EXERCISE 13

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

A constraint in the context of databases is a rule applied to columns in a table to ensure the accuracy and reliability of the data within the table Constraints enforce data integrity by limiting the type of data that can be inserted into a column, thus preventing invalid data from entering the database.

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

Constraints like NOT NULL, UNIQUE, PRIMARY KEY, and CHECK can be defined directly on a column.
Limited to the specific column only.

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

Enhance readability and maintainability of the database schema.
Help in easily identifying and understanding the purpose of the constraint.
Simplify troubleshooting and debugging when constraints are 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.

Column Name	Data Type	Nullable
location_id	NUMBER(5, 0)	NO
street_address	VARCHAR2(50)	YES
postal_code	VARCHAR2(12)	YES
city	VARCHAR2(30)	NO
state_province	VARCHAR2(25)	YES
country_id	CHAR(2)	YES

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

Column Name	Data Type	Nullable
location_id	NUMBER(5, 0)	NO
street_address	VARCHAR2(50)	YES
postal_code	VARCHAR2(12)	YES
city	VARCHAR2(30)	NO
state_province	VARCHAR2(25)	YES
country_id	CHAR(2)	YES

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

CREATE TABLE locations (location_id NUMBER(5, 0) PRIMARY KEY,
street_address VARCHAR2(50),postal_code VARCHAR2(12)city VARCHAR2(30) NOT NULL,
state_province VARCHAR2(25), country_id CHAR(2));

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

Executing the create table statem

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

DESC 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.

CREATE TABLE locations (location_id NUMBER(5, 0),street_address VARCHAR2(50),
postal_code VARCHAR2(12),city VARCHAR2(30) NOT NULL,state_province VARCHAR2(25),
country_id CHAR(2), CONSTRAINT loc_pk PRIMARY KEY (location_id),
CONSTRAINT loc_city_uk UNIQUE (city));

PRIMARY KEY, FOREIGN KEY, and CHECK Constraints

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

PRIMARY KEY: Ensures that each row in the table has a unique identifier and no NULL values.
FOREIGN KEY: Enforces a link between two tables, ensuring that the foreign key in the child table matches a primary key in the parent table.
CHECK CONSTRAINT: Ensures that all values in a column meet a specific condition.

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

```
CREATE TABLE animals ( animal_id NUMBER(6) PRIMARY KEY, name VARCHAR2(25),
license_tag_number NUMBER(10) UNIQUE,admit_date DATE NOT NULL,
adoption_id NUMBER(5),vaccination_date DATE NOT NULL);
```

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

```
CREATE TABLE animals (animal_id NUMBER(6) CONSTRAINT animal_pk PRIMARY KEY,
name VARCHAR2(25),license_tag_number NUMBER(10) CONSTRAINT license_tag_uk UNIQUE,
admit_date DATE CONSTRAINT admit_date_nn NOT NULL,
adoption_id NUMBER(5),vaccination_date DATE CONSTRAINT vaccination_date_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_I D NAM E LICENSE_TAG_NUMBE R ADMIT_DAT E ADOPTION_I D VACCINATION_DAT E
101 Spot 35540 10-Oct-2004 205 12-Oct-2004

```
INSERT INTO animals (animal_id, name, license_tag_number, admit_date,
 adoption_id, vaccination_date)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.

```
ALTER TABLE animals ADD CONSTRAINT animal_fk
 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
b. ON DELETE SET NULL

ON DELETE CASCADE: Automatically deletes child records when the parent record is deleted.
ON DELETE SET NULL: Sets the foreign key to NULL in the child records when the parent record is deleted.

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

CHECK constraints must reference columns in the same table.
Cannot reference columns in other tables or subqueries.
Must evaluate to TRUE or FALSE for each row.

PRACTICE PROBLEM

Managing Constraints

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

Add a new constraint.
Drop an existing constraint.
Enable a disabled constraint.
Disable an active 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);
```

4. Use a SELECT statement to verify the constraint names for each of the tables. Note that the Table names must be capitalized.
a. The constraint name for the primary key in the copy_d_clients table is _.

```
SELECT CONSTRAINT_NAME FROM USER_CONSTRAINTS
WHERE TABLE_NAME = 'COPY_D_CLIENTS';
SELECT CONSTRAINT_NAME FROM USER_CONSTRAINTS
WHERE TABLE_NAME = 'COPY_D_EVENTS';
```

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;
```

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 (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.

ALTER TABLE copy_d_clients DISABLE CONSTRAINT copy_d_clients_pk;

-- Insert the new event
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);

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

ALTER TABLE copy_d_clients ENABLE CONSTRAINT copy_d_clients_pk;

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

To re-enable referential integrity, ensure the data adheres to the constraint rules
before enabling it.

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

Disabling constraints allows data manipulation without constraint checks.
Re-enabling constraints ensures data integrity once the data manipulation is complete.

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

SELECT CONSTRAINT_NAME, CONSTRAINT_TYPE,
TABLE_NAME FROM USER_CONSTRAINTS;

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
R: Referential integrity (foreign key)
C: Check constraint
U: Unique constraint