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

FINAL EXAMINATION 2010/2011
BACHELOR OF SOFTWARE ENGINEERING

ECI 6267 Software Architecture

Date: 12th March 2011 **Time: 9.30 – 12.30 hrs**

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

1. On 22 February 2011, a powerful 6.3 magnitude quake hit the Christchurch city of New Zealand. New Zealand lies on the 'Ring of Fire', a seismically active area which circles the Pacific Ocean. This zone sees a large number of earthquakes and volcanoes every year. This earth quake was an eye opener to New Zealand government and they are putting up a stronger and integrated disaster management initiative. A comprehensive early warning system is being designed as one component of this plan. NZ government legislature put up single line "Every individual/institution needs to early warned about natural disaster(s) on quickest route, with appropriate latency, with most appropriate details and instructions to mitigate/escape in his/her own language." as the high level requirement. Assuming you are the enterprise Architect for this application answer following questions.

a.) What are the roles, responsibilities and scope of the "Enterprise Architect" of this system ?
[Marks 5]

b.) Write the first 10 questions (first salvo) that you would ask to expand the visibility of the requirements and how they contribute to your application architecture ? **[Marks 10]**

c.) What is/are the architectural pattern(s) you can suggest for this engagement? Justify your answer.
[Marks 10]

2. An application called "Mobilife" developed by team of students from University of Davis, won the US Microsoft Imagine Cup 2010 in software design category. The Mobilife project uses the Windows Mobile platform to do on-field analysis that detects vascular diseases like "diabetes mellitus". Simply this application gathers data as images/video of the patient using a mobile phone using non invasive methods and transfer that information to a central server that automatically perform a diagnosis.

a.) What are the architectural styles that you can use in this engagement? Briefly explain.
[Marks 10]

b.) What are the quality parameters that you define to asses and validate your architecture?
[Marks 15]

3. A common method for designing applications is to organize around an event-driven user interface. In this design pattern, developer creates the interface and subsequently writes code that will executes the desired application actions in response to user gestures. Although this may be successful for smaller, single user systems that will require little alterations to the functionality overtime, for large scale distributed applications you need to separate application data and logic from the way they are accessed or viewed. Model View Controller (MVC) is popular design pattern used in this paradigm.

a.) What are design patterns and why are they useful? **[Marks 5]**

b.) What are the key components of MVC pattern? Explain each of those using examples. **[Marks 12]**

c.) What are problems that may encounter MVC designs? Briefly explain. **[Marks 8]**

4. Extending enterprise applications to mobile devices is increasingly becoming a priority for organizations optimizing their workforce. To achieve the desired result of a robust, scalable, secure, and responsive mobile solution with multiple device platform support, many components need to work together. The challenge is to seamlessly extend various flavors of enterprise applications, many based on a variety of technologies and platforms, on to mobile devices.

a.) What are the modeling techniques that you may use to extend your enterprise applications to mobile devises? Briefly explain. **[Marks 10]**

b.) Draw the high level architecture of the service integration layer of an example system that you propose to achieve the above objective. **[Marks 15]**

5. a.) A design analysis should be an integral part of the development process. Design evaluation focuses on a few specific areas which involve explaining the design choices and their rationales which is tightly coupled with the problem domain.

i. What are the benefits of a formal design analysis? **[Marks 4]**

ii. List down techniques used in formal design analysis and their domain applicability. **[Marks 8]**

b.) A true holistic view of a system cannot be evaluated unless the various aspects and views of the system are looked at and designed individually.

i. Describe the various aspects/views of a system that need to be analyzed in order to do a comprehensive design of a system. **[Marks 5]**

ii. Describe the diagrams available in UML to depict the structural/static view of a system. **[Marks 8]**