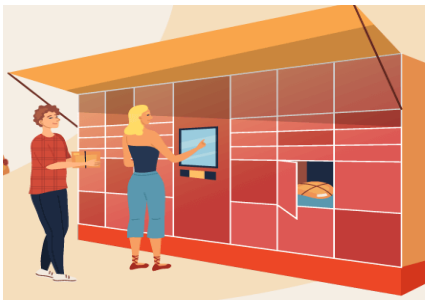
COMP3278 Introduction to Database Management Systems Assignment 1 (8%)

ER-Modeling

Due Date: 2023 Feb 17 (Fri.) 17:30 pm



The ABC company receives and temporarily stores the shipment packages for its members and allows them to group the packages for bulk delivery. You are a database designer of the ABC company, and you are building the database to support a system with the following functions:

1. **Member registration.** Each member has to provide his/her name, email, and contact number in the registration form. The system will automatically generate a unique member ID for each member.
2. **Claim package.** The company temporarily stores all the shipment packages (or packages) it receives and wait for members to claim them through the system. A member can claim a package by providing the package ID which is unique if they are from the same logistic company.
3. **Track package.** The company has many transshipment warehouses (or warehouses), each with a unique house ID.
    - When a package arrives at a warehouse, the system will store its arrival date and time.
    - A warehouse can transport packages to some other warehouse(s). The database will also store the transport links among various warehouses. Consider the example in Fig 1 below, each node in the graph represents a warehouse. A directed line exists from node A to node B if warehouse A can transport packages to warehouse B.

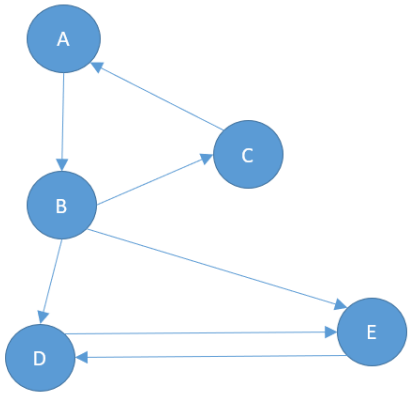


Fig 1. An example graph structure that models 5 warehouses and 7 transport links.

4. **Create group order.** A member can create a group order to gather at least one package(s) for bulk delivery. A group order is either a home-delivery order or a locker-pickup order.
    - **Home-delivery order**. If the member selects home-delivery order, the system will further ask for the address for the delivery.
    - **Locker-pickup order.** If the member selects locker-pickup order, the system will ask users to select the locker in 2 steps.

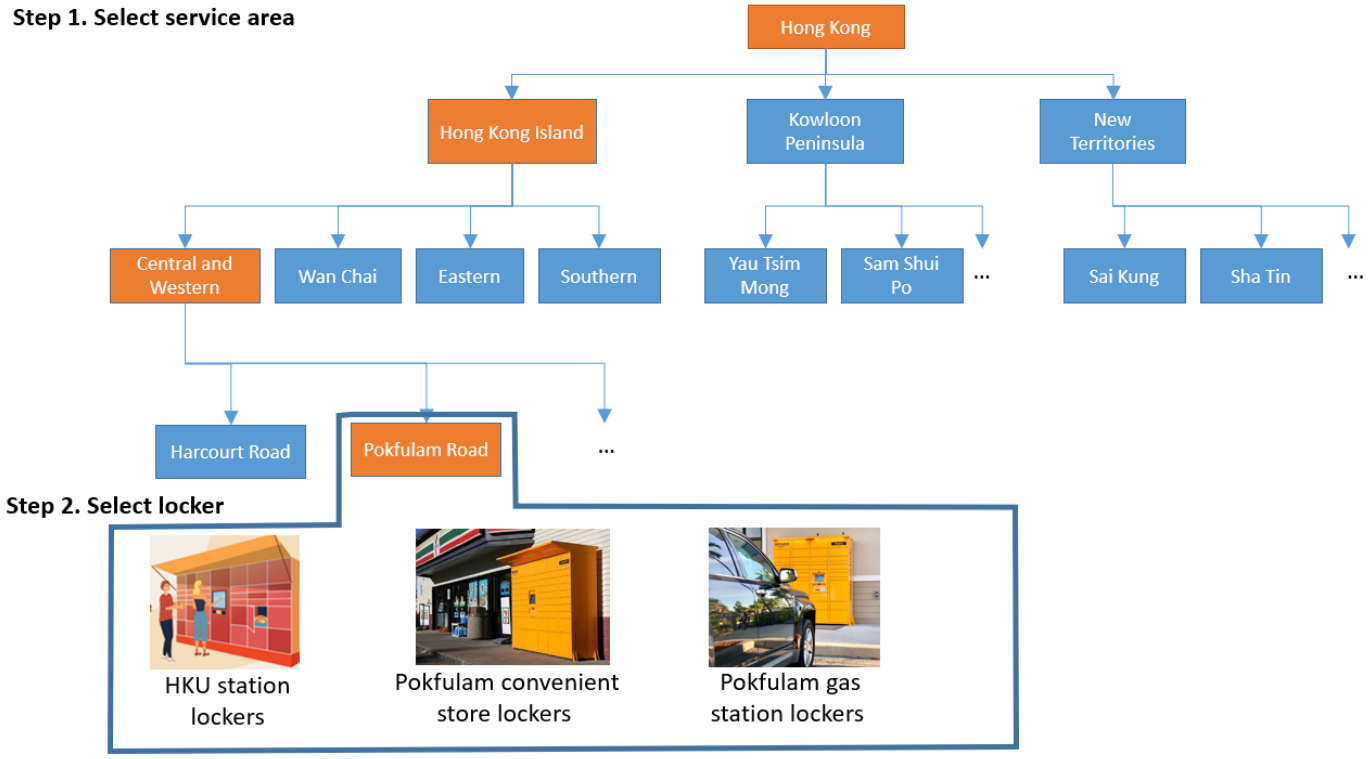


Fig 2. Two steps to select the locker for the orders that are "locker-pickup".

Step 1. Select the service area. The system first shows the service areas organized in a hierarchical structure. A service area can have zero to many sub-service areas. And a service area can be a sub-service area of at most one service area. The database will store the hierarchical relationship of the service areas.

Step 2. Select locker. Once the member selects the service area that is the leaf node in the hierarchy (e.g., Pokfulam Road, with no more sub-service area under it.), the corresponding lockers hosted in that service area are listed. A service area can have zero or many lockers hosted in it, while a locker must be hosted under one service area.

5. A locker consists of many locker cells. Each locker cell has a cell ID that is unique within a locker only. The system will store which locker-pickup order delivers to which locker cell.

Assignment tasks

[50%] Task 1. Please draw an E-R diagram to capture all the requirements above.

- If there is any information about the data model that is not listed in the specification, please make a reasonable assumption and list your assumption in your design.
- Marks will be deducted if unnecessary components are added to the tables. Please follow the problem specification when you decide on the name of the components.
- You are encouraged to draw the E-R diagram using any kind of editor, this can help us to read and understand your data model. If you choose to draw the E-R diagram by pen/pencil, please scan your work and submit a PDF file. We may ask you to re-submit a clearer version in case we cannot read the handwriting.

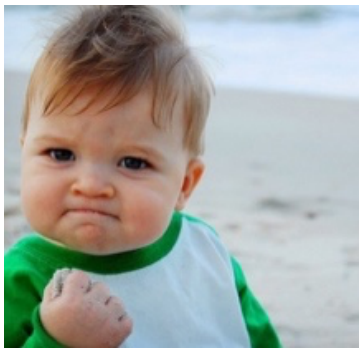
[50%] Task 2. Please translate your E-R diagram into relational table schemas.

- For each relation, underline the primary key and specify all the foreign keys if any.
- You only need to give the table schema in text form. You do not need to draw the schema and do not need to provide the data type/SQL to create the tables.
- Enjoy this assignment as a practice related to Chapter 2 😊

Submission

- Please submit one PDF file to Moodle on or before the deadline of this assignment.
- Should you have any enquiries, please feel free to post on Moodle. Thank you! 😊

Please feel free to post your questions on Moodle forum or contact us (TA Diana zhonghua@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!