UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

BIT

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2008/2009 – 2nd Year Examination – Semester 3

IT3103 – Object-Oriented Analysis and Design
PART 1 - Multiple Choice Question Paper
21st March, 2009
(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 10 pages.

- All questions are of the MCQ (Multiple Choice Questions) type.

- All questions should be answered.

- Each question will have 5 (five) choices with <u>one or more</u> 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) An object is solely responsible for carrying out any behaviours which act on its own data. This object oriented principle is called …………………

(a) polymorphism.	(b) encapsulation.	(c) inheritance.
(d) message passing.	(e) aggregation.	

2) .... is a relationship in which one larger "whole" class contains one or more smaller "parts" classes. This whole object is completely responsible for the creation and destruction of its parts.

(a) Association	(b) Gen/Spec	(c) Composition
(d) Communication	(e) Dependency	

3) .... literally means 'many forms'. It is the concept where different objects can respond to the same message in different ways.

(a) Polymorphism	(b) Encapsulation	(c) Abstraction
(d) Inheritance	(e) Composition	

4) A ……………… diagram models how events can change the state of an object over its life time, showing both the various states that an object can assume and the transition between those states.

(a) use case	(b) communication	(c) sequence
(d) object	(e) state	

5) A …………… diagram shows the configuration of software components within the physical architecture of the system's hardware nodes.

(a) use case	(b) interaction overview	(c) composite structure
(d) deployment	(e) component	

6) Examine the contents of the following **Column X** against those of **Column Y.**

Column X	Column Y
(A) Package diagram	(i) Emphasizes the structural organization of the objects which send and receive messages
(B) Communication diagram	(ii) Useful to draw when large number of classes is identified for a system
(C) Sequence diagram	(iii) Especially useful when designing embedded software for devices
	(iv) Combines features of sequence and activity diagrams to show how objects interact with each activity of a use case
(D) Timing diagram	(v) Is an Interaction diagram that emphasizes the time
(E) Interaction Overview diagram	ordering of messages

The following gives a correct matching of the contents of **Column X** with those of **Column Y**.

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

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

(a) The Rational Unified Process consists of four phases.
(b) Inception phase establishes the business case for the project.
(c) At the end of the inception phase, life cycle objectives of the project are examined and decided whether to proceed with full- scale development or not.
(d) Some inspection tasks include determining use cases, actors and draw Use Case diagrams.
(e) During the inception phase, the problem domain analysis is made and the architecture of the project gets its basic form.

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

(a) Multiplicity in a relationship defines the minimum and the maximum number of occurrences of one object class for a single occurrence of the related object classes.
(b) In UML, composition is drawn as a hollow diamond.
(c) The notation 3..5 represents a specific range from 3 to 5 including 3 and 5.
(d) The notation 3..5 represents a specific range from 3 to 5 excluding 3 and 5.
(e) In an inheritance relationship, multiplicity is not stated.

9) Consider the following statements with regard to the following diagram.
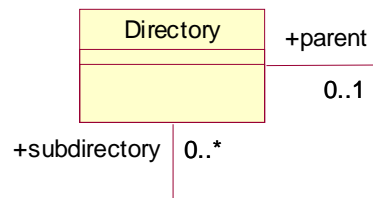
(i) The objects of the *Directory* class have links to other objects of the same class.
(ii) *parent* represent the name of the association.
(iii) It is an example for a reflexive association

Which of 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 modelling.

(i) Business requirements Use Case captures the interactions between a user and the system free of technology implementation details.
(ii) Actors are named with a verb phrase specifying the goal of an actor.
(iii) If the system has several subsystems, one may draw several use case model diagrams.

Which of the above statements is / are correct?

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

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

(a) *Tyre* and *Car* relationship is a *composition* relationship.
(b) Whether a relationship is an association or a *composition* is often domain dependent.
(c) The following is an example for a *composition* relationship.

Faculty		Department
1	1..*	

(d) The diagram given in (c) is an *association* relationship.
(e) In UML 2.0, the notation for aggregation has been dropped.

12   Consider the following UML diagram.

Person
lastName
firstName

Student		Teacher
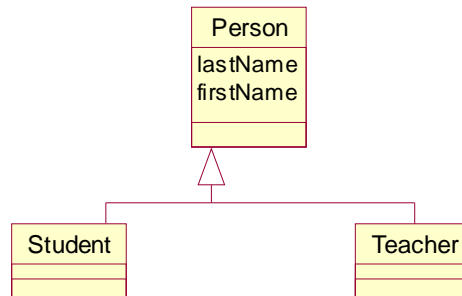
Which of the following statements is/are correct in relation to the above diagram?

(a) lastName, firstName are inheritable attributes.
(b) Person is a specialization of the student class.
(c) Student is a generalization class.
(d) The relationship between Person and the Student class is aggregation.
(e) The Classes Student and Teacher contain attributes and behaviours which are unique to them, but they also have access to the generalised attributes and behaviours of the Person object class via inheritance.

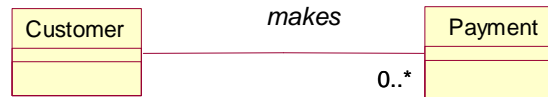13)   Which of the following diagrams is/are correct regarding UML class diagrams?

(a) It models actual object instances with current attribute values.
(b) It provides the developer with a snapshot of the system's objects at one point in time.
(c) It shows object classes where the system is composed of as well as the relationships between those object classes.
(d) It is the first UML diagram to be drawn in any Object Oriented Methodology.
(e) It shows the object interactions arranged in time sequence.

14)   Consider the following diagram.
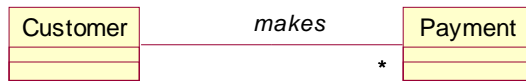
Which of the following is/are correct regarding the above diagram?

(a) Customer can make zero (no payment) or many payments
(b) Customer can make one or many payments
(c) It is an association relationship.
(d) It is a dependency relationship.
(e) The following is another representation of the above diagram.

15) Which of the following statements is/are correct regarding use-case modelling?

(a) *Depends on* is a relationship between use cases indicating that one usecase cannot be performed until a another use case has been performed.
(b) *Extends* relationship shows the optional behaviour of a Use Case.
(c) *Include* relationship shows the compulsory behaviour of a Use Case.
(d) The use case diagram, models the top level view of the business events which must be processed by the system.
(e) Use case is defined as any one or any thing that will interact with the system.

16) Consider the following use case diagram.
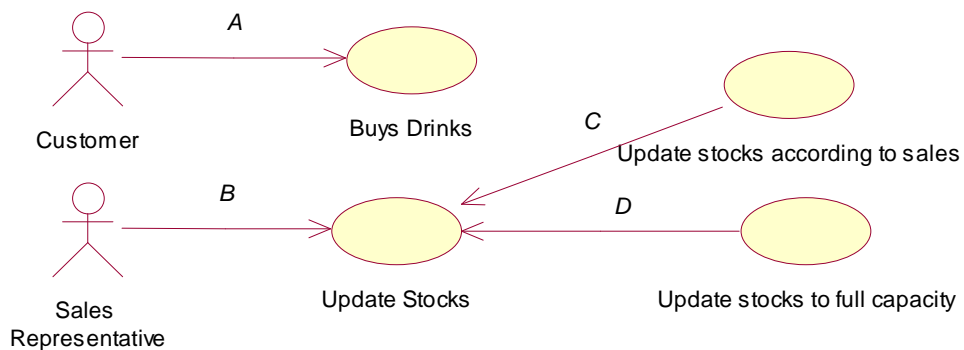
Which of the following gives the correct matching(s) for A-D?

(a) A-Association,   B-Association,   C-Include,   D- Include
(b) A-Association,   B-Association,   C-Extend,   D- Include
(c) A-Association,   B-Association,   C-Extend,   D- Extend
(d) A-Communicate, B-Communicate, C-Inheritance,   D- Inheritance
(e) A-Communicate, B-Communicate, C-Generalization, D- Generalization

17) Which of the following statements is /are correct regarding Object Oriented Design and Modelling using UML?

> (a) Object Oriented Design is an approach used to specify the software solution in terms of collaborating objects, their attributes and their methods.
> (b) An Entity class is an object class that contains business related information.
> (c) A Boundary class usually corresponds to items in real life such as member, order etc
> (d) A design pattern is a common solution to a given problem in a given context which supports reuse of proven approaches and techniques.
> (e) Users communicate with the system through the user interface, implemented as interface classes.

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

Column A	Column B
(i) Focus of Control	(A) An object class that provides the means by which an actor can interface with the system
(ii) Interface class	(B) Processes messages from a boundary class and responds to them by sending and receiving messages from the problem domain related classes
(iii) Control class	(C) It is a small rectangle that will let you know which object has control at a particular point in time
(iv) Composite Structure Diagram	(D) Show object interactions arranged in time sequence
(v) A Sequence Diagram	(E) Decomposes the internal structure of a class, component or use case

Which of the following represents (a) 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)-A, (iii)-B, (iv)-E, (v)-D

19) Consider the following activities.
   (i) Refining the use case model to reflect the implementation environment
   (ii) Modelling the class interactions, behaviours, and states which support the use-case scenario
   (iii) Updating the class diagram to reflect the implementation environment

Which of above is an /are activity/ies of Object-oriented Design?

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

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

   (i).   Q. How would one represent a message in a sequence diagram?
          A. A solid horizontal arrow indicating message inputs sent to the class.

   (ii). Q. How do you represent return messages?
          A. Dashed horizontal arrows represent return messages, but for the sake of simplicity, they are often assumed and left off in the sequence diagrams.

   (iii). Q. What are activation bars?
          A. The bars which are set over the life lines indicate the period of time during which each object instance exists.

   Which of the above pairs is/are correct?

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

21) Which of the following statements is/are correct regarding the State Diagrams?

   (a) They show the combination of states which an object can assume during its life time.
   (b) They Show the interaction between all the object classes involved in the scenario.
   (c) They are also called state machine diagrams or state transition diagrams
   (d) They show the events which cause an object to change state over time and the rules which govern the object's transition between states.
   (e) They show the activities which can be performed in parallel and the alternative paths through the flow.

22) Consider the following incomplete statements related to UML.
   (i) …………………………… are often called Object Oriented flowcharts.
   (ii) Activity diagrams graphically show the sequential flow of ……….. of either a business process or a use case.
   (iii) In an Activity diagram, …………… is a black bar with one flow coming in and two or more flows going out. Actions on parallel flows beneath it can occur in any order or concurrently.
   (iv) …………………………………….. in a state diagram is the behaviour that an object carries out while it is in a particular state.
   (v) In a state diagram, the behaviour in an activity, entry action or exit action can include sending an event to some other object. In this case, the activity, entry action or exit action is preceded by a ………. character.

   Identify from among the following, the correct order to fill the above blanks.

   (a) State diagrams, events, states, synchronization bar, ^
   (b) Sequence diagrams, activities, folk, Activity, *
   (c) Activity diagram, activities, join, Activity, ^
   (d) Activity diagrams, activities, fork, Activity, ^
   (e) State diagrams, events, join, synchronization bar, *

23) Consider the following statements related to UML 2.0 sequence diagrams.

(i) A tool used by some Object Oriented methodologies in the logical design phase is the system sequence diagram which shows the interactions between an actor and the system for a use case scenario.
(ii) Frame is a box which can enclose one or more messages to divide off a fragment of the sequence.
(iii) It is not possible to start drawing a sequence diagram before finalising the classes

Which of above statements is/are correct?

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

24) Consider the following statements related to UML 2.0 sequence diagrams.

(i) Activation bar (focus of control) indicates the period of time the object instance is active in the interaction.
(ii) Some methodologists leave the activation bars off the sequence diagram.
(iii) Frames in sequence diagram can show loops, alternative fragments, or optional steps.

Which of the above statements is/are correct?

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

25) Examine the contents of the following **Column X** against those of **Column Y**.

Column X	Column Y
(i) Communication diagram (ii) Component diagram (iii) Deployment diagram (iv) Components (v) Design Pattern	(A) describes the physical architecture of hardware and software in the system. (B) graphically shows the physical architecture of the software of the system. (C) useful to the developer to package and distribute program code to others. (D) A common solution to a given problem in a given context, which supports reuse of proven approaches and techniques. (E) Models interaction of objects via messages, focusing on the structural organization of objects in a network format.

Which of the following gives a correct matching of the contents of **Column X** with those of **Column Y**.

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

26) Which of the following statements is/are true regarding Activity diagrams?

(a) Activity diagrams are not particularly good at modeling business processes.
(b) Activity diagrams do not allow you to specify how your system will accomplish its goals.
(c) Activity diagrams cannot be used with non object oriented methodologies.
(d) The diamond-shaped node in an activity diagram is used to represent a *decision*.
(e) Repeating time events can be modeled in UML 2.0 Activity diagrams.

27) Consider the following statements in relation to Activity diagrams.

(i) They can be used to show the activities involving different participants, such as different groups or roles in a system.
(ii) In an activity diagram, there will be only one ending activity.
(iii) In an Activity diagram, a synchronization bar specifies the activities which cannot be done concurrently.

Which of the above statements is/ are true?

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

28) Which of the following statements is/are true regarding State diagrams?

(a) The fundamental elements of a state diagram are *states* and *transitions* between states.
(b) A state in a state diagram is *active* when entered through a transition and it becomes *inactive* when exited through a transition.
(c) A State diagram is one of the UML interaction diagrams.
(d) The diamond-shaped node in a state diagram is used to represent a *decision*.
(e) Sate diagram is one of the new diagrams added to UML 2.0.

29) Consider the following statements in relation to State diagrams.

(i) They tend to be used for modeling business process in which several objects participate.
(ii) They tend to be used for modeling the life cycle history of a single object.
(iii) After creating a use case diagram, *state diagrams* may be created to represent the flow across use cases or they may be created to represent the flow within a particular use case

Which of the above statements is/ are true?

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

30) Which of the following statements is / are activities related to object oriented design?

(a) Refine the use-case model to include details of how the user will actually interface with the system and how the system will respond to the stimulus to process the business event.
(b) Updating the use-case model diagram and other documentation to reflect any new use cases identified.
(c) Draw the use-case model diagram.
(d) Draw component diagrams.
(e) Control classes are added to sequence diagrams.

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