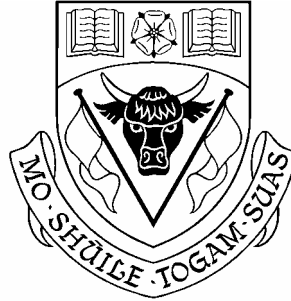


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SENG 609.23 (answers)
7/4/2003



University of Calgary
Department of Electrical and Computer Engineering

SENG 609.23: Object Oriented Analysis and Design
Behrouz Homayoun Far

Evaluation Test (7/4/2003)
19:45 – 20:30 PM

Answers

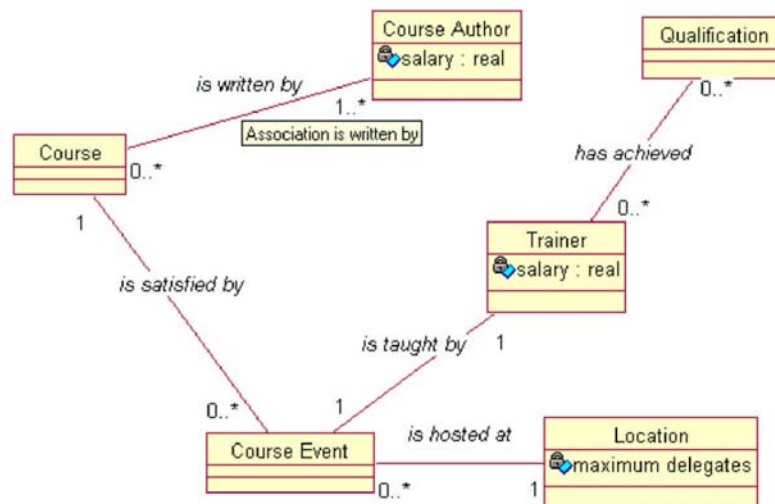
Instructions:

1. This booklet has 7 pages including this cover page.
2. The examination is closed-book.
3. Please write your name and student ID number on all pages of this booklet. Pages with no name or ID number will not be marked.
4. The maximum mark in this exam is 20. There are 20 questions and each count for 1 point of the total mark allocated to this exam.
5. There are no selective questions. Please answer all questions.
6. Please write your answers on the same sheet below each question. You may use both front and back sides of the sheets. If you need extra sheets please ask the supervisor for help.
7. Absence or failing to hand in this booklet will be treated as zero mark.

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SENG 609.23 (answers)
7/4/2003

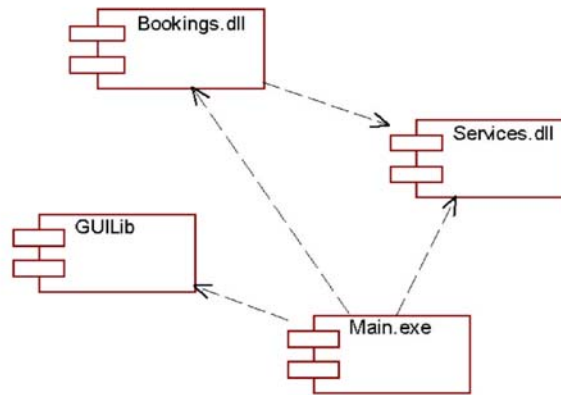
1. In the **(waterfall)** model for software development each stage must be complete before the next stage can commence.
2. In the **(Incremental or spiral)** model for software development the project is split in a series of short lifecycles, each one ending with a release of executable software.
3. In the **(RUP)** model for software development the project is divided into four major phases: Inception; Elaboration; Construction and Transition.
4. The UML is a language for ...
 - a. **Visualizing, specifying, constructing, documenting the artefacts of a software system**
 - b. Visualizing, modeling, constructing, documenting the artefacts of a software system
 - c. Visualizing, documenting, modeling, encapsulating the artefacts of a software system
 - d. Visualizing, modeling, constructing, encapsulating the artefacts of a software system
5. What is the name of the following UML diagram? **Class diagram**



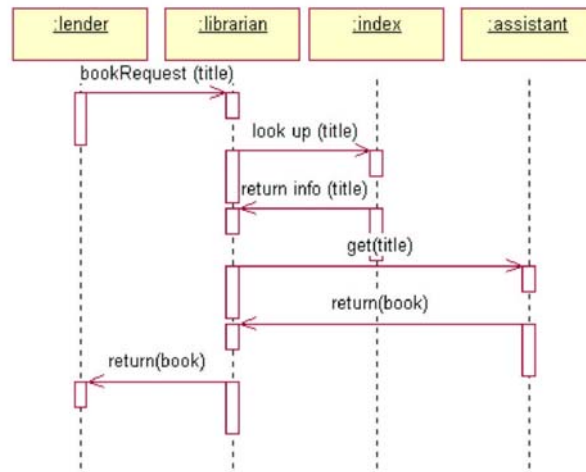
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e-mail:

SENG 609.23 (answers)
7/4/2003

6. What is the name of the following UML diagram? **Component diagram**



7. What is the name of the following UML diagram? **Sequence diagram**



8. A class inherits its parent's ...

- a. Attributes, links
- b. Operations
- c. Attributes, operations, relationships**
- d. Relationships, operations, links

9. If you wanted to organize elements into reusable groups with full information hiding you would use which one of the following UML constructs?

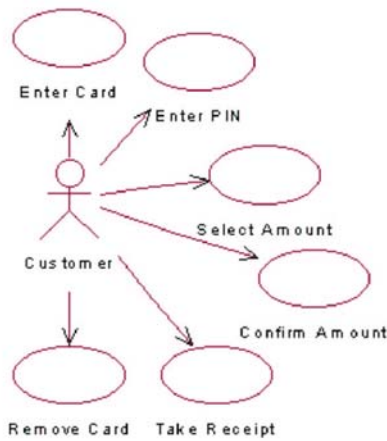
- a. Package
- b. Class
- c. Class and interface
- d. Subsystem or Component**

Name:
 Student ID no.:
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10. Let's consider a case of building an ATM system to allow a user to withdraw money. We might have the following series of common interactions in this scenario:

- enter card
- enter pin number
- select amount required
- confirm amount required
- remove card
- take receipt

Should each of these steps -- for example, "enter pin number" be a use case? Such as what is shown in the following diagram?



No.

The use case should represent a customer's goal rather than actions.

In this case, only one use case withdraw_Money would have been sufficient.

Please answer with Yes or No. If the answer is No please explain in a few words why.

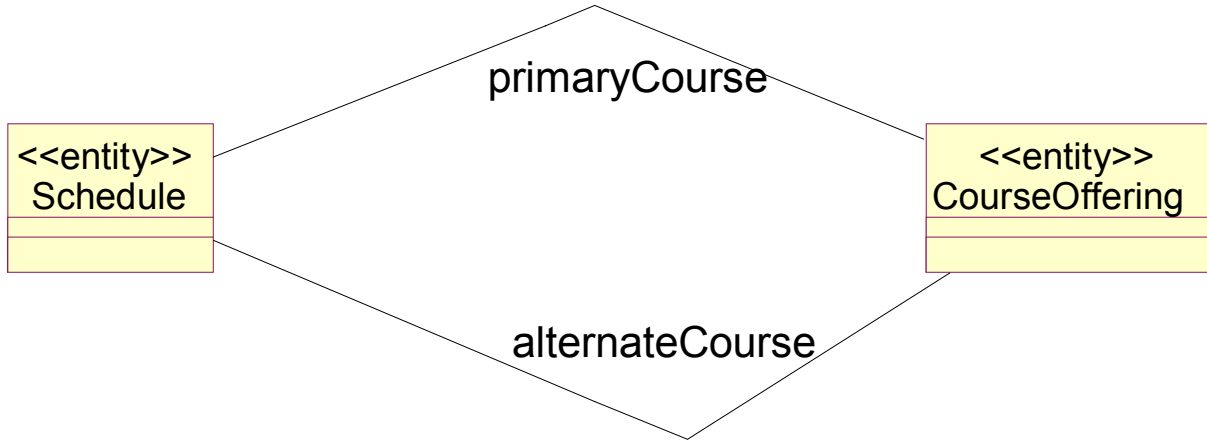
11. Write in front of each diagram below what does each of the multiplicities mean?

Concept A	*	Concept B	Unspecified "many"
Concept A	1..*	Concept B	One or More
Concept A	1..8	Concept B	One to Eight
Concept A	18	Concept B	Exactly Eighteen
Concept A	1,3,5,7,11,13	Concept B	Specified set

Name:
Student ID no.:
e-mail:

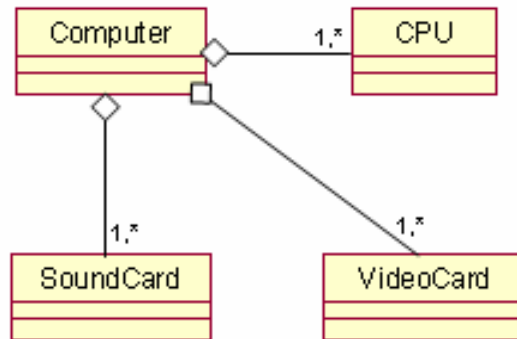
SENG 609.23 (answers)
7/4/2003

12. Explain in a few words whether the following UML class diagram is correct or not.



Incorrect: classes are not allowed to have multiple associations unless defined by different roles.

13. Suppose that a computer is built out of one or more CPUs, sound card and video card. If we model the system with representative classes draw the class diagram (relationship and multiplicity) among the following classes.



Name:
Student ID no.:
e-mail:

SENG 609.23 (answers)
7/4/2003

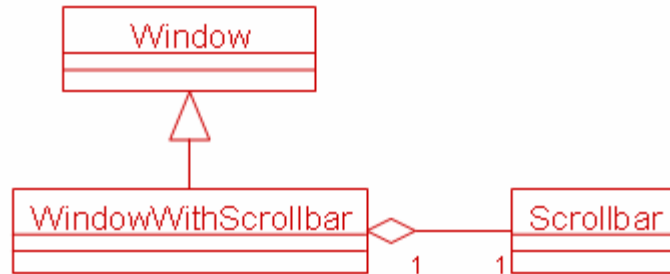
14. Explain in a few words the differences between analysis, design, and implementation mechanisms.

An analysis mechanism is a pattern that constitutes a common solution to a common architectural problem.

A design mechanism is a refinement of a corresponding analysis mechanism. It adds concrete detail to the conceptual analysis mechanism.

An implementation mechanism is a refinement of a corresponding design mechanism using a particular programming language or implementation technology.

15. For the 3 classes shown below, suppose that the **WindowWithScrollbar** class is a window having a scrollbar. Draw the class diagram (relationship and multiplicity) among the following representative classes.



16. Which statements are incorrect (false)? (multiple false statements are possible)
- Only public classes can be referenced outside of the owning package.
 - Only public classes can be referenced outside of the owning subsystem (component). **(F) classes of a subsystem are invisible**
 - Packages in lower layers can be dependent upon packages in upper layers. **(F) no, the other way is true.**
 - A design mechanism is a refinement of a corresponding analysis mechanism. It adds concrete detail to the conceptual analysis mechanism.

17. Which statements are incorrect (false)? (multiple false statements are possible)
- Dependency relation between two packages (Supplier and Client) indicates that:
- Changes to the Supplier package affect the Client package.
 - Client package can be reused independently. **(F) it cannot**
 - Whenever a change is made to the Supplier package, the Client package must be recompiled and re-tested.
 - Supplier package can be replaced by a subsystem together with its interface. **(F) unless the reference to the internal class is preserved**

Name:
Student ID no.:
e-mail:

SENG 609.23 (answers)
7/4/2003

18. Which statements are incorrect (false)? (multiple false statements are possible)
The purpose of use-case analysis in the analysis phase is:
- a. To identify the classes which perform the flow of events for a use case.
 - b. To distribute the behaviour to associations and responsibilities. **(F) nonsense! How can we distribute behaviour to associations?**
 - c. To identify the responsibilities, attributes and associations of the classes.
 - d. To identify the design and implementation mechanisms. **(F) analysis phase has not the detailed info required for design and implementation**
19. Which statements are incorrect (false)? (multiple false statements are possible)
- a. A boundary class models the interaction between the system's surroundings and its inner workings.
 - b. There should be at least one boundary object for each actor/use-case pair.
 - c. Control class controls and coordinates the attributes and operations of a use case. **(F) nonsense! use case has no attribute or operation.**
 - d. There is at least one control class per use case.
20. For the class diagram shown below, the operation “**move()**” for the Car and Boat classes
- a. are inherited from the Transport class.
 - b. **override the operation move() of the Transport class. (polymorphism)**
 - c. aggregate the operation **move()** of the Transport class.
 - d. generalize the operation **move()** of the Transport class.

