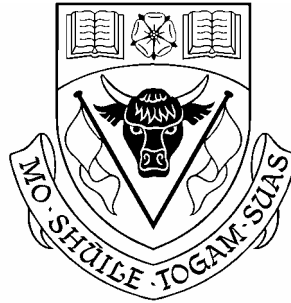


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SENG 609.23  
7/4/2003



**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

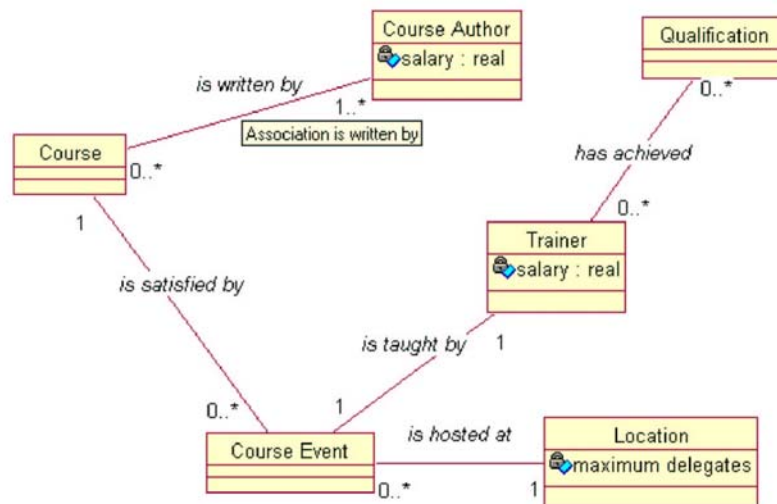
**Instructions:**

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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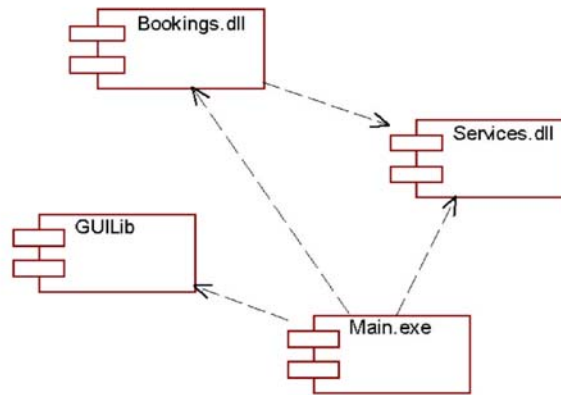
1. In the ..... model for software development each stage must be complete before the next stage can commence.
2. In the ..... model for software development the project is split in a series of short lifecycles, each one ending with a release of executable software.
3. In the .....model for software 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?



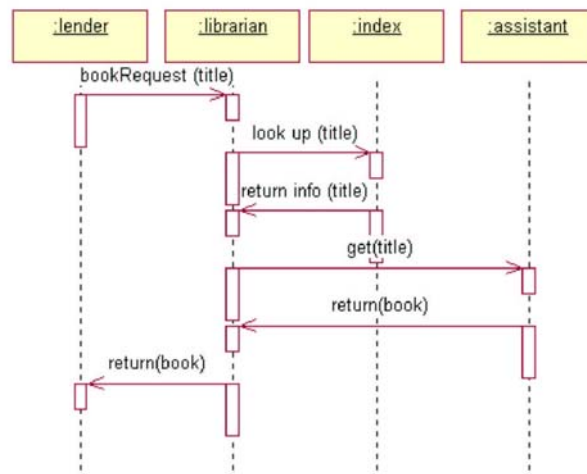
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6. What is the name of the following UML diagram?



7. What is the name of the following UML 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

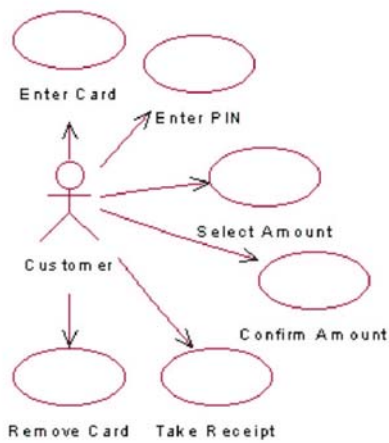
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10. Let's consider a case of building an ATM system to allow a user to withdraw money. We might have the following series of common interactions in this scenario:

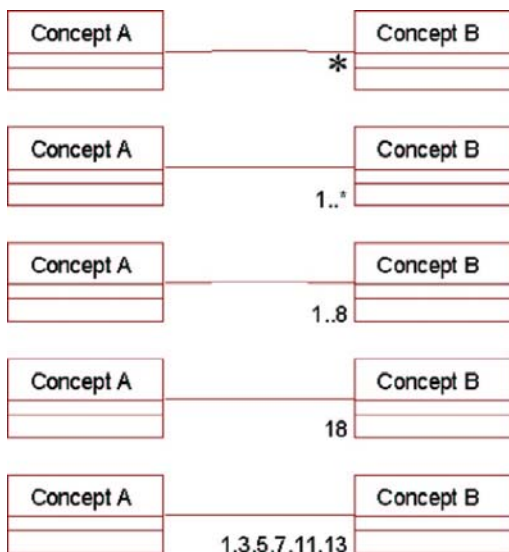
- enter card
- enter pin number
- select amount required
- confirm amount required
- remove card
- take receipt

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



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

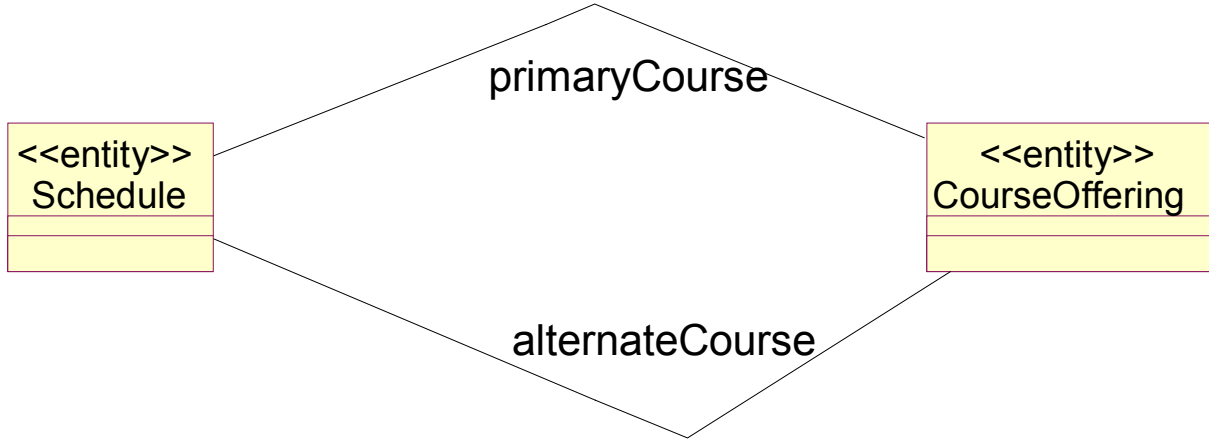
11. Write in front of each diagram below what does each of the multiplicities mean?



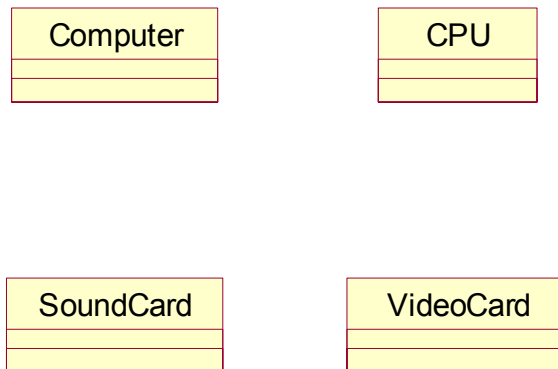
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12. Explain in a few words whether the following UML class diagram is correct or not.



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.

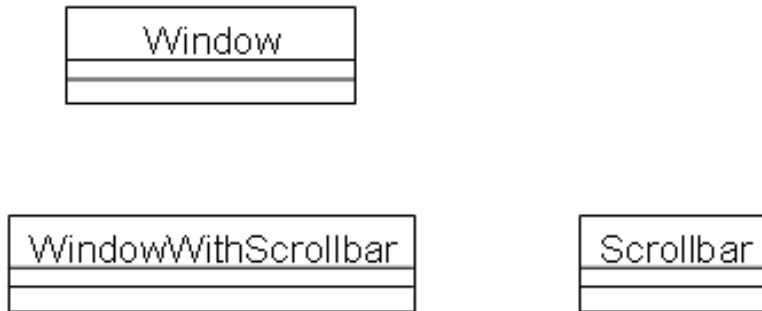


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14. Explain in a few words the differences between analysis, design, and implementation mechanisms.

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).
- Packages in lower layers can be dependent upon packages in upper layers.
- 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.
- 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.

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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.
- c. To identify the responsibilities, attributes and associations of the classes.
- d. To identify the design and implementation mechanisms.

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.
- 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.
- c. aggregate the operation **move()** of the Transport class.
- d. generalize the operation **move()** of the Transport class.

