



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

*Academic Year 2013/2014 – 2<sup>nd</sup> Year Examination – Semester 3*

***IT3104 – Object-Oriented Analysis and Design***

***PART 1 - Multiple Choice Question Paper***

1<sup>st</sup> March 2014

(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) Washing machines, toasters, radios, blenders are all appliances. In the world of object orientation, one would say that each one is a(an) ..... of the *Appliance* class.

- |                |                 |              |
|----------------|-----------------|--------------|
| (a) behaviour  | (b) attribute   | (c) subclass |
| (d) superclass | (e) aggregation |              |

2) In object oriented analysis and design ..... is the concept that different objects can respond to the same message in different ways.

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

3) A set of objects that share the same ..... is referred to as a class.

- |                |                               |              |
|----------------|-------------------------------|--------------|
| (a) attributes | (b) behaviours                | (c) use case |
| (d) messages   | (e) attributes and behaviours |              |

4) The UML ..... diagrams are used to model the static view of a system.

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

5) The UML ..... diagrams are used to model the dynamic view of a system.

- |                |               |              |
|----------------|---------------|--------------|
| (a) Use Case   | (b) State     | (c) Activity |
| (d) Deployment | (e) Component |              |

6) Which of the following is/are not UML diagrams?

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

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

- |                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------|
| (a) RUP is a commercial version of UP from IBM.                                                                   |
| (b) Inception phase of RUP defines the life cycle objectives and its goal is to “get the project off the ground”. |
| (c) RUP consists of a sequence of four phases, called problem definition, Analysis, Design and Construction.      |
| (d) RUP is an object oriented process.                                                                            |
| (e) Major milestone of the elaboration phase is the deployment of the software into the user environment.         |

8) Which of the following statements is/are correct regarding the relationship of a class diagram?

- (a) Association relationship in a class diagram should always show the navigability.
- (b) Composition relationship is drawn as a filled diamond.
- (c) Association names should be verb phrases because they indicate an action that the source object is performing on the target object.
- (d) In UML a degree in an association specifies the number of objects that can participate in a relationship at any point in time.
- (e) Dependencies are relationships in which a change one model element impacts another model element.

9) Consider the following statements with regard to object and class diagrams.

- (i) An object diagram is a diagram that shows objects and their relationships at a point in time.
- (ii) An association class in a class diagram is an association that is also a class.
- (iii) The class diagram shows a collection of classes, interfaces, associations, collaborations and constraints.

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 OOAD.

- (i) Objects work together by sending messages to one another. The messages are requests to perform operations.
- (ii) Objects are typically associated with one another. The association can take a variety of forms. An object in one class may associate with any number of objects in another class.
- (iii) Polymorphism means "many forms." Applied to object-oriented techniques, it means that the same named behaviour may be completed differently for different object 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       |                       |

11) Which of the following is/are correct regarding Interaction diagrams?

- |                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------|
| (a) There are three Interactions Diagrams in UML 2.0.                                                                                     |
| (b) Messages in a sequence diagram are drawn as arrows between lifelines.                                                                 |
| (c) They describe the behaviour of a single object.                                                                                       |
| (d) Communication diagram is one of the Interaction diagrams that emphasize the time ordered sequence of message sends between lifelines. |
| (e) Interaction Overview Diagram is an interaction diagram in UML 2.0 , which visualize a sequence of activities.                         |

12) Which of the following statements is are correct regarding the UML component diagram and the deployment diagram?

- (a) To describe a web site, for example, a deployment diagram would show what hardware components exist (e.g., a web server, an application server, and a database server), what software components run on each node (e.g., web application, database), and how the different pieces are connected
- (b) Component diagrams, which one typically prepare during the implementation phase of development, show the physical arrangement of the nodes in a distributed system, the artifacts that are stored on each node, and the components and other elements that the artifacts implement.
- (c) Both Component and Deployment diagrams show the static aspect of an object oriented software system.
- (d) UML component diagrams show 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) A Component diagram illustrates what software has been installed on the hardware depicted on the Deployment diagram.

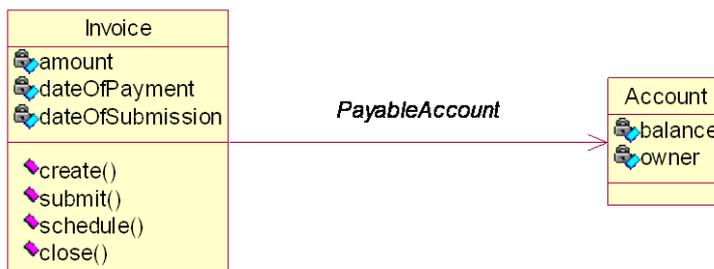
13) Which type of class relationship can be described as "kind of" or "is a"?

- (a) generalization/specialization
- (b) association
- (c) aggregation
- (d) multiplicity
- (e) dependency

14) What specifies the number of objects that can participate in a relationship at any point of time?

- (a) associatively
- (b) multiplicity
- (c) relationship
- (d) inheritance
- (e) aggregation

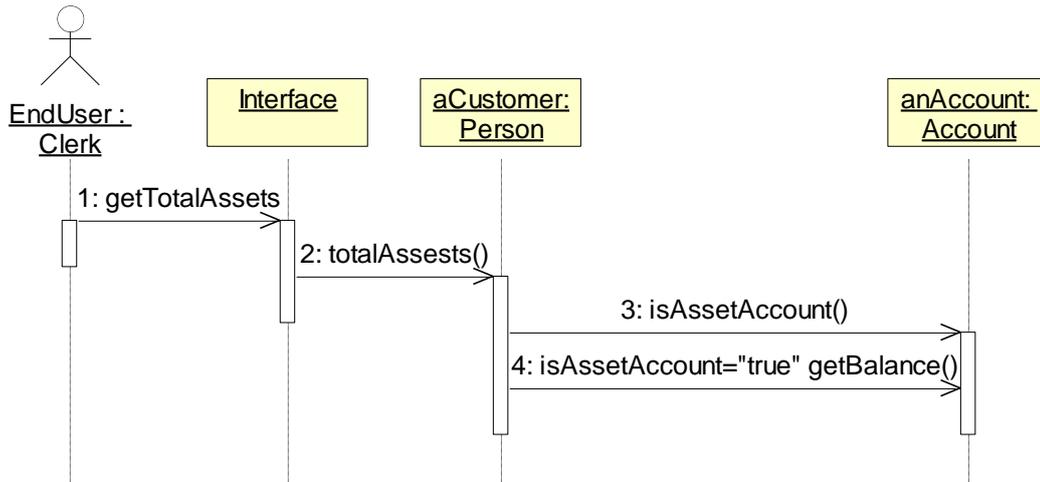
15) Consider the following diagram.



The arrow in the above diagram indicate,

- (a) Refer to
- (b) Association
- (c) Dependency
- (d) Navigability
- (e) Composition

16) Consider the following UML diagram.



A customer may have more than one asset account.

Which of the following statements is/are true regarding the given diagram?

- (a) Person is asked for assets, sums the balance of each asset Accounts.
- (b) Customer is asked for assets, returns the balance of asset account.
- (c) It is a Communication diagram.
- (d) *isAssetAccount* method must be implemented by the Person class
- (e) *totalAssests* method must be implemented by the Person class

17) Consider the following statements.

- (i) Lifelines in a sequence diagram may have activations to indicate when the life line has focus of control.
- (ii) It consists of different states and transitions between states for different objects of a scenario.
- (iii) Time is represented in a sequence diagram as proceeding in the downward direction.

Which of the above is/are true for a sequence diagram?

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

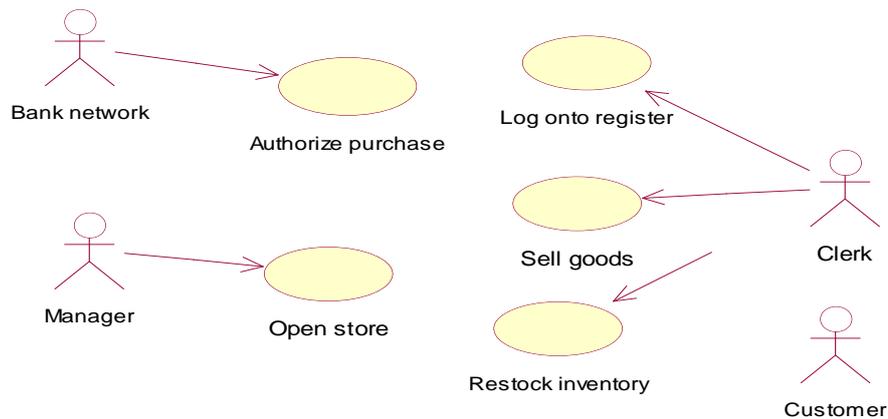
18) Take a look at the contents in column B in relation to those in column A.

Column A	Column B
(i) An Interaction fragment	(A) can be used to model business processes.
(ii) A State diagram	(B) is structure diagram which describes lightweight extension mechanism to the UML by defining custom stereotypes, tagged values, and constraints.
(iii) An Activity diagram	(C) models the states of just a single object.
(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 are the system actors in the given Use Case diagram?

- |                                     |                                            |
|-------------------------------------|--------------------------------------------|
| (a) Clerk, Manager, Customer        | (b) Clerk, Manager                         |
| (c) Clerk, Manager, Bank network    | (d) Clerk, Manager, Bank network, Customer |
| (e) Manager, Bank network, Customer |                                            |

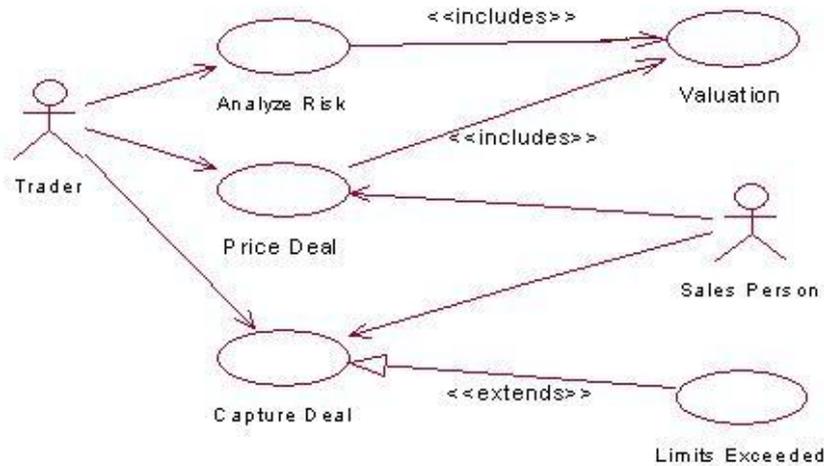
20) Some questions related to UML diagrams with possible answers are given below.

- (i). Q. List three diagrams that give a dynamic view of a system?  
A. sequence, component, state
- (ii). Q. Is a use case the same as a scenario?  
A. Yes.
- (iii). Q. What does multiplicity indicates in a class diagram?  
A. The number of objects in one class that relate to one object of an associated class.

Which of the above pairs is/are correct?

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

21) Examine the following Use Case diagram.



The following are three statements based on the use case diagram given above,

- (i) The trader and the sales person do not play the same role in the system.
- (ii) Both Analyze Risk and Prize Deal are required to value the deal.
- (iii) There may not be customers with exceeded limits.

Which of the following is true about the above statements?

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

22) Consider the following statements related to Use Case Modeling.

- (a) *Inclusion* use case supplies behavior to its base use case.
- (b) Inclusion use case supplies behavior to its base use case. Execution is then passes over to the inclusion use case.
- (c) When the *inclusion* use case in a use case diagram finishes, the control return to the base use case again.
- (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) Use cases are initially defined during the design stage of the life cycle and will be additionally refined in the implementation stage.

23) Which of the following statements is/are correct with respect to Use case modeling?

- (a) Use cases are the best choice for requirements capture when the system is dominated by functional requirements. .
- (b) Use cases are the best choice for requirements capture when the system has many types of users to which it delivers different functionality.
- (c) Functional decomposition is not used when applied to use case modeling.
- (d) Examples of systems where use cases may not be appropriate are embedded systems and systems that are algorithmically complex but with few interfaces.
- (e) Use cases are not good for requirements capture when the system has many interfaces.

24) Consider the following statements with respect to Use case modeling.

- (i) An automatic system backup that runs every evening can be represented by a Time actor.
- (ii) Credit bureau authorizing the charging by a credit card is an example for an external server actor.
- (iii) Warehouse receiving a package order to prepare a shipment is an example for an external receiver actor if the warehouse is outside the scope of the system.

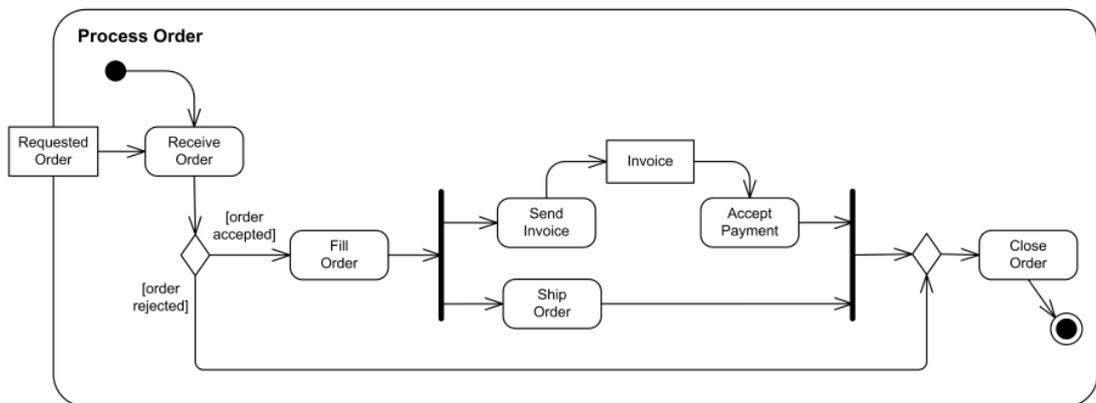
Which of the above statements is/are correct?

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

25) Which of the following statements is/are correct regarding Activity diagrams?

- |                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) In UML, an activity diagram is used to display the sequence of activities.                                                                                                      |
| (b) Activity diagrams show the workflow from a start point to the finish point detailing the many decision paths that exist in the progression of events contained in the activity. |
| (c) They may be used to detail situations where parallel processing may occur in the execution of some activities.                                                                  |
| (d) An Activity diagram can contain generalization relationships.                                                                                                                   |
| (e) Activity diagrams are not good for communicating logic to programmers.                                                                                                          |

26) Which of the given statements is/are correct with respect to the following UML diagram?



- |                                                                      |
|----------------------------------------------------------------------|
| (a) It is a Interaction Overview diagram.                            |
| (b) It is a UML Activity diagram.                                    |
| (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. |

27) A Class in a problem domain has attributes, behaviour and sometimes can be in different states. In a University Registration system, the "Course" identified as an *Entity* Class in the problem domain. From the following, identify the statement which represents object of the Class, an attribute, behaviour and a state of the class respectively.

- |                                              |
|----------------------------------------------|
| (a) IT3002, expired, NoOfUnits, AddStudent   |
| (b) IT 2103, NoOfUnits, expired, AddStudent  |
| (c) IT 2103, NoOfUnits, AddStudent, expired  |
| (d) NoOfUnits, IT 1104, AddStudent, expired  |
| (e) NoOfUnits , expired, IT 2104, AddStudent |

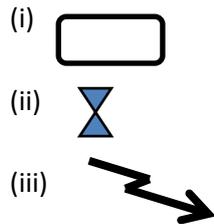
- 28) Consider the following statements related to state diagrams in UML2.0.
- (i) A state can have a transition that returns to itself. This is most useful when an effect is associated with the transition.
  - (ii) They are most commonly used to model the static behavior of classes.
  - (iii) Guard condition is a Boolean expression that must be true before the transition occurs and they are shown in square brackets.

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

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

Identify the following notations used in UML 2.0 Activity Diagrams.

29)



- |                    |                       |                               |
|--------------------|-----------------------|-------------------------------|
| (a) (i) – Activity | (ii) –Decision Node   | (iii) – Transition            |
| (b) (i) – State    | (ii) –Decision Node   | (iii) – Interruption Activity |
| (c) (i) – Activity | (ii) –Passage of time | (iii) – Interruption Activity |
| (d) (i) – State    | (ii) –Passage of time | (iii) – Transition            |
| (e) (i) – Activity | (ii) –Decision Node   | (iii) – Interruption Activity |

- 30) Consider the following multiplicity indicators and their meanings.

*Indicator Meaning*

- (i) \* Zero or More
- (ii) 1..\* One or More
- (iii) 0..1 Zero or One
- (iv) 4..7,9 4,5,6,7 or 9
- (v) 1-2 1 or 2

Which of the above is/are correct?

- |                                  |                             |
|----------------------------------|-----------------------------|
| (a) (i), (ii) and (iii) only     | (b) (ii) and (iii) only     |
| (c) (i),(ii),(iii) and (iv) only | (d) (i), (ii) and (iv) only |
| (e) All                          |                             |

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