

(TR-102) MASTERING THE SEMANTIC WEB –

Training Day 4 Report :

14 June 2024

RDF:

RDF (Resource Description Framework) is a standard for describing web resources and data interchange, developed and standardized by the World Wide Web Consortium (W3C). It is a way to represent information about resources in a structured format, using a simple and flexible data model.

RDF Triples:

RDF represents data as a collection of triples, each consisting of :

- i. Subject: The resource being described, identified by a Uniform Resource Identifier (URI).
- ii. Predicate: The property or relationship that connects the subject to the object.

- iii. Object: The value of the property, which can be another resource (identified by a URI) or a literal value (like a string or number).

Example of RDF:

RDF in a Library System

In a library system, RDF can be used to describe books and their attributes. For example, a book can be described as follows:

Subject: "To Kill a Mockingbird"

Predicate: "author"

Object: "Harper Lee"

Subject: "To Kill a Mockingbird"

Predicate: "publisher"

Object: "J.B. Lippincott & Co."

Subject: "To Kill a Mockingbird"

Predicate: "year published"

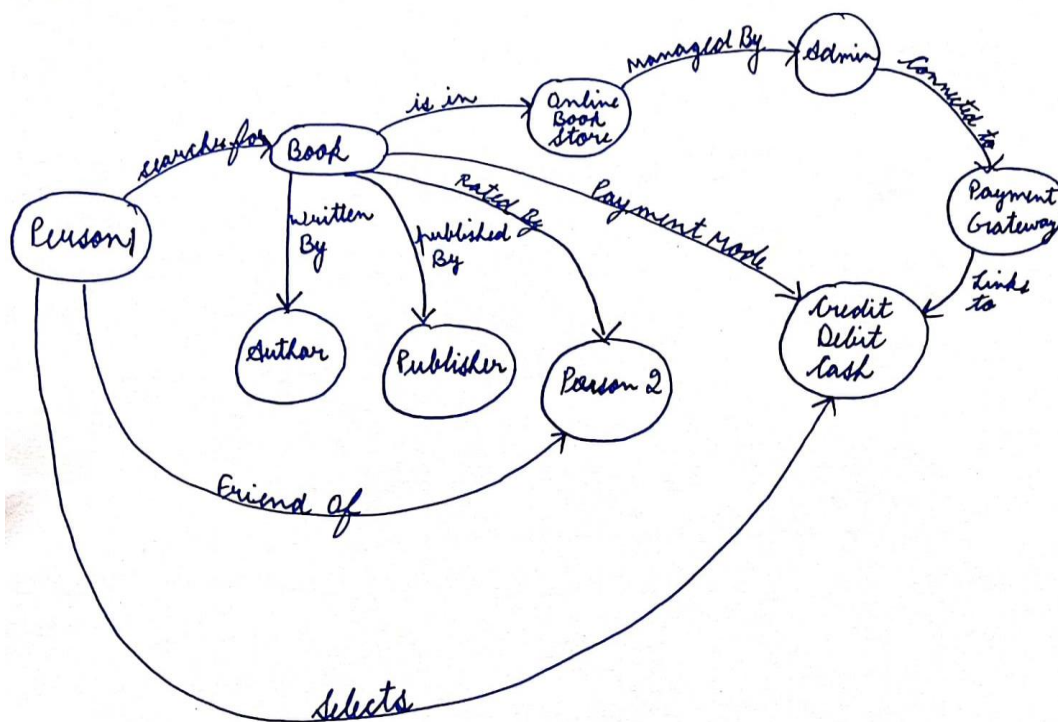
Object: "1960"

RDF Graph:

An RDF (Resource Description Framework) graph is a visual representation of RDF data, which is composed of RDF triples. The key aspects of an RDF graph are:

- i. Nodes: The subjects and objects of the RDF triples are represented as nodes in the graph. These nodes can be:
- ii. IRIs (Internationalized Resource Identifiers) - to identify resources
- iii. Literals - to represent data values like strings, numbers, etc.
- iv. Blank nodes - to represent anonymous resources without an IRI
- v. Edges: The predicates (properties) of the RDF triples are represented as directed edges (arrows) connecting the subject and object nodes.
- vi. Triples: Each triple is represented as a directed edge (the predicate) connecting the subject node to the object node.

RDF Graph On Online Book Store



Terminologies related to RDF:

Linked Data:

Linked Data is a method for publishing and connecting structured data on the web using standard technologies like URIs, HTTP, and RDF (Resource Description Framework). This allows data to be shared and linked across different sources, enabling computers to extract meaningful connections and integrate information from multiple sources.

Friend of a Friend (FOAF):

- i. FOAF is a RDF vocabulary for describing people, their activities, and their relationships to other people and objects.
- ii. It provides a way to represent information about individuals, their interests, their connections to other people, and their online presence.
- iii. FOAF is widely used in the Semantic Web community to build social networking applications and to describe the relationships between people and other entities.

Metadata Exchange:

Metadata exchange refers to the process of sharing and transferring metadata (data about data) between different systems, platforms, or applications. It allows for the exchange of information about digital content, such as files, documents, images, videos, etc.

For example, when you browse an e-commerce website, the site may collect metadata about your search queries, the products you view, and your purchase history. This metadata can then be exchanged with the site's recommendation engine, allowing it to suggest products that are more tailored to your interests and preferences.

Similarly, social media platforms exchange metadata about your connections, posts, and activities with their algorithms to provide a personalized feed and suggest new content and connections that may be of interest to you.

Introduction to JSON and XML

JSON:

JSON (JavaScript Object Notation) is a lightweight, text-based data interchange format used to transmit data between web application clients and servers. It is a subset of JavaScript and is used for exchanging data between different systems and languages.

JSON Datatypes:

JSON supports mainly some data types which are as follows:

1. String

Definition: A string is a sequence of zero or more Unicode characters, enclosed between " and " (double quotes).

Example: "color" : "Purple"

2. Number

Definition: JSON numbers follow JavaScript's double-precision floating-point format.

Example: 210, -210, 21.05, 1.0E+2

3. Boolean

Definition: Boolean values can be either true or false.

Example: "visibility" : true

4. Null

Definition: null is a special value in JSON. When there is no value to assign to a key, it can be treated as null.

Example: "visibility" : true, "popularity" : null

5. Array

Definition: An array is an ordered collection of values.

Example: {"ids" : ["1","2","3"]}

JSON Syntax:

Key-Value Pairs: JSON objects are composed of key-value pairs, where each key is a string and each value is a JSON data type.

Example: A JSON object with key-value pairs:

```
{  
  "name": "John",  
  "age": 30,
```

```
"city": "New York"
}
```

Nested Objects: JSON objects can contain nested objects, where each nested object is a separate JSON object.

Example: A JSON object with nested objects:

```
{
  "name": "John",
  "age": 30,
  "address": {
    "street": "123 Main St",
    "city": "New York",
    "state": "NY",
    "zip": "10001"
  }
}
```

JSON Parsing and Generation:

Parsing: JSON parsing involves converting a JSON string into a JavaScript object.

Example: Parsing a JSON string:

```
let jsonString = '{"name": "John", "age": 30}';
let jsonObject = JSON.parse(jsonString);
console.log(jsonObject); // Output: { name: "John", age: 30 }
```

Generation: JSON generation involves converting a JavaScript object into a JSON string.

Example: Generating a JSON string:

```
let jsonObject = { name: "John", age: 30 };  
let jsonString = JSON.stringify(jsonObject);  
console.log(jsonString); // Output: {"name":"John","age":30}
```

XML:

XML (Extensible Markup Language) is a markup language and file format for storing, transmitting, and reconstructing arbitrary data. It is a text-based language that uses tags to define the structure and content of a document. XML is designed to be platform-independent, meaning that it can be used on any operating system and with any programming language.

XML Syntax:

XML syntax is based on the following elements:

(i). XML Declaration: The XML declaration is the first line of an XML file and specifies the version of XML being used, as well as the character encoding scheme. It is written in the following format:

```
<?xml version="1.0" encoding="UTF-8"?>
```


(ii). XML Elements: XML elements are the building blocks of an XML document. They are represented by tags, which are enclosed in angle brackets (< and >). Elements can contain other elements, attributes, and text. For example:

```
<library>
  <book>
    <title>The Fire Next Time</title>
    <author>Baldwin, James</author>
  </book>
  <book>
    <title>Beloved</title>
    <author>Morris, Toni</author>
  </book>
</library>
```

(iii). XML Attributes: XML attributes are used to provide additional information about an element. They are represented by a name-value pair, where the name is the attribute name and the value is the attribute value. For example:

```
<book id="book1">
  <title>The Fire Next Time</title>
  <author>Baldwin, James</author>
</book>
```