Databases homework #2 – public car parks network

(students with even index number only)

Task #1 – database design (max 15 points)

There is a municipal car park system. It covers multiple public car parks maintained by the city. Besides having a name, geographic coordinates and an address, each car park offers some limited number of parking places located on one or more decks. A single parking place can be permanently assigned to the car owner living nearby or left free for any possible car visiting the place. Each car stay at the single parking place is being recorded – arrival time, departure time, as well as the car plate numbers are stored.

Please create an ER diagram with the data model for the described situation. Your model should include tables, columns with their types and nullability, as well as primary and foreign keys. Please remember about cardinalities.

Task #2 – data definition and manipulation (max 10 points)

Please prepare an SQL script which:

1. creates the database structure according to your model (that includes keys and other details),
2. inserts test data into your database (at least 10 records per table),
3. updates a few selected records;

Task #3 – indexes (max 5 points)

Please propose indexes for your database and prepare the SQL script creating them. Keep in mind that some data might be queried or modified more frequently than other data. Especially an information about currently available free parking slots in each park is being instantly display on the info screens around the city.

For each index write some short explanation why you think this very index should help, i.e. why you have selected required columns, why the index is clustered/unclustered etc.

Task #4 – data queries (max 5x3 points)

Please prepare SQL queries which:

1. lists the car parks ordered by their total number of parking places not assigned permanently to citizens,
2. lists the car parks ordered by the number of currently available (i.e. free & not-citizen) parking places,
3. lists the car parks ordered by the overall popularity in the last month (consider the guest places only, hint: compare car-hours used to the total number of car-hours available during the month),
4. display the 10 longest overall car stays,
5. display all currently pending, continuous car stays exceeding 2 days (consider the guest places only);

Task #5 – stored procedure (max 15 points)

Please create a stored procedure which will take a car park id as a parameter. The selected park is supposed to be closed and the procedure has to move places reserved for citizens to other nearest car parks around.

Delivery instructions

When you are done please create a report containing:

1. your personal data (name, surname, group, index number),
2. a declaration that you have implemented all tasks yourself,
3. test script proving that tasks #4 and #5 solutions are correct,
4. list of attachments (e.g. the .sql files and the ER image file);

Finally, please zip all artifacts together and send to kosickia@mini.pw.edu.pl