

GROUP-C

BIKE-RENTAL DATABASE MANAGEMENT SYSTEM

PURPOSE & SCOPE OF OUR SYSTEM (Database Planning and System definition):

1. Purpose:

The purpose of our system is to effectively manage the operations of a bike rental business. This will include:

- Facilitating the rental and return of bicycles.
- Tracking the availability and location of all bikes in the inventory.
- Managing customer information, including rental history and payment details.
- Providing reporting for management to monitor business performance.

2. Main Users:

The system will be used by three main groups of people, each with a different set of needs and permissions.

- **Customers:** The end-users who interact with the system primarily to rent bikes, make payments, view availability, and check their rental history. They will need to be able to:
 - ❖ View available bikes and their locations.
 - ❖ Register for an account.
 - ❖ Rent for bikes.
 - ❖ View their rental history and current rental status.
 - ❖ Make Payments.
- **Staff:** Employees responsible for the day-to-day operations of the business. This category is specialized into three functional roles; Generally, they will need to be able to:
 - ❖ Assist customers with rentals and returns.
 - ❖ Add, update, and remove bike information in the inventory.
 - ❖ Check bike availability and condition.
 - ❖ Process payments and issue receipts.
 - ❖ Manage customer accounts.
 - ❖ Indicate another staff member if needed to log bike transfers between locations.
 - ❖ Be available whenever finalizing of a rental process is required.

➤ **Specific Roles:**

- **Agent/Operator:** Handles core transactional duties like processing rentals, and payments at a location. Also responsible for logging bike transfers between locations. Also assists in customer management tasks like registering new customers and updating their accounts.
- **Mechanic:** Responsible for bike maintenance; performs service, updates the bike's status in the inventory, and logs repairs in the Maintenance logs.
- **Manager:** Focuses on operational oversight and mid-level reporting. They manage staff accounts and can likely manage locations and generate specific business reports.
- **Administrator:** The owner or manager of this business will require:
 - ❖ Full access to all system data.
 - ❖ The ability to generate comprehension reports on rentals, revenue, and bike usage.
 - ❖ Permissions to manage staff accounts and system settings.
 - ❖ The ability to add or remove rental locations.

3. Key Functions of the System:

The system will be able to support the following core processes:

- **Bike Management:**
 - ❖ Adding new bikes to the inventory.
 - ❖ Removing bikes that are damaged or sold.
 - ❖ Updating bike status (e.g., "Available", "Rented", Under Maintenance").
 - ❖ Tracking the location of each bike.
- **Customer Management:**
 - ❖ Registering new customers and creating their profiles.
 - ❖ Updating customer information.
 - ❖ Storing customer rental history.
- **Rental/Return Process:**
 - ❖ Taking Record whenever a bike is rented, including the start time, location, and customer.

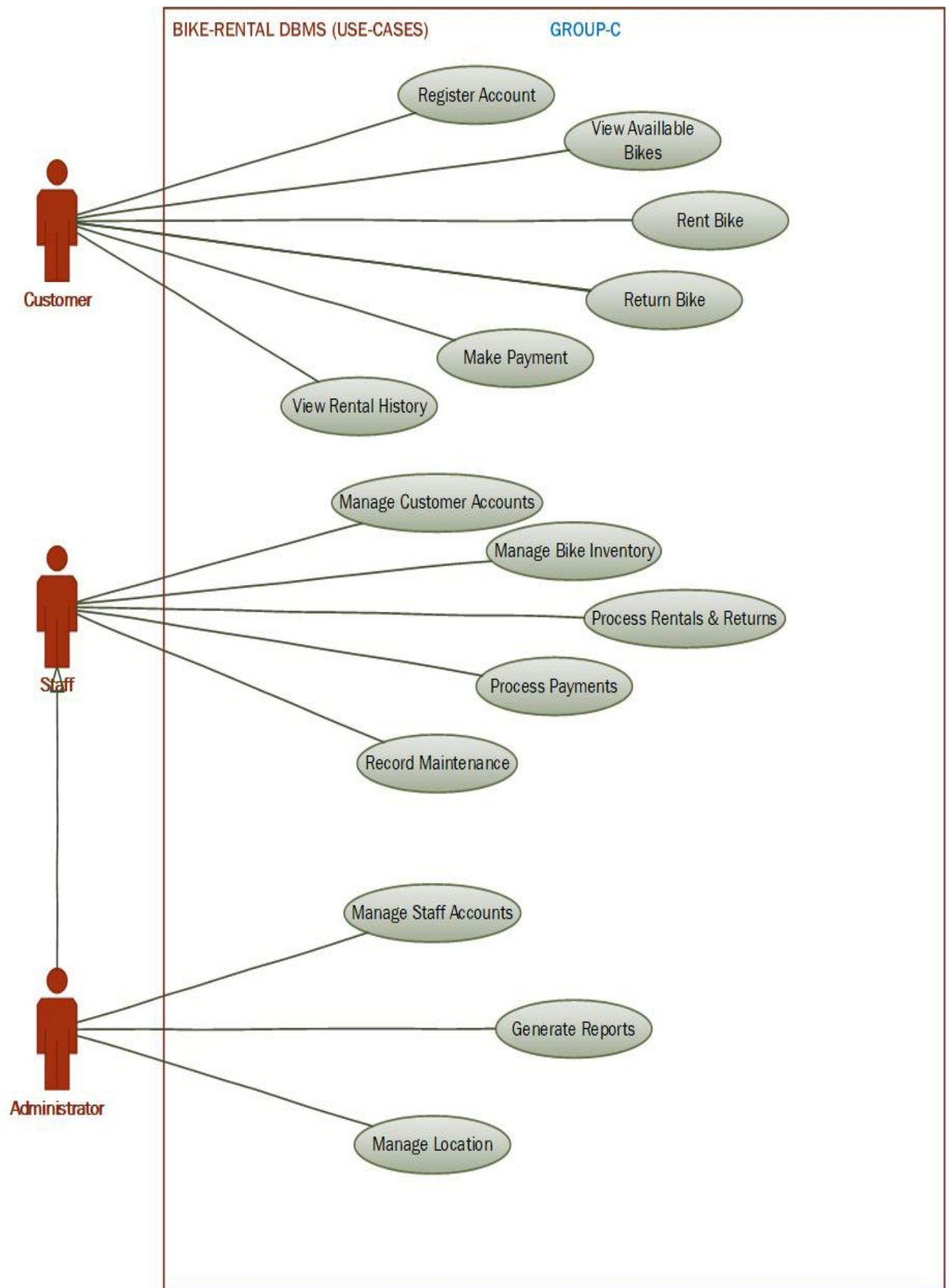
- ❖ Taking Record whenever a bike is returned, including the end time, return location, and final cost.
- ❖ Calculating the rental fee based on duration.

- **Payment and Billing:**

- ❖ Processing payments for rentals.
- ❖ Handling different payment methods (e.g., credit card, mobile money).
- ❖ Generating and storing transaction records.

- **Reporting:**

- ❖ Generating reports on daily/monthly revenue.
- ❖ Tracking the most popular bikes and rental locations.
- ❖ Monitoring bike usage to identify high-traffic areas.



REQUIREMENT GATHERING & ANALYSIS:

Entities & Attributes: Based on our project requirements, we can say that below are our expanded and critically considered list of entities and their attributes for the BIKE-RENTAL DATABASE MANAGEMENT SYSTEM.

- 1) **Customer:** This entity represents the individuals who rent the bikes.
 - **CustomerID (PK, INT):** A unique identifier for each customer.
 - **FirstName (VARCHAR (50)):** The customer's first name.
 - **LastName (VARCHAR (50)):** The customer's Last name.
 - **Email (VARCHAR (100), UNIQUE):** The customer's email address, used for communication and as a unique identifier for user accounts.
 - **PhoneNumber (VARCHAR (20)):** The customer's contact number.
 - **DateOfBirth (DATE):** The customer's date of birth (useful for age-based restrictions or promotions).
 - **RegistrationDate (DATETIME):** The date and time the customer registered in the system.
 - **PasswordHash (VARCHAR (255)):** A secure, hashed version of the customer's password.

- 2) **Bike:** This entity represents each individual bicycle available for rent.
 - **BikeID (PK, INT):** A unique identifier for each bike.
 - **BikeSerialNumber (VARCHAR (50), UNIQUE):** The unique manufacturer-assigned serial number of the bike.
 - **Model (VARCHAR (100)):** The bike's model name (e.g., "Trek Verve 2").
 - **BikeType (VARCHAR (50)):** The type of the bike (e.g., "Mountain Bike," "Road Bike," "Electric Bike").
 - **CurrentStatus (VARCHAR (20)):** The current condition and availability of the bike (e.g., "Available," "Rented," "Under Maintenance," "Retired").
 - **LastMaintenanceDate (DATE):** The date of the last service performed on the bike.
 - **RentalRatePerMinute (DECIMAL (5,2)):** The cost to rent this specific bike per minute.
 - **LocationID (FK, INT):** The current location of the bike, referencing the **Location** entity.

3) **Rental:** This entity records each instance of a bike being rented by a customer. This is a core transactional entity.

- **RentalID (PK, INT):** A unique identifier for each rental transaction.
- **CustomerID (FK, INT):** The customer who initiated the rental.
- **BikeID (FK, INT):** The bike that was rented.
- **RentalStartDate (DATETIME):** The date and time the rental began.
- **RentalEndDate (DATETIME):** The date and time the rental ended.
- **StartLocationID (FK, INT):** The location where the bike was picked up.
- **EndLocationID (FK, INT):** The location where the bike was returned.
- **TotalCost (DECIMAL (10, 2)):** The final calculated cost of the rental.
- **PaymentStatus (VARCHAR (20)):** The status of the payment (e.g., "Paid," "Pending," "Failed").

4) **Location:** This entity represents the physical stations or hubs where bikes can be rented and returned.

- **LocationID (PK, INT):** A unique identifier for each rental station.
- **LocationName (VARCHAR (100)):** The name of the location (e.g., "Makerere Main Gate Station").
- **Address (VARCHAR (255)):** The physical address of the location.
- **Longitude (DECIMAL (9, 6)):** The geographical longitude of the location.
- **Capacity (INT):** The total number of the bikes the location can hold.

5) **Staff:** This entity represents the employees who manage the rental locations and operations.

- **StaffID (PK, INT):** A unique identifier for each staff member.
- **FirstName (VARCHAR (50)):** The staff member's first name.
- **Lastname (VARCHAR (50)):** The staff member's Last name.
- **Role (VARCHAR (50)):** The role of the staff member (e.g., "Manager," "Operator," "Administrator").
- **LocationID (FK, INT):** The primary location where the staff member works.
- **Email (VARCHAR (100), UNIQUE):** The staff member's email address.

6) **Payment:** This entity records all payment transactions, providing a detailed history for billing and reporting.

- **PaymentID (PK, INT):** A unique identifier for each payment transaction.
- **RentalID (FK, INT):** The rental transaction this payment corresponds to.
- **Amount (DECIMAL (10, 2)):** The amount paid
- **PaymentDate (DATETIME):** The date and time the payment was made.
- **PaymentMethod (VARCHAR (50)):** The method of payment (e.g., "Credit Card," "Mobile Money," "Cash").
- **TransactionID (VARCHAR (100), UNIQUE):** The unique transaction identifier from the payment gateway.

7) **Maintenance Log:** This entity tracks the maintenance and repair history of each bike.

- **LogID (PK, INT):** A unique identifier for each maintenance entry.
- **BikeID (FK, INT):** The bike that was serviced.
- **MaintenanceDate (DATETIME):** The date and time of the service.
- **Description (TEXT):** A detailed description of the maintenance performed (e.g., "Replaced front tire," "Brake adjustment").
- **Cost (DECIMAL (10, 2)):** The cost of the maintenance.
- **StaffID (FK, INT):** The staff member who performed the maintenance.

