

CMP1024 Further Programming

Assignment Two

Subject to Moderation

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1 Introduction

You should hand in your program on CD and paper as well as a report, following the outline of the specification in section 2.

The Learning Outcomes addressed by this assignment are:

LO2 model object-oriented systems using UML class and use-case diagrams and appropriate modelling techniques;

LO3 create and instantiate classes in an object-oriented programming language;

LO4 model and use inheritance relationships between classes.

2 Assignment Description

Section 2.1 gives a short description of a system. You should analyse this description and produce:

- A UML use-case diagram for the system, including all important actors who will use the system. You should also include a short commentary

on this diagram, describing the process that you used to develop the diagram.

- A UML class diagram, including appropriate methods and attributes for each class in the system. Again, a commentary on your design process should be handed in too.
- Source code, on paper and CD, for a program which implements as much of your design as is possible.
- Testing and evaluation information. You should show how you have evaluated your program, including testing code, test cases, and other mechanisms.

Your work will be evaluated using the criterion reference grid in section 3.

2.1 Problem Description

Fitzroy Bailey, the owner of Rockall Vehicle Rental Agency, wishes to set up a stock-control system to manage hiring, invoicing, and customer records. Bailey should be able to determine how many vehicles are on hire at a given moment, and what the rental income to date is. The shop hires bicycles by the half-day, cars by the week (with an additional charge if a car is used for more than an average of 1,000 miles/week), and helicopters by the hour. When a customer hires a vehicle, an employee must record their name and address, and ensure that the hiring information is recorded, including the length of time for which the vehicle has been hired. Everyone who hires a vehicle must pay for it at the time of hiring.

Learning Outcome	Criterion	Pass	2ii	2i	First
Model object-oriented systems using UML class and use-case diagrams and appropriate modelling techniques	Create a use-case diagram	Syntactically correct use-case diagram	Identification of major actors, showing some correct use cases	Identification of all major use cases, with clear justification	Correct use of advanced UML features such as <<includes>>
	Create a class diagram	Syntactically correct class diagram	Identification of all major classes to be modelled with adequate narrative description	Correct usage of methods and attributes and relationships between classes, good narrative description	Correct use of features such as composition or aggregation, access control
Create and instantiate classes in an object-oriented programming language	Create classes in Java	Syntactically correct definition of classes (<i>ie</i> , code compiles)	Correct correspondence between code and design	Good implementation, with attention paid to coding standards	Excellent code with clear documentation
	Instantiate classes in Java	Testing code that demonstrates your implementation	Some testing for several classes	Sound use of a range of tests for each class in the program	Sound evaluation with advanced testing features
Model and use inheritance relationships between classes	Use inheritance	Show inheritance on class diagram	Implementation of inheritance	Show attention has been paid to overriding and polymorphism	Correct use of abstract classes and features such as super

3 Criterion Reference Grid