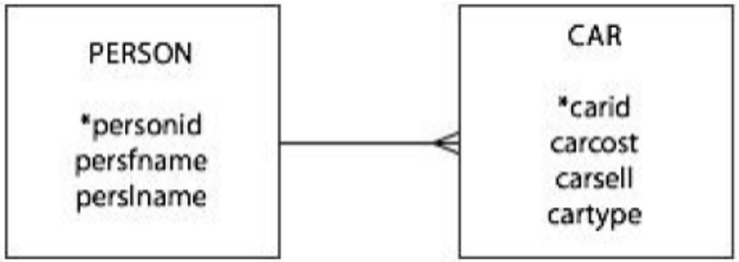
Modelling and Querying with SQL

Objective and Problems

- Build a database for a car dealership.
- Query the database to answer various questions.



Review SQL Query Functions

Select: What data are you selecting? (ie.* or a specific column)

From: Locates an entity.

Where: Specifies a condition (ie. x=0).

In: Specifies multiple values from WHERE.

Not In: Used with where to include instances that are not true.

Count/Sum/Avg/Max: Arithmetic functions often following select.

New Functions

- **GROUP BY**: Finding rows with the same value. Can be combined with AVG,SUM,<,>,=.

```
SELECT COUNT(CustomerID), Country
FROM Customers
GROUP BY Country
ORDER BY COUNT(CustomerID) DESC;
```

New Functions

- **HAVING**: When where cannot be used due to aggregate functions (ie. AVG, COUNT and SUM).

```
  SELECT Student, SUM(score) AS total FROM Marks GROUP BY Student
HAVING total > 70
```

New Functions

- **JOIN**:Combines rows on two tables.

```
SELECT Orders.OrderID, Customers.CustomerName, Orders.OrderDate
FROM Orders
INNER JOIN Customers ON Orders.CustomerID=Customers.CustomerID;
```

Combining two tables with selected attributes.
Orders=Table
Customers=Table
CustomerName=Attribute
OrderID=Attribute
CustomerID=Attribute
ON=Joining Condition

New Functions

- **Subqueries**: A select within another select.

```
SELECT natname, stkfirm, stkqty FROM stock, nation
WHERE stock.natcode = nation.natcode
AND stkqty >
(SELECT avg(stkqty) FROM stock
WHERE stock.natcode = nation.natcode);
```

natname	stkfirm	stkqty
Australia	Queensland Diamond	89251
United Kingdom	Bolivian Sheep	231678
United Kingdom	Royal Ostrich Farms	1234923
United States	Minnesota Gold	816122

Exercise Questions

a. What is the personid of Sheila O'Hara?

b. List sales personnel sorted by last name and within last name, first name.

c. List details of the sales made by Bruce Bush.

d. List details of all sales showing the gross profit (selling price minus cost price).

e. Report the number of cars sold of each type.

f. What is the average selling price of cars sold by Sue Lim?

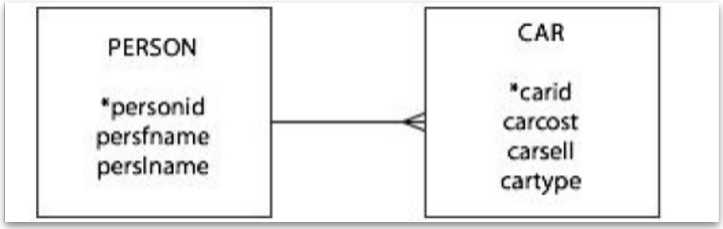
g. Report details of all sales where the gross profit is less than the average.

h. What was the maximum selling price of any car?

i. What is the total gross profit?

j. Report the gross profit made by each salesperson who sold at least three cars.

k. Create a view containing all the details in the car table and the gross profit



Data to Insert

```
CREATE TABLE person (
  personid INTEGER,
  persfname VARCHAR(6),
  perslname VARCHAR(6),
  primary key (personid)
);
```

```
CREATE TABLE car (
  carid INTEGER,
  carcost FLOAT(7,2),
  carsell FLOAT(7,2),
  cartype VARCHAR(9),
  personid INTEGER,
  constraint fk_personid foreign key (personid)
  references person(personid)
);
```

Data to Insert

Person

personid	persfname	perslname
1	Sheila	O'Hara
2	Bruce	Bush
3	Sue	Lim
4	Emma	Lim
5	Steven	Poter

Car

carid	carcost	carsell	cartype	personid
1	28820.7	30990	pickup	1
2	25750.8	27990	pickup	5
3	34950.8	37990	coupe	4
...	...	...	...	...
20	23910.8	25990	hatchback	5

Solution

a. What is the personid of Sheila O'Hara?

```
select personid from person where persfname="Sheila" and perslname="O'Hara" ;
```

personid
1

Solution

b. List sales personnel sorted by last name and within last name, first name.

select perslname, persfname from person order by perslname,persfname asc;

perslname	persfname
Bush	Bruce
Lim	Emma
Lim	Sue
O'Hara	Sheila
Poter	Steven

Solution

c. List details of the sales made by Bruce Bush.

```
select * from car where personid= (select personid from person where persfname="Bruce"
and perslname="Bush");
```

carid	carcost	carsell	cartype	personid
1	28510.8	30990	pickup	2
4	30902.8	33590	pickup	2

Solution

d. List details of all sales showing the gross profit (selling price minus cost price).

```
select carid,carcost,carsell,carsell-carcost as "gross_profit",cartype,personid from car;
```

carid	carcost	carsell	cartype	personid	gross_profit
1	28510.8	30990	pickup	2	2479.2
2	25750.8	27990	pickup	5	2239.2
3	35710.6	37990	coupe	5	2279.4
4	30902.8	33590	pickup	2	2687.2
5	28200.9	30990	pickup	5	2789.1

Solution

e. Report the number of cars sold of each type.

select cartype, count(cartype) from car group by cartype;

cartype	count(cartype)
coupe	2
hatchback	2
other	1
pickup	9
sedan	3
SUV	3

Solution

f. What is the average selling price of cars sold by Sue Lim?

```
select avg(carsell) as "avg carsell of Sue Lim" from car where personid=(select personid
from person where persfname="Sue" and perslname="Lim");
```

avg carsell of Sue Lim
28690

Solution

g. Report details of all sales where the gross profit is less than the average.

select persfname, perslname, carid, cartype, carsell-carcost as grossprofit from car, person where car.personid=person.personid and carsell-carcost < (select avg(carsell-carcost) from car):

persfname	perslname	carid	cartype	grossprofit
Sheila	O'Hara	15	coupe	2127.2
Sheila	O'Hara	17	SUV	2071.3
Sue	Lim	9	pickup	1807.2
Sue	Lim	10	other	1895.4
Sue	Lim	18	sedan	2159
Emma	Lim	6	pickup	1959.3
Emma	Lim	20	hatchback	1559.4
Steven	Poter	2	pickup	2239.2
Steven	Poter	3	coupe	2279.4
Steven	Poter	14	sedan	1350
Steven	Poter	16	sedan	1301.3

Solution

h. What was the maximum selling price of any car?

```
select max(carsell) from car;
```

max(carsell)
38990

Solution

i. What is the total gross profit?

```
select sum(carsell-carcost) as "total gross profit" from car;
```

total gross profit
48326.4

Solution

j. Report the gross profit made by each salesperson who sold at least three cars?

```
select car.personid, persfname, perslname, sum(carsell-carcost) as grossprofit from car,
person where car.personid=person.personid group by car.personid having count(*) >= 3;
```

personid	persfname	perslname	grossprofit
1	Sheila	O'Hara	10396.5
3	Sue	Lim	9760.6
4	Emma	Lim	9660.8
5	Steven	Poter	13342.1

Solution

k. Create a view containing all the details in the car table and the gross profit?

```
create view grossprofit (fname, lname, carid, type, cost, sell, profit) as select persfname,
perslname, carid, cartype, carcost, carsell, carsell-carcost from car, person where
car.personid=person.personid;
Select * from grossprofit;
```

fname	lname	carid	type	cost	sell	profit
Sheila	O'Hara	11	pickup	25191	27990	2799
Sheila	O'Hara	13	SUV	30591	33990	3399
Sheila	O'Hara	15	coupe	24462.8	26590	2127.2
Sheila	O'Hara	17	SUV	27518.7	29590	2071.3
Bruce	Bush	1	pickup	28510.8	30990	2479.2