Databases – Task 2

Task 1 (15 points)

A goal of the task is to prepare a design of a database model for the problem described below. The project should define tables, columns (including data types, length, nullability), primary and foreign keys. For each relation the corresponding tables need to be indicated. The model should be presented in a form of ER diagram.
Description of the problem:

1. A transport company provides a shipping service allowing customers to ship goods to any international location.
2. It owns vehicles described by a VIN number, make, model and maximum load. There is a responsible person assigned to each vehicle.
3. Customer data include name, address, phone number, email (optional)
4. The company provides services to customers around the world. A single transport may involve multiple vehicles. Each vehicle has a driver assigned (two if more than 8h trip)
5. Each order is described by the source and target locations, client id, a list of vehicles, a group of products to deliver.
6. Each product is assigned to one safety category (from I to IV) and has a volume, prices and a description of any length.
7. The order specifies the amount of goods, total cost, volume, time of pickup and delivery, as well as a delay flag.
8. Each employee has a supervisor. Only the company boss has none.

Task 2 (5 points)

Preparation of SQL commands for:

1. Creation of data model tables designed in Task 1 (taking into account primary and foreign keys)
2. Insert of sample rows into each table (min. 5 rows for each table and min. 10 ship orders)
3. Modification of rows for a selected table (min. 3 rows to be modified)

Task 3 (5 points)

Design of indexes for newly created tables with specification of indexing key, uniqueness, type of index (clustered or not) and the reason for index creation (e.g. speed-up of specific type of queries).

Task 4 (15 points)

Preparation of SQL SELECT reports based on newly created data model for:

1. Total volume of orders sent to each country in daily windows.
2. A list of 15 longest (distance-wise) deliveries for each client, in which at least two vehicles were used.
3. A list of drivers who realized more than 150% of average number of hours worked by an employee.
4. Maximum number of drivers used in a single delivery for each client.
5. Total number of orders in which source and destination countries differed, and a list of products didn't contain a specific good (choose from available data)

Task 5 (15 points)

Preparation of a stored procedure for an automatic assignment of another driver when the original is unavailable.

1. The procedure takes the order number for validation (as an input parameter)
2. It checks whether all drivers assigned to the delivery are available (not sick and not employed at another open delivery – without end date)
3. In case a driver is unavailable it tries to assign another available driver that is not busy at the time of the delivery plus an extra day before and after (database modification required)
4. If there are no available drivers it marks the order as delayed (database modification)
5. The procedure returns the result of the validation in the form of the report about modified rows.