Appendix B: Projects for This Course

Project 1: Parking Ticket Simulator

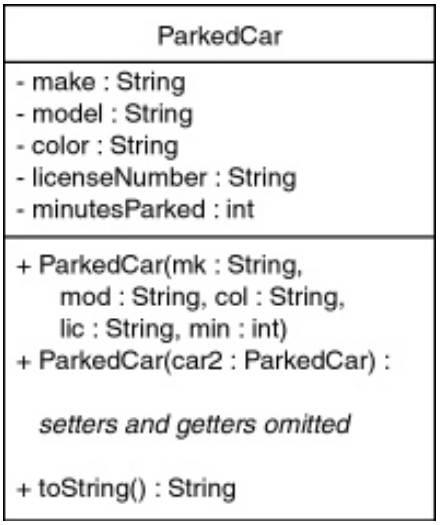
Purpose:

For this project, you will design a set of classes that work together to simulate a police officer issuing a parking ticket.

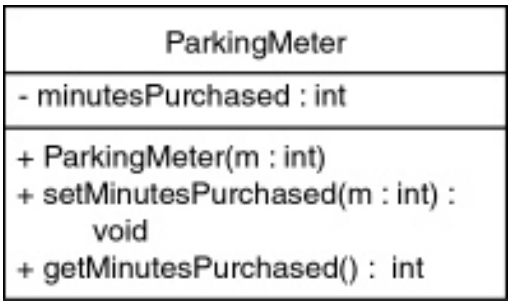
Deliverables, Requirements, and Timeline

Design the following classes:

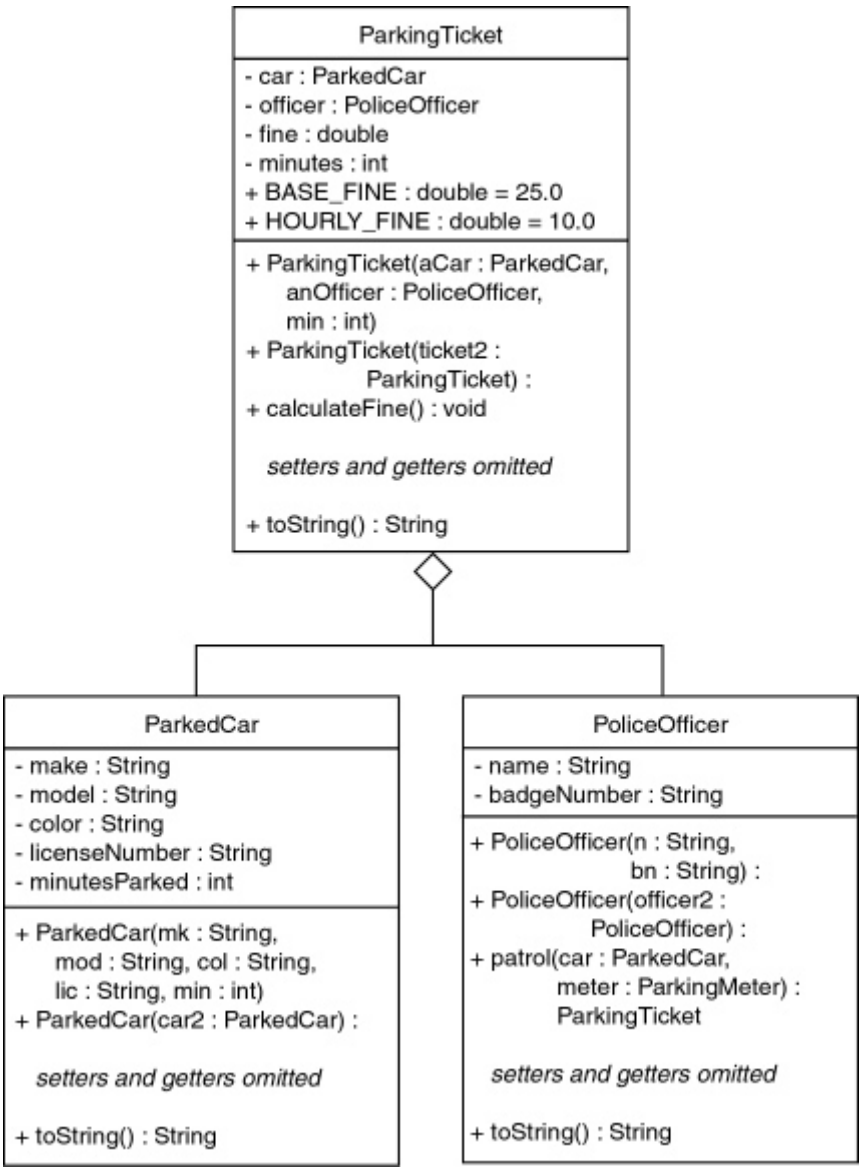
- The ParkedCar Class: This class should simulate a parked car. The responsibilities of the class are as follows:
  - To know the make of the car, model, color, license number, and the number of minutes that the car has been parked. The following is a UML figure that shows the relationship for each object:



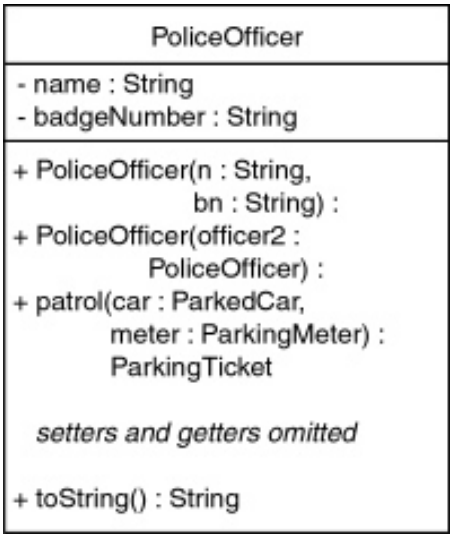
- The ParkingMeter Class: This class should simulate a parking meter. The only responsibility of the class is as follows:
  - To know the number of minutes of parking time that has been purchased. The following is a UML figure that shows the relationship for each object:



- The ParkingTicket Class: This class should simulate a parking ticket. The responsibilities of the class are as follows:
    - To report the make, model, color, and license number of the illegally parked car.
    - To report the amount of the fine, which is $25 for the first hour or part of an hour that the car is illegally parked, plus $10 for every additional hour or part of an hour that the car is illegally parked.
    - To report the name and badge number of the police officer issuing the ticket. The following is a UML figure that shows the relationship for each object:



- The PoliceOfficer Class: This class should simulate a police officer inspecting parked cars. The responsibilities of the class are as follows:
    - To know the police officer's name and badge number.
    - To examine a ParkedCar object and a ParkingMeter object, and determine whether the parking time of the car has expired.
    - To issue a parking ticket—generate a ParkingTicket object—if the time of the car has expired. The following is a UML figure that shows the relationship for each object:



Write a program that demonstrates how these classes collaborate.
Here is a sample program:

```
public class ParkingTicketSimulator
{
  public static void main(String[] args)
  {
    // Create a ParkedCar object.
    // The car was parked for 125 minutes.
    ParkedCar car = new ParkedCar("Volkswagen", "1972", "Red",
                                  "147RHZM", 125);

    // Create a ParkingMeter object. 60 minutes were purchased.
    ParkingMeter meter = new ParkingMeter(60);

    // Create a PoliceOfficer object.
    PoliceOfficer officer = new PoliceOfficer("Joe Friday",
                                        "4788");

    // Let the officer patrol.
    ParkingTicket ticket = officer.patrol(car, meter);

    // Did the officer issue a ticket?
    if (ticket != null)
      System.out.println(ticket);
    else
      System.out.println("No crimes committed!");
  }
}
```

Here is a sample of output proving that the officer did not issue a ticket:

```
> java ParkingTicketSimulator2
No crimes committed!
>
```

Here is a sample output proving that the officer did issue a ticket:

```
> java ParkingTicketSimulator
Car Data:
Make: Volkswagen
Model: 1972
Color: Red
License Number: 147RHZM
Minutes Parked: 125
Officer Data:
Name: Joe Friday
BadgeNumber: 4788
Minutes Illegally Parked: 65
Fine: $45.00
>
```

Submit your completed project on a floppy disk or CD, or print out the source code with screen shots.

Assigned and Due Date:
Assigned: Unit 4
Due: Unit 5