

B561 Assignment 3

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The following tables show some sample data values for a suppliers-parts-projects database. Suppliers (S), parts (P), and projects (J) are uniquely identified by supplier number (SID), part number (PID), and project number (JID). The relationship SPJ (shipment) stores that the specified supplier supplies the specified part to the specified project in the specified quantity.

Database

| | <u>SID</u> | SNAME | STATUS | CITY |
|----------------|------------|-------|--------|--------|
| S (suppliers): | S1 | Smith | 20 | London |
| | S2 | Jones | 10 | Paris |
| | S3 | Blake | 30 | Paris |
| | S4 | Clark | 20 | London |
| | S5 | Adams | 30 | Athens |

| | <u>PID</u> | PNAME | COLOR | WEIGHT | CITY |
|------------|------------|-------|-------|--------|--------|
| P (parts): | 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 |

| | <u>JID</u> | JNAME | CITY |
|---------------|------------|----------|--------|
| J (projects): | J1 | Sorter | Paris |
| | J2 | Punch | Rome |
| | J3 | Reader | Athens |
| | J4 | Console | Athens |
| | J5 | Collator | London |
| | J6 | Terminal | Oslo |
| | J7 | Tape | London |

| | <u>SID</u> | <u>PID</u> | <u>JID</u> | <u>QTY</u> |
|------------------|------------|------------|------------|------------|
| SPJ (shipments): | 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 |

Please note that you can use the oracle system to test your SQL queries (you only need to create the tables in the database).

List of Queries

Given are the following queries in natural language:

1. Get all shipments where the quantity is between 400 and 850 inclusive.
2. Get all pairs of city names such that a supplier in the first city supplies a project in the second city with quantity at least 200.
3. Get project numbers for projects supplied by at least one supplier not in the same city.
4. Get project names for projects supplied by supplier S3.
5. Get part numbers for parts supplied to any project in London.
6. Get supplier numbers for suppliers supplying at least one part supplied by at least one supplier who supplies at least one red part.
7. Get supplier numbers for suppliers with a status lower than that of supplier S1.
8. Get part numbers for parts supplied to all projects in London.
9. Get project numbers and cities where the city has an “l” as the first or an “a” as the second letter of its name.
10. Get project numbers for projects supplied with part P1 in an average quantity greater than the greatest quantity in which any part is supplied to project J1.
11. Get project numbers for projects supplied with at least all parts available from supplier S1.
12. Get project numbers for projects that are supplied by every supplier who supplies some red part.

Excercises

- (a) Formulate the queries (1) to (12) in SQL.
- (b) Formulate the queries (1), (5), (6), and (8) in the relational algebra.
- (c) Formulate the queries (1), (2), (7), and (8) in the tuple relational calculus.
- (d) Formulate the queries (1), (3), (4), and (8) in the domain relational calculus.