Database Management

BU.330.770

Session 2 (part II)

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Table Creation & Management

Session Objectives

» Identify the table name and structure

» Create a new table using the CREATE TABLE command

» Use a subquery to create a new table

» Add a column to an existing table

» Modify the definition of a column in an existing table

» Delete a column from an existing table

» Rename, Truncate, and Drop a table

Database Table

>> A database object

>> Stores data for the database

>> Consists of columns and rows

>> Created and modified through data definition language (DDL) commands

DCL → Data Control language
→ user access

works with structure of table

Wait, what is
DDL (Data Definition Language)? → works with structure of table
DML (Data Manipulation Language)? → works with data inside table.

DQL → just querying of data

Table Design

>> Table and column names:

- Can contain a maximum of 30 characters – no blank spaces

- Must begin with a letter

- Can contain numbers, underscore (_), and number sign (#)

- Must be unique

- No reserved words are allowed: keywords, data types (ex. SELECT, DISTINCT, CHAR, etc.)

Data Types

Data type	Description
VARCHAR2(n)	Variable-length character data, and the n represents the column's maximum length. The maximum size is 4000 characters. There's no default size for this datatype; a maximum value must be specified. Ex. VARCHAR2(9) can contain up to nine letters, numbers, or symbols.
CHAR(n)	Fixed-length character column, and the n represents the column's length. The default size is 1, and the maximum size is 2000. Ex. CHAR(9) can contain nine letters, numbers, or symbols. However, if fewer than nine are entered, spaces are added to the right to force the data to reach a length of nine.
NUMBER(p, s)	Numeric column. The p indicates **precision**, the total number of digits to the left and right of the decimal position, to a maximum of 38 digits. The s, or **scale**, indicates the number of positions to the right of the decimal. Ex. NUMBER(7, 2) can store a numeric value up to 99999.99. If precision or scale isn't specified, the column defaults to a precision of 38 digits.
DATE	Stores date and time between January 1, 4712 BC and December 31, 9999 AD. Seven bytes are allocated to the column to store the century, year, month, day, hour, minute, and second of a date. **Oracle displays the date in the format DD-MON-YY.** Other aspects of a date can be displayed by using the TO_CHAR format.

Table Creation Syntax & Defining Columns

CREATE TABLE *tablename*
    (*columnname* datatype [DEFAULT *value*]
    [, *columnname* datatype [DEFAULT *value*]]);

» Column definition list must be enclosed in parentheses

» Datatype must be specified for each column

» Maximum of 1,000 columns

» Default value is the one the system stores automatically if a user makes no entry in the column. (ex. current date)

CREATE TABLE Command Example

```
Worksheet    Query Builder
 1 ⊟ CREATE TABLE acctmanager
 2   (amid CHAR(4),
 3    amfirst VARCHAR(12),
 4    amlast VARCHAR(12),
 5    amedate DATE DEFAULT SYSDATE,
 6    amsal NUMBER(8,2),
 7    amcomm NUMBER(7,2) DEFAULT 0,
 8    amearn AS (amsal + amcomm),        ⟵——— Virtual Column
 9    region CHAR(2)
10    );
11
```

```
Script Output  X
📌 ✏ 💾 🖨 ▣  |  Task completed in 0.04 seconds
```

```
Table ACCTMANAGER created.
```

Viewing List of Tables: USER_TABLES

» A data dictionary is a typical component of a DBMS that maintains information about database objects

» You can query the data dictionary to verify all the tables that exist in your schema (used in Part I exercise with SELECT)

» The USER_TABLES data dictionary object maintains information regarding all your tables

```
SELECT table_name
FROM user_tables;
```

Viewing Table Structures: DESCRIBE

» **DESCRIBE** (or **DESC**) displays the structure of a specified table

Using USER_TAB_COLUMNS

>> Another useful data dictionary object displaying column information

>> We can verify the default settings of the columns

Worksheet | Query Builder

```
SELECT column_name, data_type, data_default
FROM user_tab_columns
WHERE table_name = 'ACCTMANAGER';
```

Why use uppercase?

Script Output ✕ | ▶ Query Result ✕

SQL | All Rows Fetched: 8 in 0.244 seconds

	COLUMN_NAME	DATA_TYPE	DATA_DEFAULT
1	AMID	CHAR	(null)
2	AMFIRST	VARCHAR2	(null)
3	AMLAST	VARCHAR2	(null)
4	AMEDATE	DATE	SYSDATE
5	AMSAL	NUMBER	(null)
6	AMCOMM	NUMBER	0
7	AMEARN	NUMBER	"AMSAL"+"AMCOMM"
8	REGION	CHAR	(null)

Invisible Columns

» We can create hidden columns by giving 'invisible' option

» Run SELECT or DESC command to check if col2 is displayed

Check Invisible Columns

» Query the USER_TAB_COLS data dictionary

USER_TAB_COLUMNS does not have the same column showing
whether it's hidden or not

Table Creation through Subqueries

>> You can use subqueries to retrieve data from an existing table

>> Subquery (or nested query) is a SELECT statement used in another SQL command (more details in Chapter 12 of the textbook)

>> Requires use of **AS** keyword

>> New column names can be assigned

CREATE TABLE *tablename* [(columnname1, columnname2, …)]
AS (*subquery*);

Subqueries must be enclosed in parentheses so that
Oracle can distinguish it from the rest of the command!
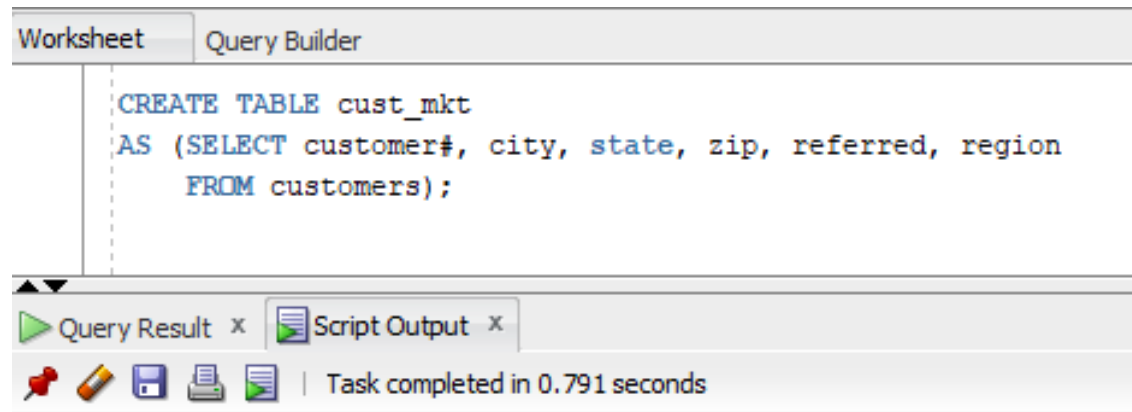
CREATE TABLE...AS Command Example

Modifying Existing Tables

» Accomplished through the **ALTER TABLE** command

» Use an **ADD** clause to add a column

» Use a **MODIFY** clause to change a column

» Use a **DROP COLUMN** to drop a column

ALTER TABLE *tablename*
ADD|MODIFY|DROP COLUMN| *columnname* [*definition*];

Example: ALTER TABLE...ADD Command

ALTER TABLE *tablename*

ADD (*columnname* datatype [DEFAULT] …);

When added, it will be the last column in the table

ALTER TABLE...DROP COLUMN Command

> ALTER TABLE *tablename*
> DROP COLUMN *columnname*;

» Can only reference **one column per execution**

» Deletion is permanent

» Cannot delete the last remaining column in a table
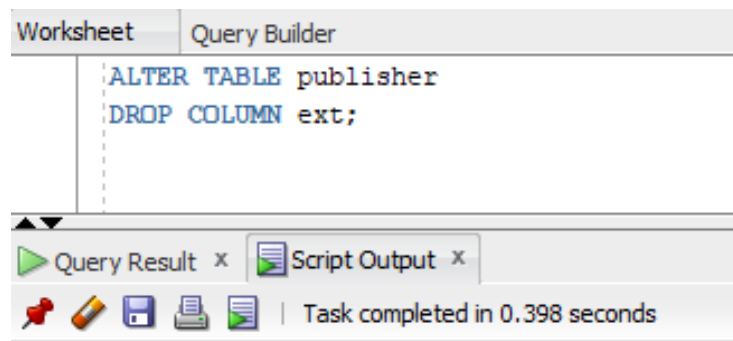
» Cannot delete a primary key column from a table

Dropping Column from Table

Worksheet | Query Builder

```
ALTER TABLE publisher
DROP COLUMN ext;
```

Query Result × | Script Output ×

Task completed in 0.398 seconds
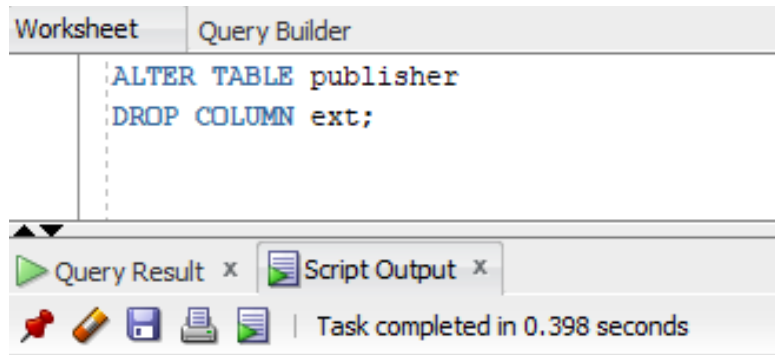
Table PUBLISHER altered.

You can't remove the 'pubid' column because...?

Worksheet | Query Builder

```
ALTER TABLE publisher
DROP COLUMN pubid;
```

Query Result × | Script Output ×

Task completed in 0.065 seconds
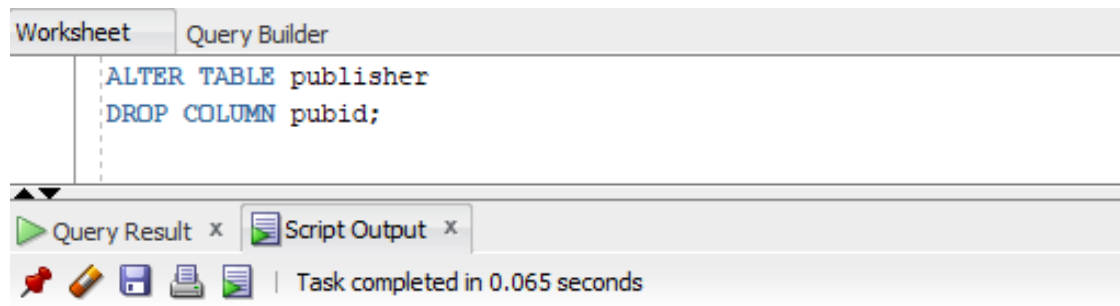
```
Error starting at line : 213 in command -
ALTER TABLE publisher
DROP COLUMN pubid
Error report -
ORA-12992: cannot drop parent key column
12992. 00000 -  "cannot drop parent key column"
*Cause:    An attempt was made to drop a parent key column.
*Action:   Drop all constraints referencing the parent key column, or
           specify CASCADE CONSTRAINTS in statement.
```

ALTER TABLE… MODIFY Modification Guidelines

» You can modify: column size, datatype, default value, visibility

» Column must be as wide as the data it already contains

» If a NUMBER column already contains data, size **cannot be decreased**

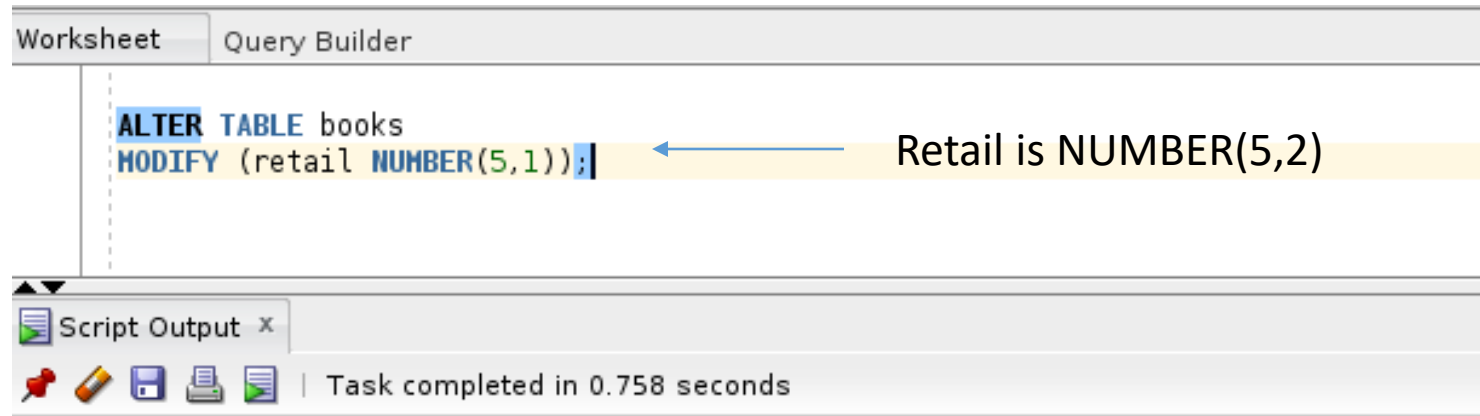» Adding or changing default data does not affect existing data

```
ALTER  TABLE  tablename
 MODIFY (columnname  datatype  [DEFAULT] …);
```

You Will Get Errors….

Worksheet | Query Builder

```
ALTER TABLE books
MODIFY (retail NUMBER(5,1));
```
← Retail is NUMBER(5,2)

Script Output ×

Task completed in 0.758 seconds

```
Error starting at line : 97 in command -
ALTER TABLE books
MODIFY (retail NUMBER(5,1))
Error report -
ORA-01440: column to be modified must be empty to decrease precision or scale
01440. 00000 -  "column to be modified must be empty to decrease precision or scale"
*Cause:
*Action:
```

Then, can you modify it to NUMBER(5, 3)??? 🤔

Worksheet   Query Builder

```
ALTER TABLE publisher
ADD rating CHAR(1);
```

First, let's add a new column, 'Rating' to the Publisher table.

Script Output ✕   ▷ Query Result ✕

📌 🧹 💾 🖨 📊 | Task completed in

Table PUBLISHER altered.

Worksheet   Query Builder

```
SELECT *
FROM publisher
```

Script Output ✕   ▷ Query Result ✕

📌 🖨 🔁 📇 SQL | All Rows Fetched: 5 in 0.098 seconds

	◈ PUBID	◈ NAME	◈ CONTACT	◈ PHONE	◈ EXT	◈ RATING
1	1	PRINTING IS US	TOMMIE SEYMOUR	000-714-8321	(null)	(null)
2	2	PUBLISH OUR WAY	JANE TOMLIN	010-410-0010	(null)	(null)
3	3	AMERICAN PUBLISHING	DAVID DAVIDSON	800-555-1211	(null)	(null)
4	4	READING MATERIALS INC.	RENEE SMITH	800-555-9743	(null)	(null)
5	5	REED-N-RITE	SEBASTIAN JONES	800-555-8284	(null)	(null)

There are no values in the 'Rating' column now.

Worksheet | Query Builder

```
ALTER TABLE publisher
MODIFY rating DEFAULT 'N';
```

Then, let's assign the 'Rating' column a default value

Script Output ✕ ▷ Query Result ✕

Task completed in 0.

Table PUBLISHER altered.

Worksheet | Query Builder

```
SELECT *
FROM publisher;
```

Script Output ✕ ▷ Query Result ✕

SQL | All Rows Fetched: 5 in 0.018 seconds

	PUBID	NAME	CONTACT	PHONE	EXT	RATING
1	1	PRINTING IS US	TOMMIE SEYMOUR	000-714-8321	(null)	(null)
2	2	PUBLISH OUR WAY	JANE TOMLIN	010-410-0010	(null)	(null)
3	3	AMERICAN PUBLISHING	DAVID DAVIDSON	800-555-1211	(null)	(null)
4	4	READING MATERIALS INC.	RENEE SMITH	800-555-9743	(null)	(null)
5	5	REED-N-RITE	SEBASTIAN JONES	800-555-8284	(null)	(null)

Values in 'Rating' did not change

Modify Columns to become (in)visible

```
Worksheet    Query Builder

DESC test_invis;

ALTER TABLE test_invis
MODIFY col2 visible;

SELECT column_name, data_type, hidden_column
FROM user_tab_cols
WHERE table_name = 'TEST_INVIS';
```

Script Output ×   ▶ Query Result ×

📌 🖨 🔁 📋 SQL | All Rows Fetched: 2 in 0.017 seconds

	COLUMN_NAME	DATA_TYPE	HIDDEN_COLUMN
1	COL1	CHAR	NO
2	COL2	NUMBER	NO

Use 'visible' to make the invisible column visible.

Use 'invisible' to make the visible column invisible.

Renaming a Table

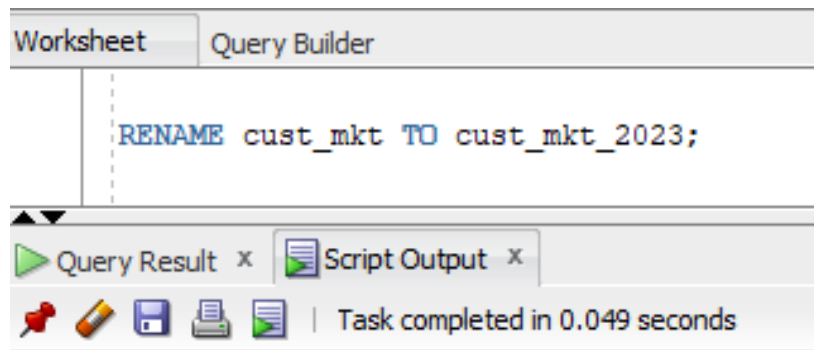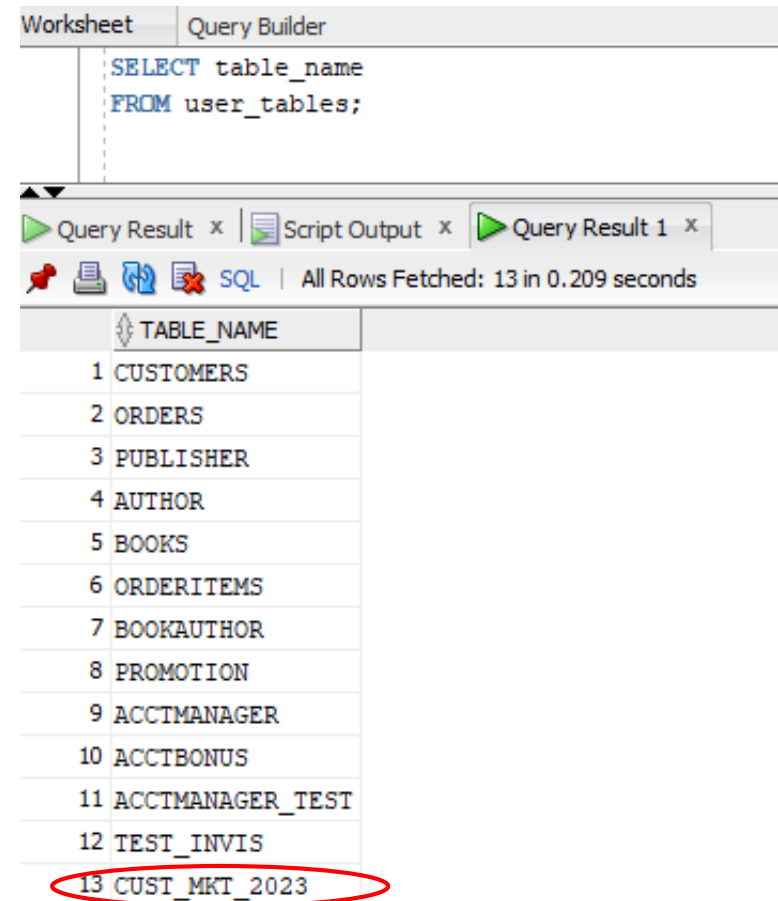- **RENAME…TO** is used to rename a table – the old name is no longer valid
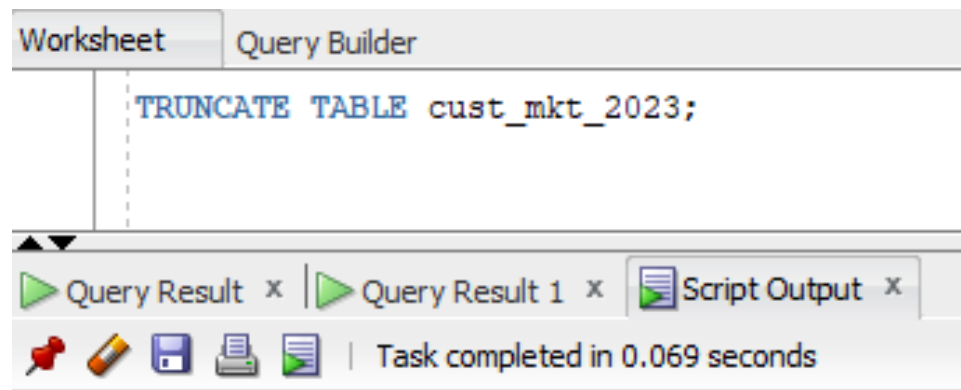
Truncating a Table

>> TRUNCATE TABLE command – all rows are deleted

>> Structure of the table remains


```
Worksheet    Query Builder

    TRUNCATE TABLE cust_mkt_2023;
```

Query Result × | Query Result 1 × | Script Output ×

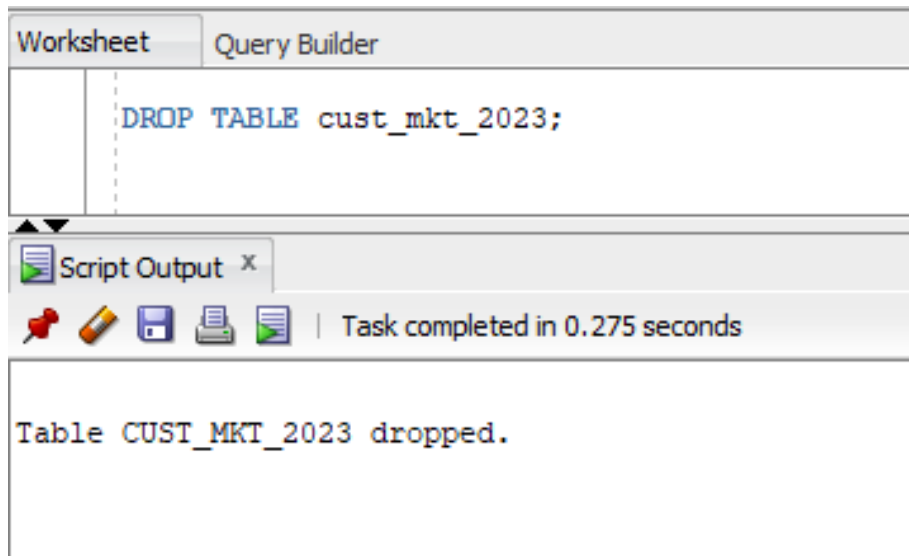Task completed in 0.069 seconds

```
Table CUST_MKT_2023 truncated.
```

>> What's the difference between 'Truncate Table' and 'Delete From' which deletes all rows in a table (DELETE FROM cust_mkt_2023;)?

Deleting a Table

- **DROP TABLE** command – table structure and contents are deleted

> DROP TABLE *tablename* [PURGE];

What if you dropped the wrong table?

DROP TABLE without Purge Option

» Dropped tables can be recovered from the recycle bin: both table structure and data


```
Worksheet    Query Builder

SELECT object_name, original_name
FROM recyclebin;
```

Script Output x   Query Result x

SQL | All Rows Fetched: 25 in 0.047 seconds

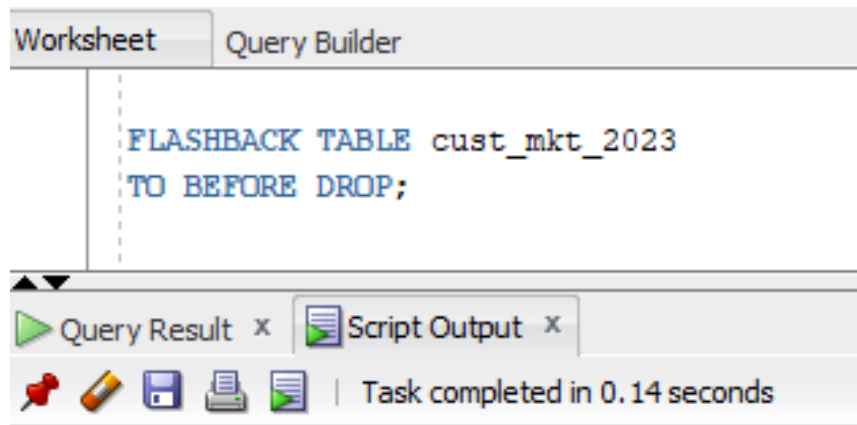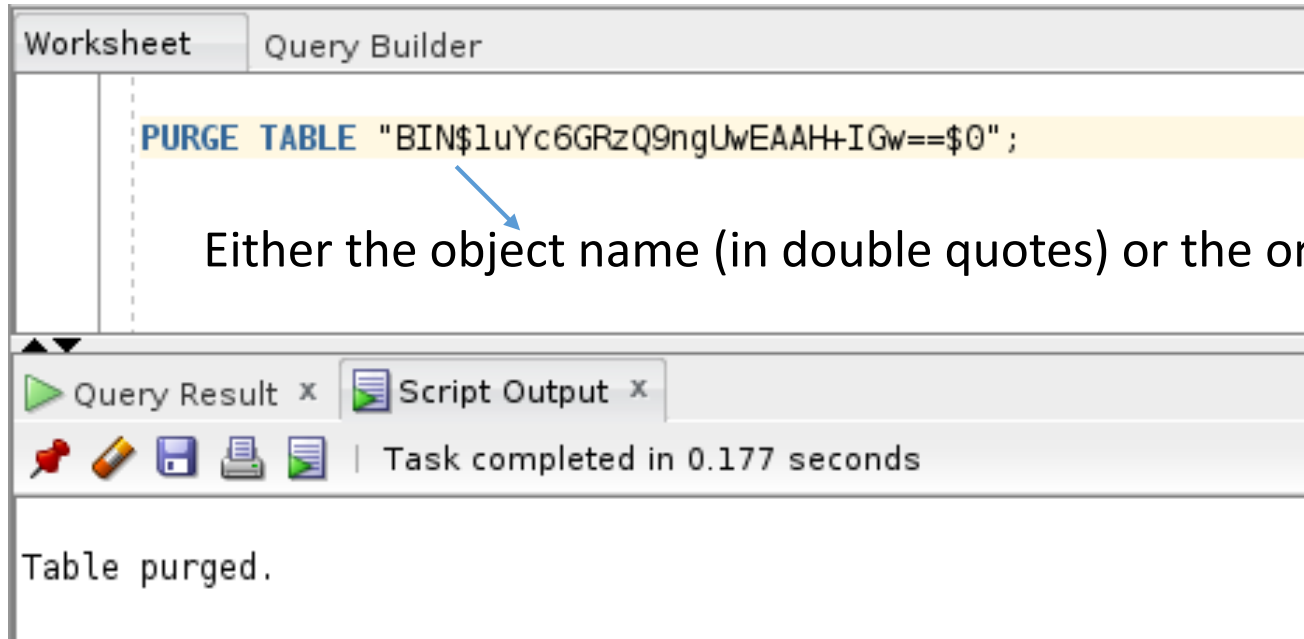|	OBJECT_NAME	ORIGINAL_NAME
23	BIN$81gFxtJ5sV7gUz0RAAovgA==$0	TEST_INVIS
24	BIN$81gFxtJ6sV7gUz0RAAovgA==$0	TEST_INVIS
25	BIN$81gFxtJ7sV7gUz0RAAovgA==$0	CUST_MKT_2023

I didn't use Purge, Yay!

FLASHBACK Command

» **FLASHBACK TABLE...TO BEFORE DROP** command recovers a table from the recycle bin

Use PURGE to Remove a Table from the Recycle Bin

Worksheet	Query Builder

```
PURGE TABLE "BIN$luYc6GRzQ9ngUwEAAH+IGw==$0";
```

Either the object name (in double quotes) or the original table name

▷ Query Result ✕ | ▣ Script Output ✕

📌 ✐ 💾 🖨 ▤ | Task completed in 0.177 seconds

Table purged.

- **PURGE TABLE** command permanently removes the table from the recycle bin.

- **PURGE RECYCLEBIN** removes all tables in the recycle bin.

PURGE Option for DROP TABLE Command

>> Using the **PURGE** option will **permanently remove** a table from the database

DROP TABLE *tablename* PURGE;
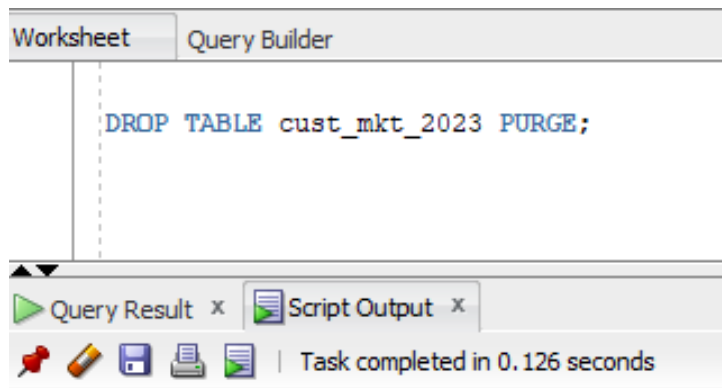
>> The table will not be copied into the recycle bin

Summary (1/2)

» You create a table with the CREATE TABLE command

» Each column to be contained in the table must be defined in terms of the column name, data type, and for certain data types, the width

» Each column name within a table must be unique

» You can change the structure of a table with the ALTER TABLE command

» Columns can be added, resized, and even deleted with the ALTER TABLE command

» Tables can be renamed with the RENAME…TO command

Summary (2/2)

» To delete all the rows in a table, use the TRUNCATE TABLE command

» To remove both the structure of a table and all its contents, use the DROP TABLE command

» A dropped table is moved to the recycle bin and can be recovered using the FLASHBACK TABLE command

» Use Purge Table *object_name* to permanently remove the table from the recycle bin

» Using the PURGE option in a DROP TABLE command permanently removes the table, meaning you cannot recover it from the recycle bin

Let's Check Our Knowledge!