ITECH7201 Software Engineering: Analysis and Design

Assignment 1

Overview

You are required to design and develop a small Java console application. Completion of this assignment requires an understanding of:

- Analysis and design techniques, including development of use cases and UML diagrams – specifically, use case diagrams, class diagrams and sequence diagrams
- Object-oriented programming, focusing on polymorphism and the use of interfaces

Timelines and Expectations

Percentage Value of Task: 20%

Due: 11:55pm Sunday the 7th May 2017 (week 7)

Minimum time expectation: 20 hours

Learning Outcomes Assessed

The following course learning outcomes are assessed by completing this assessment:

- Understand the significance of detailed project planning and control, good communication and documentation and the use of appropriate tools in order to provide a quality product
- Understand the distinction between software engineering and programming, and thus the distinction between a software configuration and a program
- Understand the methods and techniques involved in designing, implementing and maintaining an information system, in particular using an object-oriented approach
- Demonstrate skills in designing and implementing an information system.

Assessment Details

Janice is opening a snow gear hire store in the alpine regions of Australia. She wants to offer standardized hire fee options to simplify the hiring process for her business as well as rewarding those local residents and businesses who offer her their support. To do this, she is offering a three tiered hiring system, consisting of:

- Standard hire, which allows the hirer to obtain equipment for $35 per item each day
- Member hire, which allows the hirer to obtain equipment for $20 per item each day
- Affiliated business hire, which allows someone referred by a local business or accommodation to obtain equipment for $27 per item each day.

You have agreed to design and develop a small Java console program for Janice, enabling her to select the appropriate hire tier, enter the number of pieces of equipment to be hired and calculate the corresponding fee. Once the equipment hire has been processed, the program will return to the menu ready to commence another hire agreement based on the appropriate hiring tier (standard, member, affiliation), or to display progressive payment information. This payment information should display:

- total payment amounts received for standard hire agreements

- total payment amounts received for member hire agreements

- total payment amounts received for affiliated business hire agreements

- total discounts given (based on the difference between the standard hire rate and the discounted hire rates)

- total amount of all payments received across all three hiring tiers.

There is no need for this data to persist once the program has stopped running.

Janice wants the system to be flexible so that she can include additional hiring tiers at a later date without having to rewrite the entire program. This means you will need to use an interface for processing payments, and polymorphism for the various hiring classes, so that new, different hire tiers may be added at a later date with minimal updates to the code. She asked that you provide her with some documentation before you commence coding, so that she is able to verify that the program you intend to code will address her requirements. She would like to see use cases to summarize the requirements in written format, as well as use case diagrams, class diagrams and sequence diagrams.

Submission

You are required to submit the assignment before the due date consisting of:

- A Zip file containing the following (submitted via Moodle under the Assignment 1 link)
  - A written report comprising:
    - Use Cases summarizing the requirements
    - UML Diagrams, created in Enterprise Architect, comprising:
      - a Use Case Diagram for processing a hire agreement
      - a Class Diagram of the intended system
      - a Sequence Diagram for processing a hire agreement for a member.
    - A short reflection (approximately 200-300 words) of what you have learned, if anything, on this assignment, particularly relating to requirements design and analysis, UML diagrams and object-oriented programming with interfaces and polymorphism. As an example, if you found that you changed your initial UML diagrams after you had commenced coding, you should explain what these changes were and explain what you learnt that led to these changes.
  - Enterprise Architect file(s) containing your UML Diagrams for the Use Case, Class and Sequence Diagrams
  - Your finished Java program, addressing the requirements outlined in the Assignment Details.

Marking Criteria/Rubric

Task	Available Marks	Student Mark
Requirements Analysis and Design		
• Use Cases summarizing the requirements of the program	2	
• A Use Case Diagram for processing a hire agreement	2	
• A Class Diagram of the intended system	2	
• A Sequence Diagram for processing a member's hire agreement	2	
Development of Code A complete Java program addressing the requirements outlined in the Assignment Details section of this specification, including:		
• Functionality to process standard hire agreements	1	
• Functionality to process member and affiliated business hire agreements, including display of the total hire agreement amount at the appropriate price.	2	
• A progressive payments menu option that displays the total income received from each of the three hiring tiers individually, the total discounts given based on the standard price and the total income from all hire agreements combined (taking discounts into account where appropriate)	1	
• Code demonstrating the use of an interface and polymorphism to handle hire fees and the various hire fee options available	6	
Reflection on Learning		
• A short reflection (approximately 200-300 words) of what you have learned, if anything, on this assignment, particularly relating to requirements design and analysis, UML diagrams and object-oriented programming with interfaces and polymorphism.	2	
Total	20	

Feedback

Marks will be uploaded in fdlGrades and a completed marking guide provided in Moodle within 2 weeks of assignment submission.

Plagiarism:

Plagiarism is the presentation of the expressed thought or work of another person as though it is one's own without properly acknowledging that person. You must not allow other students to copy your work and must take care to safeguard against this happening. More information about the plagiarism policy and procedure for the university can be found at http://federation.edu.au/students/learning-and-study/online-help-with-plagiarism.