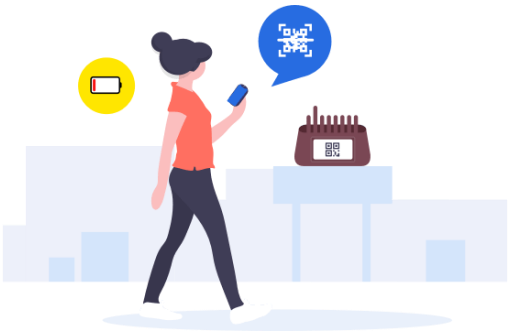
COMP3278B Introduction to Database Management Systems

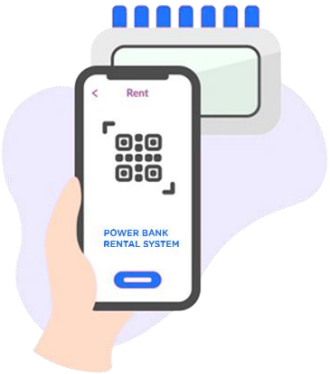
Assignment 1. **ER-Modeling**

Due Date: 2024 Feb 19 (Monday) 17:30 pm

The ABC company provides rental service of portable power banks to its registered members. You are a database designer of the ABC company, and you are designing the database to support a system with the following functions:

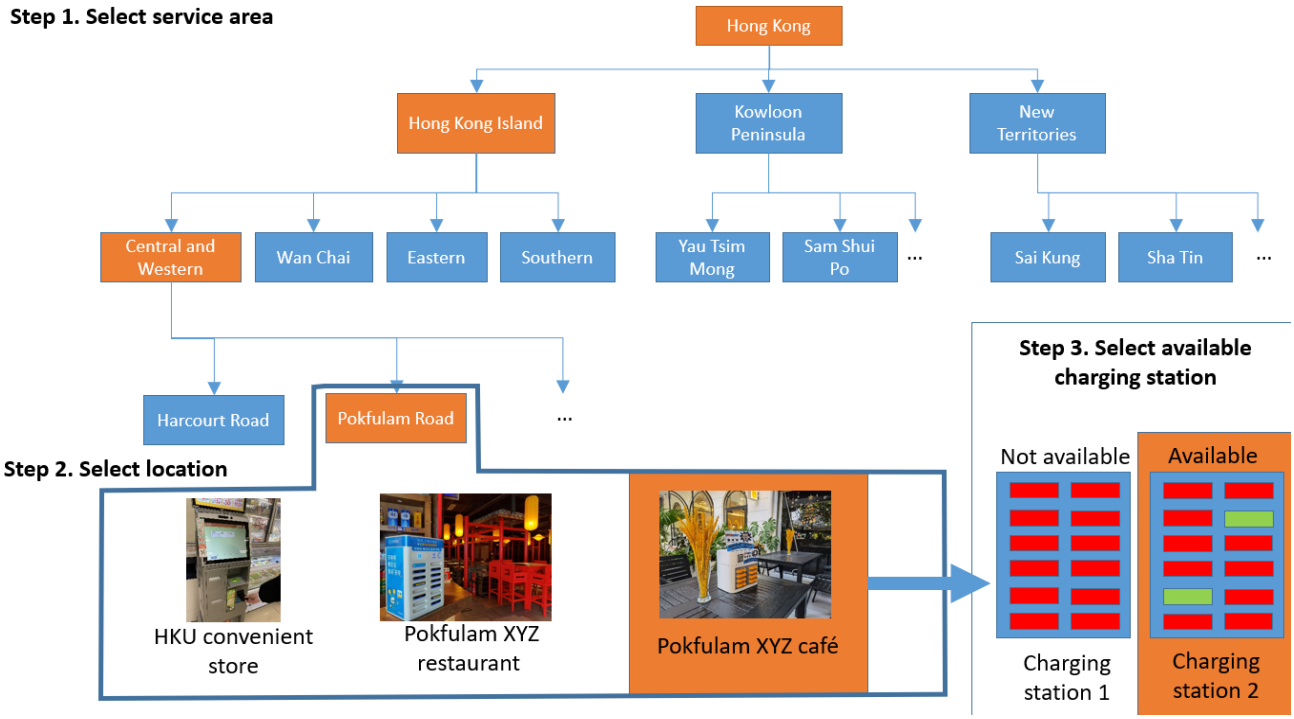


1. **Membership System**
    - Each member is required to provide their name, email, and contact number in the registration form. The system will automatically generate a unique member ID upon registration.
2. **Power Bank Management System**
    - There are charging stations, each equipped with a unique station ID and contains a certain number of charging slots.
    - Each charging slot is assigned a unique slot ID, exclusive to that particular charging station.
    - The company possesses numerous power banks, each distinguished by a unique pbID.
    - Any power bank can be plugged into any available charging slot within a charging station.
3. **Power Bank Rental System**
    - A member can initiate multiple rental transactions, each involving the rental of one power bank.
    - Each rental transaction is assigned a unique transaction ID, capturing information such as which member renting which power bank.
    - The transaction can record which charging slot the user retrieved from and the retrieval datetime, as well as which charging slot the user returned to, and the return datetime.
    - Additionally, the transaction includes details of the payment amount.



4. **Coupon System**
    - ABC Company issues coupons to its members, each with a unique coupon ID and an expiration date. There are two types of coupons: Free Rental Coupons and Discount Coupons.
    - Free Rental Tickets: Each ticket can be used to redeem one free rental transaction.
    - Merchants Discounts:
        i. These coupons are not tied to the rental of power banks but offer discounts accepted by one or more partner merchants.
        ii. ABC Company collaborates with various partner merchants, each having a unique merchant ID. Some of these merchants also maintain charging stations.

5. **Reservation System**
    - Members can reserve a power bank at any available charging station with a reservation interface that operates as follows:
    - Members can search for a service area using a hierarchical structure, eventually selecting a location - this is the lowest-level service area without any sub-service area.
    - Each location may host zero to many charging stations.
    - Members choose a charging station with an available power bank and proceed to make a reservation.
    - Each reservation is assigned a unique reservation ID and records the datetime of the reservation.



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 Leo u3010267@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!