King Saud University College of Computer and Information Sciences Computer Science Department
CSC380 Fundamentals Of Database Systems

Extra Exercise on Relation Algebra

Given the relational database schema below, ***specify the following queries using relational algebra***:

PARTS (Pno, Pname, quantity, price, Olevel)
CUSTOMERS (Cno, Cname, street, zip, phone)
EMPLOYEES (Eno, Ename, zip, Hdate)
ZIP_CODE (zip, city)
ORDERS (Ono, Cno, Eno, ReceivedDate, ShippedDate)
ODETAILS (Ono, Pno, Qty)

1. **Retrieve the names of parts that costs less than $20**

   π Pname (σ Price >20 (PARTS))

2. **Retrieve the names and cities of employees who have taken orders for parts costing more than $50.**

   R1 ← π Pno (σ Price > 50 (PARTS))

   R2 ← π Ono ODETATILS * R1

   R3 ← π Eno ORDERS * R2

   R4 ← π Eno,zip EMPLOYEE * R3

   Result :

   π Pname,City (ZIP_CODE) * R4

   Or:

   π Pname,City (ZIP_CODE) * (π Eno,Zip EMPLOYEE *(π Eno ORDERS ⋈ (

   π Ono ODETATILS * π Pno (σ Price > 50 (PARTS)))))

3. **Retrieve the names of customers who have ordered parts from employees living in Dubai.**

   π Cname (π Cno,Cname (CUSTOMRS) * (π Eno, Cno ORDERS * (π Eno,Zip

   EMPLOYEES * (σ city = ' Dubai' (ZIP_CODE))))))

4. **Retrieve the names of customers who have not placed an order**

π Cname (π Cno,Cname CUSTOMERS – (π Cno,Cname (CUSTOMERS) * π Cno (ORDERS)))

5. **List the details of all employees and include the order number, receiving and shipping dates if they have taken orders.**

   EMPLOYEE $\supset\!\!\bowtie_{Eno=Eno}$ π Eno , ReceivedDate, ShippedDate (ORDERS)

6. **Retrieve the zip code of all cities where a customer and an employee live.**

   π Zip (EMPLOYEES) ⊓ π Zip (CUSTOMERS)