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-----PRACTICAL 12-----

❖ AIM :

Suppose you are a data engineer working on a project that involves extracting data from IBM Cloud Object Storage and loading it into a DB2 database. The data in the Object Storage consists of CSV files containing sales records for various products. Your task is to load the data to DB2 and perform SQL queries on the loaded data.

Data Extraction and Loading:

Describe the steps you would take to extract data from IBM Cloud Object Storage.

Explain how you would establish a connection to the Object Storage service and retrieve the CSV files containing pizza orders records.

Outline the process of loading these CSV files into a DB2 database table.

Database Table Design:

Design a DB2 database table schema to store the orders records. Consider the structure of the CSV files and determine appropriate data types for each column.

SQL Queries and Analysis:

Provide SQL queries to perform the analyses on the loaded orders data

ADDITIONAL TASK:

Learn to host a static website on object storage and host your Portfolio or any sample static website of your own.

» Question 1: Describe the steps you would take to extract data from IBM Cloud Object Storage. Explain how you would establish a connection to the Object Storage service and retrieve the CSV files containing pizza orders records. Outline the process of loading these CSV files into a DB2 database table.

➡ To begin, create a custom bucket with the settings outlined in the provided screenshot.

➡ Open cloud object storage and create new bucket

Name	Public access	Location	Storage class	Created
tusharpractical7th	No	United States Geo (us-geo)	Smart Tier	2024-02-23 12:07 PM

➡ Select cross region , US Geo, smart tier than create bucket

➡ As we can see in below screenshot that bucket service is created Now click on upload & upload csv file provided by faculty In object:

➡ We can see csv file has been uploaded successfully.

➡ Generate credentials of cloud object storage. And set role as manager.

Go to instances and then go to service credentials to create :

The screenshot shows the 'Create Credentials' dialog box overlaid on the IBM Cloud interface. The dialog has fields for 'Name' (set to 'Tushar-Practical-12-Credentials'), 'Role' (set to 'Manager'), and a toggle switch for 'Include HMAC Credential' which is turned on. At the bottom, there are 'Cancel' and 'Add' buttons, with 'Add' being highlighted in blue. A note below the dialog says: 'the API key and secret, as well as connection information for the service.'

The screenshot shows the 'Service credentials' tab for the 'Cloud Object Storage-fz' instance. It lists one credential named 'Tushar-Practical-12-Credentials' created on '2024-04-14 10:52 PM'. The credential details are shown as a JSON snippet:

```
{
  "apikey": "CKxFu3C1MnAvf0f0f0f0f194x02j0Tb9fYtSj40Mzr-",
  "cos_hmac_keys": {
    "access_key_id": "0fff0fb1a13249e080ff51d57ceb5d1f",
    "secret_access_key": "22eedfd5576b030db43e5902f0be03b6218cd60e7d580ff43"
  },
  "endpoints": "https://control.cloud-object-storage.cloud.ibm.com/v2/endpoints",
  "iam_spiffe_description": "Auto-generated for key crn:v1:bluemix:public:cloud-object-storage:global:a/e38ea4cae9594ba29af53e3839877643:ccce7003c-f1dc-4838-8e43-2e1e88de207a:re-a132-49e9-8ef5-51d57ceb5d1f",
  "spiffe_id": "0fff0fb1-a132-49e9-8ef5-51d57ceb5d1f"
}
```

➡ We can see that our service credentials has been created successfully.

Now open Db2 UI. and select cloud object storage and enter access key from service credentials. And click on browse files.

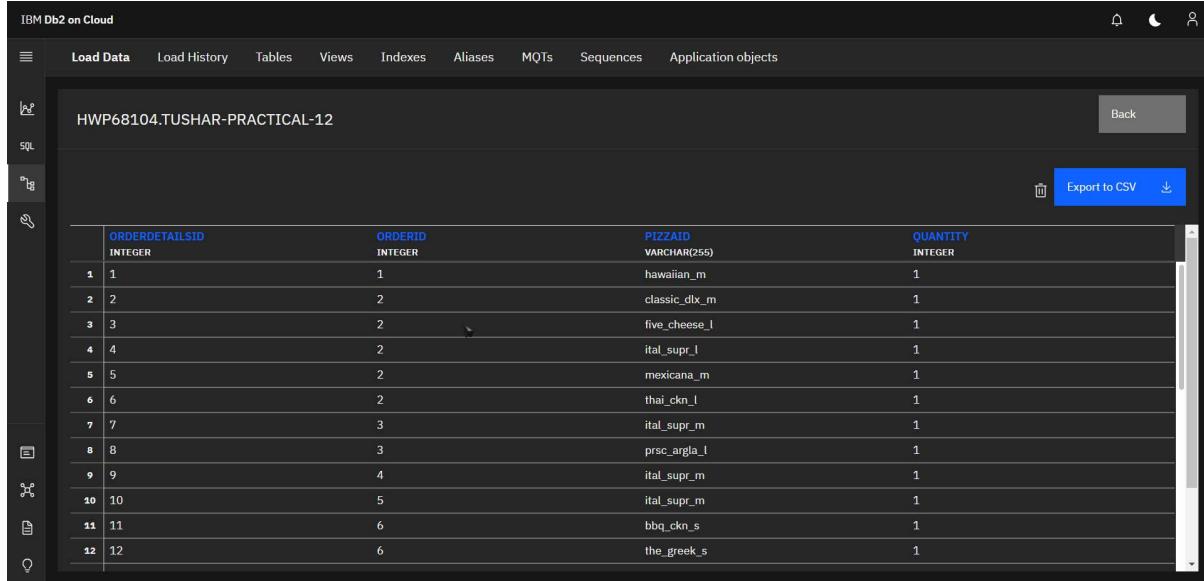
Then select our csv file from object storage that we created before:

➡ After selecting the CSV file containing our data, we proceed by clicking "Next" to initiate the table creation process

➡ Click on next then click on Overwrite table with new data.

➡ After that hit next and finalize it after that you will see like below.

Following that, we'll observe our table populated with the data from our CSV file.

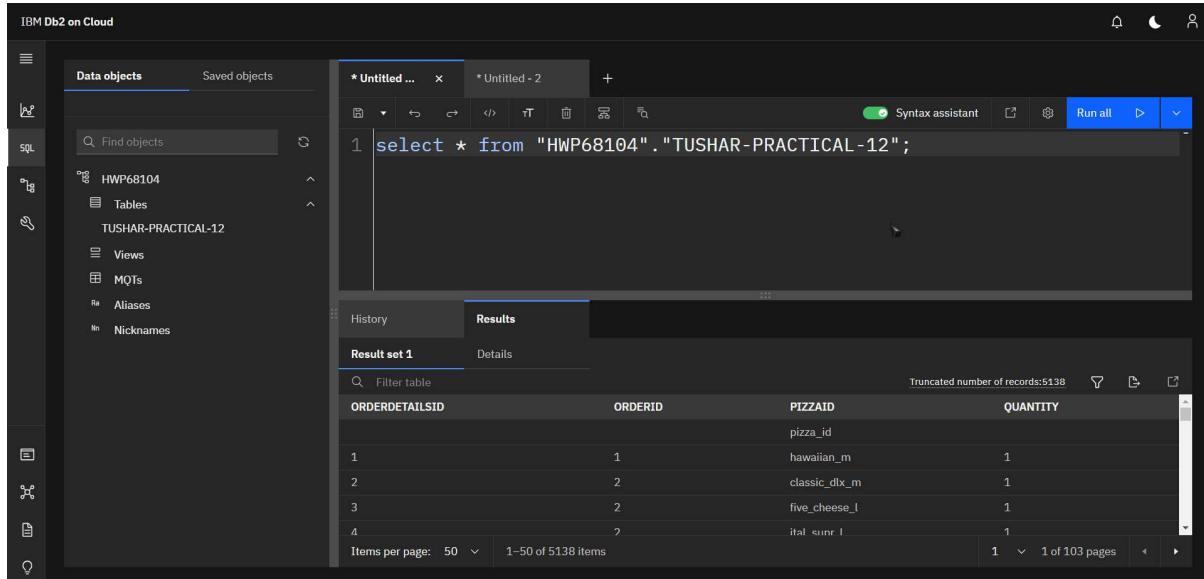


The screenshot shows the IBM Db2 on Cloud interface. The top navigation bar includes 'Load Data', 'Load History', 'Tables', 'Views', 'Indexes', 'Aliases', 'MQTs', 'Sequences', and 'Application objects'. Below this, a sub-menu for 'HWP68104.TUSHAR-PRACTICAL-12' is open, with 'Tables' selected. The main area displays the 'ORDERS' table with the following data:

	ORDERDETAILSID INTEGER	ORDERID INTEGER	PIZZAID VARCHAR(255)	QUANTITY INTEGER
1	1	1	hawaiian_m	1
2	2	2	classic_dlx_m	1
3	3	2	five_cheese_l	1
4	4	2	ital_supr_l	1
5	5	2	mexicana_m	1
6	6	2	thai_ckn_l	1
7	7	3	ital_supr_m	1
8	8	3	prsc_argla_l	1
9	9	4	ital_supr_m	1
10	10	5	ital_supr_m	1
11	11	6	bbq_ckn_s	1
12	12	6	the_greek_s	1

» **Question 2 : Provide SQL queries to perform the analyses on the loaded orders data.**

» Firstly I executed a query to display all the data in the table.



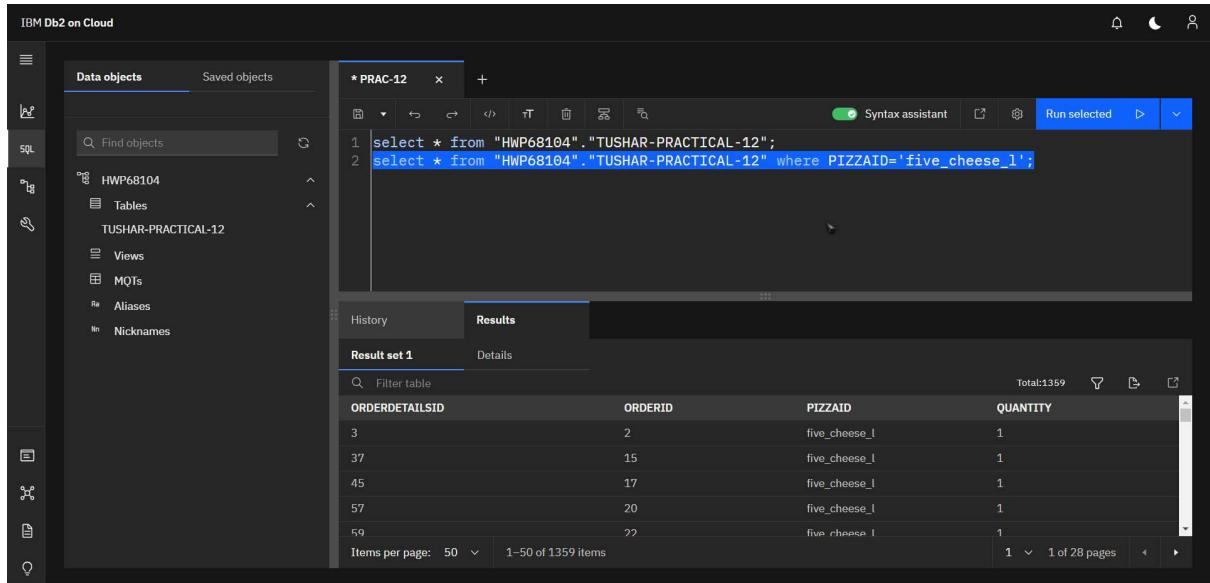
The screenshot shows the IBM Db2 on Cloud interface with a SQL query editor. The query is:

```
select * from "HWP68104"."TUSHAR-PRACTICAL-12";
```

The results pane shows the same data as the previous table:

	ORDERDETAILSID	ORDERID	PIZZAID	QUANTITY
1		1	pizza_id	
2		2	hawaiian_m	1
3		2	classic_dlx_m	1
4		2	five_cheese_l	1
5		2	ital_supr_l	1
6		2	mexicana_m	1
7		3	thai_ckn_l	1
8		3	ital_supr_m	1
9		4	prsc_argla_l	1
10		5	ital_supr_m	1
11		6	bbq_ckn_s	1
12		6	the_greek_s	1

➡ I executed a query to display data of specific PIZZAID.



The screenshot shows the IBM Db2 on Cloud interface. On the left, the sidebar displays 'Data objects' and 'Saved objects'. In the center, a query editor window titled 'PRAC-12' contains the following SQL code:

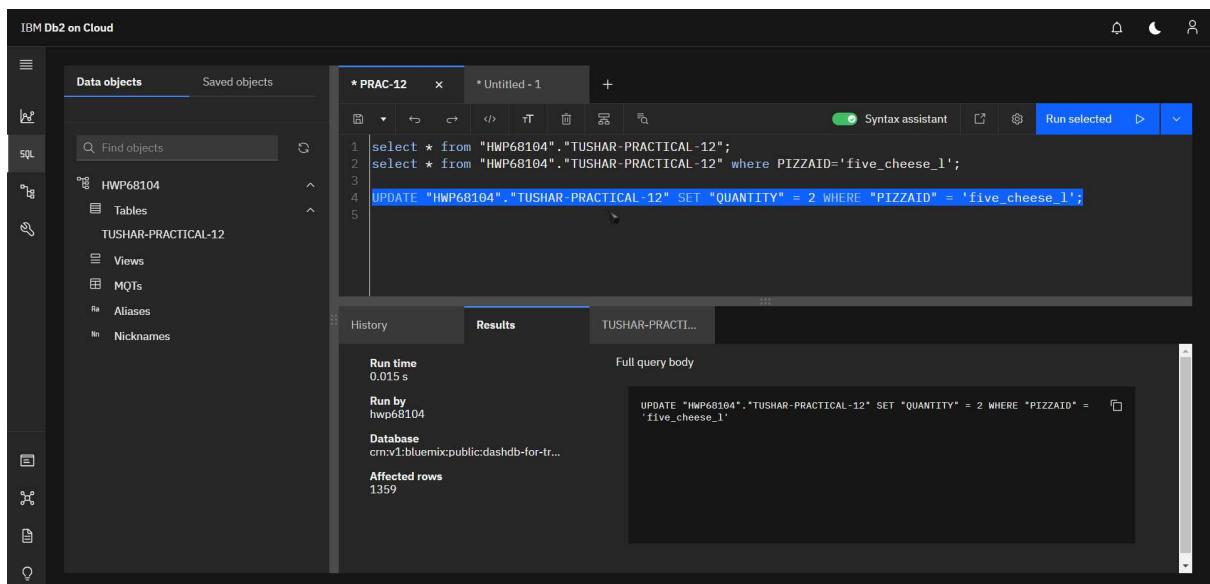
```
1 select * from "HWP68104"."TUSHAR-PRACTICAL-12";
2 select * from "HWP68104"."TUSHAR-PRACTICAL-12" where PIZZAID='five_cheese_1';
```

Below the editor, the 'Results' tab is selected, showing a table with the following data:

ORDERDETAILSID	ORDERID	PIZZAID	QUANTITY
3	2	five_cheese_1	1
37	15	five_cheese_1	1
45	17	five_cheese_1	1
57	20	five_cheese_1	1
59	22	five cheese_1	1

At the bottom of the results pane, it says 'Items per page: 50' and '1–50 of 1359 items'.

➡ I executed a query to update QUANTITY of specific PIZZAID. And we can see that QUANTITY is set 2 from 1.



The screenshot shows the IBM Db2 on Cloud interface. On the left, the sidebar displays 'Data objects' and 'Saved objects'. In the center, a query editor window titled 'PRAC-12' contains the following SQL code:

```
1 select * from "HWP68104"."TUSHAR-PRACTICAL-12";
2 select * from "HWP68104"."TUSHAR-PRACTICAL-12" where PIZZAID='five_cheese_1';
3
4 UPDATE "HWP68104"."TUSHAR-PRACTICAL-12" SET "QUANTITY" = 2 WHERE "PIZZAID" = 'five_cheese_1';
5
```

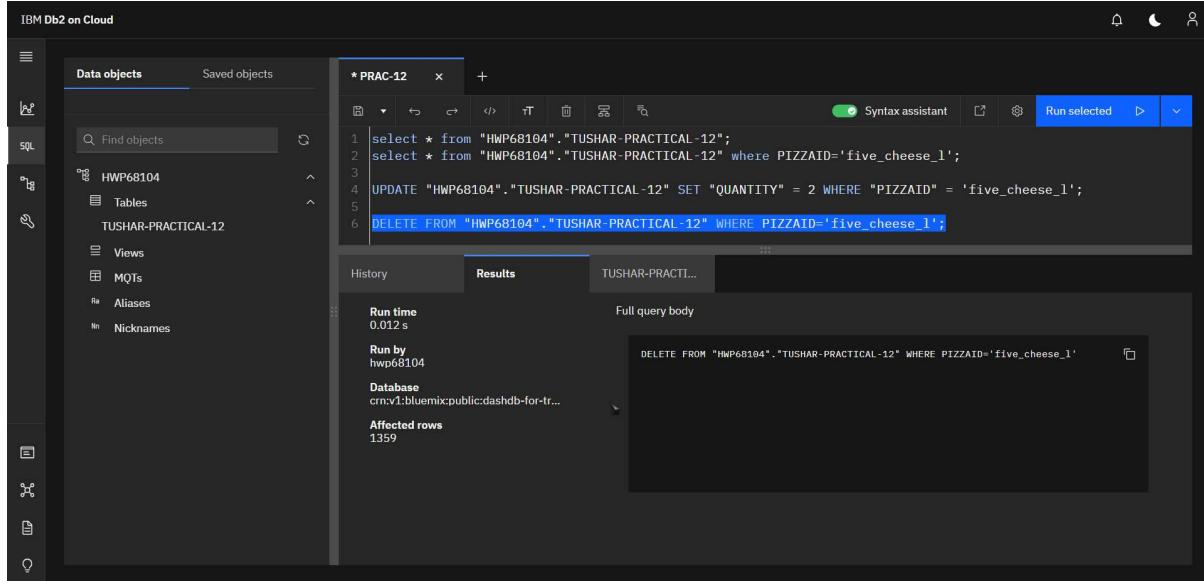
Below the editor, the 'Results' tab is selected, showing the following execution details:

- Run time: 0.015 s
- Run by: hwp68104
- Database: cmv1:bluemixpublic:dashdb-for-tr...
- Affected rows: 1359

In the bottom right pane, the 'Full query body' is displayed:

```
UPDATE "HWP68104"."TUSHAR-PRACTICAL-12" SET "QUANTITY" = 2 WHERE "PIZZAID" = 'five_cheese_1'
```

- ➡ I executed a query to delete specific PIZZAID. And we can see that PIZZAID is deleted.



The screenshot shows the IBM Db2 on Cloud interface. On the left, there's a sidebar with options like Data objects, Saved objects, SQL, Tables, Views, MQTs, Aliases, and Nicknames. The main area has a tab titled '* PRAC-12' where a SQL query is being run:

```

1 select * from "HWP68104"."TUSHAR-PRACTICAL-12";
2 select * from "HWP68104"."TUSHAR-PRACTICAL-12" where PIZZAID='five_cheese_1';
3
4 UPDATE "HWP68104"."TUSHAR-PRACTICAL-12" SET "QUANTITY" = 2 WHERE "PIZZAID" = 'five_cheese_1';
5
6 DELETE FROM "HWP68104"."TUSHAR-PRACTICAL-12" WHERE PIZZAID='five_cheese_1';

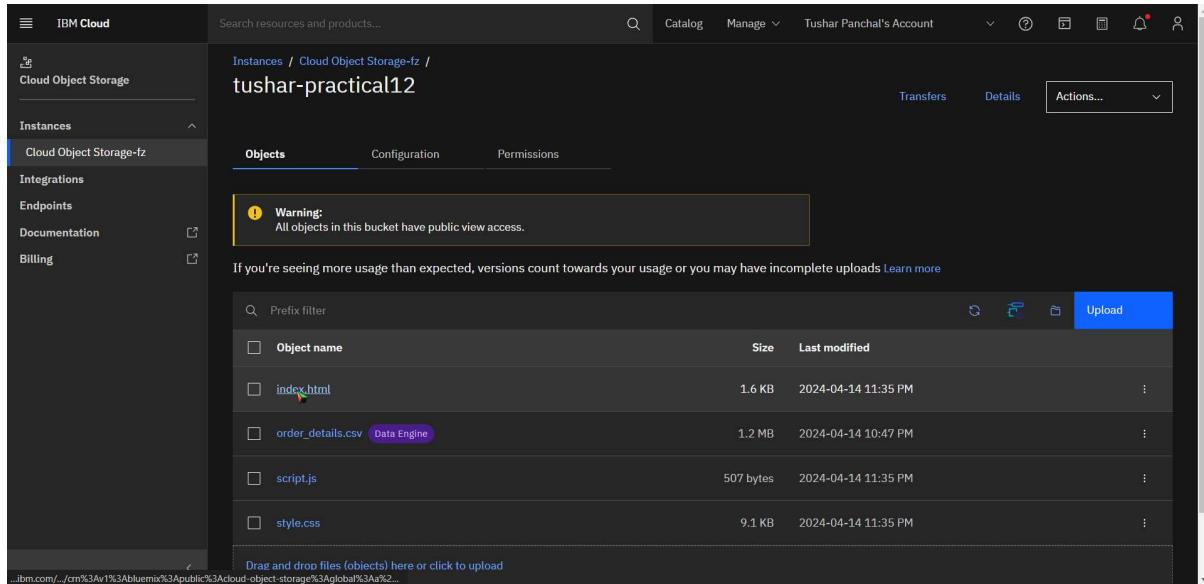
```

Below the query editor, there are tabs for History, Results, and TUSHAR-PRACTICAL-12. The Results tab shows the following details:

- Run time: 0.012 s
- Run by: hwp68104
- Database: crn:v1:bluemixpublic:dashdb-for-tr... (dashdb-for-tr-0000)
- Affected rows: 1359

» **ADDITIONAL TASK:**  **Learn to host a static website on object storage and host your Portfolio or any sample static website of your own.**

- ➡ Now go to object of bucket and click on static web hosting and upload index.html file and css ,etc.



The screenshot shows the IBM Cloud Object Storage interface. The left sidebar includes Cloud Object Storage, Instances, Cloud Object Storage-fz, Integrations, Endpoints, Documentation, and Billing. The main panel shows a bucket named 'tushar-practical12' under 'Instances / Cloud Object Storage-fz /'. The 'Objects' tab is selected, displaying a list of files:

Object name	Size	Last modified
index.html	1.6 KB	2024-04-14 11:35 PM
order_details.csv	1.2 MB	2024-04-14 10:47 PM
script.js	507 bytes	2024-04-14 11:35 PM
style.css	9.1 KB	2024-04-14 11:35 PM

A warning message states: "Warning: All objects in this bucket have public view access." Below the table, it says: "If you're seeing more usage than expected, versions count towards your usage or you may have incomplete uploads [Learn more](#)". At the bottom, there's a "Upload" button and a note: "Drag and drop files (objects) here or click to upload".

➡ now go on cloud object and go on public access and click on create access policy:

The screenshot shows the IBM Cloud interface for managing Cloud Object Storage. The left sidebar has 'Cloud Object Storage' selected. The main area shows 'Instances / Cloud Object Storage-fz / tushar-practical12'. The 'Permissions' tab is active. In the 'Bucket access policies' section, the 'Public access' tab is selected. A warning message states: 'Warning: Granting Public access to this bucket will allow anyone to access the bucket. To revoke public access, remove the "Public access" policy from this bucket within Access groups.' Below this, it says 'Status: Disabled' and 'Role for this bucket: Content Reader'. A blue 'Create access policy' button is present. Other sections like 'Context-based restrictions' and 'Firewall (legacy)' are also visible.

➡ Now turn on public access in configuration>static website hosting:

The screenshot shows the 'Static website hosting' configuration page for the 'tushar-practical12' bucket. The left sidebar has 'Cloud Object Storage' selected. The main area shows 'Static website hosting'. It says 'A static web site can be served directly from the bucket with public access or through using Cloud Internet Services in front of the bucket with public access.' Under 'Set a redirect rule type (optional)', 'Public access' is set to 'Enabled'. The 'Bucket website endpoint' field contains 'tushar-practical12.s3-web.us.cloud-object-storage.appdomain.cloud'. Below this, there's a 'Set routing rules' section with tabs for 'Manually Set' and 'Code Set'. At the bottom, there are fields for 'Error code returned' and 'Key prefix', along with an 'Add' button. The URL 'https://tushar-practical12.s3-web.us.cloud-object-storage.appdomain.cloud' is shown at the bottom.

➡ As we can see in below screenshot that code and a link is working perfectly loaded index.html:

