Exercise 6 – Data Definition Language

Consider the following ERD for a database to manage an online bookstore. Before Amazon became an online store selling everything under the sun, it was just an online bookstore.

An online bookstore needs customers to register with their email address for an account. Each time a customer wants to make a purchase, they might put several books in their shopping cart. The customer might buy multiple copies of the same book.

Before customers can buy a book, details such as author and publisher need to be entered in the database, along with the price.

Additionally, Information about which warehouse and how many of any book is required to be kept in the database.

A diagram of a database

Description automatically generated

# Part A – With Instructor

Connect to your MySQL account on sit.udst.edu.qa and remove any existing tables.

Write an SQL script that can create the tables and all attributes as shown in the ERD. Do note that this includes all primary and foreign keys as well as any surrogate keys.

The easiest approach is to do this:

* Start with blank files for the creation and clean up scripts.
* Write a create table statement for one table and execute the entire script to make sure it works.
* Write a drop table statement for the newly added table and execute the entire script to make sure that it works.
* Repeat the process adding one new table at a time. Put the new tables at the end of the create script and the beginning of the delete script. To drop the tables, you will need to drop them in the reverse order; ask yourself why.

# Part B – Additional Exercise

Try drawing the ERD given in this exercise (or at least 3 or 4 tables from it) using MySQL workbench.

From the File menu, select Export then “Forward Engineer SQL CREATE script..”. This will create an SQL file that you can use directly instead of typing the DDL commands by hand.

The default options will probably not work but you can omit the “schema qualifier”.

# Output Format

The output from the schema generation is \*messy\* and you will find that in general, handwritten DDL statements are much easier to read.

To create the table by hand I would write:

create table warehouse (

warehouse\_id int primary key,

phone varchar(50) not null,

city varchar(50) not null

);

Here is the warehouse table as generated by MySQL workbench:

CREATE TABLE IF NOT EXISTS `mydb`.`warehouse` (

`warehouse\_id` INT NOT NULL,

`phone` VARCHAR(45) NOT NULL,

`city` VARCHAR(45) NOT NULL,

PRIMARY KEY (`warehouse\_id`))

ENGINE = InnoDB;

What is all the stuff that we see from the generated code?

1. Each name is surrounded by back-ticks (``). Initially, you were not permitted to use reserved words for parts of your table. For example you cannot have a table called ‘int’ or an attribute called ‘key’. If you put back-ticks around the name, you can do it. Because the GUI allows you to write anything, the code generator puts back-ticks around every name.
2. The primary key is always given as a constraint rather than inline.
3. In front of the name of the table, the generator will include a “schema identifier” unless you ask it to omit. The schema identifier is the name of the database that will be used. When you type “create table student ()” this creates a table in the currently active database (also called a schema). If you type “create table blah.student ()” this will create a table called student in the database (schema) named blah.
4. The item “ENGINE = InnoDB” is an indication to MySQL which database storage technique will be used for this table. This is outside the scope of this course so you can ignore it. Each database engine has different features, the InnoDB engine is one of the most popular database engines that works the way that you expect. Just for comparison, there is an engine called Archive that allows you to write data but doesn’t allow you to delete it, there is an engine called Memory that keeps everything in memory. This makes the database very fast but if you power off the server then everything vanishes.