Software Technology of Internet of Things
Metadata Exercises: Adventures in Semantic Madness

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Quest 1: Exploring the Lecture Example (10XP)

Over the last decade or so the Elders have been constructing the World of Things. But it didn't turn out quite right. Rumors has it that the streams have crossed, and the consequences of that could reach far and wide. We need you, young student, to help us sort it out! I sure hope you have kept your Python skills sharp . . .

First, you must attend the lecture, or – if tardy – study the lecture slides. Next, you should study the exercise zip file as it contains many details and complexities. Once you have familiarized yourself with the code and have a good understanding the high-level structure you may venture into Quest 2!

Quest 2: Defining the Simpsons (50XP)

First you need to revisit the Simpsons example from the lecture and fill out the blanks of the partial code you studied in the first quest.

It is your task to

1. Extract a copy of the example code found in the zip archive. You should end up with three files in your local filesystem; two for modeling the Simpsons in RDF and one for modeling them in Neo4J.

2. You must choose to follow either the path of RDF, or the path of Neo4J.

3. Run the example once. The output does not seem quite right when compared to the lecture figure.

4. A part of the example code has been lost. You must scan through the code to identify the missing logic.

5. Implement the missing logic and verify that the program printouts match the model in the lecture slides.

(a) Pick a simple query that does not produce the correct result.

(b) Identify the missing data that the query relies on.

(c) Write code that inserts these data.

(d) Rerun code to verify that the query now produces the correct output.

(e) Go to step 5a.

Quest 3 [RDF only]: Verifying the Simpsons (20XP)

So far you have brought stability to the World of Things, but sadly that stability is fragile. While there are rules defining how the data should be modeled, these rules are not enforced. The forest whispers that the Startups of the East have already added data that violates the rules.

You are now faced with one last challenge before you can obtain the title of Expert Ontologist; you need to add a function that validates the defined rules. The bar is high for this one, and you need to take the lead!

The answers to the following questions leads your path to success:

1. What should the function be called?

2. Which classes of rules exist?

3. How can one find a list of all instances of a particular rule class?

4. How can one find all data matching such a a rule instance?

5. How can all of this be put together?

Start with something simple. Having some validation is better than having no validation. Then you can extend on it.