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Score: /100

CS122A HW4

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A. Relational Algebra [70pts]

1.

(a) $\sigma \text{ total_amount} > 300$ (Orders)

(b)

Orders.oid	Orders.cid	Orders.did	Orders.rid	Orders.order_datetime	Orders.total_amount
8	14	15	6	2014-01-08 18:34:34	358.85
10	18	19	10	2014-01-10 20:01:01	1379.7
12	1	13	3	2014-01-12 09:22:22	709.8
13	1	19	4	2014-01-13 11:45:45	1199.5
14	1	17	8	2014-01-14 13:24:24	569.88
17	1	6	9	2014-01-17 22:56:56	315
18	1	25	10	2014-01-18 21:00:00	2913

2.

(a) $\pi \text{ name } (\sigma \text{ rid} = 9 \text{ (Dishes)})$

(b)

Dishes.name

tempura

sesame chicken

seafood salad

3.

(a) π name, phone_number, address (σ id = 9 (Users) \bowtie σ cid = 9 (Customers))

(b)

Users.name	Users.phone_number	Customers.address
Joseph A. Obrien	7128344242	90915661 Red Hill Avenue, Ste. 201, Tustin, CA, 92780-732899

4.

(a) π address (σ name = 'wafu steak' (Orders_Contain_Dishes) \bowtie Orders \bowtie Customers)

(b)

Customers.address
90924367 Von Karman Avenue, Ste. 200, Irvine, CA, 92606-496099
90937654 Savi Ranch Pkwy, Ste 997, Yorba Linda, CA, 92887-465667

5.

(a) π name, quantity (σ ssn = '179589904' (Drivers) \bowtie Orders \bowtie Orders_Contain_Dishes)

(b)

Orders_Contain_Dishes.name	Orders_Contain_Dishes.quantity
fresh lemonade	2
the thai wrap	2
sandwich	2

6.

(a) $\pi_{\text{cid}, \text{phone_number}} ((\text{Customers} - \pi_{\text{cid}}, \text{address} (\text{Customers} \bowtie \text{Orders})) \bowtie \rho_{\text{cid} < \text{id}} (\text{Users}))$

(b)

Customers.cid	Users.phone_number
4	8503387148
5	7249386285
6	9544657930
7	8476474341
8	5089838873
9	7128344242
10	9416555246
20	4806508364
22	6127183747
24	4122207647
26	8307987830
30	3122981148

7.

(a) $(\pi_{\text{cid}, \text{rid}} (\text{Orders})) \div (\pi_{\text{rid}} (\text{Restaurants})) \bowtie \text{Customers}$

(b)

Orders.cid	Customers.address
1	9091 Spectrum Pointe Drive, Ste. 320, Lake Forest, CA, 92630-228899

B. **Tuple Relational Calculus** **[30 pts]**

1. $\{o \mid o \in \text{Orders} \wedge o.\text{total_amount} > 300\}$
2. $\{t(\text{name}) \mid \exists d \in \text{Dishes} (t.\text{name} = d.\text{name} \wedge d.\text{rid} = 9)\}$
3. $\{t(\text{name}, \text{phone_number}, \text{address}) \mid \exists u \in \text{Users} (u.\text{id} = 9 \wedge t.\text{name} = u.\text{name} \wedge t.\text{phone_number} = u.\text{phone_number}) \wedge \exists c \in \text{Customers} (c.\text{cid} = 9 \wedge t.\text{address} = c.\text{address})\}$
4. $\{t(\text{address}) \mid \exists c \in \text{Customers} (t.\text{address} = c.\text{address} \wedge \exists o \in \text{Orders} (o.\text{cid} = c.\text{cid} \wedge \exists ocd \in \text{Order_Contain_Dishes} (ocd.\text{name} = \text{'wafu steak'} \wedge ocd.\text{oid} = o.\text{oid})))\}$
5. $\{t(\text{name}, \text{quantity}) \mid \exists ocd \in \text{Order_Contain_Dishes} (t.\text{name} = ocd.\text{name} \wedge t.\text{quantity} = ocd.\text{quantity} \wedge \exists o \in \text{Orders} (o.\text{oid} = ocd.\text{oid} \wedge \exists d \in \text{Drivers} (d.\text{did} = o.\text{did} \wedge d.\text{snn} = \text{'179589904'})))\}$
6. $\{t(\text{id}, \text{phone_number}) \mid \exists u \in \text{Users} (t.\text{id} = u.\text{id} \wedge t.\text{phone_number} = u.\text{phone_number} \wedge \neg \exists o \in \text{Orders} (o.\text{cid} = u.\text{id}))\}$
7. $\{t(\text{id}, \text{address}) \mid \exists c \in \text{Customers} (t.\text{id} = c.\text{cid} \wedge t.\text{address} = c.\text{address} \wedge \exists o \in \text{Orders} (o.\text{cid} = c.\text{cid} \wedge \forall r \in \text{Restaurants} (r.\text{rid} = o.\text{rid})))\}$