



RIGA TECHNICAL UNIVERSITY
FACULTY OF COMPUTER SCIENCE AND INFORMATION
TECHNOLOGY
INSTITUTE OF APPLIED COMPUTER SYSTEMS

Practice #2
“Database Management Systems”
SQL Constructs

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2022 / 2023 Study Year

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1 Task

1. Fill table with students participating in Practice on the 1st page.
2. Review database model given in Paragraph Nr. 2.

Recommendation: create new user and new connection in sqlloader before launching script.

3. Launch script (2.CarRentalScriptPractice2.sql) from *sqldeveloper* or from *sqlplus*. This script will create database and insert all data;
4. Write queries according to given task, copy text of your query and take screenshot of result (like shown in examples below).
5. Upload report file in MS Word format to Ortus. One upload per team.

Example, how to fill queries part:

1.1 Query 1

Task: extract people with cars.

```
Select p1.lastname, c1.platenumber
From Cars C1, People P1
Where p1.pid(+) = c1.pid;
```

Result of execution

LASTNAME	PLATENUMBER
Smith	GD1111
Smith	MM53
Smith	NN7656
Doe	ZZ54
Zars	ZZ45
(null)	ZZ23

1.2 Query 2

Extract cars with owners, count of repair and sum of all repairs for each car.

```
select p1.lastname, c1.platenumber, count(r1.repid) AS
CountOfRepairs, sum(r1.repsum) as SumOfAllRepairs
from people p1, cars c1, repairs r1
where (p1.pid(+) = c1.pid) and (r1.fk_carid(+) = c1.carid)
Group by c1.platenumber, p1.lastname;
```

LASTNAME	PLATENUMBER	COUNTOFREPAIRS	SUMOFALLREPAIRS
Zars	ZZ45	4	511
Smith	NN7656	2	868
Smith	GD1111	2	877
Doe	ZZ54	0	(null)
Smith	MM53	2	779
(null)	ZZ23	0	(null)

2 Database Description

2.1 Conceptual Model

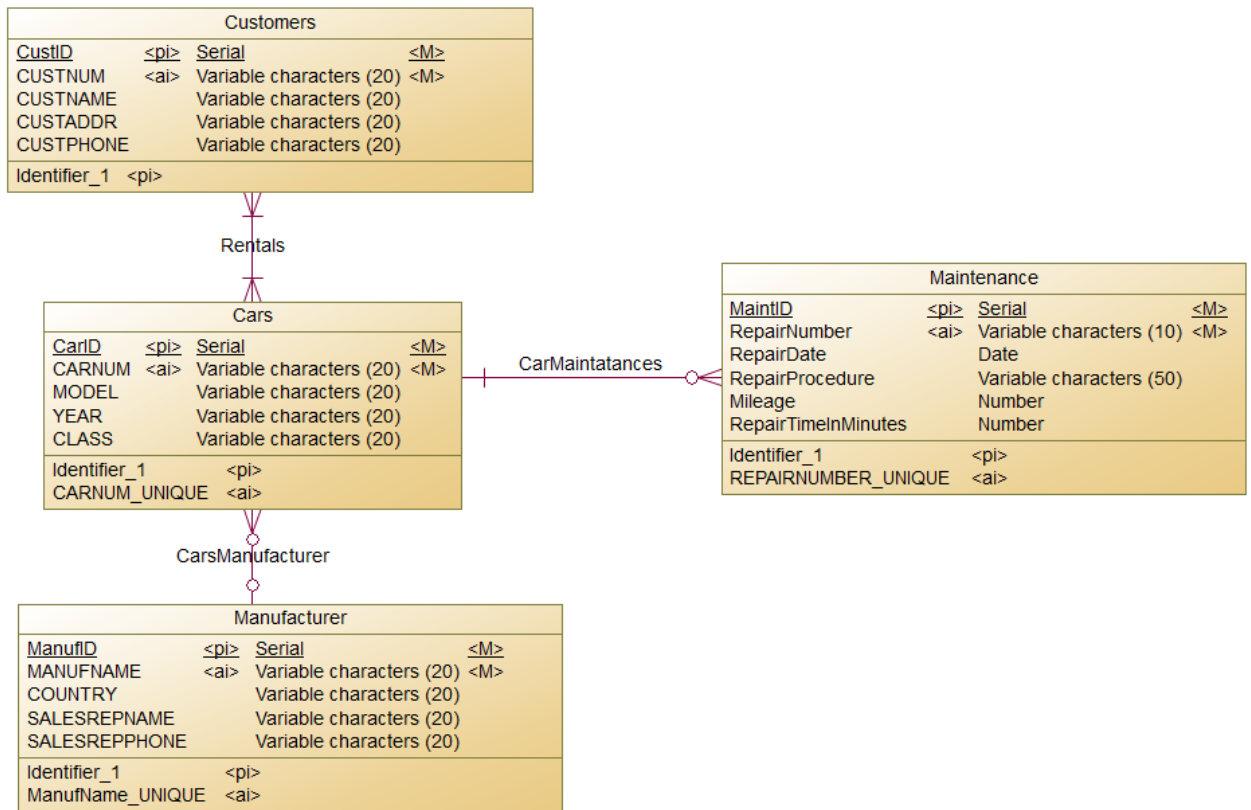


Figure 1. Conceptual Model

2.2 Physical Model

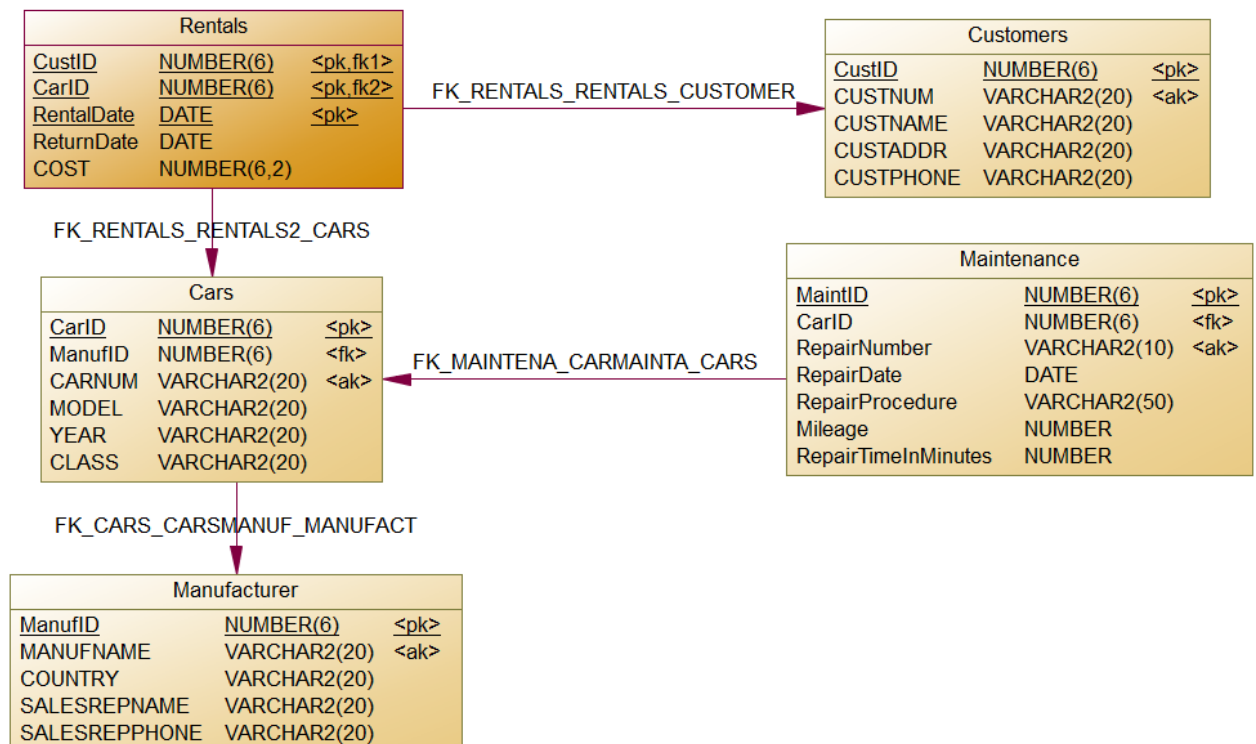


Figure 2. Physical Model

3 SQL queries

3.1 Query #1

List the manufacturers whose names begin with the letter “C” or the letter “D” and that are located in Japan.

```
SELECT *  
FROM MANUFACTURER  
WHERE (MANUFNAME LIKE 'C%' OR MANUFNAME LIKE 'D%')  
AND COUNTRY = 'Japan';
```

MANUFID	MANUFNAME	COUNTRY	SALESREPNAME	SALESREPPHONE
1	Capital Motors	Japan	Smith	9015551234
3	Digital Motors	Japan	Jones	2125554837

3.2 Query #2

What was the average mileage of the cars that had tune-ups in August, 2008?

```
SELECT AVG(MILEAGE)  
FROM MAINTENANCE  
WHERE REPAIRDATE >= '01-08-2008' AND REPAIRDATE < '01-09-2008';
```

AVG(MILEAGE)
28826.25

3.3 Query #3

How many different car models are made by manufacturers in Italy?

```
SELECT COUNT(DISTINCT MODEL)  
FROM CARS  
JOIN MANUFACTURER ON CARS.MANUFID = MANUFACTURER.MANUFID  
WHERE MANUFACTURER.COUNTRY = 'Italy';
```

COUNT(DISTINCTMODEL)
6

3.4 Query #4

How many repairs were performed on each car manufactured by Superior Motors during the month of March, 2009? Include only cars in the result that had at least **two** repairs.

```
SELECT CARS.CARID, CARS.MANUFID, CARS.CARNUM, CARS.MODEL, CARS.YEAR,
CARS.CLASS, COUNT(DISTINCT MAINTENANCE.MAINTID)
FROM CARS
JOIN MANUFACTURER ON CARS.MANUFID = MANUFACTURER.MANUFID
JOIN MAINTENANCE ON CARS.CARID = MAINTENANCE.CARID
WHERE MANUFACTURER.MANUFNAME = 'Superior Motors'
AND REPAIRDATE >= '01-03-2009' AND REPAIRDATE < '01-04-2009'
GROUP BY CARS.CARID, CARS.MANUFID, CARS.CARNUM, CARS.MODEL,
CARS.YEAR, CARS.CLASS
HAVING COUNT(DISTINCT MAINTENANCE.MAINTID) >= 2;
```

CARID	MANUFID	CARNUM	MODEL	YEAR	CLASS	COUNT(DISTINCTMAINTENANCE.MAINTID)
7	7 288299		Colorado	2002	Sedan	3
17	7 584829		Summer	2000	SUV	2
19	7 602848		Star	2000	Compact	2

3.5 Query #5

List the cars of any manufacturer that had an oil change in January, 2011, and had at least as many miles as the highest-mileage car manufactured by Superior Motors that had an oil change that same month.

```
SELECT *
FROM CARS
WHERE CARS.CARID IN (
  SELECT MAINTENANCE.CARID
  FROM MAINTENANCE
  WHERE MAINTENANCE.REPAIRPROCEDURE = 'Oil Change'
  AND REPAIRDATE >= '01-01-2011' AND REPAIRDATE < '01-02-2011'
  AND MAINTENANCE.MILEAGE >= (
    SELECT MAX(MAINTENANCE.MILEAGE)
    FROM CARS
    JOIN MAINTENANCE ON CARS.CARID = MAINTENANCE.CARID
    JOIN MANUFACTURER ON CARS.MANUFID = MANUFACTURER.MANUFID
    WHERE MANUFACTURER.MANUFNAME = 'Superior Motors'
    AND MAINTENANCE.REPAIRPROCEDURE = 'Oil Change'
    AND REPAIRDATE >= '01-01-2011' AND REPAIRDATE < '01-02-2011'
  )
);
```

CARID	MANUFID	CARNUM	MODEL	YEAR	CLASS
5	4 184737		Gold	2000	Minivan
13	7 429212		Summer	2001	SUV
14	5 429333		Venus	1999	Sedan
24	4 728100		Mars	2000	Sedan

3.6 Query #6

Combine all car events (maintenances and rentals) in one list including car numbers, event date and event type (sort by event date ascending).

```
SELECT CARS.CARID, CARS.CARNUM, MAINTENANCE.REPAIRDATE AS EVENTDATE,
'MAINTENANCE' AS EVENTTYPE
FROM CARS
JOIN MAINTENANCE ON CARS.CARID = MAINTENANCE.CARID
UNION ALL
SELECT CARS.CARID, CARS.CARNUM, RENTALS.RENTALDATE AS EVENTDATE, 'RENTAL'
AS EVENTTYPE
FROM CARS
JOIN RENTALS ON CARS.CARID = RENTALS.CARID
ORDER BY EVENTDATE ASC;
```

	CARID	CARNUM	EVENTDATE	EVENTTYPE
1		9 372819	05-08-2008	MAINTENANCE
2		5 184737	07-08-2008	MAINTENANCE
3		17 584829	11-08-2008	MAINTENANCE
4		24 728100	15-08-2008	MAINTENANCE
5		13 429212	16-11-2008	RENTAL
6		6 283249	12-12-2008	RENTAL
7		19 602848	01-03-2009	MAINTENANCE
8		7 288299	01-03-2009	MAINTENANCE
9		11 384422	01-03-2009	MAINTENANCE
10		17 584829	02-03-2009	MAINTENANCE
11		7 288299	04-03-2009	MAINTENANCE
12		17 584829	06-03-2009	MAINTENANCE
13		19 602848	07-03-2009	MAINTENANCE
14		18 589020	12-03-2009	MAINTENANCE
15		7 288299	12-03-2009	MAINTENANCE
16		13 429212	26-03-2009	RENTAL
17		23 682925	14-09-2009	RENTAL
18		18 589020	15-03-2010	MAINTENANCE
19		13 429212	16-03-2010	MAINTENANCE
20		17 584829	18-03-2010	MAINTENANCE
21		19 602848	21-03-2010	MAINTENANCE
22		11 384422	24-03-2010	MAINTENANCE
23		19 602848	25-03-2010	MAINTENANCE
24		11 384422	23-05-2010	RENTAL
25		5 184737	23-05-2010	RENTAL
26		16 573532	30-05-2010	RENTAL
27		20 612999	08-07-2010	RENTAL
28		25 842747	12-07-2010	RENTAL
29		3 49291	20-10-2010	RENTAL
30		8 328151	10-12-2010	RENTAL
31		7 288299	05-01-2011	MAINTENANCE
32		5 184737	10-01-2011	MAINTENANCE
33		13 429212	12-01-2011	MAINTENANCE
34		14 429333	22-01-2011	MAINTENANCE
35		16 573532	25-01-2011	MAINTENANCE
36		24 728100	30-01-2011	MAINTENANCE
37		13 429212	31-01-2011	RENTAL
38		15 492190	24-02-2011	RENTAL
39		25 842747	28-02-2011	RENTAL
40		15 492190	16-03-2011	RENTAL
41		18 589020	02-04-2011	MAINTENANCE
42		8 328151	21-04-2011	RENTAL
43		15 492190	01-05-2011	RENTAL
44		8 328151	21-06-2011	RENTAL
45		20 612999	21-07-2011	RENTAL
46		19 602848	12-02-2018	MAINTENANCE

3.7 Query #7

Rental information with longest rental period. Rental period in days, customer name, car number must appear.

```
SELECT TO_DATE(RETURNDATE) - TO_DATE(RENTALDATE) AS  
RENTAL_PERIOD_IN_DAYS, CUSTNAME, CARNUM  
FROM RENTALS  
JOIN CUSTOMERS ON RENTALS.CUSTID = CUSTOMERS.CUSTID  
JOIN CARS ON RENTALS.CARID = CARS.CARID  
WHERE TO_DATE(RETURNDATE) - TO_DATE(RENTALDATE) = (SELECT  
MAX(TO_DATE(RETURNDATE) - TO_DATE(RENTALDATE)) FROM RENTALS)  
ORDER BY CUSTNAME ASC;
```

RENTAL_PERIOD_IN_DAYS	CUSTNAME	CARNUM
7	Adams	842747
7	Zhang	328151

3.8 Query #8

Show 20% of our best customers by total income.

```
SELECT SUM(RENTALS.COST) AS TOTAL_INCOME_FROM_CUSTOMER,  
CUSTOMERS.CUSTID, CUSTOMERS.CUSTNUM, CUSTOMERS.CUSTNAME  
FROM CUSTOMERS  
JOIN RENTALS ON CUSTOMERS.CUSTID = RENTALS.CUSTID  
GROUP BY CUSTOMERS.CUSTID, CUSTOMERS.CUSTNUM,  
CUSTOMERS.CUSTNAME  
ORDER BY TOTAL_INCOME_FROM_CUSTOMER DESC  
FETCH FIRST 20 PERCENT ROWS ONLY;
```

TOTAL_INCOME_FROM_CUSTOMER	CUSTID	CUSTNUM	CUSTNAME
872.98	11	592937	Johnson
804.95	1	89287	Zhang

3.9 Query #9

Show customers who used our rental 2 or more times and customer's average money spending less than average rental cost.

```
SELECT *
FROM CUSTOMERS
WHERE CUSTID IN (
    SELECT CUSTID
    FROM RENTALS
    GROUP BY CUSTID
    HAVING COUNT(*) >= 2 AND AVG(COST) < (
        SELECT AVG(COST)
        FROM RENTALS
    )
);
```

CUSTID	CUSTNUM	CUSTNAME	CUSTADDR	CUSTPHONE
2	133819	Martin	Memphis, TN	9015553290
5	285028	Perez	Los Angeles, CA	2135552934

3.10 Query #10

Show customer count by each state (for state show 2 letters abbreviation). Results sort by customer count descending order then by state abbreviation ascending.

```
SELECT SUBSTR(CUSTADDR, -2) AS STATE_ABBREV, COUNT(*) AS
CUSTOMERS_NUM
FROM CUSTOMERS
GROUP BY SUBSTR(CUSTADDR, -2)
ORDER BY CUSTOMERS_NUM DESC, STATE_ABBREV ASC;
```

STATE_ABBREV	CUSTOMERS_NUM
TN	3
CA	2
DC	2
FL	2
IL	2
NY	2
OH	1
TX	1

3.11 Query #11

Select car manufacturers which cars were not maintained in 2008.

```
SELECT MANUFACTURER.MANUFID, MANUFACTURER.MANUFNAME
FROM MANUFACTURER
WHERE MANUFACTURER.MANUFID NOT IN
  (SELECT CARS.MANUFID
   FROM CARS
   INNER JOIN MAINTENANCE ON CARS.CARID = MAINTENANCE.CARID
   WHERE EXTRACT(YEAR FROM MAINTENANCE.REPAIRDATE) = 2008)
ORDER BY MANUFACTURER.MANUFID;
```

MANUFID	MANUFNAME
2	Cooperative Motors
3	Digital Motors
5	Naples Motors
6	Rome Motors
8	Tokyo Motors