CS 122A: Introduction to Data Management – Spring 2016

Homework 4: Relational Algebra and SQL query (100 points)

Due Date: **Thursday, April 28, 2016 11:45 PM, on EEE**

Part A. Relational Algebra [70 pts]

1. [5pts] Find all female customers who live in Irvine.

a) [3pts] Relational Algebra

σ (gender = 'F' $\wedge$ address_city = 'Irvine') Customer

b) [2pts] The result

Customer.cid	Customer.ssn	Customer.gender	Customer.email	Customer.address_street	Customer.address_city	Customer.address_state	Customer.address_zipcode
2	582902877	F	gimodc@qg5a543.com	9091 Watermarke Place	Irvine	CA	92612
6	830930154	F	2ldx.6l9@pk11l2s.com	90915241 Laguna Canyon Road	Irvine	CA	92618
19	22152601	F	5-.@rblrzxw-ql9c.com	90931 Creek Road	Irvine	CA	92604

2. [5pts] Return the names of dishes that a lounge (lid:113) is serving.

a) [3pts] Relational Algebra

π name (σ lid = 113 (Dish))

b) [2pts] The result

Dish.name
grilled free range chicken
grilled steak
oven baked salmon
tempura

3. [10pts] Return the credit card number and its expire date of a customer (cid:16).

a) [7pts] Relational Algebra

π card_number, expr_date (σ cid = 16 (Customer) $\bowtie$ Credit_Card)

b) [3pts] The result

Credit_Card.card_number	Credit_Card.expr_date
67718812245978283	201803

4. [10pts] Return the gender, address_street, address_city of a customer who ordered “wafu steak”. Note that many restaurants can serve “wafu steak”.

a) [7pts] Relational Algebra

π gender, address_street, address_city (π gender, address_street, address_city, cid Customer $\bowtie$ π cid (σ name = 'wafu steak' (π oid, name DishOrder_Contains_Dish) $\bowtie$ π cid, oid DishOrder))

b) [3pts] The result

Customer.gender	Customer.address_street	Customer.address_city
F	90917772 17th Street	Tustin

5. [10pts] Find the name and quantity of each dish ordered by a customer who reserved only one ticket for the flight N124 on 08:21:00 Sep. 07, 2015

a) [7pts] Relational Algebra

π name, quantity (π cid (σ flight_number = 'N124' and quantity = 1 and projected_departure_datetime = '2015-09-07 08:21:00' Customer_Reserves_Flight) $\bowtie$ (π cid, oid DishOrder) $\bowtie$ π oid, name, quantity DishOrder_Contains_Dish)

b) [3pts] The result

DishOrder_Contains_Dish.name	DishOrder_Contains_Dish.quantity
hummus	10
the burger combo	5
the karma burger	3

6. [10pts] Find the ids and the email of customers who haven't ordered at all.

a) [7pts] Relational Algebra

(π cid (Customer) - π cid ((Customer) $\bowtie$ (DishOrder))) $\bowtie$ π cid, email Customer

b) [3pts] The result

Customer.cid	Customer.email
4	r1d0800121@8w-4lb.com
5	eu3@4l4ligbm2d4.com
6	2ldx.6l9@pk11l2s.com
7	ijvbv5hx@e0z8o6w.com
8	iz4tvg5j0e.@otiw34ymv68z.com
9	xhrh8pptf0bm2@ki4jwmsiek.com
10	93nwu_g3pow65d@0zekopshz.com
11	gmzs@hdm9q8rpd.com
13	42-8b8@l0m1bttskf3.com
15	9zsiot3@8aab4f3tj.com
16	4ikmvae@xsvx5etrv2.com
17	s3et50zvq-9b1@dlayle.com
18	2-z6sf@oh-sz1whst6.com

19	5-.@rblrzxw-ql9c.com
20	iuxh@al8wsoem.com

7. [10pts] List the ids and ssn of customers who have placed an order with every one of the restaurants.

a) [7pts] Relational Algebra (**Use Division operator**)

(π cid, lid (DishOrder) ÷ π lid (Lounge)) ⋈ π cid, ssn (Customer)

b) [3pts] The result

DishOrder.cid	Customer.ssn
1	988843736

8 [10pts] Find the ssns of employees from New Jersey.

a) [7pts] Relational Algebra (You don't have to rename the column title)

π ssn σ address_state = 'NJ' (π ssn, address_state FlightAttendant ∪ π ssn, address_state MaintenanceEngineer ∪ π ssn, address_state OperationStaff ∪ π ssn, address_state Pilot)

b) [3pts] The result

FlightAttendant.ssn
281653141
650572255

Part B. SQL Queries [30 pts]

In this part, use SQL queries to do analysis on the dataset above.

1.Find cids of all customers who reserved fights.

select distinct C.cid from Customer as C, Customer_Reserves_Flight as CRF where C.cid = CRF.cid

C.cid
1
13
14

2. Find customers whose street address ends with “Warner Avenue”.
select distinct * from Customer as C where C.address_street LIKE '%Warner Avenue'

C.cid	C.ssn	C.gender	C.email	C.address_street	C.address_city	C.address_state	C.address_zipcode
7	481161938	F	ijvbv5hx@e0z8o6w.com	9091536 East Warner Avenue	Santa Ana	CA	92705
8	340130873	M	iz4tvg5j0e.@otiw34ymv68z.com	9091536 West Warner Avenue	Santa Ana	CA	92705

3. Find all customers who reserved flights and ordered food.
select distinct C.* from Customer as C, Customer_Reserves_Flight as CRF, DishOrder as D where C.cid = CRF.cid and CRF.cid = D.cid

C.cid	C.ssn	C.gender	C.email	C.address_street	C.address_city	C.address_state	C.address_zipcode
1	988843736	M	153m@4bjsvkd6f.com	9091 Spectrum Pointe Drive	Lake Forest	CA	92630
14	958708596	M	3ewd@s8xum24csra.com	90937654 Savi Ranch Pkwy	Yorba Linda	CA	92887

4. Find the locations of lounges which serve “tacos” or “hummus”.

select distinct L.location from Lounge as L, Dish as D where L.lid = D.lid and (D.name = 'tacos' or D.name = 'hummus')

L.location
section D32
section D12

5. Find cids of customers who didn’t order any dishes nor reserve any flights.

select distinct C.cid from Customer as C except (select distinct D.cid from DishOrder as D union select distinct CRF.cid from Customer_Reserves_Flight as CRF)

C.cid
4
5
6
7
8
9
10
11
15
16
17
18
19
20