



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 Ln, 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
5	Software	30004	L0004

LOCATIONS

LOC_ID	DEPT_ID	LOC
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

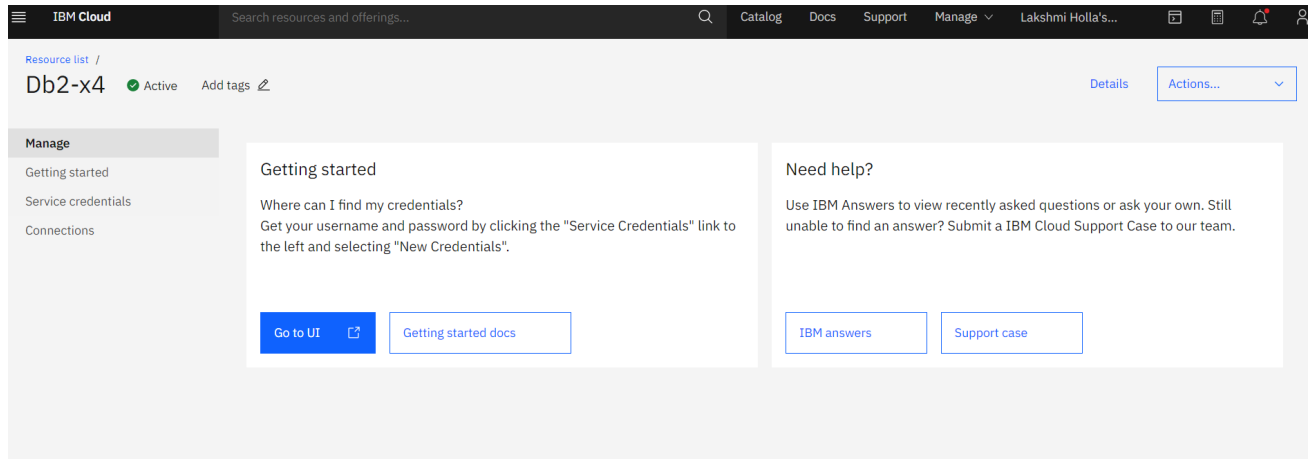
Exercise 1: Create tables using SQL scripts

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.

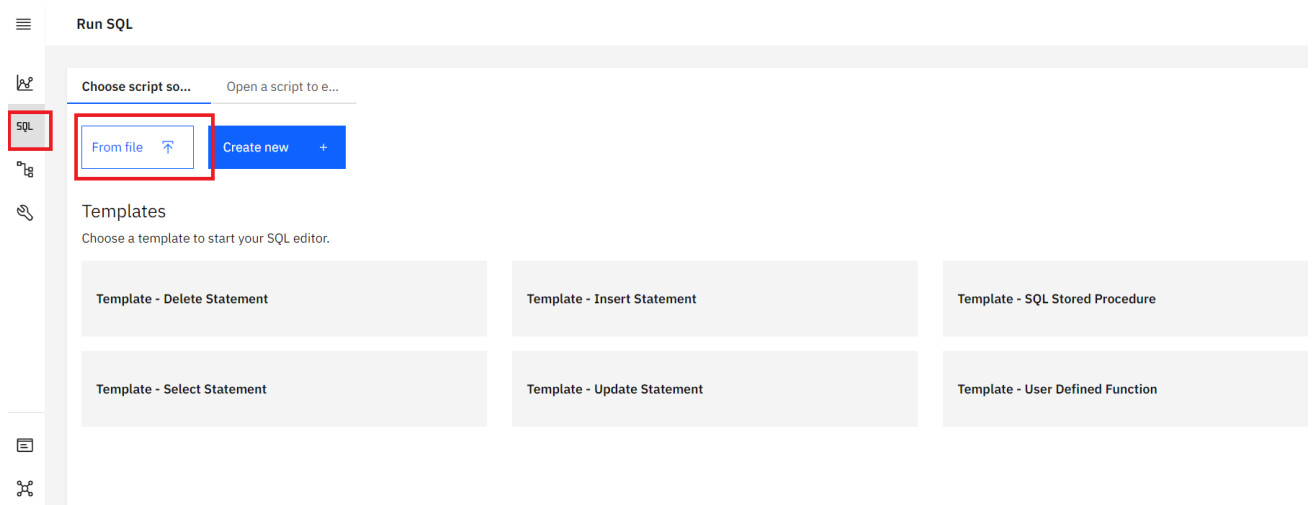
1. Download the script file to your computer:

- [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.



3. Click on Run SQL on the left corner and select the from file option.



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.

image

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.

Run SQL

HR_Databa... x

SQL Syntax assistant

```

1 --DDL statement for table 'HR' database--
2
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(38),
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     EMP_ID CHAR(9) NOT NULL,
32     START_DATE DATE,

```

Run all Remember my selection

Result - Jul 30, 2021 3:07:47 PM

DDL statement for table 'HR' dat... Run time: 0.035 s

Status: Failed

Error message

"HYL83142.EMPLOYEES" is an undefined name. SQLCODE=-204, SQLSTATE=42704, DRIVER=4.27.25

Learn more about this error

DROP TABLE JOB_HISTORY Run time: 0.022 s

DROP TABLE JOBS Run time: 0.024 s

DROP TABLE DEPARTMENTS Run time: 0.022 s

DROP TABLE LOCATIONS Run time: 0.025 s

-- Create the tables CREATE TABLE EMPLOYEES (EMP_ID CHAR(9) NOT ... Run time: 0.214 s

CREATE TABLE JOB_HISTORY (EMPL_ID CHAR(9) NOT NULL, START_DA... Run time: 0.213 s

CREATE TABLE JOBS (JOB_IDENT CHAR(9) NOT NULL, JOB_TITLE VAR... Run time: 0.242 s

CREATE TABLE DEPARTMENTS (DEPT_ID_DEP CHAR(9) NOT NULL, DEP... Run time: 0.261 s

CREATE TABLE LOCATIONS (LOCT_ID CHAR(9) NOT NULL, DEP_ID_LOC ... Run time: 0.290 s

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

Dashboard

SQL Run SQL

Data

Administration

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

Find schemas or tables

Schemas

Name	Type
MYG36304	User

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 – DEPARTMENTS, EMPLOYEES, JOBS, JOB_HISTORY and LOCATIONS (plus any other tables you may have created in previous labs e.g. PETALE, PETRESCUE, etc.).

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

Find schemas or tables Refresh

Schemas

Name	Type	Tables
MYG36304	User	5

Tables

Name	Schema	Properties
DEPARTMENTS	MYG36304	...
EMP	MYG36304	...
JOBS	MYG36304	...
JOBSHISTORY	MYG36304	...
LOCATIONS	MYG36304	...

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

The screenshot shows the Db2 console interface. On the left, a sidebar lists schemas, and a main panel shows a list of tables under the 'MYG36304' schema. The tables are: DEPARTMENTS, EMPLOYEES, INSTRUCTOR, JOBS, JOBSHISTORY, and LOCATIONS. The 'EMPLOYEES' table is selected. On the right, the 'Table definition' panel for 'EMPLOYEES' is displayed, showing the following columns and their properties:

Name	Data type	Nullable	Length	Scale
EMP_ID	CHAR	N	9	0
F_NAME	VARCHAR	N	15	0
L_NAME	VARCHAR	N	15	0
SSN	CHAR	Y	9	0
B_DATE	DATE	Y	4	0
SEX	CHAR	Y	1	0
ADDRESS	VARCHAR	Y	30	0

At the bottom of the table definition panel, there is a 'View data' button.

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.

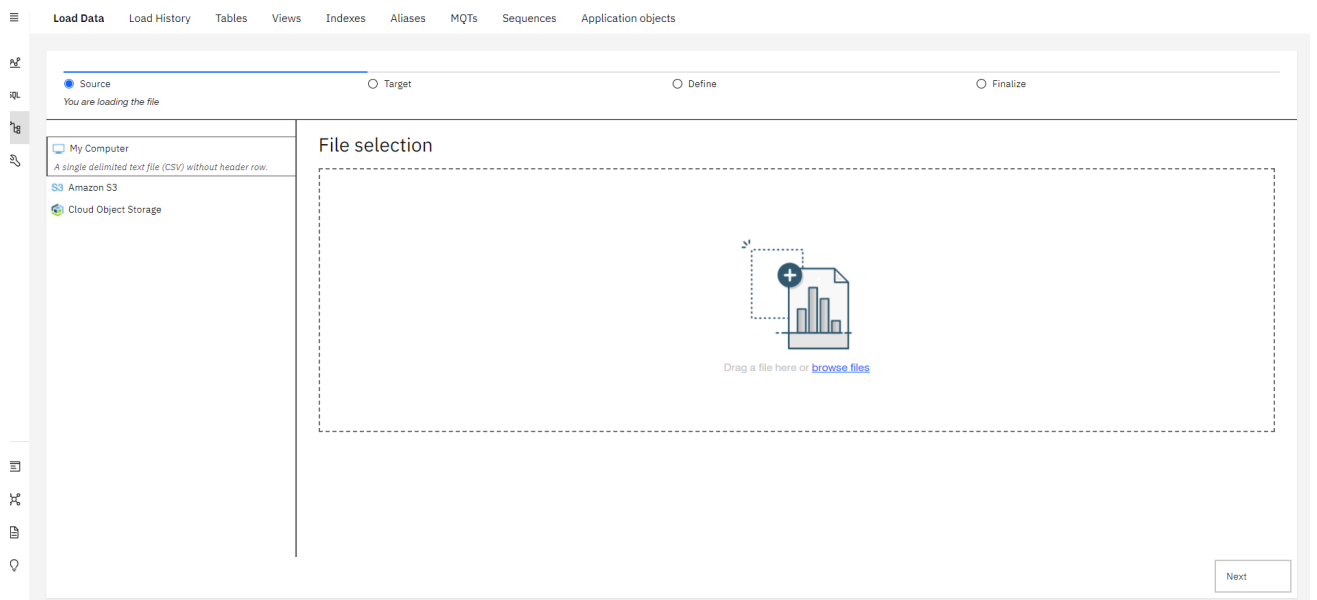
1. Download the 5 .csv files below to your local computer:

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

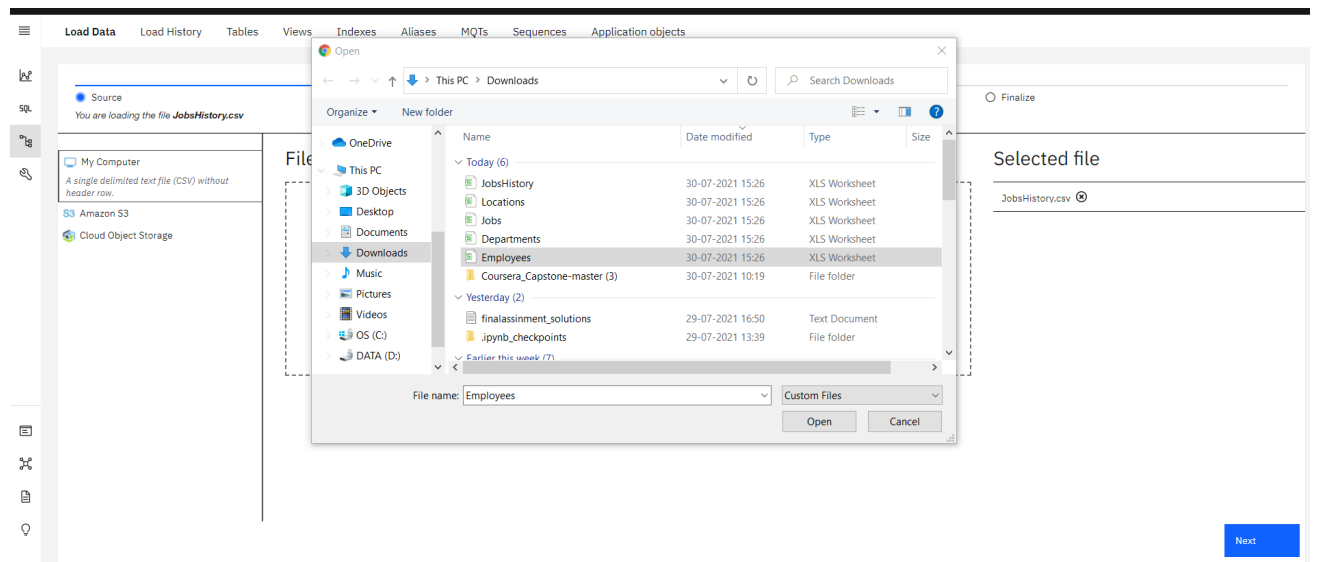
2. In the Db2 Console, from the 3-bar menu icon in the top left corner, click **Load**, and then select **Load Data**.

The screenshot shows the 'Load Data' page in the Db2 console. The 'Load Data' button is highlighted in the top navigation bar. The page is divided into two main sections: 'MENU' and 'DATA'. The 'MENU' section contains a 'Source' radio button and the text 'You are loading the file'. The 'DATA' section contains a 'My Computer' radio button and the text 'A single delimited text file (CSV) without header row.'.

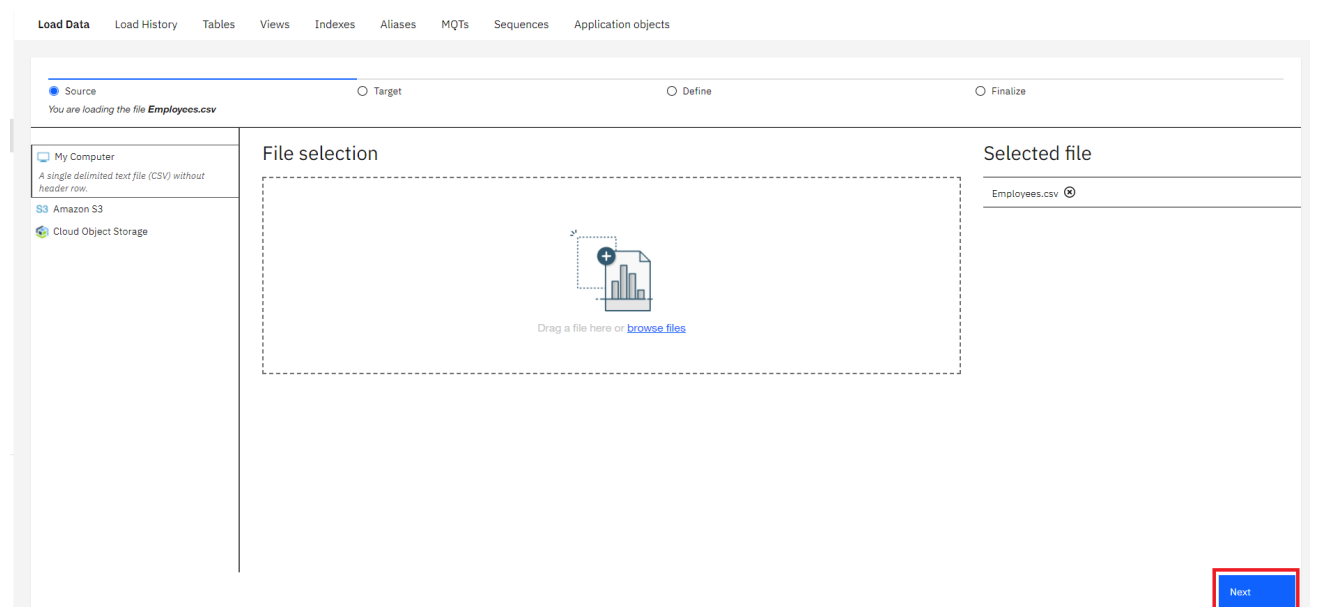
3. On the **Load Data** page that opens, ensure **My Computer** is selected as the source. Click on the **browse files** link.



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



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



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 | Finalize

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

Select a load target

Schema

Find schemas

HYL83142

Table

Find tables in HYL83142

DEPARTMENTS

EMPLOYEES

JOBS

JOB_HISTORY

LOCATIONS

Table definition

EMPLOYEES

Updated on 7/30/2021 at 3:09:45 PM

overwrite_option

Append new data

Overwrite table with new data

All existing data will be deleted from the table whether or not the loading action completes successfully.

COLUMN NAME	DATA TYPE	NULLABLE
EMP_ID	CHARACTER	
F_NAME	VARCHAR	
L_NAME	VARCHAR	
SSN	CHARACTER	Y
B_DATE	DATE	Y
SEX	CHARACTER	Y

Back | Next

7. Since the source data files do not contain any rows with column labels, **turn off** the setting for **Header in first row**. Also, click on the down arrow next to **Date format** and choose **MM/DD/YYYY** since that is how the date is formatted in the source file.

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

Source | Target | Define | Finalize

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

Code page (character encoding): 1208 (UTF-8) | Separator: , | Header in first row: ☐ | Time & date format: ☐

Date format: YYYY-MM-DD | Time format: HH:MM:SS | Timestamp format: YYYY-MM-DD HH:MM:SS

EMP_ID	F_NAME	L_NAME	SSN	B_DATE	SEX	ADDRESS	JOB_ID	SALARY	
CHARACTER	VARCHAR	VARCHAR	CHARACTER	DATE	CHARACTER	VARCHAR	CHARACTER	DECIMAL	
1	E1001	John	Thomas	123456	01/09/1976	M	5631 Rice, OakPark,IL	100	100000
2	E1002	Alice	James	123457	07/31/1972	F	980 Berry Ln, Elgin,IL	200	80000
3	E1003	Steve	Wells	123458	08/10/1980	M	291 Springs, Gary,IL	300	50000
4	E1004	Santosh	Kumar	123459	07/20/1985	M	511 Aurora Av, Aurora,IL	400	60000
5	E1005	Ahmed	Hussain	123410	01/04/1981	M	216 Oak Tree, Geneva,IL	500	70000
6	E1006	Nancy	Allen	123411	02/06/1978	F	111 Green Pl, Elgin,IL	600	90000
7	E1007	Mary	Thomas	123412	05/05/1975	F	100 Rose Pl, Gary,IL	650	65000
8	E1008	Bharath	Gupta	123413	05/06/1985	M	145 Berry Ln, Naperville,IL	660	65000
9	E1009	Andrea	Jones	123414	07/09/1990	F	120 Fall Creek, Gary,IL	234	70000
10	E1010	Ann	Jacob	123415	03/30/1982	F	111 Britany Springs,Elgin,IL	220	70000

Back | Next

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

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

Source Target Define **Finalize**

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 warnings

1000

[Back](#)
[Begin Load](#)

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

[View Table](#)
[Load More Data](#)

10

Rows read

10

Rows loaded

0

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.

Errors

Warnings

No errors

But, there is 1 warning.

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

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

Find schemas or tables

Tables

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

View data

Table definition

EMPLOYEES

Name	Data type	Nullable	Length	Scale
EMP_ID	CHAR	N	9	0
F_NAME	VARCHAR	N	15	0
L_NAME	VARCHAR	N	15	0
SSN	CHAR	Y	9	0
B_DATE	DATE	Y	4	0
SEX	CHAR	Y	1	0
ADDRESS	VARCHAR	Y	30	0
JOB_ID	CHAR	Y	9	0
SALARY	DECIMAL	Y	10	2
MANAGER_ID	CHAR	Y	9	0
DEP_ID	CHAR	N	9	0

11. Now you can view the table data.

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

HYL83142.EMPLOYEES

Back

Export to CSV

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	100000.00	30001	2
E1002	Alice	James	123457	1972-07-31	F	980 Berry Ln, Elgin,IL	200	80000.00	30002	5
E1003	Steve	Wells	123458	1980-08-10	M	291 Springs, Gary,IL	300	50000.00	30002	5
E1004	Santosh	Kumar	123459	1985-07-20	M	511 Aurora Av, Aurora,IL	400	60000.00	30004	5
E1005	Ahmed	Hussain	123410	1981-01-04	M	216 Oak Tree, Geneva,IL	500	70000.00	30001	2
E1006	Nancy	Allen	123411	1978-02-06	F	111 Green Pl, Elgin,IL	600	90000.00	30001	2
E1007	Mary	Thomas	123412	1975-05-05	F	100 Rose Pl, Gary,IL	650	65000.00	30003	7
E1008	Bharath	Gupta	123413	1985-05-06	M	145 Berry Ln, Naperville,IL	660	65000.00	30003	7
E1009	Andrea	Jones	123414	1990-07-09	F	120 Fall Creek, Gary,IL	234	70000.00	30003	7
E1010	Ann	Jacob	123415	1982-03-30	F	111 Britany Springs,Elgin,IL	220	70000.00	30004	5

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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Other Contributor(s)

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Changelog

Date	Version	Changed by	Change Description
2021-07-30	2.3	Lakshmi Holla	Updated screenshot of DB2
2021-07-08	2.2	Malika	Updated screenshot
2020-12-23	2.1	Steve Ryan	ID Review
2020-12-08	2.0	Sandip Saha Joy	Created revised version from DB0201EN
2020	1.0	Rav Ahuja	Created initial version

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