COMP3278 Introduction to Database Management Systems (8%)
Application Development
Due Date: 2023 March 17 (Fri.) 17:30 pm

The database schema solution developed in Assignment 1 has been adopted by the company with some simplification. The schemas are shown below (The underlined attributes represent the primary key of the relation):

- **Member** (member_ID, name, email, contact_number)
  Foreign Key: None
- **GroupOrder** (order_ID, member_ID)
  Foreign Key:
  {member_ID} referencing **Member**.member_ID
- **Package** (package_ID, owner_ID, order_ID, weight)
  Note: The weight column of the Package table stores the weight of the package in kg.
  Foreign Key:
  {owner_ID} referencing **Member**.member_ID
  {order_ID} referencing **GroupOrder**.order_ID
- **HomeDeliveryOrder** (order_ID, address)
  Foreign Key:
  {order_ID} referencing **GroupOrder**.order_ID
- **LockerPickupOrder** (order_ID, locker_ID, cell_number, arrival_datetime, collect_datetime)
  Foreign Key:
  {order_ID} referencing **GroupOrder**.order_ID
  {locker_ID} referencing **Locker**.locker_ID
- **ServiceArea** (service_area_ID, name, parent_area_ID)
  Foreign Key:
  {parent_area_ID} referencing **ServiceArea**.service_area_ID
- **Locker** (locker_ID, service_area_ID, name)
  Foreign Key:
  {service_area_ID} referencing **ServiceArea**.service_area_ID

Requirements

1) [20%] Build the database using MySQL

a. Using the schemas above, define tables with appropriate constraints.
b. Store the corresponding table definition commands in a SQL file called "tables.sql" (Please include also the referential constraints in the .sql file, make sure that the files can correctly build the necessary tables and constraints when import to another database).

2) [80%] Answer queries and display results

- Build from q1.php to q9.php, which solve the following nine queries, and display the result in a web browser.
- Note that besides the nine php files, you have to include one more file q8_submit.php, we will explain the use of q8_submit.php later.
- Browse the following page for the expected output of the php files with the given sample data: https://i.cs.hku.hk/~zrxie/as2_2023/index.html

Q1. [Given sample] Display the *member_ID*, *name*, *email* and *contact_number* of the member(s) whose *name* has "tom" in it.

- Case insensitive matching for the *name* of the member.
- Sort the records in descending order of *member_ID*.

Q2. [5%] Display the *order_ID*, *address*, *member_ID*, *name* of the HomeDeliveryOrder(s) that the *address* has "Hong Kong Island" in it.

- *member_ID* and *name* are the member's ID and the name of the member who made that HomeDeliveryOrder.
- Case insensitive matching for the *address* of the HomeDeliveryOrder(s).
- Sort the records in ascending order of the *order_ID*.

Q3. [5%] Display the *member_ID*, *name* and *service_count* of the member(s) who used the GroupOrder service for more than three times.

- *service_count* is the number of times the member has used the GroupOrder service.
- Sort the records in descending order of *service_count*, and then in ascending order of their *member_ID*.

Q4. [5%] Display the *member_ID*, *name* and *service_count* of the member(s) who used the LockerPickupOrder service for less than three times.

- *service_count* is the number of times the member has used the LockerPickupOrder service.
- The members who have not used any LockerPickupOrder service have to be included in the result (with *service_count* as 0).
- Sort the records in descending order of the *service_count*, and then in ascending order of their *member_ID*.

Q5. [5%] Display the *order_ID*, *total_weight* of the GroupOrder that is heavier than 10kg.

- *total_weight* is the sum of the weight of the packages of the GroupOrder.
- Sort the records in descending order of the *total_weight*, and then in ascending order of the *order_ID*.

Q6. [10%] Display the *order_ID*, *arrival_datetime*, *collect_datetime*, and *extra_hours* of the LockerPickupOrder(s) that is collected after 48 hours from its *arrival_datetime*.

- *extra_hours* is the number of extra hours that the LockerPickupOrder has not been collected after it has arrived at the locker for 48 hours.
- You may use TIMESTAMPDIFF() to solve this question.
- Sort records in descending order of the *extra_hours*, and then in ascending order of *order_ID*.

Q7. [10%] Display the *order_ID*, *locker_name*, *service_area_name* of the LockerPickupOrder with the Locker choose to be in the service area of "Hong Kong Island".

- The orders that store in the Lockers of the sub-ServiceArea(s) of "Hong Kong Island" will be included in the result.
- *locker_name* is the name of the Locker of the LockerPickupOrder.
- *service_area_name* is the name of the ServiceArea of the Locker.
- To simplify this question, you can assume that there is at most a 3-layer hierarchy structure of the ServiceArea in the testing data.

Q8. [25%]

In q8_submit.php, display a drop-down menu that contains all the *service_area_name* and *locker_count* for the serviceArea without sub-serviceArea.

- *service_area_name* is the name of the ServiceArea.
- *locker_count* is the total number of Lockers in the ServiceArea.
- Only list the record(s) with *locker_count* >= 1.
- The drop-down menu contains options in the format of "*service_area_name*: *locker_count*", sort the options in descending order of *locker_count*.
- Add a submit button, and after clicking the submit button, the page will be directed from q8_submit.php to q8.php.

In q8.php, display *locker_ID*, *locker_name*, and *uncollected_order_count* of the Lockers in the serviceArea selected from q8_submit.php

- *uncollected_order_count* is the total number of uncollected orders (with *collect_datetime* as NULL) of the Locker.
- Sort the record in descending order of *uncollected_order_count.*

Q9. [15%]

Update q8.php by making the locker_name of the locker (say, with locker_ID as *x*) a hyperlink to q9.php?locker_ID=x.

- In q9.php, display the *locker_ID*, *cell_number*, *member_ID*, member's *name* and *contact_number* of the LockerPickupOrder(s) in the locker *x* that is uncollected (with *collect_datetime* as NULL). Also list the *package_count* of the LockerPickupOrder.
  - *package_count* is the number of packages in the LockerPickupOrder.
  - Sort the records in descending order of *package_count*.

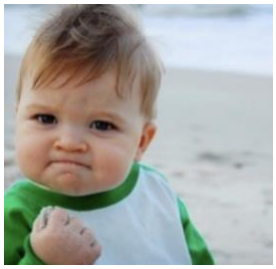
Hand in

1. Please compress "tables.sql", and all the related PHP files into one zip file and use your student number to name it (e.g. 303004954x.zip).
2. Please submit this zip file through our Moodle system before the deadline.

Important Notes

1. Let's enjoy this assignment as an interesting SQL practice.
2. Table names and attribute names must be **consistent** with the names provided in relation schemas.
3. Tutorials 2 and 3 contain important information about how to install and use PHP and MySQL. Please refer to these tutorials if necessary.
4. We provided sample tuples and sample query results for you to verify the correctness of your table definitions. Please do not submit the files with the sample data.
5. **The data that we use to grade your assignment may be different from the sample data.**

Please feel free to post your questions on Moodle forum or contact us
(TA Tom zerong@connect.hku.hk) if you encounter any difficulty with this assignment. We are very happy to help.



We wish you enjoy learning database technologies in this course!