

Saturn RDF Data and SPARQL Queries

1 Saturn RDF Data

```
:Saturn rdf:type :Planet ;
  rdfs:label "Saturn" ;
  :colorPlanet [ rdf:_1 "Golden" ; rdf:_2 "Brown" ; rdf:_3 "Blue-Gray" ] ;
  :atmosphericComposition [ rdf:_1 "Hydrogen" ; rdf:_2 "Helium" ] ;
  :mass 568 ;
  :diameter 116460 ;
  :density 687 ;
  :surfaceGravity 10.4 ;
  :escapeVelocity 35.5 ;
  :rotationPeriod 10.7 ;
  :lengthOfDay 10.7 ;
  :distanceFromSun 1433.5 ;
  :meanTemperature -140 ;
  :numberOfMoons 83 ;
  :ringSystem "Yes" ;
  :globalMagneticField "Yes" ;
  :perihelion "1350"^^xsd:decimal ;
  :aphelion "1514.5"^^xsd:decimal ;
  :orbitalPeriod "10759"^^xsd:decimal ;
  :orbitalVelocity "9.7"^^xsd:decimal ;
  :orbitalEccentricity "0.057"^^xsd:decimal ;
  :obliquityToOrbit "26.7"^^xsd:decimal ;
  :surfacePressure "Unknown" ;
  :surfaceTemperature "-139" ;
  :atmosphericPressure "Unknown" ;
  :surfaceFeatures [
    rdf:type rdf:Bag ;
    rdf:_1 "Rings" ;
    rdf:_2 "Hexagonal Storm"
  ] ;
  :composition [
    rdf:type rdf:Bag ;
    rdf:_1 "Hydrogen" ;
    rdf:_2 "Helium"
```

] .

2 Questions and SPARQL Queries

2.1 1. What is the orbital period of Saturn, and how does it compare to Earth's orbital period?

SPARQL Query:

```
PREFIX : <http://example.org/solarsystem#>

SELECT ?planetName ?orbitalPeriod
WHERE {
    VALUES ?planet { :Saturn :Earth }
    ?planet rdfs:label ?planetName ;
           :orbitalPeriod ?orbitalPeriod .
}
ORDER BY ?planetName
```

This query retrieves the orbital periods of Saturn and Earth, allowing you to compare them.

2.2 2. What are the main components of Saturn's atmosphere?

SPARQL Query:

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

SELECT ?atmosphericComposition
WHERE {
    :Saturn :atmosphericComposition ?atm .
    ?atm ?position ?composition .
    FILTER(STRSTARTS(STR(?position), STR(rdf:_)))
}
```

This query retrieves the components of Saturn's atmosphere, which include hydrogen and helium, from the :atmosphericComposition container.

2.3 3. What are the surface features of Saturn?

SPARQL Query:

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

```
SELECT ?feature
WHERE {
    :Saturn :surfaceFeatures ?features .
    ?features ?position ?feature .
    FILTER(STRSTARTS(STR(?position), STR(rdf:_)))
}
```

This query retrieves the surface features of Saturn, such as rings and the hexagonal storm, from the `:surfaceFeatures` container.