

Uranus and Neptune RDF Data and SPARQL Queries

1 Uranus and Neptune RDF Data

```
:Uranus rdf:type :Planet ;
  rdfs:label "Uranus" ;
  :colorPlanet [ rdf:_1 "Green" ; rdf:_2 "Blue" ] ;
  :atmosphericComposition [ rdf:_1 "Hydrogen" ; rdf:_2 "Helium" ] ;
  :mass 86.8 ;
  :diameter 50724 ;
  :density 1271 ;
  :surfaceGravity 8.9 ;
  :escapeVelocity 21.3 ;
  :rotationPeriod -17.2 ;
  :lengthOfDay 17.2 ;
  :distanceFromSun 2872.5 ;
  :meanTemperature -195 ;
  :numberOfMoons 27 ;
  :ringSystem "Yes" ;
  :globalMagneticField "Yes" ;
    :perihelion "2741"^^xsd:decimal ;
    :aphelion "3004"^^xsd:decimal ;
  :orbitalPeriod "30687"^^xsd:decimal ;
  :orbitalVelocity "6.8"^^xsd:decimal ;
  :orbitalEccentricity "0.046"^^xsd:decimal ;
  :obliquityToOrbit "97.8"^^xsd:decimal ;
  :surfacePressure "Unknown" ;
  :surfaceTemperature "-197" ;
  :atmosphericPressure "Unknown" ;
  :surfaceFeatures [
    rdf:type rdf:Bag ;
    rdf:_1 "Ice" ;
    rdf:_2 "Methane Clouds"
  ] ;
  :composition [
    rdf:type rdf:Bag ;
```

```

        rdf:_1 "Water" ;
        rdf:_2 "Methane" ;
        rdf:_3 "Ammonia"
    ] .

:Neptune rdf:type :Planet ;
    rdfs:label "Neptune" ;
    :colorPlanet [ rdf:_1 "Blue" ] ;
    :atmosphericComposition [ rdf:_1 "Hydrogen" ; rdf:_2 "Helium" ] ;
    :mass 102 ;
    :diameter 49244 ;
    :density 1638 ;
    :surfaceGravity 11.0 ;
    :escapeVelocity 23.5 ;
    :rotationPeriod 16.1 ;
    :lengthOfDay 16.1 ;
    :distanceFromSun 4495.1 ;
    :meanTemperature -200 ;
    :numberOfMoons 14 ;
    :ringSystem "Yes" ;
    :globalMagneticField "Yes" ;
    :perihelion "4444.5"^^xsd:decimal ;
    :aphelion "4545.7"^^xsd:decimal ;
    :orbitalPeriod "60190"^^xsd:decimal ;
    :orbitalVelocity "5.4"^^xsd:decimal ;
    :orbitalEccentricity "0.010"^^xsd:decimal ;
    :obliquityToOrbit "28.3"^^xsd:decimal ;
    :surfacePressure "Unknown" ;
    :surfaceTemperature "-201" ;
    :atmosphericPressure "Unknown" ;
    :surfaceFeatures [
        rdf:type rdf:Bag ;
        rdf:_1 "Storms" ;
        rdf:_2 "Methane Clouds"
    ] ;
    :composition [
        rdf:type rdf:Bag ;
        rdf:_1 "Water" ;
        rdf:_2 "Methane" ;
        rdf:_3 "Ammonia"
    ] .

```

2 Questions and SPARQL Queries

2.1 1. What is the number of moons and surface features of Uranus and Neptune?

SPARQL Query:

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

SELECT ?planet ?numberOfMoons ?surfaceFeatures
WHERE {
    VALUES ?planet { :Uranus :Neptune }
    ?planet :numberOfMoons ?numberOfMoons ;
           :surfaceFeatures ?features .
    ?features ?position ?surfaceFeatures .
    FILTER(STRSTARTS(STR(?position), STR(rdf:_)))
}
```

2.2 2. Which is the coldest planet in the solar system?

SPARQL Query:

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

SELECT ?planet ?meanTemperature
WHERE {
    VALUES ?planet { :Uranus :Neptune }
    ?planet :meanTemperature ?meanTemperature .
}
ORDER BY DESC(?meanTemperature)
LIMIT 1
```

2.3 3. What is the orbital period and orbital velocity of Uranus and Neptune?

SPARQL Query:

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

SELECT ?planet ?orbitalPeriod ?orbitalVelocity
WHERE {
    VALUES ?planet { :Uranus :Neptune }
    ?planet :orbitalPeriod ?orbitalPeriod ;
           :orbitalVelocity ?orbitalVelocity .
}
```

2.4 4. What are the main components of Uranus' atmosphere?

SPARQL Query:

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

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

2.5 5. What are the surface features of Neptune?

SPARQL Query:

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

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