CSIT 314 final exam

Software Methodologies (University of Wollongong)

UNIVERSITY OF WOLLONGONG AUSTRALIA

School of Computing and Information Technology

Student to complete:

Family name	
Other names	
Student number	

CSIT314
Systems Development Methodologies
South Western Sydney and Wollongong

Examination Paper
Autumn 2023

Exam duration	3 hours
Weighting	50 %
Items permitted by examiner	OPEN BOOK
Aids supplied	Nil

Directions to students

- There are 7 questions in total, and each question has 7 marks, except the last one with 8 marks.
- The use of dot points is permitted but dot points with keywords without adequate text explanation are inadequate to earn full marks. Your answers need to demonstrate the full knowledge and understanding of the topic in 350-500 words per question.
- Answer your questions in a file and convert the file to pdf. Name your pdf file with your name and student number, such as Jack_123.pdf. Please DO include your full name and student number of each page of your answer paper.
- To draw diagrams, you can use any tools of your choice or draw by hand and take pictures (make sure the pictures are all clear). However, you need to insert the diagrams or pictures into the submission file.
- Submission must be made by the exam's end time. The submission site will automatically close after the exam's end time.
- The exam shall be completed independently on your own. You shall not discuss, collude, or share your work with anyone else.
- When you submit, you acknowledge that it is your own work. Plagiarism and other academic misconducts may result in a Fail grade and are subject to the University Academic Misconduct Procedures.

The exam is based on the following project description. You are allowed to make any reasonable assumptions about the system if they are not clearly specified. Any assumptions which you have made should be stated clearly on the top of your answer with the format “Assumption #: assumption details”.

Hamilton Island is a popular tourist destination in Queensland, which attracts thousands of visitors annually who come to enjoy its beauty and explore the Great Barrier Reef. One of the most popular activities there is renting a boat to explore the surrounding islands and waterways. Now a local company would like your team to design a system (a web application) to support their boat renting business. After the interview with the business owner, your team has come to the following user stories:

Admin users:
- *As an admin, I want to be able to manage the boat inventory, such as adding or removing individual boats, updating boat information, and setting rental prices, so renter can easily book boats.*
- *As an admin, I want to be able to manage boat reservations, such as confirming or cancelling bookings, modifying rental periods, and assigning boats to renters, to maintain accurate booking records.*
- *As an admin, I want to be able to manage payment transactions, such as receiving, processing and refunding payments, to keep accurate financial records.*
- *As an admin, I want to be able to track boat usage and maintenance, such as recording boat check-ins and check-outs, scheduling boat maintenance and repairs, so that boats are properly maintained.*

Renters:
- *As a renter, I want to be able to search for available boats based on my preferred period, location, and other service, to find the right boat.*
- *As a renter, I want to be able to view detailed information about the boats, such as the type, capacity, and rental rates, so that I can make the decision to rent.*
- *As a renter, I want to be able to arrange the rental online, including submitting, modifying, cancelling the booking, as well as the payment.*
- *As a renter, I want to be able to maintain the communication with the rental company about any issues or services, such as mechanical problems or weather conditions, and further receive prompt assistance.*

Staff members:
- *As a staff member, I need to be able to view the boat rental schedule and check the condition of each boat before it is rented.*
- *As a staff member, I need to be able to communicate with renters, such as providing guidance on the boat operation, safety guidelines, weather conditions, so that renters can have a hassle-free rental experience.*
- *As a staff member, I need to be able to report the results of the boat inspection after the return, such as cleaning, oil changes, and minor repairs, so that the boats remain in good condition.*

1. Suppose that your team would apply the Scrum approach to develop this system within 12 weeks (from 1st of June). The picture (**from the final page**) provides a draft Sprint plan, and please point out the errors and further correct them (You can disregard the labels starting with "BOAT-x" as they merely represent the ID).

2. Draw the UML use case diagram for this system. You should consider all types of users and cover their use cases.

3. Following the B-C-E methodology, draw relevant class diagrams to represent your design. For each class, you should specify the class name, the attribute name, and the method name. The association between classes should also be specified.

4. Draw the UML sequence diagram to specify the procedure for the staff member. You must list all entities and the messages in the sequence diagram.

5. Suppose that your team has 10 software engineers to complete all the functions for the admin user and you are going to follow the rational unified process (RUP). Please list the objectives, the activities, the outcomes, and the milestones of each phase in RUP.

6. Suppose that the test-driven development (TDD) method is applied to develop all the functions for the renter. Please specify the steps and iterations of using TDD in this process and create the test cases (you can complete the test cases with any programming language or the pseudocode) to cover all functions for the renter.

7. Consider the following development models: Waterfall, Scrum and Kanban, for this project. Based on unique characteristics of your team members, select one method, and justify why it's more appropriate for your team. Additionally, propose specific implementation strategies and outline anticipated outcomes (note that, you can make reasonable assumptions here about your team).