CS2102 Database Systems

REVISION

Schema Refinement

AB→C, C→A, BC→D, ACD→B, D→E, D→G, BE→G, CG→B, CG→D, CE→A, CE→G

Q1. Find all the candidate keys of R

Q2. Find an extended minimal cover of F.

Step 1. Simplify the right hand side

Q2. Find an extended minimal cover of F.

Step 2. Eliminate redundant attributes

Q2. Find an extended minimal cover of F.

Step 3. Eliminate redundant functional dependencies

Q2. Find an extended minimal cover of F.

Step 4. Group all dependencies with the same left hand side into one

Q3. Is R in BCNF ?

Q4. Is R in 3NF ?

Database Security

- Suppose Bob is the owner of the table

  Part (pno, pname, cost, sname)

- If Jane want to view the content of this table. What should Bob do?

- If Tom needs to update content of this table and also pass this privilege to others. What should Bob do?

Database Security

- Part (pno, pname, cost, sname)
- Security class: TS > S > C > U

pno	pname	cost	sname	security
1	P1	10	S1	TS
2	P2	15	S1	S
3	P3	10	S2	S
4	P3	20	S2	C

- If Tom with security level S issues the query:
  - SELECT P.pname FROM Part p

- What results will Tom see?

Database Security

- Part (pno, pname, cost, sname)
- Security class: TS > S > C > U

pno	pname	cost	sname	security
1	P1	10	S1	TS
2	P2	15	S1	S
3	P3	10	S2	S
4	P3	20	S2	C

- If Jane with security level C issues the query:
  - SELECT avg(P.cost) FROM Part p

- What results will Jane see?

Database Security

- Part (pno, pname, cost, sname)
- Security class: TS > S > C > U

pno	pname	cost	sname	security
1	P1	10	S1	TS
2	P2	15	S1	S
3	P3	10	S2	S
4	P3	20	S2	C

- If Alice with security level U issues the query:
  - SELECT * FROM Part p

- What results will Alice see?

ER Model

- Each pharmaceutical company is identified by name and has a phone number.
- For each drug, the trade name and formula must be recorded. Each drug is manufactured by a pharmaceutical company, and the trade name identifies a drug uniquely from the other products of that company. If a pharmaceutical company is deleted, we need not keep track of its products any more.

- Each pharmacy has a name, address and phone number.
- Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.

- Pharmaceutical companies have long term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies. For each contract, you have to store a start date, an end date, and the text of the contract.

- What if drugs are sold at a fixed price by all pharmacies?

Relational Model

Give the SQL DDL for the following relations.

Part (pno, pname, cost, sname)
ComplexPart (pno, laborCost)
SubPart (pno, subPartOf, qty)

SQL

Part (pno, pname, cost, sname)

ComplexPart (pno, laborCost)

SubPart (pno, subPartOf, qty)

Q1. List the part numbers and part names of all basic parts whose cost is more than $10.

Part (pno, pname, cost, sname)

ComplexPart (pno, laborCost)

SubPart (pno, subPartOf, qty)

Q2. Find all the pairs of complex parts that have the same labor cost.

Q3. Find the names of the suppliers that supplies at least two parts, with the average cost of these parts.

Relational Algebra

Part (pno, pname, cost, sname)

ComplexPart (pno, laborCost)

SubPart (pno, subPartOf, qty)

Q4. List the names of suppliers who supply all complex parts whose labor cost is more than $100.

Q5. List the names of suppliers who supply at least two parts.

Relational Calculus

Part (Pno, Pname, Cost, Sname)
ComplexPart (Pno, LaborCost)
SubPart (Pno, SubPartOf, Qty)

Q6. Find the name of the cheapest part.

TRC:

DRC:

Part (Pno, Pname, Cost, Sname)
ComplexPart (Pno, LaborCost)
SubPart (Pno, SubPartOf, Qty)

Q7. Find the name of the cheapest **basic** part.

TRC:

DRC:

Part (Pno, Pname, Cost, Sname)

ComplexPart (Pno, LaborCost)

SubPart (Pno, SubPartOf, Qty)

Q8. List the part numbers that are first and second level subparts of part number p200.

TRC:

DRC: