Database Theory and Applications for Biomedical Research and Practice (BMIN 502/EPID 635)
Spring 2019
Assignment 6, continued: Implementing a clinical trial database for ABIC- in MySQL!

1. Finish up the implementation of the ABIC data model in the MySQL Workbench. This includes all tables, and all fields.

2. Create the database from your model.
   http://download.nust.na/pub6/mysql/doc/workbench/en/wb-getting-started-tutorial-creating-a-model.html
   a. Make sure you have created a database connection called MyABIC or something like that.
   b. Finish the model. Make sure that the default column is empty for each field. To change it, right-click on the field name in the table template (where you entered the field name and type), and select Clear Default from the popup menu.
   c. Save your model.
   d. Click on Database|Manage Connections in the main menu
   e. Click on the connection you created for ABIC- this is in the list of connections on the MySQL Connections pane on the left. This will populate the Connection Name slot.
   f. Click on Test Connection button, entering your password, if needed.
      i. You should see a popup that tells you that you have successfully made the MySQL connection.
      ii. Click on Close.

3. From the main menu, select Database|Forward Engineer. You will then see the wizard that sets the parameters for connecting to the database,
   a. There should be no need to change any settings on this page. Click the Continue button.
   b. The next page allows you to set options. For now, do not set any of these, and just click on Continue.
   c. On the next page, you will select the objects to forward engineer. Since you have only tables, that should be checked automatically, but if not, make sure it is. Click Continue.
   d. You will now see the SQL Script that is going to be executed to create the database. Aren't you glad that you don't have to type this? When you get to this point, STOP. We are going to review this script in class.
   e. After we discuss the script, click on continue. You might see errors in the log file. If you have errors, the database has NOT been created! We will discuss how to fix this in class.
   f. If you have no errors, you will see green checkmarks for each of the four forward engineering processes, and the message "Forward Engineer Finished Successfully". Congratulations! You now have an ABIC database in MySQL!
   g. But you still need to test it. Here is how:
      i. Click on the My ABIC tab. This will open the SQL editor.
      ii. Type **SHOW DATABASES;** and then click oin the lightning bolt icon- this will execute the command. This will list your database schemata. Identify the schema for your database- it is likely called "mydb".
      iii. Delete the SHOW DATABASES command and then type the following on separate lines:
         USE mydb; (or whatever the name of your schema is)
         SHOW TABLES;
         SELECT * FROM PATIENT;

iv. Click on the lightning bolt to execute the script. You will see a Result Grid that has null values for each field in the Patient table, This is good, since you haven't entered any data yet!

4. So you have a working ABIC database- so what? First, be sure to save your model! Next, we will enter some data. Here is the easiest way to do it:
   a. Go to your Model tab
   b. Right click on the table to which you are adding data
   c. Click Edit (name of the table)
   d. Click on the Inserts tab on the bottom of the screen
   e. Start typing in your data
   f. You can add a new row (record) by clicking on the table icon with the green plus-sign.
   g. Be sure to click on the Apply changes icon to commit your entries to the database

5. There is another method to add data, which you might find easier to use
   a. Click on the MyABIC tab to bring up the SQL query pane (where you typed in the code for step 3.g).
   b. In the left-hand pane, enter the name of you schema (probably mydb) into the Schemas slot, and click on the refresh icon. Or, you can get a list of your schemas by clicking on the refresh icon when the slot is empty.
   c. Right-click on a table, and then select "SELECT Rows – Limit 1000". There's also a little icon on the right of each table name that looks like a greid- that will also bring up the grid so you can enter data.
   d. You will then see a Result grid, in which you can type data. You can also select the Form Editor, which might be easier to use- these options are available in the icon array on the right-hand side of the Result Grid.

6. Add a few records in the Patient table, with ID=1, 2, 3, etc. Note that DATETIME fields must be entered as YYYY-MM-DD HH:MM:SS. Click on the Apply button to save your records. You will see the Workbench create the SQL code for you!

7. Then, try adding a record in a child table of your choice, with a different Patient ID, say 999. You will (or should!) get an error like this:
   ERROR 1452: 1452: Cannot add or update a child row: a foreign key constraint fails
   We will discuss this in class- this constraint is called referential integrity, which makes it impossible to create "orphan" records.

8. Using the Workbench, add some data to your ABIC database. Add three or more patients, and for at least one of the patients, several admissions, with radiology and clinical exam data.

9. Write a simple SQL query that retrieves records from the database, based on selection criteria of your choice. Remember to document your code!! Save the query as a text file as **yourlastname_BMIN502_19_6a.sql.** Then, submit to Canvas for Assignment 6 by 9am, March 13.

10. Using the code in the slides or in the create DD.sql file on Canvas, create a data dictionary of your database. Export this to a .csv file and add coding information based on the conceptual model for ABIC as described in the handout. Save the file as **yourlastname_BMIN502_19_6b.csv.** Then, submit to Canvas for Assignment 6 by 9am, 3/19.