Maynooth University
National University of Ireland Maynooth

SEMESTER 2
2023-2024

CS335FZ
Software Engineering & Software Process

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Time allowed: 2 hours

Answer at least three questions
Your mark will be based on your best three answers

All questions carry equal marks

Instructions

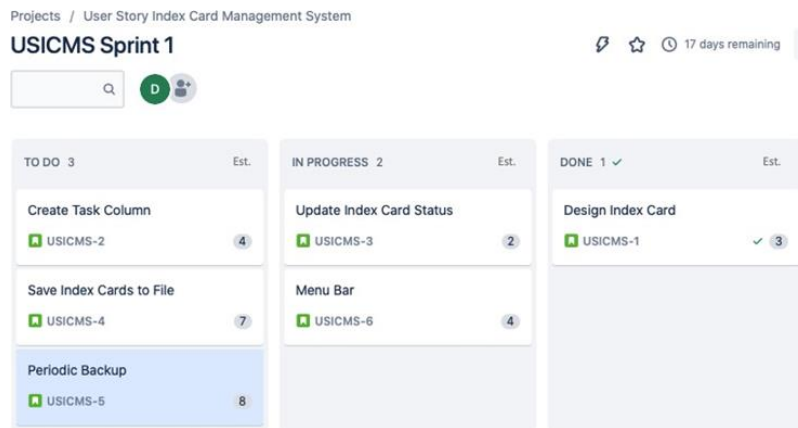|	Yes	No
Log Books Allowed	☐	X
Formula Tables Allowed	☐	X
Other Allowed (*enter details*)	☐	X

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QUESTION 1

(a)   Describe the advantages of The *V- model* (at least three).   (4 marks)

(b)   Using your knowledge of software development methodologies, contrast   (7 marks)
       Agile and Waterfall approaches with practical examples (at least three
       differences).

(c)   Discover six ambiguities in the following statement of requirements for   (9 marks)
       part of a ticket issuing system.
           An automated ticket-issuing system sells rail tickets. Users select
           their destination and input a credit card and a personal identification
           number. The rail ticket is issued, and their credit card account is
           charged. When the user presses the start button, a menu display of
           potential destinations is activated, along with a message to the user to
           select a destination.

           Once a destination has been selected, users are requested to input
           their credit card. Its validity is checked, and the user is then requested
           to input a personal identifier. When the credit transaction has been
           validated, the ticket is issued.

QUESTION 2

(a) In Scrum, a Burndown chart is frequently used for monitoring the development progress within a Sprint. Given a 4-week Sprint development and the Sprint status as shown in the figure below, draw a Burndown chart for the Sprint.   (6 marks)

Projects / User Story Index Card Management System
USICMS Sprint 1

TO DO 3	Est.
Create Task Column	
USICMS-2	4
Save Index Cards to File	
USICMS-4	7
Periodic Backup	
USICMS-5	8

IN PROGRESS 2	Est.
Update Index Card Status	
USICMS-3	2
Menu Bar	
USICMS-6	4

DONE 1 ✓	Est.
Design Index Card	
USICMS-1	✓ 3

(b) Draw the five most significant associations/dependencies (but no type relationships such as subtyping) between the classes (i.e., Customer, Seller, Manufacturer, Order, OrderItem, Product). Do not add any new classes, and do not model anything other than associations. Add all multiplicities.   (8 marks)

You may add several words of description to a connector or a multiplicity if you feel it's necessary, but most full-credit solutions will not need any such description.

(c) Provide a scenario in which a microservices architecture would benefit a software system. Discuss the advantages and potential challenges of adopting a microservices architecture over a monolithic architecture in your provided scenario.   (6 marks)

QUESTION 3

(a) Develop a sequence diagram showing the interactions involved when a student registers for a course at a university. Courses may have limited enrolment, so the registration process must include checks that places are available. Assume the student accesses an electronic course catalogue to learn about available courses. **(10 marks)**

(b) Discuss the statement: "A good software tester needs to think like an end-user." Provide reasons for your agreement or disagreement, and give an example to support your view. **(5 marks)**

(c) Explain how technical debt can accrue in a software project and describe two strategies for managing technical debt. **(5 marks)**

QUESTION 4

(a) Given a project schedule as shown in the table below, build the activity network for the project schedule and identify the critical path in the activity network.   (10 marks)

Task	Duration	Dependencies
T1	7	
T2	12	
T3	16	T1
T4	9	
T5	10	T2, T4
T6	5	T1, T2
T7	17	T1
T8	26	T3, T6
T9	14	T5, T7
T10	10	T9

(b) A small company has developed a specialised product configuration tailored for each customer. New customers usually have specific requirements to be incorporated into their system, and they pay for these to be developed. The company has an opportunity to bid for a new contract, and this could more than double its customer base. The new customer also wishes to have some involvement in the system's configuration. Explain why, in these circumstances, it might be a good idea for the company owning the software to make it open source. (at least provide four explanations)   (10 marks)