Final Project 1

Objectives

The aim of this project is to implement a Web-accessible database application. You may implement this in any programming language, the target database is the Postgresql database on wozniak.
You are required to team up with another one student.

Let’s assume that you have been hired by Nile Company (Amazon’s competition) to keep track of their inventory. Nile sales two types of products: books and videos.

Requirements

Your goal is to create an online store for the Nile Company. There will be two types of users:

- NC customers
- NC staff
- NC manager

Customers In order to purchase from NC, customers must first register. Once they are registered, they may access to the list of books or video. If they want to purchase books or videos, these items are first placed in a shopping basket, and then ordered. Customers can see the status of orders (i.e. pending or shipped).

Staff can check inventory, re-stock the online store with more components, view all customer orders, and ship orders to customers. A staff member has an on-line ID and a pass word that he/she can use to login into the company’s website to perform the previous listed tasks

Manager: can do all tasks a staff member can do. In addition, manager can (1) view statistics about sale information (in the previous week, month, or year), and (2) decide sales promotions. A Manager must login into the company’s website to perform the tasks.

Your project must include the following Web pages:

Customer Forms

Register Allows a new customer to register with NC.

Shopping Allows a registered customer to list books or videos. The purchased items may be stored in a shopping basket.

Purchase Allows a registered customer to view their shopping basket and click "Purchase". This creates an Order for the items that can then be viewed (and filled) by the NC staff. NC staff cannot see shopping baskets.
**Orders** Allows a registered customer to view the orders they have placed and see the status (either Pending or Shipped).

**Staff Forms**

**Login Screen** Staff must login in order to perform these functions. A single login for all staff is fine.

**View Inventory** See a list of all items and their quantity.

**Update Inventory** Same as above, but with editable text boxes to change the quantity of any component.

**Ship Pending Orders** View the list of pending orders (components, price, customer info). The staff member can click a "Ship It" button and, if all the components are available, the status of the order changes from "Pending" to "Shipped" and the quantities in the inventory are decreased. If the components are not available, some error page listing the missing components is generated and the order remains "Pending".

**Manager Forms**

**Login Screen** may use the staff login form

**View Inventory, Update Inventory, Ship Pending Orders**: the same as those of staff

**Sales Statistics** View the list of all items and sales history in the previous (week, month, or year)

**Sales Promotion** View the list of all items and decide the promotion rate.

**Bonus:**
(5 points) Add a search form for customer, staff, and manager to search for items. You may search by title of a book, the ISBN of a book and the subject of a book. For videos, you may search by name, age group, or theme (like Thomas the train, Bob the builder, etc.)

(5 points) Add a business decision form for NC Manager. You need to use association rules to discover frequent purchases book or video combinations. Sort the combinations according to their frequency and display to the manager in order to determine sale promotion.

**Submission**

There is no need to submit an executable, we can test the project over the Web. Submit a printed report in the following format for each group:
1. Overview (description of problem, ER diagram)
2. Database Design (table names and uses, fields names, data types, constraints, is it 3NF? if not, why not)
3. Description of CGI programs (data structures, algorithms, filenames)
4. Sample input and output screens
5. Testing (what types of testing you have performed)
Appendix I. CGI program code

**Time Line:**

1. March 23th: identify your team member, complete the ER diagram design for the final project (as part of homework 3)
2. May 4th: Presentation due. Each team has 5 minutes to do a presentation
3. May 6th: final report due

**Grading**

20 Database Design (ER correctness, normalization (BCNF/3NF) used? Foreign key specified? Domains used?)
40 Embedded SQL programs (10 style, 20 correctness, 10 efficiency)
20 Web front end (5 style, 15 correctness)
10 Testing (did any testing?)
10 Report
Final Project 2

Objective: Perform a literature survey of two frontier research topic in database and perform initial research on one of the two listed topics.

Topic 1: Graph Data Management
Topic 2: Probabilistic Data Management

Papers:

Topic 1:
- Graphs-at-a-time: Query Language and Access Methods for Graph Databases
  Huahai He and Ambuj K. Singh (UC Santa Barbara) SIGMOD’08
- Graph Summarization with Bounded Error
  Saket Navlakha (University of Maryland, College Park), Rajeev Rastogi (Yahoo! Labs, Bangalore, India), Nisheeth Shrivastava (Bell Labs Research, Bangalore, India), SIGMOD’08
- Efficient Algorithms for Exact Ranked Twig Pattern Matching over Graphs
  Gang Gou, Rada Chirkova (North Carolina State University), SIGMOD’08
- Efficiently Answering Reachability Query on Very Large Directed Graphs
  Ruoming Jin, Yang Xiang, Ning Ruan (Kent State University), Haixun Wang (IBM T.J Watson), SIGMOD’08

Topic 2:
- MCDB: A Monte Carlo Approach to Managing Uncertain Data
  Peter Haas, Mingxi Wu, Fei Xu, Ravinath Jampani, Christopher Jermaine, Lusi Perez, SIGMOD’08
- BayesStore: Managing Large, Uncertain Data Repositories with Probabilistic Graphical Models,
  Daisy Zhe Wang (UC Berkeley), Eirinaios Michelakis (UC Berkeley), Minos Garofalakis (Yahoo Research, USA), Joseph Hellerstein (UC Berkeley). VLDB’08
- Exploiting Shared Correlations in Probabilistic Databases
  Prithviraj Sen (University of Maryland), Amol Deshpande (University of Maryland), Lise Getoor (University of Maryland). VLDB’08

Requirements:

1. Pick up a topic and write a survey using the listed papers as stating point. In your survey, you need to list the objectives of the research papers, their methodology, their implementation details, and the way that they evaluate their results. The key is to compare the papers and offer pros and cons of the proposed methods.
2. Based on your survey, pick up a specific method, try to reimplement by yourself.
3. Perform a detailed experimental study of your implementation.
Report:
Each team only needs to submit one copy of the report and everyone will receive the same score based on the presentation and the report. You should follow the guidance below in writing your report:

1. Title
2. A description of the problem that you are studying
3. A justification of why the problem is important
4. A survey of current state-of-the-art of the problem
5. A statement of your investigation goal.
6. A description of how task-relevant data are collected.
7. A description of the tools that you used (or developed)
8. A description of the experiments that you performed.
9. A description and a discussion of your experimental study results
10. Conclusion and future work.

Formatting requirement: the minimal length of the report is 10 pages, single space, single column, 12 pt font, 1 inch margin for each page.

Grading:

1. Survey: 50%
2. Your implementation: 20%
3. Experimental study: 20%
4. Report: 10%