UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (*EXTERNAL*)

Academic Year 2016 – 2nd Year Examination – Semester 3

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

07th May 2016
(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) Through ……., the internal details of a class can be hidden from outside. It permits the elements of the class to be accessed from outside only through the interface provided by the class.

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

2) …… is a technique wherein attributes and behaviors common to several types of object classes are grouped into their own class.

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

3) A concept of different objects responding to the same message in different ways is referred to as …….

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

4) The messages of a use case can be graphically shown with a(n) …… diagram.

(a) Activity	(b) Profile	(c) System Sequence
(d) Class	(e) State	

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

(a) Class	(b) State	(c) Activity
(d) Deployment	(e) Component	

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

(a) Package Diagram
(b) Sequence Diagram
(c) Interaction Overview Diagram
(d) Activity Diagram
(e) Object Diagram

7) Which of the following statements is/are correct regarding the Software Process Models?

(a) The waterfall model is ***not*** an example of a Software Process model.
(b) Incremental development is a software process model used in agile development.
(c) The Software Process models are mutually exclusive and cannot be used together.
(d) Reuse-oriented software engineering is an example of a software process model.
(e) It is a simplified representation of a software process.

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

(a) Rational Unified Process is an example of a modern process model that has been derived from work on the UML and the associated Unified Software Development Process.
(b) The Waterfall model of the software development process is not an appropriate process model for projects with unstable requirements.
(c) Agile methods universally rely on an incremental approach to software specification, development and delivery.
(d) Extreme Programming is an example of an agile method.
(e) In the Spiral model, risk assessment and reduction is not considered.

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

(i) The main goal of the elaboration phase in Rational Unified Process (RUP) is to establish a business case for the problem.
(ii) During Inception phase of RUP, the analyst should identify all the external entities that will interact with the system and define these interactions.
(iii) The Construction phase of RUP involves system design, programming and testing.

Which of the above statements is/are correct?

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

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

(i) They show interactions between a system and its environment.
(ii) Interactions between actors and the system and between system components are shown in a Use Case diagram.
(iii) Use Case diagrams can be used with agile modelling.

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

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

(a) The collection of Use Cases for a system constitutes all the defined ways in which the system may be used.
(b) In UML 2.0 , *Time* can be considered as an actor in a Use Case model.
(c) UML 2 Use Case diagrams overview the usage requirements for a system.
(d) An actor in a Use Case diagram is a person, organization or external system that plays a role in one or more interactions with your system.
(e) A Use Case diagram is not a good model to discuss requirements with clients.

12) A bank customer uses an Automated Teller Machine (ATM) to withdraw money from his Savings account. In this case, who is the primary ***system*** actor?

(a) Bank Teller
(b) Bank
(c) Bank Clerk
(d) Bank Customer
(e) Teller Card

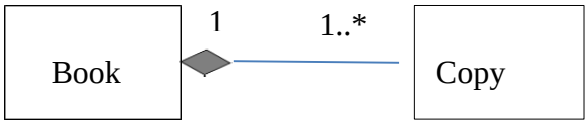
13) A bank customer can use an Automated Teller Machine (ATM) to withdraw money from his Savings account. In this case, who is the primary ***business*** actor?

(a) Bank Customer
(b) Bank Clerk
(c) Bank
(d) Bank Teller
(e) Bank Manager

14) Fill in the blank.
…… 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 Book and Copy in the above diagram is
(a) generalization.
(b) association.
(c) dependency.
(d) navigability.
(e) composition.

16) Which of the following names is best suited for a Use Case?

(a) Depositor
(b) DepositMoney()
(c) Deposit Money
(d) Money
(e) DepMon

17) Consider the following statements related to a Class diagram.
(i) It is a diagram under diagram type ‘structure’.
(ii) Inheritance in a Class diagram is indicated by a solid line with a closed, unfilled arrowhead pointing at the super class from a child class.
(iii) A customer Class in a Class diagram of a sales system would be an example of an Entity Class.

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

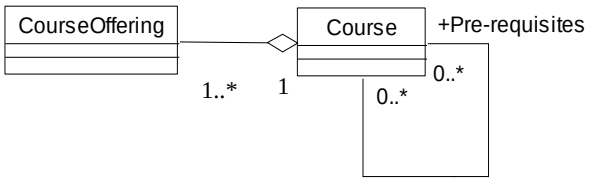
18) Take a look at the contents in column B in relation to those in column A.

Column A	Column B
(i) An Object Diagram	(A) enables you to organize model elements into groups, making your UML diagrams simpler and easier to understand.
(ii) A Sequence Diagram	(B) is structure diagram which describes lightweight extension mechanism to the UML by defining custom stereotypes, tagged values, and constraints.
(iii) Package diagram	(C) is a diagram that shows a complete or partial view of the structure of a modelled system at a specific time.
(iv) A Profile diagram	(D) is an interaction diagram that shows how processes operate with one another and in what order.
(v) A Deployment diagram	(E) shows the configuration of run time processing nodes and the components live on them.

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 Class diagram drawn for a particular scenario.



Which of the following is/are true about the above diagram?

(a) It is a component diagram.
(b) One Course object playing the role of Prerequisite is related to zero or more course objects.
(c) One Course object is related to zero or more course objects playing the role of Prerequisite.
(d) Course can have one or more Course Offerings.
(e) It is a Class diagram.

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

(i). Q. What is the difference between Class diagram and Object diagram?
A. The actual difference lies in their purpose. A Class diagram shows your classes and their relationships. An Object diagram shows the interaction between objects at some point, during run time.

(ii). Q. What is the difference between *control* and *entity* classes in a class diagram?
A. Entity Classes contain business related information whereas Control classes contain application logic.

(iii). Q. What is a persistence class?
A. It is a Class that provide functionality to read and write persistent attributes in a database.

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.

(i) Consider a *Car* as a whole entity and *Car Wheel* as part of the overall *Car*. The wheel can be created weeks ahead of time, and it can sit in a warehouse before being placed on a *Car* during assembly. In this example, *Car* and *Wheel* have composition relationship.

(ii) A class can also be associated with itself. An instance of an *Employee* can be the manager of another instance of an *Employee*.

(iii) A Design pattern is a common solution for a given problem in a given context which supports reuse of proven approaches and techniques.

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) Which of the following statements related to State diagrams is/are true?

(a) It shows the life history showing the different states of a given object.
(b) It shows the actions that result from a state change for a given object.
(c) State transitions in a State diagram may have an action and/or a guard condition associate with it.
(d) A State diagram graphically describes who will use the system and in what ways the user expects to interact with the system.
(e) It shows the events or messages that cause a transition from one state to another for a given object.

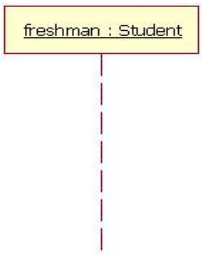
23) Which of the following statements is/are correct with respect to UML diagrams?

(a) Extending use case in a Use Case diagram typically defines optional behaviour that is not necessarily meaningful by itself.
(b) In a state diagram, the behaviour in an activity, entry action, or exit action can include sending an event to some other object.
(c) Functional decomposition is used when applied in use case modeling.
(d) Connection points in UML 2.0 represents points of entry into a state or exit out of state.
(e) The include relationship could be used to simplify large Use Case by splitting it into several use cases and to extract common parts of the behaviors of two or more use cases.

24) Consider the following statements with respect to UML Sequence diagrams.

(i) They are the most common kind of interaction diagram, which focuses on the message interchange between a number of lifelines of objects.

(ii)



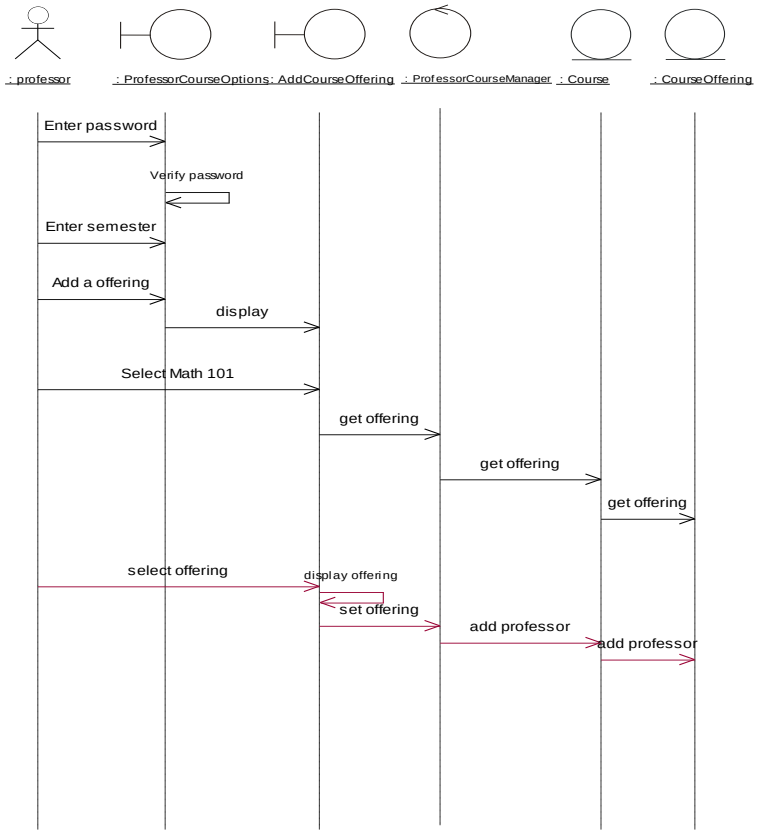
Above is an example of a Student class used in a lifeline whose instance name is freshman.

(iii) When modelling a sequence diagram, there will be times when an object will need to send a message to itself.

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 fraction drawn for a University Registration System.



Which of the following statements is/are correct?

(a) Display will be a method belonging to the ProfessorCourseOption.
(b) It is a sequence diagram.
(c) *Professor* is the actor responsible for the scenario.
(d) *getoffering* is the only operation belonging to the *Course* class in the problem domain.
(e) *ProfessorCourseManager is a control class*.

26) Consider the following statements related to *Activity* diagrams?

(i) They are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency.
(ii) Swim lanes may be used to partition an Activity diagram which allows the diagrams to expand and show who has the responsibility for each activity in a process.
(iii) Activities that happen in parallel can be shown using swim lanes.

Which of the 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

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

(a) The focus of control in a *Sequence* diagram is a small rectangle that will let one know which object has control at a particular point in time.
(b) *Activity* diagrams are useful for communicating logic to programmers, however is not recommended to use them to communicate logic to non technical users.
(c) In a *State* diagram, an event is an occurrence of a stimulus which can trigger a state transition.
(d) A *State* diagram provides a variety of symbols to model the changes which more than one object go through.
(e) A *Communication* diagram loses its sequencing information, if you do not have message numbering.

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

(i) A Composite Structure diagram explores the internal organization of classes and it can be used to explicitly describe a class as a composition of other classes.
(ii) Component diagrams allow modelers to provide a simplified, high-order view of a large system which shows how the components are composed and how they interact in the system.
(iii) 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.

Which of the above statements is/are correct?

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

29) Consider the following statements related to Model Driven Engineering (MDE).

(i) It is an approach to software development where models are the principal outputs of the development process.

(ii) Model-driven architecture method recommends that three types of abstract system models should be produced, namely Computational Independent Model(CIM), A Platform Independent Model(PIM) and Platform Specific Model(PSM).

(iii) Several tools are available for translation from CIMs to common platforms such as Java and J2EE.

Which of them is/are True?

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

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

(a) A platform independent model (PIM) can be usually described using UML models.
(b) A Computation independent model (CIM) models the important domain abstractions used in the system and they are sometimes called domain models.
(c) State model is a key model type used in xUML
(d) Action language in xUML is like a very high-level programming language where you can refer to objects and their attributes and specify actions to be carried out.
(e) PSM models the operations of the system without reference to its implementation.

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