Database Systems

Fall 2020

LAB – 07

The objective of this lab is to:

- DDL (Create Table, Alter Table Statements)
- Joins and Subquery

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Instructions:

- Work on this lab individually. Discussion is not allowed.
- Evaluation of tasks will be conducted in lab.
- Anyone caught being indulged in the act of plagiarism would be awarded an "F" grade in this lab.
- Evaluation will be considered final and you cannot debate for the marks. So, focus on performing the tasks when the time is given to you.
- **Allowed time: 1 hour and 20 minutes**
- Best of Luck!

Note: You will be using following tables in your lab tasks.

- EMP (EMPNO, ENAME, JOB, SAL, HIREDATE, COMM, MGR, DEPTNO)
- DEPT (DEPTNO, DNAME, LOC)
- SALGRADE (Grade, HISAL, LOSAL)

Perform the following tasks

Task 01:

1. **Create the following database and apply the described constraints:**

Table Name: **customer**		
Col Name	**Data Type**	**Constraints**
cust#	NUMBER(5)	Primary key
c_name	VARCHAR2(20)	Not Null
City	VARCHAR2(30)	
Nic	CHAR(16)	Unique

Table Name: **invoice**		
Col Name	**Data Type**	**Constraints**
invoice#	NUMBER(5)	Primary key
inv_date	DATE	DEFAULT sysdate
cust#	NUMBER(5)	Foreign Key references Customer Not Null
Payment	CHAR(16)	Cash, Cheque, Credit Card

Table Name: **product**		
Col Name	**Data Type**	**Constraints**
prod#	NUMBER(5)	Primary Key
p_name	VARCHAR2(50)	Not Null
Price	NUMBER(5)	Above 5

Table Name: **invoice_details**		
Col Name	**Data Type**	**Constraints**

invoice#	NUMBER(5)	Primary Key, Foreign Key references Invoice
prod#	NUMBER(5)	Primary Key
qty_ordered	NUMBER(4)	In the range 1-500

Solution:

Customer Table:

```
Create table customer (
   cust# Number(5) constraint cust_pk primary key,
   c_name varchar2(20) constraint cust_not_null not null,
   city varchar2(30),
   NIC char(16) constraint cust_nic unique
)
```

```
Table created.
```

Product Table:

```
Create table product (
   Prod# number(5) constraint product_pk primary key,
   p_name varchar2(50) constraint prod_not_null not null,
   price number(10,2) constraint prod_price_chk check (price>5)
)
```

```
Table created.
```

Invoice Table:

```
Create table invoice (
   invoice# Number(5) primary key,
   inv_date Date default sysdate,
   cust# Number(5) constraint inv_cust_uni not null,
   payment char(16) constraint payment_chk check (payment in ('Cash', 'Cheque', 'Credit Card')),
   constraint inv_cust_fk foreign key (cust#) references customer(cust#)
)
```

```
Table created.
```

Invoice Details Table:

```
Create table invoice_details (
        invoice# Number(5) constraint inv_det_fk references invoice(invoice#),
        prod# number(5),
        qty_ordered number(4) constraint qt_range check (qty_ordered between 1 and 500),
        constraint invoice_detail_pk primary key(invoice#, prod#)
)
```

```
Table created
```

2. Alter table **customer** and add **phno** field in it.

   Solution:

   ```
   Alter table customer
   add phno varchar(12)
   ```

   ```
   Table altered.
   ```

3. Alter table **customer** and
   a. Apply NOT NULL constraint on **city** field.

Solution:

Alter table customer

Modify city varchar2(30) NOT NULL

```
Table altered.
```

b. Change the size of **c_name** field to 25 characters.

Solution:

ALTER TABLE customer

modify c_name varchar2(25)

```
Table altered.
```

4. Alter table **emp** and add Primary Key constraint on **empno**.

Solution:

Alter table emp

Add primary key (empno);

```
table can have only one primary key
because primary key of emp table already exists
```

5. Alter table **invoice_details** and add foreign constraint on **prod#** referencing **product**.

Solution:

alter table invoice_details

add constraint inv_details_fk foreign key(prod#) references product(prod#)

```
Table altered.
```

6. Alter table **product** and modify the constraint on **price** filed to **>=10.**

Solution:

Alter table product

modify price number(22) check(price>=10);

```
Table altered.
```

7. View all the constraints.

Solution:

Select * from user_constraints

OWNER	CONSTRAINT_NAME	CONSTRAINT_TYPE	TABLE_NAME	SEARCH_CONDITION
WKSP_BCSF18M004	RESULT_C_CODE_COURSE	R	RESULT	-
WKSP_BCSF18M004	INV_DET_FK	R	INVOICE_DETAILS	-
WKSP_BCSF18M004	RESULT_ROLLNO_STD	R	RESULT	-
WKSP_BCSF18M004	PRODUCT_FK	R	INVOICE_DETAILS	-
WKSP_BCSF18M004	INV_CUST_FK	R	INVOICE	-
WKSP_BCSF18M004	COURSE_CT	C	COURSE	"C_TITLE" IS NOT NULL
WKSP_BCSF18M004	COURSE_DOM_CHK	C	COURSE	c_domain in('CC','IT','UE')
WKSP_BCSF18M004	COURSE_CR_HR_CHK	C	COURSE	cr_hr between 0.5 and 4
WKSP_BCSF18M004	COURSE_PK	P	COURSE	-
WKSP_BCSF18M004	COURSE_DOM_UNI	U	COURSE	

8. Disable the NOT NULL constraint on **p_name** of **product** table.

Solution:

Alter table product

disable constraint PROD_NOT_NULL

```
Table altered.
```

9. Alter table **product** and enable the NOT NULL constraint on **p_name**.

   Solution:

   Alter table product

   enable constraint PROD_NOT_NULL

```
Table altered.
```

10. Reaname the column **c_name** to **Customer Name**.
    Solution:
    Alter customer rename column c_name to "Customer Name"

```
Table altered.
```

Task 02:

1. Display the output in the following format (hint : using union and subquery)

TYPE	ENAME	SAL
2nd Maximum	FORD	3000
2nd Maximum	SCOTT	3000
2nd Minimum	JAMES	950
Maximum	KING	5000
Minimum	SMITH	800

Query:

select 'Minimum' "TYPE", ename, sal from emp where sal = (select min(sal) from emp)

union

select '2nd Minimum' "TYPE", ename, sal from emp where sal = (select min(sal) from emp where sal > (select min(sal) from emp))

union

select 'Maximum' "TYPE", ename, sal from emp where sal = (select max(sal) from emp)

union

select '2nd Maximum' "TYPE" , ename, sal from emp where sal = (select max(sal) from

emp where sal < (select max(sal) from emp))

Screenshot:

TYPE	ENAME	SAL
2nd Maximum	FORD	3000
2nd Maximum	SCOTT	3000
2nd Minimum	JAMES	950
Maximum	KING	5000
Minimum	SMITH	800

2. Display all the employees who joined in the company on the same date **using subquery.**

   Query:

   Select e1.empno, e1.ename, e1.hiredate from emp e1

   where e1.hiredate in (Select e2.hiredate from emp e2 where e1.ename <> e2.ename)

   Screenshot:

EMPNO	ENAME	HIREDATE
7902	FORD	12/03/1981
7900	JAMES	12/03/1981

3. Display the details of maximum salaried employee of each department using subquery.
   Query:
   Select ename , sal, deptno from emp e where sal in(Select max(sal) from emp group by deptno) order by deptno

   Screenshot:

ENAME	SAL	DEPTNO
KING	5000	10
FORD	3000	20
SCOTT	3000	20
BLAKE	2850	30

4. Write a query to display employee salary and salgrade and along with the manager name, salary and salgrade.

ENAME	SAL	GRADE	ENAME	SAL	GRADE
FORD	3000	4	JONES	2975	4
SCOTT	3000	4	JONES	2975	4

Query:
Select e.ename, e.sal , s.grade, m.ename, m.sal, s2.grade from emp e join salgrade s on e.sal between s.losal and s.hisal join emp m on e.mgr = m.empno join
salgrade s2 on m.sal between s2.losal and s2.hisal

OR

Select e.ename, e.sal , s.grade, m.ename, m.sal, s2.grade from emp e ,salgrade s, emp m, salgrade s2 where e.sal between s.losal and s.hisal and e.mgr = m.empno and m.sal between s2.losal and s2.hisal.
Screenshot:

ENAME	SAL	GRADE	ENAME	SAL	GRADE
FORD	3000	4	JONES	2975	4
SCOTT	3000	4	JONES	2975	4
JAMES	950	1	BLAKE	2850	4
WARD	1250	2	BLAKE	2850	4
MARTIN	1250	2	BLAKE	2850	4
TURNER	1500	3	BLAKE	2850	4
ALLEN	1600	3	BLAKE	2850	4
ADAMS	1100	1	SCOTT	3000	4
CLARK	2450	4	KING	5000	5
BLAKE	2850	4	KING	5000	5
JONES	2975	4	KING	5000	5
SMITH	800	1	FORD	3000	4

5. Display all the emps. having salgrade Grade1 and Grade 4

Query:

Select ename, sal, grade from emp e join salgrade s on e.sal between s.losal and s.hisal and s.grade in (1,4)

Screenshot:

ENAME	SAL	GRADE
SMITH	800	1
ADAMS	1100	1
JAMES	950	1
JONES	2975	4
BLAKE	2850	4
CLARK	2450	4
SCOTT	3000	4
FORD	3000	4

**********Best Of Luck**********