



UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2012/2013 – 2nd Year Examination – Semester 3

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

2nd March, 2013
(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 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) means, simply to filter out an object's properties and operations until just the ones you need are left.

(a) A behaviour	(b) An attribute	(c) Abstraction
(d) Inheritance	(e) A Service	

- 2) In object oriented analysis and design is the name given to the technique of hiding the data from users and from other objects.

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

- 3) A set of objects that share the same attributes and behaviour is referred to as

(a) an association	(b) a class	(c) a behaviour
(d) an attribute	(e) a use case	

- 4) The UML diagrams are used to model the dynamic behaviour of a particular object.

(a) activity	(b) communication	(c) sequence
(d) object	(e) state	

- 5) diagrams describe the physical architecture in terms of "nodes" for the hardware and software in the system. They show the configuration of the run time software components, processors and devices that make up the systems architecture.

(a) Use Case	(b) Interaction overview	(c) Composite structure
(d) Deployment	(e) Component	

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

Column A	Column B
(A) Use Case diagrams	(i) graphically show how objects interact with each other via messages in the execution of a use case or an operation.
(B) Sequence diagrams	(ii) model actual object instances with current attribute values.
(C) Activity diagrams	(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 diagrams	(iv) used to graphically show the organization and dependencies of the system's software components.
(E) Component diagrams	(v) graphically show the interactions between the system and external systems and users.

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)?

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| <ul style="list-style-type: none">(a) RUP is an iterative software development process framework created by the Rational Software Corporation,(b) Elaboration 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 Inspection, Elaboration, Construction and Transition.(d) RUP is not an object oriented process.(e) In Inception phase of RUP, the business case which includes business context, success factors (expected revenue, market recognition, etc.), and financial forecast is established. |
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8) Which of the following statements is/are correct regarding the relationship of a class diagram?

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| <ul style="list-style-type: none">(a) Association relationship in a class diagram does not show navigability.(b) Composition relationship is drawn as a hollow diamond.(c) In UML all associations are by default bidirectional, if the navigation is not shown.(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 a reflexive relationship.. |
|---|

9) Consider the following statements with regard to Objects.

- (i) An object is something that is or is capable of being seen, touched or otherwise sensed, and about which users store data and associate behaviour.
- (ii) Attributes are the data that represents characteristics of interest about an object.
- (iii) Behaviour refers to those things that the object can do and that correspond to functions that act on the object's data (or attributes). Behaviour is commonly referred to as a method, operation or service.

Which of the above statements is/are correct?

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|--|---|--|
| <ul style="list-style-type: none">(a) Only (i)(d) Only (i) and (ii) | <ul style="list-style-type: none">(b) Only (ii)(e) All | <ul style="list-style-type: none">(c) Only (i) and (iii) |
|--|---|--|

10) Consider the following statements related to OOAD.

- (i) A supertype is an object class whose instances store attributes that are common to one or more subtypes of the object class.
- (ii) A message is passed when one object invokes one or more of another object's methods (behaviors) to request information or some action.
- (iii) Encapsulation means "many forms." Applied to object-oriented techniques, it means that the same named behavior may be completed differently for different object classes.

Which of the above statements is/are correct?

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|--|---|---|
| <ul style="list-style-type: none">(a) Only (i)(d) Only (ii) and (iii) | <ul style="list-style-type: none">(b) Only (ii)(e) All | <ul style="list-style-type: none">(c) Only (i) and (ii) |
|--|---|---|

- 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) A Deployment diagram shows the configuration of run time processing nodes and artifacts, while a Component diagram illustrates the architectures of the software components and dependencies between them.
- (e) A Deployment diagram illustrates what software has been installed on the hardware depicted on the Component diagram.

- 12) A Sequence Diagram

- (a) describes the behaviour in many Use Cases.
- (b) describes the behaviour in a single Use Case.
- (c) describes the behaviour of a single object.
- (d) describes the behaviour of several objects.
- (e) shows the object interactions in time sequence.

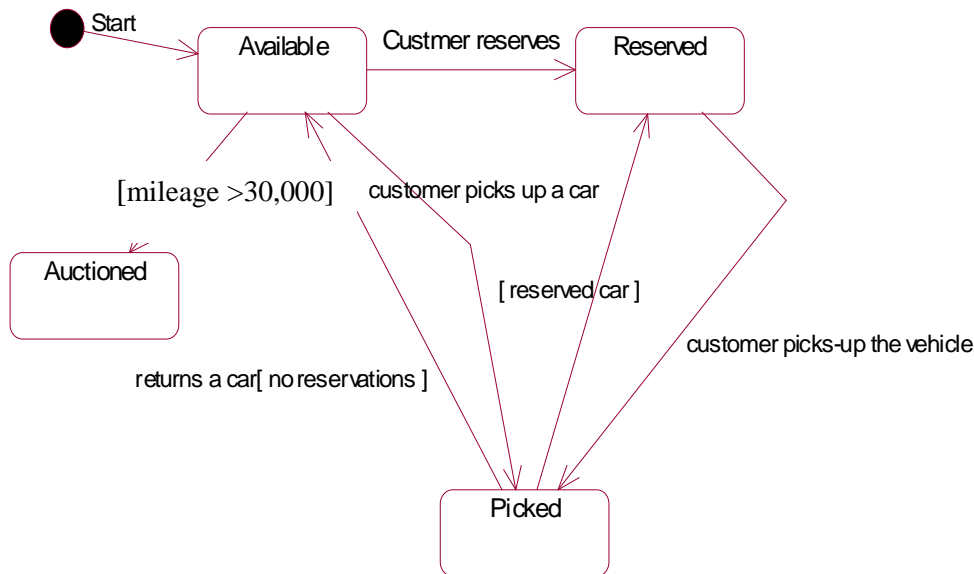
- 13) Which type of class relationship can be described as "is part of" or "is composed of"?

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

- 14) What defines how many instances of one object class can be associated with one instance of another object class?

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

- 15) Consider the following diagram drawn for a car rental company.

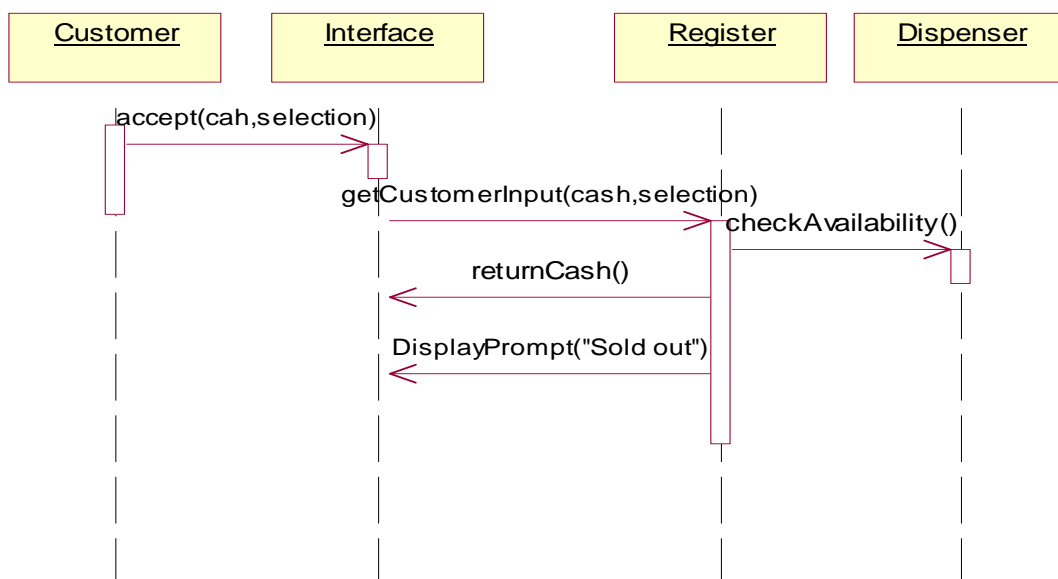


Which of the following statements is / are true regarding the above diagram?

- (a) This is an example for a state diagram.
- (b) This is an example for an activity diagram.
- (c) $\text{mileage} > 30000$ is the only guard condition that can be seen in the above diagram.
- (d) Available, Reserved, Auctioned and Picked are the transition names.
- (e) Available is the state of the object when it is created.

- 16) Consider the given Sequence diagram drawn for the scenario described below related to buying a drink from a drink dispenser machine.

When a customer wants to buy a drink from the drink dispenser he/she first makes a selection and inserts the money. The register checks for the availability of the selected drink in the dispenser. If it is not in stock money is returned with the display message “Sold Out”. If the selected drink is in stock the register checks for the money input. If it is insufficient money is returned with the display message “Insufficient cash” otherwise the dispenser releases the drink.



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

- (a) Customer is the actor responsible for the use case.
- (b) This models the scenario where selected drink is not available.
- (c) This models the scenario where selected drink is available and the input money is sufficient.
- (d) checkAvailability method must be implemented by the Dispenser class
- (e) Dispenser is a boundary class.

- 17) Consider the following statements related to the focus of control in a sequence diagram.
- (i) It indicates the time during an activation when processing is taking place within that object.
 - (ii) Parts of an activation that are not within the focus of control represent periods when, for example, an operation is waiting for a return from another object.
 - (iii) Activation box is another name given for focus of control.

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

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

Column A	Column B
(i) An Activity diagram	(A) takes the data pertaining to a business event and translates the data for appropriate presentation to the user.
(ii) A Composite Structure diagram	(B) processes messages from an interface class and responds to them by sending and receiving messages from the entity classes.
(iii) A Control class	(C) is designed to be a simplified look at what happens during an operation or a process.
(iv) An Entity Class	(D) models a class's internal structure.
(v) An Interface Class	(E) is needed to perform tasks internal to the system. It reflects a real world entity.

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 activities.
- (i) Refine the use cases to include details of how the user will actually interface with the system and how the system will respond to that to process the business event
 - (ii) Model object interactions and behaviours that support the use case scenario
 - (iii) Identify the actors and use cases

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

- (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. List three diagrams that give a static view of a system?
A. class, component, state
 - (ii). Q. Is a use case the same as a scenario?
A. No. A use case is a collection of scenarios.
 - (iii). Q. How do you represent a message in a communication diagram?
A. It is by placing an arrow near the association line that joins two objects. The arrow points to the receiving object.

Which of the above pairs is/are correct?

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

- 21) Some questions related to UML deployment diagrams with possible answers are given below.
- (i) Q. Describe the usage of deployment diagrams?
A. They are used to show the configuration of run-time processing elements and the software components and processes that are located on them.
 - (ii) Q. How do you represent a node in a deployment diagram?
A. A circle represents a node in a deployment diagram.
 - (iii) Q. What kind of information can appear on a node?
A. Information on a node can include the node name, package name and components deployed on the node.

Which of the above pairs is/are correct?

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|--------------------------|
| (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.

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| <ul style="list-style-type: none"> (a) The entity that initiates a use case is called an actor. (b) Use case modelling is the process of modelling the system's functions in terms of business events, who initiated the events and how the system responds to those events. (c) A use case diagram graphically describes who will use the system and in what ways the user expects to interact with the system. (d) Use case is a textual description of the business event and how the user will interact with the system to accomplish the task. (e) Use cases are initially defined during the requirements stage of the life cycle and will be additionally refined throughout the life cycle. |
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- 23) Which of the following statements is/are correct with respect to Use case diagrams?

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| <ul style="list-style-type: none"> (a) Use cases are good at capturing system functionality. (b) Use cases are good at capturing system constraints. (c) Use case diagrams highlight the relationships that exist among objects and actors. (d) Use cases are good for requirements capture when the system is dominated by non-functional requirements. (e) Use cases are good for requirements capture when the system has many interfaces. |
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- 24) Consider the following statements with respect to Use case modeling.
- (i) When one needs to model things that happen to the system at a specific point in time but which do not seem to be triggered by an actor, he can introduce an actor called *Time*.
 - (ii) Use cases are always initiated by an actor.
 - (iii) To find use cases, one can ask the questions “How does each actor use the system?” and “What does the system do for each actor?”.

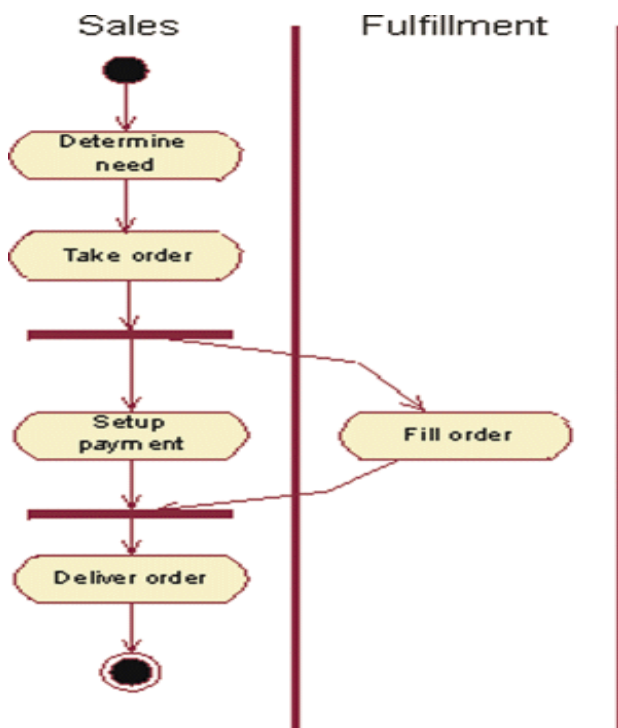
Which of the above statements is/are correct?

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

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

- (a) One can use an Activity diagram to model business processes and workflows.
- (b) Activity diagrams are also known as Object diagrams.
- (c) Activity diagrams let you model a process without having to specify the static structure of classes and objects which realize that process.
- (d) An Activity diagram can contain composition relationships.
- (e) Activity diagrams are useful for communicating logic to programmers.

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



- (a) It is a UML State diagram
- (b) It is a UML Activity diagram.
- (c) Five activities are shown in the above diagram.
- (d) Sales and Fulfillment are two swimlanes.
- (e) Take order and Setup payment are two parallel activities.

27) Which of the following is/are correct regarding relationships and roles?

- (a) In UML, association names are noun phrases that indicate the semantics of the associations.
- (b) Role names in UML are verb phrases that indicate the roles played by objects linked by the instances of the association.
- (c) When a class has an association to itself, it is a reflexive association.
- (d) A dependency indicates a relationship between two or more model elements whereby a change to one element may affect the information needed by the other element.
- (e) Generalization is a relationship between two objects in the system.

28) Consider the following statements related to state diagrams in UML.

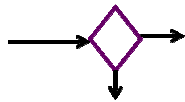
- (i) The three key elements of state diagrams are state, events and associations.
- (ii) They are most commonly used to model the dynamic behavior of classes.
- (iii) Guard condition is a Boolean expression that must be true before the transition occurs.

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

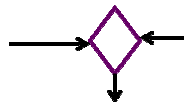
- (a) (i) Only
- (b) (ii) Only
- (c) (i) and (ii) Only
- (d) (ii) and (iii) Only
- (e) (i) and (iii) Only

29) Identify the following UML notations used in Activity diagrams.

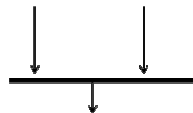
(i)



(ii)






(iii)



- | | | |
|-------------------------|---------------------|-----------------------|
| (a) (i) – Merge Node | (ii) –Decision Node | (iii) – Fork Node |
| (b) (i) – Fork Node | (ii) –Decision Node | (iii) – Merge Node |
| (c) (i) – Join Node | (ii) –Merge Node | (iii) – Decision Node |
| (d) (i) – Decision Node | (ii) – Merge Node | (iii) – Join Node |
| (e) (i) – Decision Node | (ii) –Join Node | (iii) – Merge Node |

30) Consider the following statements related to UML symbols.

- (i) The symbol used to indicate where the flow starts when an activity is invoked is 
- (ii) The symbol used to indicate the termination of an activity is 
- (iii) To terminate a specific flow within an activity, the following symbol is used. 

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

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