

CEN 4010

Software Engineering

Fall 2008

Problem sets

2.11 You are an engineer involved in the development of a financial system. During installations, you discover that this system will make a significant number of people redundant. The people in the environment deny you access to essential information to complete the system installation.

- 1. To what extent should you, as a systems engineer, become involved in this?**
- 2. It is your professional responsibility to complete the installation as contracted?**
- 3. Should you simply abandon the work until the procuring organization has sorted out the problem?**

4.1 Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems:

- 1. A system to control anti-lock braking in a car.**
- 2. A virtual reality system to support software maintenance.**
- 3. A university accounting system that replaces an existing system.**
- 4. An interactive system that allows railway passengers to find train times from terminals installed in stations.**

4.2 Explain why programs that are developed using evolutionary development are likely to be difficult to maintain.

4.5 Suggest why it is important to make a distinction between developing the user requirements and developing system requirements in the requirements engineering process.

7.2 A software system is to be developed to manage the records of patients who enter a clinic for treatment. The records include records of all patient monitoring (temperature, blood pressure, etc.), treatments given, patient reactions and so on. After treatment, the records of their stay are sent to the patient's doctor who maintains their complete medical record. Identify the principle viewpoints which might be taken into account in the specification of this system and organize these using a viewpoint hierarchy diagram.

Database Design: A Museum Information System

A museum requires an automated information system for use by visitors which helps them locate items in the museum and to find out more about items which are on display. The system is intended for use in an art museum with paintings, sculptures, and photographs. Factors which may be taken into account in the design are:

- **The system must be a 'walk up and use' system for visitors who have no training whatsoever in computer system use.**
- **You will need to be able to manage floor plan of the museum and the location of items on that floor plan. Information about specific items should be accessible by indicating their location.**
- **You should be able to find an art object by the location, artist(s), type of work, date of work, associated art movement, country of origin, or other categories you might discover.**
- **The system will have to manage multi-media information - sound, digital images and video concerning each art object.**
- **It must be possible for museum staff to change the information in the system and to add information about new exhibits. There should be no realistic limit to the amount of information one can store about an object. I.E. multiple images, sound, text, and video.**
- **When you give people information about where to find an item, they respond best to simple instructions made with reference to prominent landmarks rather than maps which they often find difficult to read.**

You assignment:

- 1. Define any standards that could be applied in making the design more compatible with other collections.**
- 2. Gather all of the data items you can think of. You may reference other art museum databases.**
- 3. Organize the data items into objects and then tables.**
- 4. Define the domain and range of the data items.**
- 5. Create any additional support tables.**
- 6. Create an entity relationship diagram.**

Deliverables:

Table Descriptions to include Table name, data item name, domain, range, and compatibility checks.

Any standards that were used in the design.

Entity Relationship Diagram.

14.2 Using examples, explain the difference between an object and an object class.

14.4 Using the UML graphical notation for object classes, design the following object classes identifying attributes and operations. Use your own experience to decide on attributes and operations that should be associated with these objects:

- 1. A telephone**
- 2. A printer for a personal computer**
- 3. A personal stereo system**
- 4. A bank account**
- 5. A library catalogue**

22.1 Discuss the differences between verification and validation, and explain why validation is a particularly difficult process.

22.5 Suggest why an organization with a competitive, elitist culture would probably find it difficult to introduce program inspections as a V & V technique.

23.1 Explain why testing can only detect the presence of errors, not their absence.

23.5 Using the sequence diagram in Figure 8.14 as a scenario propose test for the issue of electronic items in the LIBSYS system.