UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)
Academic Year 2018 – 2nd Year Examination – Semester 3

IT3105: Object Oriented Analysis and Design
Part 1- Multiple Choice Question Paper

12th May 2018

(ONE HOUR)

Important Instructions :

- The duration of the paper is one (1) 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 (*All the incorrect choices are marked & no correct choices are marked*) 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.**
- Calculators are not allowed.

1) Which of the following statements is/are correct regarding Object Oriented Analysis and Design (OOAD)?

(a) Objects are the building blocks of object oriented software.
(b) Design patterns can be used to improve the flexibility and functionality of an OOAD application.
(c) Among different types of objects, control objects bridge the gap between a system and its users.
(d) Objects are the units of data abstraction in an object oriented program.
(e) OOAD facilitates reuse in software development.

2) Which of the following statements is/are correct regarding principles of OOAD?

(a) Polymorphism means one class "has a" or "contains" other component classe(s).
(b) Inheritance shows optionality among classes at the same level of the structure.
(c) Encapsulation helps building flexible applications by breaking down the application into parts.
(d) Abstraction specifies that an operation can have the same name in different classes, and each class will perform the operation in a different way.
(e) Objects communicate with one another by passing messages between them.

3) Which of the following statements is/are correct regarding use case diagrams?

(a) A use case diagram models the system from a user's point of view.
(b) A use case is a technique for capturing the potential requirements of a new system or software change.
(c) Each use case provides a scenario that conveys how the user interacts with the system.
(d) An accounting system cannot be an actor in a library management system.
(e) A use case diagram presents a static view of the system.

4) Which of the following UML diagrams is/are appropriate in explaining scenarios?

(a) Class diagram
(b) Use case diagram
(c) Deployment diagram
(d) Component diagram
(e) State diagram

5) Which of the following UML diagrams is/are appropriate in modelling the static view of the system?

(a) Activity
(b) State
(c) Communication
(d) Sequence
(e) Class

6) Consider the following requirement in a Course registration system.

A course is a prerequisite for another course to be taken by a student

What is/are the most suitable method(s) to model the above requirement in a class diagram?

(a) Inheritance relationship
(b) Reflexive association
(c) Aggregation relationship
(d) Abstract class
(e) Association class

7) The relationship between 'Student' and 'Course' classes in a Course Registration system is modelled as given below.

If there is a requirement to record all the grades obtained by students on all the subjects they take. which of the following options provide the correct solution(s)?

i. Add 'Grade' attribute to the 'Student' class
ii. Add 'Grade' attribute to the 'Course' class.
iii. Define an Association class as 'Grade'
iv. Add a method Grade() to 'Course' class.

(a) (iii) only.	(b) (iv) only.	(c) (i) and (iii) only.
(d) (ii) and (iii) only.	(e) (i), (ii) and (iii) only.	

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

(a) UML stands for Universal Multitasking Language.
(b) UML comes with a wide variety of tools for building models and generating code.
(c) It is one of the best known methodologies for software development.
(d) UML is associated with Object Constraint Language (OCL).
(e) It is the standard graphical language for modelling object oriented software.

9) Identify correct statement/s with regard to state diagrams.

(a) State diagrams model specific instances of classes at specific instants in time.
(b) It is a way of expressing dynamic and static information about a system.
(c) Focuses on the state changes of one object.
(d) State transition can occur in response to a trigger event that can cause an action.
(e) States are represented by arrows and transitions are represented by rounded rectangles.

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

(a) RUP is a suitable process model for developing all types of software projects.
(b) Use of graphical UML models to present static and dynamic views of the software is one of the six best practices in RUP
(c) RUP consists of a sequence of four phases, namely problem definition, Analysis, Design and Construction.
(d) RUP presents the static and dynamic perspectives of the process.
(e) Phases of the RUP are more technical compared to other process models.

11) Consider the following scenario.

The message *read()* is sent to an object, which responds by displaying certain data.

Which of the following terms best describes this behavior?

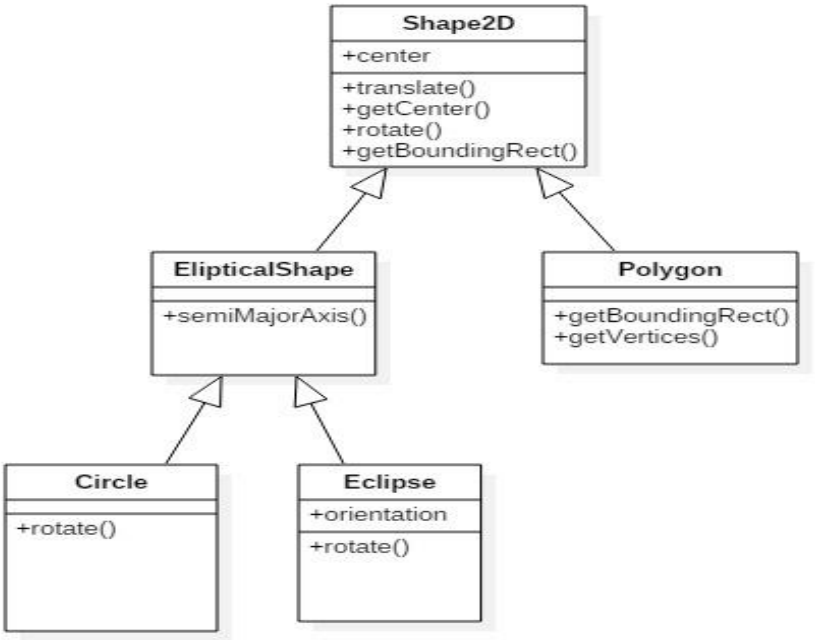
(a) Inheritance	(b) Composition	(c) Encapsulation
(d) Polymorphism	(e) Aggregation	

12) Match the terms in Column X with the most appropriate statement(s) from Column Y.

Column X	Column Y
i. Spiral model	A. Specification, development and validation are interleaved. May be plan-driven or agile.
ii. Waterfall model	B. The system is assembled from existing components. May be plan-driven or agile.
iii. Incremental model	C. Plan-driven model. Separate and distinct phases of specification and development.
iv. Reuse oriented model	D. Risks are explicitly assessed and resolved throughout the process.
v. Agile model	E. Rapid development, frequent releases of the software, reducing process overheads and producing high-quality code.

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

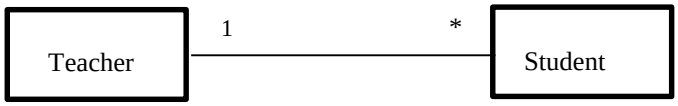
13) Consider the following diagram.



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

(a) All the operations in Shape2D class are inherited by the other four classes.
(b) The rotate operation in class Shape2D is an abstract operation.
(c) Defining the rotate operation in Circle and Eclipse classes is incorrect.
(d) Class Circle does not have any attributes.
(e) Orientation is an attribute relevant only to the Eclipse class.

14) Consider the following.



Select correct statement(s) regarding the above diagram.

(a) A teacher teaches only one student.
(b) A student has only one teacher.
(c) There can be a teacher who teaches zero students.
(d) A teacher may teach many students.
(e) There can be students without a teacher.

15) Consider the following statements on Dependency diagrams.

i. The most common usage of a dependency diagram is to show that a signature in the operation of one class uses another class.
ii. A dependency is depicted as a dashed line joining the two classes with an arrow head pointing to the depended-on class.
iii. Dependency relationships can be shown in use case diagrams.

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

(a) (i) only. (b) (ii) only. (c) (iii) only.
(d) (i) and (ii) only. (e) (i), (ii) and (iii) only.

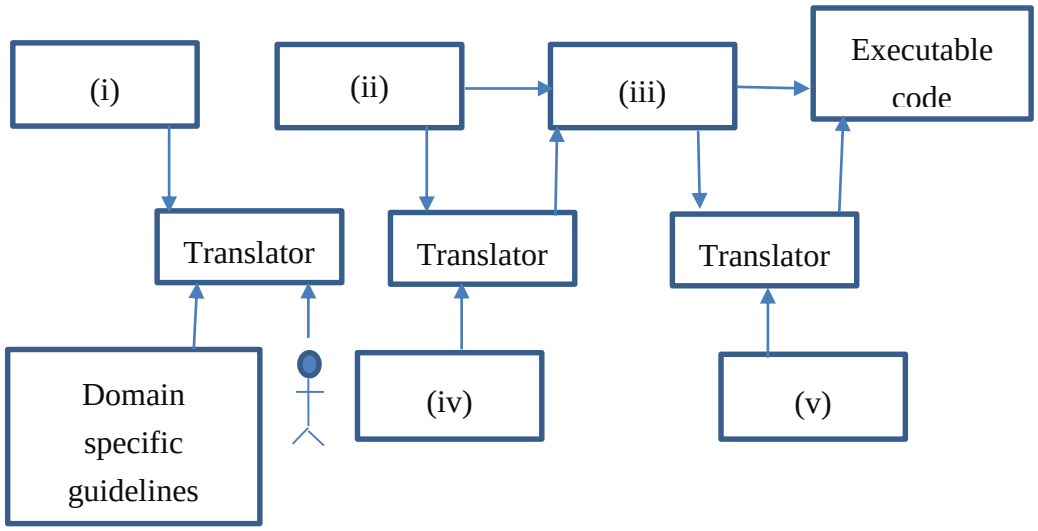
16) Consider the following statements regarding UML 2.0.

i. A timing diagram is a specific type of interaction diagram that explores the behavior of an object over a specific time period.
ii. A composite structure diagram is a type of static structure diagram that shows the internal structure of a package.
iii. An interaction overview diagram is similar to an activity diagram, but each individual activity can contain a nested interaction diagram.

Identify the correct statement(s) from the above.

(a) (i) only. (b) (i) and (ii) only. (c) (i) and (iii) only.
(d) (ii) and (iii) only. (e) (i), (ii) and (iii).

17) The following figure illustrates the Model Driven Architecture (MDA).



Identify the suitable phrases to fill those numbered (i) to (iv) in the diagram from the list given below.

A. Platform Specific Model
B. Computation Independent Model
C. Platform Specific Patterns and Rules
D. Language Specific Patterns
E. Platform Independent Model

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

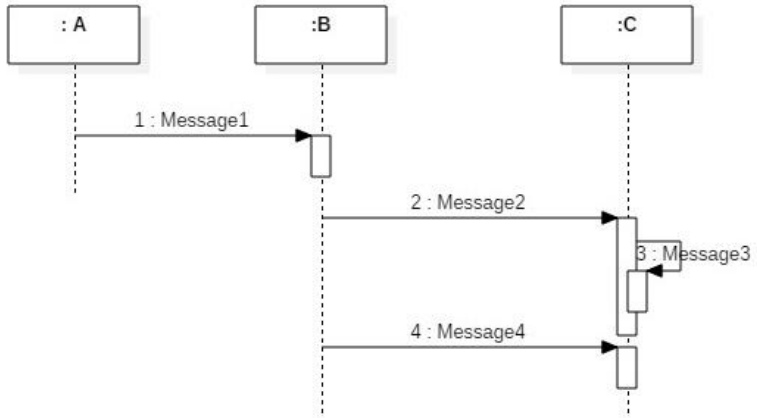
18) Which of the following statements is/are correct regarding Deployment and Component diagrams?

(a) A component diagram represents the software components.
(b) A component diagram does not show the interfaces and relationships between the components.
(c) A deployment diagram describes the hardware where various instances of components reside at run time.
(d) The nodes in a Deployment diagram represent hardware and links between nodes show how the communication takes place.
(e) Both Deployment diagrams and Component diagrams are useful in architectural modelling.

19) Activity diagrams,

(a) are similar to flow charts.
(b) can represent concurrent activities.
(c) do not show the order of activities.
(d) can supplement the description of class diagrams.
(e) can represent the logic involved in a process.

20) Consider the following diagram and the statements made with regard to it below.



i. The diagram is a type of interaction diagram.
ii. Message2 and Message4 are operations of class B.
iii. Message3 is an operation of class B.
iv. Message4 is sent before Message3.

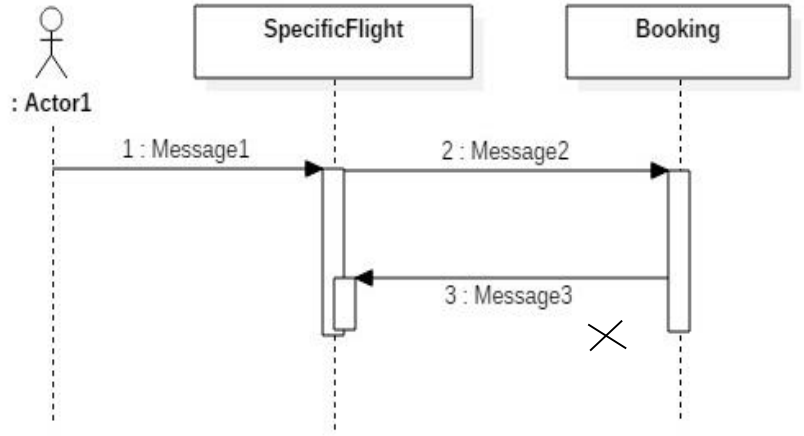
Which of the statements is/are correct regarding the diagram?

(a) (i) only.	(b) (i) and (ii) only.	(c) (i) and (iv) only.
(d) (ii) and (iv) only.	(e) (i), (ii) and (iv) only.	

21) Sequence diagrams,

(a) can be used to model the interactions in a domain defined by the class diagram.
(b) used for modelling the scenarios of a use case.
(c) are useful in identifying the operations that have to be included in each class.
(d) use vertical dimension to represent time with messages drawn horizontally in the order they are sent.
(e) can model object creation and deletion of an interaction.

22) Consider the following diagram.

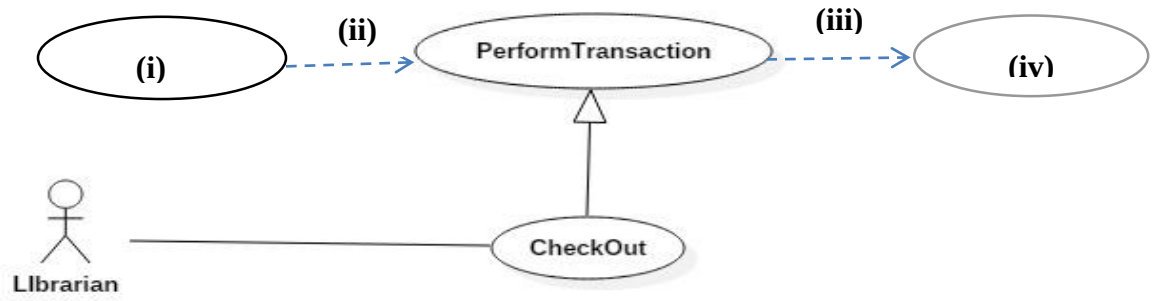


Identify the correct statement(s) related to above diagram?

i. The use case modelled is " Cancellation of a Booking"
ii. It is drawn for a scenario when a booking is requested for a fully booked flight.
iii. It illustrates the destruction of a Booking.
iv. It shows a synchronous message being passed from SpecificFlight object to Booking object.

(a) (i) only.	(b) (i) and (ii) only.	(c) (i) and (iii) only.
(d) (i), (iii) and (iv) only.	(e) (ii), (iii) and (iv).	

23) Consider the following use case diagram.



Identify the suitable phrases to fill the blanks in the diagram from the list given below.

A- Check Account Balance
B- Pay overdue
C- Extend
D- Include

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

24) Which of the following can be shown using a sequence diagram?

(a) Recursion	(b) Repetition
(c) Optional behavior	(d) Condition
(e) Message passing	

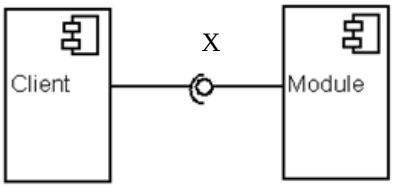
25) Consider the following statements related to Sequence and Communication diagrams.

i. A sequence diagram clarifies the relationships among the objects while Communication diagram shows the sequence of interactions among objects.
ii. Communication diagram is another way of presenting the information in a sequence diagram.
iii. Sequence diagram is organized according to time and the Communication diagram is organized according to the links among the objects.

Which of the above statements is/are true?

(a) (i) only.	(b) (ii) only.	(c) (ii) and (iii) only.
(d) (i), and (ii) only.	(e) (i) and (iii) only.	

26) Consider the following diagram in UML 2.0.



What can X be in the above diagram?

(a) Event	(b) Interface	(c) Property
(d) Association	(e) Class	

27) Identify the classes that can be there in a 'Student registration system' from among the following.

(a) Year	(b) Kamal Jayakody
(c) Chess	(d) Computer Science Student
(e) course	

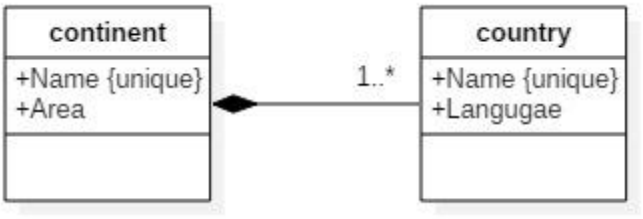
28) Consider the following scenario.

A banking application has several different types of accounts. In some types of accounts, interest is computed as a percentage of the average daily balance during a month. In other types of accounts, interest is computed as a percentage of the minimum daily balance during a month. In a mortgage account, interest is computed as a percentage of the balance at the end of the month.

What is/are the most appropriate method(s) to model the above scenario?

(a) Polymorphism	(b) Inheritance	(c) Aggregation
(d) Composition	(e) Association	

Questions 29-30 are based on the following UML model.



29) Which of the following statements is/are true regarding the above model?

(a) A continent may have no countries.
(b) If a continent is removed countries, belong to that continent will also be removed.
(c) There can be a country with two languages.
(d) Two continents can have the same area.
(e) A country can be in many continents.

30) Which of the following object oriented concepts best describe the relationship in the above model?

(a) Polymorphism	(b) Inheritance	(c) Aggregation
(d) Composition	(e) Association	

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