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?
   Ans: A constraint is a rule applied to a column or table to enforce data integrity. It ensures that the data entered into the database meets specific rules, such as uniqueness, non-null values, or valid references to other tables.
2. What are the limitations of constraints that may be applied at the column level and at the table level?

Column-Level Constraints

- Applies to one column only
- Cannot define multi-column constraints
- Syntax is simpler
- Can name constraints

Table-Level Constraints

- Can apply to one column (but not typical)
- Can define multi-column constraints
- Syntax is more complex
- Can name constraints

3. Why is it important to give meaningful names to constraints?
   - Easier to identify and debug errors
   - Improves code readability and maintainability
   - Helps in managing constraints during schema changes

Based on the information provided by the owners, choose a datatype for each column.
Indicate the length, precision, and scale for each NUMBER datatype.
Use "(nullable)" to indicate those columns that can have null values.

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

Ans: CREATE TABLE global_locations(id NUMBER(6) PRIMARY KEY,name VARCHAR2(50),date_opened DATE NOT NULL,address VARCHAR2(100) NOT NULL,city VARCHAR2(50) NOT NULL,zip_postal_code VARCHAR2(10),phone VARCHAR2(15),email VARCHAR2(100) UNIQUE,manager_id NUMBER(6),emergency_contact VARCHAR2(100));

Execute the CREATE TABLE statement in Oracle Application Express.

5. Execute a DESCRIBE command to view the Table Summary information.

Ans: DESC global_locations;

6. 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_postal	varchar2	20			X	
phone	varchar2	15			X	
email	varchar2	80			X	
manager_id	number	4			X	
contact	varchar2	40			X	

Ans: CREATE TABLE global_locations(id NUMBER(6) NOT NULL,name VARCHAR2(50),date_opened DATE NOT NULL,address VARCHAR2(100) NOT NULL,city VARCHAR2(50) NOT NULL,zip_postal_code VARCHAR2(10),phone VARCHAR2(15),email VARCHAR2(100),manager_id NUMBER(6),emergency_contact VARCHAR2(100),CONSTRAINT pk_global_locations PRIMARY KEY(id),CONSTRAINT uq_email UNIQUE(email));

PRIMARY KEY, FOREIGN KEY, and CHECK Constraints

1. What is the purpose of a

- PRIMARY KEY : Uniquely identifies each row; cannot be null.
- FOREIGN KEY : Enforces referential integrity by linking to a primary key in another table.
- CHECK CONSTRAINT : Ensures values meet a specific condition (e.g., salary > 0).

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

Ans: Ans: animal_id - Constraint Type: PRIMARY KEY, Level: Table-level; license_tag_number - Constraint Type: UNIQUE, Level: Column-level; admit_date - Constraint Type: NOT NULL, Level: Column-level; vaccination_date - Constraint Type: NOT NULL, Level: Column-level.

3. Create the animals table. Write the syntax you will use to create the table.
Ans: CREATE TABLE animals(animal_id NUMBER(6),name VARCHAR2(25),license_tag_number NUMBER(10) UNIQUE,admit_date DATE NOT NULL,adoption_id NUMBER(5),vaccination_date DATE NOT NULL,CONSTRAINT pk_animals PRIMARY KEY(animal_id));

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_NUMBE R	ADMIT_DATE	ADOPTION_ID	VACCINATION_DATE
101	Spot	35540	10-Oct-2004	205	12-Oct-2004

Ans: INSERT INTO animals VALUES(101,'Spot',35540,TO_DATE('10-OCT-2004','DD-MON-YYYY'),205,TO_DATE('12-OCT-2004','DD-MON-YYYY')); SELECT * FROM animals;

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.

Ans: **Column level: ALTER TABLE animals ADD CONSTRAINT fk_adoption_id FOREIGN KEY(adoption_id) REFERENCES adoptions(adoption_id); Table level: CONSTRAINT fk_adoption_id FOREIGN KEY(adoption_id) REFERENCES adoptions(adoption_id);**

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

a. ON DELETE CASCADE : **Deletes child rows when parent is deleted.**
b. ON DELETE SET NULL : **Sets child foreign key to NULL when parent is deleted.**

7. What are the restrictions on defining a CHECK constraint?
   - **Must return TRUE or FALSE.**
   - **Cannot use subqueries.**
   - **Cannot reference other tables or rows.**
   - **Column-level CHECK can only reference that column.**

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 tablenames must be all capital letters.

1. What are four functions that an ALTER statement can perform on constraints?
   - Add a constraint
   - Drop a constraint
   - Enable a constraint
   - Disable 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?

   Ans: 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?

   Ans: ALTER TABLE copy_d_events
   ADD CONSTRAINT copy_d_events_fk FOREIGN KEY (client_number)
   REFERENCES copy_d_clients(client_number);

4. Use a SELECT statement to verify the constraint names for each of the tables. Note that the tablenames must be capitalized.

   Ans: SELECT constraint_name, constraint_type FROM user_constraints WHERE table_name IN ('COPY_D_CLIENTS', 'COPY_D_EVENTS');

a. The constraint name for the primary key in the copy_d_clients table is **COPY_D_CLIENTS_PK**

5. Drop the PRIMARY KEY constraint on the copy_d_clients table. Explain your results.

   Ans: ALTER TABLE copy_d_clients
   DROP CONSTRAINT copy_d_clients_pk;

6. Add the following event to the copy_d_events table. Explain your results.

ID	NAME	EVENT DATE	DESCRIPTION	COST	VENUE ID	PACKAGE CODE	THEME CODE	CLIENT NUMBER
140	Cline Bas Mitzvah	15-Jul-2004	Church and Private Home formal	4500	105	87	77	7125

Ans: INSERT INTO copy_d_events VALUES (140, 'Cline Bas Mitzvah', TO_DATE('15-JUL-2004','DD-MON-YYYY'),
'Church and Private Home formal', 4500, 105, 87, 77, 7125);

7. Create an ALTER TABLE query to disable the primary key in the copy_d_clients table. Then add the values from #6 to the copy_d_events table. Explain your results.

Ans: ALTER TABLE copy_d_clients DISABLE CONSTRAINT copy_d_clients_pk;

8. Repeat question 6: Insert the new values in the copy_d_events table. Explain your results.

Ans: INSERT INTO
copy_d_events(id,name,event_date,description,cost,venue_id,package_code,theme_code,client_number) VALUES(140,'Cline Bas Mitzvah',TO_DATE('15-JUL-2004','DD-MON-YYYY'),'Church and Private Home formal',4500,105,87,77,7125);

9. Enable the primary-key constraint in the copy_d_clients table. Explain your results.

Ans: ALTER TABLE copy_d_clients ENABLE CONSTRAINT copy_d_clients_pk;

10. If you wanted to enable the foreign-key column and reestablish the referential integrity between these two tables, what must be done?

Ans: ALTER TABLE copy_d_events ENABLE CONSTRAINT copy_d_events_fk

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

Ans: To load or update data temporarily
To avoid constraint errors during bulk operations
To fix data issues before enforcing rules again

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

Ans: SELECT constraint_name, constraint_type
FROM user_constraints
WHERE table_name IN ('COPY_D_CLIENTS', 'COPY_D_EVENTS');

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