



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2014/2015 – 2nd Year Examination – Semester 3

*IT3105 – Object-Oriented Analysis and Design
PART 1 - Multiple Choice Question Paper*

28th February 2015
(ONE HOUR)

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- The paper has **30** questions and **09** pages.
- All questions are of the MCQ (Multiple Choice Questions) type.
- All questions should be answered.
- Each question will have 5 (five) choices with one or more correct answers.
- All questions will carry equal marks.
- There will be a penalty for incorrect responses to discourage guessing.
- The mark given for a question will vary from 0 to +1 (*All the correct choices are marked & no incorrect choices are marked*).
- Answers should be marked on the special answer sheet provided.
- Note that questions appear on both sides of the paper.
If a page is not printed, please inform the supervisor immediately.
- Mark the correct choices on the question paper first and then transfer them to the given answer sheet which will be machine marked. **Please completely read and follow the instructions given on the other side of the answer sheet before you shade your correct choices.**

In questions 1-5, fill in the blanks with the most appropriate answer.

1) The property that different objects can respond to the same message in different ways is known as _____.

- | | | |
|-----------------|----------------------|------------------|
| (a) inheritance | (b) encapsulation | (c) polymorphism |
| (d) interface | (e) focus of control | |

2) is the packing of data and functions into a single component.

- | | | |
|--------------------|--------------------|-------------------|
| (a) Polymorphism | (b) Generalization | (c) Encapsulation |
| (d) Specialization | (e) Composition | |

3) Objects hide their inner workings of their operations from the outside world and from other objects. This is called

- | | | |
|-------------------|-----------------|--------------------|
| (a) encapsulation | (b) Inheritance | (c) generalization |
| (d) polymorphism | (e) composition | |

4) The UML diagram is an interaction diagram used to emphasize the time-ordering of messages.

- | | | |
|--------------|-------------------|--------------|
| (a) activity | (b) communication | (c) sequence |
| (d) class | (e) state | |

5) The UML diagram is used to model the static view of a system.

- | | | |
|----------------|---------------|--------------|
| (a) class | (b) state | (c) activity |
| (d) deployment | (e) component | |

6) UML diagrams can be categorized into structure and behaviour diagrams. Which of the following diagrams is/are behaviour diagrams?

- | |
|----------------------------------|
| (a) Composite Structure Diagram |
| (b) Communication Diagram |
| (c) Interaction Overview Diagram |
| (d) Activity Diagram |
| (e) Profile Diagram |

7) Which of the following statements is/are correct regarding the Rational Unified Process (RUP)?

- | |
|--|
| (a) It does not focus on early development of software architecture. |
| (b) Inception phase of RUP defines the life cycle objectives and its goal is to “get the project off the ground”. |
| (c) Inception phase establishes the business case for the system and delimits the project scope. |
| (d) The transition phase of RUP typically starts with a beta release of the system which is then replaced with the production of the system. |
| (e) Primary objective of the elaboration phase is to establish the project’s software scope and boundary conditions. |

8) Which of the following statements is/are correct regarding the Software Development Processes?

- (a) Rational Unified Process (RUP) and Extreme Programming are object oriented methodologies.
- (b) The Waterfall model of the software development process is the most appropriate process model for projects with unstable requirements.
- (c) Agile process is a sequential software development model.
- (d) Iterative processes can be very expensive if iterations are not small enough to mitigate risk.
- (e) Spiral model is a software process represented as a sequence of activities with some backtracking from one activity to another.

9) Consider the following statements with regard to Software Development Processes.

- (i) The main goals of the elaboration phase in Rational Unified Process are to develop an understanding of the problem domain, establish an architectural framework for the system, develop the project plan and identify key project risks.
- (ii) Reuse-oriented approaches rely on a large base of reusable software components and an integrating framework for the composition of these components.
- (iii) Agile methods universally rely on an incremental approach to software specification, development and delivery.

Which of the above statements is/are correct?

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

10) Consider the following statements related to Use Case diagrams.

- (i) An *extends* relationship between use cases means that the base use case explicitly incorporates the behaviour of another use case at a location specified in the base.
- (ii) A Use Case model should describe all of the implementation specifics of an application.
- (iii) A Use Case diagram identifies all of the actors, use cases and their relationships.

Which of the above statements is/are correct?

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

11) Which of the following statements is/are correct regarding the UML Use Case diagram?

- (a) The collection of Use Cases for a system does not constitute all the defined ways in which the system may be used.
- (b) Time can be considered as an actor in a Use Case model.
- (c) A Use Case describes what a system does but it does not specify how it is done.
- (d) UML Use Case diagrams shows the dependencies among software components, including the classifiers that specify them (for example implementation classes) and the artifacts that implement them; such as source code files, binary code files, executable files, scripts and tables.
- (e) Use Case diagrams provide a simple and easily understood way for clients to view their requirements.

12) Which of the following is/are correct regarding Use Case diagrams?

- (a) The goal of a Use Case diagram is to identify all the features which the clients expect the system to support and reveals all the details about the implementation of these features.
- (b) A scenario is a collection of Use Cases initiated by an actor.
- (c) They describe the behaviour of a single object.
- (d) It is an Interaction diagram that emphasizes the time ordered sequence of messages sent between lifelines.
- (e) Actors in a Use Case model represent anyone or anything that must interact with the system.

13) Which type of class relationship can be described as "hasa" or "part of" relationship?

- (a) Generalization/Specialization
- (b) Association
- (c) Composition
- (d) include
- (e) dependency

14) Complete the following incomplete sentence.

..... is a directed relationship which is used to show that some UML element or a set of elements requires, needs or depends on other model elements for specification or implementation.

- (a) Communication
- (b) Multiplicity
- (c) Dependency
- (d) Inheritance
- (e) Aggregation

15) Consider the following diagram.



The relationship between Car and tyre in the above diagram is

- (a) generalization
- (b) association
- (c) dependency
- (d) navigability
- (e) composition

16) Identify the UML diagrams that show the messages sent between objects.

- (a) Composite Structure Diagram
- (b) Class Diagram
- (c) Use Case Diagram
- (d) Communication Diagram
- (e) Sequence Diagram

- 17) Consider the following statements related to an association class.
- (i) It describes the various kinds of relationships that can exist between classes.
 - (ii) It adds attributes and/or behaviour to an association between two other classes.
 - (iii) It associates an object with the class of which it is an instance.

Which of the above is/are true?

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

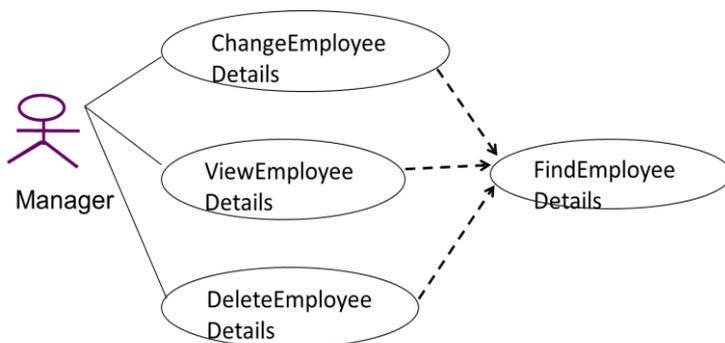
- 18) Take a look at the contents in column B in relation to those in column A.

Column A	Column B
(i) AnInteraction Overview diagram	(A) enables you to organize model elements into groups making your UML diagrams simpler and easier to understand.
(ii) Composite structure diagram	(B) is a structure diagram which describes a lightweight extension mechanism to the UML by defining custom stereotypes, tagged values and constraints.
(iii) Package diagram	(C) is a form of activity diagram in which the nodes represent interaction diagrams.
(iv) A Profile diagram	(D) models a class's internal structure.
(v) A Timing diagram	(E) is used to display the change in state or value of one or more elements over time.

Which of the following represents the correct matching(s) of the contents in column B in relation to those in column A?

- (a) (i)-C, (ii)-E, (iii)-B, (iv)-A, (v)-D
 (b) (i)-B (ii)-A, (iii)-D, (iv)-E, (v)-C
 (c) (i)-B, (ii)-A, (iii)-C, (iv)-E, (v)-D
 (d) (i)-C, (ii)-D, (iii)-A, (iv)-B, (v)-E
 (e) (i)-C, (ii)-D, (iii)-B, (iv)-E, (v)-A

- 19) Consider the following Use Case diagram drawn for a particular scenario.



What is the type of the relationship between ChangeEmployeeDetails and FindEmployeeDetails Use Cases?

- (a) Aggregation
 (b) Communication
 (c) Extends
 (d) Include
 (e) generalization

- 20) Some questions related to UML Use Case diagrams with possible answers are given below.
- (i). Q. What is the difference between Use Case diagram and use case?
 - A. Use Case diagram shows business or system, its external users and use cases applicable to the system. Use Case represents one specific goal or need of the user from the system.
 - (ii). Q. What is Actor generalization?
 - A. It refers to the relationship which can exist between two actors and which shows that one actor (descendant) inherits the role and properties of another actor (ancestor).
 - (iii). Q. When do modellers use Use Case generalizations?
 - A. It is used when modellers find two or more Use Cases that have commonalities in behavior structure, and purpose.

Which of the above pairs is/are correct?

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

- 21) Consider the following statements related to Class diagrams.
- (i) Class diagrams are used for a wide variety of purposes, including both conceptual/domain modeling and detailed design modeling.
 - (ii) Multiplicity is used to denote the number of instances of a class involved in a relationship.
 - (iii) Composition in a relationship is represented by a hollow diamond and a line between classes.

Which of the following is true about the above statements?

- | |
|---|
| (a) Only (i).
(b) Only (i) and (ii).
(c) Only (ii)
(d) Only (ii) and (iii).
(e) All |
|---|

- 22) Consider the following statements related to Use Case Modeling.
Which of the following statements is/are correct?

- | |
|--|
| (a) <i>Inclusion</i> Use Case supplies behavior to its base Use Case optionally.
(b) <<extend>> provides a way to insert new behaviour into an existing Use Case.
(c) When the <i>inclusion</i> Use Case in a Use Case diagram finishes, the control does not return to the base Use Case.
(d) A Use Case diagram graphically describes who will use the system and in what ways the user expects to interact with the system.
(e) A Use Case dependency diagram facilitates project management by showing which use-cases are more critical and thus need to have a higher priority |
|--|

- 23) Which of the following statements is/are correct with respect to UML diagrams?

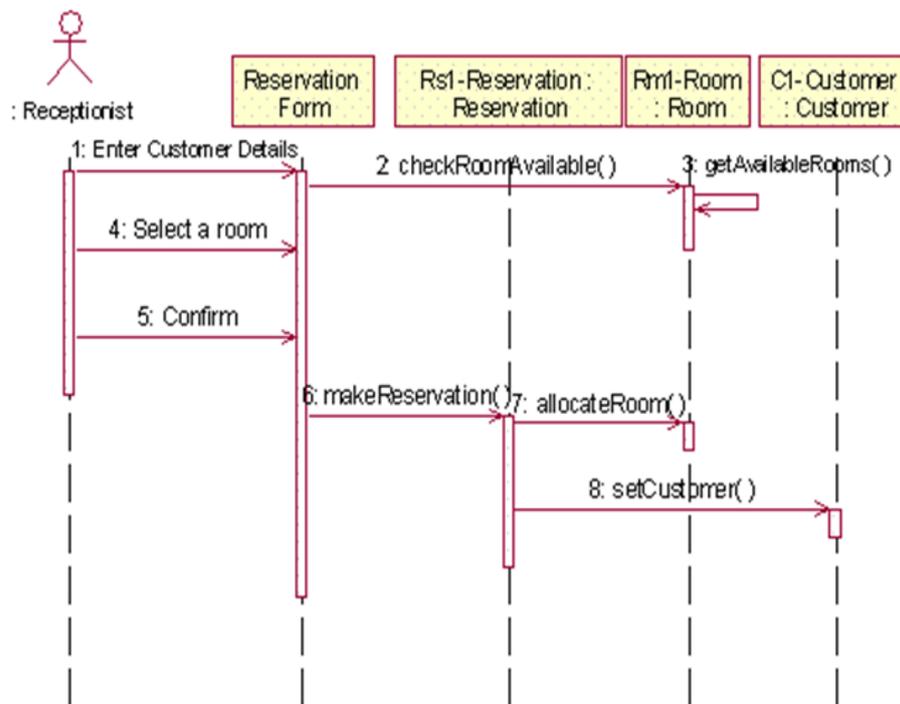
- | |
|---|
| (a) An automatic system backup that runs every evening can be represented by a Time actor in a Use Case diagram.
(b) A Grocery Clerk who scans customer buying Items is an example for a system actor in a Transaction System for Super Markets.
(c) Functional decomposition is used when applied to Use Case modeling.
(d) To determine the importance of the Use Cases, the project manager or system analyst will complete a Use Case ranking and evaluation matrix and construct a Use Case dependency diagram with inputs from the stake holders and the development team.
(e) Use cases are good for requirements capture when the system has many interfaces. |
|---|

- 24) Consider the following statements with respect to UML diagrams.
- (i) Sequence diagrams can be used to detail situations where parallel processing may occur in the execution of some activities.
 - (ii) An event on a State diagram corresponds to a message on a sequence diagram.
 - (iii) In order for one class to send a message to another on a sequence diagram or communication diagram, there must be a relationship between the two classes.

Which of the above statements is/are correct?

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

- 25) Consider the following diagram drawn for a Hotel Reservation System.



Which of the following statements is/are correct?

- (a) It is a communication diagram drawn for the reservation scenario.
- (b) It is a sequence diagram drawn for the reservation scenario.
- (c) *Receptionist* is the actor responsible for the scenario.
- (d) *makeReservation* is the only operation belonging to the Reservation class in the problem domain.
- (e) *Customer*, *Reservation* and *Room* are only some of the classes found for this Hotel Reservation System.

26) Consider the following statements related to Object Oriented Design and modeling?

- (i) High coupling and low cohesion are two very important goals of Object Oriented Design.
- (ii) Object oriented developers look for the same reuse opportunities through the use of design patterns.
- (iii) The goal of a pattern is not to discover or invent a new solution to a problem, but to formally structure an existing solution to a common problem so that others may use it and take advantage of it.

Which of the above statement(s) is/are correct?

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

27) Which of the following statements is/are correct regarding State diagrams?

- (a) A transition is a relationship between two states indicating that an object in the first state will perform certain actions and enter the second state when a specified event occurs and specified conditions are satisfied.
- (b) A transition may have multiple sources as well as multiple targets.
- (c) In the context of state machines, an event is an occurrence of a stimulus which can trigger a state transition.
- (d) It provides a variety of symbols and encompasses a number of ideas to model the changes which more than one object go through.
- (e) A guard condition in a state is rendered as a Boolean expression enclosed in square brackets and placed after the trigger event.

28) Consider the following statements related to diagrams in UML2.0.

- (i) In an activity diagram, a swimlane is a segment that shows the activities performed by a particular role.
- (ii) The focus of control in an Activity diagram is a small rectangle that will let one know which object has control at a particular point in time.
- (iii) An Activity diagram is appropriate for modelling business processes.

Which of the above statement(s) is/are correct?

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

29)

Which of the following statements is/are correct regarding UML diagrams.

- (a) The only type of relationship that exists between components in a Component diagram is the Dependency relationship. It suggests that one component must be compiled before another.
- (b) The Deployment Diagram helps to model the physical aspect of an Object-Oriented software system and it illustrates the architectures of the software components and the dependencies between them
- (c) The Deployment diagrams show the hardware for your system, the software that is installed on that hardware and the middleware used to connect the disparate machines to one another.
- (d) The Component diagram depicts a static view of the run-time configuration of processing nodes and the components that run on those nodes.
- (e) Software components in a Component diagram can be run-time components, executable components and source code components.

30)

Which of the following statements is/are correct regarding Model Driven Architecture (MDA) and Executable UML?

- (a) Model-Driven Engineering (MDE) is an approach to software development where models rather than programs are the principal outputs of the development process.
- (b) A Platform Independent Model (PIM) models the important domain abstractions used in the system and they are sometimes called domain models.
- (c) In order to create an executable sub-set of UML, Use Case, State and Class models are used.
- (d) In order to create an executable sub-set of UML, the number of model types has been dramatically reduced to three key model types.
- (e) Model-driven architecture is a model-focused approach to software design and implementation that uses a sub-set of UML models to describe a system.
