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Bus Ticket Management System-Stage 1

CS234

For our project, we have selected the Bus Ticket Management System. This software system will allow customers to purchase bus tickets and view information on bus schedules and routes. Additionally, it will support back-office operations, including driver assignments, fleet management and expense tracking. To enhance security and usability, a login feature will be implemented that will allow for role-based access control, ensuring that users have appropriate permissions based on their role. Our system comprises twelve

essential classes, each playing a crucial role in its functionality. An overview of these classes is provided below.

Bus

Purpose: This class will provide an overview of the fleet of buses that are in use and will not be visible to clients.

Features:

- A unique identifier for each bus. In addition, information about the bus such as year, make, model and seating capacity. Admins will be able to create, read, and delete buses.
- Information about the route and driver that is assigned to each bus. Admins will be able to create, read, and update assignments.
- Tracking the distance traveled to schedule and perform maintenance. Admins can read and update the distance traveled.
- The status of each bus (in use, available, under maintenance). Admins will be able to update the bus status.
- A passenger manifest to keep track of the passengers that are on or scheduled to be on a particular bus. Admins will be able to create, read and update the manifest.

Payment

Purpose: This class will be responsible for collecting payment for bus tickets that are purchased.

Features:

- Before making a payment, the client will be able to select the following: date, time, and route.
- When making a payment, a summary of the trip will be displayed, as well as the total amount due.
- The client will be present with the option to select the payment method that they would like to use.

- A receipt will be provided to the client once the payment has been processed successfully. This receipt will include ticket number, date and time of travel, the origin and destination, payment method and amount.

Ticket

Purpose: This class will manage the issuance of bus tickets and details for each ticket.

Features:

- A unique identifier will be created which serves as the ticket number. The unique identifier will not be able to be modified.
- Details about the ticket, including date and time of travel, origin and destination.
- The status of the ticket (active or cancelled). The status can be read, as well as updated.
- Details about the passenger (first and last name).

Depot

Purpose: This class will manage depot locations where buses are stored and will not be visible to clients.

Features:

- The physical address of each depot. Each depot location will have a unique identifier as well. Admins will be able to read, and update information about each depot.
- Each bus will be assigned to a particular depot. Information about the bus such as unique identifier will be used from the bus class. Admins will be able to read and update the location of each bus.
- Drivers will know which depot to go to based on their bus assignment. Drivers will have permission to read their assignments.

Route

Purpose: This class will contain all of the different bus routes for the company.

Features:

- Routes will contain the name of route, the name of the bus stop locations and the distance between bus stops.
- If users are admins, they will be able to add stops and delete stops along the routes.
- Admin users will also be able to create new routes and delete routes.
- Routes will have different buses assigned to them
- When a bus runs a route it will use the mileage data of the route to add to the bus object. This will be used to track fuel and maintenance expenses.

Schedule

Purpose: The schedule class will contain all the times that buses will be at the different stops.

Features:

- Admins will be able to create, modify, and delete schedules for the different routes.
- The schedule class will use instances of routes, the starting depot and a start time entered from the user to automatically create a schedule object.
- Schedules will be visible to all users of the system

Expenses

Purpose: Expenses will track salary cost, utilities, maintenance and fuel costs.

Features:

- Salary costs of all employees will be saved in expenses.
- Utility costs for the different depots will be saved in expenses.
- All routes have a known distance. When a bus is assigned to a route and completes it, the expenses class will calculate the fuel cost for that bus.
- The expenses class will track all maintenance costs for the buses. This will be based on the mileage of the buses.

- Admins will have access to an expense report, which lists all of the expenses.

Login

Purpose: The login class will save a username and password for each user.

Features:

- Login will also have permissions saved for each user.

- The login information will be saved to a text file.

- Admins will be able to add and delete users.

- Each user will be able to change their username and password

- A passenger will only be able to buy tickets and see route/schedule information.

- A driver will only be able to see their own employee information and what routes and depots they are assigned to.

- An admin will be able to have access to the entire system.

Passenger

Purpose: Manage information and interactions specific to passengers.

Features:

- Assigns a unique PassengerID to each passenger and stores personal details such as full name, contact email, and phone number.

- Maintains travel records, including past trips and active bookings.

- Registers new passengers, retrieves profile and travel history, updates booking or personal information, and removes accounts along with related data.

- Allows passengers to initiate ticket bookings, process cancellations, and view their travel history.

Driver

Purpose: This class will Represent and manage drivers operating the buses.

Features:

- Assigns a unique DriverID to each driver and stores their full name.

- Tracks assigned routes and schedule details while monitoring availability status (available or on leave).
- Adds new drivers, retrieves their profiles and current assignments, updates driver details such as assigned routes, and removes driver records from the system.
- Links drivers to specific routes or schedules and provides an overview of their current and upcoming assignments.

Employee

Purpose: Manage non-driving staff involved in administrative tasks.

Features:

- Assigns a unique EmployeeID to each employee and stores personal information such as full name, job title, and department.
- Maintains attendance records, logging work hours and presence.
- Registers new employees, retrieves detailed profiles and work records, updates personal or role-specific information, and removes employee records from the system.
- Handles task assignments and attendance logging, ensuring efficient coordination of administrative duties.

Admin

Purpose: Oversee the overall operations and manage the system.

Features:

- Assigns a unique AdminID to each administrator and stores personal details, including name and contact email.
- Defines access levels and privileges based on predefined roles to ensure controlled system management.
- Adds new administrators, retrieves and updates admin profiles and permissions, and removes admin accounts when necessary.

- Manages system entities such as drivers, routes, and buses, generates comprehensive system performance reports, and monitors system logs to maintain system integrity and resolve conflicts.