**Question 1: Explain why design conflicts might arise when designing an architecture for which both availability and security requirements are the most important non-functional requirements.**

Software systems often have architecture characteristics which are in competition (Kazman et al., 1998). For example, quality attributes like modifiability, security, performance and availability may be tradeoffs. That is, the improvement of one of these attributes is often accomplished at the price of one or more of the others.. These tradeoffs lead to design conflicts when building an architecture with, for example, both availability and security as the primary non-functional requirements.

Sommerville (2011) suggests that availability can be thought of as the inclusion of “redundant components and mechanisms for fault tolerance” whereas security measures “use a layered architecture with critical assets in the inner layers.” In order to provide availability, multiple backup components are included in an architecture just in case a component fails. Also, several copies of the data being processed need to be maintained. On the other hand, security measures, aimed at limiting access of the data by intruders, require a minimal number of data copies and few components that have access to that data (KSU, n.d.). Security and availability design are at odds, with security dictating minimal copies and availability needing numerous copies.

Since architectural attributes can be in competition, a system architect has to weigh the various tradeoffs (Kazman et al., 1998).

References

Kazman, R., Klein, M., Barbacci, M., Longstaff, T., Lipson, H., and Carriere, J. (1998). The Architecture Tradeoff Analysis Method. Technical Report CMU/SEI-98-TR-008 ESC-TR-98-008. Retrieved from <http://www.sei.cmu.edu/reports/98tr008.pdf>

KSU. (n.d.). Tutorial #3. IT323 -- Software Engineering II. Retrieved from <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fit323.files.wordpress.com%2F2011%2F09%2Fit323_tutorial3answers.docx>

Sommerville, I. (2001). “Chapter 6 - Architectural Design. Lecture 1-2.” Software Engineering. Retrieved from <http://my.uopeople.edu/pluginfile.php/72138/mod_resource/content/0/Ch6.pptx>

**Question 2: Draw diagrams for the conceptual and process views of the architectures of the following systems:**

**Conceptual View of automated ticket-issuing system**

**used by passengers at railway station**

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**Process View of automated ticket-issuing system**

**used by passengers at railway station**



**Conceptual View of computer controlled video conferencing system**

**that allows video, audio and computer data to be visible**

**to several participants at the same time**



**Process View of computer controlled video conferencing system**

**that allows video, audio and computer data to be visible**

**to several participants at the same time**



**Conceptual View of robot floor cleaner that is intended to clean**

**relatively clear spaces such as corridors. The cleaner**

**must be able to sense walls and other distributions**



**Process View of robot floor cleaner that is intended to clean**

**relatively clear spaces such as corridors. The cleaner**

**must be able to sense walls and other distributions**

