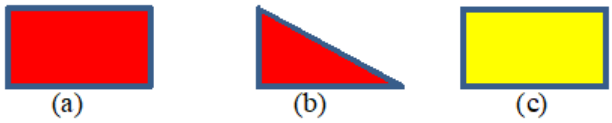
Object Oriented Analysis and Design: Assignment 4

Total Marks : 20

August 12, 2022

Question 1

Consider three objects as shown in the following figure.



In which of the following ways, the objects in the figures cannot be classified into exactly 2 classes?

Marks: 2 **MCQ**

a) Based on colour.

b) Based on colour and shape.

c) Based on the perimeter.

d) Based on area.

Answer: b)
Explanation: The three objects have two colours. The areas of the rectangles are the same but that of the triangle is less. The perimeters of the rectangles are the same but that of the triangle is less. Thus, (a), (c), and (d) are incorrect options.
The first object is rectangle and red. The second object is triangle and red. The third object is rectangle and yellow. So, based on shape and colour, the objects can be classified into 3 classes.
Hence, (b) is the desired option.

Question 2

Suppose that a customer using an ATM speaks in terms of accounts, deposits, and withdrawals; But a developer of such a system introduces new words such as databases, screen managers, lists, and queues.
Given the above description, identify the number of key abstractions identified through discovery and the number of key abstractions identified through invention.

Marks: 2 **MCQ**

a) 4, 3

b) 3, 4

c) 4, 5

d) 5, 4

Answer: d)
Explanation: The identification of key abstraction involves discovery (client's perspective) and invention (developer's perspective).
Customer, ATM, accounts, deposits, and withdrawals are the words obtained from the problem domain (discovery).
databases, screen managers, lists, and queues are the words obtained from the developer's domain (invention). Hence, option (d) is correct.

Question 3

Consider the pictorial representation of different shapes and their contents (a-f) :

The following concepts are stated:
The objects are classified into the following classes/ clusters:
Classification 1 [a], Classification 2 [b], Classification 3 [c, e], Classification 4 [d], Classification 5 [f]
Which of the following properties is (are) used for this classification? *Marks: 2* **MCQ**

a) `Shape` and `Size`

b) `Content` only.

c) `Size`, `Content`.

d) `Shape, Content`.

Answer: d)
Explanation: The following table shows the clustering based on the different properties

Classification	`Shape`, `Size`	`Content`	`Size, Content`	`Shape, Content`
1	Rectangle - Big (a)	Bomb (a)	Bomb, Big	Rectangle, Bomb (a)
2	Triangle (b)	Flower (b, f)	Flower, Smallest (b)	Triangle, flower (b)
3	Rectangle - small (c, f)	Bomb , Flower (c, e)	Flower, bomb small (c)	Rectangle, Bomb, Flower (c, e)
4	Circle (d)	Sack (d)	Flower, Bomb, Medium (e)	Circle, sack (d)
5	Rectangle - Medium (e)	Sack, standard (d)		Rectangle, Flower (f)
6		Flower, Small (f)		

Hence, option (d) is correct.

Question 4

From the given specification of a grocery store management system, the following nouns are identified: `Item, Vendor, Purchased quantity, Remaining quantity, Customer, Customer name, Date of supply, Price, Cost`.
Which of these nouns can be considered as attributes of some class in the library management system? *Marks: 2* **MCQ**

a) `Item`.

b) `Vendor`.

c) `Customer Name`.

d) `Customer`.

Answer: c)
Explanation: Nouns with single value can be considered as attributes. Refer to module 17, slide 11. Hence, option (c) is correct.

Answer questions 5 to 10 based on the following description.

Consider the following specification on `BugTracker`:
Clients report bugs of software products developed by ABC using a `BugTracker`. Each client has a name and a unique id and will be allowed to create and follow all bugs in `BugTracker` for the product(s) purchased. A bug has a unique id, an id of the software product for which the bug has been reported, a description of the bug, and the status of the bug. Once reported, the initial state of the bug is new. When a bug is reported, a tester first checks whether the bug can be recreated. If the bug can be recreated, the bug becomes open and a manager is assigned the bug. The manager sets a deadline for fixing the bug and in turn assigns the bug to a developer or himself (or herself) who fixes the bug. The developer also adds new test cases which tests the new bug reported by the client. Further, the developer tests the modified code with the newly added test cases. Once, the bug is fixed, its status changes to fixed.The developer fixes the assigned bug and informs the manager about the change in the code. The manager then asks the tester to test the modified code with all test cases including the new test cases developed for the bug. If the new code passes the regression test, the manager informs the client to upgrade to the new version of the software systems. Once the client confirms that the bug has been fixed, the bug is said to be closed.
Only a developer may get promoted to a manager after successfully completing a number of years and after being recommended by the competent authority.

Question 5

Which of the following is not a class in `BugTracker`? *Marks: 2* **MCQ**

a) `Developer`

b) `Create`

c) `Manager`

d) `Bug`

Answer: b)
Explanation: From the identification of nouns, it can be seen that `Client, Product, Tester, Developer, Bug` can be the classes but not `Create`, as it is a verb. Hence, option (b) is correct.

Question 6

Which of the following hierarchies hold in `BugTracker`? *Marks: 2* **MCQ**

a) `Developer IS A Tester`

b) `Developer IS A Client`

c) `Tester IS A Developer`

d) `Manager IS A Developer`

Answer: d)
Explanation: From the given specification, it can be seen that a `manager` must work as a developer or tester first. Hence, each `Manager` will inherit the attributes and responsibilities of a `Developer` and have additional roles like assigning bugs and sending notification to the clients.

Question 7

Identify the common attribute (may have different values) between `Client` and `Bug`?

Marks: 2 **MCQ**

a) `Id`

b) `Name`

c) `Description`

d) `Open`

Answer: a)
Explanation: The specification mentions that `Id` is associated to both the classes `Client` and `Bug`.

Question 8

Identify the complete set of attributes in the class `Bug`. *Marks: 2* **MCQ**

a) {`Id, Product Name, Description`}

b) {`Id, Product Name, Description, Status`}

c) {`Id, Product Name, Description, Open, Close`}

d) {`Id, Product Name, Description, New, Open, Fixed, Close`}

Answer: b)
Explanation: `New, Open, Fixed, Close` are values of the attribute `status` and hence, cannot be attributes themselves. Hence, option (b) is correct.

Question 9

Which of the following is not a responsibility of a `Developer` according to the specification?

Marks: 2 **MSQ**

a) Fixing bugs.

b) Creating test cases.

c) Assigning bugs

d) Running regression tests.

Answer: c), d)
Explanation: Assigning bugs is the responsibility of the `tester` and the `manager`. Running regression tests is the responsibility of the `tester`.

Question 10

Consider the following statements:

S1: `Manager` is a collaborator of `Developer`.
S2: Fixing a bug is a responsibility of a `Developer` but not that of a `Manager`.

Which of the following options is true? *Marks: 2* **MCQ**

a) S1 is true but S2 is false.

b) S1 is false but S2 is true.

c) Both S1 and S2 are true.

d) Both S1 and S2 are false.

Answer: a)
Explanation: S1 is true from the given specification. S2 is false because `Manager` is a specialization of `Developer` and inherits all its responsibilities.