INFO20003 Week 4 Lab

ER Modelling with MySQL Workbench

Objectives:

In this lab you will:

- Design an ER model
- Forward engineer the ER design to SQL
- Prepare the schema for next week's lab

Section 1: Develop an ER model

Choose **either** Task 1.1 or Task 1.2. Students who are more confident with ER modelling are suggested to complete Task 1.2.

◆ **Task 1.1** Build a physical model using MySQL Workbench for the bus company case study that was covered in Tutorial 4. Be sure to choose suitable attribute names and data types, paying attention to the length and precision of data types.

OR:

◆ **Task 1.2** Consider the following 'MusicMaker' case study. Build a physical ER model using MySQL Workbench. Be sure to choose suitable attribute names and data types, paying attention to the length and precision of data types.

MusicMaker is an app that provides a way to simplify your digital music catalogue. Music tracks are categorised according to genre (for example, classical, pop, or alternative). Users can add their own genres, but each music track can only belong to one genre, and all tracks on an album must be categorised as the one genre. The date a genre was added to the system needs to be stored. For every track, MusicMaker records the title, the track length, the year it was originally released, the artist, and the track number of the track on the album(s) it belongs to. Further, for each track we record the date it was added to the library, the last time the track was played and a rating from 0 to 10. Each track is released by a record label, and for each record label company we record their name, physical address, website, email and phone number. Lastly, for each album we record the album title and the year of release. About each artist we record their name, their website, their Twitter handle and Instagram account. Not all tracks will belong to an album, but each music track must have a genre, record label and artist.

Section 2: Forward engineering your ER model

The advantage of most ER modelling tools like MySQL Workbench is that they allow database designers to convert between ER models and actual databases. These processes are called “forward engineering” (converting a model to a database) or “reverse engineering” (generating a model based on an existing database).

In this section, you will forward engineer your ER model to a SQL script which will create the tables and relationships in the model.

◆ **Task 2.1** From the menu choose **File** > **Export** > **Forward Engineer SQL CREATE Script**:

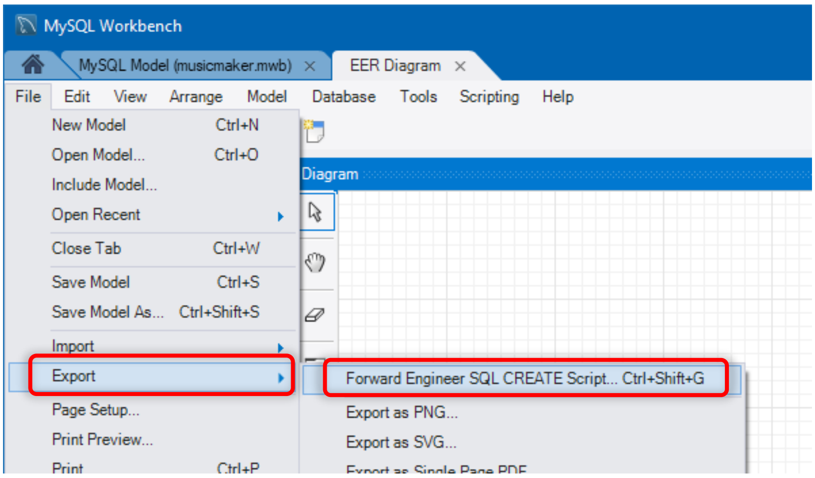
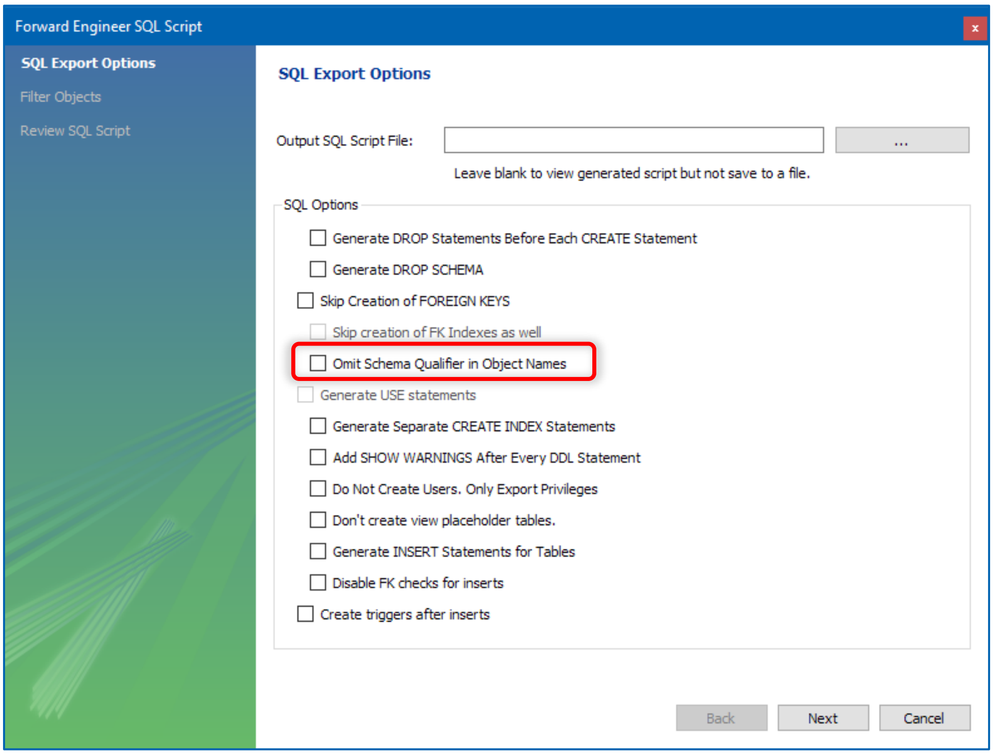


Figure 1: The Forward Engineer SQL CREATE Script menu option

The Forward Engineer SQL Script window appears:



SQL Export Options

Output SQL Script File:

Leave blank to view generated script but not save to a file.

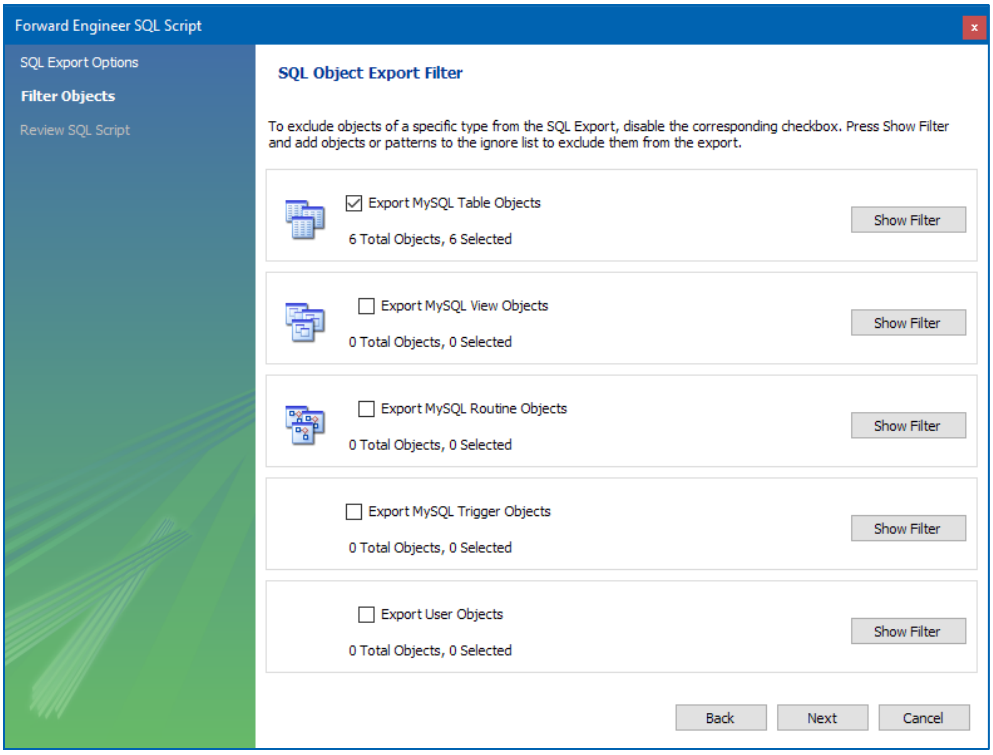
SQL Options

□ Generate DROP Statements Before Each CREATE Statement
□ Generate DROP SCHEMA
□ Skip Creation of FOREIGN KEYS
□ Skip creation of FK Indexes as well
□ Omit Schema Qualifier in Object Names
□ Generate USE statements
□ Generate Separate CREATE INDEX Statements
□ Add SHOW WARNINGS After Every DDL Statement
□ Do Not Create Users. Only Export Privileges
□ Don't create view placeholder tables.
□ Generate INSERT Statements for Tables
□ Disable FK checks for inserts
□ Create triggers after inserts

Figure 2: The SQL Export Options window in the Forward Engineer process

◆ **Task 2.2** Ensure that “Omit schema qualifier in object names” (circled in red in Figure 2) is checked, then click “Next”.

The Filter Objects window appears:



SQL Object Export Filter

To exclude objects of a specific type from the SQL Export, disable the corresponding checkbox. Press Show Filter and add objects or patterns to the ignore list to exclude them from the export.

☑ Export MySQL Table Objects
6 Total Objects, 6 Selected

□ Export MySQL View Objects
0 Total Objects, 0 Selected

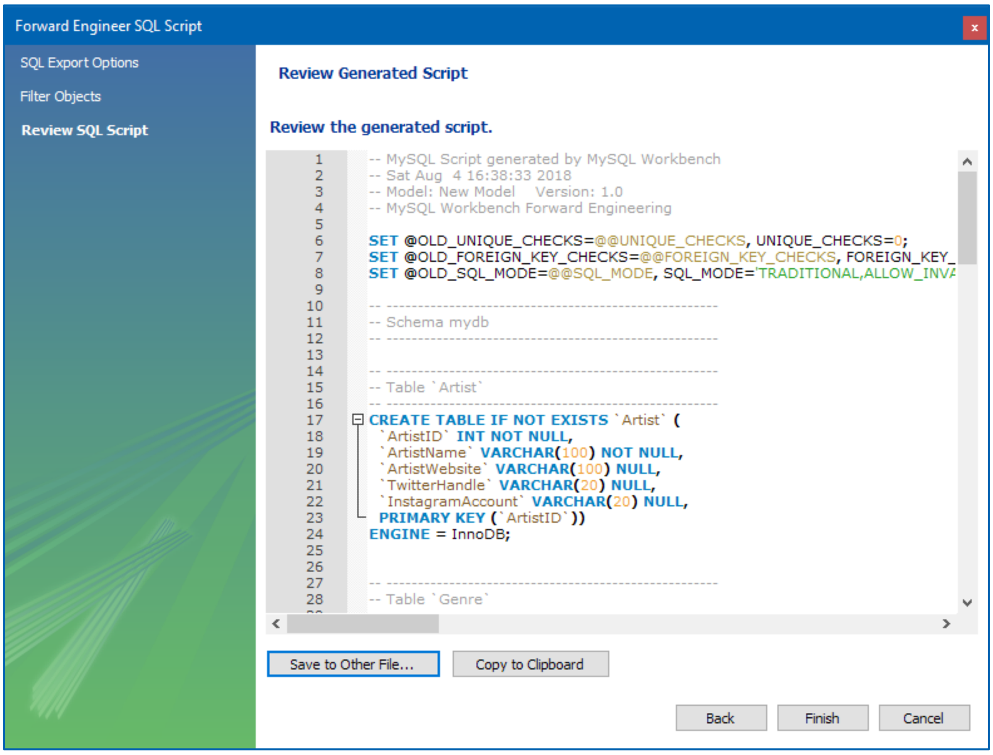
□ Export MySQL Routine Objects
0 Total Objects, 0 Selected

□ Export MySQL Trigger Objects
0 Total Objects, 0 Selected

□ Export User Objects
0 Total Objects, 0 Selected

Figure 3: The Filter Objects window of the Forward Engineer process

◆ **Task 2.3** Click “Next” again:



Review Generated Script

Review the generated script.

```
-- MySQL Script generated by MySQL Workbench
-- Sat Aug  4 16:38:33 2018
-- Model: New Model    Version: 1.0
-- MySQL Workbench Forward Engineering

SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;
SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_
SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='TRADITIONAL,ALLOW_INVA

-- -----------------------------------------------------
-- Schema mydb
-- -----------------------------------------------------


-- -----------------------------------------------------
-- Table `Artist`
-- -----------------------------------------------------
CREATE TABLE IF NOT EXISTS `Artist` (
  `ArtistID` INT NOT NULL,
  `ArtistName` VARCHAR(100) NOT NULL,
  `ArtistWebsite` VARCHAR(100) NULL,
  `TwitterHandle` VARCHAR(20) NULL,
  `InstagramAccount` VARCHAR(20) NULL,
  PRIMARY KEY (`ArtistID`))
ENGINE = InnoDB;



-- -----------------------------------------------------
-- Table `Genre`
```

Figure 4: The Review SQL Script window of the Forward Engineer process

◆ **Task 2.4** Take some time to read through the SQL script displayed.

Look carefully at the syntax of the CREATE TABLE command. Pay particular attention to the syntax used to set up foreign keys. You may be asked to write CREATE TABLE statements in tests and exams.

◆ **Task 2.5** Save the SQL script to a file by clicking the "Save to Other File" button.

◆ **Task 2.6** Click Finish to close the wizard.

Section 3: Install this semester's lab schema

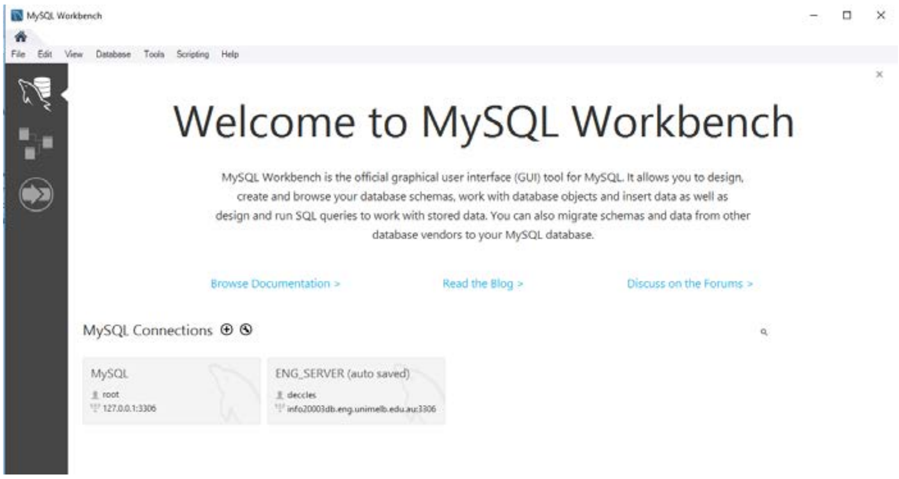
Throughout the rest of the semester, we will be using a "department store" schema to learn SQL and practice writing queries. We will now run the script to create the department store schema in your database.

◆ **Task 3.1** Download the info20003labs-depstore.sql script.

This file is on the LMS.

◆ **Task 3.2** Connect to your preferred MySQL server.

You may connect to either the info20003db.eng.unimelb.edu.au server, or your own MySQL Server if you installed this on your own computer in Week 1.



Welcome to MySQL Workbench

MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

MySQL Connections

MySQL
root
127.0.0.1:3306

ENG_SERVER (auto saved)
deccles
info20003db.eng.unimelb.edu.au:3306

Figure 5: Click your saved MySQL Connection to info20003db.eng.unimelb.edu.au or your local server.

This should bring you to the Query window:

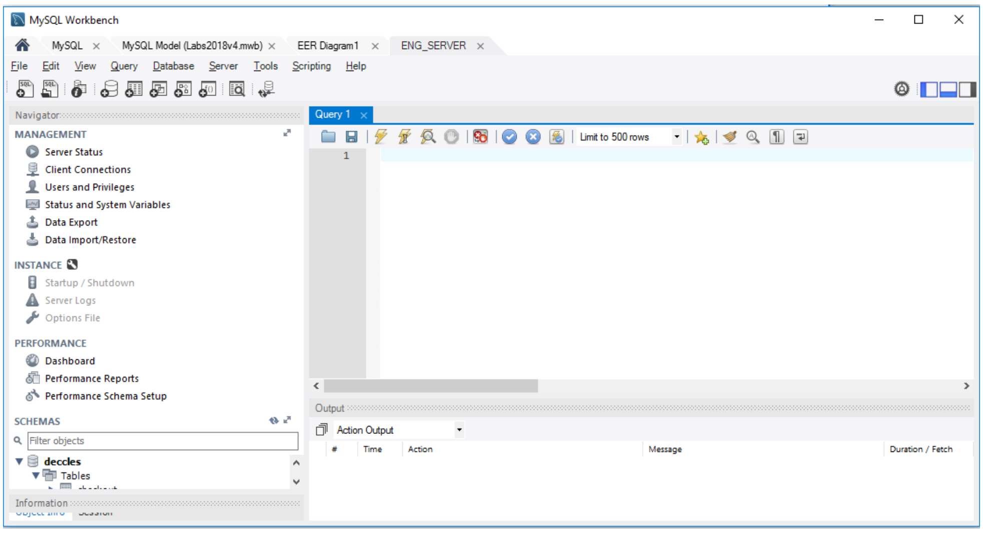


Figure 6: The New Query window

◆ **Task 3.3** From the menu, choose **File** > **Open SQL Script** and select the sql script you downloaded in Task 3.1.

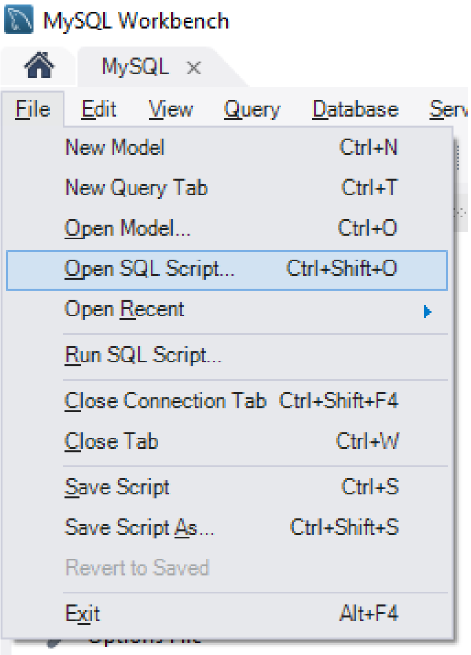
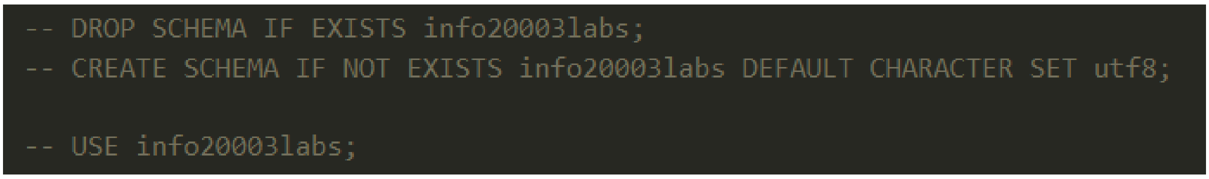


*Figure 7: The **Open SQL Script** menu item*

The script will be displayed in a new Query tab.

◆ **Task 3.4** If you are connected to **your own** MySQL Server, remove the double hyphens (“- -”) from the lines shown below in figure 8. This uncomments the DROP SCHEMA, CREATE SCHEMA and USE lines in the script.

If you are connected to **info20003db.eng.unimelb.edu.au**, do not modify these lines. They need to remain commented out.



```
-- DROP SCHEMA IF EXISTS info20003labs;
-- CREATE SCHEMA IF NOT EXISTS info20003labs DEFAULT CHARACTER SET utf8;

-- USE info20003labs;
```

Figure 8: The lab script, showing lines to uncomment for local MySQL Server installs

◆ **Task 3.5** Click the lightning button to run the entire SQL script.

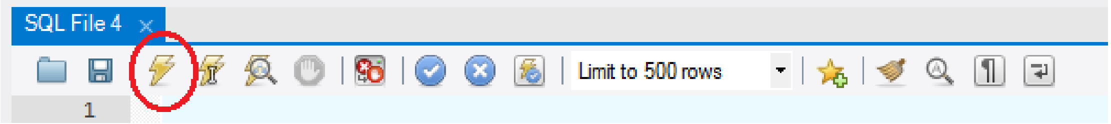


Figure 9: The Lightning button runs all SQL in the Query window.

◆ **Task 3.6** Switch to the Schemas panel (circled in blue in Figure 10) and refresh the list of databases and tables by clicking the Refresh button (circled in red).

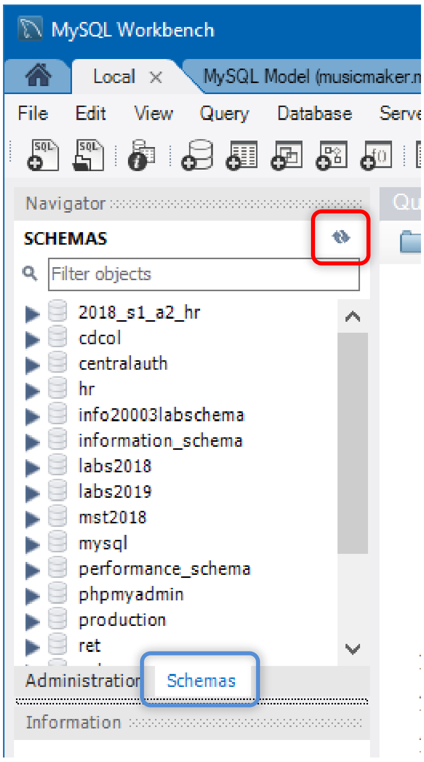


Figure 10: Refreshing the Schemas panel of the MySQL Workbench window

Under labs2019 (on your own MySQL Server) or your username (on the info20003db server), you should see the following eight tables:

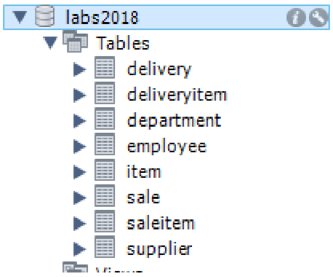


Figure 11: Tables in the lab schema

You can view the contents of a table by clicking the rightmost icon that appears when hovering the mouse over a table name:

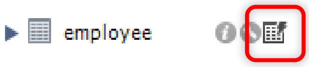


Figure 12: Viewing the contents of a table

◆ **Task 3.7** View the contents of some of the tables in the schema to familiarise yourself with its structure.

You have successfully installed the lab schema. Next week, we will begin to use it to explore SQL.

Note: If you do not see the tables in your query output window, ask your tutor for help.

End of Lab 4