



Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]
BSc (HONS) APPLIED ICT WITH SPECIALISATION [OUbs017]

EXAMINATION FOR: November - December 2023

MODULE : Software Engineering [OUbs033214]
Distributed Systems [OUbs017224]

DATE : Friday 24 November 2023

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

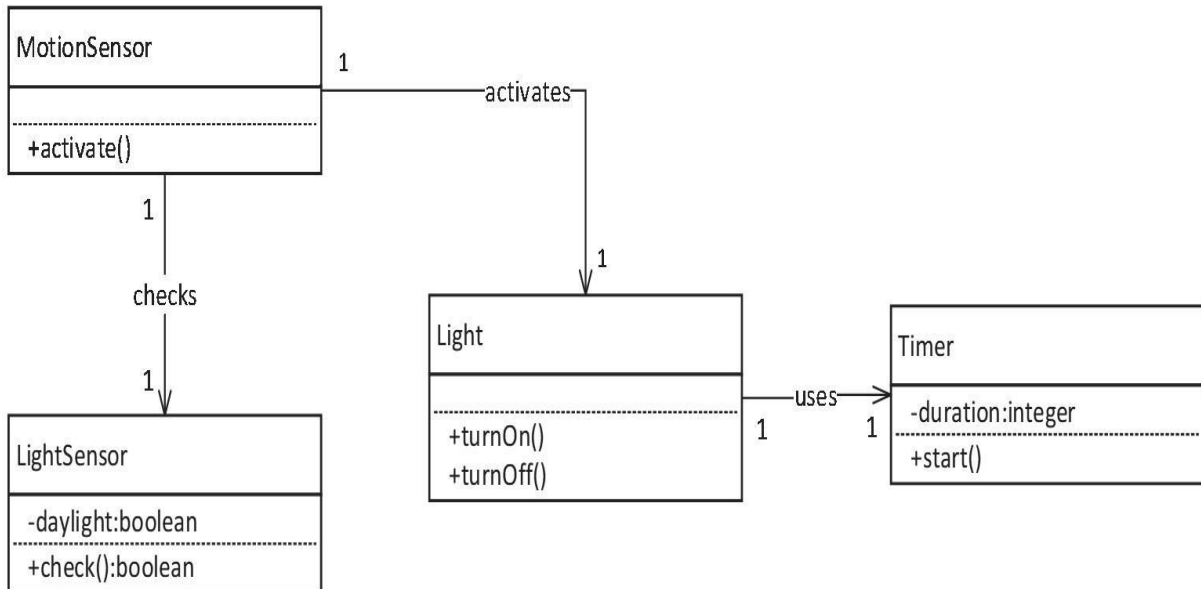
1. This question paper consists of **SIX (6) QUESTIONS**.
2. Answer **ANY TWO (2) questions** from **Section A**.
3. Answer **ANY TWO (2) questions** from **Section B**.
4. Always start a new question on a fresh page.
5. Total marks: **100**

This question paper contains 6 questions and 5 pages.

SECTION A
ANSWER ANY TWO (2) QUESTIONS

QUESTION 1 [25 MARKS]

Consider the following class diagram, which represents the design of a system to simulate the actions of a security light outside a building:



The informal specification for the behaviour of the system is as follows:

- i. When the MotionSensor is activated, if it is not daylight, then the Light is turned on. If it is daylight, the MotionSensor does not turn the Light on.
- ii. When the Light comes on, a Timer is started. The Light is turned off when the Timer runs out (expires) after a pre-set duration which is measured in seconds.

a) Describe what the class diagram represents, including all structural constraints.

(12 marks)

b) Using the class diagram and the description of the system's behaviour, draw a sequence diagram for the following scenario:

During the hours of darkness, a user activates the motion sensor by walking under the light. After the timer has expired and it has become daylight, the user walks under the light and activates the motion sensor a second time.

Clearly state any assumptions you need to make about the system behaviour.

(13 marks)

QUESTION 2 [25 MARKS]

a) Describe each of the **five (5)** stages of the waterfall model.

(10 marks)

b) Explain the possible advantages and disadvantages in using an incremental approach to project delivery.

(9 marks)

c) Explain the possible benefits and problems of using prototypes in a software development project.

(6 marks)

QUESTION 3 [25 MARKS]

a) Compare and contrast the **main features and practices of the agile approach** compared to traditional approaches at each of the key phases of the software development life cycle.

(15 marks)

b) Discuss how the clearly identifiable good practices in agile methodologies can be effectively incorporated into any software life cycle environment.

(10 marks)

SECTION B
ANSWER ANY TWO (2) QUESTIONS

QUESTION 4 [25 MARKS]

- a) List down the **twelve (12)** principles of Agile Manifesto. **(12 marks)**
- b) What do you understand by the term 'Scrum'? **(3 marks)**
- c) Explain how to plan and execute scrum sprints. **(10 marks)**

QUESTION 5 [25 MARKS]

Testing is an important aspect of software development and maintenance.

- a) Explain the purpose of each of the following different types of testing:
- i. Unit testing;
 - ii. White Box testing;
 - iii. Black Box testing;
 - iv. Integration testing.
- (12 marks)**
- b) Explain how the types of testing in part a) are used together. **(6 marks)**
- c) Explain what is meant by regression testing and why this is important in maintenance activities. **(7 marks)**

QUESTION 6 [25 MARKS]

a) What do you understand by the term **Digital Transformation**?

(4 marks)

b) Explain why during the pandemic of COVID 19, there has been a rise in demand for Digital Transformation by companies.

(5 marks)

c) Explain the Digital Transformation framework.

(10 marks)

d) Is Digital Transformation an important aspect of Software Engineering ? Justify your answer.

(6 marks)