



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 8 Examination in Engineering: December 2015

Module Number: EE8253

Module Name: Principles of software Architecture

[Three Hours]

[Answer all questions, each question carries 10 marks]

Q1 For each question below, there may be one or several correct answers. Underline all correct answers.

a) What is the purpose of SOAP in a web service?

A - A web services takes the help of SOAP to tag the data, format the data.

B - A web service takes the help of SOAP to transfer a message.

C - A web service takes the help of SOAP to describe the availability of service.

D - None of the above.

b) Which of the following is a benefit of Web services being loosely coupled?

A - The web service interface can change over time without compromising the client's ability to interact with the service.

B - Adopting a loosely coupled architecture tends to make software systems more manageable and allows simpler integration between different systems.

C - Both of the above

D - None of the above.

c) Which of the following is an advantage of RESTful web service being stateless?

A - Web services can treat each method request independently.

B - Web services need not to maintain client's previous interactions. It simplifies application design.

C - As HTTP is itself a statelessness protocol, RESTful Web services work seamlessly with HTTP protocol.

D - All of the above.

- d) Which of the following is true about Web Services RPC?
- A - Web services allow clients to invoke procedures, functions, and methods on remote objects using an XML-based protocol.
 - B - Remote procedures expose input and output parameters that a web service must support.
 - C - A web service supports RPC by providing services of its own, equivalent to those of a traditional component, or by translating incoming invocations into an invocation of an EJB or a .NET component.
 - D - All of the above.
- e) Which of the following is true about behavioral characteristics of web services?
- A - Web Services uses XML at data representation and data transportation layers.
 - B - A consumer of a web service is not tied to that web service directly.
 - C - Businesses and the interfaces that they expose should be coarse-grained. Web services technology provides a natural way of defining coarse-grained services that access the right amount of business logic.
 - D - All of the above.
- f) Which of the following pattern is used when we need to decouple an abstraction from its implementation so that the two can vary independently?
- A - Bridge Pattern
 - B - Adapter Pattern
 - C - Prototype Pattern
 - D - Filter Pattern
- g) Which of the following describes the Observer pattern correctly?
- A - This pattern is used to get a way to access the elements of a collection object in sequential manner without any need to know its underlying representation.
 - B - This pattern is used to reduce communication complexity between multiple objects or classes.
 - C - This pattern is used to restore state of an object to a previous state.
 - D - This pattern is used when there is one-to-many relationship between objects such as if one object is modified, its dependent objects are to be notified automatically.

- h) Which of the following pattern is used to separate application's concerns?
- A - Visitor Pattern
 - B - MVC Pattern
 - C - Business Delegate Pattern
 - D - Composite Entity Pattern
- i) Integer class is an example of Decorator pattern.
- A - true
 - B - false
- j) Which of the following describes the Proxy pattern correctly?
- A - In this pattern a class represents functionality of another class.
 - B - This pattern creates a chain of receiver objects for a request.
 - C - This pattern provides a way to evaluate language grammar or expression.
 - D - In this pattern a request is wrapped under an object as command and passed to invoker object.

- Q2 a) What do you mean by Design Patterns? [1 Mark]
- b) Write a Singleton design pattern class with Lazy initialization. What is the issue with this initialization in multi-threaded system? [4 Marks]
- c) Provide suggestion to fix the issue in part b and how do you prevent cloning of a singleton object. [2 Marks]
- d) List down the benefits of using design patterns? [3 Marks]

- Q3 a) What do you mean by the term "Cloud Computing" ? Explain different deployment models of cloud computing. [2.5 Marks]
- b) Describe the different cloud service models and provide an example for each. [2.25 Marks]

c) Describe the characteristics of cloud computing?
[2 Marks]

d) What are the challenges or risks you face with cloud computing?
[1.25 Marks]

e) What is "Multi-tenancy" ? List down the available Multi-tenancy models.
[2 Marks]

Q4 a) What are the characteristic of enterprise application? Provide an example for enterprise and non-enterprise application.
[2.25 Marks]

b) Describe four functional security aspects and how do you implement them?
[2 Marks]

c) Compare Transport Level Security and Message Level Security.
[3 Marks]

d) What are the HTTP methods that you used to implement following operation in ROA.
i. Retrieving the resources
ii. Modifying the resources
iii. Creating new resources
iv. Deleting resources
[1 Mark]

e) What are the main features of REST?
[1.75 Marks]

Q5 a) Explain the term High-Availability, Single Point of Failure and Fault Tolerance.
[1.5 Marks]

b) What do you mean by "Sticky Session" and why it is important in load balancing?
[1 Mark]

c) What is a Cluster? What are the main characteristics of a cluster?
[1.5 Marks]

d) List down few decision criteria that you consider when design a high availability system.
[2 Marks]

e) Briefly explain key principles of business driven development.
[4 Marks]