

# TORONTO METROPOLITAN UNIVERSITY

## CIND-110 DATA ORGANIZATION FOR DATA ANALYSTS

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### *Assignment I*

## Design and Maintain Relational Databases

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#### Assignment Context:

- A department is planning to migrate its local servers to a computational cloud platform, and the administration has requested each unit's DBA to ensure the secure migration of their respective databases to the new platform.
- A data analyst has been tasked with extracting and analyzing some data from an existing database with an outdated logical model stored on a particular server.
- To extract required data, a data analyst needs to check the most recent logical model of the existing database.
- A department unit aims to maintain its local database with more information and ensure its alignment with the information on the main central database.

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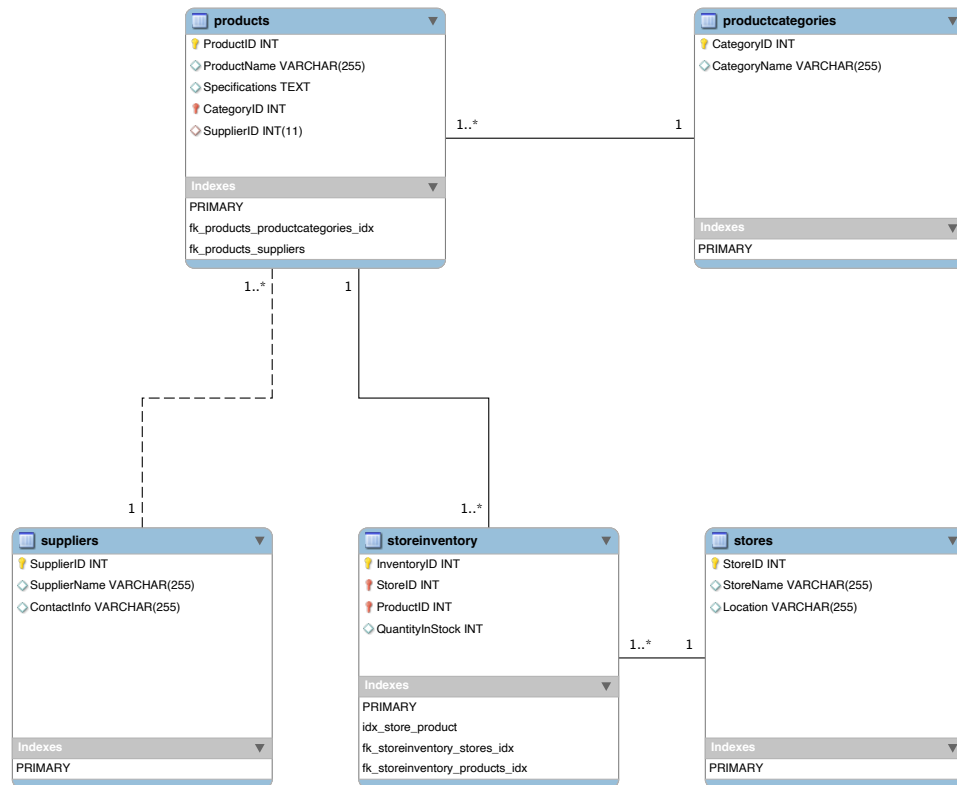
**Starts:** Wednesday January 17, 2024, 11:59 PM

**Due:** Wednesday, February 14, 2024, 11:59 PM

**This assignment counts for 15% of the total grade**

## General Instructions:

- This assignment aims to give you hands-on experience in forward and reverse engineering processes. Additionally, you will learn how to create and execute basic and advanced queries with the **ElectronicsDB** dataset. You can access the dataset as an **SQL** file from the **Assignment\_1** tab on the course shell.
- The Entity-Relationship (ER) diagram below illustrates the design of the **ElectronicsDB** database schema, including the names of the entities, the attribute data types, and the types of relationships.



- Download the **ElectronicsDB.sql** file and execute it using the **MySQL Workbench** tool to load the database to your virtual desktop environment or local machine.
- Ensure that the primary and foreign keys are identified, and entity and referential integrity constraints are retained for the **ElectronicsDB** database, all based on the above ER diagram. If necessary, please add any missing keys.
- After identifying the cardinality ratios and their directions for each relationship (whether they are one-to-many, one-to-one, or many-to-many), create them and synchronize the new ER model to the **ElectronicsDB** database source.

## Part I: [Total Points: 30]

### • Question 1 [15 Pts.]

Use the MySQL Workbench tool to perform a **reverse engineering** process on the entire database, including the three tables and their cardinality ratios. Save the resulting logical data model as an MWB file and store it on your TMU Google Drive.

#### Notes

1. To **reverse engineer** the database, please follow the instructions provided in the official MySQL Workbench documentation at the following link:  
<https://dev.mysql.com/doc/workbench/en/wb-reverse-engineer-live.html>
2. **Submission:** Submit the resulting logical data model in MWB format along with a screenshot in either JPG or PNG format. The logical model should represent all the database entities, attributes, keys, entity constraints, and referential integrity constraints.

### • Question 2 [15 Pts.]

Use the MySQL Workbench tool to **export** the entire database and save the output script as an SQL file onto your TMU Google Drive.

#### Notes

1. To **export** data using MySQL Workbench, please follow the instructions provided in the official MySQL Workbench documentation at the following link:  
<https://dev.mysql.com/doc/workbench/en/wb-admin-export-import-management.html>
2. **Submission:** Submit the output script in SQL format. The script should include the structure of the entities in addition to the data stored in these entities.

## Part II: [Total Points: 70]

### Notes

- For each of the following 7 questions: Write your answer as a **MySQL** query statement, execute it, and take a screenshot of the results. If the query result has more than 10 records, limit the output to the top 10 before taking the screenshot. Then, paste the answer and the respective screenshot into a Word or Google document file with the question number.
  - **Submission:** Submit your answer sheet for this part either in **PDF** or **DOCX** file format.
1. [8 pts.] Retrieve all products with their corresponding category names and supplier names.
  2. [8 pts.] Retrieve the names of all products with the same supplier as 'Alpha Smartphone'.
  3. [10 pts.] Retrieve all products that are either in the 'Smartphones' category (CategoryID 31) or supplied by SupplierID 50.
  4. [10 pts.] Find the total quantity in stock for each product.
  5. [10 pts.] Calculate the average stock quantity for each product category and list the categories with an average stock above 70.
  6. [12 pts.] Which products in the 'Cameras' category are supplied by at least one supplier?
  7. [12 pts.] Find products with a total quantity in stock higher than the average stock quantity of all products in their respective category.

Here is a link for more details on **how to submit your assignment** to the course shell:  
<https://www.torontomu.ca/courses/students/tutorials/assignments/>

This is the end of the assignment