Term Project: Online Bike Renting System

You are required to design and implement a software system that manages renting different types of bikes to customers in a city. This system will be a platform for customers to perform online operations like reserving a bike, charging cash credit, and viewing previous rides. On the other hand, the system provides administrative functions for the operator of the renting company like adding new bikes to the fleet, viewing available locked bikes at parks and calculating profit.

The system maintains a database for all involved customers, bikes, rental records, and rental payments. This information is accessed by users to achieve their desired functionalities and be updated continuously throughout the running time of the system. Every **customer** has the following information: name (unique), password, and cash credit. Whereas every **bike** has the following information: QR code (unique), type, park ID, status, review, and base rate. Regarding the **rental record**, it has the following information: Rental ID (unique), QR code of the bike, customer name, rental duration in days, and status. For every **rental payment**, the system records the following information: Date of rental (start date), customer name, and rental amount. Every user (customer or operator) must log in using his name and password. As a prerequisite, your implementation program **must** initially load the database with a set of customers and bikes at the beginning. **The following data must be loaded as is upon running your prgram**:

[**CUSTOMERS**]

Name	Password	Cash credit
Ali	11	150 JD
Omar	22	140 JD
Maha	33	95 JD
Hamzah	44	50 JD
Reem	55	120 JD

[**BIKES**]

QR code	Type	Park ID	Status	Review	Base rate
BK1	Sport	Park 1	Locked	67%	20
BK2	Road	Park 2	Locked	75%	15
BK3	Mountain	Park 2	Locked	90%	35
BK4	Sport	Park 3	Locked	53%	25
BK5	Road	Park 1	Locked	88%	10

The system has only one operator that logs in using the following credential:
- username: **admin**
- password: **00**

Requirement Specifications

The bike has three status values: [1]locked, which means it is parked and customers can reserve it any time, [2]unlocked, which means it is being rented now by some customer, or [3]Reserved, which means that it is already reserved by some customer but it is still locked in the park waiting the customer to come and unlock it.

The operator offers three rental rates based on the duration of rental as follows:

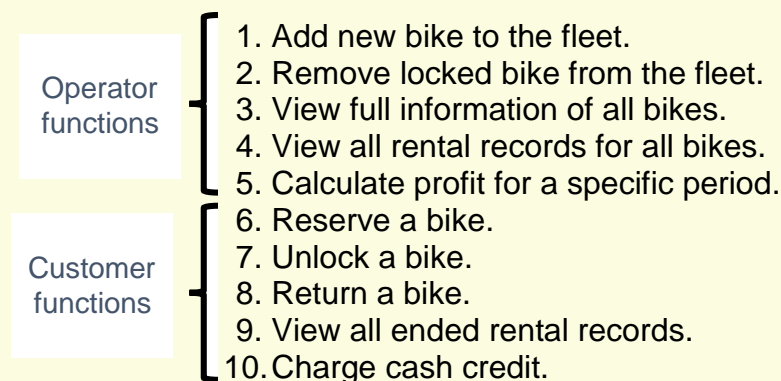| Rental Rate	Rental amount
Rate 1: <3 days	Amount=base rate
Rate 2: 3-10 days	Amount= 0.7* base rate
Rate 3: >10 days	Amount= 0.4* base rate

The system uses three parks (park 1, park 2, and park 3) to lock the involved bikes. These parks serve six zones in the city as follows:

Park 1	Zone A and Zone B
Park 2	Zone C and Zone D
Park 3	Zone E and Zone F

As a result, the customer must specify his location (Zone ID) when he decides to reserve a bike. Hence, the system tells him to which park he must go and then fetch the information of the locked bikes there. The system requires that after reserving a bike, the customer must go directly to take (unlock) the bike on rent.

When the customer returns a bike he might park it at any parks in the city and the status of the bike becomes locked again. Also, the customer provides a review percentage for the bike. The overall review percentage is calculated as average of all reviews.

The system is required to satisfy the main functional requirements for all users (customer and operator). This necessitate to explore high-level use cases then decomposing them into sub use cases to draw a full image of the involved implementation steps. Consequently, our system has the following high-level use cases:

Operator functions
1. Add new bike to the fleet.
2. Remove locked bike from the fleet.
3. View full information of all bikes.
4. View all rental records for all bikes.
5. Calculate profit for a specific period.

Customer functions
6. Reserve a bike.
7. Unlock a bike.
8. Return a bike.
9. View all ended rental records.
10. Charge cash credit.

YOUR PROGRAM MUST SHOW ONLY THE FUNCTIONS RELATED TO THE CURRENTLY LOGGED IN USER. THEREFORE, UPON RUNNING YOUR PROGRAM, THE SYSTEM MUST DISPLAY TWO LOGIN OPTIONS (LOGIN SCREEN): AS [1]OPERATOR, OR AS [2]CUSTOMER. THEN BASED ON THE SELECTED USER TYPE, THE SYSTEM MUST DISPLAY THE OPTIONS RELATED TO THE LOGGED-IN USER.

THE OPTIONS MENU FOR BOTH CUSTOMER AND OPERATOR MUST PROVIDE LOGOUT OPTION TO RETURN TO THE LOGIN SCREEN TO ENABLE HIM TO LOG IN WITH DIFFERENT USER TYPE.

In details, below are the involved steps for each use case:

Use case 1: Add new bike to the fleet

- ➢ Firstly, the system requests the following information of the bike to be added: QR code (must be unique), type (mountain or road or sport), park ID (park 1 or park 2 or park 3), and base rate. Set review to 0% and set status to "locked".
- ➢ Then, a new bike is added to the database.

Use case 2: Remove locked bike from the fleet

- ➢ Firstly, the system displays full information of all locked bikes at all parks.
- ➢ Then, the user enters the QR code of the bike to be removed.
- ➢ The system removes the record of the bike from the database.

Use case 3: View full information of all bikes

- ➢ The system displays full information of all bikes (with all status values) in the database.

Use case 4: View all rental records for all bikes

- ➢ The system displays full information of all rental records (with all status values) in the database.

Use case 5: Calculate profit for a specific period

- ➢ Firstly, the system displays full information of all payment records for all bikes.
- ➢ The system asks the operator to enter two dates (period).
- ➢ Then, the user enters the start date and end date.
- ➢ The system calculates and displays the total rental payments during the entered period.

Use case 6: Reserve a bike

- ➢ Firstly, the system asks the customer to enter his current location.
- ➢ The customer enters his location (Zone ID).
- ➢ Then, the system displays full information of all "locked" bikes at the park that serves the entered location (see zones division above).
- ➢ The Customer enters the QR code of the desired bike from the displayed list above.
- ➢ The system asks the customer to enter start date and end date of the rental period.

- ➢ The customer enters the two dates and the system changes the status of the bike to "Reserved".
- ➢ The system asks the customer to enter the ID of the rental (must be unique).
- ➢ The customer enters the rental ID and hence, a new rental record is created and saved into the database. Set status of the rental record to "inactive".
- ➢ The rental amount is calculated based on the rental period (see rental rates above), a new payment record is created and saved into the database using the start date of the rental.

Use case 7: Unlock a bike

- ➢ Firstly, the system displays all "inactive" rental records associated with the logged-in customer.
- ➢ The system asks the customer to enter the rental ID of the rental record to activate.
- ➢ Then, the user enters the id of the rental record.
- ➢ The system changes the status of the bike associated with the rental record to "unlocked".
- ➢ The system changes the status of the rental record to "on-rent".

Use case 8: Return a bike

- ➢ Firstly, the system displays all "on-rent" rental records associated with the logged-in customer.
- ➢ Then, the system asks the customer to enter the rental ID of the rental record to return.
- ➢ The user enters the id of the rental record.
- ➢ Then, the system asks the customer to enter the review percentage for the returned bike.
- ➢ The user enters the review percentage and the system updates the overall review percentage of the returned bike.
- ➢ Then, the system asks the customer to enter the new location (park ID) where he want to lock the returned bike.
- ➢ The user enters the park id and the system updates the location of the returned bike.
- ➢ The system changes the status of the bike associated with the rental record to "locked".
- ➢ The status of the rental record is set to "ended".

Use case 9: View all ended rentals

- ➢ The system displays full information of all rental records with "ended" status that associated with the logged-in customer.

Use case 10: Charge cash credit

- ➢ The system asks the customer to enter amount of cash to feed his credit.
- ➢ The customer enters the amount.
- ➢ The system updates the cash credit for the customer.

You are required to satisfy and implement every step above, else your grade will be affected accordingly. Please don't assume anything even if it makes sense. In case you do not understand something, please feel free to ask about it.