EECS 371

HW 3

Due 2/7/2019 1:59 p.m.

In this assignment, we are going to explore Linked Data to see how we can answer some complex queries. We will start with some simple queries, and we will work our way up to queries that merge data sources.

For context, we will consider the scenario in which we are trying to track a person on the run. To identify their whereabouts, we will query some data sources to get the information.

To get started, we will use SPARQL to query Wikidata, a large collaboratively edited knowledge base. We can easily query the data store by going to https://query.wikidata.org/. There you will find a query editor. Enter your queries here, click the blue button on the left, and the query is executed. The results (if any) will be displayed at the bottom of the screen.

For each of the queries below, follow the instructions. You will have one or more questions to answer for each query. In your submission, provide an answer to this question. Additionally, provide a SPARQL query that can be used to get this answer. The query should be specific, yielding only one response that contains the answer to the question(s).

Query 1.

To begin the search for Agent Z, we need to find a university.
Reports indicate that Agent Z is at a school that is a land-grant school. However, there are no signs that the school is a state university, indicating that Agent Z is at a private university. What city is Agent Z in?

In the wikidata knowledge base, all the resources have URIs consisting of a letter and some numbers. This makes it difficult to know what the resource represents. To conveniently get the name (or label) of each resource, add the following to your WHERE clause:

```
SERVICE wikibase:label {
     bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en".
}
```

Then you can add label variables to your SELECT. For example, if you have a variable ?x, then you can have another variable ?xLabel.

Query 2.

Latest intel has determined that Agent Z is now in a city, but it is unclear where the city is located. To further complicate the matter, there is conflicting evidence as to whether Agent Z is in Asia or Europe. Perhaps they are in both! Is there a city that is in both Asia and Europe?

For this query, you need to find a location that is on the continent of Europe and on the continent of Asia. There are many locations that may be on both continents, but we need to determine which are cities. Since not all cities are listed directly as a city, you may need to find locations that are instances of subclasses of city/town.

You might find cities that no longer exist, in countries that no longer exist. We can constrain our query some more to include only those that are in a country where the association with that country has started in the last 100 years (36500 days). In other words, the country relation between the city and the country has a start time associated to the relation, and we want start times in the past 100 years. To do this, try adding the following to the WHERE clause of your query (you may need to change the ?city variable).

```
?city p:P17 ?country .
?country pq:P580 ?date .
BIND (NOW() - ?date as ?distance) .
FILTER (0 <= ?distance && ?distance <= 36500) .
```

Query 3.

For the final search, we need to include more knowledge. Wikidata has a lot of knowledge about locations and other geopolitical data, but it does not have a lot of culture knowledge. For this, we will merge in Dbpedia. In your WHERE clause you will need to include a SERVICE clause like the following:

```
SERVICE <http://dbpedia.org/sparql> {
    ?subject a ?type .
}
```

As for looking for Agent Z, a few items were recovered from a fire in Denmark: a map of southern Sweden, a ticket for a hockey game, and a picture of a bridge. The train ticket suggests they are going to Sweden. The hockey ticket is red, but no information about the team (or location) remains on the ticket. The picture of the bridge looks familiar to a team member, who thinks it is a bridge that connects Denmark and Sweden.

What city is Agent Z going to? What is the name of the hockey team Agent Z was going to see?