

COMP 306: Database Management Systems

Spring 2023 - PS Week #4

Consider the relational schema:

- Customer(CID, Cname, Phone, City)
- Item(Item_ID, QuantityOnHand, UnitPrice)
- Order(OID, CID, Date, PricePaid)
- OrderDetail(OID, Item_ID, QuantityOrdered)

Write the following queries in relational algebra using this schema.

- (1) Find the item IDs and unit prices of those items ordered by customer named “Jane Doe”.
- (2) Find the name and phone number of those customers who have made at least one order for which the price paid was more than \$100.
- (3) Find the phone numbers of customers who have bought all items with unit price $> \$100$ in a single order.
- (4) Find the names of customers who have placed an order either on January 31st or February 14th, but not both.
- (5) Find the names of customers who have placed an order on March 19th which includes an item that is currently out of stock. (An item that is currently out of stock means the item’s QuantityOnHand = 0.)

Now consider a different relational schema:

- Supplier(sid, sname, address)
- Part(pid, pname, color)
- Catalog(sid, pid, cost)

Write the following queries in relational algebra using this schema.

- (6) Find the IDs of suppliers who supply some red or green part.
- (7) Find the IDs of suppliers who supply some red part or are located in 21 George Street.
- (8) Find the IDs of suppliers who supply some red part and some green part.
- (9) Find pairs of IDs such that the supplier with the first ID charges more for some part than the supplier with the second ID.
- (10) Find the IDs of suppliers who supply only red parts.
- (11) Find the names and addresses of suppliers who supply every part.
- (12) Find the IDs of parts supplied by at least two different suppliers.

Here is yet another schema:

- Aircraft(aid, aname, cruisingrange)
- Employee(eid, ename, salary)
- Certified(eid, aid)

Write the following queries in relational algebra using this schema.

- (13) Find the IDs of employees who make the highest salary.
- (14) Find the IDs of employees who make the second highest salary.
- (15) Find the IDs of employees who are certified to fly exactly three aircrafts.