QUERIES

SPARQL QUERIES
Ontology without inferences

1. Calculate the final fees for all the Senior Members.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT ?seniorMember (STR(?membershipFee) AS ?membershipFeeStr)
(STR(?discountSenior) AS ?discountSeniorStr) (STR((?membershipFee -
((?discountSenior / 100) * ?membershipFee))) AS ?finalFeeStr)
WHERE {
  ?seniorMember rdf:type c:SeniorMember .
  ?seniorMember c:hasMembership ?membership .
  ?membership c:membershipFeeInEuro ?membershipFee .
  ?membership c:discountSenior ?discountSenior .
}

seniorMember	membershipFeeStr	discountSeniorStr	finalFeeStr
BarbaraGalli	"500.0"	"20"	"400.00"
StefaniaErcole	"500.0"	"20"	"400.00"
ElenaDeSantis	"400.0"	"10"	"360.00"
VincenzoMorelli	"220.0"	"21"	"173.800"
GiorgiaFontana	"610.0"	"24"	"463.600"
AntonioRusso	"70.0"	"40"	"42.00"
LeonardoGreco	"140.0"	"15"	"119.000"
NicolaMoretti	"55.0"	"20"	"44.00"
RenatoEsposito	"70.0"	"30"	"49.00"

2. Find student gym members who are female and are enrolled in Gym Facilities in Roma.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT ?femaleStudent ?facility
WHERE {
        ?femaleStudent rdf:type c:StudentMember .
        ?femaleStudent c:gender "Female" .
        ?femaleStudent c:isEnrolledIn ?facility .

```
        ?facility rdf:type c:GymFacility .
        ?facility c:isLocatedIn c:Roma .
}
```

femaleStudent	facility
GiadaValli	FitActive_Roma
SofiaMonti	EliteGym_Roma
MartaGiovanni	EliteGym_Roma
GiadaMorelli	JungleWellness_Roma
CaterinaMonti	AnytimeFitness_Roma
FrancescaEsposito	AnytimeFitness_Roma

3. Find all adult gym members who have to renew their membership before New Year 2025.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT ?member (STR(?renewalDate) AS ?renewalDateString) ?facility ?membership
WHERE {
 ?member rdf:type c:AdultMember .
 ?membership rdf:type c:Membership .
 ?member c:hasMembership ?membership .
 ?member c:isEnrolledIn ?facility .
 ?facility rdf:type c:GymFacility .
 ?member c:membershipRenewalDate ?renewalDate .
 FILTER(?renewalDate < "2025-01-01T00:00:00"^^xsd:dateTime)
}

member	renewalDateString	facility	membership
BeatriceLombardi	"2024-10-31T11:30:00"	FitActive_Roma	Annual_FA_Roma
FrancescoDeLuca	"2024-12-02T09:25:00"	FitActive_Firenze	Trimestral_FA_Firenze
ClaudioEsposito	"2024-12-28T17:25:00"	AnytimeFitness_Firenze	Monthly_AF_Firenze
BeatriceGreco	"2024-12-12T10:10:00"	FitActive_Napoli	Annual_FA_Napoli
SimoneGreco	"2024-11-28T18:40:00"	JungleWellness_Roma	Monthly_JW_Roma
NicolaValente	"2024-12-31T13:30:00"	AnytimeFitness_Roma	Monthly_AF_Roma
AdeleRossi	"2024-11-15T14:32:00"	AnytimeFitness_Milano	Annual_AF_Milano
EmilioRossi	"2024-10-29T15:55:00"	JungleWellness_Bologna	Monthly_JW_Bologna
WalterNeri	"2024-12-19T14:55:00"	FitnessFirst_Milano	Trimestral_FF_Milano
GiorgiaBianchi	"2024-11-21T14:45:00"	JungleWellness_Bologna	Trimestral_JW_Bologna

4. Find all the Group Instructors in Torino who offer dance classes.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

```
SELECT ?instructor ?gym
WHERE {
        ?instructor rdf:type c:GroupInstructor .
        ?instructor c:worksAt ?gym .
        ?gym rdf:type c:GymFacility .
        ?gym c:isLocatedIn c:Torino .
        ?instructor c:leads c:DanceClass .
}
```

instructor	gym
SerenaGrasso	FitnessFirst_Torino

5. Find all personal trainers and which training each of them provides, who work in Roma or in Firenze.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT ?trainer ?training ?facility ?city
WHERE {
  ?trainer rdf:type c:PersonalTrainer .
  ?trainer c:providesTraining ?training .
  ?training rdf:type c:PersonalTraining .
  ?trainer c:worksAt ?facility .
  ?facility rdf:type c:GymFacility .
  ?facility c:isLocatedIn ?city .
  FILTER(?city IN (c:Roma, c:Firenze))
}
```

trainer	training	facility	city
SaraFerrari	High_Intensity_Training	JungleWellness_Roma	Roma
GiorgioVerdi	Flexibility_Mobility_Training	IconPalestre_Firenze	Firenze
PaoloRiva	Bodybuilding	AnytimeFitness_Roma	Roma
SabrinaVitali	Cardio_Endurance_Training	EliteGym_Roma	Roma
AngelaDeLuca	Core_Stability_Training	EliteGym_Roma	Roma
ElisaColombo	High_Intensity_Training	FitActive_Firenze	Firenze
DiegoMarchetti	Bodybuilding	JungleWellness_Roma	Roma
FrancescoValli	Core_Stability_Training	IconPalestre_Firenze	Firenze
AndreaConti	Bodybuilding	AnytimeFitness_Firenze	Firenze

6. Find all the strength exercises that involve more than 1 gym equipment.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
```

```
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT ?exercise (STR(COUNT(?equipment)) AS ?equipmentCount)
WHERE {
    ?exercise rdf:type c:StrengthExercises .
    ?exercise c:involvesEquipment ?equipment .
}
GROUP BY ?exercise
HAVING (COUNT(?equipment) > 1)
```

exercise	equipmentCount
OverheadPress_3x8	"2"
Deadlift_3x5	"2"
BenchPress_4x10	"3"
HipThrust_3x10	"2"
BenchPress_4x6	"3"
BarbellFrontSquat_4x6	"2"
InclineBenchPress_4x10	"3"
Squat_4x8	"2"

7. List all the Cardio Exercises involving Cardio Equipment that covers a distance (in km) greater than 5 km.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT ?exercise ?equipment (STR(?distance) as ?distances)
WHERE {
    ?exercise rdf:type c:CardioExercises .
    ?exercise c:involvesEquipment ?equipment .
    ?exercise c:distanceInKm ?distance .
    ?equipment rdf:type c:CardioEquipment .
    FILTER(?distance > 5.0)
}
```

exercise	equipment	distances
Cycling_20_15	StationeryBike	"15.0"
Rowing_15_8	RowingMachine	"8.0"

8. Find gyms in Torino and Bologna that offers a Student Discount membership greater than 10%.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT  DISTINCT ?facility (STR(?discount ) as ?discounts) ?membership
WHERE {
    ?facility rdf:type ?GymFacility .
    ?facility c:offersMembership ?membership .
    ?membership c:discountStudent ?discount .
    ?facility c:isLocatedIn ?city .
    FILTER(?discount > 10) .
    FILTER (?city = c:Bologna || ?city = c:Torino) .
}
```

facility	discounts	membership
JungleWellness_Bologna	"12"	Monthly_JW_Bologna
JungleWellness_Bologna	"30"	Annual_JW_Bologna
EliteGym_Torino	"15"	Monthly_EG_Torino

SPARQL QUERIES
Ontology with inferred data after reasoning

1. For a particular member (eg. AdeleRossi) find exercises that suit their fitness goals.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT ?exercise ?fitnessGoal
WHERE {
    c:AdeleRossi rdf:type c:GymMember .
    c:AdeleRossi c:hasGoal ?fitnessGoal .
    ?exercise rdf:type c:Exercises .
    ?exercise c:focusesOn ?fitnessGoal .
}
```

exercise	fitnessGoal
Cycling_20_15	CardiovascularEndurance
Elliptical_8_4	CardiovascularEndurance
StairClimbing_3_0.2	CardiovascularEndurance
Rowing_15_8	CardiovascularEndurance
Rowing_2_2	CardiovascularEndurance
Running_10_5	CardiovascularEndurance
Lunges_3x10	WeightLoss
DumbbellChestPress_4x10	WeightLoss
Rowing_15_8	WeightLoss
Running_10_5	WeightLoss
InclineBenchPress_4x10	WeightLoss
Rowing_2_2	WeightLoss
Cycling_20_15	WeightLoss

2. Find gym instructors in Bologna who leads CrossClass and have an Advanced experienceLevel.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT ?instructor ?gym
WHERE {
    ?instructor rdf:type c:GymInstructor .
    ?instructor c:worksAt ?gym .
    ?gym rdf:type c:GymFacility .
    ?gym c:isLocatedIn c:Bologna .
    c:CrossFitClass c:isLedBy ?instructor .
    ?instructor c:experienceLevel "Advanced" .
}

instructor	gym
StefanoGreco	JungleWellness_Bologna
FedericoBianco	FitActive_Bologna

3. Find all Exercises that involve either CardioEquipment or StrengthTrainingEquipment and are focused on WeightLoss as a fitness goal.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT DISTINCT ?exercise ?equipment
WHERE {
    ?exercise rdf:type c:Exercises .

```sparql
    ?exercise c:involvesEquipment ?equipment .
    ?exercise c:focusesOn c:WeightLoss .

    { ?equipment rdf:type c:CardioEquipment . }
    UNION
    { ?equipment rdf:type c:StrengthTrainingEquipment . }
}
```

exercise	equipment
Cycling_20_15	StationeryBike
StairClimbing_3_0.2	Stairmaster
Elliptical_8_4	EllipticalMachine
OverheadPress_3x8	Plates_2.5
InclineBenchPress_4x10	Barbell_15
InclineBenchPress_4x10	Plates_10
Deadlift_3x5	Barbell_20
OverheadPress_3x8	Barbell_15
BenchPress_4x10	Barbell_20
Squat_5x5	SmithMachine
BenchPress_4x10	Plates_30
LegPress_4x8	LegpressMachine

4. Find the exercises that involve less than 3 equipments.

```sparql
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-
ontology#>

SELECT ?exercise (STR(COUNT(?equipment)) AS ?equipmentCount) ?exerciseType
WHERE {
    ?exercise rdf:type ?exerciseType .
    ?exerciseType rdfs:subClassOf c:Exercises .
    ?exercise c:involvesEquipment ?equipment .
}
GROUP BY ?exercise ?exerciseType
HAVING (COUNT(?equipment) <3 )
```

exercise	equipmentCount	exerciseType
ChestOpenerStretch	"1"	Stretching
SpineStretch	"1"	Stretching
HamstringStretch	"1"	Stretching
JumpRope_2	"1"	CardioExercises
StairClimbing_3_0.2	"1"	CardioExercises
Running_10_5	"1"	CardioExercises
Cycling_20_15	"1"	CardioExercises
Rowing_15_8	"1"	CardioExercises
Elliptical_8_4	"1"	CardioExercises
Rowing_2_2	"1"	CardioExercises
OverheadPress_3x8	"2"	StrengthExercises
Deadlift_3x5	"2"	StrengthExercises

5. Find free weights that weigh more than 10kg and the exercises they are involved in that focuses on Muscle Gain or Power Lifting.

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX c: <http://www.semanticweb.org/carmella/ontologies/2024/9/krst-gym-ontology#>

SELECT ?equipment ?exercise ?focus
WHERE {
  ?equipment rdf:type c:FreeWeights .
  ?equipment c:equipWeightInKg ?weight .
  ?exercise rdf:type c:StrengthExercises .
  ?exercise c:involvesEquipment ?equipment .
  ?exercise c:focusesOn ?focus .
  FILTER(?weight >= 10.0 && (?focus = c:MuscleGain || ?focus = c:PowerLifting))
}

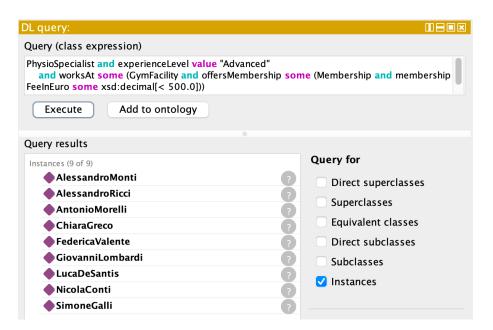| equipment	exercise	focus
Plates_10	InclineBenchPress_4x10	MuscleGain
Plates_30	BenchPress_4x10	MuscleGain
Plates_30	Deadlift_3x5	MuscleGain
Kettlebell_16	KettlebellSwing_4x15	MuscleGain
Kettlebell_24	KettlebellGobletSquat_4x6	MuscleGain
Barbell_15	InclineBenchPress_4x10	PowerLifting
Barbell_15	OverheadPress_3x8	PowerLifting
DumbbellSet_12	DumbbellChestPress_4x10	PowerLifting
DumbbellSet_40	DumbbellShoulderPress_3x6	PowerLifting
Barbell_20	Deadlift_3x5	PowerLifting
Barbell_20	BenchPress_4x10	PowerLifting
Barbell_20	BarbellFrontSquat_4x6	PowerLifting

DL QUERIES

1. Retrieve all StrengthExercises that involve both FreeWeights and WeightMachines, focus on Hypertrophy, and have a set count greater than 3

StrengthExercises and (involvesEquipment some FreeWeights) and (involvesEquipment some WeightMachine) and (focusesOn value Hypertrophy) and (setCount some xsd:integer[> 3])

DL query:

Query (class expression)

StrengthExercises **and** (involvesEquipment **some** FreeWeights) **and** (involvesEquipment **some** WeightMachine) **and** (focusesOn **value** Hypertrophy) **and** (setCount **some** xsd:integer[>2])

[Execute]   [Add to ontology]

Query results

Instances (2 of 2)
◆ **BenchPress_4x10**
◆ **BenchPress_4x6**

Query for
☐ Direct superclasse
☐ Superclasses

2. Find the physiospecialists with advanced experience level that work at facilities which offer memberships less than 500 euro.

PhysioSpecialist and experienceLevel value "Advanced"
  and worksAt some (GymFacility and offersMembership some (Membership and membershipFeeInEuro some xsd:decimal[< 500.0]))

DL query:

Query (class expression)

PhysioSpecialist **and** experienceLevel **value** "Advanced"
  and worksAt **some** (GymFacility **and** offersMembership **some** (Membership **and** membershipFeeInEuro **some** xsd:decimal[< 500.0]))

[Execute]   [Add to ontology]

Query results

Instances (9 of 9)
◆ **AlessandroMonti**
◆ **AlessandroRicci**
◆ **AntonioMorelli**
◆ **ChiaraGreco**
◆ **FedericaValente**
◆ **GiovanniLombardi**
◆ **LucaDeSantis**
◆ **NicolaConti**
◆ **SimoneGalli**

Query for
☐ Direct superclasses
☐ Superclasses
☐ Equivalent classes
☐ Direct subclasses
☐ Subclasses
☑ Instances

3. List the AdultMembers who are enrolled in gym facilities that offear at least one different types of memberships and focus on Flexibility or PostureCorrection

AdultMember and (isEnrolledIn some (GymFacility and (offersMembership min 2 Membership))) and ((hasGoal value PostureCorrection) or (hasGoal value Flexibility))

DL query:

Query (class expression)

AdultMember and (isEnrolledIn some (GymFacility and (offersMembership min 2 Membership))) and ((hasGoal value PostureCorrection) or (hasGoal value Flexibility))

[Execute] [Add to ontology]

Query results

Instances (5 of 5)
- ◆ **AlessandroValli** (?)
- ◆ **CaterinaGalli** (?)
- ◆ **GiorgiaBianchi** (?)
- ◆ **JessicaFerrara** (?)
- ◆ **MargheritaFerrari** (?)

Query for
- ☐ Direct superclasses
- ☐ Superclasses
- ☐ Equivalent classes
- ☐ Direct subclasses

4. Find the GymFacilities that offer at least 2 memberships with discounts for both seniors and students.

GymFacility and (offersMembership min 2 (Membership and ((discountStudent some xsd:integer[> 0]) and (discountSenior some xsd:integer[> 0]))))

DL query:

Query (class expression)
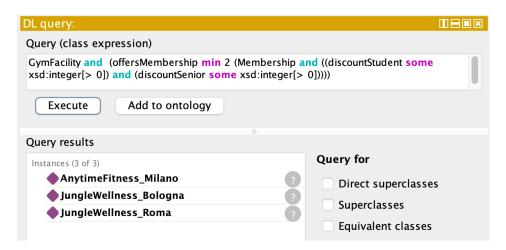
GymFacility and (offersMembership min 2 (Membership and ((discountStudent some xsd:integer[> 0]) and (discountSenior some xsd:integer[> 0]))))

[Execute] [Add to ontology]

Query results

Instances (3 of 3)
- ◆ **AnytimeFitness_Milano** (?)
- ◆ **JungleWellness_Bologna** (?)
- ◆ **JungleWellness_Roma** (?)

Query for
- ☐ Direct superclasses
- ☐ Superclasses
- ☐ Equivalent classes

5. List the gym members with fat burning fitness goals who weigh less than 70 kgs and are enrolled in gym facilities in Roma.

GymMember and (hasGoal value FatBurning)
   and (weight some xsd:decimal[< 70.0])
   and (isEnrolledIn some (GymFacility and isLocatedIn value Roma))

DL query:

Query (class expression)

GymMember **and** (hasGoal **value** FatBurning)
   and (weight **some** xsd:decimal[< 70.0])
   and (isEnrolledIn **some** (GymFacility **and** isLocatedIn **value** Roma))

[Execute]   [Add to ontology]

Query results

Instances (8 of 8)

- BarbaraGalli
- BeatriceLombardi
- CaterinaGalli
- CaterinaMonti
- EricaValente
- GiadaValli
- MartaGiovanni
- SofiaMonti

Query for
- ☐ Direct superclasses
- ☐ Superclasses
- ☐ Equivalent classes
- ☐ Direct subclasses
- ☐ Subclasses
- ☑ Instances

6. Find weight loss focused exercises that involve either FreeWeights weighing more than 20 kgs or some cardio equipment.

Exercises and focusesOn value WeightLoss
  and ((involvesEquipment some (FreeWeights and equipWeightInKg some xsd:decimal[> 20.0]))or involvesEquipment some CardioEquipment)

DL query:

Query (class expression)

Exercises **and** focusesOn **value** WeightLoss
   and ((involvesEquipment **some** (FreeWeights **and** equipWeightInKg **some** xsd:decimal[> 20.0]))**or** involvesEquipment **some** CardioEquipment)

[Execute]   [Add to ontology]

Query results

Instances (11 of 11)

- BenchPress_4x10
- Cycling_20_15
- Deadlift_3x5
- DumbbellShoulderPress_3x6
- Elliptical_8_4
- JumpRope_2
- KettlebellGobletSquat_4x6
- Rowing_15_8
- Rowing_2_2
- Running_10_5
- StairClimbing_3_0.2

Query for
- ☐ Direct superclasses
- ☐ Superclasses
- ☐ Equivalent classes
- ☐ Direct subclasses
- ☐ Subclasses
- ☑ Instances

Result filters