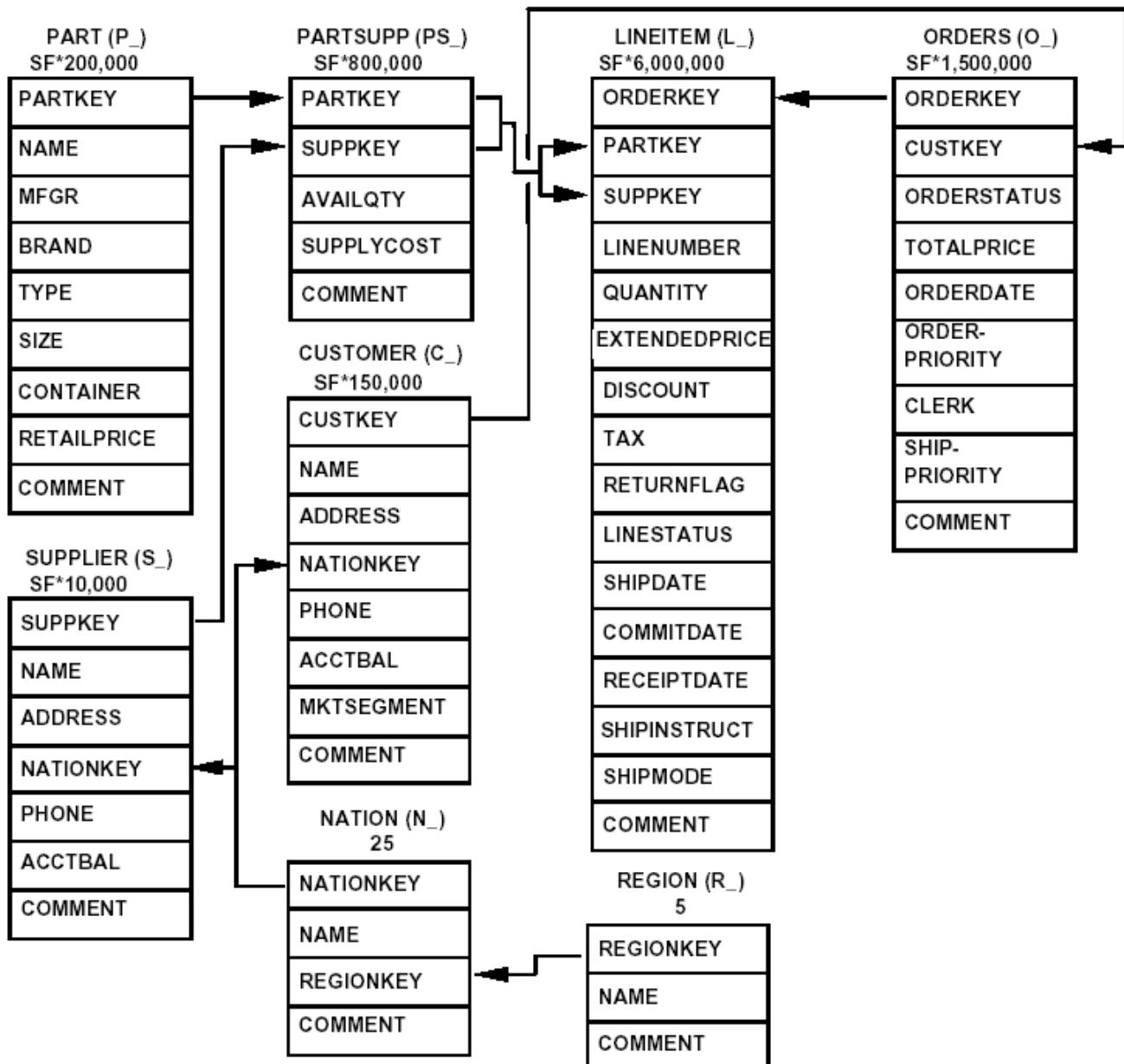


Relational Algebra: Aggregation

Database Schema

Problems



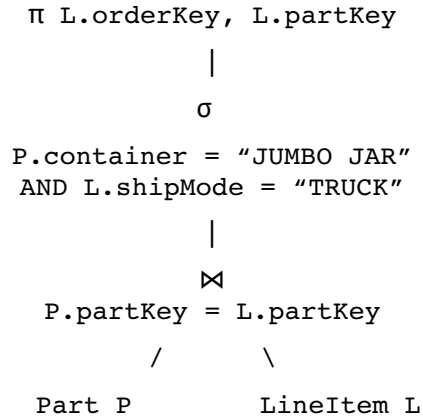
Legend:

- The parentheses following each table name contain the prefix of the column names for that table;
- The arrows point in the direction of the one-to-many relationships between tables;
- The number/formula below each table name represents the cardinality (number of rows) of the table. Some are factored by SF, the Scale Factor, to obtain the chosen database size. The cardinality for the LINEITEM table is approximate (see Clause 4.2.5).

1. Find the line items (orderKey, partKey) that are to be packed in a "JUMBO JAR" container and shipped by "TRUCK".
2. Find the line items for which the quantity ordered exceeds the quantity available. (ignore all dates)
3. Find the pairs of suppliers and customers from the same nation, which did business together.
4. List all supplied parts (from the PartSupp table) with an available quantity between 9986 and 9989 (not inclusive) and all the orders containing that supplied part.

Answers

1.



```
SELECT L.orderKey, L.partKey
FROM Part P
JOIN LineItem L on P.partKey = L.partKey
WHERE P.container = "JUMBO JAR"
AND L.shipMode = "TRUCK";
```

orderKey	partKey
167	1012
288	989
421	1331
613	1851
1537	175
1924	355
2018	1943
2406	595
2848	1645
2948	1175
3428	1175
3488	1591
3719	777

...

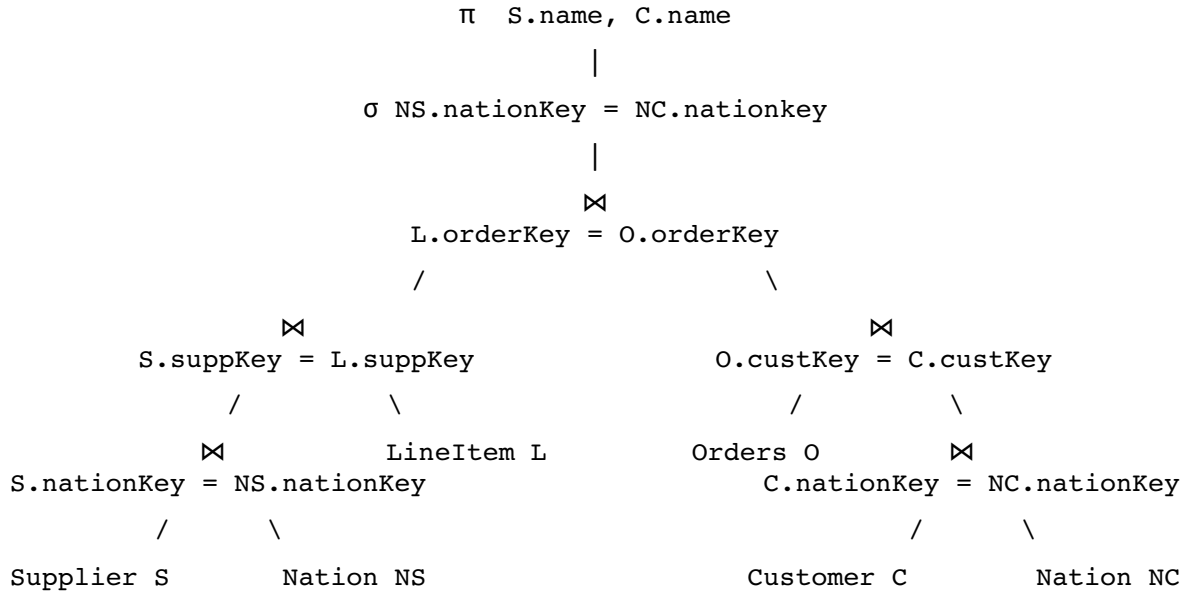
2.

```
      π LI.partKey, LI.suppKey
      |
      σ LI.quantity < PS.availQty
      |
      ⋈
LI.partKey = PS.partKey AND LI.suppKey = PS.suppKey
      /      \
LineItem LI   PartSupp PS
```

```
SELECT LI.partKey, LI.suppKey
FROM LineItem LI
JOIN PartSupp PS ON LI.partKey = PS.partKey AND LI.suppKey = PS.suppKey
WHERE LI.quantity < PS.availQty;
```

partKey	suppKey
1552	93
674	75
637	38
22	48
241	23
157	10
1062	33
43	19
191	70
1285	60

3.



```

SELECT S.name, C.name
FROM Nation NS
JOIN Supplier S on NS.nationKey = S.nationKey
JOIN LineItem L on S.suppKey = L.suppKey
JOIN Orders O on L.orderKey = O.orderKey
JOIN Customer C on O.custKey = C.custKey
JOIN Nation NC on C.nationKey = NC.nationKey
WHERE NC.nationKey = NS.nationKey;
  
```

name	name
Supplier#000000031	Customer#000001276
Supplier#000000073	Customer#000001276
Supplier#000000044	Customer#000001249
Supplier#000000057	Customer#000000008
Supplier#000000035	Customer#000000928
Supplier#000000053	Customer#000000062
Supplier#000000057	Customer#000000008
Supplier#000000031	Customer#000001103
Supplier#000000036	Customer#000000530
Supplier#000000067	Customer#000000004

...

4.

```

      π PS.partKey, PS.supplyKey, LI.orderKey
      |
σ PS.availqty > 9986 AND PS.availqty < 9989
      |
      ⋈L
LI.partKey = PS.partKey AND LI.supplyKey = PS.supplyKey
      /      \
      LineItem LI      PartSupp PS

```

```

SELECT PS.partKey, PS.supplyKey, LI.orderKey
FROM PartSupp PS
LEFT JOIN LineItem LI ON PS.partKey = LI.partKey AND PS.supplyKey = LI.supplyKey
WHERE PS.availqty > 9986 AND PS.availqty < 9989;

```

partKey	supplyKey	orderKey
28	4	NULL
520	51	1280
520	51	20422
520	51	24230
520	51	32290
520	51	38022
1986	75	15139
1986	75	20707
1986	75	21479
1986	75	27777
1986	75	29509
1986	75	38272
1986	75	39777
1986	75	41413