

## Hands-on Lab: Create Tables using SQL Scripts and Load Data into Tables

**Estimated time needed:** 30 minutes

In this lab, you will learn how to run SQL scripts to create several tables at once, as well as how to load data into tables from .csv files.

### Software Used in this Lab

In this lab, you will use [IBM Db2 Database](#). Db2 is a Relational Database Management System (RDBMS) from IBM, designed to store, analyze and retrieve the data efficiently.

To complete this lab you will utilize a Db2 database service on IBM Cloud. If you did not already complete this lab task earlier in this module, you will not yet have access to Db2 on IBM Cloud, and you will need to follow this lab first:

- [Hands-on Lab : Sign up for IBM Cloud, Create Db2 service instance and Get started with the Db2 console](#)

### Database Used in this Lab

The database used in this lab is an internal database. You will be working on a sample HR database. This HR database schema consists of 5 tables called **EMPLOYEES**, **JOB\_HISTORY**, **JOBS**, **DEPARTMENTS** and **LOCATIONS**. Each table has a few rows of sample data. The following diagram shows the tables for the HR database:

#### SAMPLE HR DATABASE TABLES

**EMPLOYEES**

EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS	JOB_ID	SALARY	MANAGER_ID	DEP_ID
E1001	John	Thomas	123456	1976-01-09	M	5631 Rice, OakPark,IL	100	100000	30001	2
E1002	Alice	James	123457	1972-07-31	F	980 Berry In, Elgin,IL	200	80000	30002	5
E1003	Steve	Wells	123458	1980-08-10	M	291 Springs, Gary,IL	300	50000	30002	5

**JOB\_HISTORY**

EMPL_ID	START_DATE	JOBS_ID	DEPT_ID
E1001	2000-01-30	100	2
E1002	2010-08-16	200	5
E1003	2016-08-10	300	5

**JOBS**

JOB_ID	JOB_TITLE	MIN_SALARY	MAX_SALARY
100	Sr. Architect	60000	100000
200	Sr. Software Developer	60000	80000
300	Jr. Software Developer	40000	60000

**DEPARTMENTS**

DEPT_ID	DEPT_NAME	MANAGER_ID	LOC_ID
2	Architect Group	30001	L0001
5	Software Development	30002	L0002
7	Design Team	30003	L0003

**LOCATIONS**

LOC_ID	DEPT_ID
L0001	2
L0002	5
L0003	7

### Objectives

After completing this lab, you will be able to:

- Create tables using SQL scripts
- Load data into tables

**NOTE : Make sure that you are using the CSV file and datasets from the same instruction file.**

### Exercise 1: Create tables using SQL scripts

In this exercise, you will learn how to execute a script containing the CREATE TABLE commands for all the tables rather than create each table manually by typing the DDL commands in the SQL editor.

1. Download the script file to your computer:
  - [HR Database Create Tables Script.sql](#)
2. Login to IBM Cloud and go to the [Resource List](#) where you can find the Db2 service instance that you created in a previous lab under **Services** section. Click on the Db2-xx service. Next, click on **Go to UI** button.

The screenshot shows the IBM Cloud console interface. At the top, there's a header with the IBM Cloud logo and a search bar. Below the header, the breadcrumb 'Resource list /' is visible. The main heading is 'Db2-x4' with a green checkmark and the word 'Active', followed by an 'Add tags' link. On the left, a 'Manage' sidebar lists 'Getting started', 'Service credentials', and 'Connections'. The main content area is titled 'Getting started' and contains the text: 'Where can I find my credentials? Get your username and password by clicking the "Service Credentials" link to the left and selecting "New Credentials".' At the bottom of this section are two buttons: 'Go to UI' (blue) and 'Getting started docs' (white with a blue border).

3. Click on **SQL** on the left corner and click the +icon

This screenshot shows the IBM Cloud SQL editor. On the left sidebar, the 'SQL' option is highlighted with a red box and a red circle labeled '1'. The main editor area has a tab labeled '\*Untitled - 1' with a red box and a red circle labeled '2' around the '+' icon used to create a new script. The editor includes a toolbar with various icons and a 'Syntax assistant' toggle on the right.

Select the **From File** option.

The screenshot shows the 'Add new script' dialog box. It has two tabs: 'Choose script source' (active) and 'Open a script to edit'. Under the 'Choose script source' tab, there are two buttons: 'From file' (highlighted with a red box) and 'Create new' (blue). Below this, there's a 'Templates' section with the text 'Choose a template to start your SQL editor.' and a grid of six template buttons: 'Template - Delete Statement', 'Template - Insert Statement', 'Template - Select Statement', 'Template - SQL Stored Procedure', 'Template - Update Statement', and 'Template - User Defined Function'.

4. Locate the file **HR\_Database\_Create\_Tables\_Script.sql** that you downloaded to your computer earlier and open it.
5. Once the statements are in the SQL Editor tool , you can run the queries against the database by selecting the **Run All** button.

**Run SQL**

\* HR\_Databa... x

⏏ ⏪ ⏩ </> ⏴ ⏵ 🔍 ☒ Syntax assistant ⏶ ⚙

```

37
38 CREATE TABLE JOBS (
39     JOB_IDENT CHAR(9) NOT NULL,
40     JOB_TITLE VARCHAR(30) ,
41     MIN_SALARY DECIMAL(10,2) ,
42     MAX_SALARY DECIMAL(10,2) ,
43     PRIMARY KEY (JOB_IDENT)
44 );
45
46 CREATE TABLE DEPARTMENTS (
47     DEPT_ID_DEP CHAR(9) NOT NULL,
48     DEP_NAME VARCHAR(15) ,
49     MANAGER_ID CHAR(9),
50     LOC_ID CHAR(9),
51     PRIMARY KEY (DEPT_ID_DEP)
52 );
53
54 CREATE TABLE LOCATIONS (
55     LOCT_ID CHAR(9) NOT NULL,
56     DEP_ID_LOC CHAR(9) NOT NULL,
57     PRIMARY KEY (LOCT_ID,DEP_ID_LOC)
58 );
59

```

Result - Feb 4

▼	✓	DI
▼	✓	DI
▼	✓	DI
▼	✓	--
▼	✓	CI
▼	✓	CI
▼	✓	CI
▼	✓	CI

Run all ▼ ☒ Remember my selection

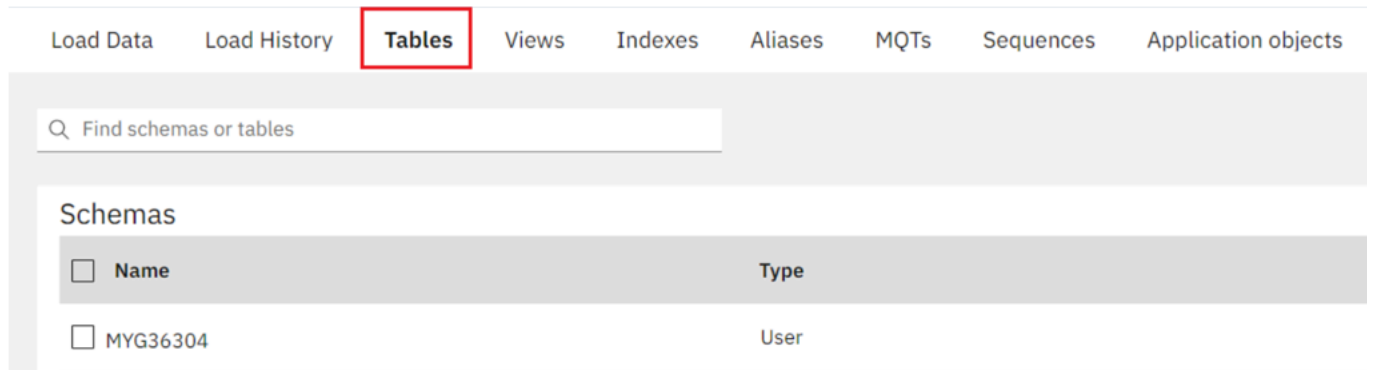
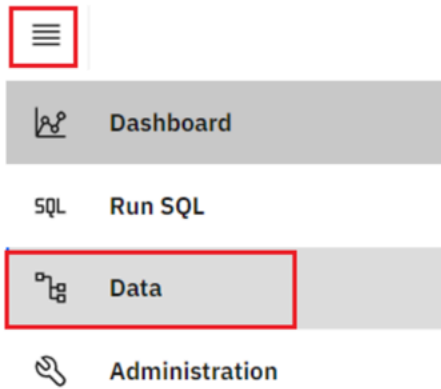
6. On the right side of the SQL editor window you will see a Result section. Clicking on a query in the Result section will show the execution details of the job like whether it ran successfully, or had any errors or warnings. Ensure your queries ran successfully and created all the tables.
  - **Note:** You may see several errors before the successful creation of the tables. These errors relate to the dropping (removal) of any pre-existing version of these tables. You can ignore these errors.

The screenshot shows an SQL IDE window titled "Run SQL". The main editor displays a script for the "HR\_Database" database. The script includes comments and SQL statements to drop existing tables and create new ones. The tables to be created are "EMPLOYEES" and "JOB\_HISTORY". The "EMPLOYEES" table has columns for EMP\_ID, F\_NAME, L\_NAME, SSN, B\_DATE, SEX, ADDRESS, JOB\_ID, SALARY, MANAGER\_ID, and DEP\_ID. The "JOB\_HISTORY" table has columns for EMPL\_ID and START\_DATE. The script is as follows:

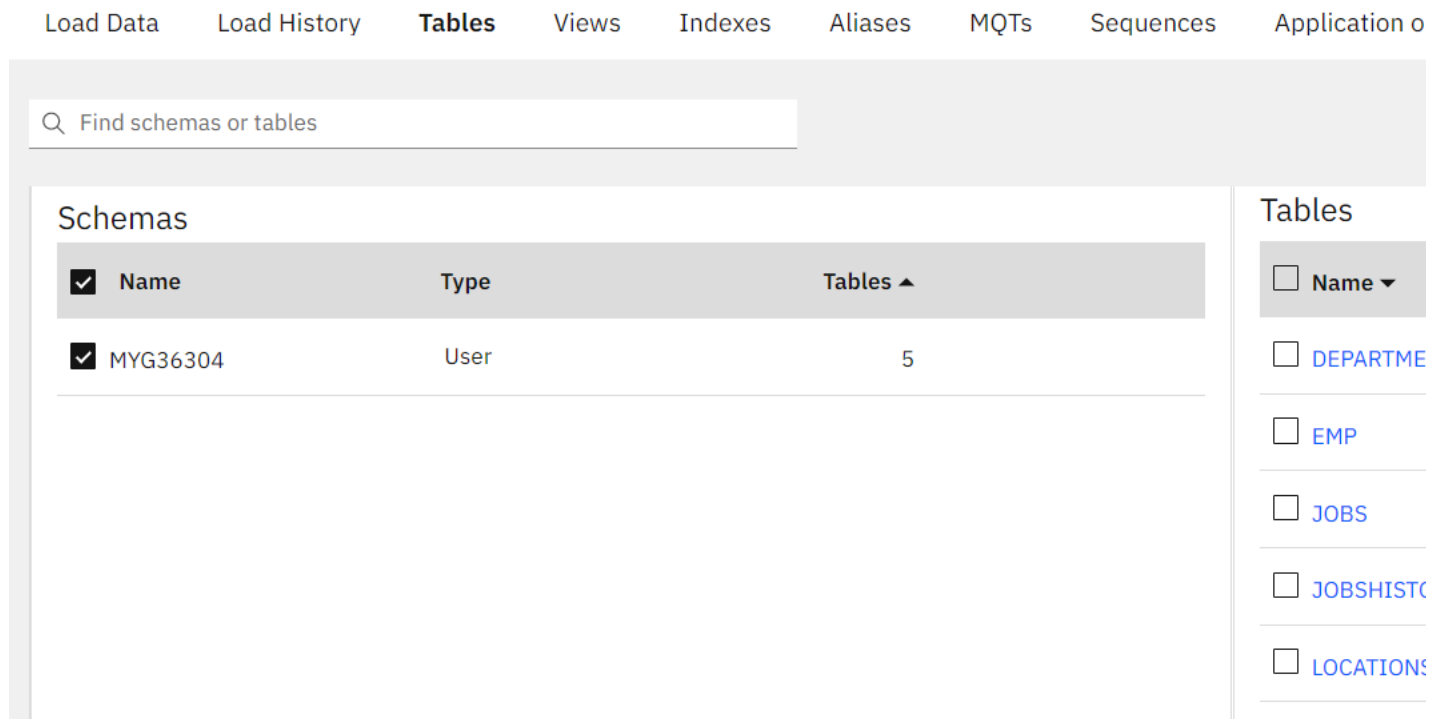
```
1  -----
2  --DDL statement for table 'HR' database--
3  -----
4
5  -- Drop the tables in case they exist
6
7  DROP TABLE EMPLOYEES;
8  DROP TABLE JOB_HISTORY;
9  DROP TABLE JOBS;
10 DROP TABLE DEPARTMENTS;
11 DROP TABLE LOCATIONS;
12
13 -- Create the tables
14
15 CREATE TABLE EMPLOYEES (
16     EMP_ID CHAR(9) NOT NULL,
17     F_NAME VARCHAR(15) NOT NULL,
18     L_NAME VARCHAR(15) NOT NULL,
19     SSN CHAR(9),
20     B_DATE DATE,
21     SEX CHAR,
22     ADDRESS VARCHAR(30),
23     JOB_ID CHAR(9),
24     SALARY DECIMAL(10,2),
25     MANAGER_ID CHAR(9),
26     DEP_ID CHAR(9) NOT NULL,
27     PRIMARY KEY (EMP_ID)
28 );
29
30 CREATE TABLE JOB_HISTORY (
31     EMPL_ID CHAR(9) NOT NULL,
32     START_DATE DATE,
```

The IDE interface includes a toolbar with icons for file operations, a "Syntax assistant" toggle, and a "Result - Ju" panel on the right. At the bottom, there is a "Run all" button and a checkbox labeled "Remember my selection".

7. Now you can look at the tables you created. Click on the data icon and then click on Tables tab



8. Select the Schema corresponding to your Db2 userid. It typically starts with 3 letters (not SQL) followed by 5 numbers (but will be different from the **MYG36304** example below). Then on the right side of the screen you should see the 5 newly created tables listed RTMENTS, EMPLOYEES, JOBS, JOB\_HISTORY and LOCATIONS (plus any other tables you may have created in previous labs e.g. PETSAL, PETRESCUE, etc.).



9. Click on any of the tables and you will see its Table Definition (that is, its list of columns, data types, etc).

Find schemas or tables

Schemas

Tables

New table +

<input type="checkbox"/> Name ▼	Schema	Properties
<input type="checkbox"/> DEPARTMENTS	MYG36304	...
<input type="checkbox"/> EMPLOYEES	MYG36304	...
<input type="checkbox"/> INSTRUCTOR	MYG36304	...
<input type="checkbox"/> JOBS	MYG36304	...
<input type="checkbox"/> JOBSHISTORY	MYG36304	...
<input type="checkbox"/> LOCATIONS	MYG36304	...

Total: 6, selected: 0

Table definition

EMPLOYEES

Name

EMP\_ID

F\_NAME

L\_NAME

SSN

B\_DATE

SEX

ADDRESS

◀

View data

## Exercise 2: Load data into tables

In this exercise, you will learn how data can be loaded into Db2. You could manually insert each row into the table one by one, but that would take a long time. Instead, Db2 (and almost every other database) allows you to load data from .CSV files.

The steps below explain the process of loading data into the tables you created earlier in exercise 1.

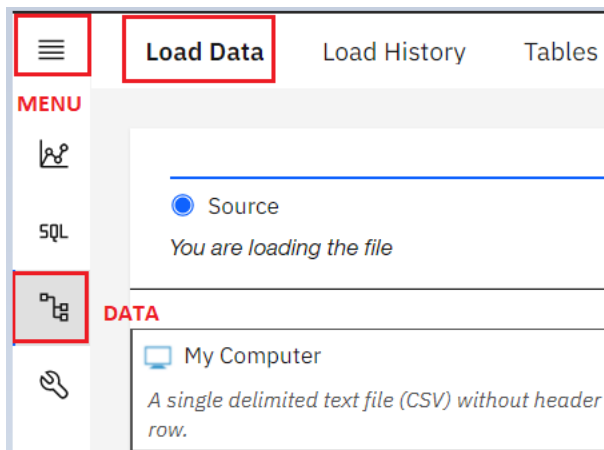
1. Download the 5 .csv files below to your local computer:

- [Departments.csv](#)
- [Employees.csv](#)
- [Jobs.csv](#)
- [Locations.csv](#)
- [JobsHistory.csv](#)

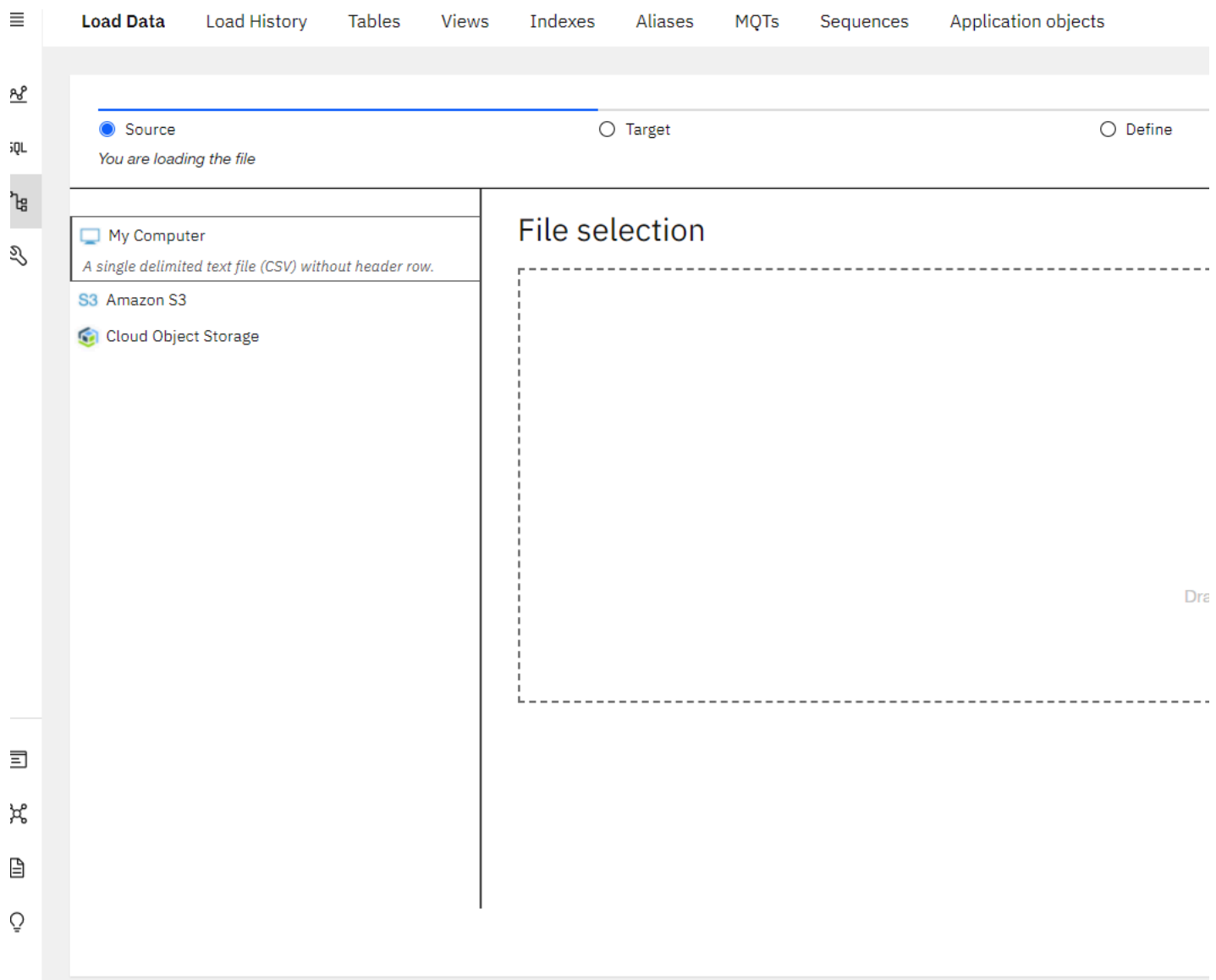
**Note:** For learners who are encountering issues with loading from .csv in Db2 using Firefox, they can download the .txt files and try with those. To download the .txt files, simply right-click on the file and select **Save link As** and save the file in local system.

- Departments.txt
- Employees.txt
- Jobs.txt
- Locations.txt
- JobsHistory.txt

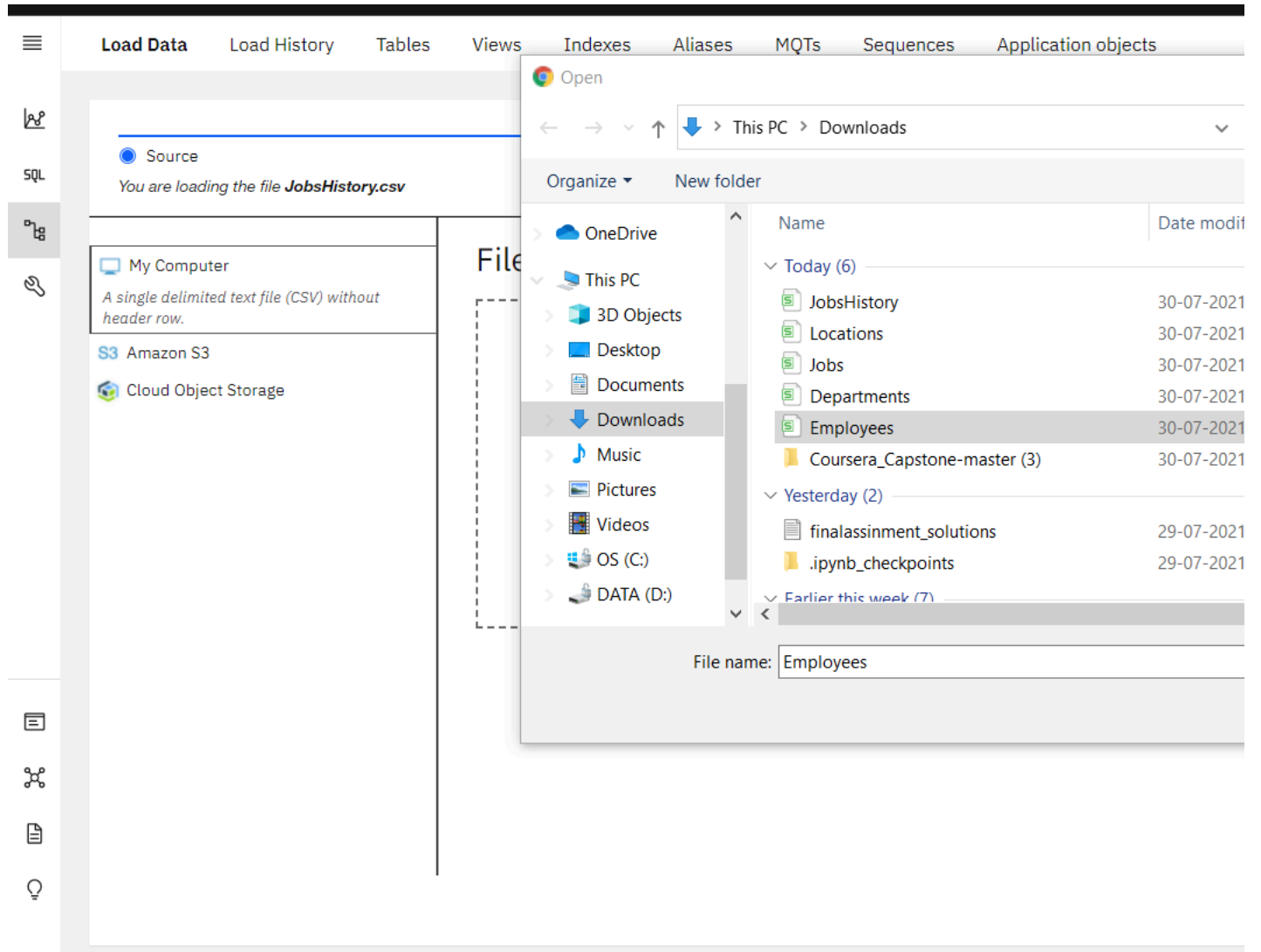
2. In the Db2 Console, from the 3-bar menu icon in the top left corner, click **Load**, and then select **Load Data**.



3. On the **Load Data** page that opens, ensure **My Computer** is selected as the source. Click on the **browse files** link.



4. Choose the file **Employees.csv** that you downloaded to your computer and click **Open**.




5. Once the File is selected, click **Next** in the bottom right corner.




**Load Data** Load History Tables Views Indexes Aliases MQTs Sequences Application objects


☒ Source ☐ Target ☐ Define

You are loading the file **Employees.csv**


 My Computer

A single delimited text file (CSV) without header row.

 Amazon S3

 Cloud Object Storage

## File selection



Drag a file here or [browse files](#)

6. Select the schema for your Db2 Userid (the one where you created the tables earlier). It will show all the tables that have been created in this schema previously, including the Employees table. Select the **EMPLOYEES** table, and in the new Table Definition tab that appears, choose **Overwrite table with new data** (note the warning message), then click **Next**. Select the **Employees** table.

**Load Data** Load History Tables Views Indexes Aliases MQTs Sequences Application objects

☒ Source

☒ Target

☐ Define

You are loading the file **Employees.csv** into **HYL83142.EMPLOYEES**

### Select a load target

#### Schema

Find schemas

HYL83142	<input checked="" type="radio"/>
----------	----------------------------------

#### Table

Find tables in HYL83142

DEPARTMENTS
EMPLOYEES
JOBS
JOB_HISTORY
LOCATIONS

7. Since the source data files do not contain any rows with column labels, **turn off** the setting for **Header in first row**.

☰

SQL

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💡

Load Data

Load History

Tables

Views

Indexes

Aliases

MQTs

Sequences

Application objects

☑ Source

☑ Target

● Define

You are loading the file **Employees.csv** into **HYL83142.EMPLOYEES**

Code page (character encoding): 1208 (UTF-8) ✓ ⓘ

Separator: ,

Header in first row: ☐

Date format: YYYY-MM-DD ✓ ⓘ

Time format: HH:MM:SS ✓ ⓘ

Timestamp format: YYYY-MM

	EMP_ID CHARACTER	F_NAME VARCHAR	L_NAME VARCHAR	SSN CHARACTER	B_DATE DATE	SEX CHA
1	E1001	John	Thomas	123456	01/09/1976	M
2	E1002	Alice	James	123457	07/31/1972	F
3	E1003	Steve	Wells	123458	08/10/1980	M
4	E1004	Santosh	Kumar	123459	07/20/1985	M
5	E1005	Ahmed	Hussain	123410	01/04/1981	M
6	E1006	Nancy	Allen	123411	02/06/1978	F
7	E1007	Mary	Thomas	123412	05/05/1975	F
8	E1008	Bharath	Gupta	123413	05/06/1985	M
9	E1009	Andrea	Jones	123414	07/09/1990	F
10	E1010	Ann	Jacob	123415	03/30/1982	F

8. Click **Next**. Review the load settings and click **Begin Load** in the bottom right corner.

☒ Source☒ Target☒ Define

You are loading the file **Employees.csv** into **HYL83142.EMPLOYEES**

## Review settings

### Summary

Code page: 1208 (Default)

Separator: , (Default)

Time format: HH:MM:SS (Default)

Date format: YYYY-MM-DD (Default)

Timestamp format: YYYY-MM-DD HH:MM:SS (Default)

String delimiter: (Default)

### Option

Maximum number of v

1000

9. After loading has completed, you will notice that you were successful in loading all 10 rows of the Employees table. If there are any **Errors** or **Warnings**, you can see them on this screen.

Load details



My computer	Target
Employees.csv	HYL83142.EMPLOYEES

Status

Settings



<b>10</b>	<b>10</b>	<b>0</b>
Rows read	Rows loaded	Rows rejected

Start time  
07/30/2021 3:51:29 PM  
End time  
07/30/2021 3:51:34 PM

The data load job succeeded  
You can now work with your data.

10. Click on the **Tables** tab and then select the **EMPLOYEES** table and then click on **View data**.

The screenshot shows a database management interface with a top navigation bar containing 'Load Data', 'Load History', 'Tables' (highlighted with a red box), 'Views', 'Indexes', 'Aliases', 'MQTs', 'Sequences', and 'Application objects'. Below this is a search bar labeled 'Find schemas or tables'. On the left, a sidebar shows 'Schemas' and 'SQL' tabs. The main area displays a table list with columns 'Name', 'Schema', and 'Properties'. The 'EMPLOYEES' table is selected, indicated by a red box around its row. At the bottom right, a 'View' button is highlighted with a red box. The status bar at the bottom indicates 'Total: 5, selected: 1'.

Name	Schema	Properties
<input type="checkbox"/> DEPARTMENTS	HYL83142	...
<input checked="" type="checkbox"/> EMPLOYEES	HYL83142	...
<input type="checkbox"/> JOBS	HYL83142	...
<input type="checkbox"/> JOB_HISTORY	HYL83142	...
<input type="checkbox"/> LOCATIONS	HYL83142	...

Total: 5, selected: 1

11. Now you can view the table data.



Load Data

Load History

**Tables**

Views

Indexes

Aliases

MQTs

Sequences

Application objects



HYL83142.EMPLOYEEES

SQL



EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS
E1001	John	Thomas	123456	1976-01-09	M	5631 Rice, OakPark
E1002	Alice	James	123457	1972-07-31	F	980 Berry Ln, Elgin,
E1003	Steve	Wells	123458	1980-08-10	M	291 Springs, Gary,I
E1004	Santosh	Kumar	123459	1985-07-20	M	511 Aurora Av, Auro
E1005	Ahmed	Hussain	123410	1981-01-04	M	216 Oak Tree, Gene
E1006	Nancy	Allen	123411	1978-02-06	F	111 Green Pl, Elgin,
E1007	Mary	Thomas	123412	1975-05-05	F	100 Rose Pl, Gary,I
E1008	Bharath	Gupta	123413	1985-05-06	M	145 Berry Ln, Nape
E1009	Andrea	Jones	123414	1990-07-09	F	120 Fall Creek, Gar
E1010	Ann	Jacob	123415	1982-03-30	F	111 Britany Springs

12. Now it's your turn to load data to the remaining 4 tables of the HR database **LOCATIONS**, **JOB\_HISTORY**, **JOBS**, and **DEPARTMENTS** from the remaining source files.

13. Click **Load More Data** and then follow the steps from **Step 3** above again to load the remaining 4 tables.  
**IMPORTANT** Make sure you perform the steps in **Step 7** for each of the 4 remaining file loads.

**Congratulations! You have completed this lab, and you are ready for the next topic.**

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# Skills Network