Task 1: Introduction

This task contains 50 multiple-choice questions. Each correct answer gives 0.5 points. Maximum score is 25 points. The task counts 25% of the exam. You should try to spend less than 60 minutes on it.

1 INFO216 multi: About the LOD Cloud

What is true about the Linked Open Data Cloud?
Select one alternative:

- LOD Cloud consists of semantic datasets on the web that are connected by shared identifiers
- LOD Cloud is a global search engine for knowledge graphs
- LOD Cloud is a hosted triple store solution for semantic data
- LOD Cloud is a vocabulary for connecting data sets over the web of data

Maximum marks: 0.5

2 INFO216 multi: not a core LOD principle

Which is NOT a core LOD principle?
Select one alternative:

- Use URIs that answer to HTTP requests
- URIs return information about resources on standard semantic formats
- Use URIs that are language-independent
- URIs return information that contain URIs of related resources

Maximum marks: 0.5

3 INFO216 multi: not a LOD best practice

Which is NOT a best practice for data provisioning in the LOD cloud?
Select one alternative:

- Link proprietary (own) vocabulary terms to other vocabularies
- Use terms from widely deployed vocabularies
- Provide provenance metadata (e.g., PROV)
- Refer to additional access methods (e.g., SPARQL)
- Provide licensing metadata (e.g., CC)
- Use URIs that are standardised by the W3C

Maximum marks: 0.5

4 INFO216 multi: year of the cloud

When did the LOD cloud start to form?
Select one alternative:

- From 2002
- From 2007
- From 1998
- From 2012

Maximum marks: 0.5

5 INFO216 multi: early LOD cloud

Which of these semantic datasets were central hubs in the first two years of the LOD cloud?
Select one alternative:

- DBpedia, FOAF and GeoNames
- Dublin Core, FOAF and SKOS
- DBpedia, Freebase and Wikidata
- Microdata, schema.org and Amazon

Maximum marks: 0.5

6 INFO216 multi: AAA

What does the initialism AAA stand for?
Select one alternative:

- anyone can say anything about any topic
- anyone can link anything about any topic
- anyone can add anything from anywhere

Maximum marks: 0.5

7 INFO216 multi: RDF resources can be

It is most precise to say that an RDF resource can be
Select one alternative:

- any of these
- a concept
- a property
- an information resource
- a material phenomenon (including people and artefacts)

Maximum marks: 0.5

8 INFO216 multi: RDFS resource types

According to RDFS semantics, a resource
Select one alternative:

- always has rdfs:Class as its rdf:type
- must have exactly one rdf:type
- always has at least one rdf:type
- may or may not have an rdf:type

Maximum marks: 0.5

9 INFO216 multi: rdf:List

Which resources can be used in a rdf:List?
Select one alternative:

- rdf:rest, rdf:first, rdf:nil
- rdfs:member
- rdf:first, rdf:last, rdf:nil
- rdf:_1, rdf:_2, rdf:_3

Maximum marks: 0.5

10 INFO216 multi: RDF list

It is true about an rdf:List (collection) that
Select one alternative:

- It is typically used to represent alternatives
- It cannot contain the same resource several times
- New members cannot be added without deleting triples
- It is easy to add new members

Maximum marks: 0.5

11 INFO216 multi: About blank nodes (select the incorrect one)

What is NOT true about blank nodes
Select one alternative:

- Blank nodes have no IRI
- Blank nodes can have a local identifier inside a graph
- Blank nodes are supported by all RDF technologies
- Blank nodes can be objects in triples.

Maximum marks: 0.5

12 INFO216 multi: RDF expressiveness

Which of these statements are supported by the basic RDF (not RDFS) semantics?
Select one alternative:

- Legally owning a gun means owning a licensed weapon
- Everything that is used as a predicate in a triple is an rdf:Property
- The subject in a hasLicensePlate triple is a Vehicle
- The object in a hasWorkHomepage triple is a URL
- A Motorbike is a Vehicle

Maximum marks: 0.5

13 INFO216 multi: RDFS Schema

RDF Schema (RDFS) is NOT
Select one alternative:

- Used for defining other vocabularies
- Used to query RDF graphs
- A small RDF-based vocabulary for more expressive graphs
- The foundation for SKOS and OWL

Maximum marks: 0.5

14 INFO216 multi: RDFS axioms

What is true about axioms in RDFS?
Select one alternative:

- They are built into the semantics of RDFS
- They must be added by the user before executing entailment rules
- They are not a part of the RDFS semantics
- They are based on description logic (DL)

Maximum marks: 0.5

15 INFO216 multi: RDFS resource classes

What is true about RDFS resource classes?
Select one alternative:

- They provide information hiding
- The properties of a resource are only visible to its neighbours
- Resources have the same RDFS class throughout their lifetime
- The properties of a resource determine its RDFS class
- Classes are templates for instantiating objects

Maximum marks: 0.5

16 INFO216 multi: why RDFS classes

What is NOT a reason that RDFS has resource classes?
Select one alternative:

- We can describe the class formally using RDFS and OWL DL
- Classes are important for defining and using other RDFS concepts
- The type (class) of a resource is an important part of its semantics
- RDFS classes restrict which properties RDF resources can have

Maximum marks: 0.5

17 INFO216 multi: RDFS properties

In RDFS which property is used to refer to further information?
Select one alternative:

- rdfs:altLabel
- rdfs:label
- rdfs:seeAlso
- rdfs:comment

Maximum marks: 0.5

18 INFO216 multi: RDFS domain and range

What is true about a triple with the form (ex:Person ex:hasPassportNumber ex:PassportNumber)
Select one alternative:

- The range of the property hasPassportNumber is PassportNumber
- The domain of the property hasPassportNumber is PassportNumber
- The range of the property hasPassportNumber is Person

Maximum marks: 0.5

19 INFO216 multi: RDFS containers

An RDFS container can *not*
Select one alternative:

- Be extended without deleting triples
- Be an rdf:List
- Be an rdfs:Alt, rdfs:Bag or rdfs:Seq
- Have duplicate members

Maximum marks: 0.5

20 INFO216 multi: RDFS expressiveness

Which statement *can* be expressed in plain RDFS?
Select one alternative:

- The BirthNumber of a Person is unique
- A class is a negation of another class
- Everyone who receives medical treatment is a patient
- A FootballTeam has 11 players, a VolleyballTeam only 6
- A class is a union (or intersection) of other classes

Maximum marks: 0.5

21 INFO216 multi: RDFS expressiveness 2

Which statement *can* be expressed in plain RDFS?
Select one alternative:

- A Republic has exactly one President
- Everyone who is a goalkeeper for a team is a player for that team.
- A StringQuartet has two violins but only one viola and one cello
- Two individuals with different URIs are actually different
- Every ancestor of an ancestor is an ancestor too

Maximum marks: 0.5

22 INFO216 multi: OWA

According to the Open World Assumption (OWA), can we assume that the information available at any point is all the information available?
Select one alternative:

- Yes, if we use the information immediately
- No, we may not
- Only if the sources are trusted

Maximum marks: 0.5

23 INFO216 multi: Nonunique Naming Assumption

What does the Non-unique Naming Assumption mean for knowledge graphs?
Select one alternative:

- The same resource might be referred to using different URIs by different people.
- The same RDF resource is always referred to using the same URI by everyone.
- URIs cannot be used to name web resources.

Maximum marks: 0.5

24 INFO216 multi: reused terms in OWL

Which properties defined by RDF and RDFS are reused in OWL?
Select one alternative:

- rdf:type, rdf:sameAs, rdfs:domain
- rdf:type, rdfs:subPropertyOf, rdf:Property
- rdfs:range, rdfs:Resource, rdf:Thing

Maximum marks: 0.5

25 INFO216 multi: which OWL statement?

In OWL, the statement "Herbivores only eat Plants" is most similar to
Select an alternative:

- A complement class
- An existential property restriction
- A cardinality restriction
- A universal property restriction

Maximum marks: 0.5

26 INFO216 multi: owl:inverseOf

Which statement is most precise about the owl:inverseOf property?
Select one alternative:

- owl:inverseOf is used for properties that are always each other's reverses
- owl:inverseOf is used for properties that may be each other's reverses
- owl:inverseOf is used for classes that are necessarily each other's negations
- owl:inverseOf is used for classes that can be each other's negations

Maximum marks: 0.5

27 INFO216 multi: owl:disjointWith

owl:disjointWith can be used for properties

Select one alternative:

- owl:disjointWith can only be used object properties
- Always true
- Always false

Maximum marks: 0.5

28 INFO216 multi: owl:Nothing

What is *false* about owl:Nothing?
Select one alternative:

- It can used to represent that something is not the case
- It corresponds to False in logic
- It can be the rdf:type of an OWL individual
- It corresponds to the bottom concept in DL

Maximum marks: 0.5

29 INFO216 multi: Not the case in DL...

How can you state that something is not the case in plain DL (not OWL DL)?
Select an alternative:

- Subsumption of bottom
- Contradiction
- Negative property assertion
- Disjunctiveness

Maximum marks: 0.5

30 INFO216 multi: HermiT and Pellet

What are HermiT and Pellet examples of?
Select one alternative:

- Graph APIs
- Inference engines
- Triple stores
- Ontology editors

Maximum marks: 0.5

31 INFO216 multi: DL

What is true about description logic?
Select one alternative:

- It uses the same notation as first-order predicate logic
- It can be written in several different ways, including in OWL
- It is usually represented visually in the form of diagrams
- It has several variants, all of them semi-decidable

Maximum marks: 0.5

32 INFO216 multi: SPARQL property path

Given the property :belongsTo (:city :belongsTo :country), which SPARQL pattern gives us the cities of a given country?
Select one alternative:

- :country !:belongsTo ?city .
- :country :belongsTo+ ?city .
- :country ^:belongsTo ?city .

Maximum marks: 0.5

33 INFO216 multi: SPARQL path

Given the properties :hasDaughter and :hasSon, which SPARQL pattern gives us all the sons and daughters of a person?

Select one alternative:

- ?person : hasDaughter OR :hasSon ?child
- ?person : hasDaughter AND :hasSon ?child
- ?person : hasDaughter | :hasSon ?child

Maximum marks: 0.5

34 INFO216 multi: SPARQL restriction

If we have the following SPARQL sentence and we want to see only those products that give a revenue higher than 20000, which SPARQL clause do we need to add at the end?

```
SELECT ?product (SUM(?price) AS ?revenue) WHERE {
   ?product ex:hasSold ?price .
}
GROUP BY ?product
```

Select one alternative:

- HAVING (?revenue > 20000)
- FILTER (?revenue > 20000)
- WHERE (?revenue > 20000)

Maximum marks: 0.5

35 INFO216 multi: Not a SPARQL query

Which of the following is not a SPARQL query type?
Select one alternative:

- ASK
- CONSTRUCT
- DESCRIBE
- JOIN

Maximum marks: 0.5

36 INFO216 multi: Wikidata

Wikidata today gets most of its data from
Select an alternative:

- Wikipedia
- DBpedia
- Natural Language Processing (NLP)
- User-generated content

Maximum marks: 0.5

37 INFO216 multi: Wikidata

What is correct about Wikidata?
Select one alternative:

- Wikidata is older than DBpedia
- Wikidata is derived from Wikipedia
- Wikidata contains structured data
- Wikidata stores all its data as RDF internally

Maximum marks: 0.5

38 INFO216 multi: DBpedia

What is correct about DBpedia?
Select one alternative:

- DBpedia contains much more information than Wikidata
- DBpedia uses numeric identifiers for resources and properties
- DBpedia is derived from Wikipedia
- DBpedia can be edited by humans

Maximum marks: 0.5

39 INFO216 multi: GeoNames

What is correct about GeoNames?
Select one alternative:

- GeoNames Is a semantic encyclopaedia like Wikipedia for geology terms
- GeoNames is designed for representing geospatial information about cities, countries, states, continents, rivers …
- GeoNames is vocabulary of geo-spatial concepts like latitude, longitude and altitude

Maximum marks: 0.5

40 INFO216 multi: WordNet

What is correct about WordNet?
Select one alternative:

- WordNet is an multilingual translation semantic service
- WordNet is an electronic open-source dictionary
- WordNet is an opensource semantic network for NLP projects

Maximum marks: 0.5

41 INFO216 multi: Dublin Core (DC) is used for

The Dublin Core (DC) vocabulary is used for
Select one alternative:

- Describing governmental and regional organizations
- Describing data privacy policies
- Describing web resources and physical resources

Maximum marks: 0.5

42 INFO216 multi: FOAF vocabulary is used for (mark the incorrect one)

The FOAF vocabulary is *not* used for
Select one alternative:

- describing people, the links between them
- describing peoples emotions and feelings
- describing things that people can do and social web sites

Maximum marks: 0.5

43 INFO216 multi: Geo (WGS84) vocabulary

The Geo (WGS84) vocabulary is used
Select one alternative:

- for representing latitude, longitude and altitude
- for representing geology and earth science terms
- for representing cities, countries, states, continents, rivers, and so on

Maximum marks: 0.5

44 INFO216 multi: Event ontology properties

Important properties in the Event ontology are
Select one alternative:

- product, agent, offer, price, customer
- before, after, overlap, meet
- place, time, factor, agent, sub_event
- related_event, broader_event, narrower_event, see_also

Maximum marks: 0.5

45 INFO216 multi: SIOC

SIOC is a vocabulary / ontology for
Select one alternative:

- Representation of security information online to prevent cybercrime
- Representing classification schemas such as library catalogues
- Representing the context and origin of semantic information
- Representing information originating from social media

Maximum marks: 0.5

46 INFO216 multi: schema.org

What is true about schema.org?
Select one alternative:

- It is backed by commercial companies and targets electronic commerce
- It is backed by UNESCO and targets the cultural heritage domain
- It is a community effort to align the ontologies behind DBpedia, Wikidata and other datasets
- It is a global effort to unify the world's library catalogues

Maximum marks: 0.5

47 INFO216 multi: JSON-LD keywords

Which is *not* a reserved keyword in JSON-LD?
Select one alternative:

- @type: signifies that the JSON object with the @type key has a particular RDF type (or several types)
- @id: signifies that the JSON object with the @id key is identified by a particular URI
- @context: signifies a JSON object that contains the context (or semantic mapping) for the other objects in the same JSON array
- @rule: signifies an entailment rule that applies to the object
- @value: signifies that a value is a literal

Maximum marks: 0.5

48 INFO216 multi: relation prediction

When talking about graph embeddings, relation prediction means that
Select one alternative:

- Given two nodes, to find edge types that are candidates to form a plausible triple.
- Given a node, determine whether it plausibly represents a relation or not.
- Given a node, to find semantically similar nodes.
- Given two nodes and an edge type, to decide whether they form a plausible triple.

(Here, plausible means "likely to be true".)

Maximum marks: 0.5

49 INFO216 multi: link prediction

When talking about graph embeddings, link prediction means that
Select one alternative:

- Given a node and an edge type, to decide nodes that are candidates to form a plausible triple.
- Given a node, to find semantically similar nodes.
- Given two nodes, to find all property paths between them.
- Given two nodes and an edge type, to decide whether they form a plausible triple.

(Here, plausible means "likely to be true".)

Maximum marks: 0.5

50 INFO216 multi: triple classificaiotn

When talking about graph embeddings, triple classification means that
Select one alternative:

- Given a node and an edge type, to find nodes that are candidates to form a plausible triple.
- Given two nodes, to find edge types that are candidates to form a plausible triple.
- Given a node, to find semantically similar nodes.
- Given two nodes and an edge type, to decide whether they form a plausible triple.

(Here, plausible means "likely to be true".)

Maximum marks: 0.5

Task 2: Introduction

This task uses an existing knowledge graph about movies.

- First, you will be asked to add RDF triples to the graph. Each correct answer gives 0.5 or 1.5 points. Maximum score is 3 points.
- Next, you will be asked to write 6 SHACL constraints about the graph. Each correct constraint gives 2 points. Maximum score is 12 points.

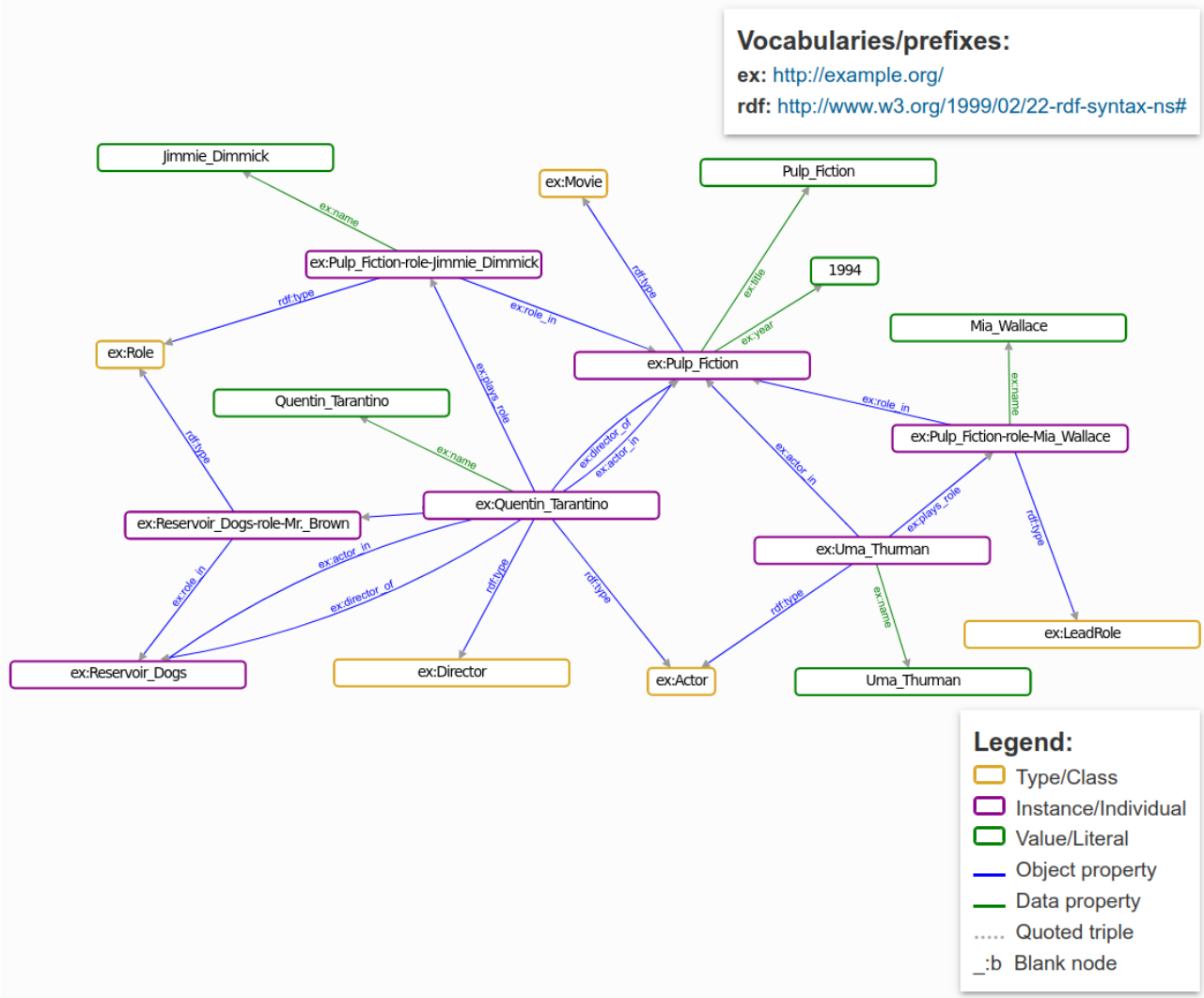
Maximum score for the whole task is 15 points. It counts 15% of the exam. You should try to spend 36 minutes on it or less.

Here is a small part of the knowledge graph in Turtle. On the next page, you will find a drawing of the graph. Later tasks in this exam will use the same graph.

```
@prefix : <http://example.org/> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

:Pulp_Fiction a :Movie ;
    :title "Pulp_Fiction" ;
    :year "1994"^^xsd:year .

:Pulp_Fiction-role-Mia_Wallace a :LeadRole ;
    :name "Mia_Wallace" ;
    :role_in :Pulp_Fiction .

:Uma_Thurman a :Actor ;
    :name "Uma_Thurman" ;
    :actor_in :Pulp_Fiction ;
    :plays_role :Pulp_Fiction-role-Mia_Wallace .

:Pulp_Fiction-role-Jimmie_Dimmick a :Role ;
    :name "Jimmie_Dimmick" ;
    :role_in :Pulp_Fiction .

:Reservoir_Dogs-role-Mr._Brown a :Role ;
    :role_in :Reservoir_Dogs .

:Quentin_Tarantino a :Actor, :Director ;
    :name "Quentin_Tarantino" ;
    :director_of :Pulp_Fiction, :Reservoir_Dogs ;
    :actor_in :Pulp_Fiction, :Reservoir_Dogs ;
    :plays_role :Pulp_Fiction-role-Jimmie_Dimmick, :Reservoir_Dogs-role-Mr._Brown .
```

Nytt dokument

Here is a drawing of the knowledge graph from the previous page.
Later tasks in this exam will use the same graph.



The introduction to task 3 will present an ontology that fits this knowledge graph, if you want to have a look already now.

51 INFO216 RDF: Add triple

Add an RDF triple to the movie knowledge graph to represent this fact:
Reservior Dogs is a movie.

Fill in your triple here

Maximum marks: 0.5

52 INFO216 RDF: Add triple

Add an RDF triple to the movie knowledge graph to represent this fact:
Reservoir Docs is directed by Quentin Tarantino.
Express this without introducing a new property that is not already used in the graph.

Fill in your triple here

Maximum marks: 0.5

53 INFO216 RDF: Add triple

Add an RDF triple to the movie knowledge graph to represent this fact:
The German title of Reservoir Dogs is "Reservoir Dogs - Wilde Hunde".
(German has language code 'de'.)

Fill in your triple here

Maximum marks: 0.5

54 INFO216 RDF: Add triples

Add RDF triples to the movie knowledge graph to represents this fact:
Quentin Tarantino is the only director of Pulp Fiction.
Express this using a new property *:list_of_directors* from the movie to a closed list of directors that has Quentin Tarantino as its only member.

Fill in your triple here

Maximum marks: 1.5

55 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
A director must have exactly one name.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

56 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
The name of a director must have type string.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

57 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
A director must be the director of at least one movie.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

58 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
If an actor is an actor in a resource, that resource must be a movie.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

59 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
If an actor plays a role that is a role in some resource, that resource must be a movie.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

60 INFO216 SHACL: Write constraint

Write a SHACL constraint in Turtle to represent this statement:
A movie must be directed by at least one dIrector or acted in by at least one actor.

Fill in your SHACL constraint here

Format

Words: 0

Maximum marks: 2

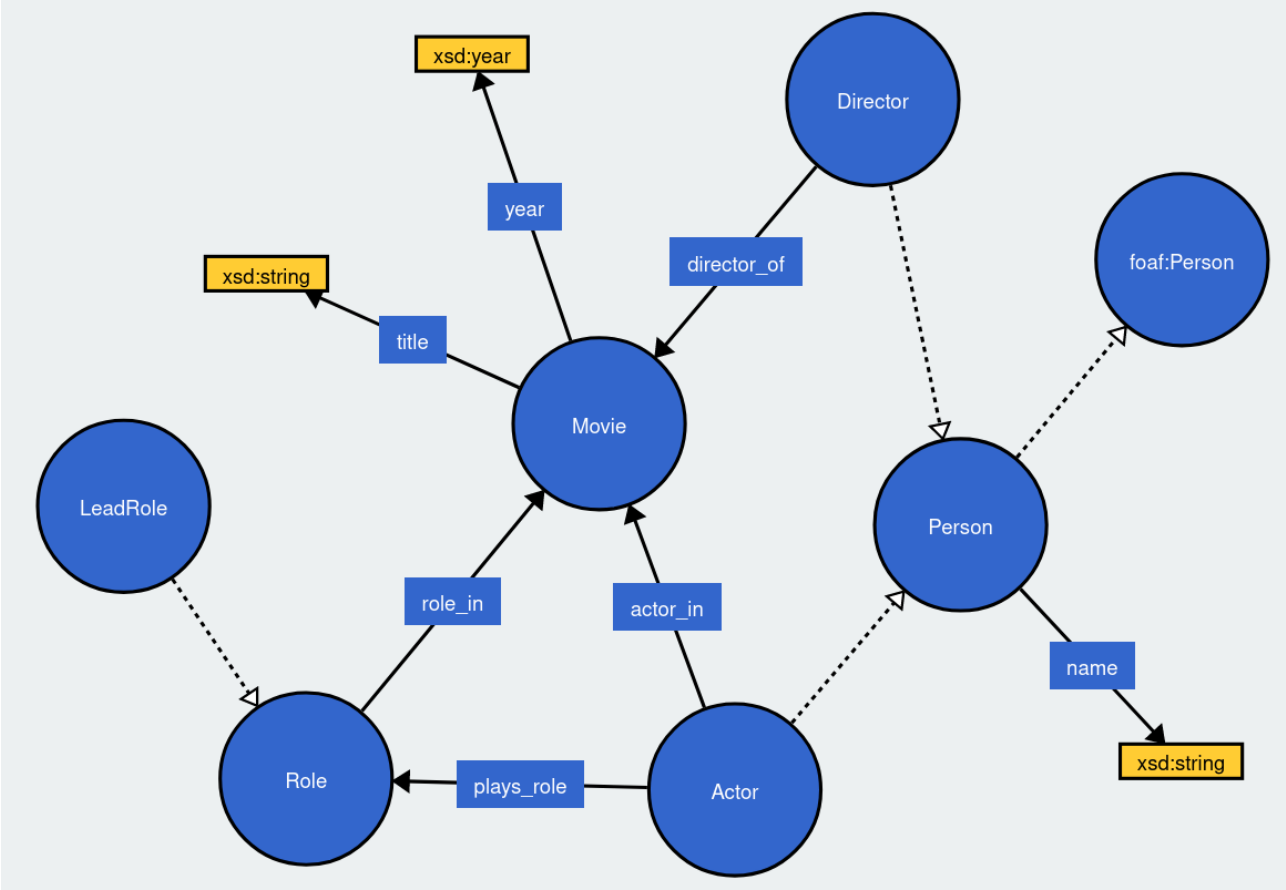
Task 3: Introduction

This task continues to use the knowledge graph about movies from Task 2.

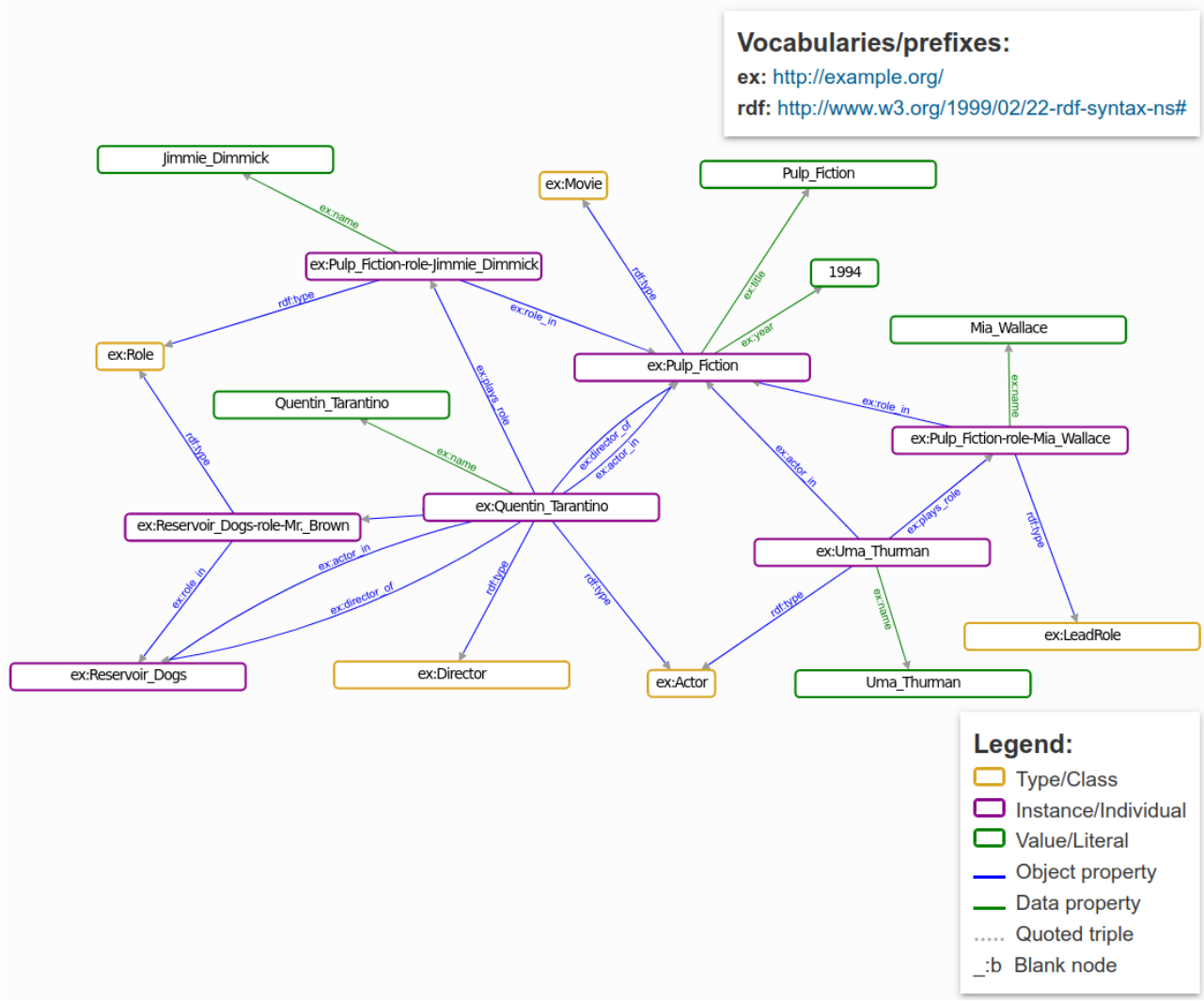
- First, you will be asked to write 5 RDFS rules in Turtle. Each correct rule gives 1 point. Maximum score is 5 points.
- Next, you will be asked to write 4 OWL constraints in Turtle. Each correct rule gives 2.5 points. Maximum score is 10 points.

Maximum score for the whole task is 15 points. It counts 15% of the exam. You should try to spend 36 minutes on it or less.

Here is a drawing of the movie ontology you will be working on. It fits the knowledge graph you used before:



And here is the example knowledge graph (same as before):


Vocabularies/prefixes:
ex: http://example.org/
rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
Jimmie_Dimmick
ex:name
ex:Movie
Pulp_Fiction
ex:Pulp_Fiction-role-Jimmie_Dimmick
rdf:type
ex:role_in
rdf:type
ex:title
1994
ex:year
Mia_Wallace
ex:Role
ex:Pulp_Fiction
ex:plays_role
Quentin_Tarantino
ex:role_in
ex:name
ex:director_of
ex:actor_in
ex:Pulp_Fiction-role-Mia_Wallace
rdf:type
ex:name
ex:Quentin_Tarantino
ex:actor_in
ex:plays_role
rdf:type
ex:Reservoir_Dogs-role-Mr._Brown
ex:Uma_Thurman
ex:role_in
ex:actor_in
ex:director_of
rdf:type
rdf:type
rdf:type
ex:name
ex:LeadRole
ex:Reservoir_Dogs
ex:Director
ex:Actor
Uma_Thurman
Legend:
Type/Class
Instance/Individual
Value/Literal
Object property
Data property
Quoted triple
_:b Blank node

61 INFO216 RDFS: Write triple

Write an RDFS triple in Turtle to represent this statement:
A resource that is the director of something is a director.

Fill in your RDFS triple here

Format

Words: 0

Maximum marks: 1

62 INFO216 RDFS: Write triple

Write an RDFS triple in Turtle to represent this statement:
A resource that something else is a director of is a movie.

Fill in your RDFS triple here

Format

Words: 0

Maximum marks: 1

63 INFO216 RDFS: Write triple

Write an RDFS triple in Turtle to represent this statement:
The year of something has type xsd:year.

Fill in your RDFS triple here

Format

Words: 0

Maximum marks: 1

64 INFO216 RDFS: Write triple

Write an RDFS triple in Turtle to represent this statement:
An actor is a person.

Fill in your RDFS triple here

Format

Words: 0

Maximum marks: 1

65 INFO216 RDFS: Write triple

Write an RDFS triple in Turtle to represent this statement:
A director is a person.

Fill in your RDFS triple here

Format

Words: 0

Maximum marks: 1

66 INFO216 OWL: Write expression

Write an OWL expression in Turtle to represent this statement:
Nothing can be both a person and a movie.

Fill in your OWL expression here

Format

Words: 0

Maximum marks: 2.5

67 INFO216 OWL: Write expression

Write an OWL expression in Turtle to represent this statement:
Nothing can be more than one of a person, a role, or a movie.

Fill in your OWL expression here

Format

Words: 0

Maximum marks: 2.5

68 INFO216 OWL: Write expression

Write an OWL expression in Turtle to represent this statement:
Something that plays in at least one movie is an actor.

Fill in your OWL expression here

Format

Words: 0

Maximum marks: 2.5

69 INFO216 OWL: Write expression

Write an OWL expression in Turtle to represent this statement:
A lead actor is an actor that plays at least one lead role.

Fill in your OWL expression here

Format

Words: 0

Maximum marks: 2.5

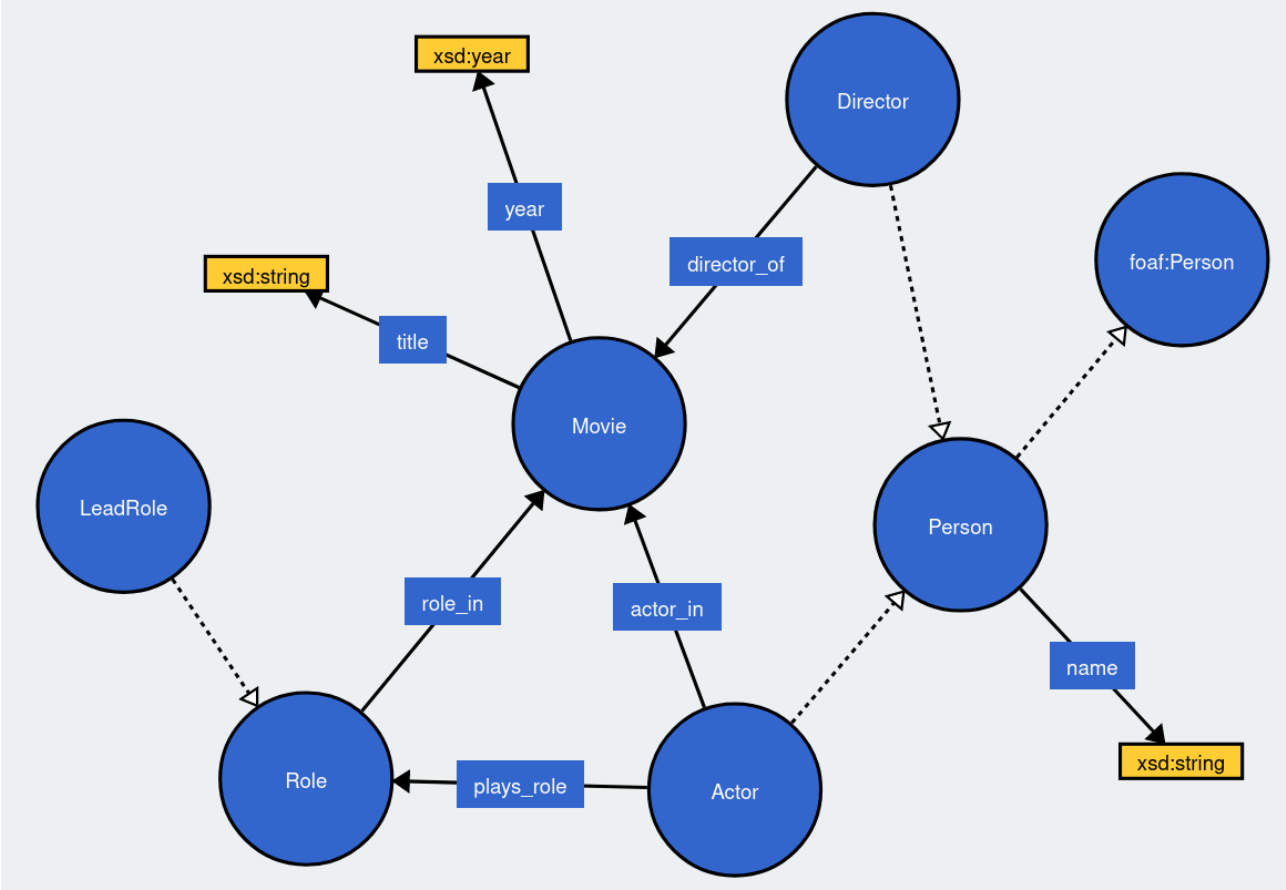
Task 4: Introduction

This task continues to use the knowledge graph and ontology about movies from Tasks 2 and 3.

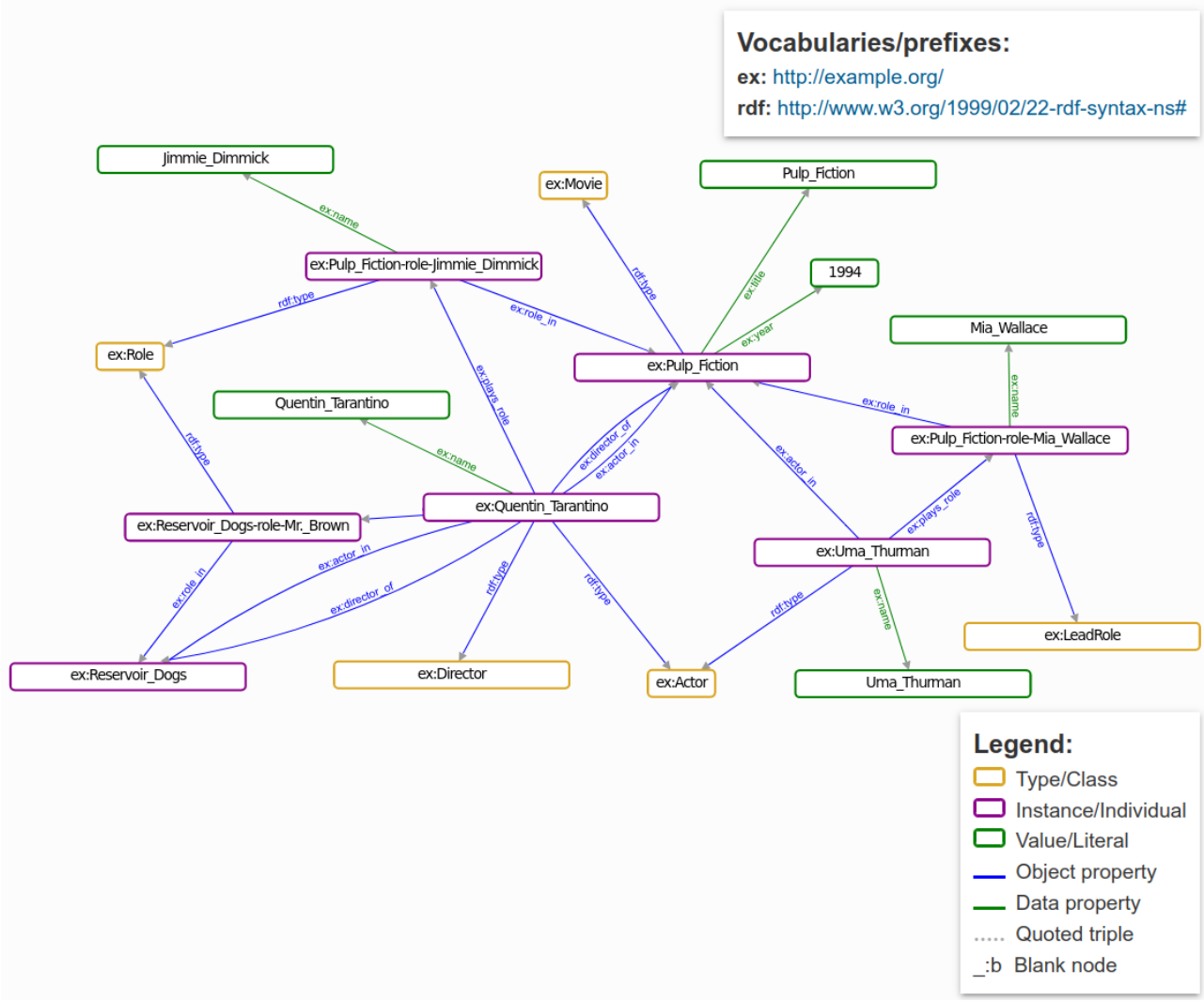
- First, you will be asked to write 8 SPARQL queries. Each correct query gives 2 points. Maximum score is 16 points.
- Next, you will be asked to write 2 SPARQL updates. Each correct update gives 2 point. Maximum score is 4 points.

Maximum score for the whole task is 20 points. It counts 20% of the exam. You should try to spend 48 minutes on it or less.

Here is the movie ontology you have been working on (same as before):



And here is the example knowledge graph (also same as before):


Vocabularies/prefixes:
ex: http://example.org/
rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
Jimmie_Dimmick
ex:name
ex:Movie
Pulp_Fiction
ex:Pulp_Fiction-role-Jimmie_Dimmick
rdf:type
ex:title
1994
ex:year
ex:role_in
Mia_Wallace
ex:Role
ex:Pulp_Fiction
ex:plays_role
Quentin_Tarantino
ex:role_in
ex:name
ex:director_of
ex:actor_in
ex:Pulp_Fiction-role-Mia_Wallace
ex:Quentin_Tarantino
ex:actor_in
ex:plays_role
ex:Reservoir_Dogs-role-Mr._Brown
ex:Uma_Thurman
ex:role_in
ex:actor_in
ex:director_of
rdf:type
ex:LeadRole
ex:Reservoir_Dogs
ex:Director
ex:Actor
Uma_Thurman
Legend:
Type/Class
Instance/Individual
Value/Literal
Object property
Data property
Quoted triple
_:b Blank node

70 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
Count the number of movies that are represented in the graph.

Fill in your SPARQL query here

Format

Words: 0

Example output:

Maximum marks: 2

71 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List the titles and years of all movies.

Fill in your SPARQL query here

Format B I U x_2 x^2 I_x Ω Σ

Words: 0

Maximum marks: 2

72 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List the titles and years of all movies since 2000.

Fill in your SPARQL query here

Format B I U x_2 x^2 I_x Ω Σ

Words: 0

Maximum marks: 2

73 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List the titles and years of all movies sorted first by year, then by name.

Fill in your SPARQL query here

Format

Words: 0

Maximum marks: 2

74 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
Count the number of movies for each year with more than one movie.

Fill in your SPARQL query here

Format

Words: 0

Maximum marks: 2

75 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List the names of all persons that are both directors and actors.

Fill in your SPARQL query here

Format B I U x_2 x^2 I_x Ω Σ

Words: 0

Maximum marks: 2

76 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List the actor name and movie title for all lead roles.

Fill in your SPARQL query here

Format

Words: 0

Maximum marks: 2

77 INFO216 SPARQL: Movie query

Write the following query in SPARQL, using only properties and classes from the ontology:
List all distinct pairs of actor names that have played lead roles in the same movies.

Fill in your SPARQL query here

Format

Words: 0

Maximum marks: 2

78 INFO216 SPARQL: Movie update

Write a SPARQL update to modify the graph as follows, using only properties and classes from the ontology:
Remove all years (of movies) that are expressed as strings (and not xsd:year) from the graph.

Fill in your SPARQL update here

Format

Words: 0

Maximum marks: 2

79 INFO216 SPARQL: Movie update

Write a SPARQL update to modify the graph as follows, using only properties and classes from the ontology:

Add the language tag 'en' to every Movie title.

Fill in your SPARQL update here

Format

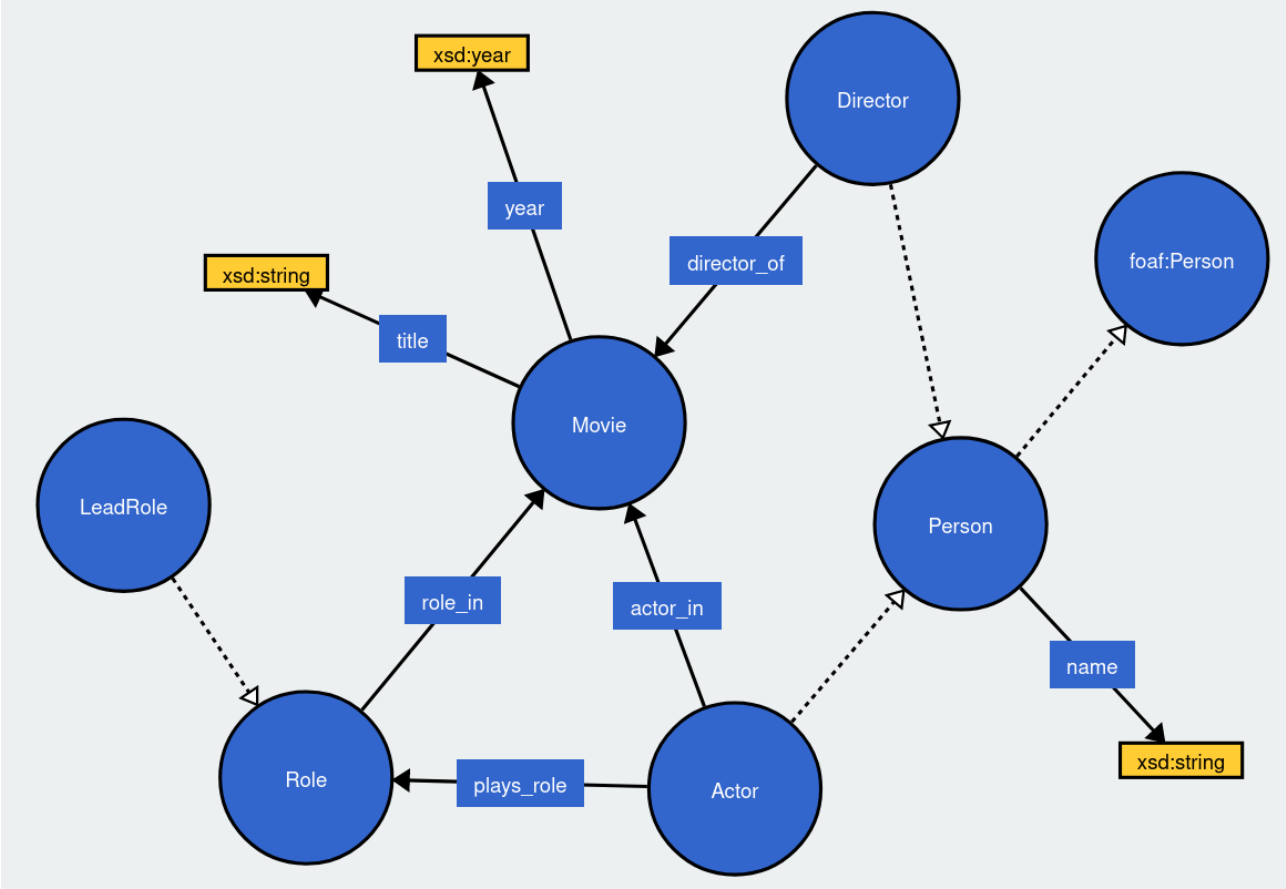
Words: 0

Maximum marks: 2

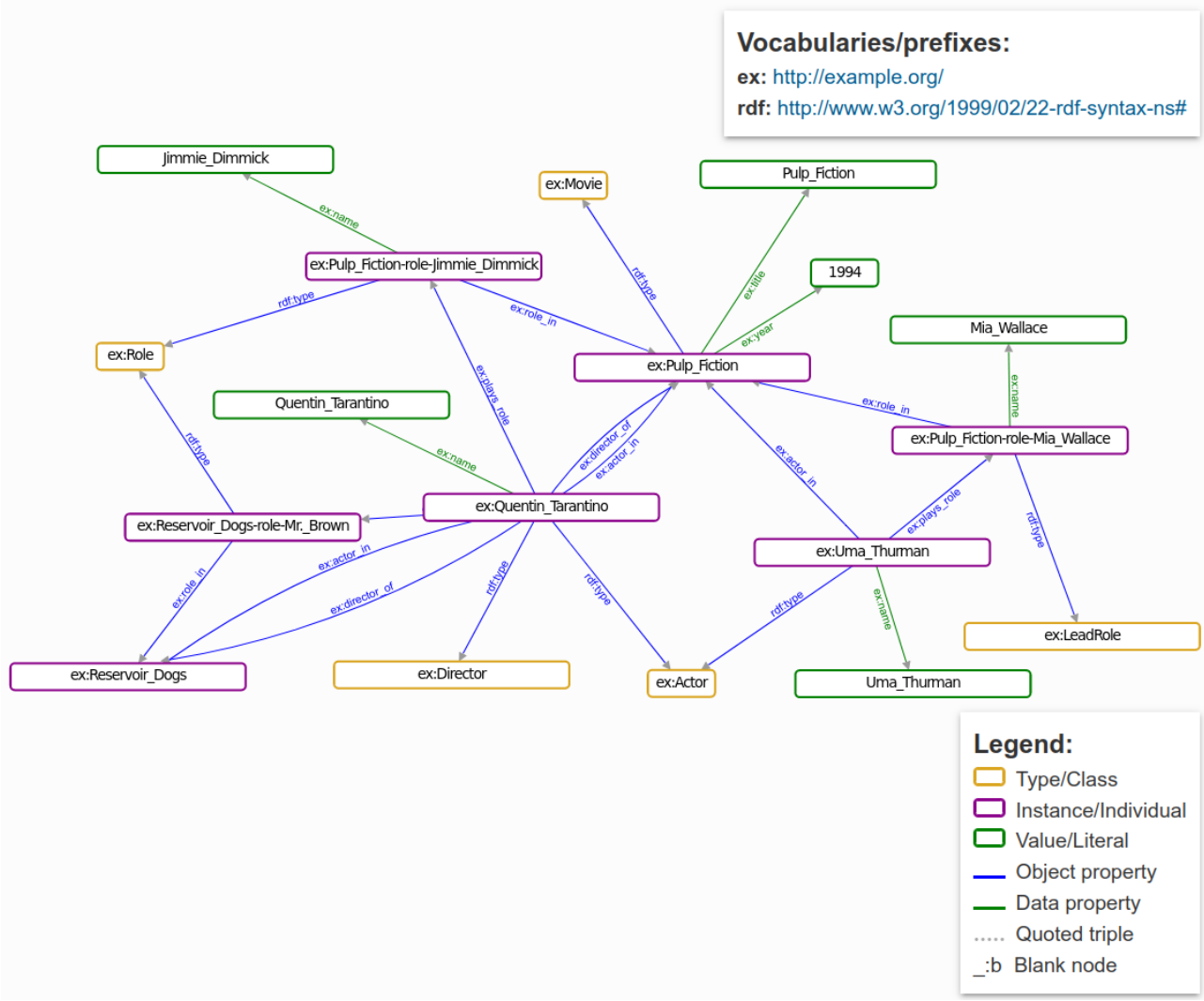
Task 5: Introduction

In this task we will continue to use the ontology and knowledge graph from Tasks 2-4. You will be asked to fill in 5 pieces of Python code. Each correct piece gives up to 5 points. Maximum score is 25 points. The task counts 25% of the exam. You should try to spend less than 60 minutes on it.

Here is the movie ontology you have been working on (same as before):



And here is the example knowledge graph (also same as before):


Vocabularies/prefixes:
ex: http://example.org/
rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
Jimmie_Dimmick
ex:name
ex:Movie
Pulp_Fiction
ex:Pulp_Fiction-role-Jimmie_Dimmick
rdf:type
ex:role_in
rdf:type
ex:title
1994
ex:year
Mia_Wallace
ex:Role
ex:Pulp_Fiction
ex:plays_role
Quentin_Tarantino
ex:role_in
ex:name
ex:director_of
ex:actor_in
ex:Pulp_Fiction-role-Mia_Wallace
rdf:type
ex:name
ex:Quentin_Tarantino
ex:actor_in
ex:Reservoir_Dogs-role-Mr._Brown
ex:plays_role
ex:Uma_Thurman
rdf:type
ex:role_in
ex:actor_in
ex:director_of
rdf:type
rdf:type
rdf:type
ex:name
ex:LeadRole
ex:Reservoir_Dogs
ex:Director
ex:Actor
Uma_Thurman
Legend:
Type/Class
Instance/Individual
Value/Literal
Object property
Data property
Quoted triple
_:b Blank node

80 INFO216 programming: New graph

Write Python code to create a new graph **g** and namespace **MOVIE** with path *'http://example.org/'*. In the graph, bind the *':'* prefix to the new namespace. Also bind the **DC** and **FOAF** namespaces to the usual *dc:* and *foaf:* prefixes. Include necessary **import** statements in the code.

Fill in your Python code here

Format

Words: 0

Maximum marks: 5

81 INFO216 programming: Adding triples

Write the *body* of a function that takes a graph **g** and a dictionary **movie_dict** about a movie and one of its directors and extends the graph with RDF triples that represent that movie and director.

Here is an example of an argument that can be passed to the function:
{ 'Movie': 'Pulp_Fiction', 'Director': 'Quentin_Tarantino', 'Year': 1994 }

This is the function header:

def add_movie_triples(g, row):
Fill in the Python body here

Format

Words: 0

Maximum marks: 5

82 INFO216 programming: SHACL

Write Python code to validate the graph **g** from the earlier tasks against the following SHACL constraint:

A Movie must have exactly one dc:title.

Print out each problem that is found in **g**. Include **import** statements.

Fill in your Python code here

Format

Words: 0

Maximum marks: 5

83 INFO216 programming: SPARQL query

Write a Python function to count, for each property used as predicate in a graph **g**, how many triples it is the predicate of. The function should print its results to screen as a table.

This is the function header:

def predicate_count(g):

Fill in your Python code here

Format

Words: 0

Maximum marks: 5

84 INFO216 programming: OWL reasoning

Write Python code to load an ontology from the file *'movie-ontology.ttl'* into the graph **g** from the earlier tasks. Call the *predicate_count*-function from the previous task to print out how many triples each property in the graph is the predicate of. Write code to calculate the deductive closure on the graph, including **import** statements. Finally, call the *predicate_count*-function from the previous task again.

Fill in your Python code here

Format

Words: 0

Maximum marks: 5

85 INFO216 exam: Final comments (not graded)

Do you have comments to the exam?

Fill in your comments here

Format

Words: 0

Maximum marks: 0