**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))

1. **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 \bowtie ( π Ono ODETATILS \* π Pno (σ Price > 50 (PARTS)))))

1. **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))))))

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

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

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

EMPLOYEE Eno=Eno π Eno , ReceivedDate, ShippedDate (ORDERS)

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

π Zip (EMPLOYEES) П π Zip (CUSTOMERS)