

## **Comp1168-Database Management-Group Project**

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**Group Size:** Maximum **Six (6)** students: Students from different CRNs can form a group together

**Due Date:** Sunday April 9, 2023 (submission through Blackboard)

### **Project Synopsis:**

Your team has been hired by **ABC Bus Transit Company** to create a database that would store information about their buses, drivers, routes, trips, passengers, and company staff etc.

The business case description for **ABC Bus Transit ® Company** follows:

**ABC Bus Transit Company** offers trips to the public between major Canadian cities. Registered Passengers can book tickets online, by paying online either with a credit card or PayPal, for their upcoming bus trips from ABC's website. Passengers can register by creating an account free of cost by visiting ABC's website. Passenger can login and can see their past and future trips with ticket prices. Passengers can also cancel a trip up to 2 hours before the departure. Passengers can also buy tickets from major bus stops either through vending machines or from the ticket booths at some major stops (big cities, terminal stations etc.)

ABC has 27 different routes with a start and end city for each route. Each route is identified by a unique Route Id (i.e. Route No 12) and has a start and end stop with a number of intermediate stops. The frequency of buses that operate on these routes is different. Some routes only have one or two buses each day whereas some popular routes have multiple buses operating at different times. There are some routes that are either seasonal (only operate in summer months for example) or operate on weekends only.

The scheduling department, headed by a manager, is responsible for assigning a bus (vehicle) and a company driver to a trip. A trip is defined as a bus operating between any two stops on a specific route. Each route has a number of intermediate stops and the database would store the street address for each stop.

The buses are also sent to a company workshop for routine maintenance/oil changes after running for 5000 Kms or once a month (whichever comes first) and stay in the workshop for a day (unless the workshop Manager decides to keep the bus for a longer time due to some defect identification). If a bus ever breaks down (due to some defect) on the road, the driver would inform his/her supervisor and the supervisor then contacts the workshop manager who sends a mobile team of mechanics to fix it on spot or take it to the nearest workshop. The database would keep a track of buses' history in terms of their unique bus ids, license plates, year of manufacture, operational history (what route, distance the bus covered on each day) , any down time (the time a bus remains idle at a terminal stop)

Drivers should be able to see their schedule for the next 4 weeks online and also can requests their preferred shifts. The supervisor may accommodate their request but it is not guaranteed. The supervisor should be able to generate reports for each route, buses, and drivers.

Workshop Manager can also schedule mechanics for shifts and mechanics should be able to see their schedules online. Each bus entering or leaving the workshop is checked in and checked out. Workshop staff should be able to add the type of work performed on each bus such as oil change, tire replacement, engine overhaul etc. Workshop Manager should be able to generate reports such as mechanical work performed on each bus or each month (for example).

### **Project Requirements:**

Please make reasonable and educated assumptions about missing/ ambiguous information and properly document (in a few words/sentences only) your assumptions and the rationale behind those assumptions.

1. Please create a **Conceptual Data Model (using Draw.io or Visio)**, containing entities and their relationships as they exist in the problem domain (including any M:M relationships)
2. Please create a **Physical (Logical) Data Model** using MySQL Workbench® based on the conceptual model. Create a new schema named **GroupxxSchema** (xx is your

group number, i.e; [Group21Schema](#)) and then create a physical EER model in it containing the tables with appropriate columns and relationships among these tables (resolved as 1: M only). Assign proper data types to columns and add appropriate keys & constraints. Make sure that all relations are in 3NF.

3. Now Forward Engineer this EER model to create tables and relationships and INSERT 10-15 records per table.

4. Create the following **TEN queries**: ([read the following Project Submission Requirements' file no 3](#) part carefully about the submission process for this section)

- 1) Create a query that retrieves a **passengers travel history** (future and past trips) including the trips taken, fare paid, distance travelled including any cancelled trips. (Five results minimum).
- 2) Create a query that retrieves a **driver's schedule** for an upcoming week including the information about routes and buses they will drive (make sure to leave at least 8 hours rest period after every trip and their hours per week should not exceed 40).
- 3) Create a query that retrieves the **schedule for a particular route** with the arrival and departure time for each stop (Five results minimum).

- 4) Create a query that retrieves a particular **bus's travel history** for a particular week including the routes and exact travel times including any down time or time spent in a workshop.
- 5) Create a query that retrieves the **passenger bookings list** for a particular bus operating on a route including passenger details and their start and end bus stops.
- 6) ABC Company's management wants to send a "Happy holidays" greeting cards in December and needs the full names and complete addresses (street address, city, province, Postal Code) for all human beings who are part of the company (drivers, staff, workshop crew etc.) so create a query that retrieves this information (usually called a **mailing label**).
- 7) Create a query that retrieves the **total number of buses that operated on each route** on a particular date (use any date of your choice)
- 8) Create a query that retrieves the **number of passengers who booked tickets for each trip for a particular date and route** (use any date/route of your choice).
- 9) Create a query that retrieves a **list of all buses serviced in the workshop** during a particular week, including details of the bus, defect types, repairs performed and the mechanic(s) who performed these repairs.

- 10) Create a query that retrieves the total number of hours worked by each driver during a particular week. (Use any dates/week).

### **Project Submission Requirements:**

**Each group will submit three(3) separate files through Blackboard Submission Link before the deadline.**

#### **File no 1-Project Report (Pdf or MS word) document containing:**

**File Name GroupXXReport: XX is your group number i.e.; Group77Report.pdf**

1. A cover page containing **all members' Last names, First names, Student Ids and CRN.**
2. Second page will contain the **Conceptual Data model** (created in Draw.io or similar software and then imported as Image in MS Word/pdf).
3. Third Page will contain **Logical/Physical ER model** (created in MySQL Workbench or similar software and then imported as Image in MS Word/pdf). ( **See Appendix A of this document for instructions**)
4. Fourth Page will have (any) assumptions or clarifications.

#### **File No: 2- Database creation SQL Script file:**

**File Name GroupXXSchema: XX is your group number i.e.; Group77Schema.sql**

Script will create the **schema** containing the required tables and data.

Make sure this file executes without errors and creates the schema with all required tables and data.

(See Appendix B of this document for instructions).

### **File No: 3- Queries' Script file**

**File Name GroupXXQueries: XX is your group number i.e.; Group27Queries.sql**

Script file that will contain the queries created for the section4 as described above.

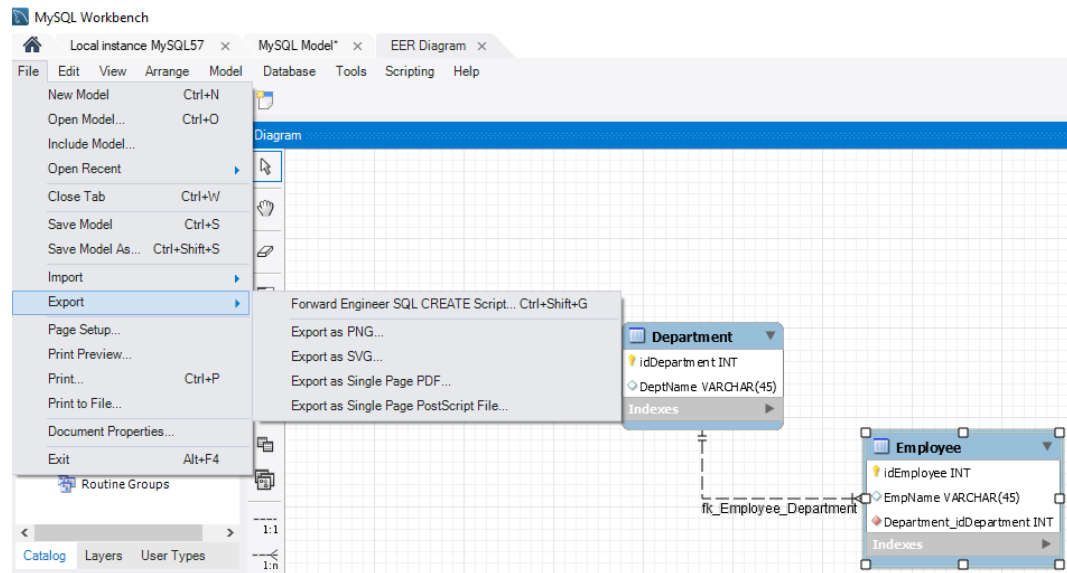
Add a comment before each query's sql code, which will contain the Question Number and then copy the original question (from the ten queries provided above)

**Five percent (5%) marks are reserved for proper file submission and organization, formatting of your report according to the specifications provided above.**

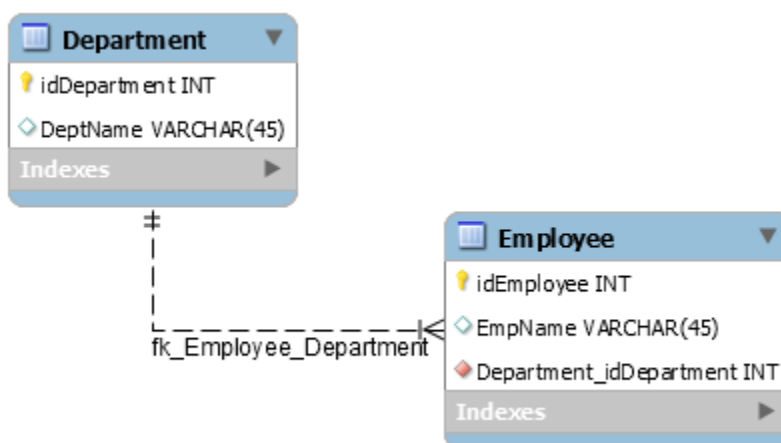
## **Appendix A: How to Export Models My SQL workbench as Image**

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### **File Export-Export as PNG**



Now Insert that PNG file in Word and will look like this

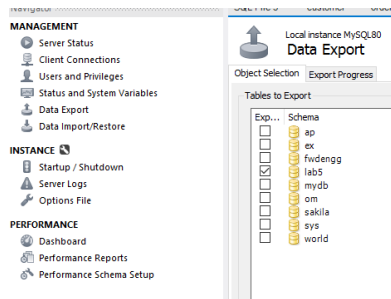


## Appendix B: How to Script a Schema (Table structure and Data)

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## 1. Main Server Instance Page--- click on Administration--- Management- Data Export



2. Pick the Schema and check the following options

3. Dump Structure and Data

4. Provide a script file name (**GroupxxSchema**) with its path selected.

5. Create Dump in a single Transaction

6. Include Create Schema

