UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2011/2012 – 2nd Year Examination – Semester 3

IT3104 – Object-Oriented Analysis and Design
PART 1 - Multiple Choice Question Paper

25th February, 2012
(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) …………………. specifies a role that some external entity adopts when interacting with your system directly.

(a) A behaviour	(b) An attribute	(c) An object
(d) An actor	(e) A Service	

2) .... is a relationship between more general element and a more specific element, where the more specific element is entirely consistent with the more general element but contains more information.

(a) Polymorphism	(b) Generalization	(c) Association
(d) Specialization	(e) Composition	

3) ………. is a relationship in which the 'whole' object' is responsible for the creation and destruction of its "parts". If the 'whole' were to die, the "part" would die with it.

(a) Association	(b) Aggregation	(c) Generalization
(d) Dependency	(e) Composition	

4) The UML …………. diagram shows the configuration of software components within the physical architecture of the system's hardware "nodes".

(a) Component	(b) Communication	(c) Sequence
(d) Deployment	(e) State	

5) …………… diagram combines features of sequence and activity diagrams to show how objects interact within each activity of a use case.

(a) Use Case	(b) Interaction overview	(c) Composite structure
(d) Profile	(e) Timing	

6) Examine the contents of the following **Column A** against those of **Column B.**

Column A	Column B
(A) Use Case Diagrams	(i) emphasizes the structural organization of the objects which send and receive messages.
(B) Communication diagram	(ii) models actual object instances with current attribute values.
(C) Activity Diagram	(iii) can be used to show the flow of a business process, the steps of a use case, or the logic of an object behaviour.
(D) Object diagram	(iv) shows the configuration of software components within the physical architecture of the system's hardware "nodes"
(E) Deployment diagram	(v) involves finding actors and their responsibilities.

Which of the following gives a correct matching of the contents of **Column A** with those of **Column B**?

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

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

> (a) Defines who, what, when, and how of developing software.
> (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) It is a modern software engineering process that is use case driven, architecture centric, and iterative and incremental.

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

> (a) Generalization relationship in a class diagram does not show the navigability.
> (b) Composition relationship is drawn as a filled diamond.
> (c) If multiplicity is not explicitly stated in an association then it is defaults to a multiplicity of 1.
> (d) Multiplicity in an association specifies the number of objects that can participate in a relationship at any point in time.
> (e) When a class has an association to itself, relationship is referred to as an aggregation.
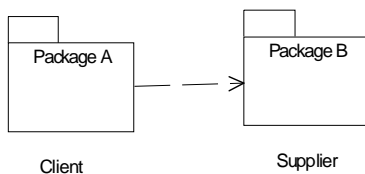
9) Consider the following statements with regard to reflexive associations in UML class diagrams.
   (i) A reflexive relationship occurs when a class has objects that can play a variety of roles.
   (ii) In UML it is shown as an association line from the class rectangle back to the same class rectangle
   (ii) To model the following in a UML class diagram one needs to use reflexive association.
       "A car occupant can be either a driver or a passenger"

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 diagram and identify the correct relationship type.

> (a) Association   (b) Aggregation   (c) Composition
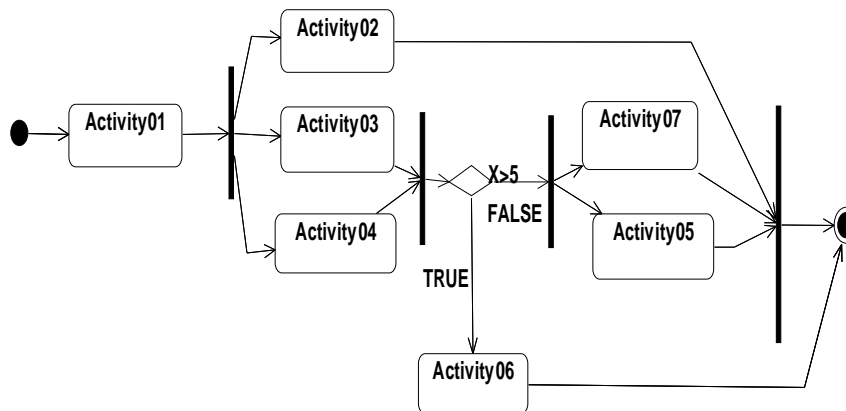> (d) Generalization   (e) Dependency

11) Which of the following statements describe(s) the difference(s) between the component diagram and the deployment diagram?

> a) While Deployment diagram models the system dynamics, Component diagram models how people interact with the system.
> b) Component diagrams are used to describe the components and Deployment diagrams show how they are deployed in hardware.
> c) Both component and deployment diagrams show the physical aspect of an object oriented software system.
> d) Deployment diagram shows the configuration of run time processing nodes and artifacts, while Component diagram illustrates the architectures of the software components and dependencies between them.
> e) Component diagram illustrates what software has been installed on the hardware depicted on the Deployment diagram.

12) Which of the following notations is/are common to both Activity diagram and State diagram?

> a) Initial State
> b) Final State
> c) Swim lane
> d) Transitions
> e) Synchronization bars

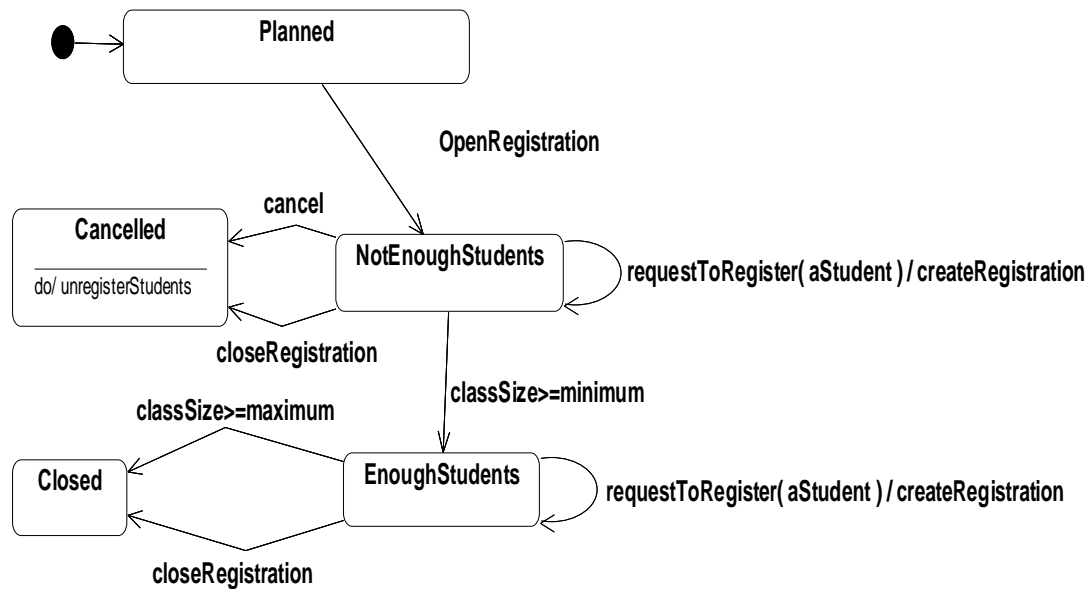**Consider the following activity diagram and answer the questions from (13) to (14).**

13) Which of the following activities could occur simultaneously?

> (a) Activity 02, Activity 03 and Activity 04
> (b) Activity 05, Activity 06 and Activity 07.
> (c) Activity 02 and Activity 05.
> (d) Activity 03, Activity 04 and Activity 06.
> (e) Activity 05 and Activity 06.

14) | Which of the following activity(ies) should be completed before starting the 'Activity 06'?

(a) Activity 02
(b) Activity 03
(c) Activity 04
(d) Activity 05
(e) Activity 07

Consider the following diagram and answer the questions from (15) to (17).

15) | The above diagram

(a) is invalid as it cannot be followed without a final state.
(b) is an example for a collaboration diagram.
(c) illustrates the dynamic behavior of a system.
(d) shows the change of an object through life time.
(e) contains incorrectly specified one or more transitions.

16) | Which of the following is/are can be treated as an activity in the above diagram?

(a) NotEnoughStudents
(b) CloseRegistration
(c) classSize>=maximum
(d) unregisterStudents
(e) Open

17) Which of the following is/are correct regarding the transition details of the "requestToRegister(aStudent)/createRegistration"?

> (a) Action - requestToRegister, Argument- aStudent, Event- createRegistration
>
> (b) GuardCondition- requestToRegister, Event- aStudent, Action - createRegistration
>
> (c) Event- requestToRegister, Argument- aStudent, Action - createRegistration
>
> (d) Event- requestToRegister, GuardCondition- aStudent, Stereotype - createRegistration
>
> (e) Stereotype- requestToRegister, Event- aStudent, Argument - createRegistration

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

Column A	Column B
(i) Entity Class	(A) takes the data pertaining to a business event and translates the data for appropriate presentation to the user.
(ii) Persistence Class	(B) process messages from an interface class and respond to them by sending and receiving messages from the entity classes.
(iii) Control class	(C) is a problem domain class that contains business related information.
(iv) System Class	(D) An object class that provides functionality to read and write persistence attributes in a database.
(v) Interface Class	(E) isolates the other objects from operating system-specific functionality.

Which of the following represent (s) 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)-A, (iii)-B, (iv)-E, (v)-A

19) Consider the following activities.

   (i) Transforming Analysis Use Cases to Design Use cases..
   (ii) Identify class behaviours and responsibilities.
   (iii) Model Object states

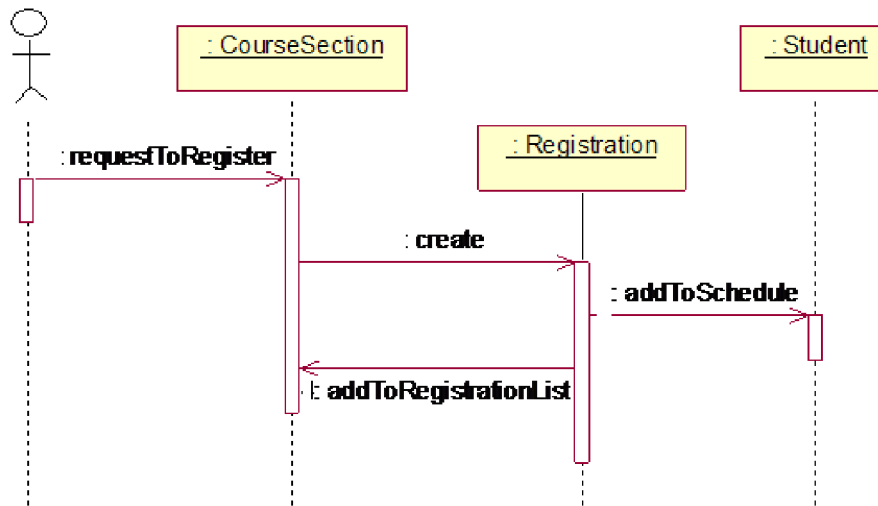Which of above statements is/are activities of Object-Oriented Design?

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

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

   (i). Q. Only operations within the class or within children of the class can access features with protected visibility. What is the symbol used to represent protected visibility in UML?

      A. #

  (ii). Q. How many control classes can there be in a Sequence diagram?

      A. zero or one

 (iii). Q. What is a design pattern?

      A. It is a common solution to a given problem in a given context, which supports reuse of proven approaches and techniques.

Which of the above pairs is/are correct?

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

21) Consider the following diagram and the user scenarios and identify the correct order with respect to the sequence diagram.
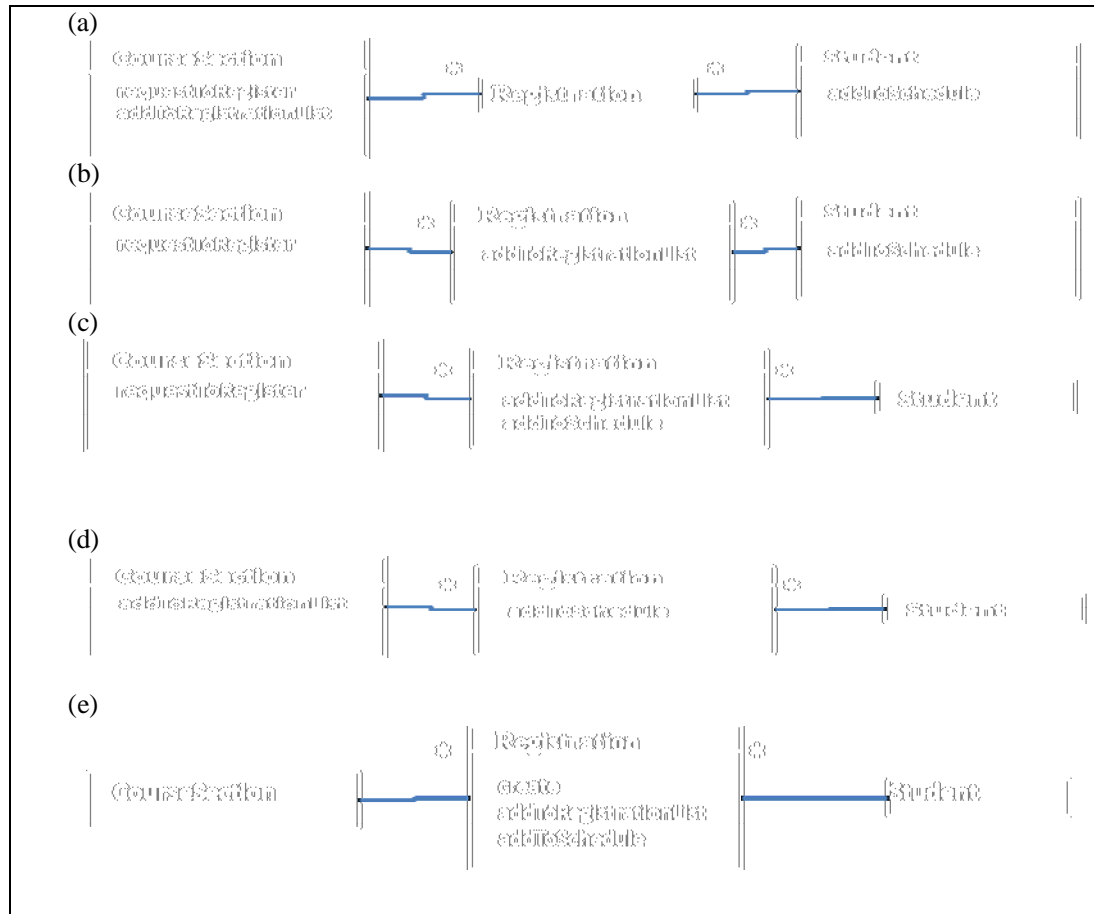

User Scenarios

    A. Student object creates the Registration to add a course to the schedule.
    B. The actor initiates the interaction via the user interface.
    C. Registration object asks the Student to add it to the list of courses.
    D. Registration object asks the CourseSection to add it to the list of registered students.
    E. Creates a Registration.
    F. The user interface sends a requestToRegister message to the CourseSection.

a)	A, E, C, D
b)	B, F, E, C, D
c)	A, F, C, D
d)	B, F, E, D, C
e)	A, F, E, D, C

22) Which of the following class diagrams is/are comply with the sequence diagram in Question 21?

(a)

(b)

(c)

(d)

(e)

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

(a) The vertical dimension of the sequence diagram represents the time.
(b) The vertical dash line of a sequence diagram is known as the live activation.
(c) Sequence diagrams highlight the relationships that exist among objects and actors.
(d) Sequence diagram is a way to model the dynamic aspects of a software system.
(e) Messages are shown as arrows from object to class in a sequence diagram.

24) The small rectangle drawn along the vertical dash line is known as

(a) activation box.
(b) class.
(c) focus of control.
(d) time line.
(e) state

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

> (a) A class diagram can generate an infinite number of instance diagrams.
> (b) Instance diagrams are also known as object diagrams.
> (c) The number of links among classes in an instance diagram should be consistent with the multiplicity of that class diagram.
> (d) An instance diagram can contain generalization relationships.
> (e) An instance diagram should NOT contain instances and links of classes and associations that are present in the class diagram.

26) Which of the following statements is/are correct with respect to the Polygon and LineSegment class shown below?
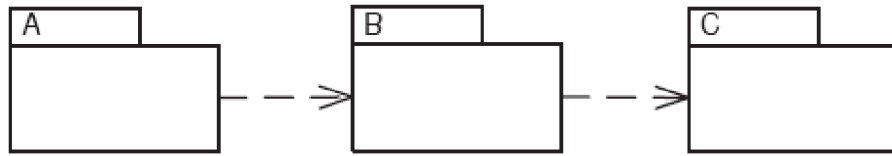

> (a) A polygon is composed of line segments.
> (b) A line segment can be belongs to many number of polygons.
> (c) The line segments are deleted when the polygon is deleted.
> (d) Line segment hasParts in the Polygon class.
> (e) The association between the two classes is known as a composition.

27) Which of the following diagrams express that 'a board of directors has either zero or 3 to 8 persons as board members'?

(a)

(b)

(c)

(d)

(e)

28) Consider the following package diagram.

Which of the following statements related to the above diagram is/are correct?
- (i) If package C changes, package B must be inspected for necessary changes, and if there are any, package A may have to be adapted as well.
- (ii) If package B changes, package A and package C must be inspected for necessary changes.
- (iii) Packages should be designed in a way that a change in one does not have any effect on others.
- (iv) Dashed arrow line should NOT be used to represent relationships among packages.

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

29) Identify the following notations.

(i)

(ii)

(iii)

- (a) (i) – Control Class (ii) – Boundary Class (iii) – Entity Class
- (b) (i) – Entity Class (ii) – Boundary Class (iii) – Control Class
- (c) (i) – Interface Class (ii) –User Class (iii) – Entry Class
- (d) (i) – Entry Class (ii) –User Class (iii) – Interface Class
- (e) (i) –Boundary Class (ii) –Control Class (iii) – Entity Class

30) Which of the following statement(s) is/are correct regarding State Diagrams?

- (a) They model aspects of the dynamic behaviour of a system.
- (b) They are drawn only in the Elaboration phase of Unified Process.
- (c) States are rounded rectangles , apart from the intial state (filled circle) and stop state (bull's eye).
- (d) Transitions indicate possible paths between states and are modelled by an arrow.
- (e) State diagrams should be drawn for all the objects identified by the analyst.

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