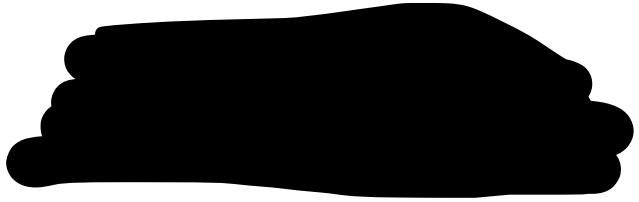
Booking Ontology



mammadaliyevmammadali01@gmail.com

Artificial Intelligence

O.Pomorova

Goal

- **Subject domain problem**
- My ontoligy’s goal is to motivate travelers to book rooms or places from our booking system
- For this purpose my ontology will help guesses to choose best options for their needs

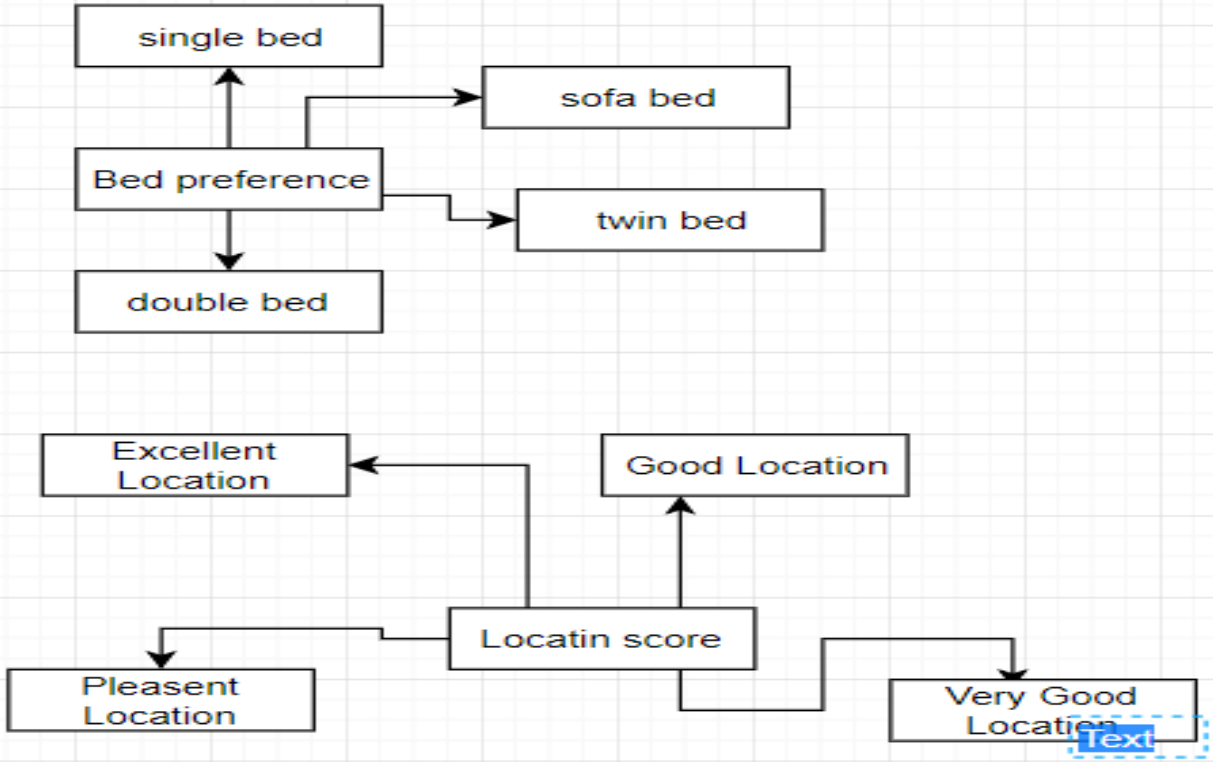
Pattern-Based Chatbots

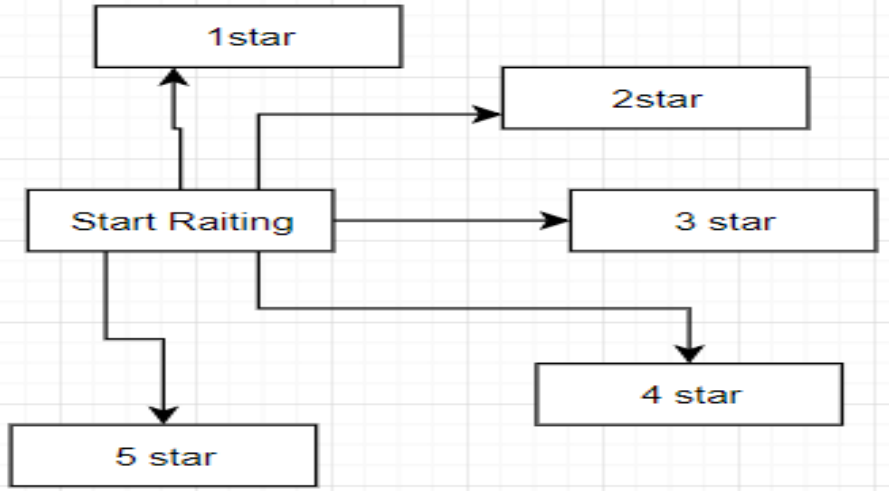
- Chatbot: Wellcome how can I help you today?
- User:I am looking for rooms for 2 persons for 3 days
- Chatbot: Great! We will offer best pleace in this city on chipest price and we have an amasing web site and an app for searching suitable places
- User: All right how can I do it?
- Chatbot: You just need to use correct filters while you are searching for a room
- User: okay thanks

Develop the Vocabulary

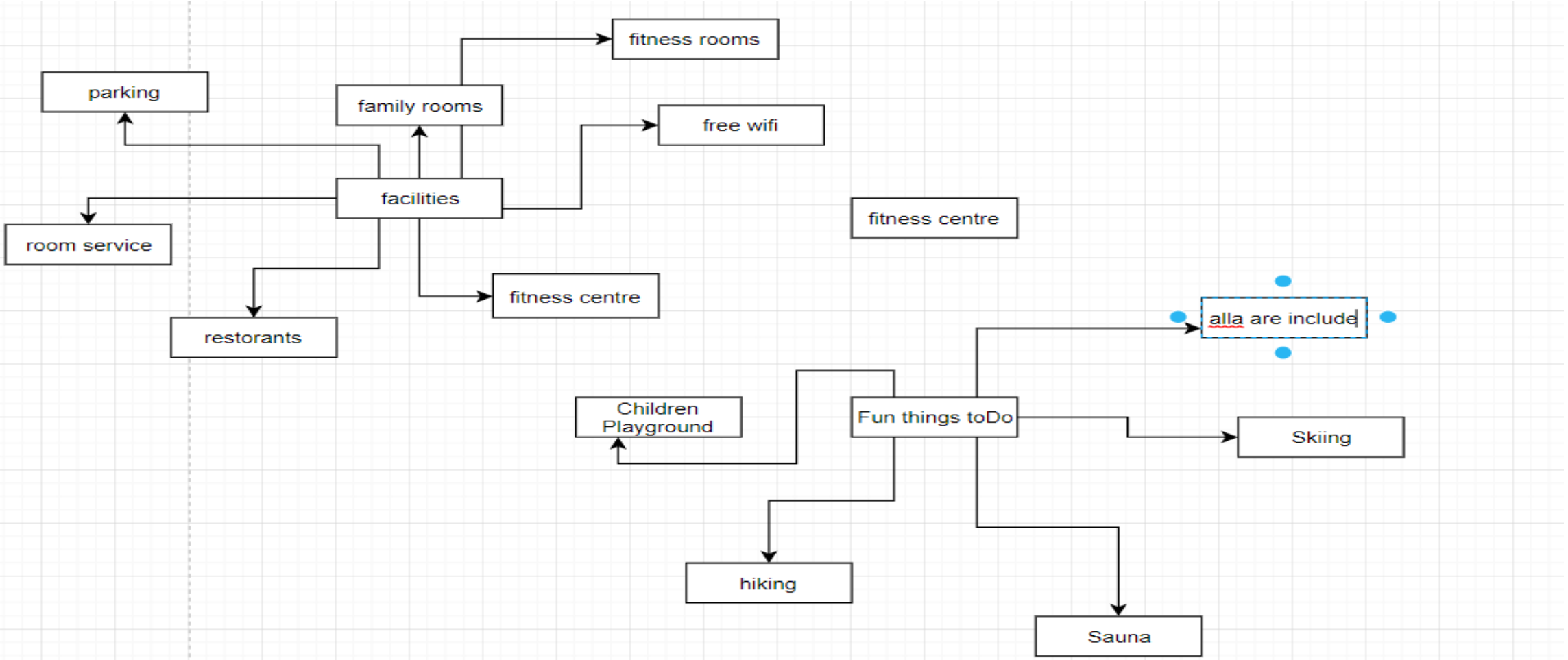
self-standing	modifiers	relations	definable
Budget	zlotyPerNight	has currency	zloty operation
BedPreference	tipe of bed	has sofa	Bed operator
Room Facilities	Family Room	has facilities	
	room Service	has room service	Room Operator
Fun Things ToDo	Entertaiment	has children Playgraund	
Star Rating	raiting	has Stars	raiting operator
Location Score	Location performance	has Zloty	english language
Popular Filters	credit cards	has Cash	
		has Debt card	
		has good locations	
		has non smoking rooms	Fitness center
			Swimming pool
			Location operator

Develop the conceptual model

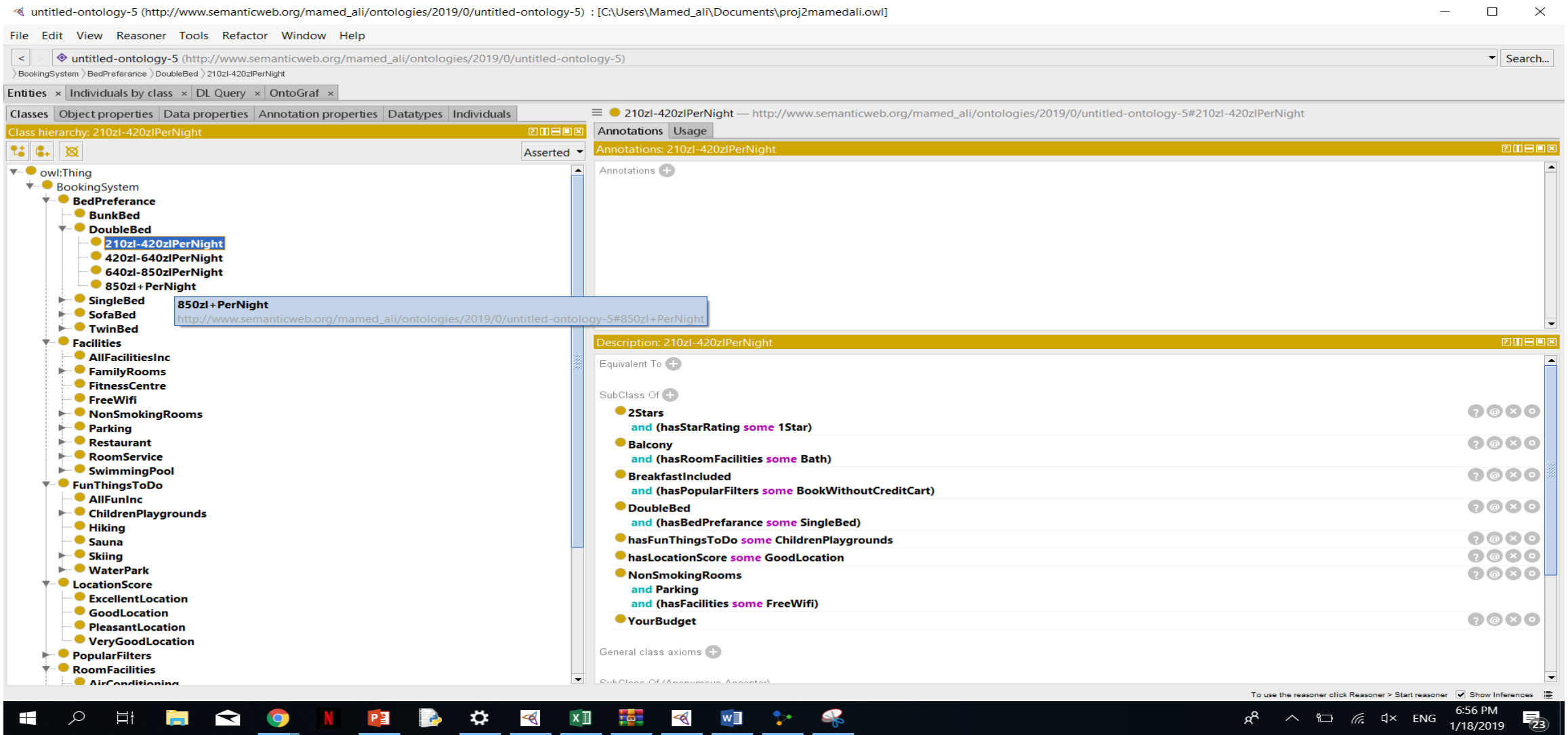




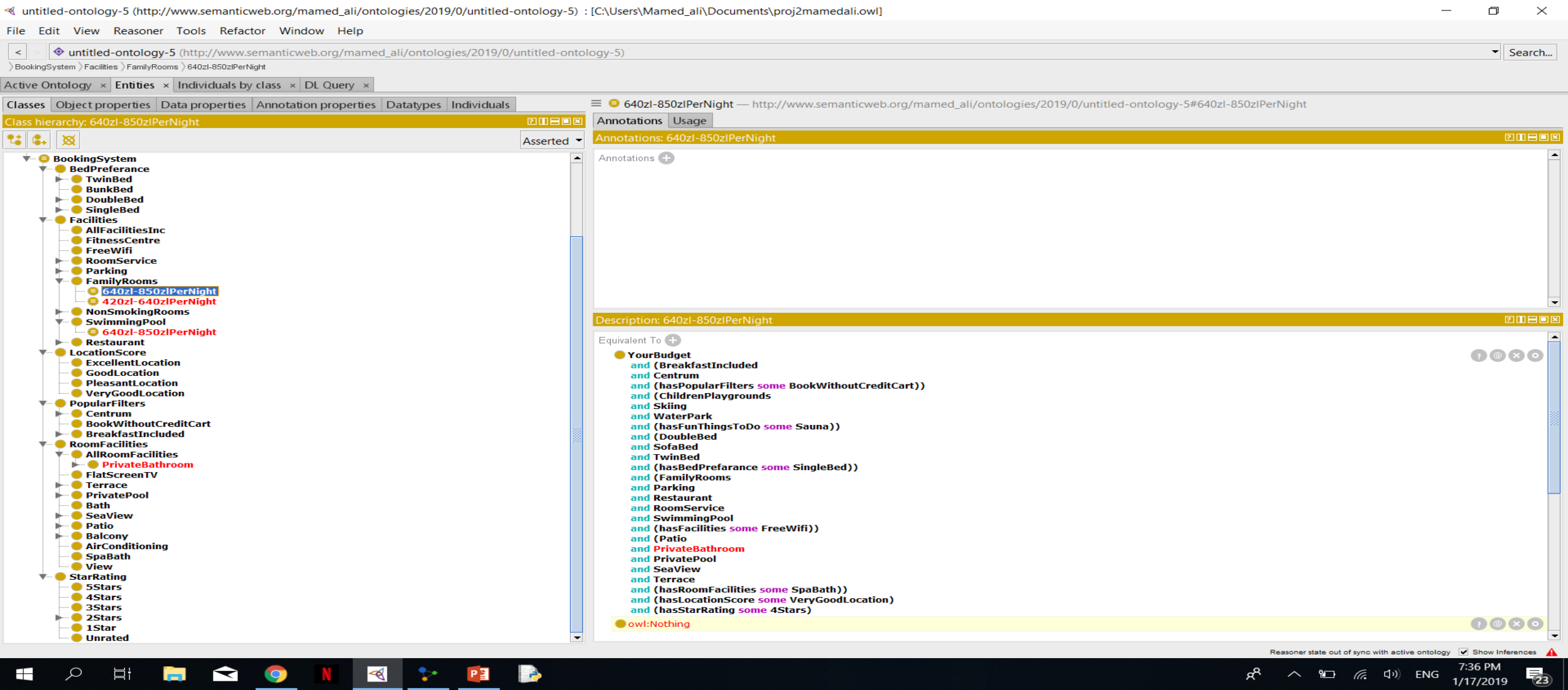
Develop the conceptual model



Classes


untitled-ontology-5 (http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5) : [C:\Users\Mamed_ali\Documents\proj2mamedali.owl]
File Edit View Reasoner Tools Refactor Window Help
untitled-ontology-5 (http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5)
Search...
BookingSystem BedPreferance DoubleBed 210zl-420zlPerNight
Entities Individuals by class DL Query OntoGraf
Classes Object properties Data properties Annotation properties Datatypes Individuals
Class hierarchy: 210zl-420zlPerNight
Asserted
owl:Thing
BookingSystem
BedPreferance
BunkBed
DoubleBed
210zl-420zlPerNight
420zl-640zlPerNight
640zl-850zlPerNight
850zl+PerNight
SingleBed
SofaBed
TwinBed
Facilities
AllFacilitiesInc
FamilyRooms
FitnessCentre
FreeWifi
NonSmokingRooms
Parking
Restaurant
RoomService
SwimmingPool
FunThingsToDo
AllFunInc
ChildrenPlaygrounds
Hiking
Sauna
Skiing
WaterPark
LocationScore
ExcellentLocation
GoodLocation
PleasantLocation
VeryGoodLocation
PopularFilters
RoomFacilities
850zl+PerNight
http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5#850zl+PerNight
210zl-420zlPerNight — http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5#210zl-420zlPerNight
Annotations Usage
Annotations: 210zl-420zlPerNight
Annotations
Description: 210zl-420zlPerNight
Equivalent To
SubClass Of
2Stars
and (hasStarRating some 1Star)
Balcony
and (hasRoomFacilities some Bath)
BreakfastIncluded
and (hasPopularFilters some BookWithoutCreditCart)
DoubleBed
and (hasBedPrefarance some SingleBed)
hasFunThingsToDo some ChildrenPlaygrounds
hasLocationScore some GoodLocation
NonSmokingRooms
and Parking
and (hasFacilities some FreeWifi)
YourBudget
General class axioms
To use the reasoner click Reasoner > Start reasoner
Show Inferences
ENG
6:56 PM
1/18/2019

Classes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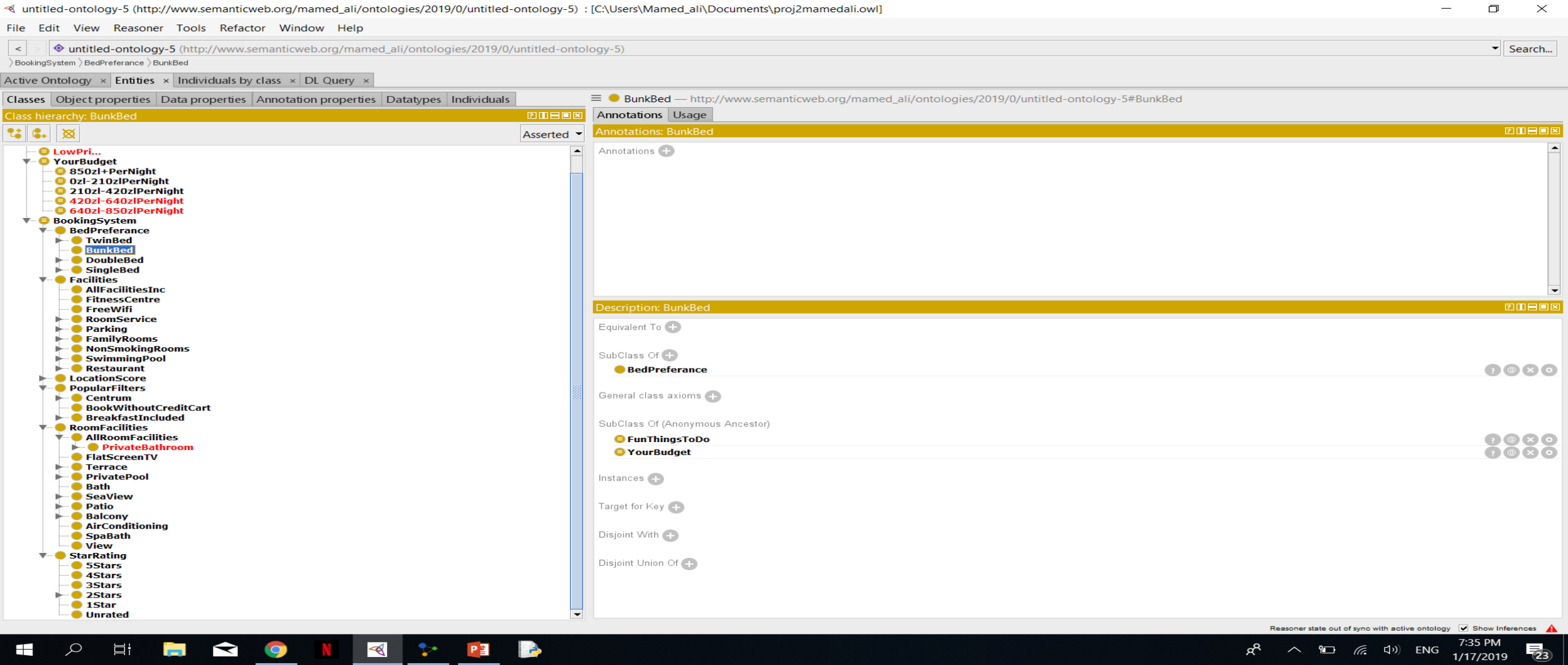
File Edit View Reasoner Tools Refactor Window Help
untitled-ontology-5 (http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5)
Search...
BookingSystem Facilities FamilyRooms 640zl-850zlPerNight
Active Ontology Entities Individuals by class DL Query
Classes Object properties Data properties Annotation properties Datatypes Individuals
Class hierarchy: 640zl-850zlPerNight
Asserted
BookingSystem
BedPreferance
TwinBed
BunkBed
DoubleBed
SingleBed
Facilities
AllFacilitiesInc
FitnessCentre
FreeWifi
RoomService
Parking
FamilyRooms
640zl-850zlPerNight
420zl-640zlPerNight
NonSmokingRooms
SwimmingPool
640zl-850zlPerNight
Restaurant
LocationScore
ExcellentLocation
GoodLocation
PleasantLocation
VeryGoodLocation
PopularFilters
Centrum
BookWithoutCreditCart
BreakfastIncluded
RoomFacilities
AllRoomFacilities
PrivateBathroom
FlatScreenTV
Terrace
PrivatePool
Bath
SeaView
Patio
Balcony
AirConditioning
SpaBath
View
StarRating
5Stars
4Stars
3Stars
2Stars
1Star
Unrated
640zl-850zlPerNight — http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5#640zl-850zlPerNight
Annotations Usage
Annotations: 640zl-850zlPerNight
Annotations
Description: 640zl-850zlPerNight
Equivalent To
YourBudget
and (BreakfastIncluded
and Centrum
and (hasPopularFilters some BookWithoutCreditCart))
and (ChildrenPlaygrounds
and Skiing
and WaterPark
and (hasFunThingsToDo some Sauna))
and (DoubleBed
and SofaBed
and TwinBed
and (hasBedPrefarance some SingleBed))
and (FamilyRooms
and Parking
and Restaurant
and RoomService
and SwimmingPool
and (hasFacilities some FreeWifi))
and (Patio
and PrivateBathroom
and PrivatePool
and SeaView
and Terrace
and (hasRoomFacilities some SpaBath))
and (hasLocationScore some VeryGoodLocation)
and (hasStarRating some 4Stars)
owl:Nothing
Reasoner state out of sync with active ontology
Show Inferences
ENG
7:36 PM
1/17/2019

Classes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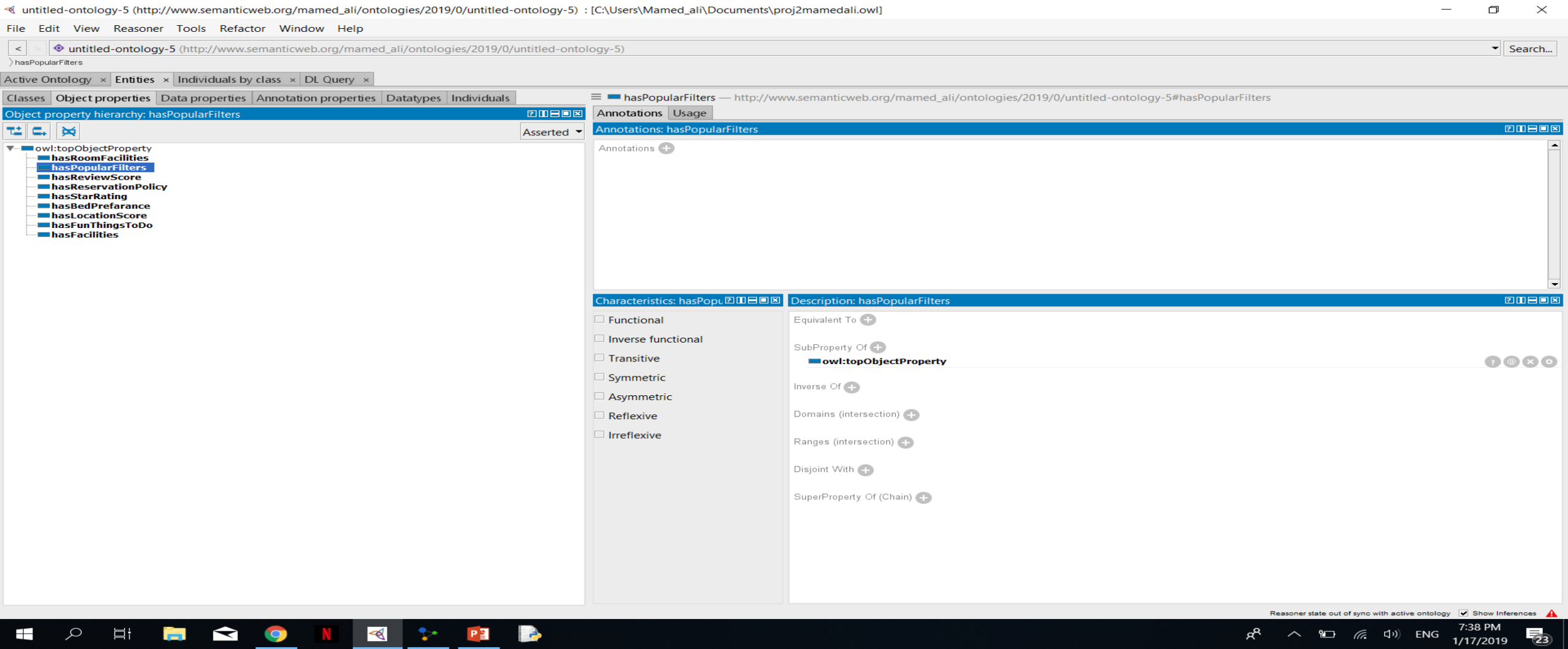
File Edit View Reasoner Tools Refactor Window Help
untitled-ontology-5 (http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5)
Search...
BookingSystem BedPreferance BunkBed
Active Ontology Entities Individuals by class DL Query
Classes Object properties Data properties Annotation properties Datatypes Individuals
Class hierarchy: BunkBed
Asserted
LowPri...
YourBudget
850zl+PerNight
0zl-210zlPerNight
210zl-420zlPerNight
420zl-640zlPerNight
640zl-850zlPerNight
BookingSystem
BedPreferance
TwinBed
BunkBed
DoubleBed
SingleBed
Facilities
AllFacilitiesInc
FitnessCentre
FreeWifi
RoomService
Parking
FamilyRooms
NonSmokingRooms
SwimmingPool
Restaurant
LocationScore
PopularFilters
Centrum
BookWithoutCreditCart
BreakfastIncluded
RoomFacilities
AllRoomFacilities
PrivateBathroom
FlatScreenTV
Terrace
PrivatePool
Bath
SeaView
Patio
Balcony
AirConditioning
SpaBath
View
StarRating
5Stars
4Stars
3Stars
2Stars
1Star
Unrated
BunkBed — http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5#BunkBed
Annotations Usage
Annotations: BunkBed
Annotations
Description: BunkBed
Equivalent To
SubClass Of
BedPreferance
General class axioms
SubClass Of (Anonymous Ancestor)
FunThingsToDo
YourBudget
Instances
Target for Key
Disjoint With
Disjoint Union Of
Reasoner state out of sync with active ontology
Show Inferences
ENG
7:35 PM
1/17/2019

Properties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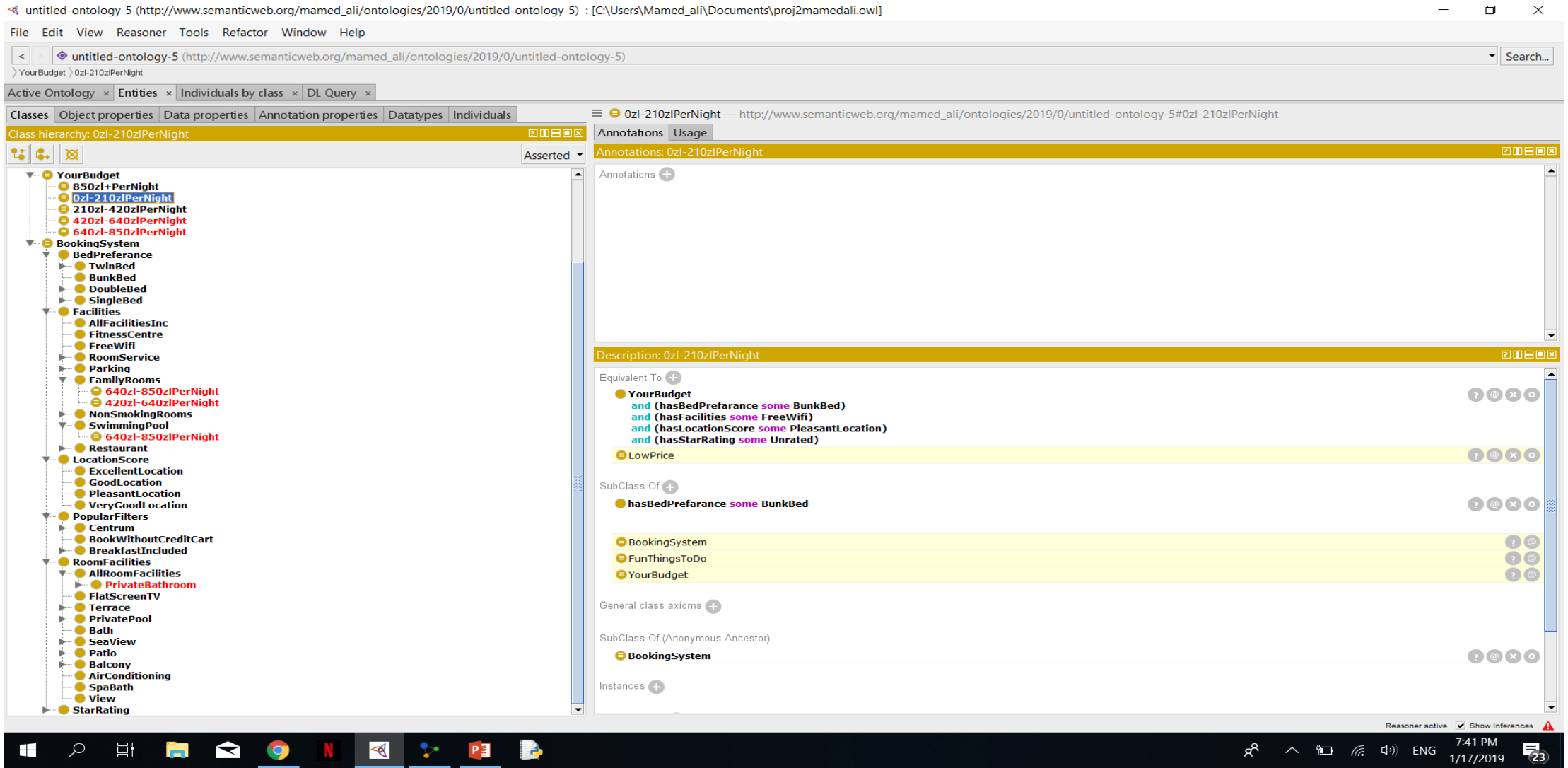
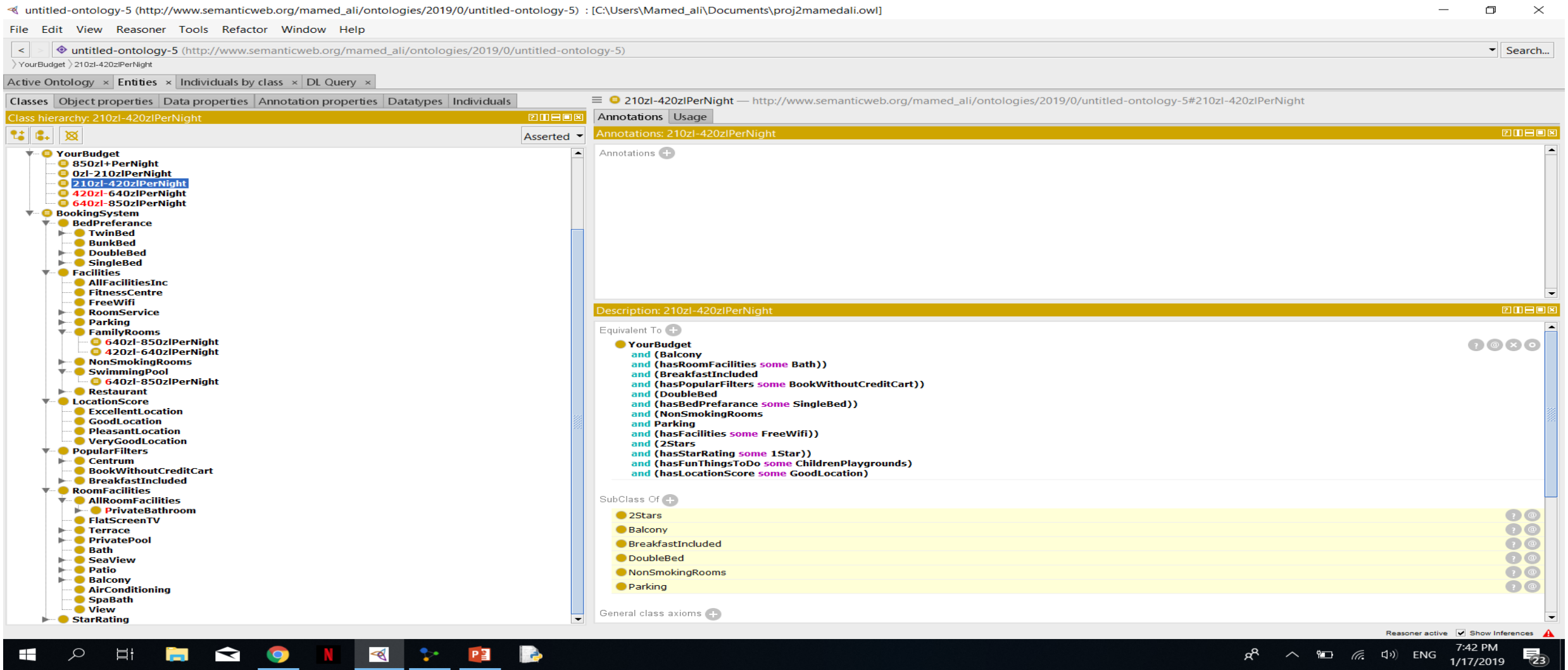
File Edit View Reasoner Tools Refactor Window Help
untitled-ontology-5 (http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5)
Search...
hasPopularFilters
Active Ontology
Entities
Individuals by class
DL Query
Classes
Object properties
Data properties
Annotation properties
Datatypes
Individuals
Object property hierarchy: hasPopularFilters
Asserted
owl:topObjectProperty
hasRoomFacilities
hasPopularFilters
hasReviewScore
hasReservationPolicy
hasStarRating
hasBedPrefarance
hasLocationScore
hasFunThingsToDo
hasFacilities
hasPopularFilters — http://www.semanticweb.org/mamed_ali/ontologies/2019/0/untitled-ontology-5#hasPopularFilters
Annotations
Usage
Annotations: hasPopularFilters
Annotations
Characteristics: hasPopu
Functional
Inverse functional
Transitive
Symmetric
Asymmetric
Reflexive
Irreflexive
Description: hasPopularFilters
Equivalent To
SubProperty Of
owl:topObjectProperty
Inverse Of
Domains (intersection)
Ranges (intersection)
Disjoint With
SuperProperty Of (Chain)
Reasoner state out of sync with active ontology
Show Inferences
ENG
7:38 PM
1/17/2019

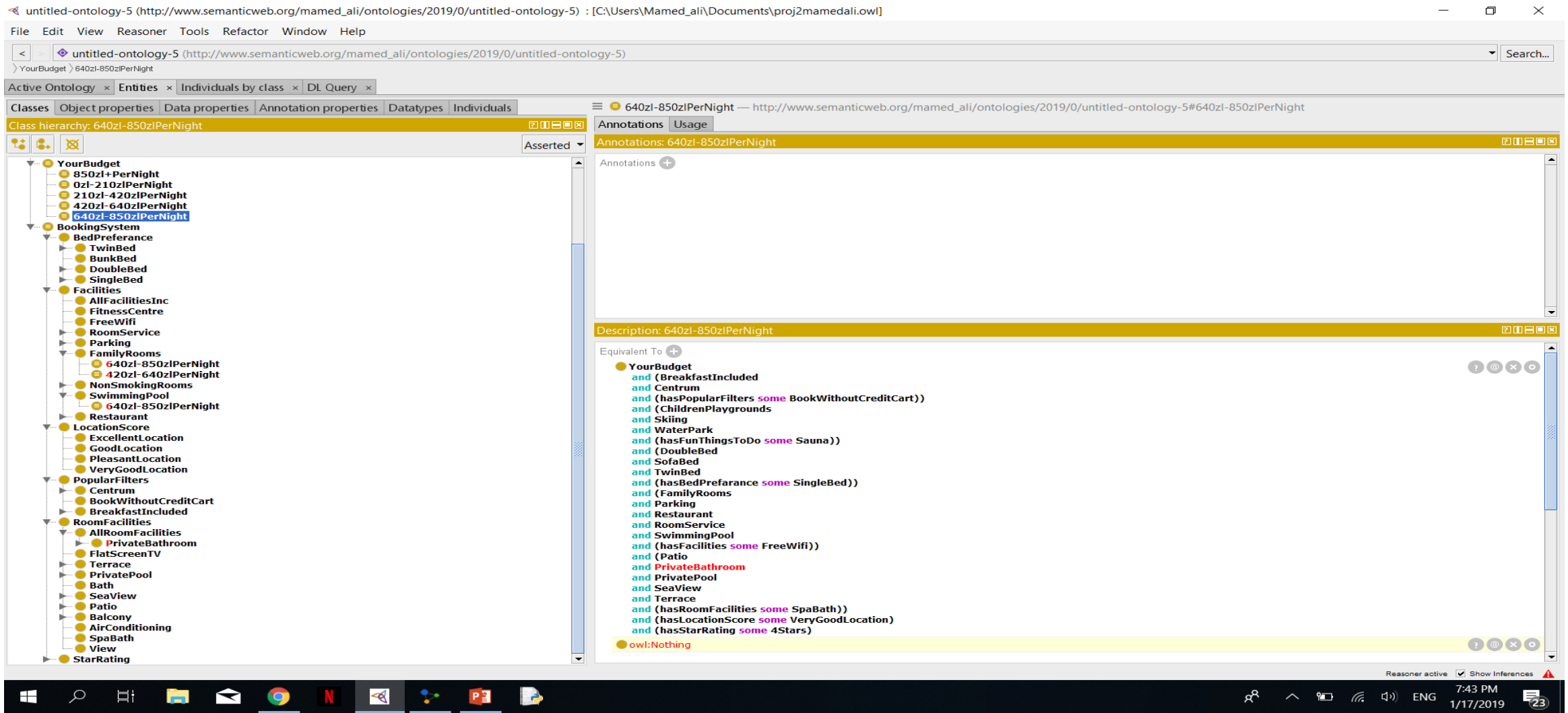
Reasoner(Fact++)



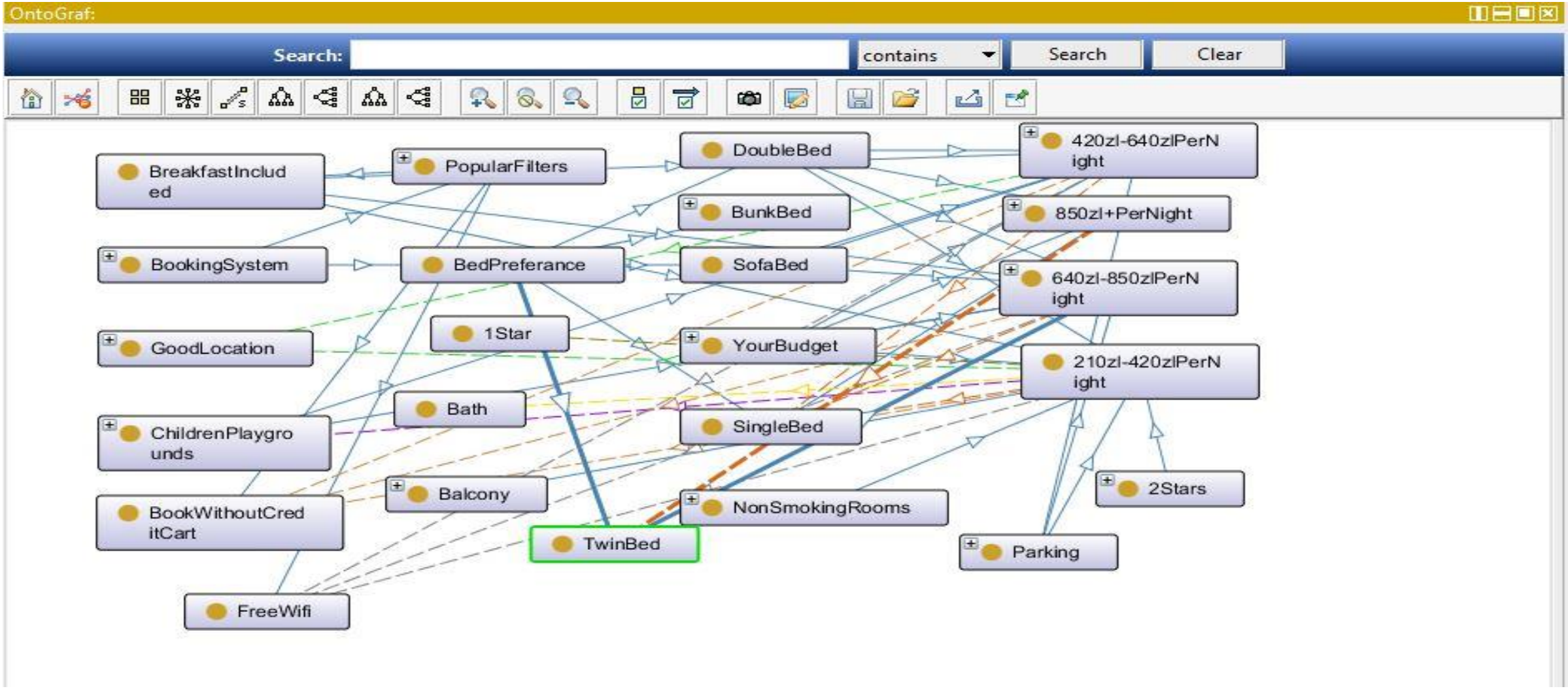
Reasoner(Hermit)



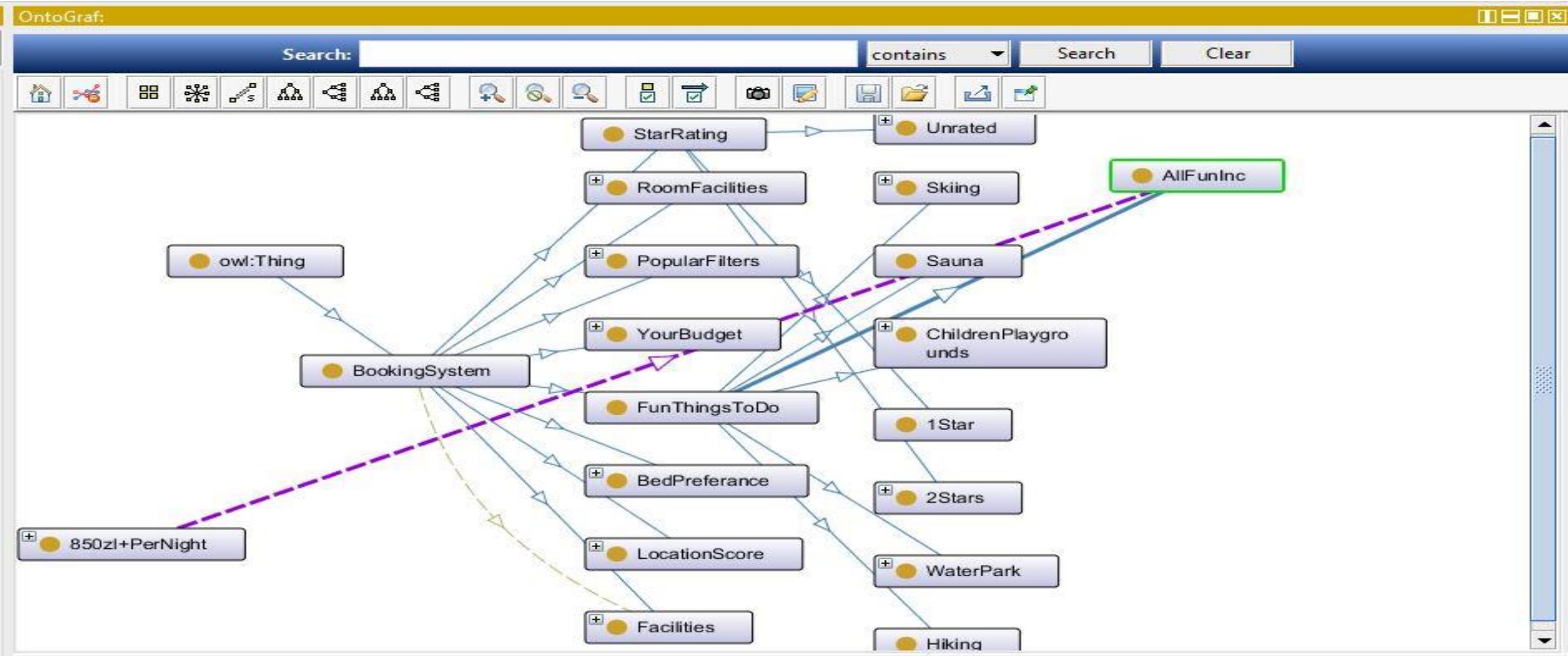
Reasoner(Pallet)



Ontograf


OntoGraf:
Search:
contains
Search
Clear
BreakfastIncluded
PopularFilters
DoubleBed
420zl-640zlPerNight
BunkBed
850zl+PerNight
BookingSystem
BedPreferance
SofaBed
640zl-850zlPerNight
1Star
GoodLocation
YourBudget
210zl-420zlPerNight
Bath
ChildrenPlaygrounds
SingleBed
Balcony
2Stars
BookWithoutCreditCart
NonSmokingRooms
TwinBed
Parking
FreeWifi

Ontograf


OntoGraf:
Search:
contains
Search
Clear
StarRating
Unrated
RoomFacilities
Skiing
AllFunInc
owl:Thing
PopularFilters
Sauna
YourBudget
ChildrenPlaygrounds
BookingSystem
FunThingsToDo
1Star
BedPreferance
2Stars
850zl+PerNight
LocationScore
WaterPark
Facilities
Hiking

Queries

Active Ontology × | Entities × | Classes × | Object Properties × | Individuals by class × | Individuals matrix × | DL Query × | VOWL × | SPARQL Query ×

SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
                WHERE { ?subject rdfs:subClassOf ?object }
```

subject	object
TwinBed	BedPreferance
0zl-210zlPerNight	hasFacilities some FreeWifi
SwimmingPool	Facilities
420zl-640zlPerNight	ChildrenPlaygrounds and WaterPark and (hasFunThingsToDo some Sauna)
FreeWifi	Facilities
420zl-640zlPerNight	BreakfastIncluded and Centrum and (hasPopularFilters some BookWithoutCreditCart)
5Stars	StarRating
FunThingsToDo	BookingSystem
Unrated	StarRating
210zl-420zlPerNight	Balcony and (hasRoomFacilities some Bath)
210zl-420zlPerNight	2Stars and (hasStarRating some 1Star)
420zl-640zlPerNight	hasLocationScore some GoodLocation

Execute

Queries

Active Ontology × | Entities × | Classes × | Object Properties × | Individuals by class × | Individuals matrix × | DL Query × | VOWL × | SPARQL Query ×

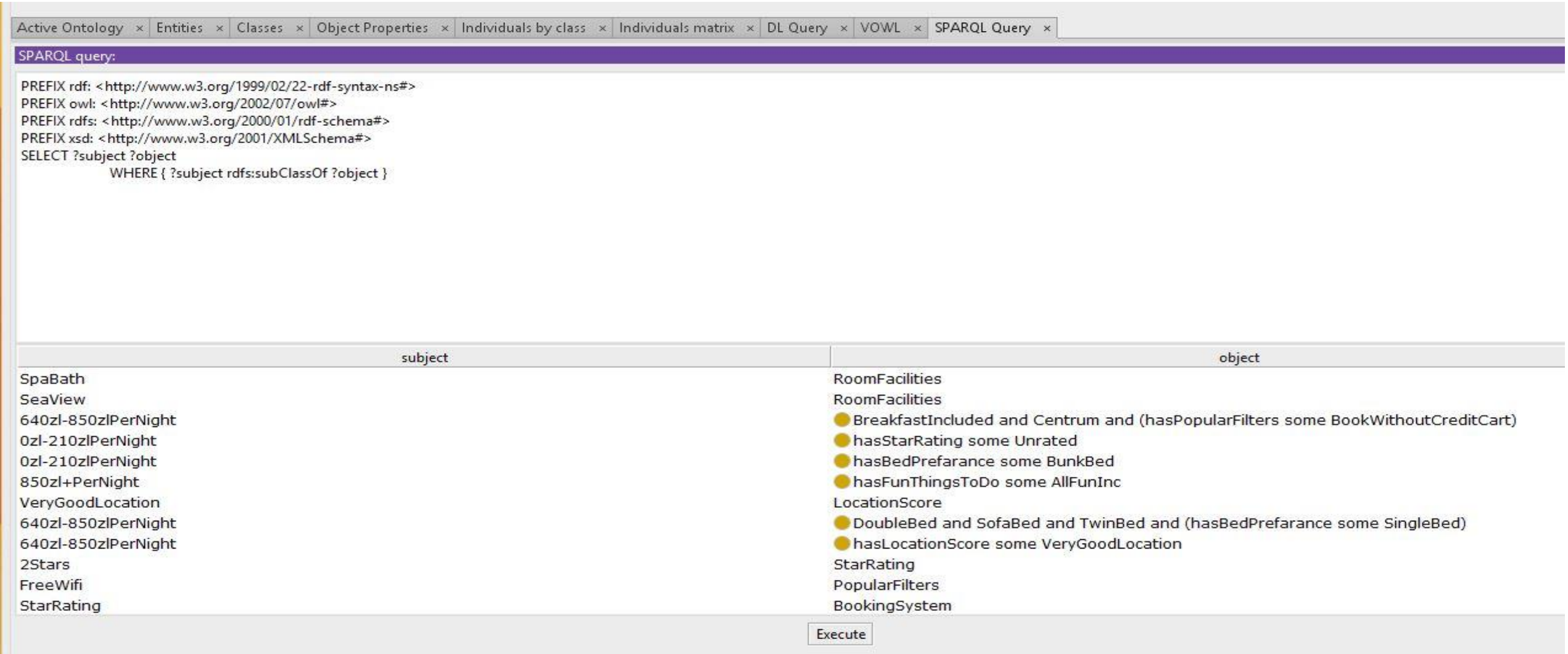
SPARQL query:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
                WHERE { ?subject rdfs:subClassOf ?object }
```

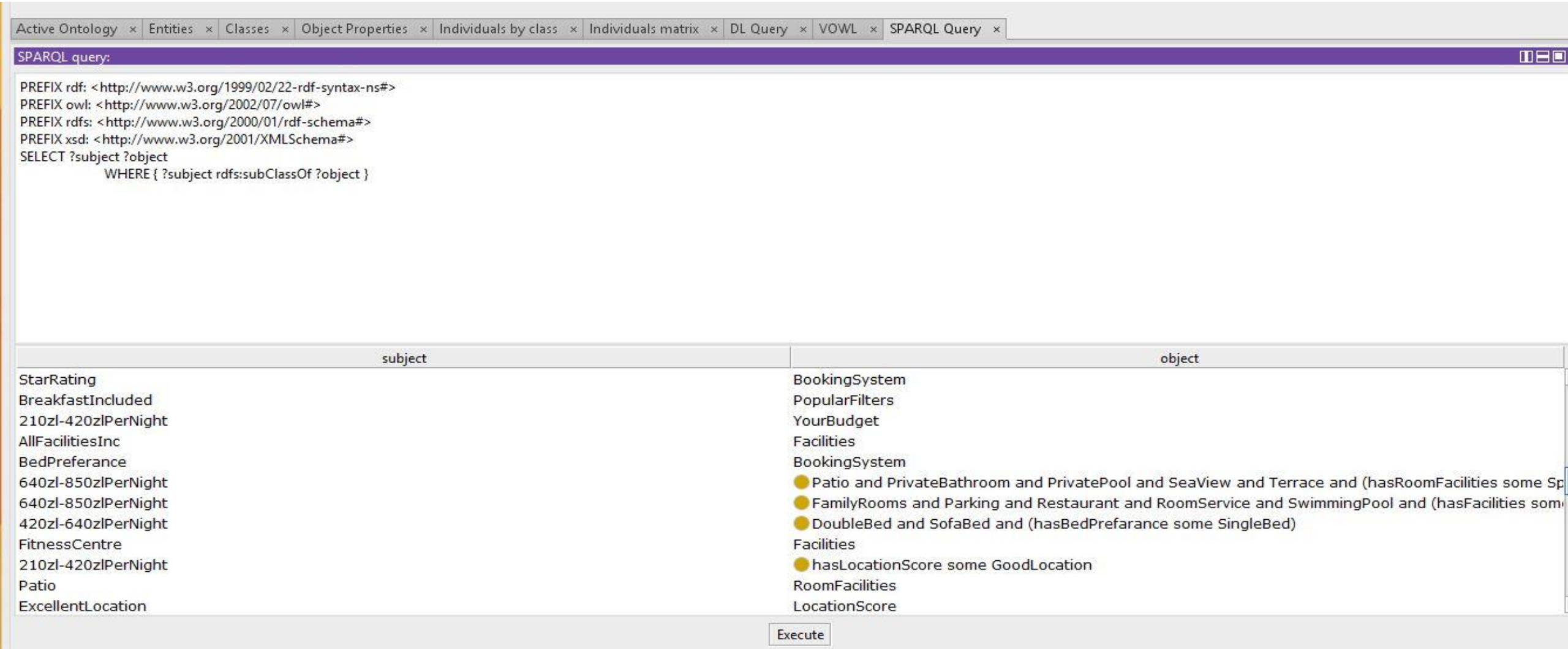
subject	object
420zl-640zlPerNight	hasStarRating some 3Stars
PopularFilters	BookingSystem
Parking	Facilities
420zl-640zlPerNight	PrivateBathroom and SeaView and (hasRoomFacilities some SpaBath)
640zl-850zlPerNight	YourBudget
850zl+PerNight	YourBudget
0zl-210zlPerNight	hasLocationScore some PleasantLocation
Sauna	FunThingsToDo
BunkBed	BedPreferance
850zl+PerNight	hasFacilities some AllFacilitiesInc
Centrum	PopularFilters
Facilities	BookingSystem

Execute

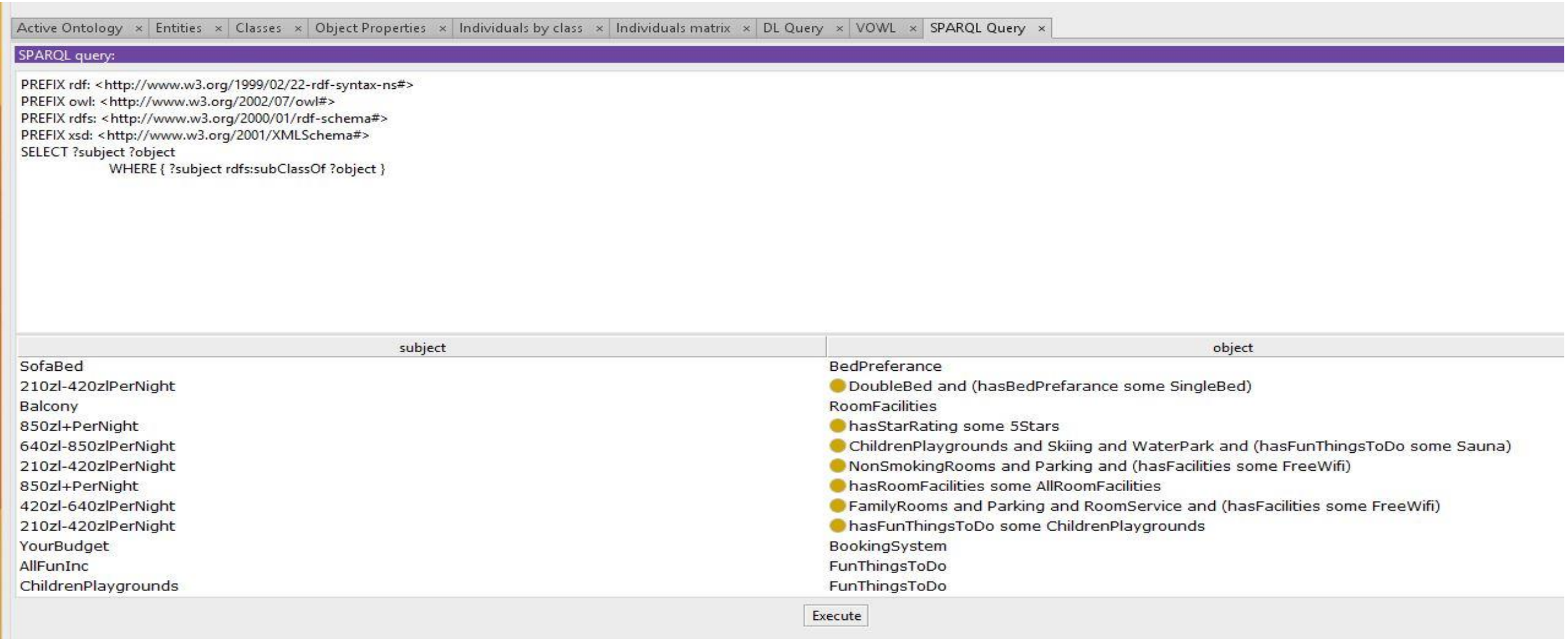
Queries


Active Ontology
Entities
Classes
Object Properties
Individuals by class
Individuals matrix
DL Query
VOWL
SPARQL Query
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
WHERE { ?subject rdfs:subClassOf ?object }
subject
object
SpaBath
RoomFacilities
SeaView
RoomFacilities
640zl-850zlPerNight
BreakfastIncluded and Centrum and (hasPopularFilters some BookWithoutCreditCart)
0zl-210zlPerNight
hasStarRating some Unrated
0zl-210zlPerNight
hasBedPrefarance some BunkBed
850zl+PerNight
hasFunThingsToDo some AllFunInc
VeryGoodLocation
LocationScore
640zl-850zlPerNight
DoubleBed and SofaBed and TwinBed and (hasBedPrefarance some SingleBed)
640zl-850zlPerNight
hasLocationScore some VeryGoodLocation
2Stars
StarRating
FreeWifi
PopularFilters
StarRating
BookingSystem
Execute

Queries


Active Ontology
Entities
Classes
Object Properties
Individuals by class
Individuals matrix
DL Query
VOWL
SPARQL Query
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
WHERE { ?subject rdfs:subClassOf ?object }
subject
object
StarRating
BookingSystem
BreakfastIncluded
PopularFilters
210zl-420zlPerNight
YourBudget
AllFacilitiesInc
Facilities
BedPreferance
BookingSystem
640zl-850zlPerNight
Patio and PrivateBathroom and PrivatePool and SeaView and Terrace and (hasRoomFacilities some Sp
640zl-850zlPerNight
FamilyRooms and Parking and Restaurant and RoomService and SwimmingPool and (hasFacilities som
420zl-640zlPerNight
DoubleBed and SofaBed and (hasBedPrefarance some SingleBed)
FitnessCentre
Facilities
210zl-420zlPerNight
hasLocationScore some GoodLocation
Patio
RoomFacilities
ExcellentLocation
LocationScore
Execute

Queries


Active Ontology
Entities
Classes
Object Properties
Individuals by class
Individuals matrix
DL Query
VOWL
SPARQL Query
SPARQL query:
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
SELECT ?subject ?object
WHERE { ?subject rdfs:subClassOf ?object }
subject
object
SofaBed
BedPreferance
210zl-420zlPerNight
DoubleBed and (hasBedPrefarance some SingleBed)
Balcony
RoomFacilities
850zl+PerNight
hasStarRating some 5Stars
640zl-850zlPerNight
ChildrenPlaygrounds and Skiing and WaterPark and (hasFunThingsToDo some Sauna)
210zl-420zlPerNight
NonSmokingRooms and Parking and (hasFacilities some FreeWifi)
850zl+PerNight
hasRoomFacilities some AllRoomFacilities
420zl-640zlPerNight
FamilyRooms and Parking and RoomService and (hasFacilities some FreeWifi)
210zl-420zlPerNight
hasFunThingsToDo some ChildrenPlaygrounds
YourBudget
BookingSystem
AllFunInc
FunThingsToDo
ChildrenPlaygrounds
FunThingsToDo
Execute

Difficulty for developing ontology

1. Analising booking field takes a long time

2. its hart to determine some subclasses for the given ontology

3. Creating a conceptual model was a little bit hard