

The College of Charleston

DISC 210 Dataset Organization and Management  
G. Pothering  
Spring, 2021  
Mid-Term Exam

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Problem	Points	Score
1.	24	18
2.	20	20
3.	25	20
4.	25	25
Total	94	83
Percentage of 100		89

1. (24 points) You are given the following instance of the tables of a database.

+18

Table F			
A	X	Y	Z
a1	x1	y1	z2
a1	x2	y2	z2
a2	x1	y1	z3
a2	x1	y1	z1
a3	x3	y2	z3

Table G		
B	X	Y
b1	x1	y2
b2	x1	y1
b3	x2	y2
b4	x2	y1
b5	x3	
b7	x3	y1

Table H			
C	A	D	B
c1	a3	c1	b2
c2	a2	c2	b2
c3	a2	c1	b2
c4	a3	c3	b7

Based on what you see in the database, identify for each table

- a. (12 points; 4 points) Two possible candidate keys (if a table has more than 2, you need only give 2; if a table has only 1 however, give the candidate key followed by "only one"). No superkeys (candidate keys that contain other candidate keys) are allowed. For any compound keys, place the attribute names inside parentheses.

+6

For Table F:

+2

(Y, Z) (X, Z)

For Table G:

+3

B

-1

For Table H:

+1

(C, D)

not necessary -1

(A, D) -2

- b. (12 points; 4 points each) Possible foreign keys (if none, say NONE)

+12

For Table F:

None

For Table G:

None

For Table H:

None

None

B

consistent with a.

A X Y Z B X Y C A D B

2. (20 points) Given the following database schema (say for an Uber-like company) and description of its attribute types, give SQL commands to implement one of either the CAR or DRIVER relations (your choice) and the SHIFT relation. Be sure to include declarations of primary keys, foreign keys, and allowance of NULL values (or not). Use the next page for your answer (you need not submit this page).

CAB (CarID, Make, Model, Year, LicNum)

DRIVER (DID, Name, Address, Phone, DrvLic)

SHIFT(WrkDate, WrkShift, *CarID*, *DriverID*, Mileage, Revenue)

Here primary key attributes are in underlined and foreign key attributes are in bold italics (it should be obvious what the foreign keys are referencing).

CAR		
Attribute Name	Type	Not Null?
<u>CarID</u>	Fixed length character string - 6	Yes
Make	Variable length character string - 8	Yes
Model	Variable length character string - 8	Yes
Year	Fixed length character string - 4	Yes
LicNum	Fixed length character string - 10	No

DRIVER		
Attribute Name	Type	Not Null?
<u>DID</u>	Fixed length character string - 8	Yes
Name	Variable length character string - 30	Yes
Address	Variable length character string - 50	No
Phone	Fixed length character string - 12	No
DrvLic	Fixed length character string - 9	Yes

SHIFT		
Attribute Name	Type	Not Null?
<u>WrkDate</u>	Date	Yes
<u>WrkShift</u>	Fixed length character string - 3	Yes
<i><u>CARID</u></i>	Fixed length character string - 6	Yes
<i><u>DriverID</u></i>	Fixed Length character string - 8	No
Mileage	Integer	No
Revenue	Real	No

## 2. Code for problem 2

20/20 create table if not exists car (

~~car (~~

8/8 CarID char(6), not null,  
Make varchar(8), not null,  
model varchar(8), not null,  
Year char(4), not null,  
LicNum char(10),  
primary key (CarID)

);

create table if not exists (

12/12 WrkDate DateTime not null,  
WrkShift char(3), not null,  
CarID char(6), not null,  
DriverID varchar(8),  
Mileage int,  
Revenue Decimal(10, 2),

Primary key (WrkDate, WrkShift, CarID),

Foreign key (CarID) references car (CarID)

Foreign key (DriverID) references Driver (DEID)

);

3. (25 points; 5 points each part) Given the CAP database schema from Assignment 1 (a compact version of which is reproduced below)

CUSTOMERS (CID, CName, City, Discount)  
 AGENTS (AID, AName, City, Commission)  
 PRODUCTS (PID, PName, City, Quantity, Price)  
 ORDERS (OrdNo, Month, CID, AID, PID, Qty, Cost)

Write SQL statements to

- a. Remove all orders from the ORDERS table that involve customer c002.

+5 ~~delete from orders~~ ~~where CID = 'c002';~~ Delete from orders  
 where CID = 'c002';

- b. For those Customers who had a discount less than 5% increase it to 5%

+5 update Discount ~~OK.~~  
~~from Customers~~  
 set Discount = '5%'  
 where Discount < '5%';

- c. SQL allows values to be calculated using arithmetic operators such as +, -, \*, and names of attributes as operands. Given this, write an SQL statement expression that will increase the price of all products by 2%.

+1 update Cost  
 set Cost = Cost \* 1.02;

- d. Insert yourself as an AGENT with an agent id of a07, but do not assign a commission yet. I'm assuming you'll use your name and an appropriate city value.

+5 insert into Agents values ('a07', 'Patrick M. Lake', 'Charleston',  
 0.10, null);

- e. Insert a new product with the name chalk, price 0.75, and product id of p08. These are the only attributes that will have values

+4 insert into Products ('p08', 'chalk', null, null, 0.75);



**+25**

4. (25 points) Consider the following relations from a database that keeps track of business trips of its sales people:

SPERSON(EmpID, Name, SupervisorID)  
TRIP(TripID, EmpID, ToCity, StartDate, EndDate)  
EXPENSE(TripID, ItemDescription, Cost)  
EXPENSEITEM(Description, MaxCostAllowed)

Express the following queries in SQL

- a. (3 points) Give full details of all expenses that had a "Massage" item.

**+3** Select \*  
From Expense  
Where Item Description = 'massage';

- b. (7 points) Get the names of all cities that were visited across all trip. Do not list a city name more than once and give the cities in alphabetical order.

**+7** select distinct To City  
from Trip  
Order by To City;

- c. (4 points) How many trips were taken to Charleston?

**+4** Select count(~~TripID~~) (TripID)  
From Trip  
Where To City = 'Charleston';

- d. (7 points) What were the least, greatest, and average costs filed for an "airport shuttle"? Use appropriate column headings.

**+7** Select min(Cost) as 'minimum cost', max(Cost) as 'maximum cost',  
avg(Cost) as 'Average cost',  
From Expense  
Where Item Description = 'airport shuttle';

- e. (4 points) Add yourself as a salesperson with employee id of 'S091' and with supervisor 'S019'.

**+4** insert into SPERSON Value ('S091', 'Patrick Melake', 'S019');