Exercise II - SQL

Part 2 – Import Tables into SQL Server

CEE412/CET522

Transportation Data Management and Visualization

WINTER 2020

Outline

The objective of this exercise is to learn how to import Excel worksheets to SQL Server as database relations.

Final product: three loop data tables in a SQL Server database.

Step 1: Download Data

Download E2_Loopdata.xlsx from Canvas, which can be found under **Files → Exercises → Exercise 2**.

Take a look at the downloaded data.

The Excel file has three spreadsheets, each contains data collected from one loop detector:

- Data in *I5_145M2* and *I5_145S2* are readings from two single loop detectors.
- *I5_145T2* contains data from a dual loop detector.

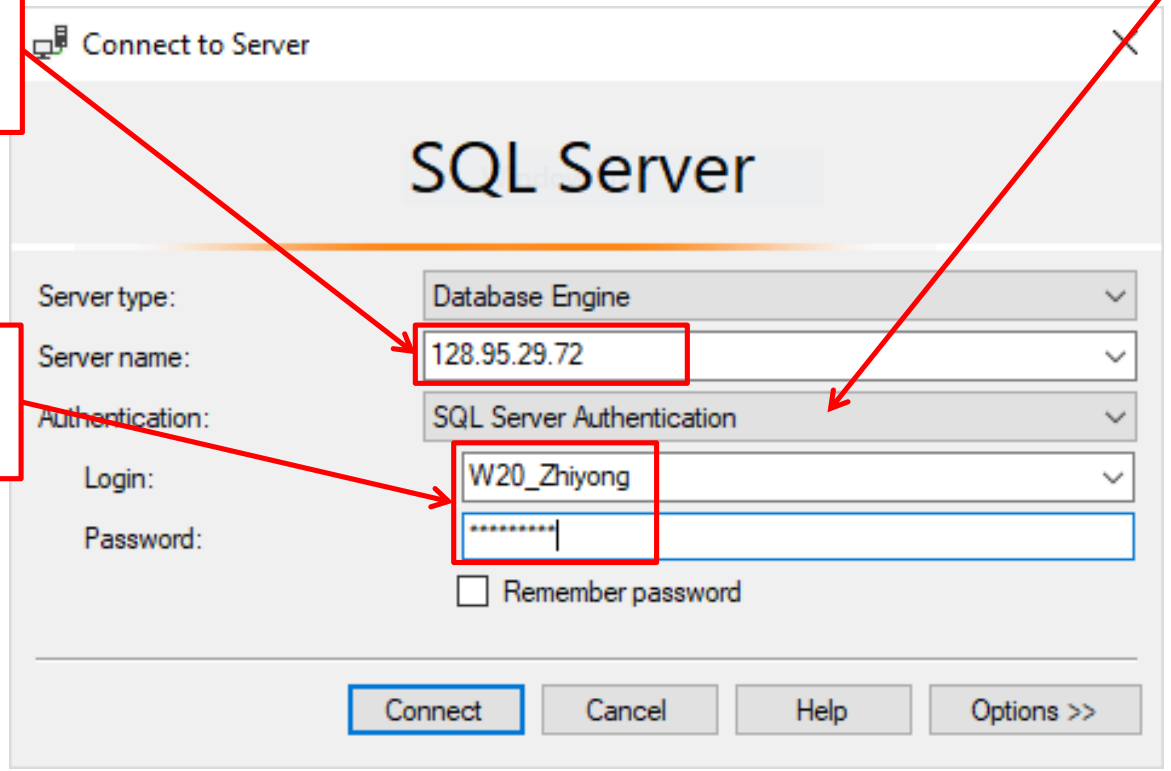
Step 2: Log on Your Database Account

You can omit this step if you didn't disconnect from your database.

Use **SQL Server Authentication**

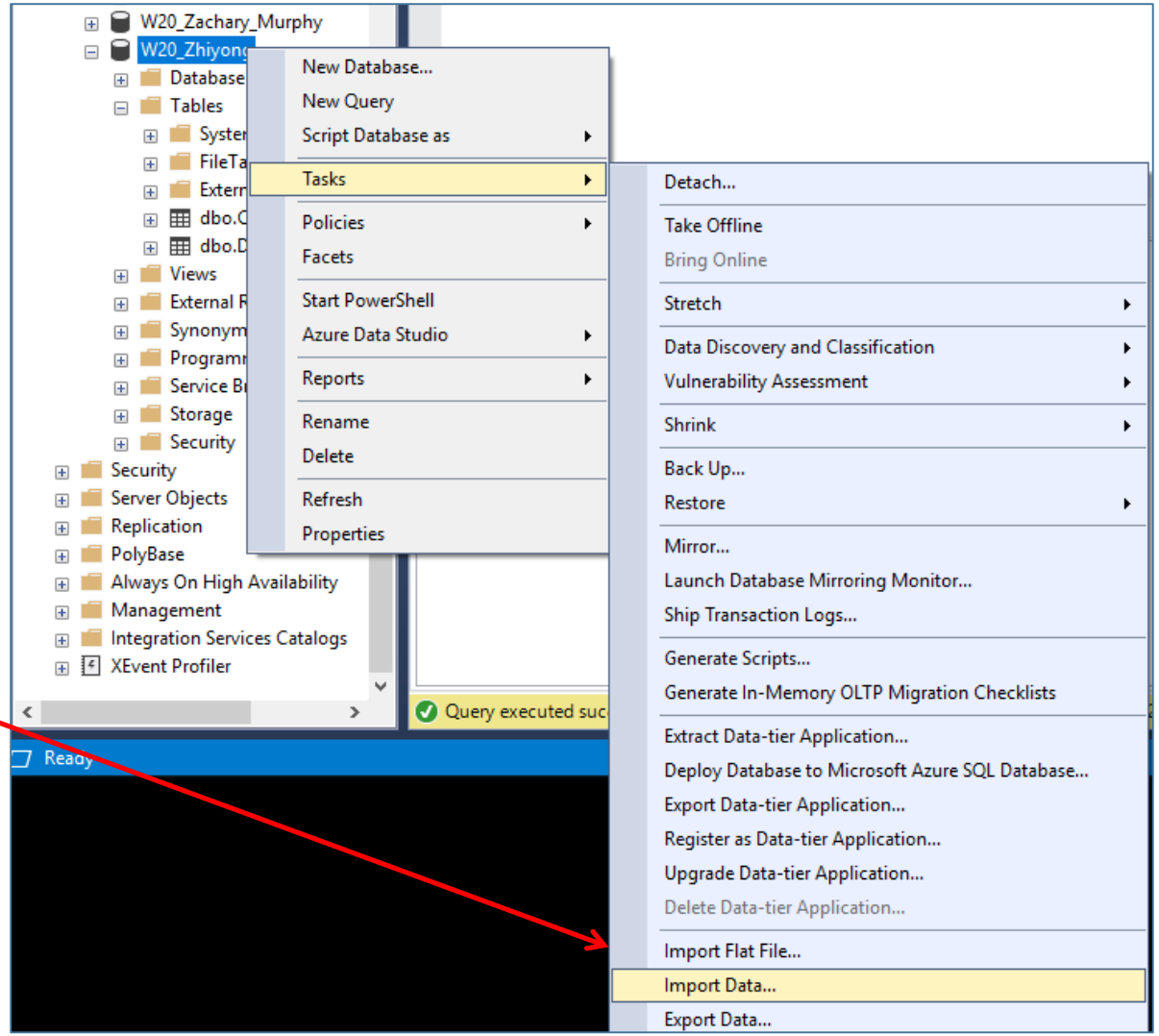
Input the class server IP address: 128.95.29.72

Input your account name and your password



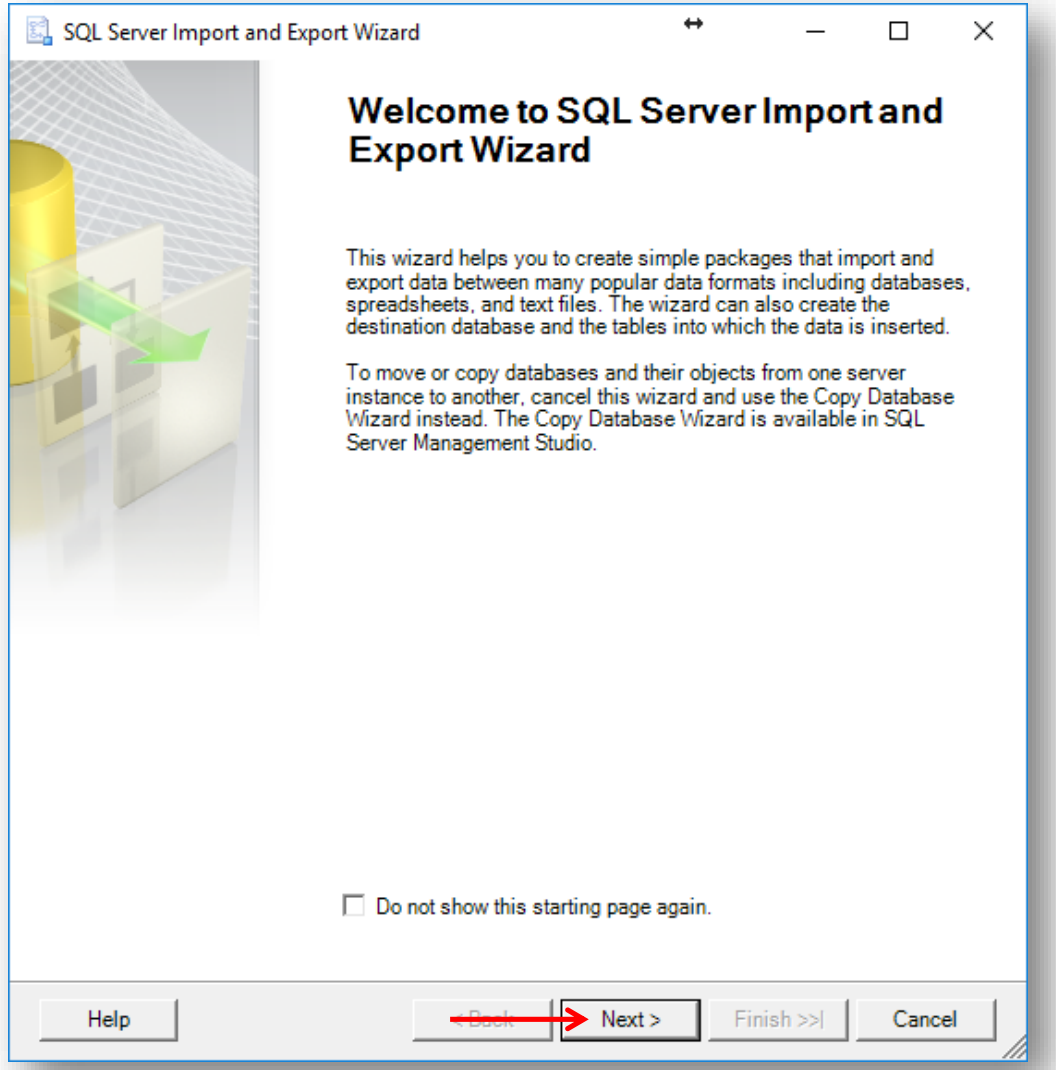
Step 3: Activate the Import/Export Wizard

- Locate to the database you want to import the Excel worksheet to (your own database).
- To activate the Import/Export Wizard, right click on your database and click **Tasks** → **Import Data**.



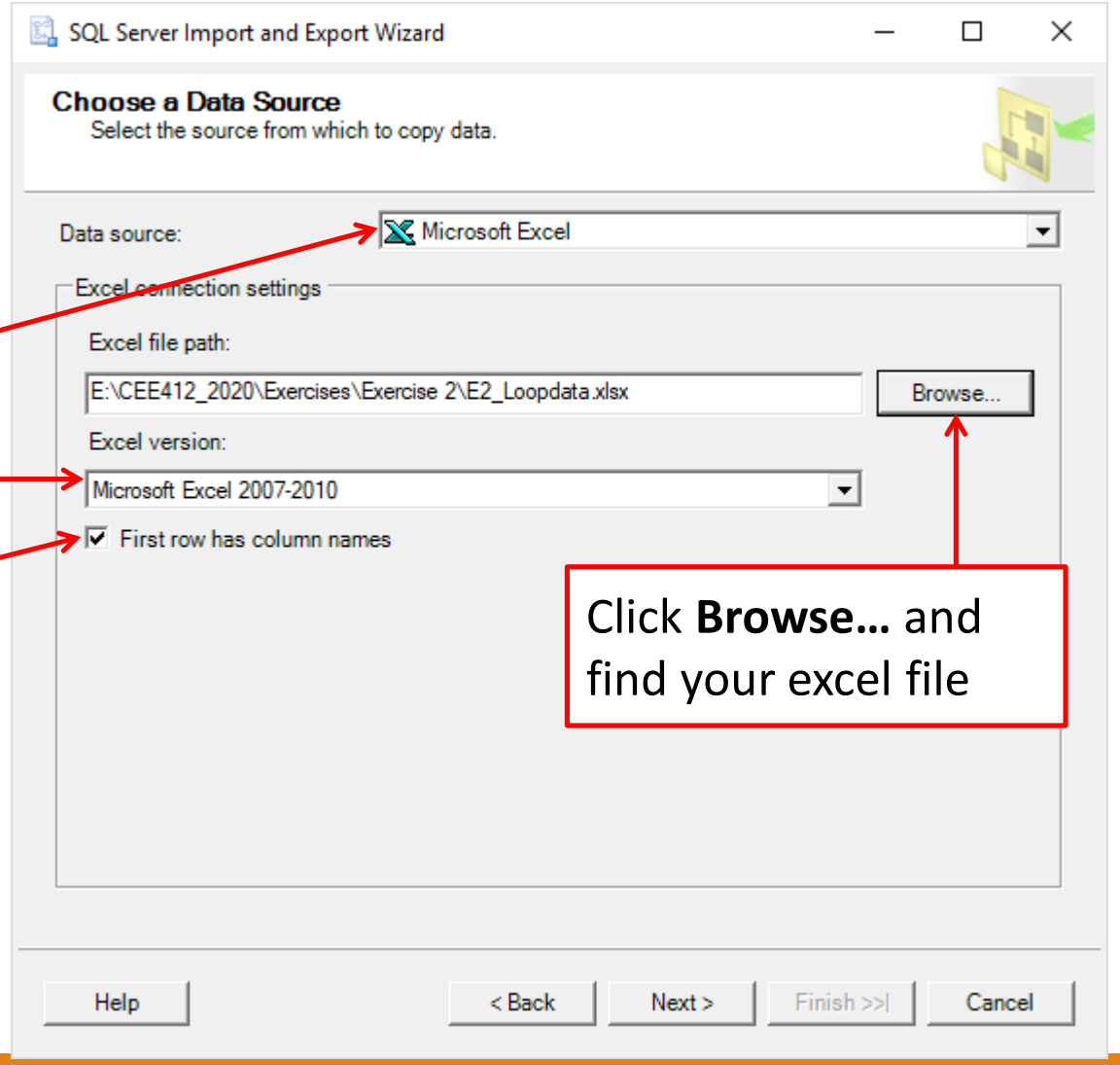
Step 3: Activate the Import/Export Wizard

You will see a welcome window, click **Next** to proceed.



Step 4: Choose a Data Source

Select “Microsoft Excel” from the **Data Source** combo list and locate your Excel file for data import in the file path. Then click **Next**.



Choose Excel here

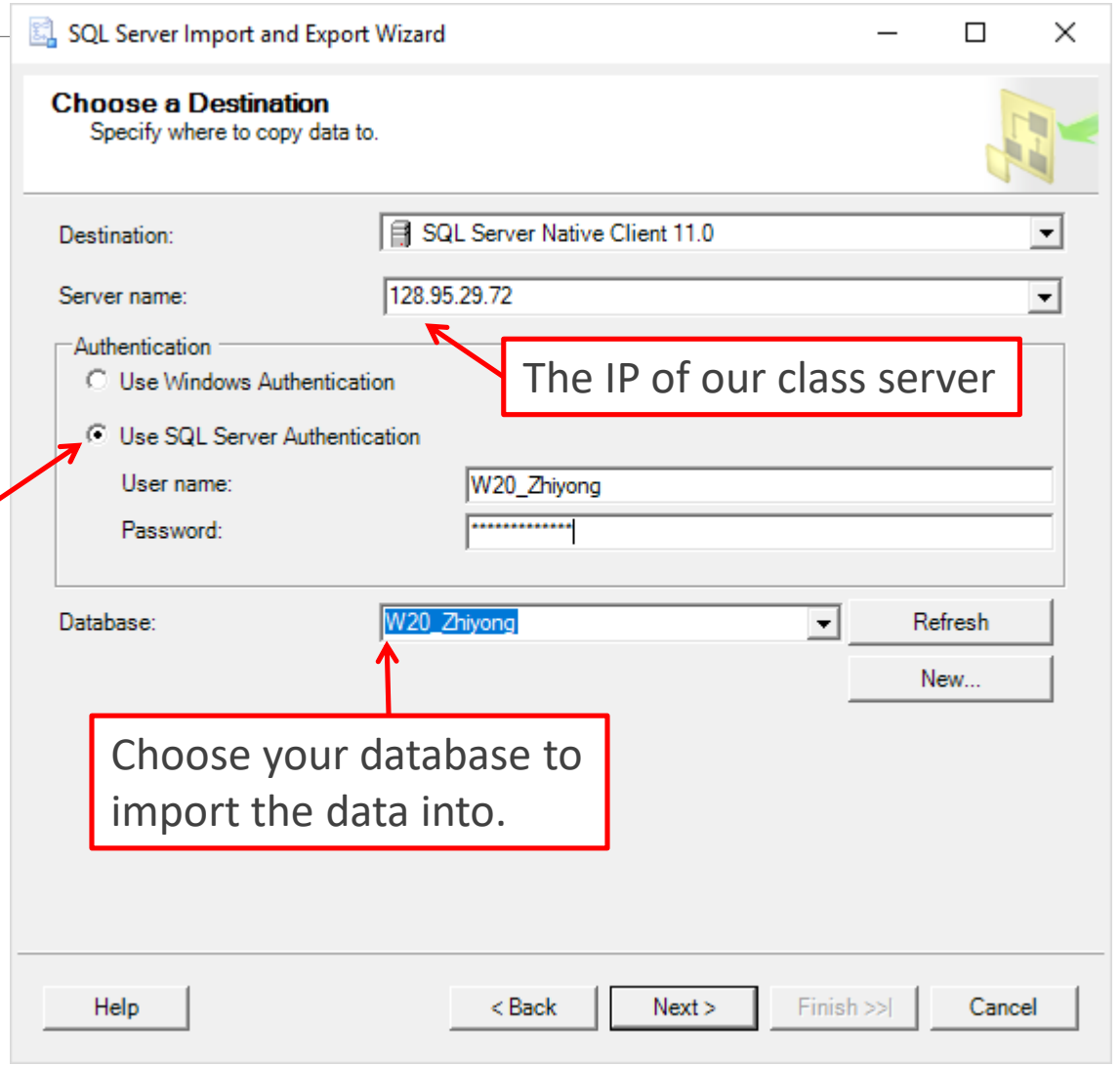
Choose Excel Version

Make sure this is checked

Click **Browse…** and find your excel file

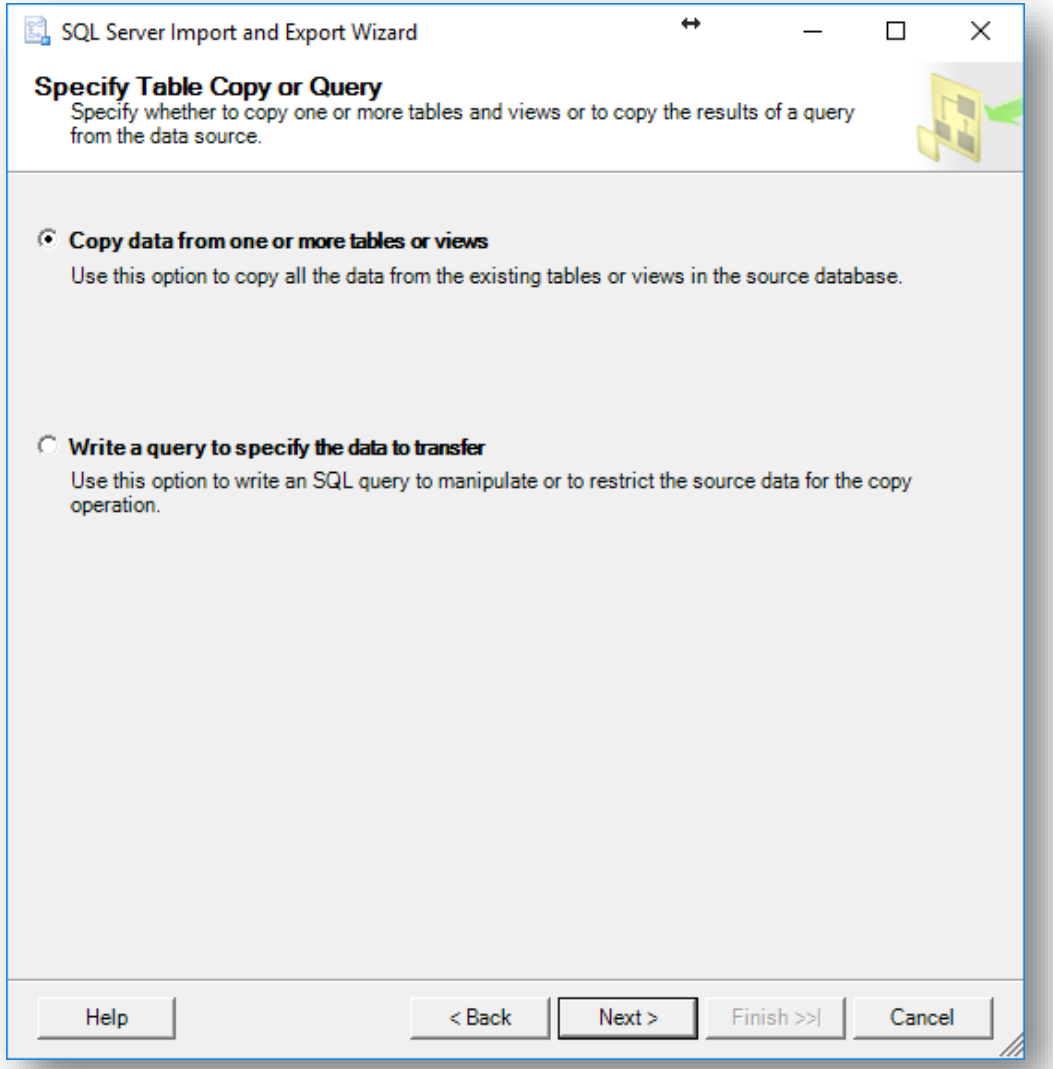
Step 5: Choose a Destination

Select “SQL Server Native Client 11.0” from the **Destination** combo list and specify our server name or in the Server text field. Type your user name and password for SQL Server authentication. Then click **Next**.



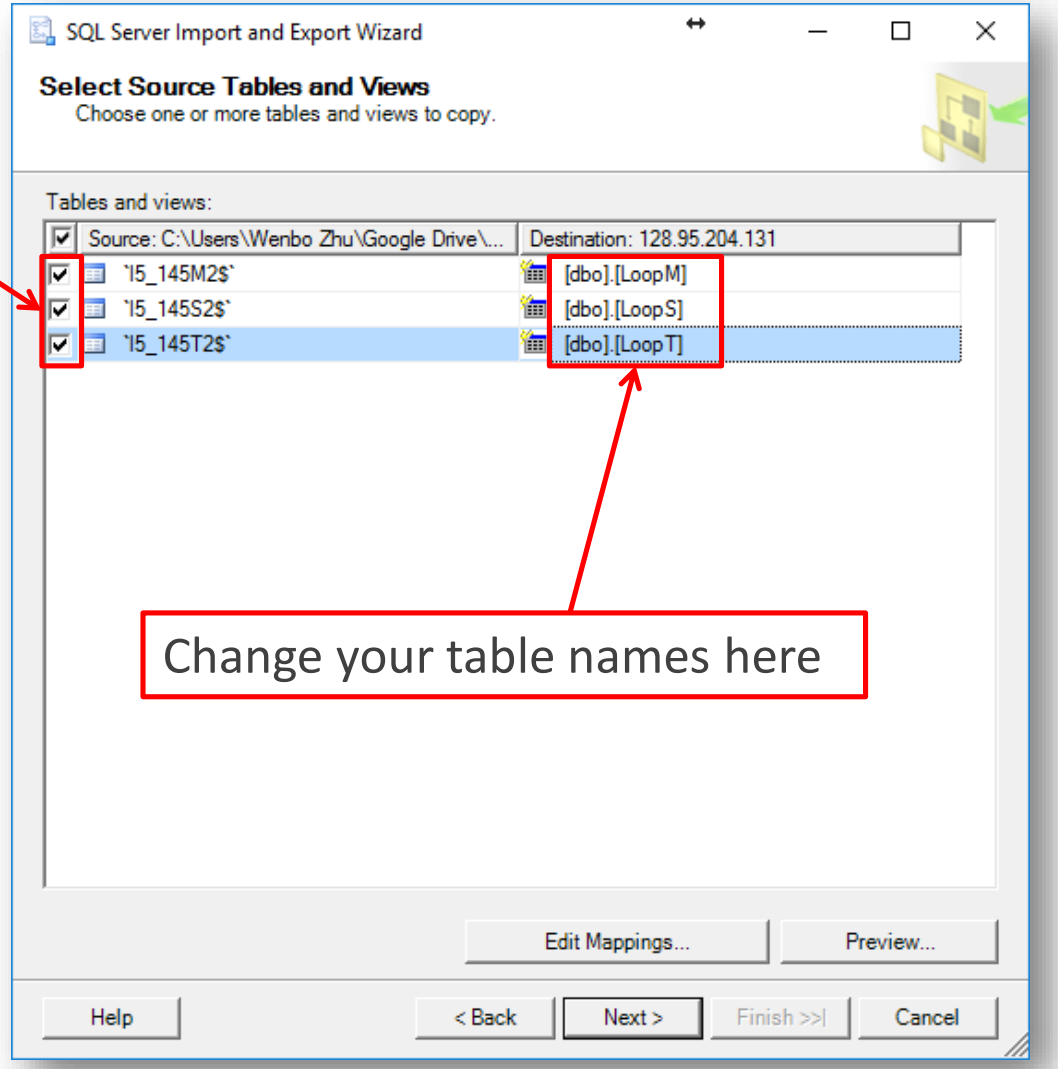
Step 6: Specify Table Copy or Query

Choose **Copy data from one or more tables or views** and click **Next**.



Step 7: Select Source Tables and Views

Select all worksheets

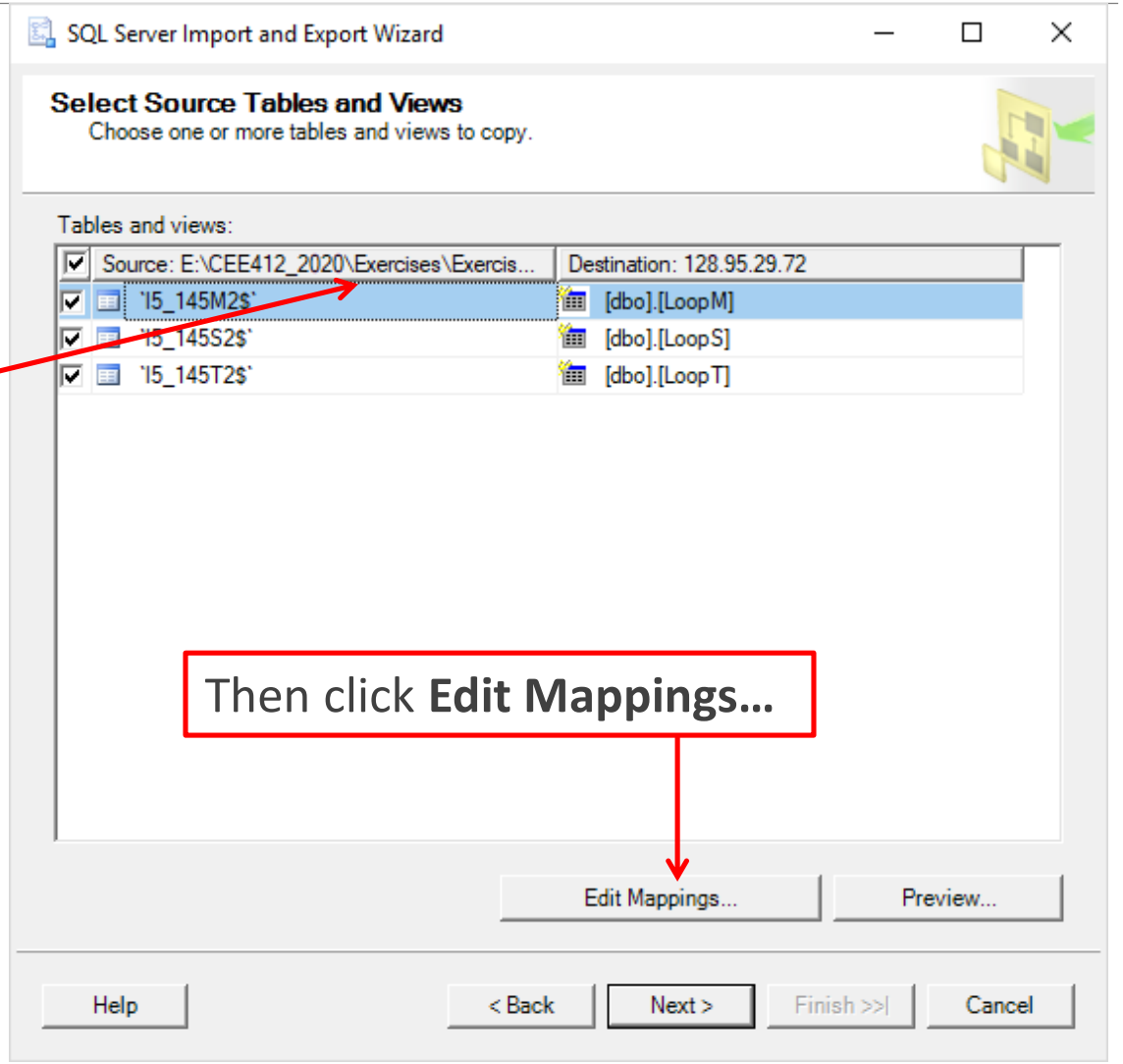


- Note that a new table is created in SQL server for each of the imported tables
- You can rename the resulting tables in your database. Here I used “LoopM”, “LoopS”, and “LoopT” for simplicity.

Step 8: Edit Mappings

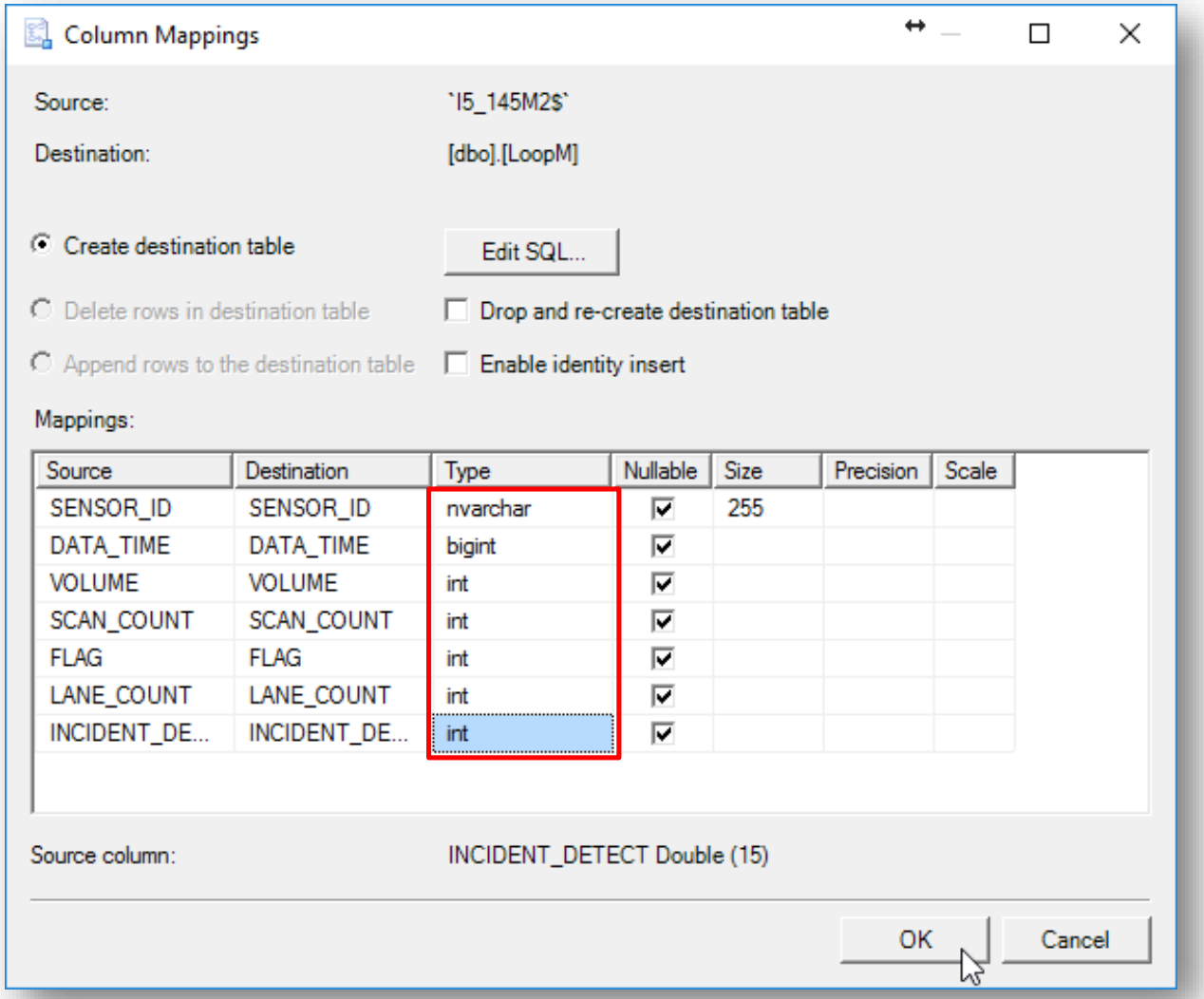
It's important to define the data type for the imported table columns, as SQL is statically (strongly) typed.

Click to highlight the first table



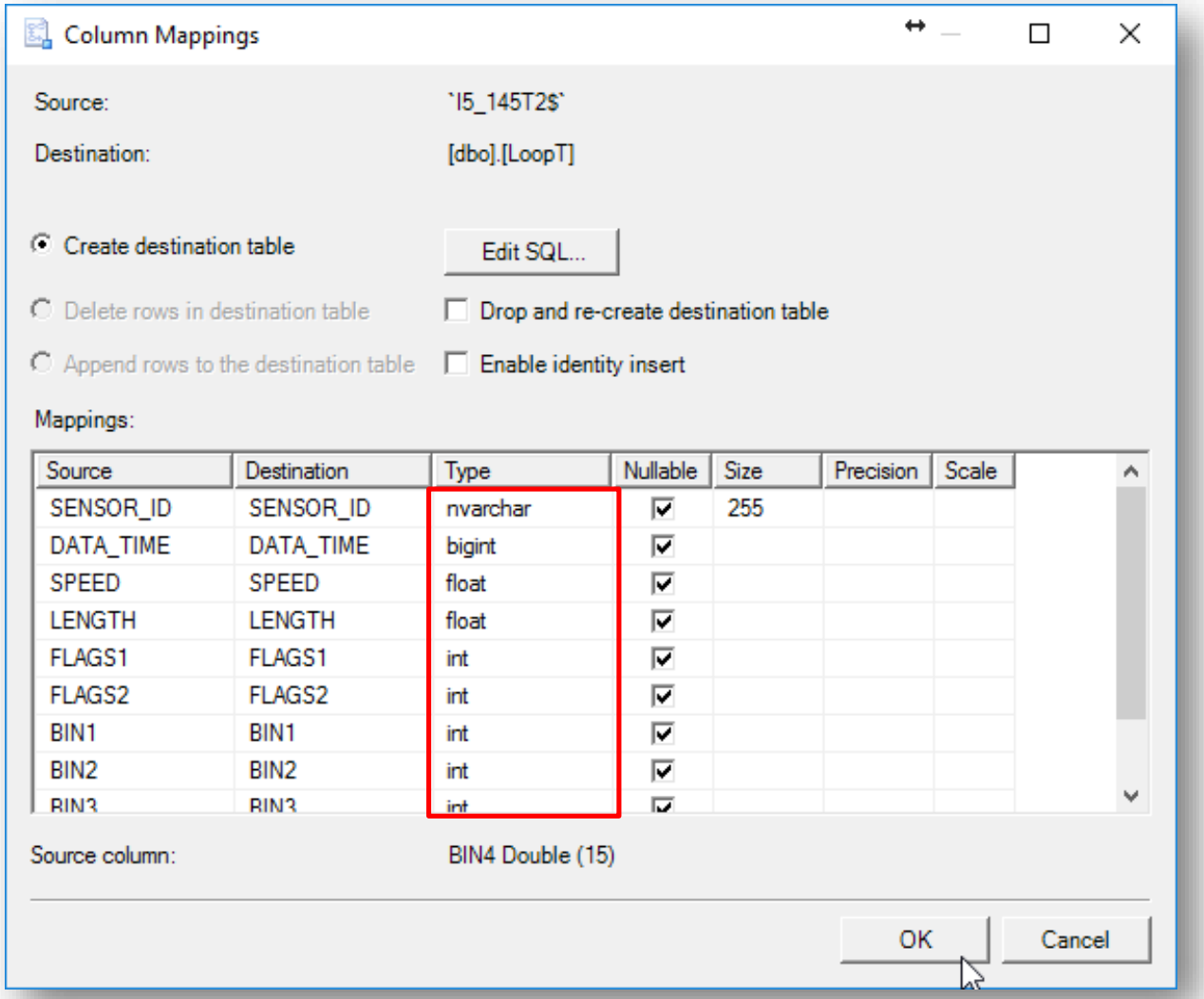
Step 8: Edit Mappings

- This is where you set the data types and names for each imported column.
- Leave SENSOR_ID unchanged, and set DATA_TIME to “bigint”.
- Change the type for the remaining attributes to int.
- Click **OK**.



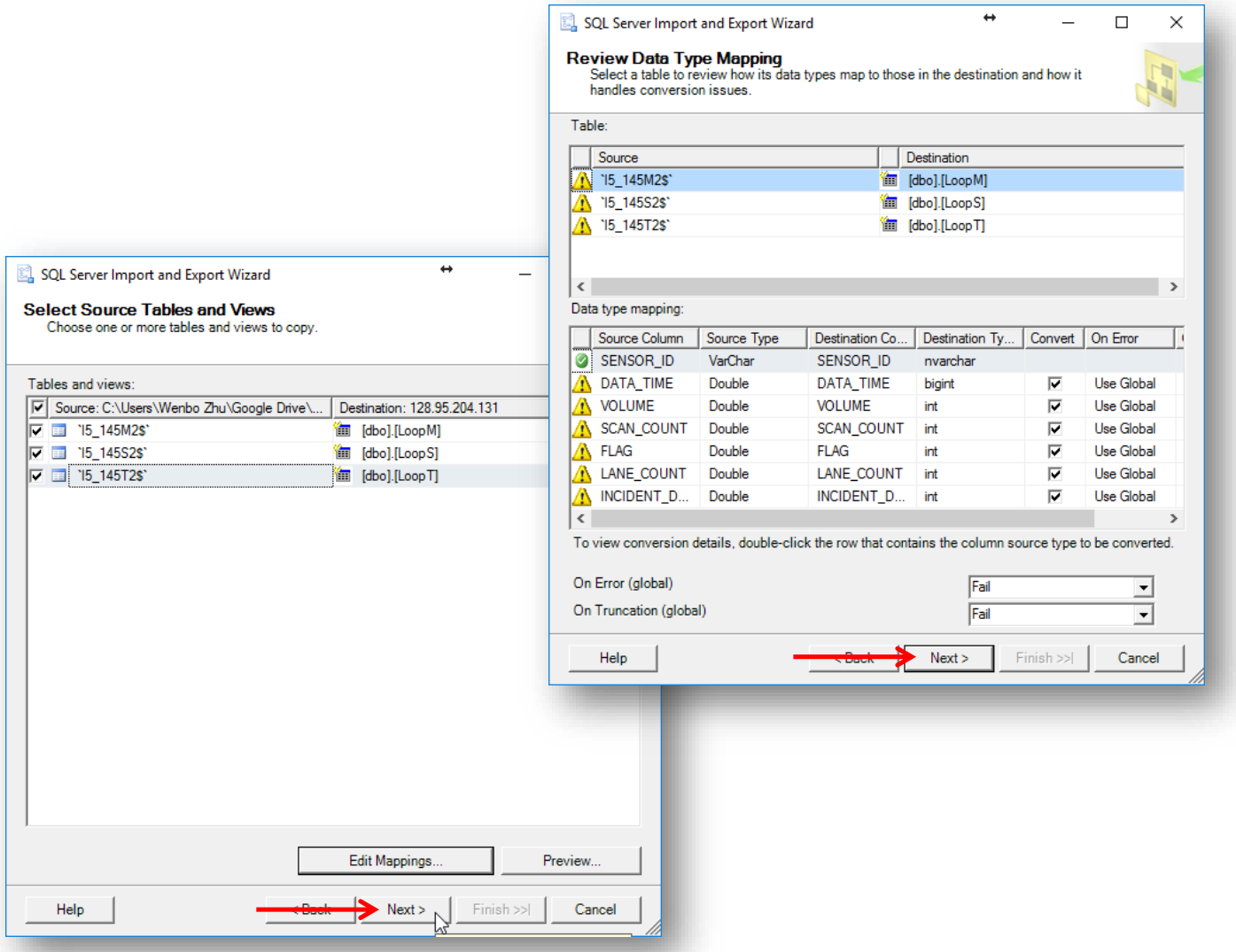
Step 8: Edit Mappings

- Repeat the previous step for the 2nd table (I5_145S2).
- The 3rd table (I5_145T2) contains dual loop detector data, which have slightly different data types.
- For the 3rd table, set the data types as shown. You should keep using “float” type for SPEED and LENGTH fields.



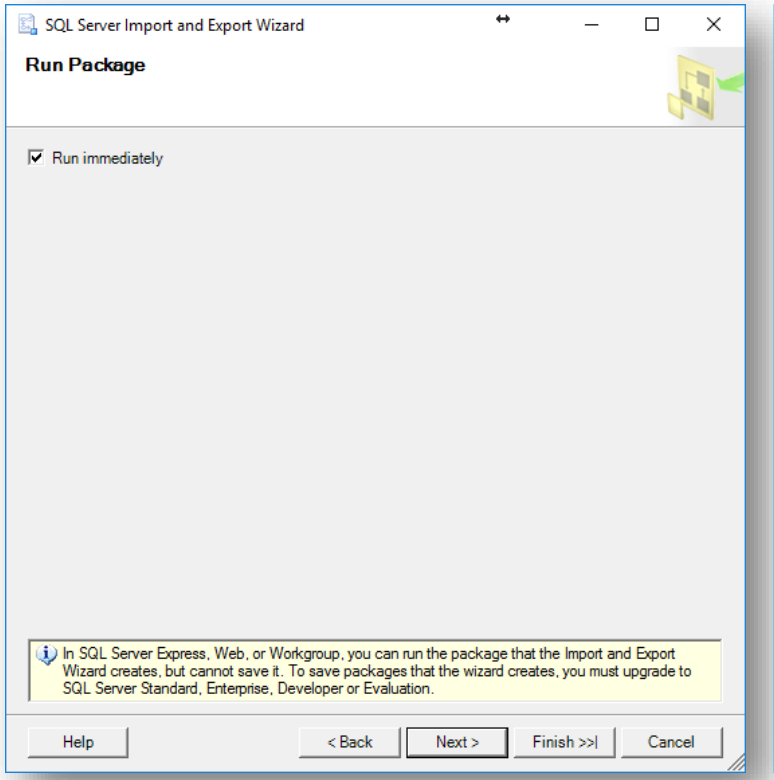
Step 8: Edit Mappings

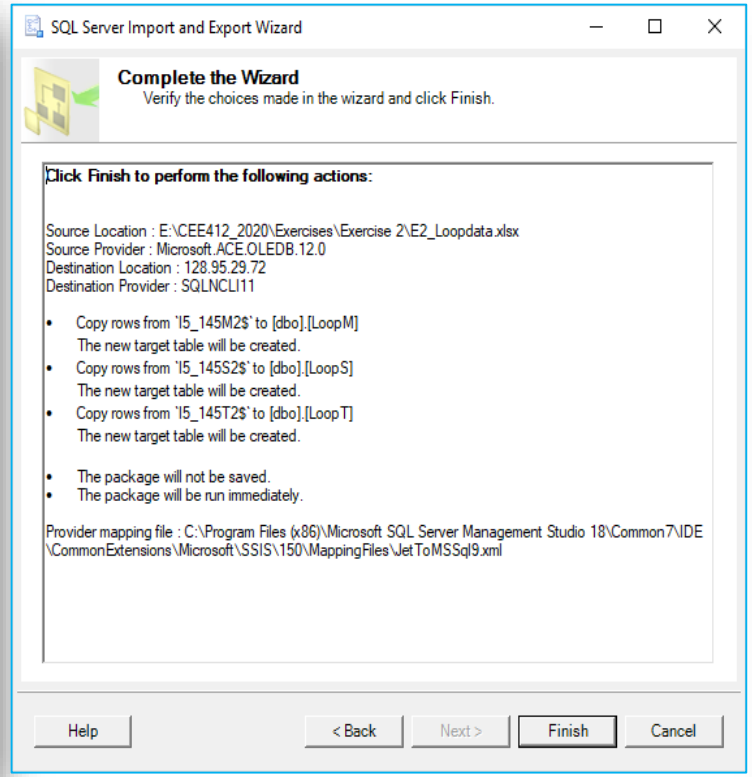
- After all data mappings are set, click **Next**.
- You can review the data type conversions you just defined. Click **Next** to proceed.

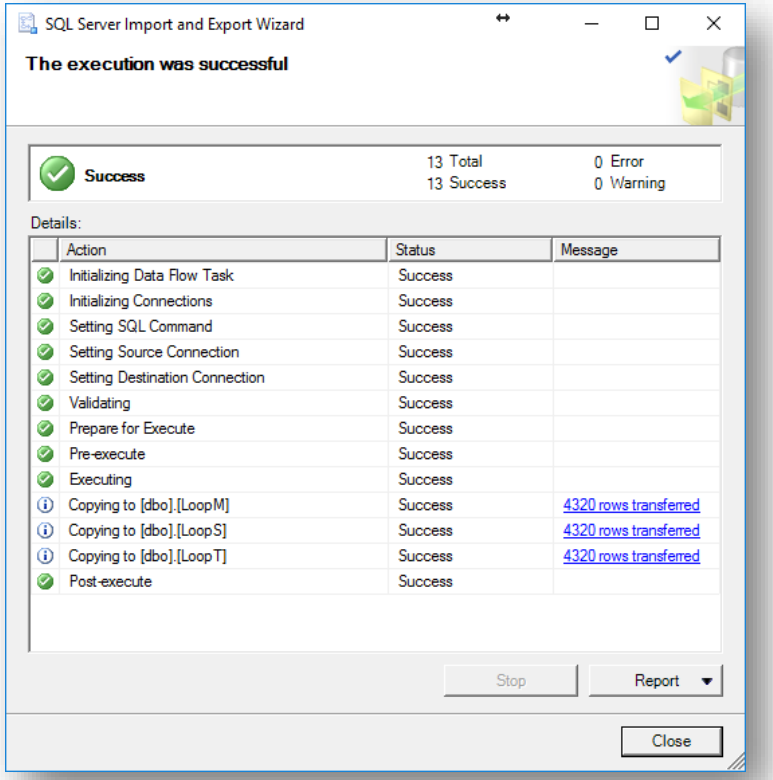


Step 9: Import Data

- Click **Next** to run immediately.
- Click **Finish**.
- Click **Close** after all the tasks are completed.

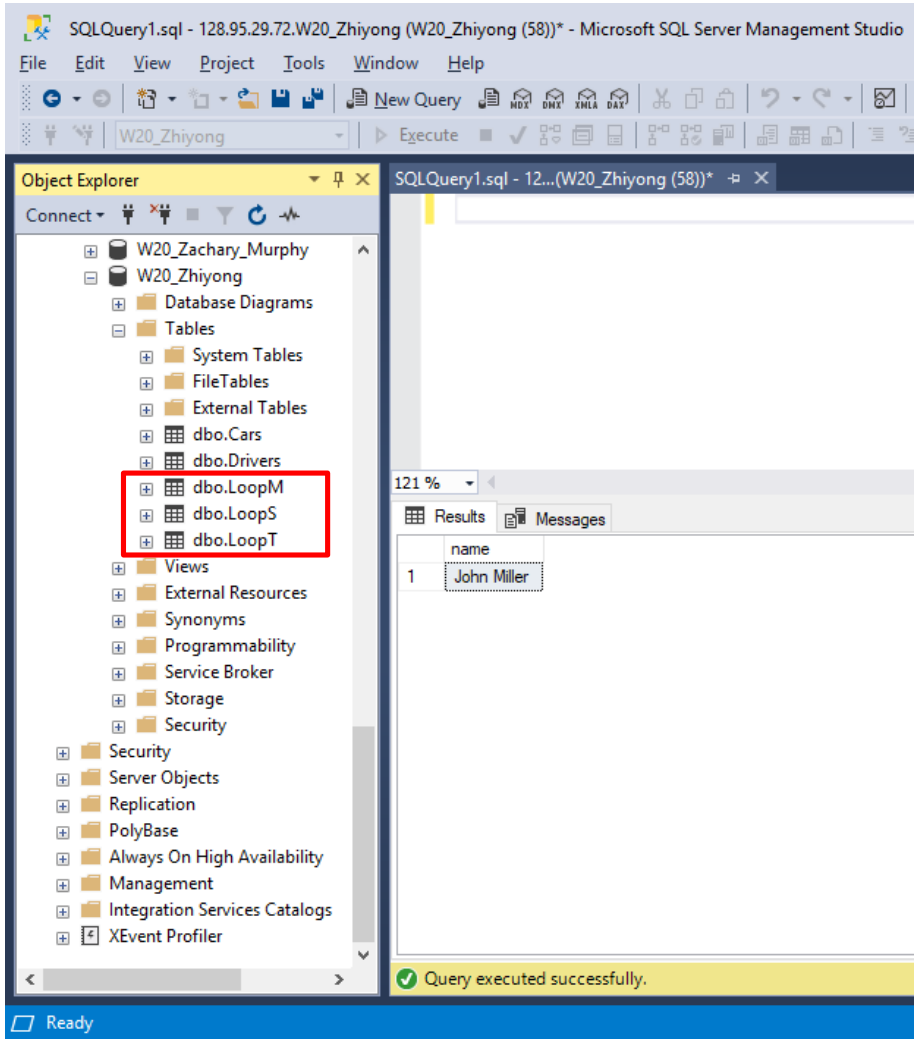






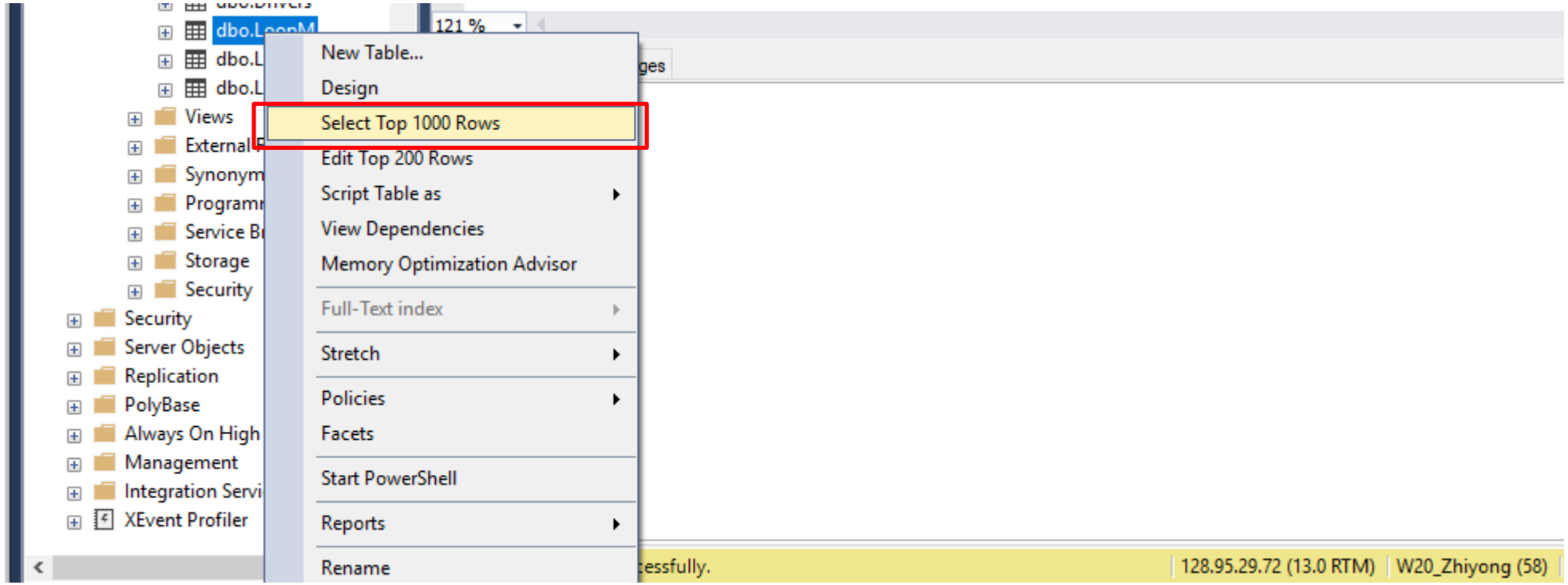
Step 10: Look at the Data

- Now you should have three new tables in your database
- If you do not see them, refresh your database by right clicking **Tables → Refresh**.



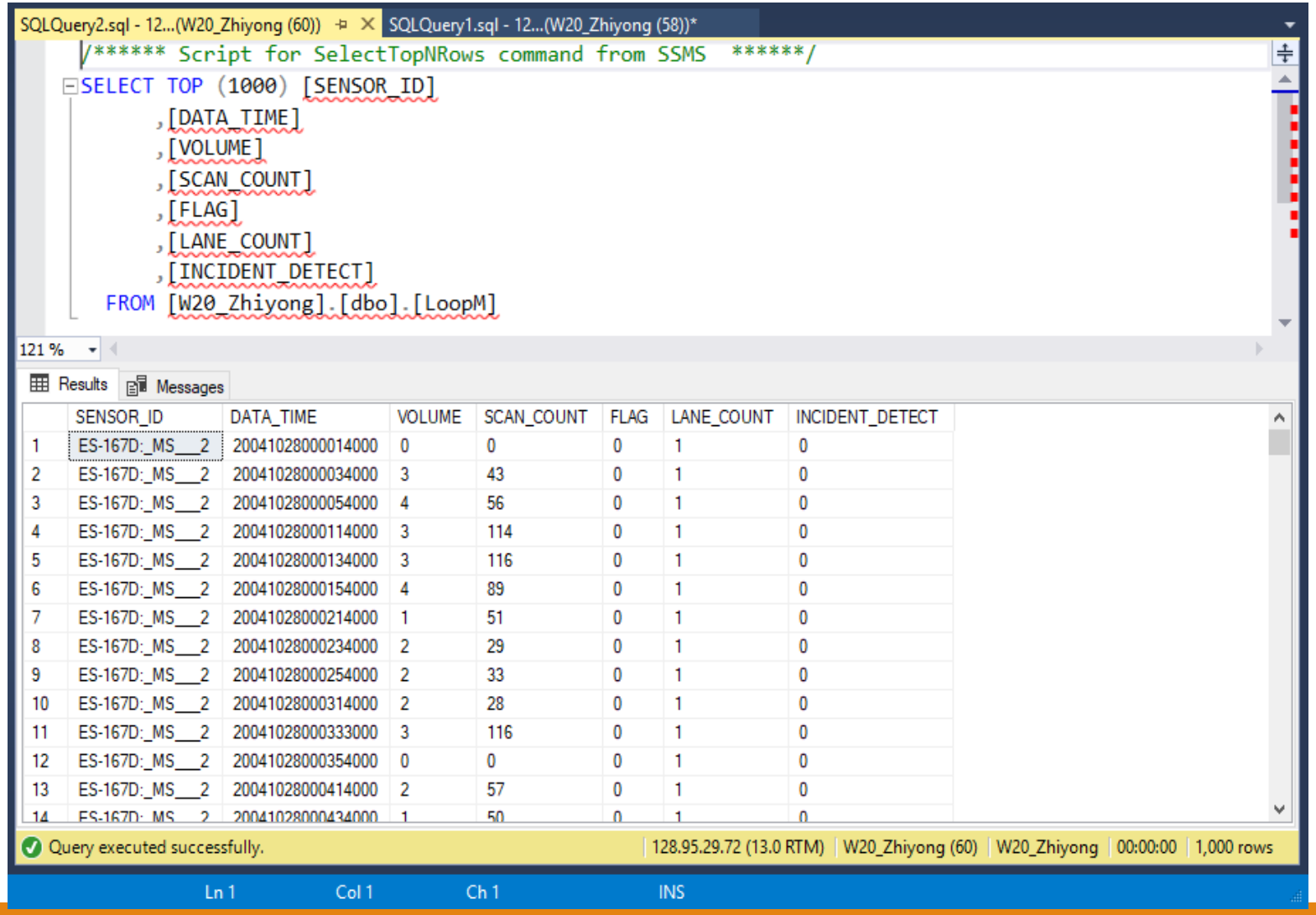
Step 10: Look at the Data

- To check if your data import was successful, right click on either table, and then click **Select Top 1000 Rows**.



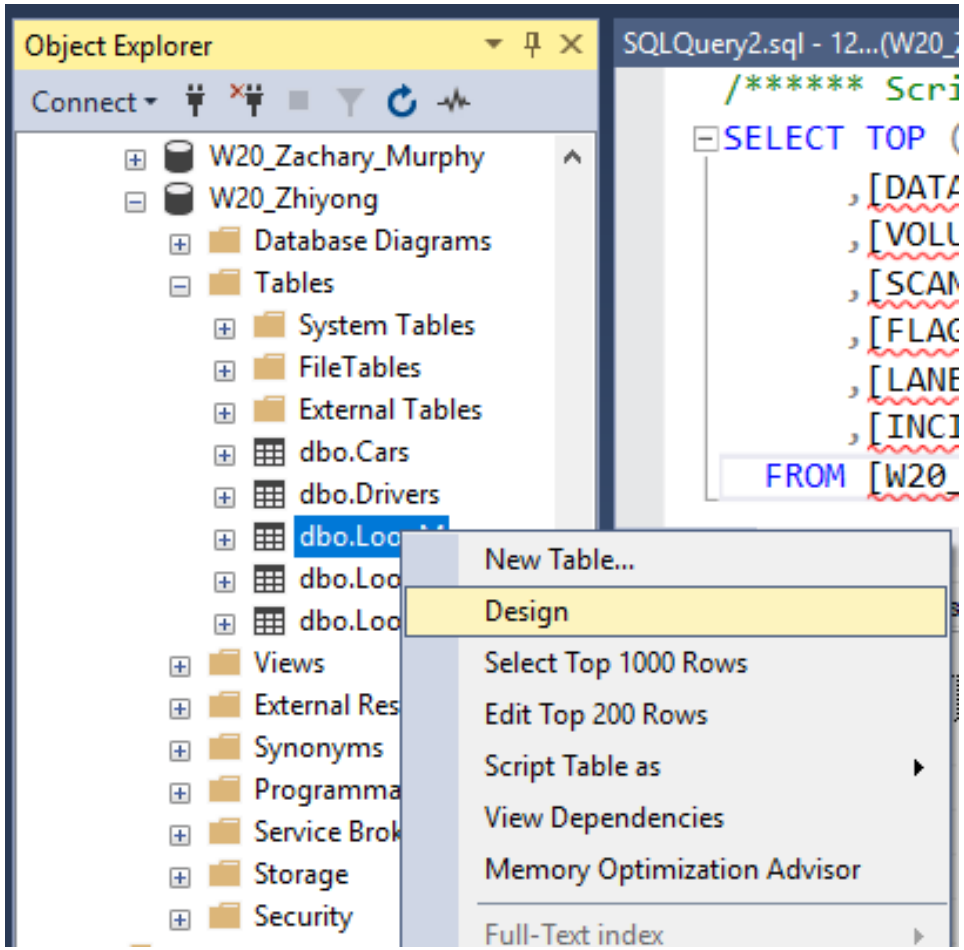
Step 10: Look at the Data

- The query will be created automatically.
- The imported data should look exactly the same as those in the Excel worksheet.



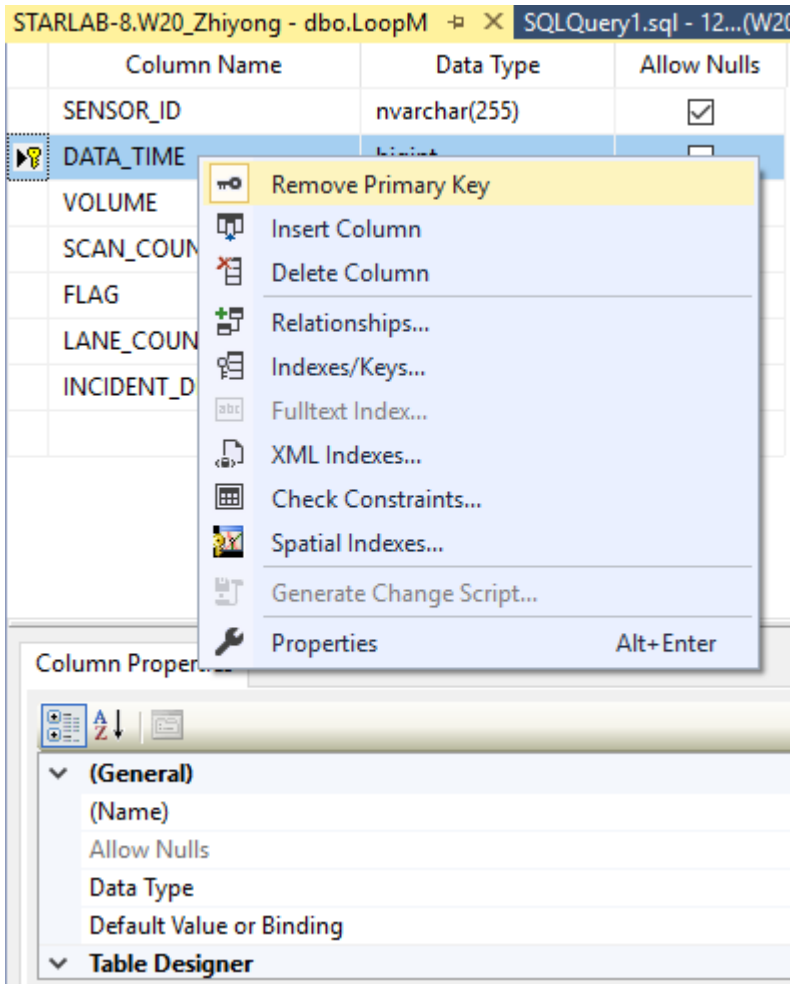
Step 10: Define the Keys

- In order to specify a key for each table, right click on the table, then click **Design**.



Step 10: Define the Keys

- Right click **DATA_TIME** → **Set Primary Key** to set this attribute as the primary key of this relation.
- Notice that SQL Server does not allow null for the primary key attribute after you have defined the key.
- Close the design window and save your change.



Step 10: Define the Keys

- Set the same primary key (DATA_TIME) for the other two tables using GUI or ALTER TABLE statement.
- The following statement shows how to set the primary key for the “LoopS” table.

```
ALTER TABLE loops
ALTER COLUMN data_time BIGINT NOT NULL

ALTER TABLE loops
  ADD CONSTRAINT pk_loops PRIMARY KEY (data_time)
```

- Note that in order to define an attribute as the key, you need to first add a NOT NULL constraint to the attribute.
- Now you have the Excel Worksheets imported to your database in the SQL Server.

Query Practice

Develop some queries to answer the following questions (note: the three tables can be joined based on the DATA_TIME field).

- Find the time intervals with scan_count > 700 from the M loop data.
- Do the same intervals have scan_count > 700 from the S loop measurements?
- Are there any intervals with vol = 0, but scan_count > 0 in the M loop data?
- What are the dual-loop (T loop) measured speed for intervals with M-loop measured scan_count > 700?
- Develop your own questions and use SQL to find the results.

Disconnect from Your Database

- Remember to disconnect from your database and close SQL Server Management Studio before leaving the lab.