**CAR RENTAL SYSTEM**

package car.hire;

import java.util.ArrayList;

import java.util.Date;

import java.util.List;

// Car class

class Car {

private String carId;

private String make;

private String model;

private int year;

private double rentalPrice;

private boolean isAvailable;

public Car(String carId, String make, String model, int year, double rentalPrice) {

this.carId = carId;

this.make = make;

this.model = model;

this.year = year;

this.rentalPrice = rentalPrice;

this.isAvailable = true;

}

// Getters and setters

public String getCarId() { return carId; }

public void setCarId(String carId) { this.carId = carId; }

public String getMake() { return make; }

public void setMake(String make) { this.make = make; }

public String getModel() { return model; }

public void setModel(String model) { this.model = model; }

public int getYear() { return year; }

public void setYear(int year) { this.year = year; }

public double getRentalPrice() { return rentalPrice; }

public void setRentalPrice(double rentalPrice) { this.rentalPrice = rentalPrice; }

public boolean isAvailable() { return isAvailable; }

public void setAvailable(boolean isAvailable) { this.isAvailable = isAvailable; }

@Override

public String toString() {

return "Car{" +

"carId='" + carId + '\'' +

", make='" + make + '\'' +

", model='" + model + '\'' +

", year=" + year +

", rentalPrice=" + rentalPrice +

", isAvailable=" + isAvailable +

'}';

}

}

// Customer class

class Customer {

private String customerId;

private String name;

private String email;

private String phone;

public Customer(String customerId, String name, String email, String phone) {

this.customerId = customerId;

this.name = name;

this.email = email;

this.phone = phone;

}

// Getters and setters

public String getCustomerId() { return customerId; }

public void setCustomerId(String customerId) { this.customerId = customerId; }

public String getName() { return name; }

public void setName(String name) { this.name = name; }

public String getEmail() { return email; }

public void setEmail(String email) { this.email = email; }

public String getPhone() { return phone; }

public void setPhone(String phone) { this.phone = phone; }

@Override

public String toString() {

return "Customer{" +

"customerId='" + customerId + '\'' +

", name='" + name + '\'' +

", email='" + email + '\'' +

", phone='" + phone + '\'' +

'}';

}

}

// RentalTransaction class

class RentalTransaction {

private String transactionId;

private Car car;

private Customer customer;

private Date rentalDate;

private Date returnDate;

public RentalTransaction(String transactionId, Car car, Customer customer, Date rentalDate) {

this.transactionId = transactionId;

this.car = car;

this.customer = customer;

this.rentalDate = rentalDate;

}

// Getters and setters

public String getTransactionId() { return transactionId; }

public void setTransactionId(String transactionId) { this.transactionId = transactionId; }

public Car getCar() { return car; }

public void setCar(Car car) { this.car = car; }

public Customer getCustomer() { return customer; }

public void setCustomer(Customer customer) { this.customer = customer; }

public Date getRentalDate() { return rentalDate; }

public void setRentalDate(Date rentalDate) { this.rentalDate = rentalDate; }

public Date getReturnDate() { return returnDate; }

public void setReturnDate(Date returnDate) { this.returnDate = returnDate; }

@Override

public String toString() {

return "RentalTransaction{" +

"transactionId='" + transactionId + '\'' +

", car=" + car +

", customer=" + customer +

", rentalDate=" + rentalDate +

", returnDate=" + returnDate +

'}';

}

}

// RentalAgency class

class RentalAgency {

private List<Car> cars = new ArrayList<>();

private List<Customer> customers = new ArrayList<>();

private List<RentalTransaction> rentals = new ArrayList<>();

public void addCar(Car car) {

cars.add(car);

}

public void addCustomer(Customer customer) {

customers.add(customer);

}

public void rentCar(String carId, String customerId) {

Car car = findCar(carId);

Customer customer = findCustomer(customerId);

if (car != null && customer != null && car.isAvailable()) {

car.setAvailable(false);

RentalTransaction rental = new RentalTransaction("TX" + (rentals.size() + 1), car, customer, new Date());

rentals.add(rental);

System.out.println("Car rented successfully: " + rental);

} else {

System.out.println("Car rental failed.");

}

}

public void returnCar(String carId) {

Car car = findCar(carId);

if (car != null) {

car.setAvailable(true);

System.out.println("Car returned successfully.");

} else {

System.out.println("Car return failed.");

}

}

public void listAvailableCars() {

for (Car car : cars) {

if (car.isAvailable()) {

System.out.println(car);

}

}

}

private Car findCar(String carId) {

for (Car car : cars) {

if (car.getCarId().equals(carId)) {

return car;

}

}

return null;

}

private Customer findCustomer(String customerId) {

for (Customer customer : customers) {

if (customer.getCustomerId().equals(customerId)) {

return customer;

}

}

return null;

}

}

// Main class for testing

public class CarRentalSystem {

public static void main(String[] args) {

RentalAgency agency = new RentalAgency();

// Adding some cars

agency.addCar(new Car("C1", "Toyota", "Camry", 2020, 50));

agency.addCar(new Car("C2", "Honda", "Accord", 2019, 45));

// Adding some customers

agency.addCustomer(new Customer("CU1", "John Doe", "john@example.com", "1234567890"));

agency.addCustomer(new Customer("CU2", "Jane Smith", "jane@example.com", "0987654321"));

// Listing available cars

System.out.println("Available cars:");

agency.listAvailableCars();

// Renting a car

agency.rentCar("C1", "CU1");

// Listing available cars after renting one

System.out.println("Available cars after rental:");

agency.listAvailableCars();

// Returning a car

agency.returnCar("C1");

// Listing available cars after returning one

System.out.println("Available cars after return:");

agency.listAvailableCars();

}

}