CITS4401 Software Requirements and Design S1-2020 FINAL

Assessment Attachments

CITS4401scenarios.pdf (https://phx004-public-prod-bucket.s3.amazonaws.com/attachments/2/b/2bb17623-2863-4edf-a687-e5e0cd97fd29.pdf)

1. Questions 1 to 6 concern the LinkTrip scenario provided with this exam paper. The scenario is located in the drop down option titled Exam Controls, and is visible by selecting Exam Attachments. Read the scenario carefully before you answer these questions.

   Identify three key **stakeholders** for the LinkTrip software system.
   For each stakeholder briefly justify your choice by explaining their role in the system.
   (12 marks)

   (Please write your essay question on a separate piece of paper)

2. Questions 1 to 6 concern the LinkTrip scenario provided with this exam paper. Read the scenario carefully before you answer these questions.

   Identify one **functional requirement** for the LinkTrip software.
   Describe this requirement using a user story.
   (8 marks)

   (Please write your essay question on a separate piece of paper)

3. Questions 1 to 6 concern the LinkTrip scenario provided with this exam paper. Read the scenario carefully before you answer these questions.

   Identify one **non-functional** requirement for the LinkTrip software.
   Describe this requirement using the following features:
   a) description of the requirement;
   b) rationale for this requirement;
   c) fit criterion.
   The fit criterion is a measurement of the requirement such that it is possible to test objectively whether the solution satisfies this requirement.
   (8 marks)

   (Please write your essay question on a separate piece of paper)

4. Questions 1 to 6 concern the LinkTrip scenario provided with this exam paper. Read the scenario carefully before you answer these questions.

   Select **one** of the requirements you identified in the previous questions.
   State which requirement you are considering.
   Explain how you would go about gathering further information to confirm your understanding of this requirement.
   It is suggested you choose two or more requirements elicitation techniques.
   Justify your choices.
   (8 marks)

   (Please write your essay question on a separate piece of paper)

UMLclass3.pdf (https://phx004-public-prod-bucket.s3.amazonaws.com/attachments/f/1/f1e94d57-a47f-4ce3-9abf-e08a5ca3ee35.pdf)

5. This question applies to the attached UML class diagram.
The diagram shows 3 classes for the LinkTrip software system.
Complete the labels for the two given arrows in this UML class diagram.
You should provide a name for the relationships (A and B).
Specify suitable multiplicities for those relationships (C,D,E,F).
Carefully state any assumptions you make.
(12 marks)

(Please write your essay question on a separate piece of paper)

UMLsequence.pdf (https://phx004-public-prod-bucket.s3.amazonaws.com/attachments/e/3/e37ca7e0-3285-48ab-a2c3-5617e0a6e5c5.pdf)

6. This question applies to the attached incomplete UML sequence diagram for the LinkTrip software system. Describe a possible sequence of interactions for making a shuttle booking, assigning a vehicle and completing a trip. Use the three participants given in the sequence diagram above. Your task is to complete this diagram by adding the activity arrows for the remaining interaction steps in this scenario. For each added arrow give a text description for the arrow with:
a) the initiating participant;
b) the receiving participant;
c) a name for the interaction message.
The first arrow has been provided in the diagram for you. A suitable text description would be:
From Passenger to System: request a ride (from pick up to drop off location)
(12 marks)

(Please write your essay question on a separate piece of paper)

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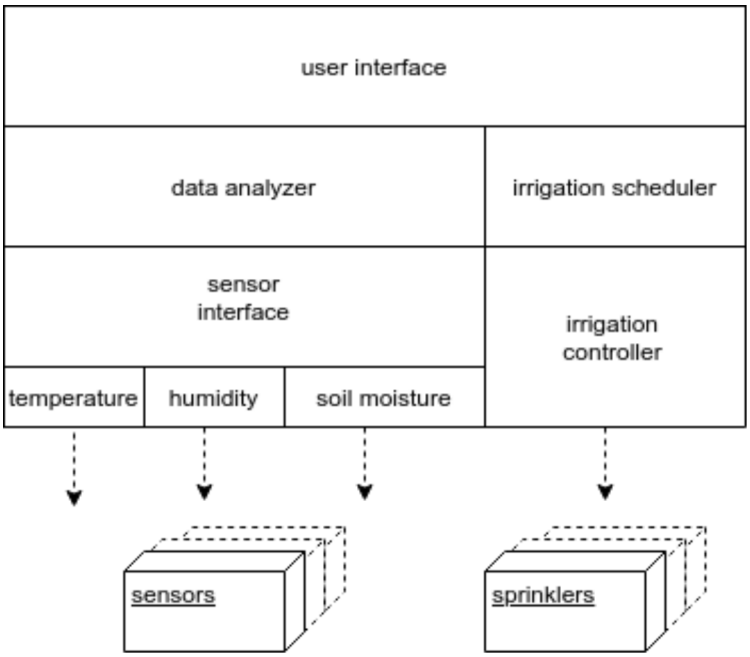
design-q1-arch.png

7. his question and the following ones relate to the "AgriCorp" scenario. The scenario is located in the drop down option titled Exam Controls, and is visible by selecting Exam Attachments.

One of your colleagues, Bob, proposes the following architecture for the new system (shown as a “box-and-line” diagram):



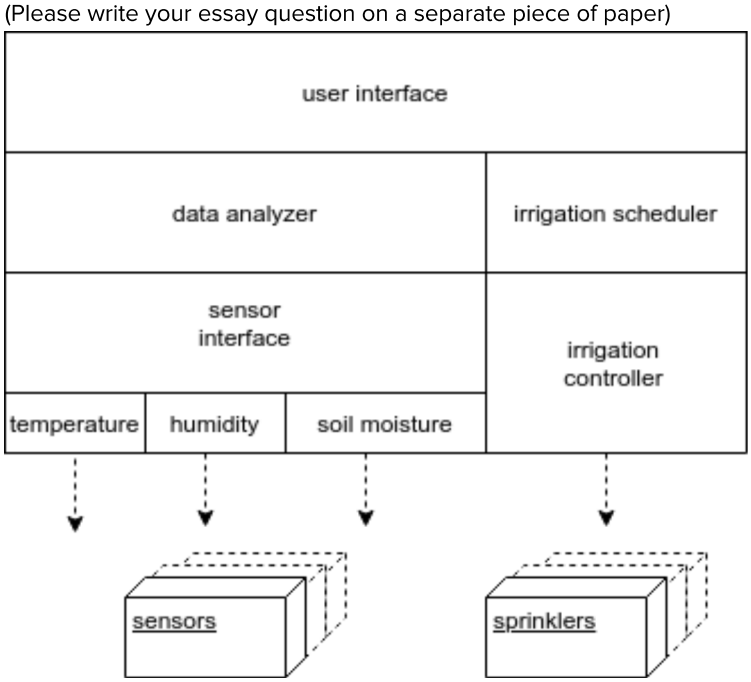
A second colleague, Alice, says that a problem with this architecture is that users may want direct control of sprinklers, and this architecture implies that won’t be possible.

Write an answer to the following questions:

1. What architecture style is Bob proposing here?
2. Do you think Alice is correct?
3. Give arguments for and against an architecture style like the one Bob has proposed.

(15 marks)

(Please write your essay question on a separate piece of paper)



8. Your colleague Zebedee is in charge of writing up a design document for the new system, which will record all the design decisions made and alternatives considered.

Currently, he estimates that fully recording all design decisions will require over four thousand pages of documentation. Alice suggests to him that producing a report of this length might not be a good use of resources.

Write an answer explaining:
1. Whether you think Alice or Zebedee is correct.
2. What things Zebedee should exclude from the report.
3. Any advice you would give to Zebedee to help ensure the report is useful.

(15 marks)

(Please write your essay question on a separate piece of paper)

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9. It turns out your company already has designed and implemented a component in a previous project which would be useful for communicating with moisture sensors. However, rather than being written in Java (the language you are using for the current project), it is written in C. Furthermore, in your current system design, all the other sensors implement a Java interface called Sensor , and obviously the C code does not implement the Java methods needed for a sensor.

Write an answer explaining:
1. How would you resolve this? Specifically, what design patterns, if any, might you use, and how would you use them?
2. For each pattern in (1), state what sort of pattern it is (and why): is it structural, behavioural, or creational?

(15 marks)

(Please write your essay question on a separate piece of paper)

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10. For the AgriCorp system as described:

1. Explain why it could be regarded as an event-driven system.
2. What are some of the sorts of events that might be emitted? (Give a name or description of each event, and explain under what circumstances it might be emitted.)
3. What might be some components that react to events?

Mention at least two events, and at least one reactive component.

(15 marks)

(Please write your essay question on a separate piece of paper)