

## Section 10 Lesson 1: Defining NOT NULL and UNIQUE Constraints

### Try It / Solve It

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.

1. What is a "constraint" as it relates to data integrity? **Constraints are database rules used to create reliable data by preventing invalid data entry into tables.**
2. What are the limitations of constraints that may be applied at the column level and at the table level? **Constraints that refer to more than one column must be defined at the table level. The NOT NULL constraint can be specified ONLY at the column level, not the table level. If the word CONSTRAINT is used in a CREATE TABLE, you must give the constraint a name.**
3. Why is it important to give meaningful names to constraints? **Constraint names that aren't meaningful would make it soon difficult to distinguish one from another. Ultimately work would end up being redone.**
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.
5. Use "nullable" to indicate those columns that can have null values.


**global\_locations**

Field	Type	Nullable	Key	Default	Extras
location_id	number(5,0)	NO	PK		
open_date	date	NO		SYSDATE	
address	varchar2(50)	YES			
city	varchar2(30)	NO			
email	varchar2(30)	NO			UNIQUE

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 (
  location_id  number(5),
  open_date   date DEFAULT SYSDATE NOT NULL,
  address      varchar2(50),
  city        varchar2(30) NOT NULL,
  email       varchar2(30) NOT NULL,
  CONSTRAINT global_loc_email_uk UNIQUE (email),
  CONSTRAINT global_loc_loc_id_pk PRIMARY KEY (location_id));
```

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

Rows  

Save
Run

```

CREATE TABLE global_locations (
  location_id      number(5) CONSTRAINT global_loc_loc_id_pk PRIMARY KEY,
  open_date        date DEFAULT SYSDATE NOT NULL,
  address           varchar2(50),
  city              varchar2(30) NOT NULL,
  email             varchar2(30) NOT NULL CONSTRAINT global_loc_email_uk UNIQUE);

```


Results
Explain
Describe
Saved SQL
History

Table created.

0.03 seconds

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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

Rows  

Save
Run

```

describe global_locations;

```

Results
Explain
Describe
Saved SQL
History

Object Type TABLE Object GLOBAL\_LOCATIONS

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
GLOBAL_LOCATIONS	LOCATION_ID	NUMBER	-	5	0	1	-	-	-
	OPEN_DATE	DATE	7	-	-	-	-	SYSDATE	-
	ADDRESS	VARCHAR2	50	-	-	-	✓	-	-
	CITY	VARCHAR2	30	-	-	-	-	-	-
	EMAIL	VARCHAR2	30	-	-	-	-	-	-
1-5									

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

Application Express 4.2.5.00.08  
Language: en | Copyright © 1999, 2014, Oracle. All rights reserved.

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 global_locations (  
  location_id    number(5),  
  open_date     date DEFAULT SYSDATE NOT NULL,  
  address        varchar2(50),  
  city           varchar2(30) NOT NULL,  
  email          varchar2(30) NOT NULL,  
  CONSTRAINT global_loc_email_uk UNIQUE (email),  
  CONSTRAINT global_loc_loc_id_pk PRIMARY KEY (location_id));
```


## Section 10 Lesson 2: PRIMARY KEY, FOREIGN KEY, and CHECK Constraints

### Try It / Solve It

1. What is the purpose of a
  - a. PRIMARY KEY – A primary key uniquely identifies each row in a table.
  - b. FOREIGN KEY – A foreign key links back to the primary key (or a unique key) in another table which is the basis of the relationship between the tables.
  - c. CHECK CONSTRAINT – A check constraint is an explicitly defined condition that must be met.
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 NOT NULL
adoption_id NUMBER(5)
vaccination_date DATE NOT NULL,
CONSTRAINT animal_id_pk PRIMARY KEY (animal_id)
CONSTRAINT animal_ltn_uk UNIQUE (license_tag_number)
```

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

Rows  

Save **Run**

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

**Results** Explain Describe Saved SQL History

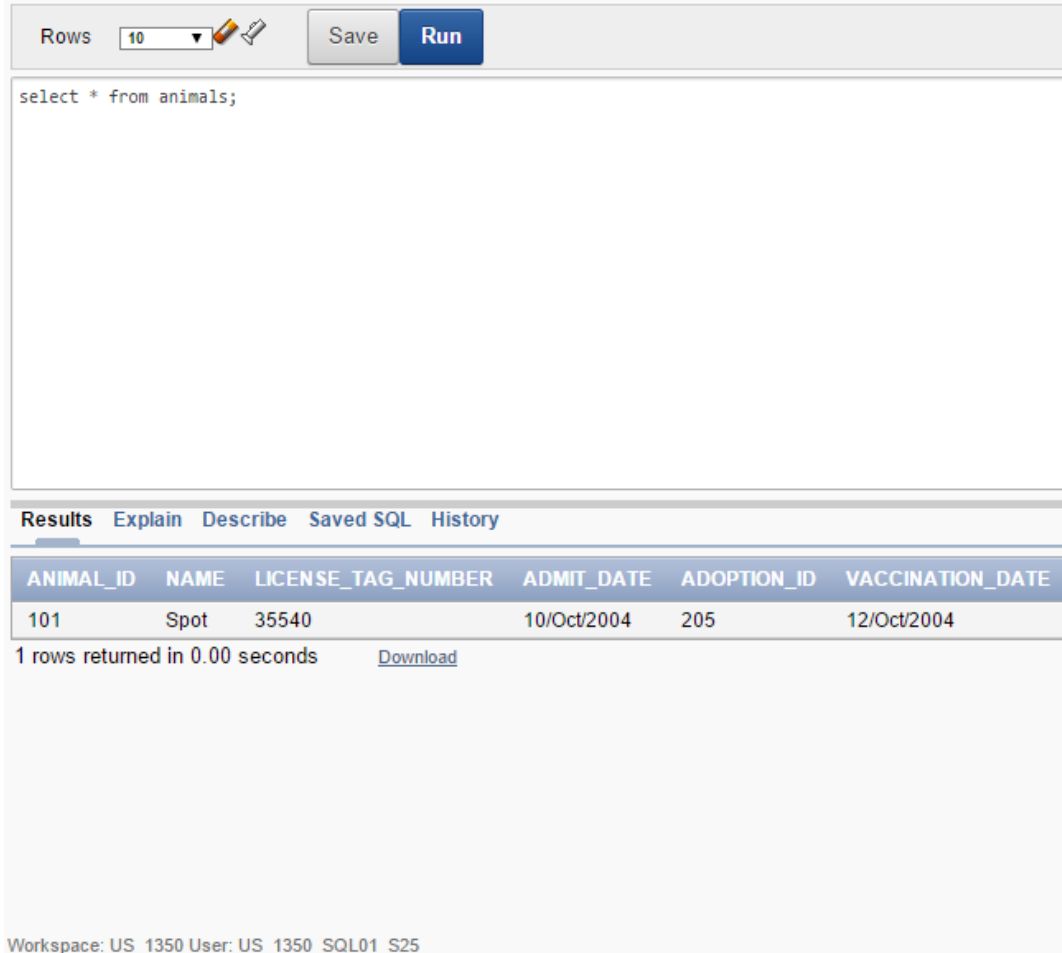
Table created.

0.06 seconds

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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



The screenshot shows the Oracle SQL Developer interface. At the top, there is a toolbar with a 'Rows' dropdown set to 10, a 'Save' button, and a 'Run' button. Below the toolbar, the SQL editor contains the query: `select * from animals;`. The 'Results' tab is selected, displaying the query results in a table format. The table has six columns: ANIMAL\_ID, NAME, LICENSE\_TAG\_NUMBER, ADMIT\_DATE, ADOPTION\_ID, and VACCINATION\_DATE. The results show one row: 101, Spot, 35540, 10/Oct/2004, 205, and 12/Oct/2004. Below the table, it states '1 rows returned in 0.00 seconds' and provides a 'Download' link. At the bottom, the workspace information is displayed: 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.

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

1 rows returned in 0.00 seconds [Download](#)

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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
ADD CONSTRAINT animals_adopt_id_fk
FOREIGN KEY(adoption_id)
REFERENCES adoptions(adoption_id)
```

6. What is the effect of setting the foreign key in the `ANIMAL` table as:
- `ON DELETE CASCADE` – If a row in the `adoptions` table is deleted, then this option allows rows that refer to it to also be deleted.

- b. ON DELETE SET NULL – Instead of deleting the rows in the child table, the rows are instead filled with null values when this option is enabled.
- 7. What are the restrictions on defining a CHECK constraint? A CHECK constraint must only be on the row where the constraint is defined. It cannot be used in queries that refer to values in other rows. It cannot contain functions SYSDATE, UID, USER, or USERNV. It cannot use pseudocolumns CURRVAL, NEXTVAL, LEVEL, or ROWNUM.

## Section 10 Lesson 3: Managing Constraints

### Try It / Solve It

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.

1. What are four functions that an `ALTER` statement can perform on constraints? [Adding or dropping constraints, enabling or disabling constraints, and adding a NOT NULL constraint to a column.](#)
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?

The screenshot shows the Oracle SQL Workshop interface. At the top, there is a toolbar with a 'Rows' dropdown set to '10', a 'Save' button, and a 'Run' button. Below the toolbar is a text area containing the SQL statement:

```
alter table copy_d_clients
add constraint copy_d_clients_pk
primary key (client_number);
```


Below the text area is a tabbed interface with tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is selected, showing the output:

```
Table altered.
```

Below the output, the execution time is displayed as '0.01 seconds'. At the bottom of the interface, the workspace information is shown: 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.



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?

Rows  

Save Run

```
alter table copy_d_events
add constraint copy_d_events_fk
foreign key(client_number)
references copy_d_clients(client_number);
```

Results Explain Describe Saved SQL History

Table altered.

0.02 seconds

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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

Rows
10
Save
Run

```

select constraint_name, table_name
from user_constraints
where (table_name = upper('copy_d_clients') or
table_name = upper('copy_d_events'))
and constraint_type != upper('c')
order by constraint_name;

```

Results Explain Describe Saved SQL History

CONSTRAINT_NAME	TABLE_NAME
COPY_D_CLIENTS_PK	COPY_D_CLIENTS
COPY_D_EVENTS_FK	COPY_D_EVENTS

2 rows returned in 0.07 seconds [Download](#)

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

- The constraint name for the primary key in the copy\_d\_clients table is [COPY\\_D\\_CLIENTS\\_PK](#).
- The constraint name for the foreign key in the copy\_d\_events table is [COPY\\_D\\_EVENTS\\_FK](#).

5. Drop the PRIMARY KEY constraint on the copy\_d\_clients table. Explain your results.

The drop was not able to be performed due to the foreign key reference.

Rows

Save Run

```
alter table copy_d_clients
drop constraint copy_d_clients_pk;
```

Results Explain Describe Saved SQL History

ORA-02273: this unique/primary key is referenced by some foreign keys

0.01 seconds

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

Application Express 4.2.5.00.08  
Language: en | Copyright © 1999, 2014, Oracle. All rights reserved.

6. Add the following event to the copy\_d\_events table. Explain your results. [Violation of integrity constraint.](#)

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

Rows 
Save Run

```

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);

```

Results Explain Describe Saved SQL History

ORA-02291: integrity constraint (US\_1350\_SQL01\_S25.COPY\_D\_EVENTS\_FK) violated - parent key not found

0.01 seconds

Application Express 4.2.5.00.08

Workspace: US\_1350 User: US\_1350\_SQL01\_S25 Language: en | Copyright © 1999, 2014, Oracle. All rights reserved.

7. Create an ALTER TABLE query to disable the primary key in the copy\_d\_clients table. Then add the values from #5 to the copy\_d\_events table. Explain your results. [This cannot be performed without disabling the foreign key in the copy\\_d\\_events table.](#)

Rows

Save

Run

```
alter table copy_d_clients
disable constraint
copy_d_clients_pk;
```

Results

Explain

Describe

Saved SQL

History

ORA-02297: cannot disable constraint (US\_1350\_SQL01\_S25.COPY\_D\_CLIENTS\_PK) - dependencies exist

0.00 seconds



Application Express 4.2.5.00.08

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

Language: en | Copyright © 1999, 2014, Oracle. All rights reserved.

8. Repeat question 5: Insert the new values in the copy\_d\_events table. Explain your results. [Question 5 cannot be repeated. The primary key could not be disabled without the foreign key being disabled first. The foreign key in copy\\_d\\_events cannot be enabled without the primary key in the copy\\_d\\_clients table.](#)

9. Enable the primary-key constraint in the copy\_d\_clients table. Explain your results. [Table copy\\_d\\_clients primary key was able to be enabled.](#)

Rows    Save Run

```
alter table copy_d_clients
enable constraint
copy_d_clients_pk;
```

Results Explain Describe Saved SQL History

```
Table altered.
```

```
0.03 seconds
```

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

10. If you wanted to enable the foreign-key column and reestablish the referential integrity between these two tables, what must be done? [To reestablish referential integrity between the two tables, the current data must be valid to the constraints that are being enabled. The primary key that is being referenced must also be enabled first.](#)
11. Why might you want to disable and then re-enable a constraint? [Disabling and then re-enabling constraints can be found desirable in situations that call for loading large amounts of data into a table and performing batch operations that make massive changes to a table.](#)
12. Query the data dictionary for some of the constraints that you have created. How does the data dictionary identify each constraint type?
- C – CHECK      P – Primary      R – Referential      U – Unique constraint