

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_IDENT | JOB_TITLE | MIN_SALARY | MAX_SALARY |
|-----------|----------------------|------------|------------|
| 100 | Sr. Architect | 60000 | 100000 |
| 200 | Sr.SoftwareDeveloper | 60000 | 80000 |
| 300 | Jr.SoftwareDeveloper | 40000 | 60000 |

DEPARTMENTS

| DEPT_ID_DEP | DEP_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

| LOCT_ID | DEP_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

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.

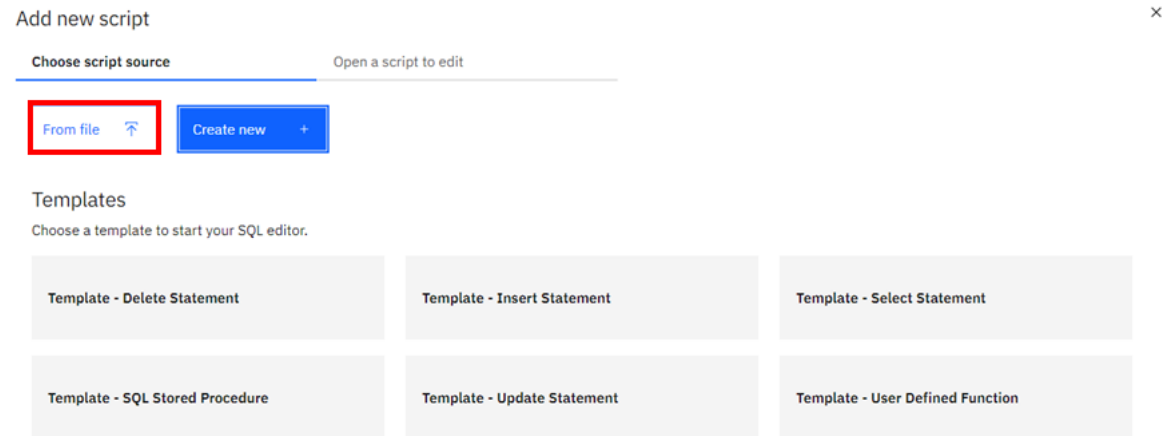
1. Download the script file to your computer:
 - [HR_Database_Create_Tables_Script.sql](#)
2. Login to IBM Cloud and go to the [Resource List](#) where you can find the Db2 service instance that you created in a previous lab under **Services** section. Click on the Db2-xx service. Next, click on **Go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

The screenshot shows the IBM Cloud console interface. At the top is a dark navigation bar with the IBM Cloud logo, a search bar, and links for Catalog, Docs, Support, Manage, and a user profile. Below this, the 'Resource list' page is displayed for a 'Db2-x4' instance, which is marked as 'Active'. A left sidebar contains a 'Manage' section with links for 'Getting started', 'Service credentials', and 'Connections'. The main content area has a 'Getting started' section with instructions on finding credentials and a 'Go to UI' button. To the right, a 'Need help?' section offers links to 'IBM answers' and 'Support case'.

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

This screenshot shows the IBM Cloud SQL editor. On the left, a sidebar with a tree view has the 'SQL' option highlighted with a red box and a red circle labeled '1'. The main editor area has a tab labeled '*Untitled - 1' with a '+' icon to its right, also highlighted with a red box and a red circle labeled '2'. The editor includes a toolbar with icons for file operations, a 'Syntax assistant' toggle, and a 'Run all' button. The editor content area is currently empty.

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.

Run SQL

* HR_Databa... x [Add new](#)

⏏ ⏪ ⏩ ⏴ ⏵ ⏶ ⏷ 🔍 ☒ Syntax assistant ⏴ ⚙

```

36
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, 2022 11:39:20 AM ⌵ ⋮

| | | | |
|---|---|--|-------|
| ⌵ | ✓ | DROP TABLE JOBS | Run t |
| ⌵ | ✓ | DROP TABLE DEPARTMENTS | Run t |
| ⌵ | ✓ | DROP TABLE LOCATIONS | Run t |
| ⌵ | ✓ | -- Create the tables CREATE TABLE EMPLO... | Run t |
| ⌵ | ✓ | CREATE TABLE JOB_HISTORY (EMPL_ID ... | Run t |
| ⌵ | ✓ | CREATE TABLE JOBS (JOB_IDENT CHAR(... | Run t |
| ⌵ | ✓ | CREATE TABLE DEPARTMENTS (DEPT_ID_... | Run t |
| ⌵ | ✓ | CREATE TABLE LOCATIONS (LOCT_ID CH... | Run t |

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.

Run SQL

*HR_Databa... x

SQL

 --DDL statement for table 'HR' database--

 -- Drop the tables in case they exist
 DROP TABLE EMPLOYEES;
 DROP TABLE JOB_HISTORY;
 DROP TABLE JOBS;
 DROP TABLE DEPARTMENTS;
 DROP TABLE LOCATIONS;
 -- Create the tables
 CREATE TABLE EMPLOYEES (
 EMP_ID CHAR(9) NOT NULL,
 F_NAME VARCHAR(15) NOT NULL,
 L_NAME VARCHAR(15) NOT NULL,
 SSN CHAR(9),
 B_DATE DATE,
 SEX CHAR,
 ADDRESS VARCHAR(30),
 JOB_ID CHAR(9),
 SALARY DECIMAL(10,2),
 MANAGER_ID CHAR(9),
 DEP_ID CHAR(9) NOT NULL,
 PRIMARY KEY (EMP_ID)
);
 CREATE TABLE JOB_HISTORY (
 EMPL_ID CHAR(9) NOT NULL,
 START_DATE DATE,

Syntax assistant

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

----- --DDL statement for table 'HR' da

Status: Failed

Error message
 "HYL83142.EMPLOYEES" is an undefined name.. SQLCODE=-204, SQLSTATE=42704,
[Learn more about this error](#)

✖ DROP TABLE JOB_HISTORY

✖ DROP TABLE JOBS

✖ DROP TABLE DEPARTMENTS

✖ DROP TABLE LOCATIONS

✔ -- Create the tables CREATE TABLE EMPLOYEES (EMP_ID CHAR(9) NOT

✔ CREATE TABLE JOB_HISTORY (EMPL_ID CHAR(9) NOT NULL, START_D

✔ CREATE TABLE JOBS (JOB_IDENT CHAR(9) NOT NULL, JOB_TITLE VAR

✔ CREATE TABLE DEPARTMENTS (DEPT_ID_DEP CHAR(9) NOT NULL, DEI

✔ CREATE TABLE LOCATIONS (LOCT_ID CHAR(9) NOT NULL, DEP_ID_LOC

Run all Remember my selection

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

The screenshot shows a database management interface. On the left, a sidebar menu has a hamburger icon at the top, followed by 'Dashboard', 'SQL Run SQL', 'Data' (highlighted with a red box), and 'Administration'. The main area has a top navigation bar with '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'. Under the search bar, the 'Schemas' section is visible, containing a table with two columns: 'Name' and 'Type'. The table has one row with the value 'MYG36304' under 'Name' and 'User' under 'Type'.

| 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. PETSale, PETRESCUE, etc.).

Find schemas or tables

Schemas

| <input checked="" type="checkbox"/> Name | Type | Tables ▲ |
|--|------|----------|
| <input checked="" type="checkbox"/> MYG36304 | User | 5 |

Tables

| <input type="checkbox"/> Name ▼ | Schema | P |
|--------------------------------------|----------|---|
| <input type="checkbox"/> DEPARTMENTS | MYG36304 | ⋮ |
| <input type="checkbox"/> EMP | MYG36304 | ⋮ |
| <input type="checkbox"/> JOBS | MYG36304 | ⋮ |
| <input type="checkbox"/> JOBSHISTORY | MYG36304 | ⋮ |
| <input type="checkbox"/> 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).

Schemas

New table +

⌵ ⌶ ⋮ ✕

Total: 6, selected: 0

EMPLOYEES

[View data](#)

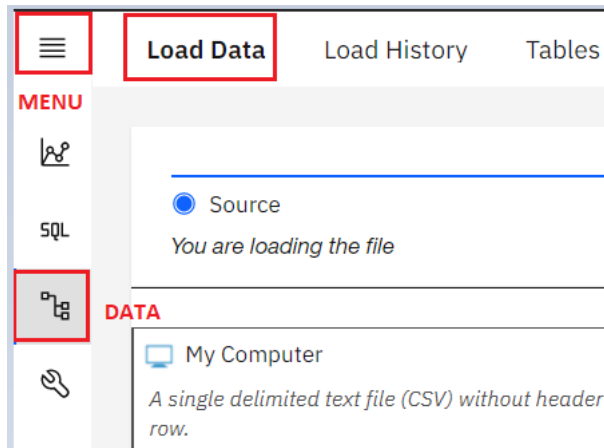
In this exercise, you will learn how data can be loaded into Db2. You could manually insert each row into the table one by one, but that would take a long time. Instead, Db2 (and almost every other database) allows you to load data from .CSV files.

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

- 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:

- [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.

☰

⚙

SQL

🔧

🔗

📄

💡

Load Data

Load History

Tables

Views

Indexes

Aliases

MQTs

Sequences

Application objects

☒ Source

☐ Target

☐ Define

☐ Finalize

You are loading the file


My Computer

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

Amazon S3

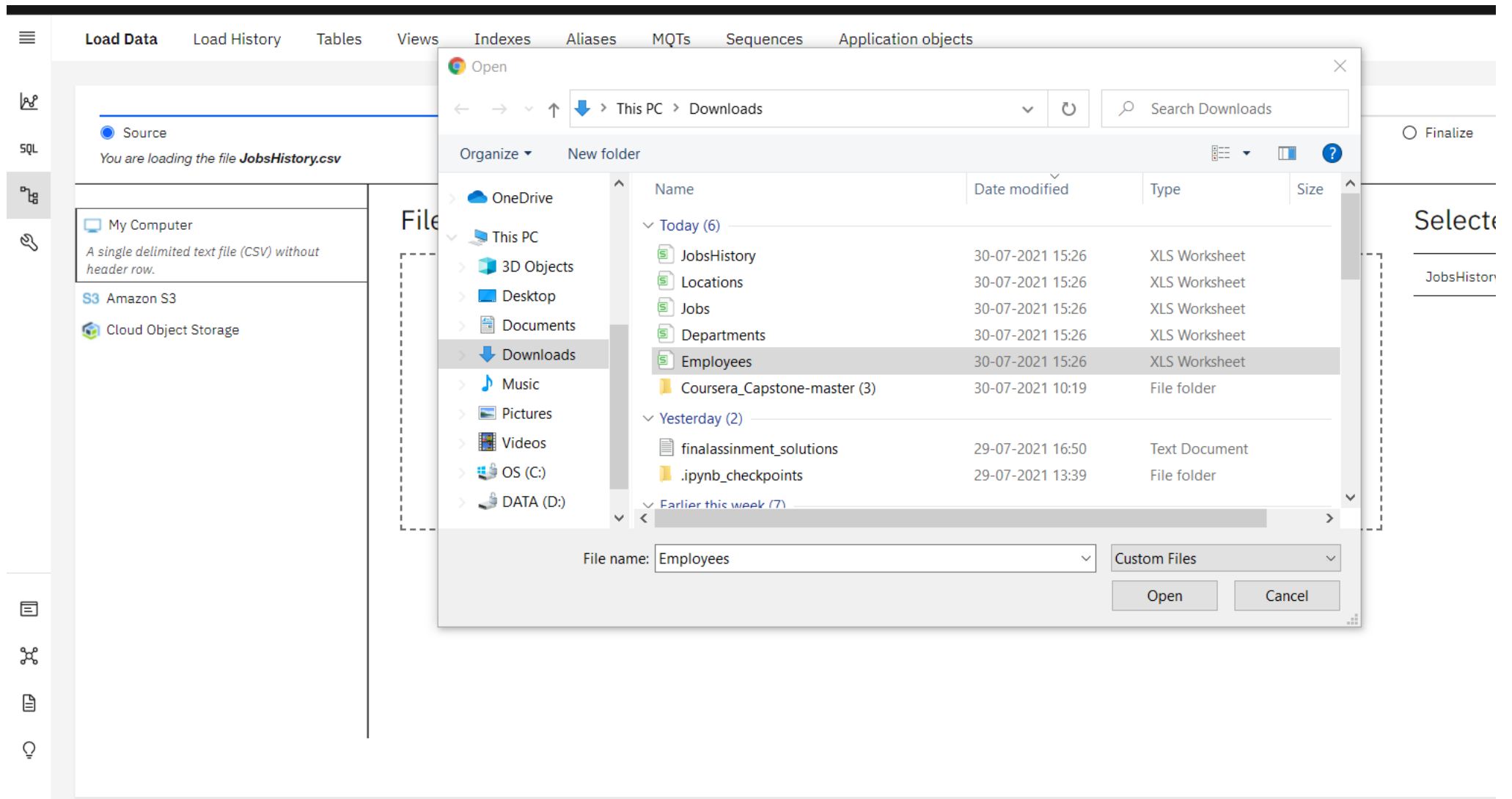
Cloud Object Storage

File selection



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

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 ☐ Finalize

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](#)

Selected f

Employees.csv

6. 1. 1
1. 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 **I
- Copied!

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

New table +

Find tables in HYL83142

DEPARTMENTS

EMPLOYEES

✓

JOBS

JOB_HISTORY

LOCATIONS

Table definition

EMPLOYEES

overwrite_option

☐ Append new data

☒ Overwrite table with new data

⚠

☐ All existing data will be deleted from completes successfully.

| COLUMN NAME | DATA TYPE |
|-------------|-----------|
| EMP_ID | CHAR |
| F_NAME | VARCHAR |
| L_NAME | VARCHAR |
| SSN | CHAR |
| B_DATE | DATE |
| SEX | CHAR |

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

SQL

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

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

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



WARNING
1 warning

My computer

Target


Employees.csv

HYL83142.EMPLOYEES

[View](#)

Status

Settings



10

10

0

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.

Errors 0

Warnings 1

No errors were found.
But, there were 1 warning.

10.
1. 1

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

Copied!

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

Find schemas or tables

SQL

Schemas

Tables

New table +

| 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

Table definition

EMPLOYEES

| Name | Data type | Nullable |
|------------|-----------|----------|
| EMP_ID | CHAR | N |
| F_NAME | VARCHAR | N |
| L_NAME | VARCHAR | N |
| SSN | CHAR | Y |
| B_DATE | DATE | Y |
| SEX | CHAR | Y |
| ADDRESS | VARCHAR | Y |
| JOB_ID | CHAR | Y |
| SALARY | DECIMAL | Y |
| MANAGER_ID | CHAR | Y |
| DEP_ID | CHAR | N |

View data

11. Now you can view the table data.



SQL



HYL83142.EMPLOYEES

| EMP_ID | F_NAME | L_NAME | SSN | B_DATE | SEX | ADDRESS | JOB_ID | SALARY |
|--------|---------|---------|--------|------------|-----|------------------------------|--------|-----------|
| E1001 | John | Thomas | 123456 | 1976-01-09 | M | 5631 Rice, OakPark,IL | 100 | 100000.00 |
| E1002 | Alice | James | 123457 | 1972-07-31 | F | 980 Berry ln, Elgin,IL | 200 | 80000.00 |
| E1003 | Steve | Wells | 123458 | 1980-08-10 | M | 291 Springs, Gary,IL | 300 | 50000.00 |
| E1004 | Santosh | Kumar | 123459 | 1985-07-20 | M | 511 Aurora Av, Aurora,IL | 400 | 60000.00 |
| E1005 | Ahmed | Hussain | 123410 | 1981-01-04 | M | 216 Oak Tree, Geneva,IL | 500 | 70000.00 |
| E1006 | Nancy | Allen | 123411 | 1978-02-06 | F | 111 Green Pl, Elgin,IL | 600 | 90000.00 |
| E1007 | Mary | Thomas | 123412 | 1975-05-05 | F | 100 Rose Pl, Gary,IL | 650 | 65000.00 |
| E1008 | Bharath | Gupta | 123413 | 1985-05-06 | M | 145 Berry Ln, Naperville,IL | 660 | 65000.00 |
| E1009 | Andrea | Jones | 123414 | 1990-07-09 | F | 120 Fall Creek, Gary,IL | 234 | 70000.00 |
| E1010 | Ann | Jacob | 123415 | 1982-03-30 | F | 111 Britany Springs,Elgin,IL | 220 | 70000.00 |

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.

Author(s)

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- [Sandip Saha Joy](#)

Changelog

| Date | Version | Changed by | Change Description |
|------------|---------|-----------------|---------------------------------------|
| 2022-08-19 | 2.4 | D.M.Naidu | Upload .txt files |
| 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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