

Software Design Exam 2021

Q1

Which of the following statements is **TRUE**?

- An abstract class can have relationships with other classes.
- An abstract class has no relationships with other classes.
- An abstract class can be instantiated.
- An abstract class has no attributes.

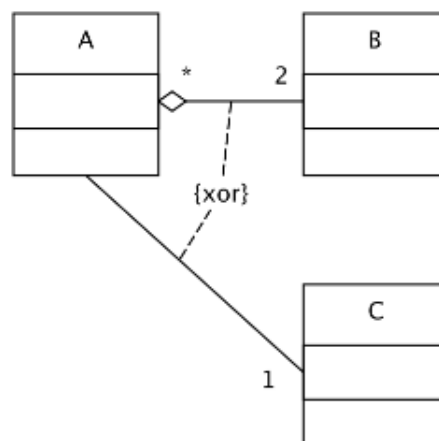
Q2

Which of the following statements about naming variables in your code is **TRUE**?

- When using a temporary variable, a good practice is to always name it "temp".
- Variable names should convey as much information as possible.
- Variable names should be as long as possible.
- Variable names should be as short as possible.

Q3

Given the following fragment of class diagram, which of the following statements is **TRUE**?



- One object of B may be associated with multiple objects of A.
- One object of A may contain only two or more objects of B.
- If an instance of A is deleted, all contained instances of B are deleted as well.
- One object of A is associated with exactly one object of C and two objects of B.

Q4

Which of the following statements about state machine diagrams are FALSE?

- A state machine can have zero or more final states.
- Events trigger transitions.
- The initial state can have any number of incoming transitions.
- A guard condition is only evaluated when the corresponding event occurs.

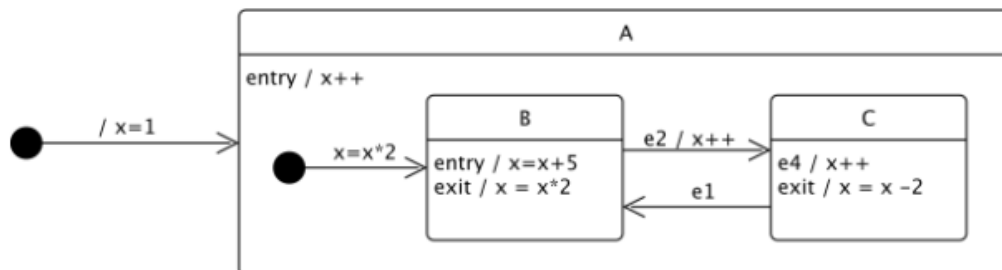
Q5

Which of the following statements about the loop fragment of UML sequence diagrams is TRUE?

- The loop fragment has more than one operand.
- If you model a loop loop(8) with the condition $[x \leq 10]$, the loop is executed exactly 8 times, independently of the condition.
- If the minimum and maximum number of iterations are not specified, the default value is (1, *) where * denotes an infinite number of iterations.
- Both the minimum and maximum number of iterations must be always defined.

Q6

Given the following state machine diagram, what is the value of x after the occurrence of the event chain e2, e4, e1, e3, e2?



- 21
- 49
- 65
- 48

Q7

Which of the following statements about complexity is TRUE?

- It is more important for a module to have a simple implementation than a simple interface.
- It is more important for a module to have a simple interface than a simple implementation.
- It is a good practice to have the same piece of code appearing in many parts of your system.
- One method should perform as many tasks as possible.

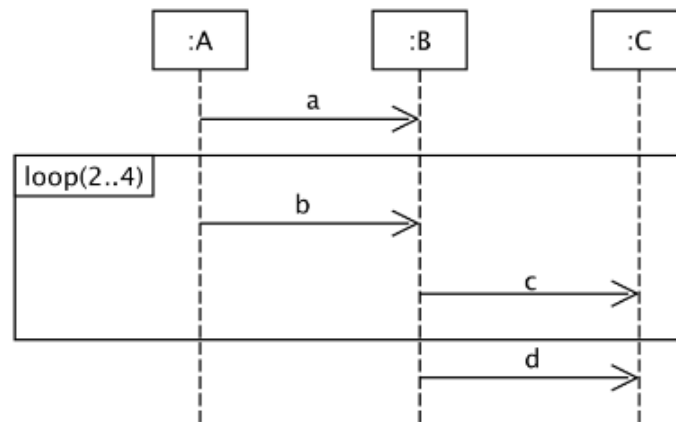
Q8

Which of the following statements about the UML generalization relationship is TRUE?

- A generalization relationship does not represent the fact that instances of a class are special types of instances of another class.
- A generalization relationship may have navigable, non-navigable, and partially navigable directions.
- A generalization relationship does not have multiplicities and visibility.
- A generalization relationship may be identified by a unique association name.

Q9

Given the following sequence diagram, which of the four traces below is possible?



- $a \rightarrow b \rightarrow c$
- $a \rightarrow b \rightarrow c \rightarrow b \rightarrow c \rightarrow b \rightarrow c \rightarrow b \rightarrow c$
- $a \rightarrow b \rightarrow c \rightarrow b \rightarrow c \rightarrow b \rightarrow d$
- $a \rightarrow b \rightarrow c \rightarrow b \rightarrow c \rightarrow b \rightarrow c \rightarrow d$

Q10

Which of the following statements about compositions (composite aggregations, represented as black diamonds in diagrams) is FALSE?

- The composite aggregation can be used in object diagrams.
- In a composition, a part may belong to one and only one composite at a time.
- The composite aggregation is not a commutative relationship.
- When the composite element is deleted, the parts are deleted too.

Q11

Can you give a brief definition of UML sequence diagrams and which aspects of the system they can represent?

Q12

What are the main principles of the Observer design pattern?