Homework 2

This homework requires the creation of a Python program for managing a car dealership's inventory and user database using a simple text-file based system. The program, named "Carmax," simulates a dealership environment where users can sign up, log in, and interact with the inventory according to their role (customer or employee).

Core Objectives:
Class Structure: Implement classes for Car (with subclasses Sedan, Minivan, Sportscar), User (with subclasses Customer, Employee), Inventory, and Members. These classes should encapsulate the data and operations pertinent to cars, users, and their interactions.

File-Based Storage: Use text files (users.txt and inventory.txt) as databases to store users and car inventory data. The program must load these files at startup and update them upon exit, ensuring persistence of data.

Functional Requirements:

For users (customers and employees), implement features such as login, sign-up, and data display.
For inventory, enable adding, deleting, updating, and displaying cars. Implement features specific to user roles, e.g., only employees can add or remove cars.
Provide interaction capabilities, such as adding cars to a customer's cart and viewing cart contents.
User Interface: Implement a simple text-based user interface that guides users through various options, depending on their role.

Program Flow:
Startup: Load users and inventory from files.
User Interaction:

- Display main menu options: Log in, Sign up, Exit.
- Handle user inputs to navigate through the program.

Role-Specific Features: Depending on the user's role, offer different functionalities (e.g., view inventory, manage cars for employees; view, add to cart for customers).
Shutdown: Save updated users and inventory back to the files.

Example of data fileS

users.txt

```
dkim 1234 Employee Dongchul Kim dkim@carmax.com CEO
app123 6364.dd3K Customer Jackson Cantu j88@gmail.com 0
hukkz993 3!7A2dss Customer Mike Gonzalez h332@yahoo.com 0
apple12 3W2i.d2 Employee Carlos Lee clee@carmax.com Dealer
23fasd 39SD.jd Customer Jose Luis jluis@hotmail.com 2 AB234KXAZ ID321XKWA
```

inventory.txt

```
AB234KXAZ Sedan Honda Accord 2018 100 3000.00 G Y
CD555SA72 Sedan Toyota Camry 2010 11000 7000.00 S N
AB234KL34 Sedan Honda Civic 2009 15000 4000.00 R Y
XX55JKA31 Minivan Honda odyssey 2018 500 5000.00 B Y
FF2HHKL94 Sedan BMW 535i 2011 12000 9000.00 W N
ID321XKWA Sportscar Audi R8 2018 300 110000.00 B Y
```

Example of the program and user interface

```
Welcome to Carmax in Mission, Texas!

1.Log in
2.Sign up
3.Exit

Please input your choice: 2

Sign up as:
1. Employee
2. Customer
Enter your choice: 2

Please input user id: dkim123
Please input password: 3948
Please input your first name: Daniel
Please input your last name: Kim
Please input your email: dankim@gmail.com
Thank you for your sign up!

1.Log in
2.Sign up
3. Exit

Please input your choice: 1

Please input your user id: dkim123
Please input password: 3948

Welcome, Dongchul Kim!

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 1

 VIN         Type    Brand    Model   Year   Mileage  Price     Color Feature
 CD555SA72   Sedan   Toyota   Camry   2010   11000    7000.00   S
 AB234KL34   Sedan   Honda    Civic   2009   15000    4000.00   R     Hybrid
 XX55JKA31   Minivan Honda    Odyssey 2018   500      5000.00   B     Sliding door
 FF2HHKL94   Sedan   BMW      535i    2011   12000    9000.00   W

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 2

1.  Sort by VIN
2.  Sort by Brand
3.  Sort by Model
4.  Sort by Year
5.  Sort by Mileage
6.  Sort by Price
7.  Sort by Color

Please input your choice: 5
```

```
VIN         Type    Brand    Model    Year   Mileage  Price     Color Feature
XX55JKA31   Minivan Honda    Odyssey  2018   500      5000.00   B     Sliding door
CD555SA72   Sedan   Toyota   Camry    2010   11000    7000.00   S
FF2HHKL94   Sedan   BMW      535i     2011   12000    9000.00   W
AB234KL34   Sedan   Honda    Civic    2009   15000    4000.00   R     Hybrid

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 3

VIN         Type    Brand    Model    Year   Mileage  Price     Color Feature
XX55JKA31   Minivan Honda    Odyssey  2018   500      5000.00   B     Sliding door
CD555SA72   Sedan   Toyota   Camry    2010   11000    7000.00   S
FF2HHKL94   Sedan   BMW      535i     2011   12000    9000.00   W
AB234KL34   Sedan   Honda    Civic    2009   15000    4000.00   R     Hybrid

Please input a VIN: FF2HHKL94

Successfully BMW 535i has been added to your cart!

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 4

VIN         Type    Brand    Model    Year   Mileage  Price     Color Feature
FF2HHKL94   Sedan   BMW      535i     2011   12000    9000.00   W

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 5

Your cart is empty.

1.  Display Inventory
2.  Sort Inventory
3.  Add to Cart
4.  View Cart
5.  Empty Cart
6.  Log out

Please input your choice: 6

Bye~!

1.Log in
2.Sign up
3.Exit

Please input your choice: 2

Sign up as:
1. Employee
2. Customer
Enter your choice: 1
Enter the manager code: 1234
```

```
Please input user id: park
Please input password: 3242
Please input password again: 3242
Please input your first name: Daniel
Please input your last name: Park
Please input your email: dpark@carmax.com
Please input your position: Manager
Thank you for your sign up!

1. Log in
2. Sign up
3. Exit

Please input your choice: 1

Please input your user id: park
Please input password: 3242

Welcome, Daniel Park!

1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 1


 VIN          Type     Brand    Model    Year   Mileage  Price      Color Feature
 AB234KXAZ    Sedan    Honda    Accord   2018   100        3000.00   G     Hybrid
 CD555SA72    Sedan    Toyota   Camry    2010   11000      7000.00   S
 AB234KL34    Sedan    Honda    Civic    2009   15000      4000.00   R     Hybrid
 XX55JKA31    Minivan  Honda    Odyssey  2018   500        5000.00   B     Sliding door
 FF2HHKL94    Sedan     BMW     535i     2011   12000      9000.00   W
 ID321XKWA    Sportscar Audi    R8       2018   300      110000.00   B     Spoiler

1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 2

 VIN: AB234K888
 Type: Sportscar
 Brand: Audi
 Model: R8
 Year: 2024
 Mileage: 14
 Price: 117500.00
 Color: R
 Spoiler: N

 VIN          Type      Brand    Model    Year   Mileage  Price       Color Feature
 AB234K888    Sportscar Audi     R8       2024   14       117500.00   R

Successfully Audi R8 has been added.

 VIN          Type     Brand    Model    Year   Mileage  Price      Color Feature
 AB234KXAZ    Sedan    Honda    Accord   2018   100        3000.00   G     Hybrid
 CD555SA72    Sedan    Toyota   Camry    2010   11000      7000.00   S
 AB234KL34    Sedan    Honda    Civic    2009   15000      4000.00   R     Hybrid
 XX55JKA31    Minivan  Honda    Odyssey  2018   500        5000.00   B     Sliding door
 FF2HHKL94    Sedan    BMW      535i     2011   12000      9000.00   W
 ID321XKWA    Sportscar Audi    R8       2018   300      110000.00   B     Spoiler
```

```
AB234K888   Sportscar Audi     R8       2024   14       117500.00   R


1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 3

 VIN         Type       Brand    Model    Year   Mileage  Price      Color Feature
 CD555SA72   Sedan      Toyota   Camry    2010   11000      7000.00   S
 AB234KL34   Sedan      Honda    Civic    2009   15000      4000.00   R     Hybrid
 XX55JKA31   Minivan    Honda    Odyssey  2018   500        5000.00   B     Sliding door
 FF2HHKL94   Sedan      BMW      535i     2011   12000      9000.00   W
 AB234K888   Sportscar  Audi     R8       2024   14       117500.00   R

 Please input VIN to delete: AB234KL34

 VIN         Type       Brand    Model    Year   Mileage  Price      Color Feature
 AB234KL34   Sedan      Honda    Civic    2009   15000    4000.00    R     Hybrid

Successfully this car has been deleted.

 VIN         Type       Brand    Model    Year   Mileage  Price      Color Feature
 AB234KXAZ   Sedan      Honda    Accord   2018   100        3000.00   G     Hybrid
 CD555SA72   Sedan      Toyota   Camry    2010   11000      7000.00   S
 XX55JKA31   Minivan    Honda    Odyssey  2018   500        5000.00   B     Sliding door
 FF2HHKL94   Sedan      BMW      535i     2011   12000      9000.00   W
 ID321XKWA   Sportscar  Audi     R8       2018   300      110000.00   B     Spoiler
 AB234K888   Sportscar  Audi     R8       2024   14       117500.00   R

1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 4

 VIN         Type       Brand    Model    Year   Mileage  Price      Color Feature
 AB234KXAZ   Sedan      Honda    Accord   2018   100        3000.00   G     Hybrid
 CD555SA72   Sedan      Toyota   Camry    2010   11000      7000.00   S
 XX55JKA31   Minivan    Honda    Odyssey  2018   500        5000.00   B     Sliding door
 FF2HHKL94   Sedan      BMW      535i     2011   12000      9000.00   W
 ID321XKWA   Sportscar  Audi     R8       2018   300      110000.00   B     Spoiler
 AB234K888   Sportscar  Audi     R8       2024   14       117500.00   R

Please input VIN: XX55JKA31

1.  Update brand
2.  Update model
3.  Update year
4.  Update mileage
5.  Update price
6.  Update color
7.  Update feature

 Please select option: 5

 Please input price: 30000

 It has been updated. Thank you.

 VIN         Type       Brand    Model    Year   Mileage  Price      Color Feature
 AB234KXAZ   Sedan      Honda    Accord   2018   100        3000.00   G     Hybrid
```

```
CD555SA72   Sedan      Toyota   Camry    2010   11000       7000.00   S
XX55JKA31   Minivan    Honda    Odyssey  2018   500        30000.00   B      Sliding door
FF2HHKL94   Sedan      BMW      535i     2011   12000       9000.00   W
ID321XKWA   Sportscar  Audi     R8       2018   300       110000.00   B      Spoiler
AB234K888   Sportscar  Audi     R8       2024   14        117500.00   R

1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 5

 ID         F_Name    L_Name              Email    Password  Cart
 app123    Jackson     Cantu     j88@gmail.com  6364.dd3K
 hukkz993     Mike  Gonzalez    h332@yahoo.com   3!7A2dss
 23fasd       Jose      Luis jluis@hotmail.com    39SD.jd  AB234KL34 FF2HHKL94
 dkim123    Daniel       Kim  dankim@gmail.com       3948

1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 6

 ID        F_Name    L_Name    Email             Position
 dkim      Dongchul  Kim       dkim@carmax.com   CEO
 apple12   Carlos    Lee       clee@carmax.com   Dealer
 park      Daniel    Park      dpark@carmax.com  Manager


1.  Display Inventory
2.  Add Car
3.  Delete Car
4.  Update Car
5.  Display Customers
6.  Display Employees
7.  Logout

 Please input: 7

1. Log in
2. Sign up
3. Exit

Please input your choice: 3

Thank you!
```

```
# Base classes for cars and users
class Car:
    # Initialization and display methods here

class User:
    # Initialization and basic user methods here

# Subclasses for different types of cars
class Sedan(Car):
    # Specific attributes/methods for Sedan

class Minivan(Car):
    # Specific attributes/methods for Minivan

class Sportscar(Car):
    # Specific attributes/methods for Sportscar

# Subclasses for different types of users
class Customer(User):
    # Customer-specific attributes/methods

class Employee(User):
    # Employee-specific attributes/methods

# Class to manage the inventory
class Inventory:
    # Methods to load, add, remove, update, and display cars

# Class to manage users/members
class Members:
    # Methods to load, add, authenticate users, and display information

# Main application class
class Main:
    def __init__(self):
        # Initialize Inventory and Members
    def start(self):
        # Main loop to handle user interaction
    def close(self):
        # Save data back to files

# Entry point
if __name__ == "__main__":
    app = Main()
    app.start()
    app.close()
```

Evaluation Rubric with Expectation Note

Expectation Note:

All submissions must achieve the same results as demonstrated in the example provided in the homework description. This includes the ability to handle user interactions, manage inventory, and maintain cart functionality exactly as outlined. The evaluation will specifically assess whether the program can replicate these outcomes under similar test conditions.

1. User Management (**25** Points)

- Sign-up and Login: Implementation matches the example, with users able to create accounts and log in accurately. (10 Points)
- User Data Handling: User data is correctly managed as per the example, with seamless loading, updating, and saving operations. (10 Points)
- Role-Based Features: The program correctly differentiates between customer and employee functionalities, as shown in the example. (5 Points)

2. Inventory Management (**35** Points)

- Inventory Operations: The addition, deletion, and updating of cars reflect the provided example, with accurate role-based access control. (15 Points)
- File Handling for Inventory: The program's handling of inventory data matches the example, ensuring data integrity and accuracy. (10 Points)
- Display and Sorting: Inventory display and sorting functionalities are consistent with the example, providing correct and expected outcomes. (10 Points)

3. Shopping Cart Functionality (**20** Points)

- Adding to Cart: Functionality for adding cars to the cart must replicate the example, including the way changes are reflected in user data. (10 Points)
- Viewing and Managing Cart: The cart's viewing and managing capabilities should precisely match the example, including how items are displayed and can be removed. (10 Points)

4. Program Flow and Error Handling (**20** Points)

- User Interface Flow: The flow of the text-based user interface should guide users through options and functionalities exactly as depicted in the example. (10 Points)
- Error Handling and Validation: The program's handling of errors and input validation should ensure a user experience consistent with the example, including the provision of feedback for corrections. (10 Points)

Evaluation Focus:

This rubric is designed to ensure that each program functionality not only exists but also **performs and yields results as demonstrated in the homework description's example above**. Submissions will be closely compared against these expected outcomes to gauge compliance and accuracy.

Submission Directions

File Preparation: Ensure your project consists of at least two main files: **`carmax.py`** (or however you named your main program file) and any additional module files you created. Include your **`users.txt`** and **`inventory.txt`** files provided. https://faculty.utrgv.edu/dongchul.kim/3329/hw2.zip

Do not forget to put comments on the top of the program including your name, date, program name, and so on

Compress Your Files: Place all of the relevant files into a single folder named `[YourName]_hw2.zip`. Compress this folder into a ZIP file.

Submission: Submit your ZIP file through the blackboard.

Deadline: March 10th.