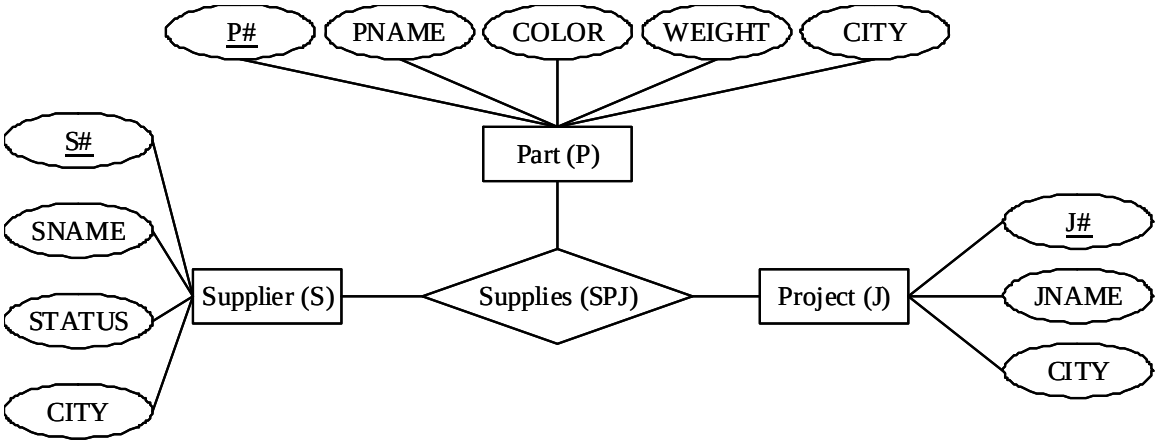
IELM 230. Relational Algebra and SQL Practice for Exam

Here are some questions to practice RA and SQL queries. No model answers are provided, and you are encouraged to discuss amongst your study group to find solutions. For SQL, you can also create the DB, for example, in MS Access or MySQL, and test out your queries.

The problems are taken from an old version of the text "An Introduction to Database Systems" by C. J. Date. This book is available in the library, and may also have hints/solutions for some problems.

The DB used for these questions is based on the following ER diagram.



Description:
The DB tracks the data of different parts used by various projects of a company. Each Project is identified by a project number, called J#; each part is identified by its part number, P#, and each supplier is identified by his ID number, S#. The status of a supplier indicates their current rating for quality. The 'City' field of a part indicates where it is stored. The data of which supplier supplies how much quantity of which part for which project is in the relation Supplies (table SPJ). Thus the primary key of SPJ table is the combination of (S#, P#, J#).

For most of the practice questions, you may assume that the data in the tables is as shown in the figure below.

S

S#	SNAME	STATUS	CITY
S1	Smith	20	London
S2	Jones	10	Paris
S3	Blake	30	Paris
S4	Clark	20	London
S5	Adams	30	Athens

P

P#	PNAME	COLOR	WEIGHT	CITY
P1	Nut	Red	12	London
P2	Bolt	Green	17	Paris
P3	Screw	Blue	17	Rome
P4	Screw	Red	14	London
P5	Cam	Blue	12	Paris
P6	Cog	Red	19	London

J

J#	JNAME	CITY
J1	Sorter	Paris
J2	Punch	Rome
J3	Reader	Athens
J4	Console	Athens
J5	Collator	London
J6	Terminal	Oslo
J7	Tape	London

SPJ

S#	P#	J#	QTY
S1	P1	J1	200
S1	P1	J4	700
S2	P3	J1	400
S2	P3	J2	200
S2	P3	J3	200
S2	P3	J4	500
S2	P3	J5	600
S2	P3	J6	400
S2	P3	J7	800
S2	P5	J2	100
S3	P3	J1	200
S3	P4	J2	500
S4	P6	J3	300
S4	P6	J7	300
S5	P2	J2	200
S5	P2	J4	100
S5	P5	J5	500
S5	P5	J7	100
S5	P6	J2	200
S5	P1	J4	100
S5	P3	J4	200
S5	P4	J4	800
S5	P5	J4	400
S5	P6	J4	500

Exercise RA questions:

1. Report the supplier names of suppliers who supply part P2

2. Report the names of suppliers who supply all the part.

3. Report the names of projects that use only red parts.

4. Report the names of projects who are supplied by at least one supplier which rating below 15.

5. Report the names of all suppliers except the ones with the worst status in their city. For example, if London has three suppliers, S9, S10 and S11 with respective status 10, 15, 20, then the query should report the names of S10 and S11.

[Note: for more practice of RA, you can also use the questions 1, 2, 4, 6, 7, 8, 9, 10 in the SQL exercises below].

Exercise SQL questions:

1. Report the names and numbers of suppliers and parts that are located in the same city.

2. Report all pairs of city names such that a supplier located in the first city supplies a part located in the second city. For example, if S1 is located in London and supplies P1, and P1 is stored in Paris, then the query will report the pair “London, Paris”.

3. Report the total number of suppliers that supply part P3.

[Hint: You can use *count(DISTINCT S#)*]

4. Report the part number and name of all parts that are supplied by more than two different suppliers.

5. Report the names of all projects whose name does not start with the letter ‘T’.

[Hint: You can use ‘NOT LIKE’]

6. Report the names of suppliers who supply at least one red part.

7. Report the names of suppliers who do not supply any red part.

8. Report the part numbers for parts supplied by a supplier in London to a project in London.

9. Report the Supplier number and name of all suppliers whose status is lower than the rating of S1.

10. Report the project names of projects that are supplied only by supplier S1.

11. Modify the SPJ table such that the Quantity supplied by all Suppliers in London is reduced by 50%.