EXERCISE-3

INCLUDING CONSTRAINTS

OBJECTIVE

After the completion of this exercise the students should be able to do the following

- Describe the constraints
- Create and maintain the constraints

What are Integrity constraints?

- Constraints enforce rules at the table level.
- Constraints prevent the deletion of a table if there are dependencies

The following types of integrity constraints are valid

a) **Domain Integrity**

✓ NOT NULL
✓ CHECK

b) **Entity Integrity**

✓ UNIQUE
✓ PRIMARY KEY

c) **Referential Integrity**

✓ FOREIGN KEY

Constraints can be created in either of two ways

1. At the same time as the table is created
2. After the table has been created.

Defining Constraints

Create table tablename (column_name1 data_ type constraints. column_name2 data_ type constraints …);

Example:

Create table employlees (employee_id number(6). first_name varchar2(20). ..job_id varchar2 (10). CONSTRAINT emp_emp_id_pk PRIMARY KEY (employlee_id));

Domain Integrity

This constraint sets a range and any violations that takes place will prevent the user from performing the manipulation that caused the breach.It includes:

NOT NULL Constraint

While creating tables, by default the rows can have null value the enforcement of not null constraint in a table ensure that the table contains values.

Principle of null values:

- Setting null value is appropriate when the actual value is unknown, or when a value would not be meaningful.
- A null value is not equivalent to a value of zero.
- A null value will always evaluate to null in any expression
- When a column name is defined as not null, that column becomes a mandatory i.e., the user has to enter data into it.
- Not null Integrity constraint cannot be defined using the alter table command when the table contain rows.

Example

```
CREATE TABLE employees (employee_id number (6), last_name varchar2(25) NOT NULL, salary
number(8,2), commission_pct number(2,2), hire_date date constraint emp_hire_date_nn NOT
NULL',...);
```

CHECK

Check constraint can be defined to allow only a particular range of values when the manipulation violates this constraint the record will be rejected Check condition cannot contain sub queries.

```
CREATE TABLE employees (employee_id number (6), last_name varchar2 (25) NOT NULL, salary
number(8,2), commission_pct number(2,2), hire_date date constraint emp_hire_date_nn NOT
NULL', CONSTRAINT emp_salary_mi CHECK(salary > 0));
```

Entity Integrity

Maintains uniqueness in a record. An entity represents a table and each row of a table represents an instance of that entity. To identify each row in a table uniquely we need to use this constraint. There are 2 entity constraints:

a) Unique key constraint

It is used to ensure that information in the column for each record is unique, as with telephone or driver's license numbers. It prevents the duplication of value with rows of a specified column in a set of column. A column defined with the constraint can allow null value.
If unique key constraint is defined in more than one column i.e., combination of column cannot be specified. Maximum combination of columns that a composite unique key can contain is 16.

Example:

```
CREATE TABLE employees (employee_id number(6), last_name varchar2(25) NOT NULL,email
varchar2(25), salary number(8,2), commission_pct number(2,2), hire_date date constraint
emp_hire_date_nn NOT NULL',COSTRAINT emp_email_uk UNIQUE(email));
```

PRIMARY KEY CONSTRAINT

A primary key avoids duplication of rows and does not allow null values. Can be defined on one or more columns in a table and is used to uniquely identify each row in a table. These values should never be changed and should never be null.
A table should have only one primary key. If a primary key constraint is assigned to more than one column or combination of column is said to be composite primary key, which can contain 16 columns.

Example:

CREATE TABLE employees (employee_id number(6) , last_name varchar2(25) NOT NULL,email varchar2(25), salary number(8,2), commission_pct number(2,2), hire_date date constraint emp_hire_date_nn NOT NULL, Constraint emp_id pk PRIMARY KEY (employee_id),CONSTRAINT emp_email_uk UNIQUE(email));

c) Referential Integrity

It enforces relationship between tables. To establish parent-child relationship between 2 tables having a common column definition, we make use of this constraint. To implement this, we should define the column in the parent table as primary key and same column in the child table as foreign key referring to the corresponding parent entry.

Foreign key

A column or combination of column included in the definition of referential integrity, which would refer to a referenced key.

Referenced key

It is a unique or primary key upon which is defined on a column belonging to the parent table.
Keywords:

FOREIGN KEY: Defines the column in the child table at the table level constraint.

REFERENCES: Identifies the table and column in the parent table.

ON DELETE CASCADE: Deletes the dependent rows in the child table when a row in the parent table is deleted.

ON DELETE SET NULL: converts dependent foreign key values to null when the parent value is removed.

CREATE TABLE employees (employee_id number(6) , last_name varchar2(25) NOT NULL,email varchar2(25), salary number(8,2), commission_pct number(2,2), hire_date date constraint emp_hire_date_nn NOT NULL, Constraint emp_id pk PRIMARY KEY (employee_id),CONSTRAINT emp_email_uk UNIQUE(email),CONSTRAINT emp_dept_fk FOREIGN KEY (department_id) references deparments(dept_id));

ADDING A CONSTRAINT

Use the ALTER to

- Add or Drop a constraint, but not modify the structure
- Enable or Disable the constraints
- Add a not null constraint by using the Modify clause

Syntax

ALTER TABLE table name ADD CONSTRAINT Cons_name type(column name);

Example:

ALTER TABLE employees ADD CONSTRAINT emp_manager_fk FOREIGN KEY (manager_id) REFERENCES employees (employee_id);

DROPPING A CONSTRAINT

Example:

ALTER TABLE employees DROP CONSTRAINT emp_manager_fk;

CASCADE IN DROP

- The CASCADE option of the DROP clause causes any dependent constraints also to be dropped.

Syntax

ALTER TABLE departments DROP PRIMARY KEY|UNIQUE (column)| CONSTRAINT constraint _name CASCADE;

DISABLING CONSTRAINTS

- Execute the DISABLE clause of the ALTER TABLE statement to deactivate an integrity constraint
- Apply the CASCADE option to disable dependent integrity constraints.

Example

ALTER TABLE employees DISABLE CONSTRAINT emp_emp_id_pk CASCADE;

ENABLING CONSTRAINTS

- Activate an integrity constraint currently disabled in the table definition by using the ENABLE clause.

Example

ALTER TABLE employees ENABLE CONSTRAINT emp_emp_id_pk CASCADE;

CASCADING CONSTRAINTS

The CASCADE CONSTRAINTS clause is used along with the DROP column clause.
It drops all referential integrity constraints that refer to the primary and unique keys defined on the dropped Columns.

This clause also drops all multicolumn constraints defined on the dropped column.

Example:

Assume table TEST1 with the following structure

```
CREATE TABLE test1 ( pk number PRIMARY KEY. fk number. col1 number,col2 number,
CONTRAINT fk_constraint FOREIGN KEY(fk) references test1. CONSTRAINT ck1 CHECK
(pk>0 and col1>0). CONSTRAINT ck2 CHECK (col2>0));
```

An error is returned for the following statements

```
ALTER TABLE test1 DROP (pk);
```

```
ALTER TABLE test1 DROP (col1);
```

The above statement can be written with CASCADE CONSTRAINT

```
ALTER TABLE test 1 DROP(pk) CASCADE CONSTRAINTS;
```

(OR)

```
ALTER TABLE test 1 DROP(pk, fk, col1) CASCADE CONSTRAINTS;
```

VIEWING CONSTRAINTS

Query the USER_CONSTRAINTS table to view all the constraints definition and names.

Example:

```
SELECT constraint_name, constraint_type, search_condition FROM user_constraints
WHERE table_name='employees';
```

Viewing the columns associated with constraints

```
SELECT constraint_name. constraint_type. FROM user_cons_columns
WHERE table_name='employees';
```

Find the Solution for the following:

1. Add a table-level PRIMARY KEY constraint to the EMP table on the ID column.The constraint should be named at creation. Name the constraint my_emp_id_pk.

Alter table emp add constraint my-emp-id-pk primary key(id);

2. Create a PRIMARY KEY constraint to the DEPT table using the ID column. The constraint should be named at creation. Name the constraint my_dept_id_pk.

```
alter table dept Add constraint my.emp.dept-id.pk
primary key (id);
```

3. Add a column DEPT_ID to the EMP table. Add a foreign key reference on the EMP table that ensures that the employee is not assigned to nonexistent department. Name the constraint my_emp_dept_id_fk.

```
alter table emp Add dept_id Number;
alter table emp add constraint my-emp-dept-id-fk
foreign key (dept_id) References dept (id);
```

4. Modify the EMP table. Add a COMMISSION column of NUMBER data type, precision 2, scale 2. Add a constraint to the commission column that ensures that a commission value is greater than zero.

```
alter table emp add commission Number (2,2);
alter table emp add constraint emp-commission.ck check
(commission > 0);
```

Evaluation Procedure	Marks awarded
Query(5)	5
Execution (5)	5
Viva(5)	5
Total (15)	15
Faculty Signature	8/4/25

PRACTICE QUESTIONS

Limit Rows Selected

1. Using the Global Fast Foods database, retrieve the customer's first name, last name, and address for the customer who uses ID 456

Select first_name, last_name, addres from customers
where customer-id=456;

2. Show the name, start date, and end date for Global Fast Foods' promotional item "ballpen and highlighter" giveaway

Select promo-name, start_date, end-date from promotions
where promo-name = 'ballpen and highlighter giveaway';

3. Create a SQL statement that produces the following output:

Oldest

The 1997 recording in our database is The Celebrants Live in Concert

Select 'The 1997 recording in our database is the Celebrants
Live in concert' AS "Oldest" from dual;

4. The following query was supposed to return the CD title "Carpe Diem" but no rows were returned. Correct the mistake in the statement and show the output.

```
SELECT produce_title
FROM d_cds
WHERE title = 'carpe diem' ;
```

5. The manager of DJs on Demand would like a report of all the CD titles and years of CDs that were produced before 2000.

Select title, year from d-cds where year < 2000;

6. Which values will be selected in the following query?

```
SELECT salary
FROM employees
WHERE salary < = 5000;
```

a. 5000
b. 0 - 4999
c. 2500
d. 5

ans: all

7. Write a SQL statement that will display the student number (studentno), first name (fname), and last name (lname) for all students who are female (F) in the table named students.

Select studentno, fname, lname from students where gender='F';

8. Write a SQL statement that will display the student number (studentno) of any student who has a PE major in the table named students. Title the studentno column Student Number

Select Student no As "Student Number" from Student where
major='PE';

9. Write a SQL statement that lists all information about all male students in the table named students.

select * from students where gender='m';

10. Write a SQL statement that will list the titles and years of all the DJs on Demand's CDs that were not produced in 2000.

select title, year from d-cds where year <>2000;

11. Write a SQL statement that lists the Global Fast Foods employees who were born before 1980.

Select * from employees where birth_date < To_date ('01-Jan-1980',
'DD-MON-YYYY');

Evaluation Procedure	Marks awarded
Practice Evaluation (5)	5
Viva(5)	5
Total (10)	10
Faculty Signature	8/9/25