**Assignment #4 - Pay and Go Evening Parking  
GUI/OO Version**

**Pairs Programming Assignment**

You may work with a partner on this assignment as long as you notify your instructor BEFORE you submit your design work. You can NOT designate a partner after the deadline for submitting the design. Submit only ONE copy of the assignment under one student account. Make sure BOTH names are included in the documentation AT THE TOP of the source code.

**Description**

This is a difficult and challenging assignment that requires you to do research and independent learning. This assignment can be very rewarding and interesting as you will:

* see how a windows program works
* modify the windows program to communicate with the back-end domain classes
* write all the back-end domain classes

Recommended Resources:

* Chapter 12
  + In particular pages 783-788
  + in particular 798-803 (to arrange fields and buttons based on a grid system)
* Chapter 6 A first look at classes
* Section 7.13 The ArrayList Class

You have recently been employed at Pay and Go Parking by their IT department as a Intermediate Developer. They had started work on a program to keep track of cars parked in your parking lot. The programmer has started work on the GUI for the parking system but didn’t get a chance to finish the domain programming.

This parking system is a bit different in that drivers don’t need to put a ticket on their dash, all they need to do is provide their licence plate number in conjunction with a credit card number.

This is an evening only parking lot and cars are charged a flat rate of $4.00 for the evening. Customers will come up to the machine and enter their credit card number and their license plate and then they can park in the lot.

Sample system:

* GUI OO Version.jar – is my working solution to the problem. It will give you a feel for how it should work. It does some error checking on the input but if you want to improve it that would be worth bonus marks.

## Design

The following is an OO Design. Skeleton code is provided.

Domain Classes – these need to be developed and tested first

* ParkingLot – contains an ArrayList of Cars parked within the parkingLot
  + Methods
    - ParkingLot() – creates the ArrayList of cars called ‘parkingLot’
    - int numCars() – returns the number of cars in the parkingLot
    - void addCar (Car x) – adds Car ‘x’ to the parkingLot
    - Car findCar(String plate) – looks through the parkingLot to see if there is a car with the same ‘plate’. If so it returns the Car object that matches the ‘plate’ otherwise null.
    - void printCharges() – create the dailyCharges report to the file c:/temp/dailyCharges.txt
    - void plateList() – creates a list of all plates that are registered to park in lot. The file is output to c:/temp/plateList.txt.
* Car – models information about parked cars
  + Attributes:
    - plate – license plate
    - ccNumber – credit Card number
    - ccMonth – number representing the expiry month of the credit card
    - ccYear - number representing the expiry year of the credit card
    - ccv – security code on the back of the card
    - charge – the amount to charge the credit card for parking in the lot

GUI classes – once the domain classes are done you can implement the buttons in the GUI

* ParkAndGoPanelCreate
  + contains the main() function that creates the JFrame
  + This is the function that you run to start the GUI
* ParkAndGoFrame
  + this is the body of the GUI
  + within the various Listeners you will add code to create the ParkingLot object and call the various methods depending on which buttons are pressed

Sample output, written to various files when the user exits the application.

Daily Charges Report

dailyCharges.txt

Daily parking summary for Wed Jun 18 16:00:36 MDT 2014

Plate Credit Card Expiry CCV Charge

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ABC123 658935241257 11/17 653 $ 4.00

GSY293 562385412356 6/15 321 $ 4.00

DYV182 653298541682 11/16 554 $ 4.00

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Total $ 12.00

Plate List

plateList.txt

Plate List for Wed Jun 18 16:00:36 MDT 2014

Plate

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ABC123

GSY293

DYV182

**Submissions**  
Be careful to submit your own work, I will be using various tools to analyse all the submitted assignments to determine if any plagiarism has occurred. It is better to submit your own partial solution than to copy from another student.

It is recommended that you develop this program incrementally so that you can be awarded part marks for a working program, even if not all of the methods are working. Recommended order and value is shown below:

1. Implement the Car class and test it in BlueJ - 10%
2. Implement ParkingLot.addCar() and test it in BlueJ - 10%
3. Implement ParkingLot.findCar() and test it in BlueJ - 10%
4. Add the code to the GUI to call addCar() when the Register button is pressed - 10%
5. Add the code to the GUI to call findCar() when the Search button is pressed - 10%
6. Implement ParkingLot.plateList() and test it in BlueJ - 15%
7. Implement ParkingLot.printCharges() and test it in BlueJ - 15%
8. Add the code to the GUI to call plateList() and printCharges() when the user exits the application 10%

Marking Rubric:

* Working Java code (required to receive a grade > 50%)
* Indentation – consistent
* Readability – good variable names
* Documentation
* Comments at the top which include: Name, date, program description

Bonus Marks (20% extra)

* learn how to use a layout manager such as the BorderLayout manager or GridLayout manager so that the components are laid out in a better format on the screen
* learn how to sort the arraylist of plates based on the plate number BEFORE outputting to the reports
* learn how to rewrite GUI code to code so that you don’t need three Listener classes
* provide better error checking on input values from the form