

## EXERCISE 12

### Intro to Constraints; NOT NULL and UNIQUE Constraints

Global Fast Foods has been very successful this past year and has opened several new stores. They need to add a table to their database to store information about each of their store's locations. The owners want to make sure that all entries have an identification number, date opened, address, and city and that no other entry in the table can have the same email address. Based on this information, answer the following questions about the global\_locations table. Use the table for your answers.

Global Fast Foods global\_locations Table

| NAME              | TYPE | LENGTH | PRECISION | SCALE | NULLABLE | DEFAULT |
|-------------------|------|--------|-----------|-------|----------|---------|
| Id                |      |        |           |       |          |         |
| name              |      |        |           |       |          |         |
| date_opened       |      |        |           |       |          |         |
| address           |      |        |           |       |          |         |
| city              |      |        |           |       |          |         |
| zip/postal code   |      |        |           |       |          |         |
| phone             |      |        |           |       |          |         |
| email             |      |        |           |       |          |         |
| manager_id        |      |        |           |       |          |         |
| Emergency contact |      |        |           |       |          |         |

1. What is a "constraint" as it relates to data integrity?

A constraint is a rule that restricts the values in table columns to ensure the accuracy and reliability (integrity) of the data.

2. What are the limitations of constraints that may be applied at the column level and at the table level?

Column - level: Can only be applied to single column.

Table - Level: Must be used when a constraint applies to two or more columns (composite key).

3. Why is it important to give meaningful names to constraints?

Meaningful names make it easier to identify and troubleshoot errors when a constraint is violated.

4. Based on the information provided by the owners, choose a datatype for each column. Indicate the length, precision, and scale for each NUMBER datatype.

Since no specific column names or owner information are provided, you should choose datatypes based on that.

5. Use "(nullable)" to indicate those columns that can have null values.

Create Table global\_locations (id Number(4) NOT NULL, name Varchar(20), date\_opened Date NOT NULL, address Varchar2(30) NOT NULL, city Varchar2(20) NOT NULL, "zip/postal code" Varchar2(20), phone Varchar(15), email Varchar2(30) UNIQUE, manager\_id Number(4), "emergency contact" Varchar2(40));

6. Write the CREATE TABLE statement for the Global Fast Foods locations table to define the constraints at the column level.

constraint glc\_email\_uq UNIQUE (email);

7. Execute the CREATE TABLE statement in Oracle Application Express.

Same as the above create table

8. Execute a DESCRIBE command to view the Table Summary Information.

DESC Table;

9. Rewrite the CREATE TABLE statement for the Global Fast Foods locations table to define the UNIQUE constraints at the table level. Do not execute this statement.

| NAME       | TYPE     | LENGTH | PRECISION | SCALE | NULLABLE | DEFAULT |
|------------|----------|--------|-----------|-------|----------|---------|
| id         | number   | 4      |           |       |          |         |
| loc_name   | varchar2 | 20     |           |       | X        |         |
|            | date     |        |           |       |          |         |
| address    | varchar2 | 30     |           |       |          |         |
| city       | varchar2 | 20     |           |       |          |         |
| zip_code   | varchar2 | 20     |           |       | X        |         |
| phone      | varchar2 | 15     |           |       | X        |         |
| email      | varchar2 | 30     |           |       | X        |         |
| manager_id | number   | 4      |           |       | X        |         |
| contact    | varchar2 | 40     |           |       | X        |         |

### PRIMARY KEY, FOREIGN KEY, and CHECK Constraints

1. What is the purpose of a  
• PRIMARY KEY - uniquely identifies each row
- FOREIGN KEY - Link two tables and enforces data consistency.
- CHECK CONSTRAINT - Defines a condition that all rows must satisfy

2. Using the column information for the animals table below, name constraints where applicable at the table level, otherwise name them at the column level. Define the primary key (animal\_id). The license\_tag\_number must be unique. The admit\_date and vaccination\_date columns cannot contain null values.

```
animal_id NUMBER(6)
name VARCHAR2(25)
license_tag_number NUMBER(10)
admit_date DATE
adoption_id NUMBER(5),
vaccination_date DATE
```

3. Create the animals table. Write the syntax you will use to create the table.

```
Create Table animals (animal_id number(6) constraint animals_pk
primary key, name varchar2(25), license_tag_number number(10) constraint
animals_lic_no unique, admit_date date constraint animals_admit_nn
adoption_id number(5), vaccination_date date constraint animals_vacc_nn
not NULL);
```

4. Enter one row into the table. Execute a SELECT \* statement to verify your input. Refer to the graphic below for input.

| ANIMAL_ID | NAME | LICENSE_TAG_NUMBER | ADMIT_DATE  | ADOPTION_ID | VACCINATION_DATE |
|-----------|------|--------------------|-------------|-------------|------------------|
| 101       | Spot | 35540              | 10-Oct-2004 | 205         | 12-Oct-2004      |

```
Insert into animals (Animal-id, Name, License-tag-number, admit_date,
adoption-in, vaccination-date) value (101, 'Spot', 35540, '10-oct-2004',
205, '12-oct-2004'),
```

5. Write the syntax to create a foreign key (adoption\_id) in the animals table that has a corresponding primary-key reference in the adoptions table. Show both the column-level and table-level syntax. Note that because you have not actually created an adoptions table, no adoption\_id primary key exists, so the foreign key cannot be added to the animals table.

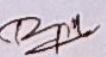
ALTER TABLE animals ADD (adoption\_id NUMBER(5) constraint animal\_adop\_fk ~~FOREIGN~~ reference adoptions (adoption\_id));

6. What is the effect of setting the foreign key in the ANIMAL table as:

- a. ON DELETE CASCADE
- b. ON DELETE SET NULL
- c. deleting parent row automatically deletes all dependent child rows.
- d. deleting a parent row automatically sets the foreign key columns to NULL in all dependent child rows.

7. What are the restrictions on defining a CHECK constraint?

check constraints cannot reference values from other rows, other tables, sequences, sysdate, or the non-deterministic functions.

| Evaluation Procedure | Marks awarded                                                                       |
|----------------------|-------------------------------------------------------------------------------------|
| Query (5)            | 5                                                                                   |
| Execution (5)        | 5                                                                                   |
| Viva (5)             | 5                                                                                   |
| Total (15)           | 15                                                                                  |
| Faculty Signature    |  |

## PRACTICE PROBLEM

### Managing Constraints

Using Oracle Application Express, click the SQL Workshop tab in the menu bar. Click the Object Browser and verify that you have a table named copy\_d\_clients and a table named copy\_d\_events. If you don't have these tables in your schema, create them before completing the exercises below. Here is how the original tables are related. The d\_clients table has a primary key client\_number. This has a primary-key constraint and it is referenced in the foreign-key constraint on the d\_events table.

NOTE: The practice exercises use the d\_clients and d\_events tables in the DJs on Demand database. Students will work with copies of these two tables named copy\_d\_clients and copy\_d\_events. Make sure they have new copies of the tables (without changes made from previous exercises). Remember, tables copied using a subquery do not have the integrity constraints as established in the original tables. When using the SELECT statement to view the constraint name, the tablename must be all capital letters.

1. What are four functions that an ALTER statement can perform on constraints?

The four functions are ADD, DROP, DISABLE, and enable a constraint.

2. Since the tables are copies of the original tables, the integrity rules are not passed onto the new tables; only the column datatype definitions remain. You will need to add a PRIMARY KEY constraint to the copy\_d\_clients table. Name the primary key copy\_d\_clients\_pk . What is the syntax you used to create the PRIMARY KEY constraint to the copy\_d\_clients.table?

alter table copy-d-clients add constraint copy-d-clients-pk  
primary key (client-number);

3. Create a FOREIGN KEY constraint in the copy\_d\_events table. Name the foreign key copy\_d\_events\_fk. This key references the copy\_d\_clients table client\_number column. What is the syntax you used to create the FOREIGN KEY constraint in the copy\_d\_events table?

Alter Table Copy-d-events add constraint copy-d-events-fk  
foreign key (client-number) References copy-d-clients (client-number);

- Write SQL statement to verify the constraint names for each of the tables. Note that the constraint names are as follows
- The primary key constraint name in copy\_of\_clients is copy\_of\_clients\_pk
- The constraint name for the primary key in the copy\_of\_clients table is
- The first constraint statement will fail because the copy\_of\_clients\_pk foreign key depends on the copy\_of\_clients\_pk primary key
- The second constraint statement on the copy\_of\_clients table fails in your results.
- The drop constraint statement will fail because we can't drop a foreign key depends on the copy\_of\_clients\_pk primary key
- Add an identity column to the copy\_of\_events table. Explain your results.

| # | NAME             | DESCRIPTION | TYPE | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY | CLIENT NUMBER |
|---|------------------|-------------|------|--------|---------|-----------|----------|--------|----------|--------|---------------|
| 1 | copy_of_events   | Events      | INT  | 100    | 101     | 102       | 103      | 104    | 105      | 106    | 105           |
| 2 | copy_of_clients  | Clients     | INT  | 100    | 101     | 102       | 103      | 104    | 105      | 106    | 105           |
| 3 | copy_of_packages | Packages    | INT  | 100    | 101     | 102       | 103      | 104    | 105      | 106    | 105           |

- Insert statement will fail due to a foreign key violation
- Create an ALTER TABLE query to disable the primary key in the copy\_of\_clients table. Then add the new row to the copy\_of\_events table. Explain your results.
- also table copy\_of\_clients DISABLE constraint copy\_of\_clients\_pk;
- Insert statement insert the new value in the copy\_of\_events table. Explain your results.
- also table copy\_of\_clients disable constraint copy\_of\_clients\_pk;

9. Enable the primary key constraint in the table clients (data type integer and name).  
After table copy, if clients enable constraint (PK - clients PK);

10. If you wanted to enable the foreign key constraint and constraint in the referenced integrity between these two tables, what must be done?

You must delete or update the invalid rows (e.g. Client 123) in copied clients before you can successfully re-enable the foreign key constraint.

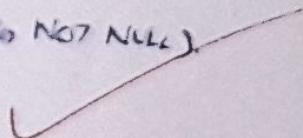
11. Why might you want to disable and then re-enable a constraint?

To improve performance when loading large amounts of data. Constraints are disabled during the load and re-enabled afterward to validate the new data.

12. Query the data dictionary for some of the constraints that you have created. How does the data dictionary identify each constraint type?

The user\_constraints view identifies constraints by constraint type:

- P for primary key.
- R for foreign key
- U for unique key
- C for check constraint (includes NOT NULL).



| Evaluation Procedure | Marks awarded |
|----------------------|---------------|
| Query(5)             | 5             |
| Execution (5)        | 5             |
| Viva(5)              | 5             |
| Total (15)           | 15            |
| Faculty Signature    | DPL           |