Date: 24/9/25

AIM: TO understand Constraints in data integrity of a table.

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 enforced on data columns in a table. Its primary purpose is to limit the type of data that can be inserted or updated into a table thereby ensuring the accuracy and reliability (integrity) of the database.

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

It can refer only refer to one column. Cannot define multi-column constraints.

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

Must be used when a constraint needs to apply to two or more columns combined, or when defining a foreign KEY that references columns in another table.

It is important give meaningful names to constraints due to readability, Troubleshooting and management of databases.

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.

1. id, Number, -, 10, 0
2. name, VARCHAR2, 50, -, -
3. date_opened, DATE, -, -, -
4. date_opened, DATE, -, -, -
5. address, VARCHAR2, 100, -, -
6. city, varchar2, 50, -, -
7. zip_postal_code, varchar2, 15, -, -
8. Phone, varchar2, 15, -, -
9. email, varchar2, 50, -, -
10. manager_id, NUMBER, -, 6, 0
11. emergency_contact, VARCHAR2, 50, -, -

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

- NOTNULL is applied to id, name, address and city as these are critical identifying location fields.
- The remaining fields are left as nullable.

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

Create Table global - locations(id NUMBER(10,0) CONSTRAINT pk - global - locations - id PRIMARY KEY, name VARCHAR2(50) Constraint nn - global - locations - name NOT NULL, date - opened DATE, address varchar2(100) CONSTRAINT nn - global - locations - address NOT NULL, city varchar2(50) CONSTRAINT nn - global - locations - city NOT NULL, zip - postal - code VARCHAR2(15), phone varchar2(15), email varchar2(50), mgr - id NUMBER(6,0), emergency - contact varchar2(50));

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

"Table global - locations created."

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

DESC global - locations;

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				
	date				X	
address	varchar2	30				
city	varchar2	20				
zip_postal	varchar2	20				
phone	varchar2	15			X	
email	varchar2	80			X	
manager_id	number	4			X	
contact	varchar2	40			X	

Create Table global - fast foods - locations (id NUMBER(4), loc - name varchar2(20), date DATE, address VARCHAR2(30), city VARCHAR2(20), zip - postal varchar2(20), phone varchar2(15), email varchar2(80), manager - id NUMBER(4), contact VARCHAR2(40), CONSTRAINT pk - location - id PRIMARY KEY(id), CONSTRAINT ck - loc - name - address UNIQUE(loc - name, address), CONSTRAINT uk - loc - email UNIQUE (email));

PRIMARY KEY, FOREIGN KEY, and CHECK Constraints

1. What is the purpose of a
   - PRIMARY KEY
   - FOREIGN KEY
   - CHECK CONSTRAINT

PRIMARY KEY - Uniquely identify each row in a table.
FOREIGN KEY - Refers to the primary key or a unique key in another table
CHECK CONSTRAINT - It enforce domain integrity, ensuring that data values fall within a specific, acceptable range or set of values.

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) — constrain: PRIMARY KEY — level: column
name VARCHAR2(25)
license_tag_number NUMBER(10) — Unique — Table
admit_date DATE — NOT NULL — column
adoption_id NUMBER(5),
vaccination_date DATE — NOT NULL — column

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

Create Table animals (animal_id NUMBER(6) constraint pk_animal_id PRIMARY KEY, name VARCHAR2(25), license_tag_number NUMBER(10), admit_date DATE CONSTRAINT nn_animal_admit_date NOT NULL, adoption_id NUMBER(5), vaccination_date DATE constraint nn_animal_vaccdate NOT NULL, CONSTRAINT uk_license_tag UNIQUE(license_tag_number));

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_id, vaccinate_date) VALUES (101, 'Spot', 35540, DATE '2004-10-10', 205, DATE '2004-12-12'); COMMIT;

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.

ALTER TABLE animals ADD (adoption_id NUMBER(5) CONSTRAINT fk_animal_adoption_id REFERENCES adoptions (adoption_id));

ALTER TABLE animals ADD constraint fk_animal_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 – If a row in the parent table is deleted, all corresponding rows in the ANIMAL that reference the deleted key are automatically deleted
b. ON DELETE SET NULL

b. The child rows of the ANIMAL table is automatically set to NULL.

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

1. Cannot reference other Rows.
2. Cannot use Non-Deterministic Functions.
3. Cannot use Privileged columns.
4. No data dictionary views.

RESULT:

Thus the constraints in data integrity are studied

Evaluation Procedure	Marks awarded
Query(5)	5
Execution (5)	5
Viva(5)	2
Total (15)	12
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?

The four functions are ADD, DROP, ENABLE and DISABLE.

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);
```

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

```
Select table_name, 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.

```
ALTER TABLE copy_d_clients DROP CONSTRAINT
copy_d_clients_pk;
```

The command will fail because the COPY_D_CLIENTS_PK constraint is referenced by the foreign key in the child table, copy_d_events.

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

Insert into copy_d_events (ID, NAME, EVENT_DATE, DESCRIPTION, COST, VENUE_ID, PACKAGE_CODE, THEME_CODE, CLIENT_NUMBER) VALUES (240, 'Clint Mitra', DATE '2004-11-08', 'Mitzvah', 6500, 10, 'YF', 'J', 789);

The INSERT statement will fail. It will raise a referential integrity error because the CLIENT_NUMBER 789 does not exist as a primary key in the base table.

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.

ALTER TABLE copy_d_clients DISABLE PRIMARY KEY CASCADE;

INSERT INTO copy_d_events (ID, NAME, EVENT_DATE, DESCRIPTION, COST, VENUE_ID, PACKAGE_CODE, THEME_CODE, CLIENT_NUMBER) VALUES (240, 'Clint Mitra', DATE '2004-11-08', 'Mitzvah', 6500, 10, 'YF', 'J', 789);
COMMIT;

The INSERT statement will succeed. With the foreign key disabled, the database no longer checks the referential integrity rule, allowing data that violates the rule to be inserted.

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

INSERT INTO copy_d_events (ID, NAME, EVENT_DATE, DESCRIPTION, COST, VENUE_ID, PACKAGE_CODE, THEME_CODE, CLIENT_NUMBER) VALUES (240, 'Another Event', DATE '2005-01-01', 'Party', 1000, 20, 'A', 'C', 789);

If a Primary key constraint is defined but disabled, you can insert duplicate values into PK column of the target table.

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

Alter TABLE copy_d_clients Enable PRIMARY;

The command will fail in two likely scenarios: Data violation and Dependent Foreign key.

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

To reenable the foreign key we have to resolve data violation, Enable the Parent key, Enable the Foreign key.

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

It is necessary to disable and then re-enable a constraint due to Bulk data loading, Data Transformation, Performance clean up and validation

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

P Primary Key Uniquely identifies rows; cannot be null

R Referential Integrity Foreign key relationship to a parent table.

U Unique Key Ensures all values in the columns are unique.

C Check or Not Null A user defined check condition or a NOT NULL constraint.

V With Check Check option Constraint on a view (less common)

```
Select constraint_name, table_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)	2
Total (15)	12
Faculty Signature	