Running neo4j on docker:

a) Loading data from CSV:

LOAD CSV FROM

```
"https://raw.githubusercontent.com/jpatokal/openflights/master/data/airports.dat" AS row WITH toInteger(row[0]) AS Id,
```

```
row[1] AS Name,
  row[2] AS City,
  row[3] AS Country,
  row[4] AS Code,
  row[5] AS ICAO,
  toFloat(row[6]) AS Latitude,
  toFloat(row[7]) AS Longitude,
  toFloat(row[8]) AS Altitude,
  toInteger(row[9]) AS Timezone
MERGE (a:Airport {Id: Id})
 ON CREATE SET a. Name = Name,
         a.City = City,
         a.Country = Country,
         a.Code = Code,
         a.ICAO = ICAO,
         a.Latitude = Latitude,
         a.Longitude = Longitude,
         a.Altitude = Altitude,
         a.Timezone = Timezone
```

LOAD CSV FROM

"https://raw.githubusercontent.com/jpatokal/openflights/master/data/airlines.dat" AS row WITH toInteger(row[0]) AS Id,

```
row[1] AS Name,
  row[2] AS Alias,
  row[3] AS IATA,
  row[4] AS ICAO,
  row[5] AS Callsign,
  row[6] AS Country,
  row[7] AS Active
MERGE (a:Airline {Id: Id})
 ON CREATE SET a. Name = Name,
         a.Alias = Alias,
         a.IATA = IATA,
         a.ICAO = ICAO,
         a.Callsign = Callsign,
         a.Country = Country,
         a.Active = Active
LOAD CSV FROM
"https://raw.githubusercontent.com/jpatokal/openflights/master/data/routes.dat" AS row
CREATE (:Route (AirlineCode: row[0], AirlineId: toInteger(row[1]), SourceAirport: row[2],
  SourceAirportId: toInteger(row[3]), DestinationAirport: row[4], DestinationAirportId:
toInteger(row[5]),
  Codeshare: row[6], Stops: toInteger(row[7]), Equipment: row[8])
Renaming attributes was not needed as the attributes names are already named according the
referenced website during load from csv.
Creating relations:
:auto USING PERIODIC COMMIT
LOAD CSV FROM
"https://raw.githubusercontent.com/jpatokal/openflights/master/data/routes.dat" as row
MATCH (A:Airline) WHERE A.Id = toInteger(row[1])
MATCH (R:Route) WHERE R.AirlineId = toInteger(row[1])
CREATE (R)-[:OPERATED_BY]->(A)
:auto USING PERIODIC COMMIT 1000 LOAD CSV FROM
"https://raw.githubusercontent.com/jpatokal/openflights/master/data/routes.dat" as row
MATCH (A:Airport) WHERE A.Id = toInteger(row[3])
MATCH (R:Route) WHERE R.SourceAirportId = toInteger(row[3])
CREATE (R)-[:STARTS_FROM]->(A)
```

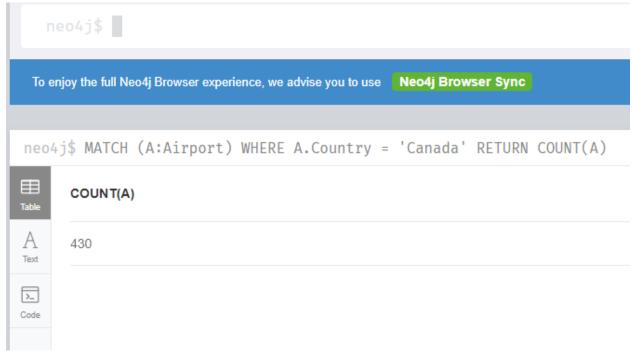
:auto USING PERIODIC COMMIT 1000

LOAD CSV FROM

"https://raw.githubusercontent.com/jpatokal/openflights/master/data/routes.dat" as row MATCH (A:Airport) WHERE A.Id = toInteger(row[5])
MATCH (R:Route) WHERE R.DestinationAirportId = toInteger(row[5])
CREATE (R)-[:END_TO]->(A)

b) Answer to the 8 queries:

a. MATCH (A:Airport) WHERE A.Country = 'Canada' RETURN COUNT(A)



b.

MATCH (R:Route), (A:Airport) WHERE R.SourceAirportId = A.Id

AND A.Name = 'St. Anthony Airport'



MATCH (R:Route), (A:Airport), (A1:Airport)
WHERE R.SourceAirportId = A.Id
AND R.DestinationAirportId = A1.Id
AND A.Name = 'St. Anthony Airport'
AND A1.Country = 'Canada'

RETURN R, A, A1

```
neo4j$ MATCH (R:Route), (A:Airport), (A1:Airport) WHERE R.SourceAirportId = A.I.d AND R.DestinationAirportId = A1.Id AND A.Name =...
          "AirlineCode": "PB",
                                                           "Timezone": -3,
                                                                                                                 "Timezone": -4,
         "SourceAirportId": 24,
                                                          "Country": "Canada",
                                                                                                                 "Country": "Canada",
         "Equipment": "SFB",
                                                          "Latitude": 51.3918991089,
                                                                                                                 "Latitude": 51.443599700899995,
>_
         "SourceAirport": "YAY",
                                                          "ICAO": "CYAY",
                                                                                                                 "ICAO": "CYBX",
         "Stops": 0,
                                                           "City": "St. Anthony",
                                                                                                                 "City": "Lourdes-De-Blanc-
                                                          "Id": 24,
          "DestinationAirportId": 5485,
                                                                                                                Sablon",
         "DestinationAirport": "YBX"
                                                          "Longitude": -56.083099365200006,
                                                                                                                 "Id": 5485,
                                                                                                                 "Code": "YBX",
                                                           "Code": "YAY".
                                                           "Altitude": 108.0,
                                                                                                                  "Longitude": -57.185298919699996,
                                                           "Name": "St. Anthony Airport"
                                                                                                                 "Altitude": 121.0,
                                                                                                                 "Name": "Lourdes de Blanc Sablon
                                                                                                                Airport"
  Started streaming 3 records after 1 ms and completed after 68 ms.
```

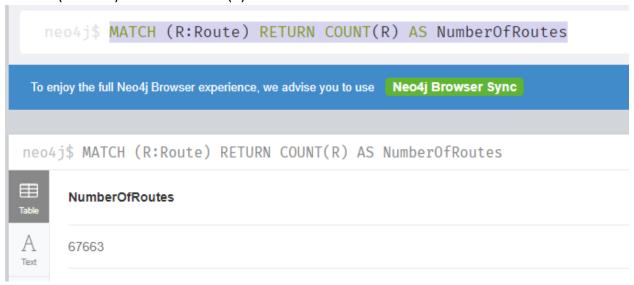
c.

MATCH (AR:Airline), (R:Route), (A:Airport), (A1:Airport)
WHERE AR.Id = R.AirlineId
AND R.SourceAirportId = A.Id
AND R.DestinationAirportId = A1.Id
AND (A.NAME = 'St. Anthony Airport' OR A1.Name = 'St. Anthony Airport')

RETURN DISTINCT AR. Name



d.
MATCH (R:Route) RETURN COUNT(R) AS NumberOfRoutes



MATCH (R:Route) RETURN (COUNT(R) - COUNT(R.Codeshare)) / toFloat(COUNT(R)) * 100 AS PercentageOfNotSharingFlight



e.

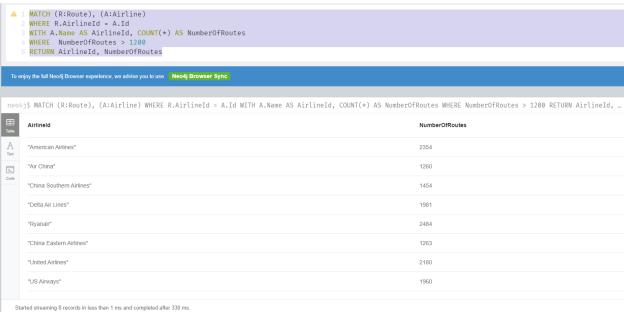
MATCH (R:Route), (A:Airline)

WHERE R.AirlineId = A.Id

WITH A.Name AS AirlineId, COUNT(*) AS NumberOfRoutes

WHERE NumberOfRoutes > 1200

RETURN AirlineId, NumberOfRoutes



f.

CALL {MATCH (A:Airport), (R:Route)

WHERE A.Id = R.DestinationAirportId

WITH A.Name AS AirportName, COUNT(*) AS NumberOfAirportAsDestination

WHERE NumberOfAirportAsDestination > 180

RETURN AirportName, NumberOfAirportAsDestination }

RETURN COUNT(AirportName) AS NumberOfAirportWithMoreThan80TimesAsDestination

```
1 CALL
    2 {MATCH (A:Airport), (R:Route)
    3 WHERE A.Id = R.DestinationAirportId
    4 WITH A.Name AS AirportName, COUNT(*) AS NumberOfAirportAsDestination
    5 WHERE NumberOfAirportAsDestination > 180
    6 RETURN AirportName, NumberOfAirportAsDestination
 To enjoy the full Neo4j Browser experience, we advise you to use Neo4j Browser Sync
neo4j$ CALL {MATCH (A:Airport), (R:Route) WHERE A.Id = R.DestinationAirportId WITH A.
      NumberOfAirportWithMoreThan80TimesAsDestination
     86
CALL {MATCH (A:Airport), (R:Route)
WHERE A.Id = R.SourceAirportId
WITH A.Name AS AirportName, COUNT(*) AS NumberOfAirportAsSource
WHERE NumberOfAirportAsSource > 180
RETURN AirportName, NumberOfAirportAsSource }
RETURN COUNT(AirportName) AS NumberOfAirportWithMoreThan80TimesAsSource
      1 CALL
      2 {MATCH (A:Airport), (R:Route)
      3 WHERE A.Id = R.SourceAirportId
      4 WITH A.Name AS AirportName, COUNT(*) AS NumberOfAirportAsSource
      5 WHERE NumberOfAirportAsSource > 180
      6 RETURN AirportName, NumberOfAirportAsSource
   To enjoy the full Neo4j Browser experience, we advise you to use Neo4j Browser Sync
  neo4j$ CALL {MATCH (A:Airport), (R:Route) WHERE A.Id = R.SourceAirportId WITH A.N
  NumberOfAirportWithMoreThan80TimesAsSource
  Α
       84
```

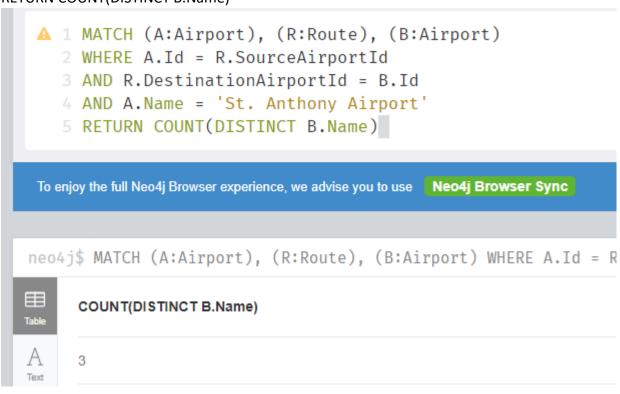
The numbers are not equal.

g.

MATCH (A:Airport), (R:Route), (B:Airport) WHERE A.Id = R.SourceAirportId AND

R.DestinationAirportId = B.Id AND A.Name = 'St. Anthony Airport'

RETURN COUNT(DISTINCT B.Name)



h.

MATCH (A:Airline), (R:Route), (AR:Airport)

WHERE A.Id = R.AirlineId AND R.DestinationAirportId = AR.Id

AND A.Name = 'Air France'

WITH AR.Country AS Country, COUNT(DISTINCT R.DestinationAirportId) AS NumberOfAirports ORDER BY NumberOfAirports DESC

RETURN Country, NumberOfAirports

```
▲ 1 MATCH (A:Airline), (R:Route), (AR:Airport)
      WHERE A.Id = R.AirlineId AND R.DestinationAirportId = AR.Id
    3 AND A.Name = 'Air France'
    4 WITH AR.Country AS Country, COUNT(DISTINCT R.DestinationAirportId) AS NumberOfAirports
    5 ORDER BY NumberOfAirports DESC
   6 RETURN Country, NumberOfAirports
 To enjoy the full Neo4j Browser experience, we advise you to use Neo4j Browser Sync
neo4j$ MATCH (A:Airline), (R:Route), (AR:Airport) WHERE A.Id = R.AirlineId AND R.DestinationAirportId = AR.Id AND A.Name = 'Air France'
     "United States"
                                                                                                                 141
>_
     "United Kingdom"
                                                                                                                 11
     "China"
                                                                                                                 11
     "Germany"
                                                                                                                 10
     "Italy"
                                                                                                                 10
     "Spain"
                                                                                                                 8
     "Brazil"
```

c) Two more queries:

a. Top ten countries based on number of airports:

MATCH (AR:Airport)

WITH AR.Country AS Country, COUNT(*) AS NumberOfAirports

ORDER BY NumberOfAirports DESC LIMIT 10

RETURN Country, NumberOfAirports

Started streaming 121 records after 1 ms and completed after 208 ms.

- 1 MATCH (AR:Airport)
- 2 WITH AR.Country AS Country, COUNT(*) AS NumberOfAirports
- 3 ORDER BY NumberOfAirports DESC LIMIT 10
- 4 RETURN Country, NumberOfAirports

To enjoy the full Neo4j Browser experience, we advise you to use Neo4j Browser Sync

neo4j\$ MATCH (AR:Airport) WITH AR.Country AS Country, COUNT(*) AS NumberOfAirports ORDER BY NumberOfAirports

Table	Country	NumberOfAirports
A	"United States"	1512
∑_ Code	"Canada"	430
	"Australia"	334
	"Brazil"	264
	"Russia"	264
	"Germany"	249
	"China"	241
	"France"	217
	"United Kingdom"	167

Started streaming 10 records after 1 ms and completed after 190 ms.

b. Top ten airlines based on number of routes:

MATCH (AR:Airline), (R:Route)

WHERE AR.Id = R.AirlineId

WITH AR.Name AS Airline, COUNT(*) AS NumberOfRoutes

ORDER BY NumberOfRoutes DESC LIMIT 10

RETURN Airline, NumberOfRoutes

