SPARQL Queries and RDF for Earth

1 RDF Representation of Earth

The RDF representation of Earth is as follows:

```
:Earth rdf:type :Planet ;
    rdfs:label "Earth" ;
    :colorPlanet [ rdf:_1 "Blue" ; rdf:_2 "Brown" ; rdf:_3 "Green" ; rdf:_4 "White" ] ;
    :atmosphericComposition [ rdf:_1 "Nitrogen (78.1%)" ; rdf:_2 "Oxygen" ] ;
    :mass 5.97 ;
    :diameter 12742 ;
    :density 5514 ;
    :surfaceGravity 9.8 ;
    :escapeVelocity 11.2 ;
    :rotationPeriod 23.9 ;
    :lengthOfDay 24.0 ;
    :distanceFromSun 149.6 ;
    :meanTemperature 15 ;
    :numberOfMoons 1 ;
    :ringSystem "No" ;
    :globalMagneticField "Yes" ;
    :perihelion "147.1"^^xsd:decimal ;
    :aphelion "152.1"^^xsd:decimal ;
    :orbitalPeriod "365.2"^^xsd:decimal ;
    :orbitalVelocity "29.8"^^xsd:decimal ;
    :orbitalEccentricity "0.017"^^xsd:decimal ;
    :obliquityToOrbit "23.4"^^xsd:decimal ;
    :surfacePressure "1"^^xsd:decimal ;
    :surfaceTemperature "-89 to 58" ;
    :atmosphericPressure "1"^^xsd:decimal ;
    :surfaceFeatures [
        rdf:type rdf:Bag ;
        rdf:_1 "Oceans" ;
        rdf:_2 "Mountains" ;
        rdf:_3 "Plains"
    ] ;
    :composition [
        rdf:type rdf:Bag ;
```

```
        rdf:_1 "Iron Core" ;
        rdf:_2 "Silicate Mantle" ;
        rdf:_3 "Water"
    ] .
```

2 SPARQL Queries

2.1 2. Which planet has no moon?

```
PREFIX : <http://example.org/solarsystem#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT ?planetName
WHERE {
    ?planet rdf:type :Planet ;
            rdfs:label ?planetName ;
            :numberOfMoons ?moons .
    FILTER(?moons = 0)
}
```

2.2 3. What are the colors of Earth?

```
PREFIX : <http://example.org/solarsystem#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

SELECT ?color
WHERE {
    :Earth :colorPlanet ?colorContainer .
    ?colorContainer ?position ?color .
    FILTER(STRSTARTS(STR(?position), STR(rdf:_)))
}
```

2.3 4. How many Earths could fit inside the Sun?

```
PREFIX : <http://example.org/solarsystem#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT (ROUND(?sunVolume / ?earthVolume) AS ?earthsInSun)
WHERE {
    BIND(1.412E18 AS ?sunVolume)  # Sun's volume in km³
    :Earth :diameter ?diameter .
    BIND((4 / 3) * 3.14159 * ((?diameter / 2) * (?diameter / 2) * (?diameter / 2)) AS ?earth
}
```