ITI1120 Fall 2012 – Assignment 5

Available: Monday Nov 19
Due: Sunday Dec 2, 23:59

Instructions

This assignment may be completed in TEAMS OF TWO PEOPLE. You must identify the team by going to Virtual Campus home page; click on the Assignment 5 Team Sign Up icon and follow instructions to sign up your team. This information is required to assign the marking of the submitted assignment to a marker.

The assignment should be submitted only once by a member of your team, but please ensure that the identification material contains the information for both team members. If both team members submit an assignment – one shall be chosen **randomly** for marking. Follow the instructions in the lab manual for submitting assignments through the Virtual campus. The following are specific instructions for this assignment:

- Question 1 should be answered in files Car.java and ParkingLot.java (templates have been provided). UML diagrams should be pasted in the file A5Q1.doc. Also paste the contents of both java files into the Word file A5Q1.doc. The file A5Q1.java is provided to test these two classes.
- Question 2 should be answered in Java files ParkEvent.java and ParkEventList.java (templates have been provided). UML diagrams should be pasted in the file A5Q2.doc. Also paste the content of the java files into the Word file A5Q2.doc. The file A5Q2.java is provided to test these two classes.
- The file A5Simulation.java is provided to test all classes from both questions.
- Inserting the Java source code into Word files will allow the marker to make comments on the source code in the Word file.
- Submit **only** the Java files that you have completed, i.e. Car.java, ParkingLot.java, ParkEvent.java and ParkEventList.java.
- Zip all the .doc, .java, and .class files in a5_xxxxxx.zip, where xxxxxx is the student number of the person submitting the assignment and submit it through the Virtual Campus.
- Be sure to start the assignment soon and not wait until the last weekend to start. Better to put many small efforts over the next two weeks to complete the assignment than one single large effort.

Here are guidelines to completing the assignment in a team of 2:

- Question 1: One partner can complete the classes Car and ParkingLot.
- Question 2: The second partner can complete the classes ParkEvent and ParkEventList.
- Once all classes are complete, the team can meet to execute A5Simulate for testing all classes.

Marking Scheme (total 100 marks)

- **Regulations and Standards: 10 marks**
- Question 1: 45 marks
- Question 2: 45 marks

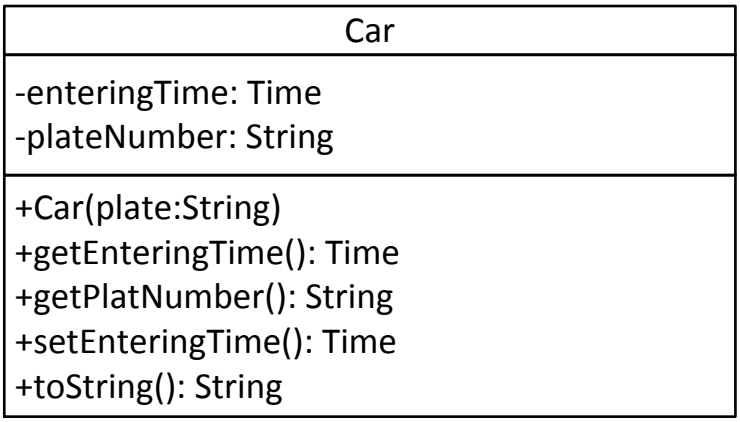
In this assignment you shall be developing several classes to complete a software project where parking of cars in different parking lots is simulated. The first question deals with creating the classes `Car` (to represent cars) and `ParkingLot` (to represent parking lots). The second question deals with creating the class `ParkEvent` which shall represent the event of a car either entering a lot or leaving a lot as well as the class `ParkEventList` which contains a list (i.e. array) of `ParkEvent` objects. These latter classes define a set of *events* that occur at specific points in times. Simulation of this system is called Discrete Event Simulation. The following classes are provided to support your development:

- `A5Q1`: For testing the classes from question 1.
- `A5Q2`: For testing the classes from question 2.
- `A5Simulation`: For testing all classes from both questions 1 and questions 2.
- `Time`: This class is complete and extents the Time class studied in Lab 9.
- `Car` and `ParkingLot`: The classes provided are incomplete and need to be completed for Question 1.
- `ParkEvent` and `ParkEventList`: The classes provided are incomplete and need to be completed for Question 2.

Question 1 (45 marks)

Implementation of a Car Class

Complete the implementation of a **Java** class `Car` that will store information for a car and provide operations to work with the car. The following UML diagram provides the design of the class and shows the private attributes and public methods included in the class.



The methods are described in the template provided (Car.java) – see comments given for each method. For completeness, include the above UML diagram in the file A5Q1.doc.

Design and Implementation of a ParkingLot Class

Complete the design and implementation of **Java** class `ParkingLot` that will store information for a parking lot, and provide operations to work with the lot. The following UML diagram shows the public methods (and suggested private methods) included in the class. One attribute is shown, *spots*. The attribute *spots* is a reference to an array of Car objects. Note that this array shall be of fixed size (according to the capacity of the parking lot). The element of the array contains *null* when no `Car` object is occupying the *spot* and a reference to a Car objet when it occupies the spot. Other attributes are not shown; you are required to add additional attributes to be used.

ParkingLot
- spots: Car [] *To be completed*
+ParkingLot(name: String, rate: double, max: double, capacity: int) +getDailyRevenue() : double +getHourlyRate(): double +getMaxCharge() : double +getCapacity() : int +resetDailyRevenue() +resetLot(rate: double, max: double, capacity: int) +carEnter(c: Car, t: Time) +carLeave(c: Car, t: Time) +print() +toString() -findCar(c: Car): int -findSpot(): int

The methods are described in the Java template provided – see comments given for each method. Complete the UML diagram to show any additions made to the design and include in the A5Q1.doc file. A Visio file has been provided with the above diagram for modifications.

Testing the Car and ParkingLot classes:
The class `A5Q1` with a `main()` method (and other methods) is provided to test your `ParkingLot` class and Car class. Appendix A provides the output from the execution of the `main()` method.

Question 2 (45 marks)

In this question, you will develop classes that allow the simulation of cars parking in parking lots. The simulation of the parking lots is based on an approach called Discrete Event Simulation. A discrete event is defined as a point in time at which a change is made to the model (in our specific case the collection of `ParkingLot` and `Car` objects). Thus an event is defined as an object that contains a point in time (i.e. a reference to a `Time` object), a reference to a `ParkingLot` object (where the change is to be made), a reference to a `Car` object (which either enters or leaves the parking lot), and a reference to a `String` object that contains the string "Enter" or "Leave" to indicate whether the car enters or leaves the parking lot. An event in our model consists of a car either entering or leaving a parking lot.

To define a simulation over a day, a number of events (i.e. `ParkingEvent` objects) are defined and stored in the `ParkingEventList` object. This latter object can then be used to "run" or "execute" the simulation.

Implementing the ParkEvent Class (for creating an object that defines a parking event)

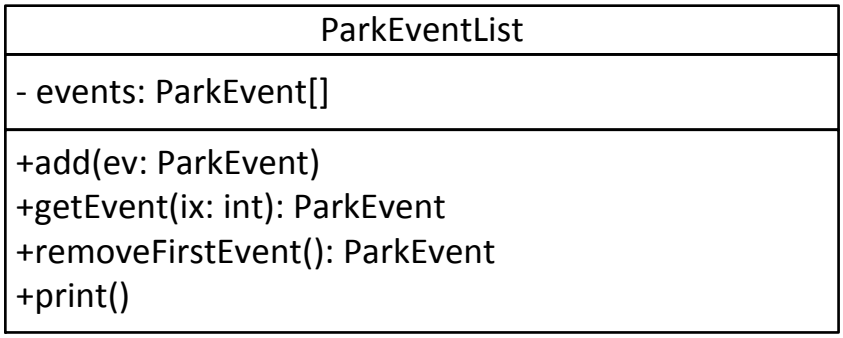
Complete the Java class *`ParkEvent`* that contains the information described above (which can be different for each *`ParkEvent`* object). The following UML diagram provides a definition for the *`ParkEvent`* class.

ParkEvent
+ENTER: String = "Enter" +LEAVE: String = "Leave" -theCar: Car -theLot: ParkingLot - eventTime: Time - eventType: String
+ParkEvent(c: Car, p:ParkingLot, t:Time, evnt:String) +getCar(): Car +getParkingLot(): ParkingLot +getTime(): Time +isEnterEvent(): boolean +isLeaveEvent(): boolean +toString: String

The methods are described in the Java template provided (ParkEvent.java) – see comments given for each method. For completeness, include the above UML diagram in the file A5Q2.doc.

Design and Implementation of the ParkEventList Class (for creating and manipulating a list of ParkEvent objects)

Complete the Java class *ParkEventList* that is designed to manage a list of *ParkEvent* objects; such objects are used in the simulation of cars entering and leaving parking lots. The following UML diagram provides a base definition for the *ParkEventList* class.



The public methods are described in the Java template ParkEvent.java provided – see comments given for each method. Note that no Constructor is provided or necessary (examine how the *events* attribute is initialized). Do consider including private methods. In particular the *add* method would be simplified if you defined separate private methods for adding an event at the start of the list, adding an event at the end of the list and for inserting events within the list. Complete the UML diagram to show any additions made to the design and include in the A5Q2.doc file. A Visio file has been provided with the above diagram.

Testing the ParkEvent and ParkEventList classes:
The class `A5Q2` with a `main()` method (and other methods) is provided to test your `ParkEvent` class and `ParkEventList` class. Appendix A provides sample output from the execution of the `main()` method.

Testing all classes:

The class `A5Simulation` provides a complete user interface that can provide the means to test all classes working together. Appendix A provides a sample output of the execution of the `main` method in this class.

Appendix A

A5Q1 Output

```
**********Enter Leave Tests**********
----------Enter Leave Test----------
09:00 - Car CSI 356 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
09:20 - Car CSI 356 left Test Lot and paid $ 1.75
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 1.75
>--------------------<
------------------------------------------------------------------------
----------Enter Leave Test----------
09:00 - Car CSI 356 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 1.75
>--------------------<
10:00 - Car CSI 356 left Test Lot and paid $ 3.50
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 5.25
>--------------------<
------------------------------------------------------------------------
----------Enter Leave Test----------
09:10 - Car CSI 356 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 5.25
>--------------------<
11:10 - Car CSI 356 left Test Lot and paid $ 7.00
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
------------------------------------------------------------------------
----------Enter Leave Test----------
09:30 - Car CSI 356 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
```

```
10:45 - Car CSI 356 left Test Lot and paid $ 5.25
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 17.50
>--------------------<
------------------------------------------------------------------------
--------------------------Enter Leave Test----------------------
09:00 - Car CSI 356 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 17.50
>--------------------<
14:00 - Car CSI 356 left Test Lot and paid $ 8.00
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 25.50
>--------------------<
------------------------------------------------------------------------

**********Test Changes In Lot**********
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
09:00 - Car CSI 356 entered Test Lot
09:01 - Car ITI 193 entered Test Lot
09:02 - Car ELG 245 entered Test Lot
09:03 - Car PHY 391 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 | ITI 193 | ELG 245 | PHY 391 |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
10:01 - Car ITI 193 left Test Lot and paid $ 3.50
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  | ELG 245 | PHY 391 |
+---------+---------+---------+---------+
Daily Revenue: $ 3.50
>--------------------<
10:03 - Car PHY 391 left Test Lot and paid $ 3.50
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 |  Empty  | ELG 245 |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 7.00
>--------------------<
11:03 - Car PHY 391 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CSI 356 | PHY 391 | ELG 245 |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 7.00
>--------------------<
```

```
11:04 - Car CSI 356 left Test Lot and paid $ 8.00
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  | PHY 391 | ELG 245 |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 15.00
>--------------------<
11:05 - Car CEG 109 entered Test Lot
>---------Test Lot----------<
+---------+---------+---------+---------+
| CEG 109 | PHY 391 | ELG 245 |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 15.00
>--------------------<

**********Bad Enter - Leave Actions**********
>---------Test Lot----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
09:00 - Car CSI 356 entered Test Lot
09:00 - Car CSI 356 is already parking in Test Lot
09:30 - Car ITI 193 is not in Test Lot
09:01 - Car ITI 193 entered Test Lot
09:02 - Car ELG 245 entered Test Lot
09:03 - Car PHY 391 entered Test Lot
09:04 - Lot is full. Car CEG 109 cannot enter Test Lot
```

A5Q2 Output

```
***************Adding Events*********************
-----------------------------------------
-----------------------------------------
Added event: 10:30: Car is CSI 356, Lot is Lot 1, Enter event
-----------------------------------------
10:30: Car is CSI 356, Lot is Lot 1, Enter event
-----------------------------------------
Added event: 09:00: Car is ITI 193, Lot is Lot 2, Enter event
-----------------------------------------
09:00: Car is ITI 193, Lot is Lot 2, Enter event
10:30: Car is CSI 356, Lot is Lot 1, Enter event
-----------------------------------------
Added event: 14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
09:00: Car is ITI 193, Lot is Lot 2, Enter event
10:30: Car is CSI 356, Lot is Lot 1, Enter event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Added event: 13:45: Car is CSI 356, Lot is Lot 1, Leave event
-----------------------------------------
09:00: Car is ITI 193, Lot is Lot 2, Enter event
10:30: Car is CSI 356, Lot is Lot 1, Enter event
13:45: Car is CSI 356, Lot is Lot 1, Leave event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Added event: 10:15: Car is ITI 193, Lot is Lot 2, Leave event
-----------------------------------------
09:00: Car is ITI 193, Lot is Lot 2, Enter event
10:15: Car is ITI 193, Lot is Lot 2, Leave event
10:30: Car is CSI 356, Lot is Lot 1, Enter event
13:45: Car is CSI 356, Lot is Lot 1, Leave event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------

***************Removing Events*********************
Removed event: 09:00: Car is ITI 193, Lot is Lot 2, Enter event
-----------------------------------------
10:15: Car is ITI 193, Lot is Lot 2, Leave event
10:30: Car is CSI 356, Lot is Lot 1, Enter event
13:45: Car is CSI 356, Lot is Lot 1, Leave event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Removed event: 10:15: Car is ITI 193, Lot is Lot 2, Leave event
-----------------------------------------
10:30: Car is CSI 356, Lot is Lot 1, Enter event
13:45: Car is CSI 356, Lot is Lot 1, Leave event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Removed event: 10:30: Car is CSI 356, Lot is Lot 1, Enter event
-----------------------------------------
13:45: Car is CSI 356, Lot is Lot 1, Leave event
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Removed event: 13:45: Car is CSI 356, Lot is Lot 1, Leave event
-----------------------------------------
14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
Removed event: 14:00: Car is ELG 245, Lot is Lot 1, Enter event
-----------------------------------------
-----------------------------------------
```

A5Simulation Sample Output

```
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
----------------------------------------
Configuration for Lot 2
    Rate: $ 3.50
    Max Charge: $ 15.00
    Capacity: 8
----------------------------------------

1) Show Events Log
2) Trace Events
3) Change lot configuration
4) Exit
Enter your choice (1-4): 1
Please enter a value for seed: 1234
09:12 - Car PHY 391 entered Lot 1
09:29 - Car MAT 234 entered Lot 2
09:38 - Car CEG 109 entered Lot 2
12:24 - Car CSV 346 entered Lot 1
12:50 - Car CEG 109 left Lot 2 and paid $ 12.25
13:30 - Car ELG 245 entered Lot 2
14:48 - Car PHY 391 left Lot 1 and paid $ 12.00
14:57 - Car ITI 193 entered Lot 1
15:30 - Car CSV 346 left Lot 1 and paid $ 10.50
16:31 - Car MAT 234 left Lot 2 and paid $ 15.00
17:24 - Car CSI 356 entered Lot 2
17:39 - Car ITI 193 left Lot 1 and paid $ 9.00
18:03 - Car MCB 204 entered Lot 2
18:11 - Car MCG 243 entered Lot 1
18:50 - Car CHG 485 entered Lot 1
18:53 - Car MCG 243 left Lot 1 and paid $ 3.00
19:21 - Car ELG 245 left Lot 2 and paid $ 15.00
20:27 - Car CHG 485 left Lot 1 and paid $ 6.00
20:58 - Car MCB 204 left Lot 2 and paid $ 10.50
22:43 - Car CSI 356 left Lot 2 and paid $ 15.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 40.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 67.75
>--------------------<
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
----------------------------------------
Configuration for Lot 2
    Rate: $ 3.50
    Max Charge: $ 15.00
    Capacity: 8
----------------------------------------

1) Show Events Log
2) Trace Events
3) Change lot configuration
4) Exit
```

```
Enter your choice (1-4): 2
Please enter a value for seed: 1234
09:12 - Car PHY 391 entered Lot 1
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
--------------------------------------
Press any key to go to next event

09:29 - Car MAT 234 entered Lot 2
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
--------------------------------------
Press any key to go to next event

09:38 - Car CEG 109 entered Lot 2
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | CEG 109 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
--------------------------------------
Press any key to go to next event

12:24 - Car CSV 346 entered Lot 1
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 | CSV 346 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | CEG 109 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
--------------------------------------
Press any key to go to next event
```

```
12:50 - Car CEG 109 left Lot 2 and paid $ 12.25
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 | CSV 346 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
-------------------------------------
Press any key to go to next event

13:30 - Car ELG 245 entered Lot 2
>---------Lot 1----------<
+---------+---------+---------+---------+
| PHY 391 | CSV 346 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 0.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
-------------------------------------
Press any key to go to next event

14:48 - Car PHY 391 left Lot 1 and paid $ 12.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  | CSV 346 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 12.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
-------------------------------------
Press any key to go to next event

14:57 - Car ITI 193 entered Lot 1
>---------Lot 1----------<
+---------+---------+---------+---------+
| ITI 193 | CSV 346 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 12.00
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
-------------------------------------
Press any key to go to next event
```

```
15:30 - Car CSV 346 left Lot 1 and paid $ 10.50
>---------Lot 1----------<
+---------+---------+---------+---------+
| ITI 193 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 22.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| MAT 234 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 12.25
>--------------------<
------------------------------------
Press any key to go to next event

16:31 - Car MAT 234 left Lot 2 and paid $ 15.00
>---------Lot 1----------<
+---------+---------+---------+---------+
| ITI 193 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 22.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
|  Empty  | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event

17:24 - Car CSI 356 entered Lot 2
>---------Lot 1----------<
+---------+---------+---------+---------+
| ITI 193 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 22.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event

17:39 - Car ITI 193 left Lot 1 and paid $ 9.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 31.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event
```

```
18:03 - Car MCB 204 entered Lot 2
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 31.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event

18:11 - Car MCG 243 entered Lot 1
>---------Lot 1----------<
+---------+---------+---------+---------+
| MCG 243 |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 31.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event

18:50 - Car CHG 485 entered Lot 1
>---------Lot 1----------<
+---------+---------+---------+---------+
| MCG 243 | CHG 485 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 31.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event

18:53 - Car MCG 243 left Lot 1 and paid $ 3.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  | CHG 485 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 34.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 | ELG 245 | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 27.25
>--------------------<
------------------------------------
Press any key to go to next event
```

```
19:21 - Car ELG 245 left Lot 2 and paid $ 15.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  | CHG 485 |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 34.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 |  Empty  | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 42.25
>--------------------<
-------------------------------------
Press any key to go to next event

20:27 - Car CHG 485 left Lot 1 and paid $ 6.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 40.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 |  Empty  | MCB 204 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 42.25
>--------------------<
-------------------------------------
Press any key to go to next event

20:58 - Car MCB 204 left Lot 2 and paid $ 10.50
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 40.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
| CSI 356 |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 52.75
>--------------------<
-------------------------------------
Press any key to go to next event

22:43 - Car CSI 356 left Lot 2 and paid $ 15.00
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 40.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 67.75
>--------------------<
-------------------------------------
Press any key to go to next event
```

```
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
---------------------------------------
Configuration for Lot 2
    Rate: $ 3.50
    Max Charge: $ 15.00
    Capacity: 8
---------------------------------------

1) Show Events Log
2) Trace Events
3) Change lot configuration
4) Exit
Enter your choice (1-4): 3
Do you which to change either lot? (y or n) y
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
---------------------------------------
Do you wish to change the lot? ( y or n) n
Configuration for Lot 2
    Rate: $ 3.50
    Max Charge: $ 15.00
    Capacity: 8
---------------------------------------
Do you wish to change the lot? ( y or n) y
Please enter a value for hourly rate: 4.00
Please enter a value for maximum charge: 15.50
Please enter a value for capacity: 6
New setup for Lot 2
    Rate: $ 4.00
    Max Charge: $ 15.50
    Capacity: 6

Hit any key to continue ...
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
---------------------------------------
Configuration for Lot 2
    Rate: $ 4.00
    Max Charge: $ 15.50
    Capacity: 6
---------------------------------------

1) Show Events Log
2) Trace Events
3) Change lot configuration
4) Exit
Enter your choice (1-4): 1
Please enter a value for seed: 1234
09:12 - Car PHY 391 entered Lot 1
09:29 - Car MAT 234 entered Lot 2
09:38 - Car CEG 109 entered Lot 2
12:24 - Car CSV 346 entered Lot 1
12:50 - Car CEG 109 left Lot 2 and paid $ 14.00
13:30 - Car ELG 245 entered Lot 2
14:48 - Car PHY 391 left Lot 1 and paid $ 12.00
14:57 - Car ITI 193 entered Lot 1
15:30 - Car CSV 346 left Lot 1 and paid $ 10.50
16:31 - Car MAT 234 left Lot 2 and paid $ 15.50
17:24 - Car CSI 356 entered Lot 2
```

```
17:39 - Car ITI 193 left Lot 1 and paid $ 9.00
18:03 - Car MCB 204 entered Lot 2
18:11 - Car MCG 243 entered Lot 1
18:50 - Car CHG 485 entered Lot 1
18:53 - Car MCG 243 left Lot 1 and paid $ 3.00
19:21 - Car ELG 245 left Lot 2 and paid $ 15.50
20:27 - Car CHG 485 left Lot 1 and paid $ 6.00
20:58 - Car MCB 204 left Lot 2 and paid $ 12.00
22:43 - Car CSI 356 left Lot 2 and paid $ 15.50
>---------Lot 1----------<
+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+
Daily Revenue: $ 40.50
>--------------------<
>---------Lot 2----------<
+---------+---------+---------+---------+---------+---------+
|  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |  Empty  |
+---------+---------+---------+---------+---------+---------+
Daily Revenue: $ 72.50
>--------------------<
Configuration for Lot 1
    Rate: $ 3.00
    Max Charge: $ 12.00
    Capacity: 4
----------------------------------------
Configuration for Lot 2
    Rate: $ 4.00
    Max Charge: $ 15.50
    Capacity: 6
----------------------------------------

1) Show Events Log
2) Trace Events
3) Change lot configuration
4) Exit
Enter your choice (1-4):
```