

Islamic University of Technology (IUT)

CSE 4308: Database Management Systems Lab Lab Report # 3

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Introduction

The goal of the third database management systems lab was to learn how to create, modify, and alter different parts of a relation in a database.

In this Lab, we learned about the Data Definition Language and the Data Manipulation Language. The different types of statement functions are involved in both.

Method

The first task of the lab was to create three tables with specific attributes and domains.

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The first table was an Account table with two attributes. ACCOUNT_NO with char(5) domain, BALANCE with Number domain which can't be NULL, and a constraint where the ACCOUNT_NO was the primary key.

The second table was a Customer table with three attributes. A CUSTOMER_NO attribute with char(5) domain, CUSTOMER_Name attribute with VARCHAR2(20) domain which can't be NULL, and a CUSTOMER_CITY attribute with VARCHAR2(10) attribute. There is an additional constraint where the CUSTOMER_NO attribute is a primary key.

```
EN Command Prompt-sqiplus

SQL> CREATE TABLE ACCOUNT
2 (
3 ACCOUNT_NO CHAR (5),
4 BALANCE NUMBER NOT NULL,
5 CONSTRAINT PK_ACCOUNT_NO PRIMARY KEY (ACCOUNT_NO)
6 );

Table created.

SQL> CREATE TABLE CUSTOMER
2 (
3 CUSTOMER_NO CHAR (5),
4 CUSTOMER_NAME VARCHAR2 (20) NOT NULL,
5 CUSTOMER_NAME VARCHAR2 (10),
6 CONSTRAINT PK_CUSTOMER_NO PRIMARY KEY (CUSTOMER_NO)
7 );

Table created.

SQL> CREATE TABLE DEPOSITOR
2 (
3 ACCOUNT_NO CHAR (5),
4 CUSTOMER_NO CHAR (5),
5 CONSTRAINT PK_ACCOUNT_NO_CUSTOMER_NO PRIMARY KEY (ACCOUNT_NO, CUSTOMER_NO)
6 );

Table created.
```

The final table is a DEPOSITOR table. There are only two attributes, ACCOUNT_NO with CHAR(5) domain and CUSTOMER_NO with CHAR(5) domain. They are both the primary key to this table.

The second task of the lab was to alter these three tables in various ways, using the statement functions, previously shown in the lab.

- (a) I altered the CUSTOMER table for it to have another attribute, Date of Birth with Date domain.
- (b) I altered the ACCOUNT table and modified the domain of the BALANCE attribute. I changed its precision to NUMBER(12,2).
- (c) I altered the names of the attributes of the DEPOSITOR table to A_NO and C_NO.
- (d) I also altered the name of the DEPOSITOR table and renamed it to DEPOSITOR INFO.
- (e) I added two foreign key references to the DEPOSITOR_INFO table, where the A_NO foreign key references the ACCOUNT_NO attribute of the ACCOUNT table and the C_NO foreign key references the CUSTOMER_NO of the CUSTOMER table.

```
SQL> ALTER TABLE CUSTOMER ADD DATE_OF_BIRTH DATE;

Table altered.

SQL> ALTER TABLE ACCOUNT MODIFY BALANCE NUMBER(12,2);

Table altered.

SQL> ALTER TABLE DEPOSITOR RENAME COLUMN ACCOUNT_NO TO A_NO;

Table altered.

SQL> ALTER TABLE DEPOSITOR RENAME COLUMN CUSTOMER_NO TO C_NO;

Table altered.

SQL> ALTER TABLE DEPOSITOR RENAME TO DEPOSITOR_INFO;

Table altered.

SQL> ALTER TABLE DEPOSITOR RENAME TO DEPOSITOR_INFO;

Table altered.

SQL> ALTER TABLE DEPOSITOR_INFO ADD CONSTRAINT FK_DEPOSITOR_ACCOUNT FOREIGN KEY (A_NO)

2 REFERENCES ACCOUNT(ACCOUNT_NO);

Table altered.

SQL> ALTER TABLE DEPOSITOR_INFO ADD CONSTRAINT FK_DEPOSITOR_CUSTOMER FOREIGN KEY (C_NO)

2 REFERENCES CUSTOMER(CUSTOMER_NO);

Table altered.

SQL> ALTER TABLE DEPOSITOR_INFO ADD CONSTRAINT FK_DEPOSITOR_CUSTOMER FOREIGN KEY (C_NO)

2 REFERENCES CUSTOMER(CUSTOMER_NO);

Table altered.
```

I Input different input values which might satisfy the given problems.

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| Column | State | Sta
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I added these input values later in the lab because the values in previously input wouldn't satisfy all the given tasks.

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Expression (1995)

Op. 18581 2810 01995110_1869 VALUS (1-165');

1 mo created.

Op. 18581 2810 01995180 VALUS (1-165'), "Gent," '12-986-81');

1 mo created.

Op. 18581 2810 0195088 VALUS (1-165'), "Gent," '6-496-81');

1 mo created.

Op. 18581 2810 0195088 VALUS (1-165'), "Gent," '6-496-81');

1 mo created.

Op. 18581 2810 0195081 VALUS (1-165'), 26662113);

1 mo created.

Op. 18581 2810 0105081 VALUS (1-165'), 26662113);

1 mo created.

Op. 18581 2810 01051100_1800 VALUS (1-166');

1 mo created.

Op. 18581 2810 01051100_1800 VALUS (1-166');

1 mo created.

Op. 18581 2810 01051100_1800 VALUS (1-166');

1 mo created.

Op. 18581 2810 01051100_1800 VALUS (1-166');

1 mo created.
```

The first task was, we had to select all the account numbers with a balance greater than 100,000. I used the SELECT statement to display the ACCOUNT_NO and the WHERE statement to state the condition BALANCE > 100,000.

```
EX Command Prompt - sqlplus - X
SQL> SELECT ACCOUNT_NO FROM ACCOUNT WHERE BALANCE > 100000;

ACCOU
----
A-102
A-103
A-104
SQL>
```

The second task was to find all the customer names who lived in Dhaka city. I used the SELECT statement to display the CUSTOMER_NAME and the WHERE statement to set the condition of CUSTOMER_CITY is 'DHK'.

The third task was to find all the customer number whose name started with A. Here I used the SELECT statement to display the CUTOMER_NO and the WHERE statement to choose the records where the CUSTOMER_NAME is LIKE (similar to) 'A%' (starts with A).

The fourth task was to find all the distinct account numbers from the DEPOSITOR_INFO table. Although this was a bit confusing. Since the A_NO attribute was a primary key, this automatically set the A_NO records to being unique/distinct. Regardless, I used the SELECT DISTINCT A_NO statement to select only unique account no in the DEPOSITOR_INFO table.

The fifth task was to show the cartesian product of the ACOUNT and DEPOSITOR_INFO tables. I used the SELECT * to display all attributes and the FROM ACCOUNT, DEPOSITOR_INFO statement to create the cartesian product table.

The sixth task was to show the natural join between the CUSTOMER and DEPOSITOR_INFO table. I used the SELECT * to display all the attributes and the FROM CUSTOMER NATURAL JOIN DEPOSITOR_INFO statement to create the natural join table.

```
Command Prompt - sqlplus
QL> SELECT *
2 FROM CUSTOMER NATURAL JOIN DEPOSITOR_INFO;
                                             CUSTOMER_C DATE_OF_B A_NO C_NO
CUSTO CUSTOMER_NAME
                                                              DHK 16-JUL-00 A-101 C-101
KHL 09-SEP-01 A-101 C-101
DHK 07-SEP-01 A-101 C-101
KHL 19-DEC-01 A-101 C-101
KHL 06-APR-00 A-101 C-101
KHL 06-APR-00 A-101 C-101
DHK 16-JUL-00 A-102 C-102
KHL 09-SEP-01 A-102 C-102
CHK 07-SEP-01 A-102 C-102
KHL 19-DEC-01 A-102 C-102
KHL 06-APR-00 A-102 C-102
CHK 16-JUL-00 A-103 C-103
 -103 TANZIM
  104 RIDUN
  105 AYESHA
101 NAZMUL
           SHAKKHOR
 -103 TANZIM
-104 RIDUN
-105 AYESHA
 USTO CUSTOMER_NAME
                                                               CUSTOMER_C DATE_OF_B A_NO C_NO
                                                                                         09-SEP-01 A-103 C-103
07-SEP-01 A-103 C-103
19-DEC-01 A-103 C-103
06-APR-00 A-103 C-103
16-JUL-00 A-104 C-104
09-SEP-01 A-104 C-104
07-SEP-01 A-104 C-104
19-DEC-01 A-104 C-104
06-APR-00 A-104 C-104
  102 SHAKKHOR
 -103 TANZIM
-104 RIDUN
-105 AYESHA
  101 NAZMUL
          SHAKKHOR
TANZIM
RIDUN
  105 AYESHA
     rows selected.
```

Then we had to find the names and cities of the customers who had an account. I created a cartesian product of all three tables. I implemented a WHERE condition which selected only the values where the ACCOUNT_NO attribute of ACCOUNT table and the A_NO attribute of the DEPISITOR_INFO table match and the CUSTOMER_NO attribute of CUSTOMER table and the C_NO attribute of the DEPOSITOR_INFO table match. This eliminates all the illogical records created by the cartesian product. Then I used the SELECT statement to display only the CUSTOMER NAME and the CUSTOMER CITY.



Then we were asked to find all the customer related information who have a balance greater than 1000. I created a cartesian product of all three tables. I implemented a WHERE condition which selected only the values where the ACCOUNT_NO attribute of ACCOUNT table and the A_NO attribute of the DEPISITOR_INFO table match and the CUSTOMER_NO attribute of CUSTOMER table and the C_NO attribute of the DEPOSITOR_INFO table match. This eliminates all the illogical records created by the cartesian product. Then I used the SELECT statement to display only the CUSTOMER_NO, CUSTOMER NAME and the CUSTOMER_CITY. And I added and additional WHERE condition which required the BALANCE to be greater than 10,000.



Finally, we were asked to show all the customer related information who had a balance between 5000 and 10000 and their depositor lived in Khulna city. . I created a cartesian product of all three tables. I implemented a WHERE condition which selected only the values where the ACCOUNT_NO attribute of ACCOUNT table and the A_NO attribute of the DEPISITOR_INFO table match and the CUSTOMER_NO attribute of CUSTOMER table and the C_NO attribute of the DEPOSITOR_INFO table match. This eliminates all the illogical records created by the cartesian product. Then I used the SELECT statement to display only the CUSTOMER_NO, CUSTOMER NAME and the CUSTOMER_CITY. And I added and additional WHERE condition which required the BALANCE to be between 5000 and 10000 and the CUSTOMER_CITY had to be 'KHL'.

```
SQL> SELECT CUSTONER, NO, CUSTOMER_NAME, CUSTOMER_CITY

2 FROM CUSTOMER_ROO, CUSTOMER_COUNT, DEPOSITOR_INFO .AMO = ACCOUNT. ACCOUNT_NO AND DEPOSITOR_INFO.C_NO = CUSTOMER.CUSTOMER_NO AND ACCOUNT.

ALANCE >= 5880 AND ACCOUNT. BALANCE <=18980 AND CUSTOMER.CUSTOMER_CITY = 'KHL';

no rows selected

SQL>

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This however, came with the drawback where, none of my input values matched this requirement, so no records were displayed. I increased the limit of the BALANCE to 1000000000 and then, can see that, my code does indeed work.

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The Code

```
CREATE TABLE ACCOUNT
(
ACCOUNT_NO CHAR (5),
BALANCE NUMBER NOT NULL,
CONSTRAINT PK_ACCOUNT_NO PRIMARY KEY (ACCOUNT_NO)
);

CREATE TABLE CUSTOMER
(
CUSTOMER_NO CHAR (5),
CUSTOMER_NAME VARCHAR2 (20) NOT NULL,
CUSTOMER_CITY VARCHAR2 (10),
CONSTRAINT PK_CUSTOMER_NO PRIMARY KEY (CUSTOMER_NO)
);

CREATE TABLE DEPOSITOR
(
ACCOUNT NO CHAR (5),
```

```
CUSTOMER NO CHAR (5),
CONSTRAINT PK ACCOUNT NO CUSTOMER NO PRIMARY KEY (ACCOUNT NO, CUSTOMER NO)
);
ALTER TABLE CUSTOMER ADD DATE_OF_BIRTH DATE;
ALTER TABLE ACCOUNT MODIFY BALANCE NUMBER(12,2);
ALTER TABLE DEPOSITOR RENAME COLUMN ACCOUNT NO TO A NO;
ALTER TABLE DEPOSITOR RENAME COLUMN CUSTOMER NO TO C NO;
ALTER TABLE DEPOSITOR RENAME TO DEPOSITOR INFO;
ALTER TABLE DEPOSITOR INFO ADD CONSTRAINT FK DEPOSITOR ACCOUNT FOREIGN KEY (A NO)
REFERENCES ACCOUNT(ACCOUNT NO);
ALTER TABLE DEPOSITOR INFO ADD CONSTRAINT FK DEPOSITOR CUSTOMER FOREIGN KEY
REFERENCES CUSTOMER(CUSTOMER NO);
INSERT INTO ACCOUNT VALUES ('A-101', 45320);
INSERT INTO ACCOUNT VALUES ('A-102', 54230000);
INSERT INTO ACCOUNT VALUES ('A-103', 200042118);
INSERT INTO ACCOUNT VALUES ('A-104', 200042150);
INSERT INTO ACCOUNT VALUES ('A-105', 500);
INSERT INTO ACCOUNT VALUES ('A-106', 10000);
INSERT INTO ACCOUNT VALUES ('A-107', 200042113);
INSERT INTO CUSTOMER VALUES ('C-101', 'NAZMUL', 'DHK', '16-JUL-00');
INSERT INTO CUSTOMER VALUES ('C-102', 'SHAKKHOR', 'KHL', '09-SEP-01');
INSERT INTO CUSTOMER VALUES ('C-103', 'TANZIM', 'DHK', '07-SEP-01');
INSERT INTO CUSTOMER VALUES ('C-104', 'RIDUN', 'KHL', '19-DEC-01');
INSERT INTO CUSTOMER VALUES ('C-105', 'AYESHA', 'KHL', '6-APR-00');
INSERT INTO CUSTOMER VALUES ('C-106', 'SHANTA', 'DHK', '24-MAR-01');
INSERT INTO CUSTOMER VALUES ('C-107', 'NAFISA', 'DHK', '6-APR-01');
INSERT INTO DEPOSITOR INFO VALUES ('A-101', 'C-101');
INSERT INTO DEPOSITOR INFO VALUES ('A-102', 'C-102');
INSERT INTO DEPOSITOR_INFO VALUES ('A-103', 'C-103');
INSERT INTO DEPOSITOR INFO VALUES ('A-104', 'C-104');
INSERT INTO DEPOSITOR_INFO VALUES ('A-105', 'C-105');
INSERT INTO DEPOSITOR INFO VALUES ('A-106', 'C-106');
```

```
SELECT ACCOUNT NO FROM ACCOUNT WHERE BALANCE > 100000;
SELECT CUSTOMER NAME FROM CUSTOMER WHERE CUSTOMER CITY = 'DHK';
SELECT CUSTOMER NO FROM CUSTOMER WHERE CUSTOMER NAME LIKE 'A%';
SELECT DISTINCT A NO FROM DEPOSITOR INFO;
SELECT * FROM ACCOUNT, DEPOSITOR INFO;
SELECT *
FROM CUSTOMER NATURAL JOIN DEPOSITOR INFO;
SELECT CUSTOMER NAME FROM DEPOSITOR INFO, CUSTOMER WHERE DEPOSITOR INFO.C NO =
CUSTOMER.CUSTOMER NO;
SELECT CUSTOMER NAME, CUSTOMER CITY
FROM CUSTOMER, ACCOUNT, DEPOSITOR INFO WHERE DEPOSITOR INFO.A NO =
ACCOUNT.ACCOUNT NO AND DEPOSITOR INFO.C NO = CUSTOMER.CUSTOMER NO;
SELECT CUSTOMER NO, CUSTOMER NAME, CUSTOMER CITY
FROM CUSTOMER, ACCOUNT, DEPOSITOR INFO WHERE DEPOSITOR INFO.A NO =
ACCOUNT.ACCOUNT NO AND DEPOSITOR INFO.C NO = CUSTOMER.CUSTOMER NO AND
ACCOUNT.BALANCE > 1000;
SELECT CUSTOMER NO, CUSTOMER NAME, CUSTOMER CITY
FROM CUSTOMER, ACCOUNT, DEPOSITOR INFO WHERE DEPOSITOR INFO.A NO =
ACCOUNT.ACCOUNT NO AND DEPOSITOR INFO.C NO = CUSTOMER.CUSTOMER NO AND
ACCOUNT.BALANCE >= 5000 AND ACCOUNT.BALANCE <=10000 AND CUSTOMER.CUSTOMER_CITY =
'KHL' :
```

Problems

The third task of the Lab was where we had to rack our brains. The instructions about which type of input we had to put in weren't clear enough. So I spent half the Lab thinking about the different types of inputs that could be possible. The DEPOSITOR_INFO table. I had no idea what type of input should be in the DEPOSITOR_INFO table whatsoever. After figuring out which input values I should put in there, I could finally begin, but it took too long.

Conclusion

With that, I had successfully completed another successful Lab. All in all, it was a pleasant introduction to DDL and DML. I was able to learn a lot about dropping and adding constraints. And the priority order of dropping values. This developed my intrigue towards Database even more than ever before.