

Homework #1

Due January 29, 2007, in class

Please answer the following questions using lucid, concise English language; use the electronic word processing system and graphics tools of your choice to produce high-quality output. At the due date, please turn in stapled hardcopies of your work, as well as an electronic copy via email. Scores for late assignments will be multiplied by 0.8 for each day late. Please remember that this is an individual assignment; refer to the class web pages for the definition of "individual".

Please find a short list of open source tools for creating graphs etc. at <http://java-source.net/open-source/uml-modeling>; others are easy to locate via Google and other search engines. Note that for this assignment the use of UML notation is not required – just make sure that you provide an explanation of the notation you are using.

1. Software Architecture, Architectural Aspects, and Logical vs. Technical System Entities

Read the article '[The Structure of the "THE"-Multiprogramming System](#)' by Edsger W. Dijkstra (item #1 on the reading list on the class web pages).

1. What aspects of system quality are addressed by the author, and how does the architecture support them?
2. Identify the major *logical* entities of the system together with their relationships. Use whatever graphical notation you know/like to visualize your narrative; please give the meaning of the notational elements (boxes, lines, arrows ...) you use.
3. What are the major *technical* system entities? What is their relationship with the logical entities?

2. Understanding Problem Domains, System Properties, Tradeoff

Consider an *online video rental store* as an example system.

1. Who, besides the customer, is involved in an order?
2. List at least five services provided by a typical online video rental store, and give corresponding usage scenarios (who is involved, what information needs to be exchanged, etc.).
3. Identify the major logical entities of the system together with their relationships using the same notation as in 1.2 above.
4. What do typical technical system architectures for implementing business information systems such as this one look like?

5. For the given system, order the system properties as listed on slides 18/19 of slide set #2 into three classes of importance ("high – medium – low"), and give the rationale for your decision.

3. Quality Attributes and their Effect on Software Architecture

Security is one of the key quality attributes for any online store. SSL is a popular technology for establishing security for Internet transactions.

1. Describe SSL's key properties and determine whether it would be suitable for the online video rental store.
2. Is SSL "application-dependent" or "application-independent"? Why?
3. Identify areas of security that SSL does *not* address. For at least two such areas discuss technologies you would choose for the online video rental store discussed in 2.1—2.5. What is your rationale? Describe the technical infrastructure required for these technologies; how would it influence the technical architecture for the online video rental store?

4. Risks

Identifying and managing risks is a central aspect of requirements gathering and project management in general. Risks can also have an influence on how your architecture is structured.

1. Identify at least five (5) risks of the video rental store project, and rank them on a scale of "high – medium – low".
2. For each risk you list, provide a suggestion for risk mitigation together with a rationale (1-2 sentences). Indicate if your mitigation strategy will have an impact on the architecture.