Lab 2: Database requirements analysis and design

Due date: Tuesday, January 22, 3:00pm.

This is a **group lab**. Each group submits one set of deliverables. Each group member receives the same grade for the assignment.

Course Project Information

This quarter, CPE 366 comes with a group course project. General information about the project is provided below.

Customer. Our customer this quarter is Dr. Mark Edwards, Associate Professor at Cal Poly's Animal Science department, and the head of the horse nutrition program. Dr. Edwards works with a senior Animal Science student Stephanie Yarbro, who will also be involved in the project and will represent the customer on a number of occasions.

Project. The customer asks us to design and build a database storing horse nutrition information and tracking inventory of horse feed at the Cal Poly's horse unit. The customer asks us to design and implement a database application that allows the customer, his students and colleages and other categories of users access information about horse diets, horse locations within the horse unit and, additionally, to track the feed inventory over the period of time.

Lab Overview

In the course of this lab, you will elicit requirements for the database, and build initial database design. The lab assignment spans three lab periods, each of which will serve a different goal. This document specifies your assignment for each of the periods as well as final deliverable.

The overview of the lab structure is below.

January 15, 2008: 12:10 - 1:30pm: tour of Cal Poly's horse unit with Dr. Edwards. An introduction into the application domain, intial information about customer needs.

January 17, 2008: 12:10 - 1:30pm: question and answer session with Dr. Edwards. An opportunity to obtain clarifications of the customer's domain, information to be stored in the database, customer's needs and customer's vision for the database and (time permitting) the database application.

January 22, 2008: 1:40 - 3:00pm: group lab session. An opportunity to consult course instructor and finalize initial database design. Submission of deliverables.

Assignment

Horse Unit Tour

The tour of the horse unit will serve as your introduction to the application domain. During the tour, Dr. Edwards will discuss various aspects of operation of the horse unit, which need to be captured by the database you are designing. Questions are welcome throughout the tour.

Prior to reading your assignment, please, note the following: *while the tour itself will be a rather informal endeavor,* ***information provided to you throughout the tour is counted as official***. That is, any descriptive information about the horse unit operation, and/or specific objects associated with the horse unit has the **status of a customer requirement**.

In addition to the tour, upon your return from it, you will be provided with a written document prepared by the customer containing (as far as the customer is concerned at the moment) a **customer's specification of the desired database**. The document will reiterate and reinforce most of the things you learn during the tour, will provide more specific details of some aspects of the desired database, and, together with the information you gather from the tour, will serve as your starting point.

Assignment. Attendance of the tour is required. A signup sheet will be passed. During the tour, it is your responsibility to listen carefully to the information conveyed. Questions are welcomed. You are welcome to take notes (as much as the circumstances and environment will permit it). Photography is permitted.

Upon returning from the tour and receiving the customer's specification document, you will study the document in detail in preparation to the Thursday (January 17) Q&A session.

Question and Answer Session

Please note: information provided to you by customer *may* be incomplete, and it *may* contain errors. ***None*** *of the possible omissions or errors are intentional.* One of the key purposes of the Q&A session is to identify if errors and omissions are present and fix any that are discovered.

Assignment. In preparation for the Q&A session with the customer, each team must study the materials provided to the class by the customer. The goal of each team is to identify any aspects of the application domain, information about objects to be stored in the database, customer needs (w.r.t. the database), *that require clarification.*

Prior to beginning of the Thursday, January 17 lab (12:10pm, 14-253), each team must come up with a set of questions that the team wants to ask the customer during the Q& A session. Each team must bring its list of questions to the lab period. Note that in addition to the customer, questions may be directed at the instructor.

Please note: initial list of questions **must be prepared** by each group independently of other groups. However, once lists are prepared, I allow for groups to compare them. I expect that many questions will coincide or be similar (it is ok if multiple groups have similar/same questions). It is also ok for one group to come up with a question, no other group has asked — there is no need for other groups to add it to their lists.

Q&A session. Each team will be given 7-8 minutes of time to ask their questions and receive answers from the customer and the instructor. We will set the order of questioning by a simple lottery at the beginning of the lab. Since the lab will take place at our regular classroom, I strongly suggest that each team sits together (feel free to move chairs around). Please note the following:

- Listen carefully to the questions other groups are asking. It is very likely, that some of your team's questions will be posed by teams who get to ask questions earlier.
- If your group runs out of questions yield your time to the next group.
- If your group has unanswered questions left after its Q&A period, wait until all groups ask their questions. If the question has still not been asked, you will have a chance to ask it at the end of the lab.
- You are certainly allowed to ask questions that are not on your list - some questions might occur to you as a result of things said during the Q&A session.

After each team had a chance to ask questions, if any additional questions remain, a free-form Q&A period will begin and will last until the end of the lab period. Any questions that went unasked, or unanswered during the Q&A session should be submitted in writing (via email) to the instructor. The questions will be forwarded to the customer, who, in turn, will provide answers prior to the Tuesday, January 22 lab.

Assignment. Your task during the Q&A session is to follow the flow of discussion, and take note of the customer's and the instructor's answers. You shall also note and keep track of any omissions or errors uncovered during the questioning. Note, that any significant omissions and/or errors may lead to a new version of the customer spec. being prepared after the Thursday lab.

Database Design

The tour of the horse unit, customer's specification document and subsequent question-and-answer session with the customer should provide you with sufficient information to prepare the initial design of the customer's database.

The main task of this lab is for each team to prepare an initial database design document. While some aspects of initial design can be started prior to the Q&A session, it is expected that the main work on this part of the lab will take place after the Thursday, January 17 lab. Initial preparation can (and should) be made outside of class/lab-time. However, you may use Tuesday, January 22 lab period for finalizing your design. In particular, throughout the lab period, I will be available to all groups for consultations concerning your design.

Database Design Assignment

Each team shall prepare an initial design document. The document, shall, at a minimum, contain the following information:

- List of entity sets for the proposed database.
- List of attributes for each proposed entity set.
- Identification of primary keys for each proposed entity set.
- Identification of any other entity set constraints for the proposed entity sets.
- List of relationship sets for the proposed database. For each relationship set, the following must be indicated:
  - All participating enitity sets.
  - All clarifying relationship set attributes.
  - Type of the relationship set (one-to-one, one-to-many, many-to-many).

- List of other relationship set constraints.
- E-R diagram of the proposed database design.

The design document must be typeset (handwritten submissions will not be accepted). The E-R diagram shall be designed using drawing software. (if you are using Windows, you can use MS Powerpoint; if you are using Linux, CS labs have xfig, which allows exporting designed diagrams into .eps (Encapsulated Postscript) format). The E-R diagram shall contain all entity sets and relationship sets. It shall also contain all key attributes for all entity sets and all relationship set attributes. Other attributes can be omitted from the diagram for clarity. All constraints that can be shown on the diagram, shall be shown.

The design document shall begin with the name of the group, and the list of group members. Note, that in general, **all documents** submitted by each team during the course of the project must contain the team name and the list of students. (and so shall all code written for the project).

Submission Instructions

You need to submit the following:

1. The list of questions (in hardcopy) that you brought to the Thursday, January 17 class, plus any subsequent revisions. Your submission may indicate which questions your group got to ask, which were asked by other groups, which questions were added during the discussion.
2. Hard copy of the initial design document.

Both items can be submitted together at the end of the Tuesday, January 22 lab period (P.S. hard copy submissions will be accepted without penalty until the end of the office hours at 4pm. If submitting after the lab period is over, please bring the submission to my office at 14-215).

Please, keep the soft copies of all submitted documents. You will be working with them in the labs that follow.