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THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

FINAL EXAMINATION 2012/2013
BACHELOR OF SOFTWARE ENGINEERING

ECI 6267 Software Architecture

Date: 4th August 2013 **Time: 09:30 – 12:30 hrs**

Answer **only four (4)** *questions:*

1. Please read following excerpt on Software Architecture.

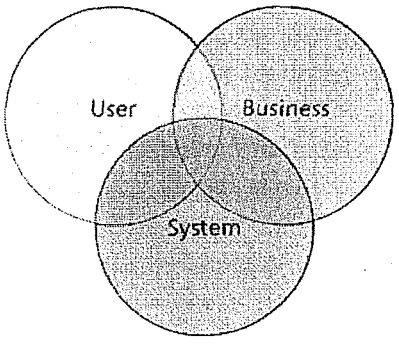
> If a project has not achieved system architecture, including its rationale, the project should not proceed to full-scale system development. Specifying the architecture as a deliverable enables its use throughout the development and maintenance process.
>
> - Barry Boehm [Boehm 95]

(Bass, Len, Paul Clements, and Rick Kazman. *Software Architecture in Practice, 2nd ed.* Addison-Wesley, 2003.)

a.) What are the benefits "Software Architecture" brings to an organization and its engineering team?

[Marks 10]

Systems should be designed with consideration for the user, the system (the IT infrastructure), and the business goals as shown below.



b.) List down list of quality attributes that can be used to measure the quality of a defined "Software Architecture" explaining each attribute briefly.

[Marks 10]

c.) What are the key responsibilities of a Software Architect?

[Marks 05]

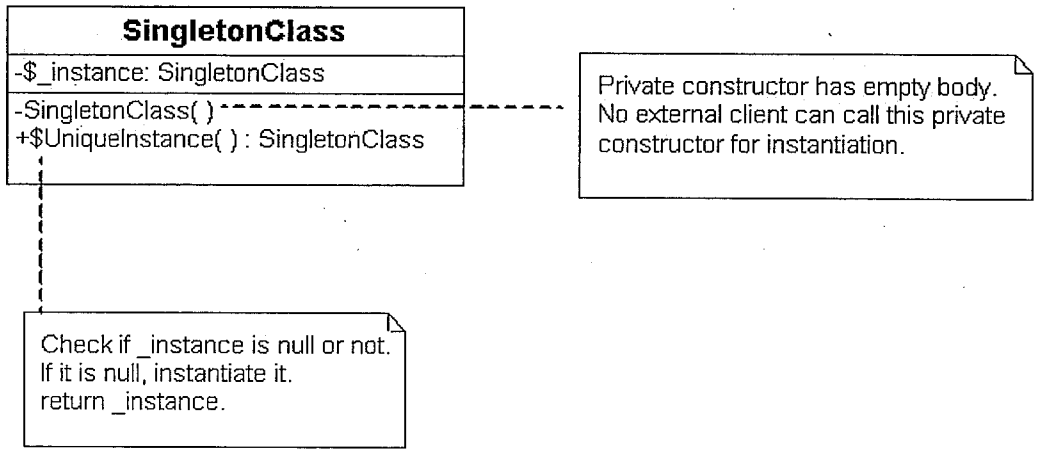
2.

a.) What are the major activities identified under software evolution ?

[Marks 10]

b.) Explain the concepts behind "Lehman's Law of Software Evolution" in detail with examples. **[Marks 15]**

3. Design pattern is a general, reusable, proven solution template to a commonly occurring problem in a given context in software design. It includes both problem and the solution with the rationale that binds them together. Please find a diagram that describe a simple recreational design pattern.



a.) Explain in detail the key benefits brought by adopting software design patterns.

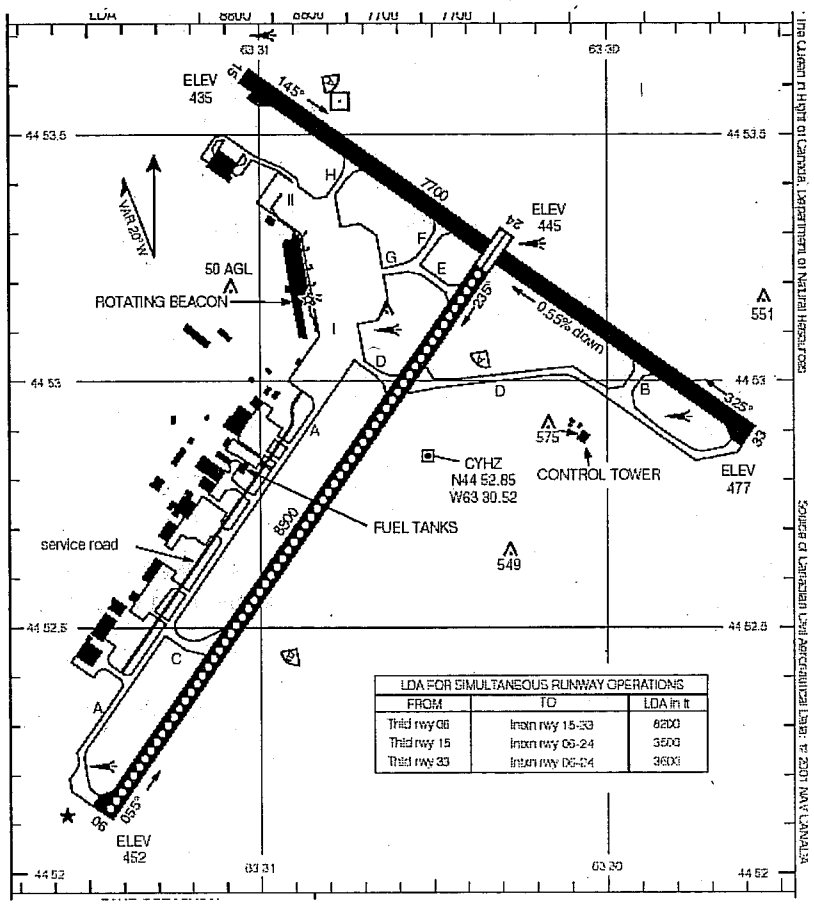
[Marks 05]

b.) What is the name of the design pattern shown on above UML diagram. Briefly explain the problem resolved by above design pattern.

[Marks 10]

c.) "Inappropriate use of design patterns may unnecessarily increase complexity." Explain above statement in detail. **[Marks 10]**

4. Problem Statement :



Above diagram shows a domestic airport runaway. Planes approaching the runaway has to be guided by the control tower using radio signals. Approaching aircraft requests permission to land from the control tower. Control tower needs to guide entire landing procedure when permission granted. Multiple aircrafts may request permission for landing at the same time. As a Software Architect you have been asked to design a software system in order to automate aircraft landing procedure.

a.) Identify main use cases of the problem statement.

[Marks 05]

b.) Draw a UML component diagram that describes the main components of the system and their interactions.

[Marks 05]

c.) What are the key non-functional requirements of the system?

[Marks 05]

d.) How do you measure quality of a software design? Describe in detail.

[Marks 10]

5. A software architecture defines both structure and behavior of a system. Software architecture is commonly organized in views, which are analogous to the different types of blueprints made in building architecture. A view is a representation of a set of system components and relationships among them.

a.) What are the types of architectural views that can be used to visualize a system? Briefly explain. **[Marks 10]**

b.) Explain event-driven architecture providing an real-life exam **[Marks 15]**

6.

a.) Function oriented design is one of design strategies used in software application development. Explain in detail the nature of function oriented design. **[Marks 10]**

b.) Compare function oriented design with object oriented design in detail. **[Marks 15]**