



COMP 6741
Intelligent Systems

PROJECT: Unibot

TEAM 8

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Competency Questions

- Q1: What is the course SOEN6431 about?
- Q2: Which topics is Manthan competent in?
- Q3: Which topics were covered in the first lecture of SOEN6431?
- Q4: Which subjects are offered by SOEN department?
- Q5: Show me the subjects related to Finance.
- Q6: How many subjects did Jaynil studied?
- Q7: Provide the worksheets of 3rd and 4th week in COMP6741.
- Q8: Provide me the 4th lectures detail of SOEN 6431.
- Q9: In which subjects Jaynil scored grade A?
- Q10: Which lecture covers "SPARQL"?

Vocabulary

There are a variety of vocabularies accessible for various reasons. We used several vocabularies to build the knowledge graph, like DBP, FOAF, DC, RDF, and RDFS. We utilised foaf:name from the FOAF ontology to define the entity in the knowledge graph that is related to individuals. We used DBP as a prefix to attach a dbpedia link in triples, and this DBP is used in many places, such as topics of lectures. To specify the course information and course number, the DC vocabulary's dc:description and dc:identifier attributes are applied. We also used the rdfs:seeAlso property to add course resources like an overview, as well as the rdfs:comment property to offer a summary of the lecture specifics.

To build a knowledge graph, we applied FOAF, RDFS, and RDF Ontologies to define custom classes and properties. We developed the uni:University, uni:Course, uni:Lecture, and uni:Student classes from rdfs:Class to describe details about university, course, subject, lecture, and student. We made different properties such as uni:creditIs, uni:subjectOf, uni:slideIs, uni:topicIs, uni:grade and uni:idnumberIs from rdf:property to attach details about additional information about students and courses. To add a description of classes and properties, the RDFS vocabulary terms rdfs:comment, rdfs:domain, and rdfs:range are used.

Knowledge Base Construction

We used two CSV files from the <https://opendata.concordia.ca/datasets/> to construct the knowledge base of courses offered by the university: CU SR OPEN DATA CATALOG-47958298.csv and CU SR OPEN DATA CATALOG DESC-45649197.csv. First, we combined these two files because one contains a list of courses and the other includes descriptions of these courses. Then, using pandas, we read this merged CSV file. This file was iterated to add triples of the course's name, department, code, credit, and description. We also include all the data from two courses, COMP6741 and SOEN6431, including outlines, slides, and worksheets. We created a course folder and put data of these two courses in it. To add the links of slides and worksheets we used the “OS” library and added the triples to the knowledge graph.

In the knowledge graph, we additionally inserted topics (with DBpedia links) for each lecture. We used SPOTLIGHT to produce the links for each topic and created a CSV file with all the topics and DBpedia URLs. We added topics to lecture triples by using this CSV file. Two students were added to the knowledge graph, with triples of name, identification number, email, and a list of completed courses with grades.

Queries

QUE 1: what is the course SOEN6431 about?

In this query, we select the course, which is the part of **SOEN** subject and has the identifier **6431**. We displayed the description of this course, and we also select the outline if it is available. For that we used **OPTIONAL** keyword.

```
SELECT ?course_outline ?description
WHERE {
    ?course rdf:type uni:Course ;
    uni:subjectOf "SOEN" ;
    dc:identifier "6431" ;
    dc:description ?description ;
    OPTIONAL { ?course rdfs:seeAlso ?course_outline }
}
```

Output:

course_outline	description
1 < http://localhost:3030/IS_Project/file%3A%5C%5C%3A%5CUser%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourse%5CSOEN6431%5Ccourse_outline.pdf >	The course addresses both technical and managerial views of software comprehension and software maintenance issues. Topics covered in this course include: cognitive models, software visualization, CASE tools, reverse engineering, static and dynamic source code analysis, software configuration management, and introduction to current research topics in software maintenance and program comprehension. A project is required.

Showing 1 to 1 of 1 entries

< 1 >

QUE 2: Which topics is Manthan competent in?

In this query, we selected the list of **course** completed by student **Manthan** and retrieved the **topics** of each lecture of these subjects.

```
SELECT ?topics
WHERE {
    ?course a uni:CompletedCourse ;
            foaf:givenName "Manthan" ;
            uni:courseIs ?courses .
    ?name rdf:type uni:Lecture ;
            dc:isPartOf ?courses ;
            uni:topicIs ?topics .
}
```

Output:

	topics
1	< http://dbpedia.org/resource/Bernhard_Horwitz >
2	< http://dbpedia.org/resource/Compiler >
3	< http://dbpedia.org/resource/Dependent_and_independent_variables >
4	< http://dbpedia.org/resource/Association_for_Computing_Machinery >
5	< http://dbpedia.org/resource/Debugging >
6	< http://dbpedia.org/resource/Control-flow_graph >
7	< http://dbpedia.org/resource/Routing >

QUE 3: Which topics were covered in the first lecture of SOEN6431?

In this query, first we selected course, which is part of **SOEN6431**, and which have **identifier 1** (**Lecture 1**) and displayed the **topics** of this lecture.

```
SELECT ?topics
WHERE {
    ?course rdf:type uni:Lecture ;
            dc:isPartOf "SOEN6431" ;
            dc:identifier "1" ;
            uni:topicIs ?topics .
}
```

Output:

	topics
1	< http://dbpedia.org/resource/Code_refactoring >
2	< http://dbpedia.org/resource/Percival_Lowell >
3	< http://dbpedia.org/resource/Evolution >
4	< http://dbpedia.org/resource/Lincoln_Near-Earth_Asteroid_Research >
5	< http://dbpedia.org/resource/Unix >
6	< http://dbpedia.org/resource/Evolvability >
7	< http://dbpedia.org/resource/Outsourcing >
8	< http://dbpedia.org/resource/Industry >

QUE 4: Which subjects are offered by SOEN department?

In this query, we selected the course, which is the part of **SOEN** department and displayed the list of this **course name**.

```
SELECT ?name
WHERE {
    ?course rdf:type uni:Course ;
    uni:subjectOf "SOEN" ;
    foaf:name ?name.
}
```

Output:

	name
1	ADV. PROG. PRACTICES
2	SYSTEMS REQMT. SPECIFICATION
3	Project and Report
4	Data Systems for Software Engineers
5	BIG DATA ANALYTICS
6	SOFTWARE VERIFICAT N/TESTING
7	SOFTWARE ENG.CASE STUDY

QUE 5: Show me the subjects related to Finance.

In this query, we selected the name of all **subjects** available in knowledge base and by using **FILETER** keyword, only displayed the **course name** which contains **Finance** keyword.

```

SELECT ?name
  WHERE{
    ?course a uni:Course ;
    foaf:name ?name .
    FILTER contains((?name),"Finance")
  }

```

Output:

	name
1	Perspective on Canadian Business (Administered by the Finance Department)
2	Cases in Finance
3	Honours Seminar in Finance
4	International Finance
5	Theory of Finance II
6	Personal Finance
7	Real Estate Investment and Finance
8	Behavioural Finance

QUE 6: How many subjects did Jaynil studied?

In this query, we selected the list of **completed subjects** of student whose name is **Jaynil** and count the total number of subjects using **COUNT** keyword.

```

SELECT (COUNT(?course) as ?total)
  WHERE{
    ?course a uni:CompletedCourse ;
    foaf:givenName "Jaynil" .
  }

```

Output:

	total
1	"2"^^<http://www.w3.org/2001/XMLSchema#integer>

QUE 7: Provide the worksheets of 3rd and 4th week in COMP6741.

In this query, we selected the lectures of **COMP6741** and displayed the link of worksheets of **week 3** and **week 4**. To select the two lectures we used **UNION** keyword.

```

SELECT ?work_sheets
WHERE{
    ?lec a uni:Lecture ;
        dc:isPartOf "COMP6741" ;
        uni:worksheetIs ?work_sheets .
    {?lec dc:identifier "3" ; }
    UNION
    {?lec dc:identifier "4" ; }
}

```

Output:

	work_sheets
1	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CCOMP6741%5Cworksheets%5Cworksheet_4.pdf>
2	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CCOMP6741%5Cworksheets%5Cworksheet_3.pdf>

QUE 8: Provide me the 4th lectures detail of SOEN 6431.

In this query, we selected the lecture of **SOEN6431**, whose **lecture number is 4** and displayed the **slides** and **topics** of this lecture. We also select **worksheet** if it is available using **OPTIONAL** keyword.

```

SELECT ?slide ?topics ?work_sheets
WHERE{
    ?lec a uni:Lecture ;
        dc:identifier "4" ;
        dc:isPartOf "SOEN6431" ;
        uni:slideIs ?slide ;
        uni:topicIs ?topics .
    OPTIONAL {?lec uni:worksheetIs ?work_sheets}
}

```

Output:

	slide	topics	work_sheets
1	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CSOEN6431%5Cslides%5Cslides_4.pdf>	<http://dbpedia.org/resource/Dataflow>	
2	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CSOEN6431%5Cslides%5Cslides_4.pdf>	<http://dbpedia.org/resource/Dead_code>	
3	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CSOEN6431%5Cslides%5Cslides_4.pdf>	<http://dbpedia.org/resource/Instruction_pipelining>	
4	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CSOEN6431%5Cslides%5Cslides_4.pdf>	<http://dbpedia.org/resource/Interview>	
5	<http://localhost:3030/IS_Project/C%3A%5CUsers%5CManthan%20Moradiya%5CDesktop%5CChat-bot%5Ccourses%5CSOEN6431%5Cslides%5Cslides_4.pdf>	<http://dbpedia.org/resource/Partition_of_a_set>	

QUE 9: In which subjects Jaynil scored grade A?

In this query, we selected the **list of subjects completed** by student **Jaynil** and has **grade A**. With the use of this selected subject number, we displayed the **name of this subject** using **FILTER** and **contains** keyword.

```
SELECT ?name
WHERE{
    ?course a uni:CompletedCourse ;
            foaf:givenName "Jaynil" ;
            uni:grade "A" ;
            uni:courseIs ?courseID .
    ?courses a uni:Course ;
            dc:identifier ?code ;
            uni:subjectOf ?sub ;
            foaf:name ?name .
    FILTER contains((?courseID), ?code)
    FILTER contains((?courseID), ?sub)
}
```

Output:

	name
1	SOFT. COMP.& MAINTENANCE

QUE 10: Which lecture covers "SPARQL"?

In this query, we selected the lectures in which **SPARQL** topic is **covered** and displayed the **name** of this lectures.

```
SELECT ?names
WHERE{
    ?lec a uni:Lecture ;
        uni:topicIs dbp:SPARQL ;
        foaf:name ?names .
}
```

Output:

	names
1	Knowledge Base Queries & SPARQL
2	Knowledge Base Design & Applications