18         String queryString = "PREFIX ex:
<http://example.org/> \n";
19         queryString += "PREFIX foaf: <" +
FOAF.NAMESPACE + "> \n";
20         queryString += "SELECT ?s ?n ?p \n";
21         queryString += "WHERE { \n";
22         queryString += "     ?s ex:creatorOf ?
p; \n";
23         queryString += "             foaf:firstName
?n; \n";
24         queryString += "             {?p rdfs:label
\"Guernica\".} \n";
25         queryString += "             UNION{?p
rdfs:label \"Sunflowers\".} \n";
26         queryString += "}";
27
28         TupleQuery query =
conn.prepareTupleQuery(queryString);
29
30         // A QueryResult is also an
AutoCloseable resource, so make sure it gets
closed when done.
31         try (TupleQueryResult result =
query.evaluate()) {

```

```

32                     // we just iterate over all
33                     solutions in the result...
34                     for (BindingSet solution :
35                         result) {
36                         // ... and print out the
37                         value of the variable binding for ?s and ?n
38                         System.out.println("?s = " +
39                         solution.getValue("s"));
36                         System.out.println("?n = " +
37                         solution.getValue("n"));
37                         System.out.println("?p = " +
38                         solution.getValue("p"));
39                     }
40     } finally {
41         // Before our program exits, make
42         // sure the database is properly shut down.
43         db.shutdown();
44     }
45 }
46

```

## Result

```

?<http://example.org/Picasso> = http://example.org/Picasso
?<http://example.org/Picasso> = "Pablo"
?<http://example.org/guernica> = http://example.org/guernica
?<http://example.org/VanGogh> = http://example.org/VanGogh
?<http://example.org/VanGogh> = "Vincent"
?<http://example.org/sunflowers> = http://example.org/sunflowers

```

## Q2

- List all the artists (including living places) who live in Spain or other places.

# SPARQL

```
1 PREFIX ex: <http://example.org/>
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 SELECT ?s ?n ?place
4 WHERE {
5     ?s a ex:Artist;
6     foaf:firstName ?n.
7     OPTIONAL{?s ex:homeAddress ?p.
8             ?p ex:country ?place.}
9 }
```

## code

```
1 public class MYQuery2 {
2
3     public static void main(String[] args)
4         throws IOException {
5         // Create a new Repository.
6         Repository db = new SailRepository(new
7             MemoryStore());
8
9         // Open a connection to the database
10        try (RepositoryConnection conn =
11            db.getConnection()) {
12            String filename = "example-data-
13            artists.ttl";
14            try (InputStream input =
15                MYQuery2.class.getResourceAsStream("/" +
16                filename)) {
17                // add the RDF data from the
18                // inputstream directly to our database
19                conn.add(input, "", 
20                    RDFFormat.TURTLE);
21            }
22        }
23    }
24}
```

```

16          // we do a simple SPARQL SELECT-query
that retrieves all resources of type `ex:Artist`,
17          // and their first names.
18          String queryString = "PREFIX ex:
<http://example.org/> \n";
19          queryString += "PREFIX foaf: <" +
FOAF.NAMESPACE + "> \n";
20          queryString += "SELECT ?s ?n ?place
\n";
21          queryString += "WHERE { \n";
22          queryString += "    ?s a ex:Artist;
\n";
23          queryString += "        foaf:firstName
?n. \n";
24          queryString += "        OPTIONAL{?s
ex:homeAddress ?p. \n";
25          queryString += "        ?p ex:country ?
place.} \n";
26          queryString += "}";
27
28          TupleQuery query =
conn.prepareTupleQuery(queryString);
29
30          // A QueryResult is also an
AutoCloseable resource, so make sure it gets
closed when done.
31          try (TupleQueryResult result =
query.evaluate()) {
32              // we just iterate over all
solutions in the result...
33              for (BindingSet solution :
result) {
34                  // ... and print out the
value of the variable binding for ?s and ?n
35                  System.out.println("?s = " +
solution.getValue("s"));

```

```

36                     System.out.println("?n = " +
37                         solution.getValue("n"));
38                     System.out.println("?place =
39                         " + solution.getValue("place"));
40                     }
41             }
42         } finally {
43             // Before our program exits, make
44             // sure the database is properly shut down.
45             db.shutdown();
46         }

```

## Result

```

?s = http://example.org/Picasso
?n = "Pablo"
?place = "Spain"
?s = http://example.org/VanGogh
?n = "Vincent"
?place = null

```

## Q3

- List all paintings, their names, and the corresponding techniques.

## SPAQL

```

1 PREFIX ex: <http://example.org/>
2 SELECT ?s ?n ?t
3 WHERE {
4     ?s a ex:Painting;
5     rdfs:label ?n;
6     ex:technique ?t.
7 }
```

## code

```
1 public class MYQuery3 {  
2  
3     public static void main(String[] args)  
4         throws IOException {  
5             // Create a new Repository.  
6             Repository db = new SailRepository(new  
7                 MemoryStore());  
8  
9             // open a connection to the database  
10            try (RepositoryConnection conn =  
11                db.getConnection()) {  
12                String filename = "example-data-  
13                    artists.ttl";  
14                try (InputStream input =  
15                    MYQuery3.class.getResourceAsStream("/" +  
16                    filename)) {  
17                    // add the RDF data from the  
18                    inputStream directly to our database  
19                    conn.add(input, "",  
20                        RDFFormat.TURTLE);  
21                }  
22  
23                // we do a simple SPARQL SELECT-query  
24                // that retrieves all resources of type `ex:Artist`,  
25                // and their first names.  
26                String queryString = "PREFIX ex:  
27                    <http://example.org/> \n";  
28                queryString += "PREFIX foaf: <" +  
29                    FOAF.NAMESPACE + "> \n";  
30                queryString += "SELECT ?s ?n ?t \n";  
31                queryString += "WHERE { \n";  
32                queryString += "      ?s a ex:Painting;  
33                    \n";  
34                queryString += "      rdfs:label ?n;  
35                    \n";
```

```
24         queryString += "      ex:technique ?  
25         t. \n";  
26  
27         TupleQuery query =  
28         conn.prepareStatement(queryString);  
29  
29         // A QueryResult is also an  
30         AutoCloseable resource, so make sure it gets  
31         closed when done.  
32         try (TupleQueryResult result =  
33             query.evaluate()) {  
34             // we just iterate over all  
35             // solutions in the result...  
36             for (BindingSet solution :  
37                 result) {  
38                 // ... and print out the  
39                 // value of the variable binding for ?s and ?n  
40                 System.out.println("?n = " +  
41                 solution.getValue("n"));  
42                 System.out.println("?t = " +  
43                 solution.getValue("t"));  
44             }  
45         }  
46     }  
47 }
```

# Result

```
?s = http://example.org/starryNight
?n = "Starry Night"
?t = "oil on canvas"
?s = http://example.org/sunflowers
?n = "Sunflowers"
?t = "oil on canvas"
?s = http://example.org/potatoEaters
?n = "The Potato Eaters"
?t = "oil on canvas"
```

## Week 8

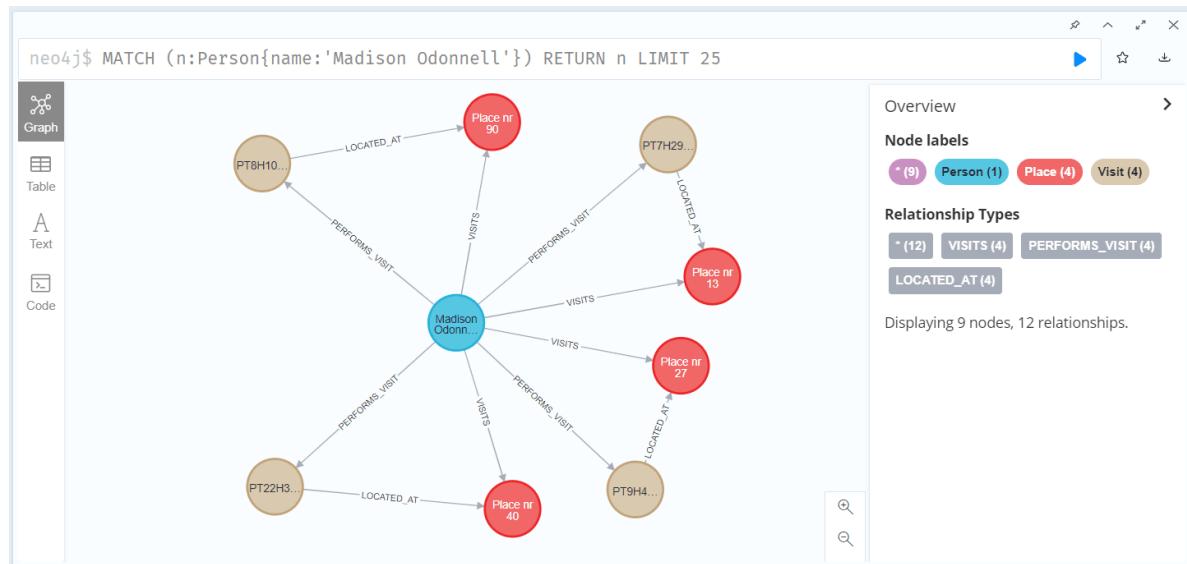
### 导入contact-tracing-43.dump文件到数据库neo4j中

```
1 | neo4j-admin load --from=import\contact-tracing-
43.dump --database=neo4j --force
```

```
D:\Softwares\neo4j-community-4.4.1\bin>neo4j-admin load --from=import\contact-tracing-43.dump --d
atabase=neo4j --force
Selecting JVM - Version:11.0.13+10-LTS-370, Name:Java HotSpot(TM) 64-Bit Server VM, Vendor:Oracle
Corporation
Done: 87 files, 7.878MiB processed.
```

### 查询名叫Madison Odonnell的人物节点，并记录下该节点的

```
1 | MATCH (p:Person{name:'Madison Odonnell'}) Return
LIMIT 25
```



```
1 | MATCH (p:Person{name:'Madison Odonnell'}) return p.healthstatus,p.name,p.confirmedtime
```

	p.healthstatus	p.name	p.confirmedtime
1	"Healthy"	"Madison Odonnell"	"2020-04-25T23:09:38Z"

## 将该人物节点及与其相连的关系删除，并检查是否删除成功

```
1 | MATCH (p:Person{name:'Madison Odonnell'}) Detach Delete p
```

```
neo4j$ MATCH (p:Person{name:'Madison Odonnell'}) Detach Delete p
```

Deleted 1 node, deleted 8 relationships, completed after 174 ms.

```
1 | MATCH (p:Person{name:'Madison Odonnell'}) Return p
```

```
neo4j$ MATCH (p:Person{name:'Madison Odonnell'}) Return p
```

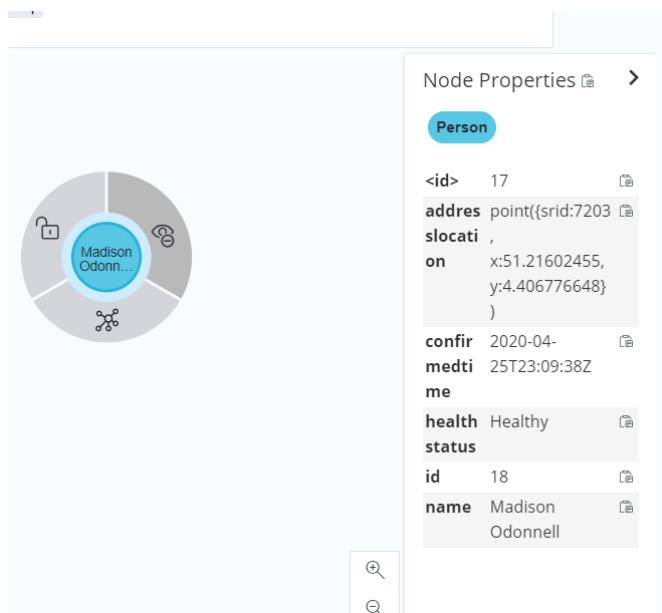
(no changes, no records)

- 删除成功

# 重新创建该节点以及第2步记录下来的节点属性:

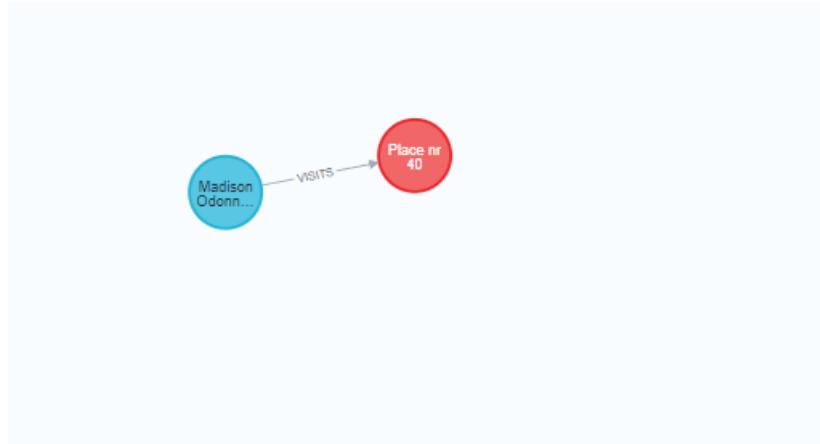
```
1 Create (p:Person {confirmedtime: "2020-04-25T23:09:38Z", name: "Madison Odonnell", healthstatus: "Healthy", id: "18", addresslocation: point({srid:7203, x:51.21602455, y:4.406776648})) Return p
```

- 创建成功



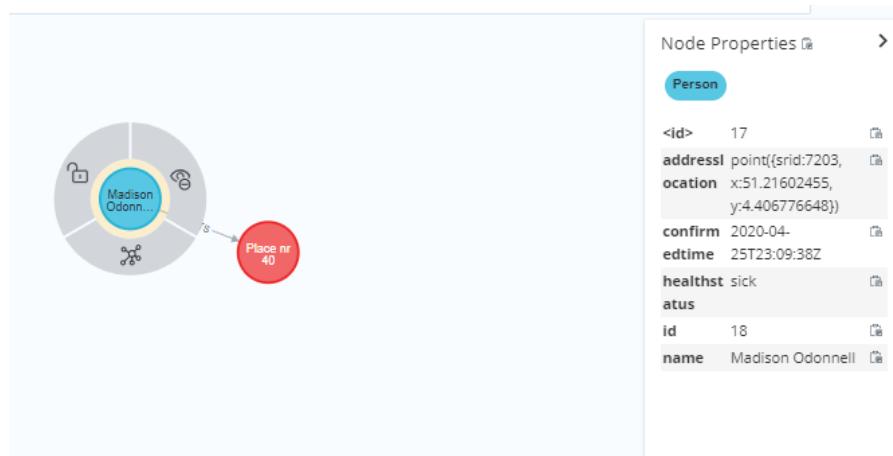
# 重新创建关系： Madison Odonnell的人物节点与名为'Place nr 40'的Place节点间的关系，不考虑关系属性：

```
1 Match (p:Person{name:'Madison Odonnell'}), (p1:Place{name:'Place nr 40'}) Create(p)-[r:VISITS]->(p1) Return p, r, p1
```



## Madison Odonnell不幸被确诊为新冠 (healthstatus='sick') , 对图谱进行更新

```
1 | Match (p:Person{name:'Madison Odonnell'})  
Setp.healthstatus='sick' Return p
```



- 检测

```
1 | Match (p:Person{name:'Madison Odonnell'}) Return p
```

