U.PORTO
FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO

Master in Informatics and Computing Engineering
Semantic Web and Linked Data
Exercise 1: RDF
2025/26

Publishing data on the Semantic Web

In this exercise, we want to publish structured data in RDF, following Linked Data principles and best practices.

We will start by observing existing data on the Web, then modelling your own data by reusing known vocabularies and linking your data to other data sources.

1. Observing existing data

We will start by examining data from a well-known Linked Data provider, DBpedia.

1. Start a Web browser.
2. Please answer to the questions below on a file and format of your choice. Your answers should be very short.
3. Using your Web browser, go to http://dbpedia.org/page/Tim_Berners-Lee. What is this page describing? Write your answer in English or Portuguese in the text file.
4. Observe the data available there. The Web page is an HTML document, but it shows RDF triples from the RDF database DBpedia, in an almost human-readable form. Try to figure out the triples that are shown there. Give 3 examples of RDF triples (each on a different line in your text file) observed in this file. Write them in Turtle format.
5. The Web page shows a table with two columns. The first column (with header **Property**) has values that are hyperlinks. Click on one of those links, for instance dbo:birthDate and look at what is shown there. What kind of information does this property provide? Write your answer in the text file.
6. Go back to the previous page. Look at the second column in the table, with head **Value**. Some values are hyperlinks, some are not. What does it mean when the value is a hyperlink? Try to explain as concisely as possible in your file.
7. Consider the line where the Property is dbp:education. Move your mouse on the second link in the Value column. On the bottom left of the browser window, you should see the URL to which this link is pointing to. Write this URL in your text file.
8. Click on the link, then look at the address bar in Firefox. Compare it to the link you saw just before and write it down in your text file. Why are they different? What does the address on the link represent about what the address to which you are redirected to? Explain concisely in your text file.
9. At the first page (that is, http://dbpedia.org/page/Tim_Berners-Lee) consider the Property dbp:birthPlace. What is the number in the Value column? What does the text between brackets represent? Take a look at dbp:children. What does the value formally represent? What is its type? Write your short answers in the text file.
10. In the header of the page, you can see "Formats". Select the Turtle format and look at its content. You can also look at other RDF formats, in particular RDF/XML and JSON-LD.
11. Tim Berners-Lee is also described in other RDF data sets on the Web. Find the property `owl:sameAs` and look at the values there. You can see URIs that point to other domains. All of them contain RDF data.

As in DBpedia, the data is usually displayed in HTML, but there are links to the RDF data. Find RDF files that describe Tim Berners-Lee at the Deutsche National Bibliothek, and at the BBC.

2. Authoring data in RDF

Now that you have seen how an existing Linked Data web site works, you will be editing and publishing your own RDF files.

In this exercise, you will be describing your personal profile to build a distributed social network.

One aspect of this task is to model data using graphs. Instead of writing pure RDF syntax, feel free to sketch a graph representation on paper.

1. **Define Your IRI (Internationalized Resource Identifier):** Begin by defining an IRI that represents yourself. If you have a personal website or LinkedIn profile, you can use that as your IRI. Alternatively, you may create a fictional namespace for this exercise, such as *me:* (e.g., *me:YourName*).
2. **Explore the FOAF Example:** Look at the FOAF (Friend of a Friend) example on Wikipedia. In the example, a person is identified as a *foaf:Person*, which is actually a shorthand for the IRI *http://xmlns.com/foaf/0.1/Person*.
   Similarly, define yourself as a *foaf:Person*, and add other relevant classes that describe you, such as *foaf:Student*, *foaf:Man* or *foaf:Woman*, etc.
3. **Enrich Your RDF Profile with Interests and Projects:** Expand your RDF profile by including your interests, previous projects, or any other relevant information. For instance, state that one of your interests is the Semantic Web. Use the IRI *http://dbpedia.org/resource/Semantic_Web* to represent this concept from DBpedia. Feel free to add more interests using IRIs from other authoritative sources.
4. **Add Personal Information (Names, Affiliations):** Include your full name or at least your first and last name. Optionally, add your nickname. Next, link yourself to your university or any other affiliations. If necessary, create new predicates for relationships that don't already exist. For simplicity, you can use the me: prefix to define new predicates (e.g., *me:affiliatedWith*).
5. **Include Additional Details About Yourself:** Provide more information about your background. This could include your home address, previous schools you attended, family members (real or fictitious), and friends. Feel free to use existing predicates or create new ones under the *me:* prefix.
6. **Indicate Connections with Others:** Use the *foaf:knows* property to indicate that you know someone, such as a classmate. Ask your classmates which IRI they are using for themselves and reuse that in your graph to state that you know them.
7. **Express Your Status as a Student:** Represent in your graph that you are a master's student since a certain date (e.g., since October 2021). You can include the start date of your program as part of the RDF data using appropriate properties (e.g., *me:startedOn*).
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[i] Adapted from Semantic Web by Antoine Zimmermann.