UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

UNIVERSITY OF COLOMBO, SRI LANKA

Academic Year 2017/2018 - Second Year Examination - Semester I - 2019

SCS 2103 – Software Engineering II (R1)
Two (2) HOURS

Answer All Questions

To be completed by the candidate

Examination Index No: _____

No. of Pages: 12

No. of Questions: 4

Important Instructions:

- The duration of the paper is **2 (two) hours.**
- Answer all 4 (four) questions. All questions carry equal marks (25).
- You have to mark the correct choices of MCQs in the question paper according to the instructions given.
- For Q1 (MCQ questions) there will be a penalty for incorrect responses to discourage guessing.
- **Write your answers** in English for Q2,Q3 and Q4 using the space provided **in this question paper.**
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- If a page is not printed, please inform the supervisor immediately.
- **No electronic devices are allowed to be used during the examination.**

For Examiner's use only

Question No	Marks
1	
2	
3	
4	
Total	

Index No: .....

Q1 Each of the following MCQ (Multiple Choice Questions) will have 4 choices with **one or more correct answers**. Circle the answers in the question paper. (eg. Q16 ((d)))

(1) Which of the following is/are correct regarding *Use Case* modelling?

(a) Project scope cannot be estimated using use case model.
(b) Use Case and Scenario are identical terms and refer to a set of actions to complete a system's functionality.
(c) A single scenario may relate to multiple use cases.
(d) It is an approach that facilitates user-centred development

(2) Which of the following statements is/are correct regarding *Use Case* diagrams/modelling?

(a) Use Case Modelling is the process of modelling a system's functions in terms of business events, who initiated the events, and how the system responds to those events
(b) Use-case ranking and priority matrix is a tool used to evaluate use cases and determine their priority
(c) Use Case Models cannot be drawn if a non-Object Oriented approach is used.
(d) The main purpose of a use case diagram is to show who interacts with your system, and the main goals they achieve with it.

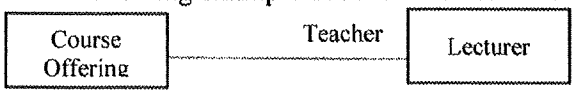
(3) Consider the following statements in relation to *Software Process Models.*

(i) An incremental model process is one in which software is built and delivered in pieces.
(ii) Waterfall model is best suited for projects where the requirements can be clearly defined.
(iii) In incremental process user requirements are prioritized and the highest priority requirements are included in early increments.

Which of the above statements is/are true?
(a) Only (i) and (ii) (b) Only (i) and (iii) (c) Only (ii) and (iii) (d) All

(4) Which of the following statements is/are correct regarding identifying classes, and drawing a *Class* diagram?

(a) The following is a correct representation of the multiplicity '4 to 8 or 10'
4..8,10
(b) In the following example *Teacher* is a *role* name.



(c) Class diagrams are used for a wide variety of purposes, including both conceptual/domain modelling and detailed design modelling.
(d) Composition relationship in a class diagram is represented by a hollow diamond and a line between classes.

(5) The relationship between 'Student' and 'Course classes in a Course Registration system is modelled as given below.

If there is a requirement to record all the grades obtained by students on all the courses they take.

Which of the following options provide the correct solution(s)?

(i) Add 'Grade' attribute to the 'Student' class
(ii) Add 'Grade' attribute to the 'Subject class.
(iii) Define an Association class as 'Student Grade' to store the grade.

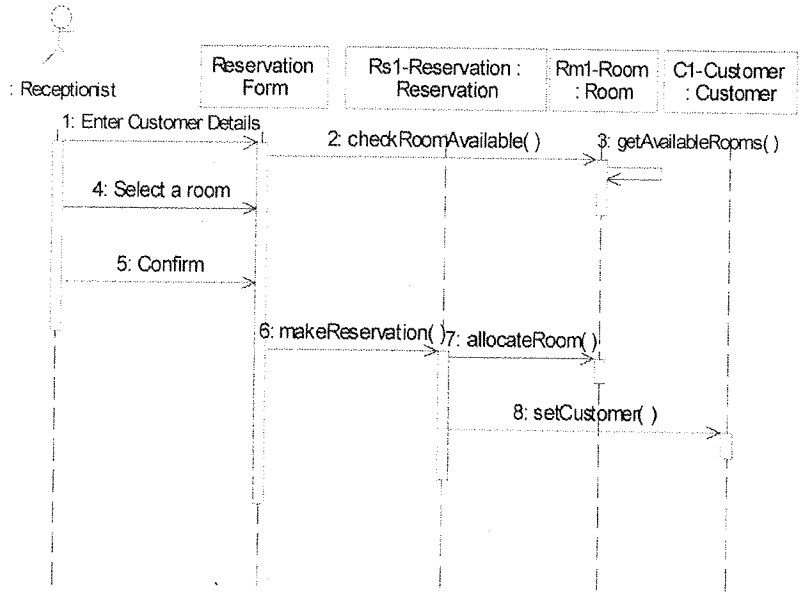
(a) Only (i) (b) Only (ii) (c) Only (iii) (d) Only (ii) and (iii)

(6) Consider the following

Select correct statement(s) regarding the above class diagram

(a) A Professor teaches at least one Course.
(b) A Course is taught by one Professor.
(c) There cannot be a Professor who does not teach any Course
(d) A Professor may teach many Courses.

(7) Which of the given statements is/are correct regarding the following *UML* diagram?



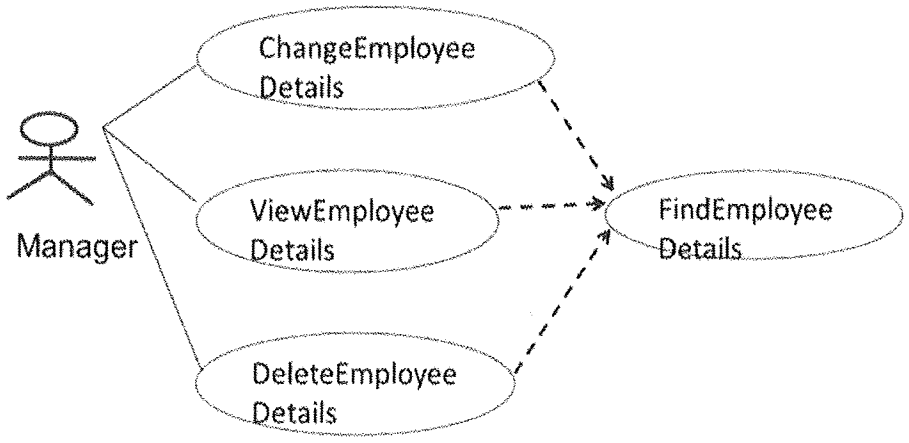
(a) It is a sequence diagram.
(b) *checkRoomAvailable* and *allocateRoom* are methods belong to the *Room* class.
(c) *allocateRoom* and *setCustomer* are methods belong to the *Reservation* class.
(d) *allocateRoom* method is called after *makeReservation* method.

(8) Which of the following is/are **not** *interaction* diagram(s) available in UML 2.5?

(i) *Communication* Diagram
(ii) *Profile* Diagram
(iii) *Timing* Diagram
(iv) *Interaction Overview* Diagram
(v) *Composite Structure* Diagram
(vi) *Sequence* Diagrams

(a) Only (ii) and (v) (b) Only (i) , (ii) and (v) (c) Only (ii), (iii), (iv) and (v)
(d) Only (i), (iii), (iv) and (vi)

(9) Consider the following statements related to the given diagram.



(i) Dashed arrows represents *extend* relationships.
(ii) FindEmployeeDetails is a common functionality find in ChangeEmployeeDetails, ViewEmployeeDetails and DeleteEmployeeDetails Use Cases.
(iii) The relationship between the Manager and the ChangeEmployeeDetails is an association.

Which of the above statements is/are correct?
(a) Only (i) (b) Only (ii) and (iii) (c) Only (i) and (iii) (d) All

(10) Consider the following statements related to Class diagrams.

(i) Methods in Class diagrams can be easily identified from sequence diagrams.
(ii) It is an example for a UML behaviour diagram,
(iii) In a UML 2.0 Class diagrams, relationship between a Computer and its component parts is represented by an *association* relationship.
Which of the above statements is/are true?

(a) (i) and (ii) Only (b) (i) and (iii) Only (c) (ii) and (iii) Only (d) All

(11) Which of the following is/are correct regarding CRC analysis and user stories?

(a) CRC card is a viable alternative to UML sequence diagram to design the dynamics of object interaction and collaboration.
(b). It can help to form a "bridge" from structural model to behavioural model
(c) Analysts put related CRC cards together to find out interacting objects.
(d) CRC is the abbreviation of 'Class, Relationships and Collaborators'.

(12) Which of the following statements is/are correct process models and CASE tools?

(a) The first OO CASE tools had the notation battle to fight, which made comparing the tools quite difficult because people were more comparing the diagramming notations than the tool's features themselves.
(b) Classic CASE tools require a central repository which is a central place of storage where product specifications, requirement documents, related reports and diagrams etc. are stored.
(c) Visual Paradigm is a UML CASE Tool supporting UML 2, SysML and Business Process Modelling Notation from the Object Management Group.
(d) JIRA is a popular CASE tool which provides bug tracking, issue tracking, and project management functions.

[25 Marks]

Answer questions 2,3 and 4 in the given space.

Q2 (i) State whether the following statements related to User Stories, Epics , Themes , Use Cases and Use Case diagrams is/are correct. Justify your answer if it is **false**.

[19 Marks]

(a) *User Story* is a simplified description of a requirement or feature written whereas *Use Cases* focus on how your system interacts with other systems and actors and are typically extremely detailed, much more than a user story.

(b). A *theme* is a collection of related user stories.

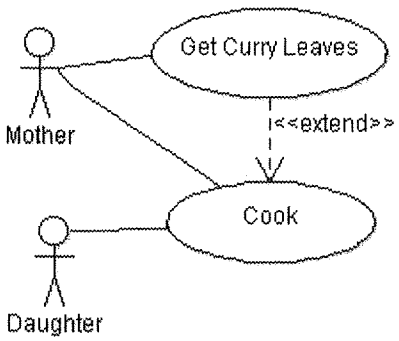
(c) Epics are large user stories, typically which are too big to implement in a single iteration and therefore they need to be disaggregated into smaller user stories at some point.

(d) A story point is a metric used in agile development to estimate the difficulty of implementing a given user story.

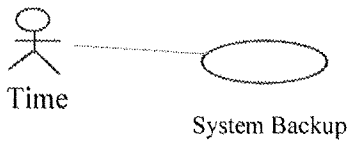
(e) Any one can write user stories. Over the course of a good agile project, you should expect to have user story examples written by each team member.

(f) Use Case diagram drawn for the following situation is given below.

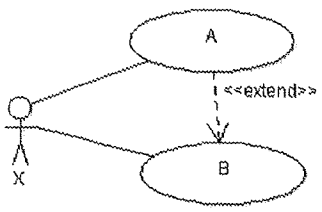
"Mother and the Father cook dinner together. Sometimes it is necessary that one of them gets curry leaves from the garden."



(g) The following is not a correct way of modelling an automatic system backup that runs every evening.



(h) The <<extend>> relationship in the following diagram means A might or might not invoke B.



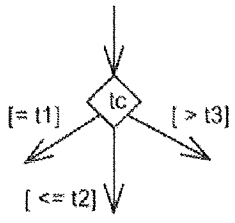
(ii) Draw a Use Case diagram for the following description.
"Customers of the garage can buy cars. Customers with a bad credit should pay an extra down payment".

[06 Marks]

Q3. (i) Consider the following statements related to Activity diagrams. State whether the statements is/are correct? Justify your answer for false statements.

[13 Marks]

(a) A guard expression in an Activity diagram can be represented as given below.



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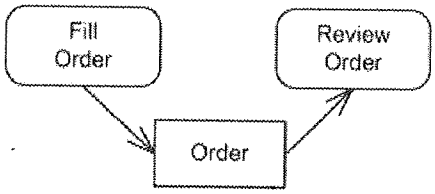
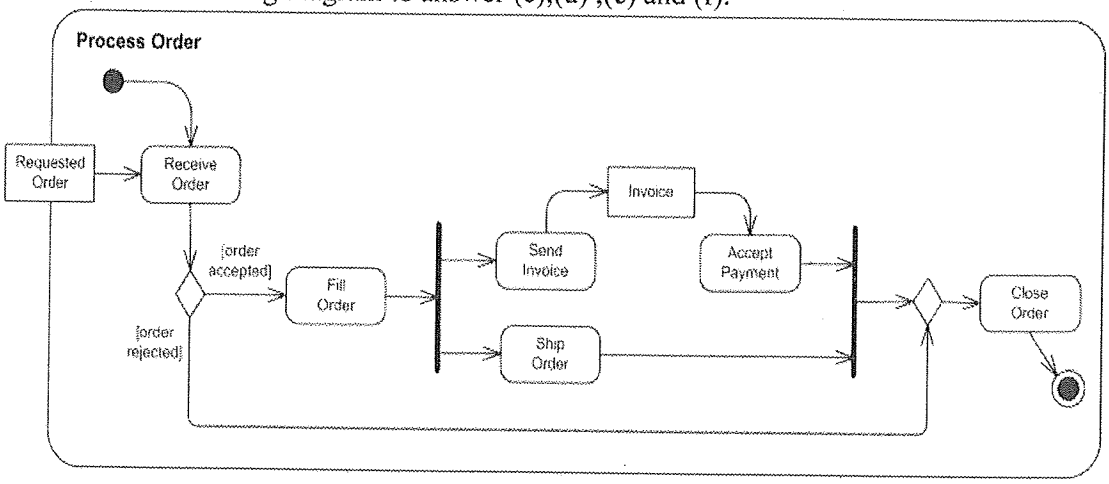
(b) The following segment of the *Activity* diagram represents *an* object flow of orders between *Fill Order* and *Review Order* actions.



Consider the following diagram to answer (c),(d) ,(e) and (f).



(c) Send Invoice and Ship Order are parallel activities.

(d) Process order is a swimlane.

(e) Send Invoice, *Fill Order* and *Ship Order* are parallel activities.

(f) The following is the UML symbol used to represent an accept time event in an activity diagram.

(ii) Write down whether the following statements is/are true. If the statement is **true**, you are required to briefly give reasons with **one** relevant example. If it is **false**, you are required to correct the statement.

(12 Marks)

(a) In a cloud computing system, there is a workload shift. Local computers no longer have to do all the heavy processing when it comes to running applications. The network of computers that make up the cloud handles them instead.

(b) In Aspect Oriented Software Engineering (AOSE), Aspects implement system functionality that may be required at limited places in a program. It encapsulates functionality that sits in one module.

(c) The Rational Unified Process (RUP) is not an iterative software development process framework.

Q4

You are required to implement a missing persons online service (website) for a certain country. The functionalities and users for this service are as follows.

- Firstly, the information about missing people will reach the Judicial Medical Officers (JMOs) from the police department, through official paper documents.
- The JMOs will then transfer these details (paper documents) to the system administrators of the website.
- The system administrators will enter these details regarding missing people to the central database through the website.
- Before the above details are published in the online service, an appointed JMO will verify the information using a function of the website. If the details are incorrectly presented, the JMO will request the system administrator to rectify the issue using the website.
- Verified details are published in the website by the system administrator.
- The public unregistered and registered users will be using the 'Find missing persons service' to find details about missing people (e.g their relatives) using the website. They will be entering details and using the filtering functions of the website to search the databases.
- The public registered users will use the system to post special requests regarding finding missing persons, if they are unable to find details from the 'Find missing persons service'.

The above initial requirement has been finalized and delivered to you. However, most of the users of this system have very less IT expertise (e.g. Medical officers) and they have requested test runs with the system, before it is deployed. Therefore, there can be changes in the initial requirements.

(i) Select and justify a suitable software development process for this project.

[5 Marks]

(ii) Draw the use case diagram for the above initial requirement. [15 Marks]

(iii) List the classes including their attributes and operations (or methods) which are required to implement this system. [5 Marks]

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