Issue Report : 903

Issue Link : https://github.com/RDFLib/rdflib/issues/903

About the issue :

The issue asks “Whether rdflib supports adding data ranges as per OWL2 specification?”
The code given in the issue is :

```
g.add((URIRef(ns+"Answer"), RDF.type, RDFS.Datatype))
g.add((URIRef(ns+"Answer"), OWL.unionOf, (XSD.string, XSD.boolean,XSD.positiveInteger)))
g.add((URIRef(ns+"answer_value"), RDF.type, RDFS.Property))
g.add((URIRef(ns+"answer_value"), RDFS.domain, URIRef(ns+"Question")))
g.add((URIRef(ns+"answer_value"), RDFS.range, URIRef(ns+"Answer")))
```

The user wants to create a custom datatype for an URI, which can take a tuple of data types.
The code has two issues in it :

a) Giving a range of datatypes in a single add function with tuples is not defined in rdflib.(line 2)
b) In line 3,the term “Property” is not present in the namespace of rdf-schema.

Solution for the issue :

The error shown in line 2 is :

```
AssertionError: Object
(rdflib.term.URIRef('http://www.w3.org/2001/XMLSchema#string'),
rdflib.term.URIRef('http://www.w3.org/2001/XMLSchema#boolean'),
rdflib.term.URIRef('http://www.w3.org/2001/XMLSchema#positiveInteger'))
must be an rdflib term
```

From the error we can infer that the user is providing a tuple but the rdflib is asking for rdflib term type. This checking of rdflib is taking place in “graph.py” from the rdflib library.

Later we have found out that for the “ g.add() ” statement, three terms in a triple i.e subject,object and predicate should be in the form of rdflib term type.
The rdflib is accepting the code if it is in this form :

```
g.add((URIRef(ns+"Answer"), OWL.unionOf , XSD.string ))
```

But in this case the URI can only take one datatype at a time because XSD.string is a rdf type but tuple is not .

So we have changed the code such that “For a particular URI and a Property, add function can take a range of datatypes”.

Steps done to resolve the issue :

- In add function from“graph.py”, before checking whether the triples are in rdflib type or not we have checked where the object is a tuple or not.
- If an object is a tuple, then we have created a function block to resolve this issue. If the object is not a tuple, then it will check for rdflib type.
- Inside the function block, we have taken each data-type from the tuple and added the triples individually.

By executing the above steps, the issue is resolved. We have generalized the add statement, now any number of data types can be given in a tuple.

Another error was shown in line 4 which is trivial :

```
AttributeError: "term 'Property' not in namespace
'http://www.w3.org/2000/01/rdf-schema#
```

Property term was defined in rdf but not in rdf-schema. By just changing RDFS to RDF solved the error.

Output after resolving the issue :

After 2 lines,

```
g.add((URIRef(ns+"Answer"), RDF.type, RDFS.Datatype))
g.add((URIRef(ns+"Answer"), OWL.unionOf, (XSD.string, XSD.boolean,XSD.positiveInteger)))
```

That particular URI has taken a type Datatype. And then it has taken a bunch of data types for the property “unionOf”.
The output after 2 lines is :

```
@prefix ns1: <http://www.w3.org/2002/07/owl#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://example.org/people/Answer> a rdfs:Datatype ;
        ns1:unionOf xsd:boolean,
        xsd:positiveInteger,
        xsd:string .
```

The next three lines are :

```
g.add((URIRef(ns+"answer_value"), RDF.type, RDF.Property))
g.add((URIRef(ns+"answer_value"), RDFS.domain, URIRef(ns+"Question")))
g.add((URIRef(ns+"answer_value"), RDFS.range, URIRef(ns+"Answer")))
```

Output after running the complete code is :

```
@prefix ns1: <http://www.w3.org/2002/07/owl#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://example.org/people/answer_value> a rdf:Property ;
        rdfs:domain <http://example.org/people/Question> ;
        rdfs:range <http://example.org/people/Answer> .

<http://example.org/people/Answer> a rdfs:Datatype ;
        ns1:unionOf xsd:boolean,
        xsd:positiveInteger,
        xsd:string .
```