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Last four digits of student id: 0778

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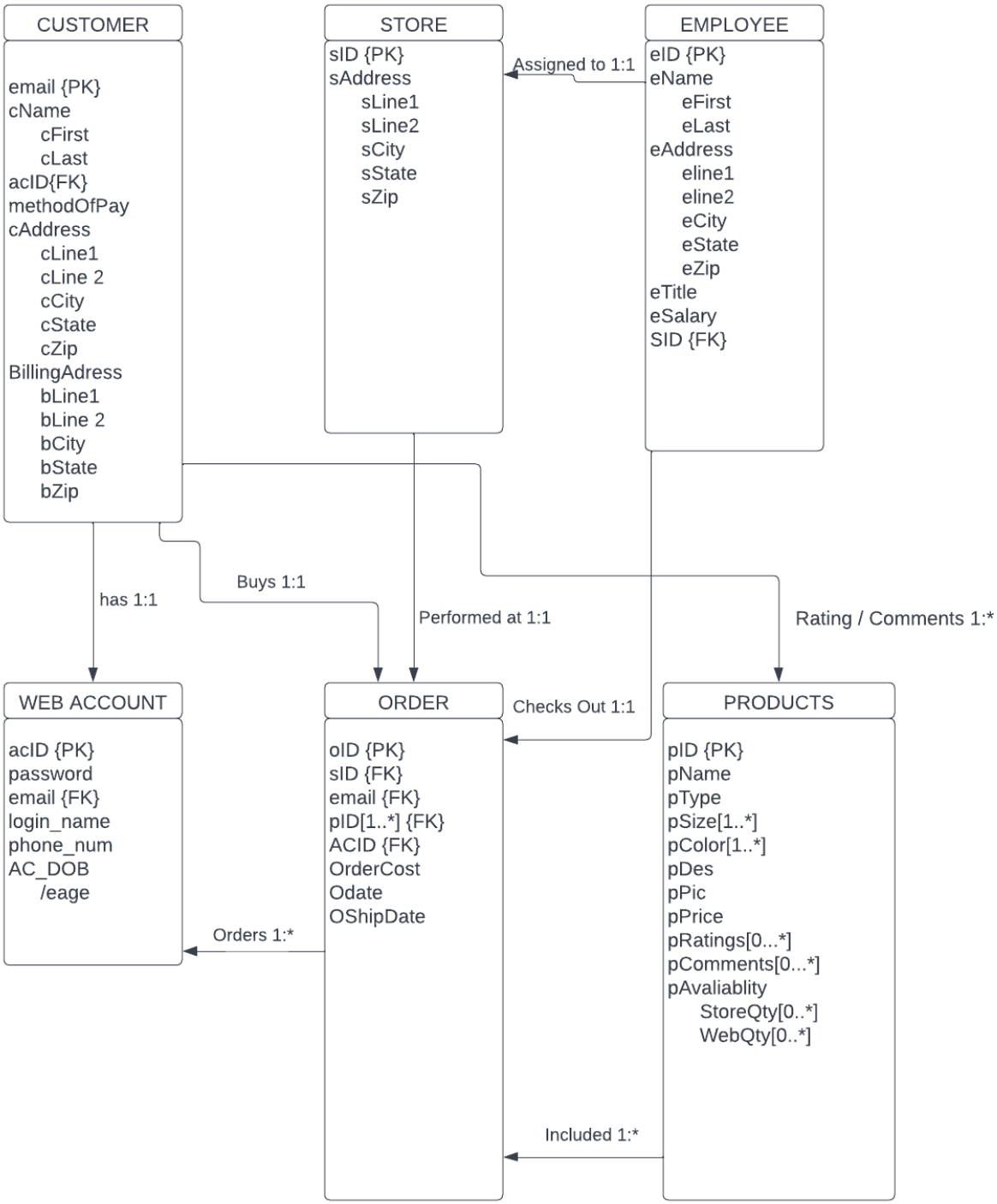
UML:



Convert UML to relations:

Customer (email, cfirst, clast, acID, methodOfPay,cAddress,cLine1,cLine 2,cCity,cState,cZip, BillingAdress,bLine1,bLine 2, bCity,bStatebZip)

Employee(eID,efirst,elast,eDOB,eAge,eAddress,eline1,eline2,eCity,eState,eZip,etitle, esalary, sID)

Store(SID, Address, sline1 , sline2, scity, sState, sZip)

Product(PID, pName, pType, pPrice, pSize, pColor,Pdes,pPic,pRating, pComments, pAvaliability,StoreQty,WebQty)

WebAccount(ACID, ACaddress, email, login_name, password, cost_DOB)

Order(oID, oCost, EID, email, oDate,oShip,orderDate,SID)

Relational Algebra:

1. Identify the 12 month purchase history for [customer]. Display the customer name, product, size, price, date of purchase.

A ← σ email= "JohnnyDepp@gmail.com" (Π email,cfirst,clast((CUSTOMER))
B ← σ oDate>="10-1-2021" (Π oDate, oID, email(ORDER))
C ← σ A.email=B.email (A X B)
D ← σ C.Pid = Product.Pid(C X Π pName, pSize,pPrice((PRODUCT))

Ans ← Π cFirst, cLast, pName, pSize, pPrice, oDate(D)

[Note: Customer is chosen to be Johnny Depp and because people can have the same name, in this database we identity customers by their emails so the reason for that email choice]

2. Identify [product], [size] available now at the [store location]. Display the product name, product code, available colors and price.

City ← σ Scity= "SunnySide"(Π sId, sCity, (STORE))
A ← σ pType= "Jacket" ∧ pSize = "S" (Π pId, pName, pColor,pPrice(Product))
B ← σ City.SID = store_product.sId(sCity X Store_product)
C ← σ B.Pid =A. Pid (A x B)

Ans ← Π pName,pId, pColor,pPrice (D)

[Note: Store location is chosen to be Sunnyside, product is a Jacket, Size is Small or S]

3. Identify when the recent order for [customer] will be shipped. Display the products ordered, price and ship date.

Recent ← σ oDate >= "10-1-2022" Λ oDate <= "10-7-2022" (ORDER)
Johnny ← σ email= "JohnnyDepp@gmail.com" (Π email,cfirst,clast (CUSTOMER))
A ← σ Johnny,email = Order.email (Johnny X Π OID (Recent)
B ← σ A.OID = Order.OID (A X ORDER)
C ← σ B.PID = Product. PID (B X Π pID, oShipDate, pPrice (Product))

Ans ← Π pID, oShipDate,pPrice (C)

[Note: Recent order is depicted as order placed within the most recent week

4. Identify products with no inventory offered at the web store. Display the product name, product code, size and color.

A ← σ availability = 0 Λ webqty=0 (Π pName, pPid(Product))
B ← Π pID(PRODUCT) - Π pID (A)
C ← σ B.pID=Products.pID (B X Π pID,pName,pSize,pColor)

Ans ← Π pName, pID, pSize, pColor (C)

[Note: The product display the amount of quantity items in store and web quantity]

5. Identify [product] not sold in the last month at the web store. Display the product name, product code, size, color and price.

A ← σ oDate > "10-1-2022" Λ oDate >"10-31-2022" (Π oID,pID,SID,oDate (ORDER))
B ← σ sID = "Online" (Π sId, sCity, (STORE))
C ← σ A.sID - B.sID (A X B)
D ← Π oID (ORDER) - Π oID(C)
E ← σ D.oID = Order.oID (D X ORDER)
F ← σ E.pID= Product.pID (E X Π pID,pName, (PRODUCT))

Ans ← Π pName, pID, pSize, pColor, pPrice (F)

[Note: This database puts web orders through the Store ID as “Online” to sort and organize online orders]

6. Identify customers without a purchase in the last year. Display the customer name and email.

A ← σ oDate > ”10-10-2021”(Π oDate,email(ORDER))
B ← Π email (CUSTOMER) - Π email(A)
C ← σ B.email = CUSTOMER.email(B X Π email, cName, cfirst,clast(CUSTOMER))
Answer ← Π email, cfirst, clast(C)

7. Identify sales by state in the [last year]. Display 3 columns: state, number of sales and total dollar sales.
date ← σ oDate>”10-1-2021” (Π OID, email, Odate, (ORDER))
A ← σ date.email = Customer.email (Date X Π cState (CUSTOMER))
B ← σ A.OID = Order.OID (A X Order)
C ← σ B.PID = Product.PID (C X Π PID, pPrice (ORDER)

Ans ← (State, Number of Sales, Total dollar Sales) cState, ℱ count OID , sum pPrice (C)

[Note: ℱ is aggregate function]

8. Identify the total number of active [New York] customers. Display the number.
A ← Π email (σ oDate> “10-1-2021” (Π Odate,email (ORDER))
B ← σ cState = “New York” (Π email, cState (CUSTOMER))
C ← A.email = B.email (A X B)

Ans ← ℱ countemail (C)

[Note: ℱ is aggregate function , the activate date choose is customers who ordered something within the year.]

9. Identify sales by product in the [last year]. Display 3 columns: Product name, number of products sold and total dollar amount.

I’m not sure how to answer this question.

10. Identify [product] with low customer ratings in the last 6 months. Display the product, size, color, price, rating, and the customer description.

A ← σ Odate > “1-1-2022” ∧ Odate < “6-1-2022” (Π pID , oDate, (ORDER))
B ← σ rating < 3 (Π pID, pName, prating (PRODUCT))
C ← σ A.pID = B.pID (A X B)

D ← σ C.pID = Product.pID (C X Π pID, pName (PRODUCT))

Ans ← Π pName, pSize, pColor, pPrice, pRating,pDes (D)

[Note: Anything below a 3 rating will be considered a low customer rating and the 6th month period is from 1-1-2022 to 6-1-2022]

11. Identify employees who are not customers. Display the employee name, employee ID and address.

A ← σ Customer.address = Employee.address (CUSTOMER X EMPLOYEE)
B ← Π cAddress (A) - Π Eaddress (EMPLOYEE)
C ← σ B.address = Employee.Eaddress (B X Π ename,eID, Eaddress (EMPLOYEE))
Ans ← Π ename, eID, Eaddress (C)

[Note: In this part, we compared the addresses of customers and employees to see which ones were the same because there wasn't anything similar to compare because employee didn't have an email attribute and people can have the same names]

12. Identify products sold [day] at the [store location]. Display the customer name, product purchased, price and address.

A ← σ SCity= "SunnySide" (Π sid, scity (STORE))
B ← σ ODate= "10-31-2022" (Π oDate,pID,SID (ORDER))
C ← σ A.sID = B. sID (A X B)
D ← σ C.email = Customers.email (C X Customers)
E ← σ D.pID = Product.pID (D X Products)

Ans ← Π cFirst, cLast,pName,cAddress, pPrice (E)

[Note: Day chosen was Halloween 2022 and the store location is picked in sunnyside]

13. Identify customers who live in warm weather states and also recently purchased winter jackets. Display the customer name, product, date of purchase and price

A ← σ Odate > "10-10-2021" (ORDERS)
B ← σ A.PID = product.pID (A X PRODUCT)
C ← σ B.pName = "Jacket"
D ← Π email (A)
E ← σ Customers.email = D.email (D X CUSTOMERS)
F ← σ cState= (warm_states)
Ans ← Π cFirst, clast,pName, Odate, pPrice (F)

[Note: I’m not really sure how to find warm states that bought jackets]