Faculty of Computing, Engineering and the Built Environment



Undergraduate Programme Academic Year 2014-2015 **Coursework: Team Project**

Module:	CMP2515 Software Design UG2
School:	Computing, Telecommunication and Networks
Module Co-ordinator:	Professor Zhiming Liu
Setup Date:	20/02/2015
Submission Date:	21/04/2015
Team Number:	
Team Leader:	

Team Members:

Instruction to Students:

The final report to submit should contain this page as the cover page, with the above details of the team filled in.

As part of project management, each team should have a weekly meeting. A weekly project diary should be maintained to record the attendance of the meetings by team members, together with brief notes about the weekly project tasks allocations and how well individual team members meet the deadlines of their project tasks.

The final project report should include the weekly dairy in the part of the project management.

Project Description

Bvis Car Hire Company: The Problem Description

You are invited to design a computer system for a car hire company. The system will record details of the company's fleet of cars and its hire transactions. A conversation with the director of the company produced the following description of the requirements for the system. The requirements were based on the way the company currently works with a ``paper-based'' manual system. The current manual system works as follows:

- The company keeps a file of its customers. When registering a new customer the following information is recorded: name, telephone number and address. The customer file is used for all customers -- note that ``non-regular" customers can be removed from the customer file.
- For each car, the details recorded should include its registration number (unique), make, model, engine capacity, hire class (1 6) and the date of registration, together with the date of each service, the mileage at the service, and the name of the mechanic responsible. The mileage of each car is also recorded -- this is updated each time a car is returned from a hire.
- Cars have a minor service every 6,000 miles and a major service every 12,000 miles (approximately). Cars are serviced at the first opportunity when they exceed a service interval. The company has its own garage and one of its mechanics is put in charge of a particular service. The management requires that the date of any service performed on a car is recorded, together with the name of the mechanic responsible for the service.
- When a vehicle is hired, if the customer is not known to the system, their name, address, telephone number, and driving licence number are recorded on the hire form, together with the identification of the hired vehicle. The dates of the beginning and end of the hire are recorded (the second is an estimate and will be updated when the vehicles is returned) as are the number of miles at the start of the hire period.
- When the car is returned, actual return date and the mileage are recorded in the hire agreement file, and the cost of hire is calculated, based on the daily hire rate. The customer must make a payment (by cash only) and get a receipt before leaving the company.
- The management requires that every completed hire is recorded with the details of the customer, the dates of the beginning and end of hire, and the amount of the payment.
- There is a record kept for each hire class of vehicles: the daily, weekly, and monthly hire rates are recorded. These rates vary from model to model according to the hire class.
- The garage keeps a record of the name, address and home telephone number of each mechanic; the management must keep track of the mechanics with the same name and telephone number. It is a requirement of the company that all mechanics hold a current driving license.

You are to develop and implement a computer-based system to replace the current manual system. The system should be paperless. Functions are to be provided for the following queries and updates.

- 1. Register a new customer.
- 2. Record that a particular car has been hired.
- 3. Record that a particular car has been returned.
- 4. Calculate the cost based on the daily hire rate.
- 5. Display the appropriate details, and print out a receipt.
- 6. Log a completed hire.
- 7. Record a service for a particular car, together with the date of the service, the type of the service, and the name of the mechanic responsible.
- 8. Remove a customer.
- 9. Add a new car to the fleet.
- 10. Delete a car that is no longer in the hire fleet.
- 11. Add a mechanic who has joined the company.
- 12. Remove the details of a mechanic who has left the company.
- 13. Determine if a particular car is due for a particular service.
- 14. List the information (history) about all hires for a specified car.
- 15. List the information (history) about all services that a specified car has had.

Your project development and documentation are required to cover the following activities and artefacts.

I. The initial requirements understanding

In this stage

- 1. Discuss the nature of the Bvis Car Hire Company described above and justify why an object-oriented development applicable to the project. You need to read and refer points to ideas discussed Chapter 3 of the course notes. Elaborate the problem description as necessary to support your analysis.
- 2. Present the system functions according to the guidelines in Section 4.1 of the course notes.
- 3. Identify the *essential use cases*, which cover and support the understanding of the required functions in the problem description.
- 4. Write an *expanded version* for each of these use cases.
- 5. Create a use case diagram for the use cases that you identified in the previous question to show the relationships between the actors and the use cases, and the relationships between the use cases.
- 6. Using the guidelines, strategies, and notation discussed in the course notes, work through the problem statement and the use cases that you have identified in item 3 to identify classes (concepts), associations, and attributes in the application domain. You should give enough discussion to support your identification. Draw a conceptual class diagram, which includes, the classes, associations, and attributes that you have identified. Again, you only have to consider the functions and the use cases that you considered for item 3. You should give enough discussion to support your identification. Draw a conceptual model, which includes, the classes, associations, and attributes that you have identification. Draw a conceptual model, which includes, the classes, associations, and attributes that you have identified. You may find that you need to refine or modify your use cases.

II. Analysis of Functionality of System Operations

7. Use the techniques discussed in Chapter 6 of the course notes to identify the system operations from the typical course of events of the use cases that you have produced. Create system sequence diagrams for the typical course of events of the use cases that you think most significant for the development

of the system. You may find that you need to refine or modify your use cases and conceptual model that you have produced.

8. Based on your use-case model and conceptual model that you have produced write the contracts for the system operations that you have identified. You may find that you need to refine or modify your use-case model and conceptual model while you are working on the contracts.

III. Use case design

Based on the use-case model and the conceptual model that you created and the contracts of the system operations that you defined for the system operations that you have identified, work out a design for the system. The design document should include

- 9. The collaboration diagrams or object sequence diagrams (not both) which show the assignment of responsibilities to classes of objects.
- 10. Enough discussion about the use of the patterns in your assignment of responsibilities to classes of objects.
- 11. The design class diagrams, which shows the methods/operations of classes.

IV. Documentation

12. Produce the final project report for a coherent presentation of the development activities and the artefacts produced, i.e. UML model. The design process activities and the models should be evaluated, and the consistency of the models should be discussed. Enough glossary definitions should be given for the terms used in the design to help the reader.

The submission of the coursework is the final is the overall project report, in which the UML models should be created by using the tool.