

Table of Contents

| | |
|---|----|
| List of classes..... | 1 |
| Checking the Course name in Course offered in our ontology..... | 1 |
| Authors of the Courses..... | 1 |
| Competency Questions | 2 |
| 1. Recommend top five rating courses which are free with certificates. | 2 |
| 2. List some of the courses for learners who want a certificate after attending the course without having to do assignment, quiz, and exam. | 4 |
| 3. Mrs. B is working in an organization and does not have time to attend online live courses on Data Science; recommend some courses for her which are not live session courses. | 6 |
| 4. Mr. A is from a management background, and he wants to learn some computer networking related courses, ontology shall recommend some courses for him. | 8 |
| 5. Mr. C is a new project manager in K-Bank, and he has to develop an information system for ATM machines. What are the courses that will help him to manage the project well? | 10 |
| 6. Mrs. D wants to apply for a job and for that job she needs a Software Training course certificate, and the deadline of the job application is in 1 month. List some of the Software Training courses with certificates that she can obtain within a month (45 hours). | 12 |
| 7. Which is the highest rated course of Author XYZ which is free of cost? | 14 |
| 8. If I take the ABC course, what are some of the prerequisite courses that I need to attend? 16 | |
| 9. List some of the advanced/recommended courses after completing a particular course. .. | 18 |
| 10. Mrs. E has some budget limitation; recommend some courses which are below or equal to 100 Euro to her. | 21 |
| Extra..... | 23 |
| Check the recent updated course..... | 23 |

List of classes

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Classes WHERE {  
    ?Classes rdf:type owl:Class  
}
```

Checking the Course name in Course offered in our ontology.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?CourseName WHERE {  
    ?Course rdf:type oc:CourseOffered .  
    ?Course oc:CourseName ?CourseName  
}
```

Authors of the Courses

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Author ?Name WHERE {  
    ?Author rdf:type oc:Author .  
    ?Author oc:AuthorName ?Name  
}
```

Competency Questions

1. Recommend top five rating courses which are free with certificates.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name.  
    ?Course oc:CourseCertificate true.  
    ?Course oc:CourseRating ?R. FILTER (?R >=4)  
    ?Course oc:CourseFee 0.  
}
```

Active ontology × Entities × Individuals by class × OWLViz × DL Query × SPARQL Query ×

Snap SPARQL Query:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>  
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>  
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>  
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name.  
    ?Course oc:CourseCertificate true.  
    ?Course oc:CourseRating ?R. FILTER (?R >=4)  
    ?Course oc:CourseFee 0.  
}
```

Execute

| ?Course | ?Name |
|---------|---|
| oc:N1 | Juniper Open Learning ^{^^xsd:string} |
| oc:SE1 | Software Engineering Training ^{^^xsd:string} |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Class hierarchy: CQ1

Annotations: CQ1

Description: CQ1

Equivalent To

SubClass Of

General class axioms

SubClass Of (Anonymous Ancestor)

Instances

Target for Key

owl:Thing

Author

Course

CourseFromYounten

CourseLearnedByHenry

CourseOffered

Applied_Data_Science

Diploma_in_Computer_Networking

Information_System_Design_and_Management

Introduction_Data_Science

Juniper_Open_Learning

Networking_in_Google_Cloud

Software_Design_and_Development

Statistics_and_Data_Science

CourseOutdated

CoursesFromHarvard

CourseWithHighRating

CourseWithoutCertificate

CQ1

CQ10

CQ2

CQ3

CQ4

CQ5

CQ6

CQ7

CQ8

CQ9

DataScienceCourses

FreeCourses

NetworkingCourses

PrerequisiteForHerny

SoftwareEngineeringCourses

CourseCategory

Data_Science_Course

Networking_Course

Software_Engineering_Course

CourseOragnizer

MOOC

University

Learner

Annotations

Description

Equivalent To

SubClass Of

General class axioms

SubClass Of (Anonymous Ancestor)

Instances

Target for Key

Course

and (CourseWithHighRating

and (CourseCertificate value true)

and (CourseFee value 0))

CourseWithHighRating

FreeCourses

Course

and (CourseRating some xsd:integer[>= 4])

Course

and (CourseFee some xsd:integer[<= 0])

N1

SE1

2. List some of the courses for learners who want a certificate after attending the course without having to do assignment, quiz, and exam.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name.  
    ?Course oc:CourseCertificate true.  
    ?Course oc:CourseAssessment false  
}
```

Active ontology × Entities × Individuals by class × OWLViz × DL Query × SPARQL Query ×

Snap SPARQL Query:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>  
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>  
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>  
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name.  
    ?Course oc:CourseCertificate true.  
    ?Course oc:CourseAssessment false  
}
```

Execute

| ?Course | ?Name |
|---------|---|
| oc:N2 | Networking in Google Cloud ^M xsd:string |
| oc:SE1 | Software Engineering Training ^M xsd:string |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Class hierarchy: CQ2

Annotations: CQ2

Description: CQ2

Equivalent To +

Course
and ((CourseAssessment value false)
and (CourseCertificate value true))

SubClass Of +

Course

General class axioms +

SubClass Of (Anonymous Ancestor)

Instances +

N2
SE1

Target for Key +

Disjoint With +

Disjoint Union Of +

owl:Thing
Author
Course
CourseFromYounten
CourseLearnedByHenry
CourseOffered
Applied_Data_Science
Diploma_in_Computer_Networking
Information_System_Design_and_Management
Introduction_Data_Science
Juniper_Open_Learning
Networking_in_Google_Cloud
Software_Design_and_Development
Statistics_and_Data_Science
CourseOutdated
CoursesFromHarvard
CourseWithHighRating
CourseWithoutCertificate
CQ1
CQ10
CQ2
CQ3
CQ4
CQ5
CQ6
CQ7
CQ8
CQ9
DataScienceCourses
FreeCourses
NetworkingCourses
PrerequisiteForHerny
SoftwareEngineeringCourses
CourseCategory
Data_Science_Course
Networking_Course
Software_Engineering_Course
CourseOragnizer
MOOC
University
Learner

- Mrs. B is working in an organization and does not have time to attend online live courses on Data Science; recommend some courses for her which are not live session courses.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?CourseCategory ?Name WHERE {
    ?CourseCategory rdf:type oc:DataScienceCourses.
    ?CourseCategory oc:CourseName ?Name.
    ?CourseCategory oc:CourseSession ?x FILTER regex(?x, "Recorded")
}
```

Active ontology ×
Entities ×
Individuals by class ×
OWL Viz ×
DL Query ×
SPARQL Query ×

Snap SPARQL Query:

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?CourseCategory ?Name **WHERE** {
 ?CourseCategory rdf:type oc:DataScienceCourses.
 ?CourseCategory oc:CourseName ?Name.
 ?CourseCategory oc:CourseSession ?x **FILTER** regex(?x, "Recorded")
}

Execute

| ?CourseCategory | ?Name |
|-----------------|---|
| oc:DS1 | Applied Data Science with Python ^{^^xsd:string} |
| oc:DS2 | Python for Data Science and Machine Learning Bootcamp ^{^^xsd:string} |
| oc:DS3 | Introduction to Data Science ^{^^xsd:string} |

The screenshot displays the Protégé ontology editor interface. The top menu bar includes File, Edit, View, Reasoner, Tools, Refactor, Window, and Help. The address bar shows the URL: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20>. The main workspace is divided into several panes:

- Left Pane (Class Hierarchy):** Displays a tree view of the ontology classes. The 'Course' class is expanded, showing subclasses like 'CourseFromYouten', 'CourseLearnedByHenry', 'CourseOffered', 'CourseOutdated', 'CoursesFromHarvard', 'CourseWithHighRating', 'CourseWithoutCertificate', 'CQ1', 'CQ10', 'CQ2', 'CQ3' (highlighted), 'CQ4', 'CQ5', 'CQ6', 'CQ7', 'CQ8', 'CQ9', 'DataScienceCourses', 'FreeCourses', 'NetworkingCourses', 'PrerequisiteForHerny', 'SoftwareEngineeringCourses', 'CourseCategory', 'CourseOragnizer', 'MOOC', 'University', and 'Learner'.
- Top Right Pane (Annotations):** Shows the 'CQ3' class selected. The 'Annotations' tab is active, displaying a list of annotations for 'CQ3'.
- Bottom Right Pane (Description):** Shows the 'Description' tab for 'CQ3'. It displays the class description: `Course and (DataScienceCourses and (CourseSession value "Recorded"))`. Below this, it shows the 'SubClass Of' section with 'DataScienceCourses' listed. The 'General class axioms' section shows 'Course' as a subclass of an anonymous ancestor with the axiom: `Course and (hasCategory some Data_Science_Course)`. The 'Instances' section lists 'DS1', 'DS2', and 'DS3' as instances of 'CQ3'.

4. Mr. A is from a management background, and he wants to learn some computer networking related courses, ontology shall recommend some courses for him.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?CourseCategory ?Name WHERE {  
    ?CourseCategory rdf:type oc:NetworkingCourses.  
    ?CourseCategory oc:CourseName ?Name  
}
```

Order by ?CourseCategory

Active ontology × Entities × Individuals by class × OWLViz × DL Query × SPARQL Query ×

Snap SPARQL Query:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>  
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>  
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>  
SELECT ?CourseCategory ?Name WHERE {  
    ?CourseCategory rdf:type oc:NetworkingCourses.  
    ?CourseCategory oc:CourseName ?Name  
}  
Order by ?CourseCategory
```

Execute

| ?CourseCategory | ?Name |
|-----------------|---|
| oc:N1 | Juniper Open Learning ^{^^xsd:string} |
| oc:N2 | Networking in Google Cloud ^{^^xsd:string} |
| oc:N3 | The Bits and Bytes of Computer Networking ^{^^xsd:string} |
| oc:N4 | Introduction to Open Source Networking Technologies ^{^^xsd:string} |
| oc:N5 | Computer Netwoking ^{^^xsd:string} |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Annotations Usage

Class hierarchy: CQ4

Annotations: CQ4

Description: CQ4

Equivalent To

SubClass Of

General class axioms

SubClass Of (Anonymous Ancestor)

Instances

Target for Key

owl:Thing

Author

Course

CourseFromYounten

CourseLearnedByHenry

CourseOffered

Applied_Data_Science

Diploma_in_Computer_Networking

Information_System_Design_and_Management

Introduction_Data_Science

Juniper_Open_Learning

Networking_in_Google_Cloud

Software_Design_and_Development

Statistics_and_Data_Science

CourseOutdated

CoursesFromHarvard

CourseWithHighRating

CourseWithoutCertificate

CQ1

CQ10

CQ2

CQ3

CQ4

CQ5

CQ6

CQ7

CQ8

CQ9

DataScienceCourses

FreeCourses

NetworkingCourses

PrerequisiteForHerny

SoftwareEngineeringCourses

CourseCategory

Data_Science_Course

Networking_Course

Software_Engineering_Course

CourseOragnizer

MOOC

University

Learner

Course

and NetworkingCourses

and (CourseName some xsd:string)

NetworkingCourses

Course

and (hasCategory some Networking_Course)

N1

N2

N3

N4

N5

5. Mr. C is a new project manager in K-Bank, and he has to develop an information system for ATM machines. What are the courses that will help him to manage the project well?

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name  
    FILTER regex(?Name, "Management", "i")  
}
```

Order By ?Course

Active ontology × Entities × Individuals by class × OWLViz × DL Query × SPARQL Query ×

Snap SPARQL Query:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>  
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>  
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>  
SELECT ?Course ?Name WHERE {  
    ?Course oc:CourseName ?Name  
    FILTER regex(?Name, "Management", "i")  
}  
Order By ?Course
```

Execute

| ?Course | ?Name |
|---------|---|
| oc:SE2 | Information System Design and Management ^{ML} xsd:string |

The screenshot displays the Protégé OWL editor interface. The top tabs include 'Active ontology', 'Entities', 'Individuals by class', 'OWL Viz', 'DL Query', and 'SPARQL Query'. The left pane shows the 'Class hierarchy: CQ5' with a tree structure. The right pane shows the 'Description: CQ5' with various class axioms.

Class hierarchy: CQ5

- owl:Thing
 - Author
 - Course
 - CourseFromYounten
 - CourseLearnedByHenry
 - CourseOffered
 - Applied_Data_Science
 - Diploma_in_Computer_Networking
 - Information_System_Design_and_Management
 - Introduction_Data_Science
 - Juniper_Open_Learning
 - Networking_in_Google_Cloud
 - Software_Design_and_Development
 - Statistics_and_Data_Science
 - CourseOutdated
 - CoursesFromHarvard
 - CourseWithHighRating
 - CourseWithoutCertificate
 - CQ1
 - CQ10
 - CQ2
 - CQ3
 - CQ4
 - CQ5**
 - CQ6
 - CQ7
 - CQ8
 - CQ9
 - DataScienceCourses
 - FreeCourses
 - NetworkingCourses
 - PrerequisiteForHenry
 - SoftwareEngineeringCourses
 - CourseCategory
 - Data_Science_Course
 - Networking_Course
 - Software_Engineering_Course
 - CourseOragnizer
 - MOOC
 - University
 - Learner

Description: CQ5

- Equivalent To
 - Course and (CourseName value "Information System Design and Management")
- SubClass Of
 - Course
- General class axioms
- SubClass Of (Anonymous Ancestor)
- Instances
 - SE2
- Target for Key
- Disjoint With
- Disjoint Union Of

6. Mrs. D wants to apply for a job and for that job she needs a Software Training course certificate, and the deadline of the job application is in 1 month. List some of the Software Training courses with certificates that she can obtain within a month (45 hours).

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name WHERE {
    ?Course rdf:type oc:SoftwareEngineeringCourses.
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseDuration ?x FILTER (?x <=20)
}
```

Order by ?CourseCategory

Active ontology ×
Entities ×
Individuals by class ×
OWL Viz ×
DL Query ×
SPARQL Query ×

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name WHERE {
    ?Course rdf:type oc:SoftwareEngineeringCourses.
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseDuration ?x FILTER (?x <=20)
}
Order by ?CourseCategory
    
```

Execute

| ?Course | ?Name |
|---------|---|
| oc:SE1 | Software Engineering Training ^{^^xsd:string} |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Class hierarchy: CQ6 Annotations: CQ6

owl:Thing

- Author
- Course
 - CourseFromYounten
 - CourseLearnedByHenry
 - CourseOffered
 - Applied_Data_Science
 - Diploma_in_Computer_Networking
 - Information_System_Design_and_Management
 - Introduction_Data_Science
 - Juniper_Open_Learning
 - Networking_in_Google_Cloud
 - Software_Design_and_Development
 - Statistics_and_Data_Science
 - CourseOutdated
 - CoursesFromHarvard
 - CourseWithHighRating
 - CourseWithoutCertificate
- CQ1
- CQ10
- CQ2
- CQ3
- CQ4
- CQ5
- CQ6**
- CQ7
- CQ8
- CQ9
- DataScienceCourses
- FreeCourses
- NetworkingCourses
- PrerequisiteForHerny
- SoftwareEngineeringCourses
- CourseCategory
 - Data_Science_Course
 - Networking_Course
 - Software_Engineering_Course
- CourseOragnizer
 - MOOC
 - University
- Learner

Annotations: CQ6

Annotations +

Description: CQ6

Equivalent To +

Course
and (SoftwareEngineeringCourses
and (CourseDuration some xsd:integer[<= 20])
and (CourseCertificate value true))

SubClass Of +

SoftwareEngineeringCourses

General class axioms +

SubClass Of (Anonymous Ancestor)

Course
and (hasCategory some Software_Engineering_Course)

Instances +

SE1

Target for Key +

Disjoint With +

Disjoint Union Of +

7. Which is the highest rated course of Author XYZ which is free of cost?

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name ?Author WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:hasAuthor ?a.
    ?a oc:AuthorName ?Author. FILTER regex(?Author, "Younten").
    ?Course oc:CourseFee 0
}
```

Active ontology x
Entities x
Individuals by class x
OWL Viz x
DL Query x
SPARQL Query x

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name ?Author WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:hasAuthor ?a.
    ?a oc:AuthorName ?Author. FILTER regex(?Author, "Younten").
    ?Course oc:CourseFee 0
}
|

```

Execute

| ?Course | ?Name | ?Author |
|---------|---|---------------------|
| oc:SE1 | Software Engineering Training^^xsd:string | Younten^^xsd:string |

The screenshot displays the Protégé ontology editor interface. The top navigation bar includes tabs for 'Active ontology', 'Entities', 'Individuals by class', 'OWL Viz', 'DL Query', and 'SPARQL Query'. Below this, there are tabs for 'Annotation properties', 'Datatypes', and 'Individuals'. The main left pane shows the 'Class hierarchy: CQ7' with a tree structure. The right pane shows the 'Description: CQ7' with various class axioms.

Class hierarchy: CQ7

- owl:Thing
 - Author
 - Course
 - CourseFromYounten
 - CourseLearnedByHenry
 - CourseOffered
 - Applied_Data_Science
 - Diploma_in_Computer_Networking
 - Information_System_Design_and_Management
 - Introduction_Data_Science
 - Juniper_Open_Learning
 - Networking_in_Google_Cloud
 - Software_Design_and_Development
 - Statistics_and_Data_Science
 - CourseOutdated
 - CoursesFromHarvard
 - CourseWithHighRating
 - CourseWithoutCertificate
 - CQ1
 - CQ10
 - CQ2
 - CQ3
 - CQ4
 - CQ5
 - CQ6
 - CQ7**
 - CQ8
 - CQ9
 - DataScienceCourses
 - FreeCourses
 - NetworkingCourses
 - PrerequisiteForHerny
 - SoftwareEngineeringCourses
 - CourseCategory
 - Data_Science_Course
 - Networking_Course
 - Software_Engineering_Course
 - CourseOragnizer
 - MOOC
 - University
 - Learner

Description: CQ7

Equivalent To +

- Course
 - and (CourseFromYounten
 - and CourseWithHighRating
 - and FreeCourses)

SubClass Of +

- CourseFromYounten
- CourseWithHighRating
- FreeCourses

General class axioms +

SubClass Of (Anonymous Ancestor)

- Course
 - and (CourseRating some xsd:integer[>= 4])
- Course
 - and (CourseFee some xsd:integer[<= 0])
- Course
 - and (hasAuthor value A4)

Instances +

- SE1

8. If I take the ABC course, what are some of the prerequisite courses that I need to attend?

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name ?Learner ?Prerequisite ?RName WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:isLearnBy ?a.
    ?a oc:LearnerName ?Learner. FILTER regex(?Learner, "Henry").
    ?Prerequisite oc:isPrerequisiteOf ?Course.
    ?Prerequisite oc:CourseName ?RName
}
```

Active ontology x
Entities x
Individuals by class x
OWL Viz x
DL Query x
SPARQL Query x

Snap SPARQL Query: 🔍 📄 🗑

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name ?Learner ?Prerequisite ?RName WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:isLearnBy ?a.
    ?a oc:LearnerName ?Learner. FILTER regex(?Learner, "Henry").
    ?Prerequisite oc:isPrerequisiteOf ?Course.
    ?Prerequisite oc:CourseName ?RName
}
    
```

Execute

| ?Course | ?Name | ?Learner | ?Prerequisite | ?RName |
|---------|--|-------------------------------|---------------|--|
| oc:DS1 | Applied Data Science with Python ^{^^xsd:string} | Henry ^{^^xsd:string} | oc:DS3 | Introduction to Data Science ^{^^xsd:string} |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Class hierarchy: CQ8

Annotations: CQ8

Description: CQ8

Equivalent To +

Course
and (isPrerequisiteOf value DS1)

SubClass Of +

PrerequisiteForHerny

General class axioms +

SubClass Of (Anonymous Ancestor)

Course
and (isPrerequisiteOf some (isLearnBy value L2))

Instances +

DS3

Target for Key +

Disjoint With +

Disjoint Union Of +

owl:Thing

Author

Course

CourseFromYounten

CourseLearnedByHenry

CourseOffered

Applied_Data_Science

Diploma_in_Computer_Networking

Information_System_Design_and_Management

Introduction_Data_Science

Juniper_Open_Learning

Networking_in_Google_Cloud

Software_Design_and_Development

Statistics_and_Data_Science

CourseOutdated

CoursesFromHarvard

CourseWithHighRating

CourseWithoutCertificate

CQ1

CQ10

CQ2

CQ3

CQ4

CQ5

CQ6

CQ7

CQ8

CQ9

DataScienceCourses

FreeCourses

NetworkingCourses

PrerequisiteForHerny

SoftwareEngineeringCourses

CourseCategory

Data_Science_Course

Networking_Course

Software_Engineering_Course

CourseOragnizer

MOOC

University

Learner

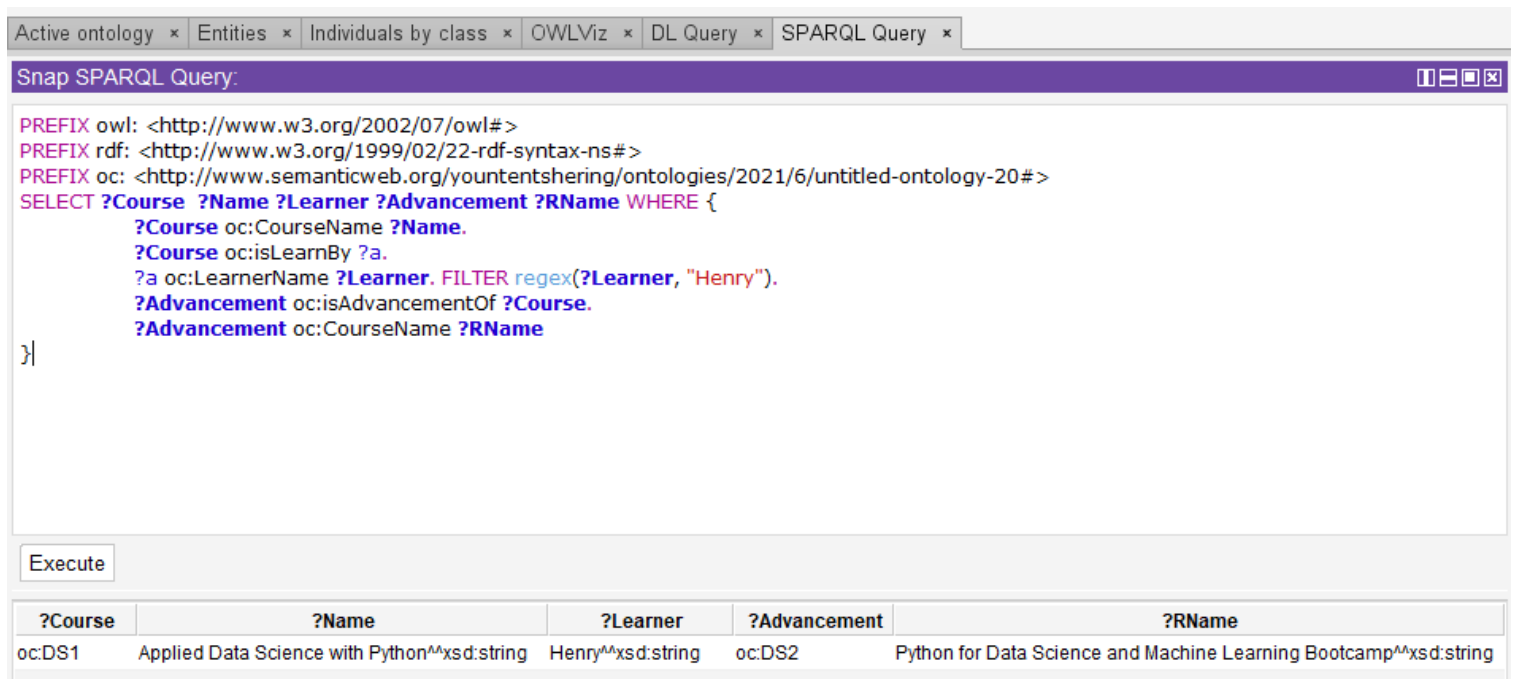
9. List some of the advanced/recommended courses after completing a particular course.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name ?Learner ?Advancement ?RName WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:isLearnBy ?a.
    ?a oc:LearnerName ?Learner. FILTER regex(?Learner, "Henry").
    ?Advancement oc:isAdvancementOf ?Course.
    ?Advancement oc:CourseName ?RName
}
```



The screenshot shows a web application with tabs for 'Active ontology', 'Entities', 'Individuals by class', 'OWL Viz', 'DL Query', and 'SPARQL Query'. The 'SPARQL Query' tab is active, displaying a text area with the SPARQL query. Below the text area is an 'Execute' button. The results are shown in a table with five columns: ?Course, ?Name, ?Learner, ?Advancement, and ?RName. The first row of results is: oc:DS1, Applied Data Science with Python, Henry, oc:DS2, Python for Data Science and Machine Learning Bootcamp.

| ?Course | ?Name | ?Learner | ?Advancement | ?RName |
|---------|----------------------------------|----------|--------------|---|
| oc:DS1 | Applied Data Science with Python | Henry | oc:DS2 | Python for Data Science and Machine Learning Bootcamp |

Another Way to get the list:

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name ?Advancement ?AName WHERE {
    ?Course oc:CourseName ?Name.
    ?Advancement oc:isAdvancementOf ?Course.
    ?Advancement oc:CourseName ?AName
}
```

Active ontology ×
Entities ×
Individuals by class ×
OWL Viz ×
DL Query ×
SPARQL Query ×

Snap SPARQL Query: ⏏ ⏏ ⏏ ⏏

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name ?Advancement ?AName WHERE {
    ?Course oc:CourseName ?Name.
    ?Advancement oc:isAdvancementOf ?Course.
    ?Advancement oc:CourseName ?AName
}
```

Execute

| ?Course | ?Name | ?Advancement | ?AName |
|---------|--|--------------|--|
| oc:DS1 | Applied Data Science with Python ^{^xsd:string} | oc:DS2 | Python for Data Science and Machine Learning Bootcamp ^{^xsd:string} |
| oc:DS3 | Introduction to Data Science ^{^xsd:string} | oc:DS1 | Applied Data Science with Python ^{^xsd:string} |
| oc:N4 | Introduction to Open Source Networking Technologies ^{^xsd:string} | oc:N5 | Computer Networking ^{^xsd:string} |
| oc:SE3 | Learn Software Design and Development ^{^xsd:string} | oc:SE4 | Software Architecture and Design ^{^xsd:string} |

The screenshot displays the OWL2 Web Editor interface for an ontology. The top navigation bar includes tabs for 'Active ontology', 'Entities', 'Individuals by class', 'OWL Viz', 'DL Query', and 'SPARQL Query'. Below this, there are tabs for 'Annotation properties', 'Datatypes', 'Individuals', 'Classes', 'Object properties', and 'Data properties'. The main left pane shows the 'Class hierarchy: CQ9' with a tree structure. The right pane shows the 'Description: CQ9' with various logical expressions.

Class hierarchy: CQ9

- owl:Thing
 - Author
 - Course
 - CourseFromYounten
 - CourseLearnedByHenry
 - CourseOffered
 - Applied_Data_Science
 - Diploma_in_Computer_Networking
 - Information_System_Design_and_Management
 - Introduction_Data_Science
 - Juniper_Open_Learning
 - Networking_in_Google_Cloud
 - Software_Design_and_Development
 - Statistics_and_Data_Science
 - CourseOutdated
 - CoursesFromHarvard
 - CourseWithHighRating
 - CourseWithoutCertificate
 - CQ1
 - CQ10
 - CQ2
 - CQ3
 - CQ4
 - CQ5
 - CQ6
 - CQ7
 - CQ8
 - CQ9**
 - DataScienceCourses
 - FreeCourses
 - NetworkingCourses
 - PrerequisiteForHenry
 - SoftwareEngineeringCourses
 - CourseCategory
 - Data_Science_Course
 - Networking_Course
 - Software_Engineering_Course
 - CourseOragnizer
 - MOOC
 - University
 - Learner

Description: CQ9

- Equivalent To: Course and (isAdvancementOf value DS1)
- SubClass Of: CourseOffered
- General class axioms
- SubClass Of (Anonymous Ancestor)
- Instances: DS2
- Target for Key
- Disjoint With
- Disjoint Union Of

10. Mrs. E has some budget limitation; recommend some courses which are below or equal to 100 Euro to her.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseFee ?x FILTER (?x <=100 && ?x !=0)
}
```

Active ontology x
Entities x
Individuals by class x
OWL Viz x
DL Query x
SPARQL Query x

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseFee ?x FILTER (?x <=100 && ?x !=0)
}
```

Execute

| ?Course | ?Name |
|---------|---|
| oc:DS3 | Introduction to Data Science ^{^^xsd:string} |
| oc:N2 | Networking in Google Cloud ^{^^xsd:string} |
| oc:N4 | Introduction to Open Source Networking Technologies ^{^^xsd:string} |
| oc:N5 | Computer Networking ^{^^xsd:string} |

Active ontology x Entities x Individuals by class x OWLViz x DL Query x SPARQL Query x

Annotation properties Datatypes Individuals

Classes Object properties Data properties

Class hierarchy: CQ10

Annotations: CQ10

Description: CQ10

Equivalent To +

Course and (CourseFee some xsd:integer[<= 100])

SubClass Of +

Course

General class axioms +

SubClass Of (Anonymous Ancestor)

Instances +

DS3 N2 N4 N5

Target for Key +

Disjoint With +

Disjoint Union Of +

owl:Thing

Author

Course

CourseFromYounten

CourseLearnedByHenry

CourseOffered

Applied_Data_Science

Diploma_in_Computer_Networking

Information_System_Design_and_Management

Introduction_Data_Science

Juniper_Open_Learning

Networking_in_Google_Cloud

Software_Design_and_Development

Statistics_and_Data_Science

CourseOutdated

CoursesFromHarvard

CourseWithHighRating

CourseWithoutCertificate

CQ1

CQ10

CQ2

CQ3

CQ4

CQ5

CQ6

CQ7

CQ8

CQ9

DataScienceCourses

FreeCourses

NetworkingCourses

PrerequisiteForHerny

SoftwareEngineeringCourses

CourseCategory

Data_Science_Course

Networking_Course

Software_Engineering_Course

CourseOragnizer

MOOC

University

Learner

Extra

Check the recent updated course.

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>

```
SELECT ?Course ?Name ?Update WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseLastUpdate ?Update
}
```

Order By DESC(?Update)

Active ontology x
Entities x
Individuals by class x
OWLviz x
DL Query x
SPARQL Query x

Snap SPARQL Query:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX oc: <http://www.semanticweb.org/yountentshering/ontologies/2021/6/untitled-ontology-20#>
SELECT ?Course ?Name ?Update WHERE {
    ?Course oc:CourseName ?Name.
    ?Course oc:CourseLastUpdate ?Update
}
Order By DESC(?Update)

```

Execute

| ?Course | ?Name | ?Update |
|---------|--|-----------------------------------|
| oc:SE2 | Information System Design and Management^^xsd:stri... | 2021-12-01T09:00:06^^xsd:dateTime |
| oc:SE1 | Software Engineering Training^^xsd:string | 2021-12-01T09:00:03^^xsd:dateTime |
| oc:DS3 | Introduction to Data Science^^xsd:string | 2021-12-01T09:00:02^^xsd:dateTime |
| oc:N1 | Juniper Open Learning^^xsd:string | 2020-12-01T09:00:06^^xsd:dateTime |
| oc:N2 | Networking in Google Cloud^^xsd:string | 2020-12-01T09:00:06^^xsd:dateTime |
| oc:N4 | Introduction to Open Source Networking Technologies^^... | 2020-12-01T09:00:06^^xsd:dateTime |
| oc:SE4 | Software Architecture and Design^^xsd:string | 2020-12-01T09:00:05^^xsd:dateTime |
| oc:DS2 | Python for Data Science and Machine Learning Bootca... | 2020-12-01T09:00:01^^xsd:dateTime |
| oc:DS1 | Applied Data Science with Python^^xsd:string | 2020-12-01T09:00:00^^xsd:dateTime |
| oc:SE3 | Learn Software Design and Development^^xsd:string | 2019-12-01T09:00:04^^xsd:dateTime |
| oc:DS4 | MicroMasters Statistics and Data Science^^xsd:string | 2019-12-01T09:00:03^^xsd:dateTime |
| oc:N3 | The Bits and Bytes of Computer Networking^^xsd:string | 2017-12-01T09:00:06^^xsd:dateTime |