CS 4400 DATABASE PROJECT

Spring Semester 2009

PURPOSE OF PROJECT

Analyze, specify, design, implement and demonstrate an information system to support the operation of the Online Shopping System. The database and the application must be implemented using ORACLE available on ACME. Alternative implementations must be approved by the professor.

PROJECT PHASES

The three phases of the project cover the following tasks. Specific deliverables will be defined for each of the three phases.

PHASE	DESCRIPTION	DUE DATE
I	Analysis & Specification	13-Feb (Friday)
II	Design	25-Mar (Wednesday)
III	Implementation & Testing	21-Apr (Tuesday)
	Demonstration	April 22-25

Note : Each group can submit the project either in Prof. Mark's class on the respective days, or to the T.A. at CoC commons during the TA office hour. As a backup, you may submit to Secretary Deborah in 3042 Klaus building before 4 p.m. on the due date. Her phone no. is 404-385-2892. Phase III requirements will be communicated later.

GROUPS:

Each group must have 3 or 4 members. We allow for 2 member groups; but 4 is an absolute limit. Members can be combined from multiple sections – but your title sheet on each report must state the last name, first name of each member along with their section. As a group, you will decide whether to complete the lightweight or

heavyweight project options. The two options are identical for phases I and II, but differ in the deliverable for phase III. Note that the option of whether you wish to do heavy or light weight can wait until you get into phase III and as late as the final submission of Phase III.

Heavyweight Option:

Groups choosing this option will demo a working implementation of their project to the TA. The implementation must include a Java or web-based GUI (Graphical User Interface) that uses JDBC (Java Database Connectivity) or ODBC (Open Database Connectivity) for database access. The SQL statements you create in phase II will be embedded inside your GUI.

Lightweight Option:

Groups choosing the lightweight option will submit working SQL statements for each of the project tasks and demo the SQL statements to the TA. This option may be appealing to groups with little or no experience programming GUIs.

Oracle

We will provide you with access to the Oracle Database Management System on ACME. See the course webpage for further information on how to access Oracle from the ACME command line or from a Java program.

DELIVERABLES FOR EACH PHASE

Phase I:

- List of group members (mark clearly on the title page in alphabetical order by Last Name, if from different sections, mention section of each member),
- Information Flow Diagram,
- E-R Diagram,
- Task Decomposition (where appropriate)
- Additional note, if necessary, about any assumptions

Useful Link for Phase I:

http://www-static.cc.gatech.edu/classes/AY2007/cs4400_spring/methodologyFall2002.ppt

Phase II:

- List of continuing group members (alphabetical order by Last Name),
- Copy of the E-R Diagram from phase I (with any revisions),
- Copy of the Information Flow Diagram from phase I (with any revisions),
- Relational Schema Diagram (with primary and foreign keys identified, referential integrity is shown by arrows),
- Create Table statements, including domain constraints, integrity constraints, primary keys, and foreign keys,
- SQL statements for each task

Phase III:

- Copy of the Create Table statements from phase II (with any revisions),
- Contents of each Table in your Database,
- Source Code (documented) for your System,
- A set of working SQL statements for all project tasks (Lightweight Option)
- A functional GUI with embedded SQL statements that accesses your database (Heavyweight Option)
- A system demo to one of the TAs (use SQLPLUS if you choose the light weight option) during the assigned demo-days.

GRADING:

The project will consist of 3 phases (deliverables) as well as a final demonstration to the TA. Phase I and Phase II of the project are each worth 10% credit (of your total grade for this class). Credit for phase III depends on the implementation option you choose.

Heavyweight Option -20% credit: We will use the embedded SQL feature of ORACLE, called JDBC (A Sun Standard for Java Data Base Connectivity), which allows us to embed SQL statements in a Java program.

Lightweight Option -5% credit: We will use the SQLPLUS feature of ORACLE, which allows us to execute stand-alone SQL statements.

Project Description (Version 2)

For the project, you will be developing a database application for online shopping called “Online ShopMart”. The store primarily sells two types of items, namely books and CDs in its online store. There are two types of users:

The customers of the system are the ones who search for items and buy certain items. The manager of the system is responsible for adding items to the inventory, approving the orders, etc.

For using this system, the customer should be a registered member of the website. For the purpose of this project all operations are performed after the user has logged in to his account.

The information and credentials of the manager have been hard coded into this database. That is, information about the managers has been inserted in the database after the database is setup.

Task 1a: Create New User Profile

The customer creates a profile for the site which he can use later on when he wants to log in to the site or make purchases. The username of the customer should be unique in the system. The profile needs to have one shipping address associated with his profile. The items he buys will be shipped to that address.

The create form can be similar to one shown in figure 2.

The system should also have a password which should be no less than 6 alphanumeric characters.

After logging in, the customer must have the options as shown in figure 1.

Fig 1: Operations to be supported after user logs into the system.

Task 1b: Update User Profile

The user should be able to change his personal information similar to the one shown below in Fig 1a.

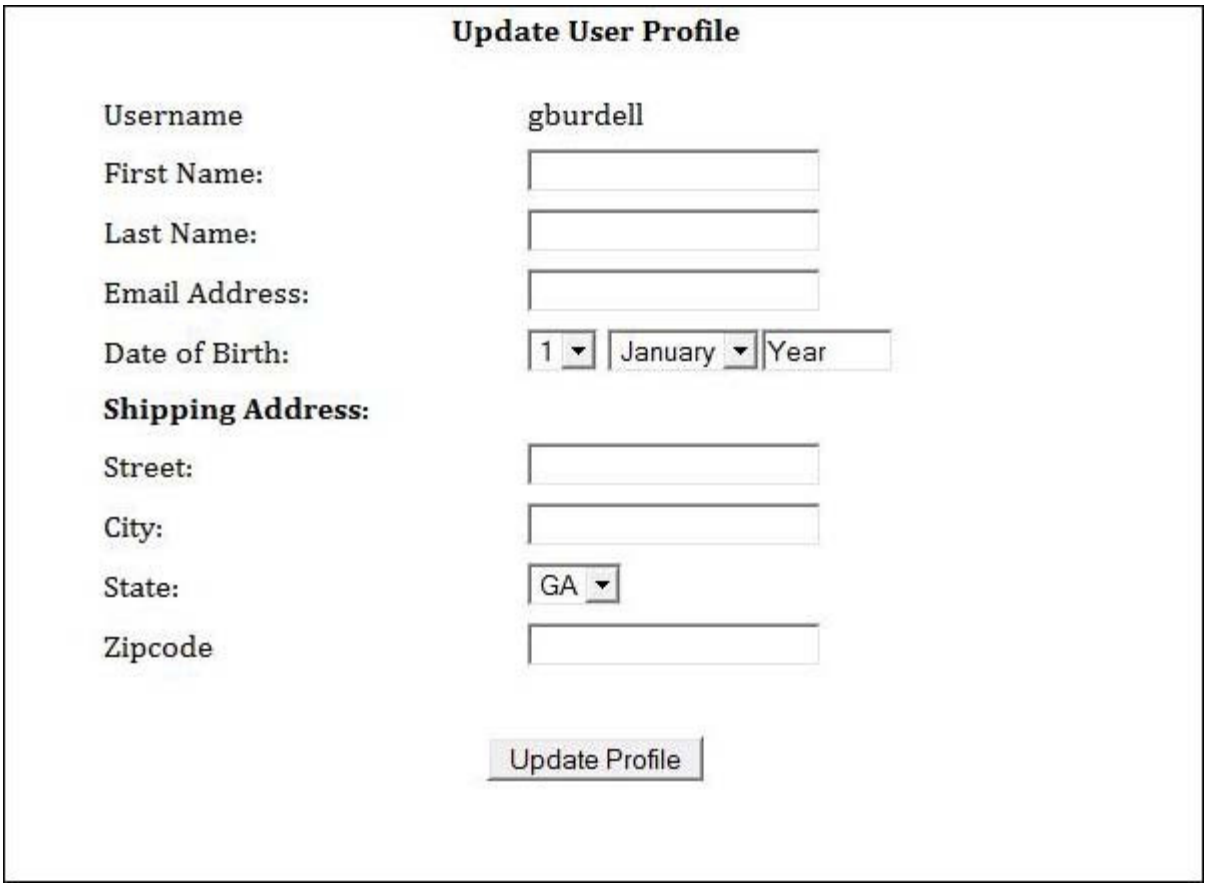


Fig 1a: Updating User Profile

The customer must also be given the option to change the password.

Task 1c:

When the customer selects "view all purchases", he/she must be shown all the purchases he/she has made and also the products returned.

Task 2: Searching the entries

The search feature helps the customer to find the book or the CD's he/she is looking for. Note that the each book is supposed to belong to one category (e.g. "Travel", "Science Fiction", "Reference") only. All existing categories should be visible under the drop-down menu.

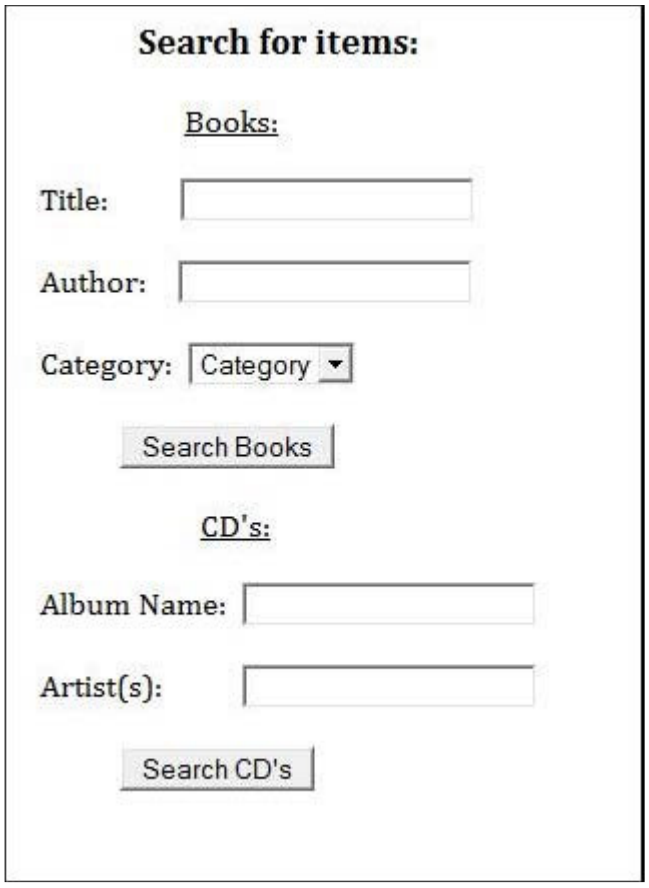


Fig 2: Search

It is absolutely OK if the user doesn't enter anything in the above fields. In that case, the search should return the entire catalog for that type of item being searched.

The Search results page for both type of items searched will be similar to the one shown in figure 3.

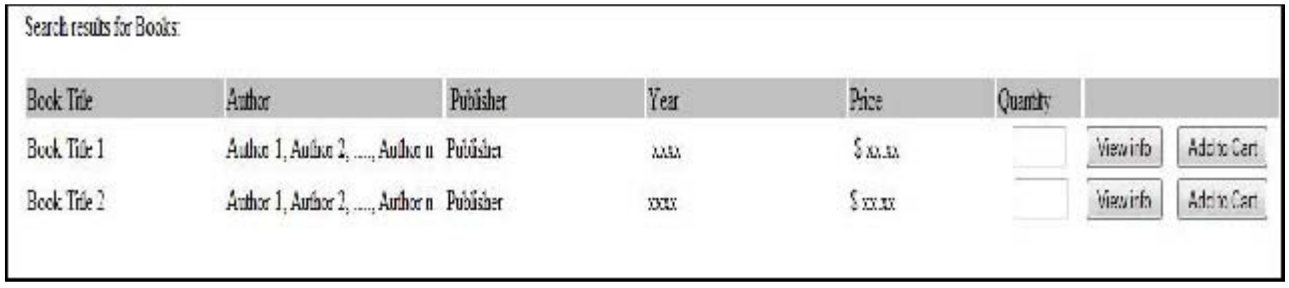


Fig 3: Search Results

The ‘view Info’ button will display the information regarding the book such as the ISBN number, authors, year in which it was published, etc and an optional URL for the website. The ‘Add to Cart’ button will add the item to the shopping cart.

The quantity in the inventory is only updated after the final checkout and not when the item is added to the shopping cart.

Task 3: Shopping Cart

The user must be able to see and manage the shopping cart. The shopping cart only lasts as long as the customer has logged in to the system. That is, after the customer logs out, the items in the shopping cart are no longer present when he logs in the next time.

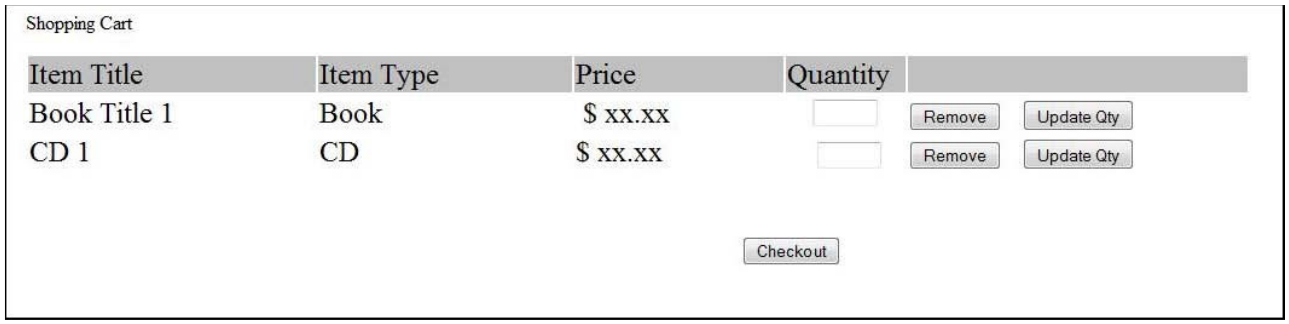


Fig 4: Shopping Cart

Before proceeding to the check out, it is imperative to see if the quantity entered for that item exists in the inventory. If there isn’t sufficient quantity, the customer should be shown a message about the maximum amount available and they can order only the maximum amount available. Only if all the items have sufficient quantity in the inventory should the customer be allowed to proceed for checkout.

Payment Information:

The customer can store his/her payment information like credit card details so that he just selects one of the stored cards for buying the items. He can also enter some other detail not stored on the system for checking out the items. In that case, an option must be made available to the user if he/she wants to save that payment information.

Checkout:

The payment for the purchase can be made using one of the payment information stored by the customer. The customer can also enter new payment information on the checkout screen and choose if he wants to save this new payment information.

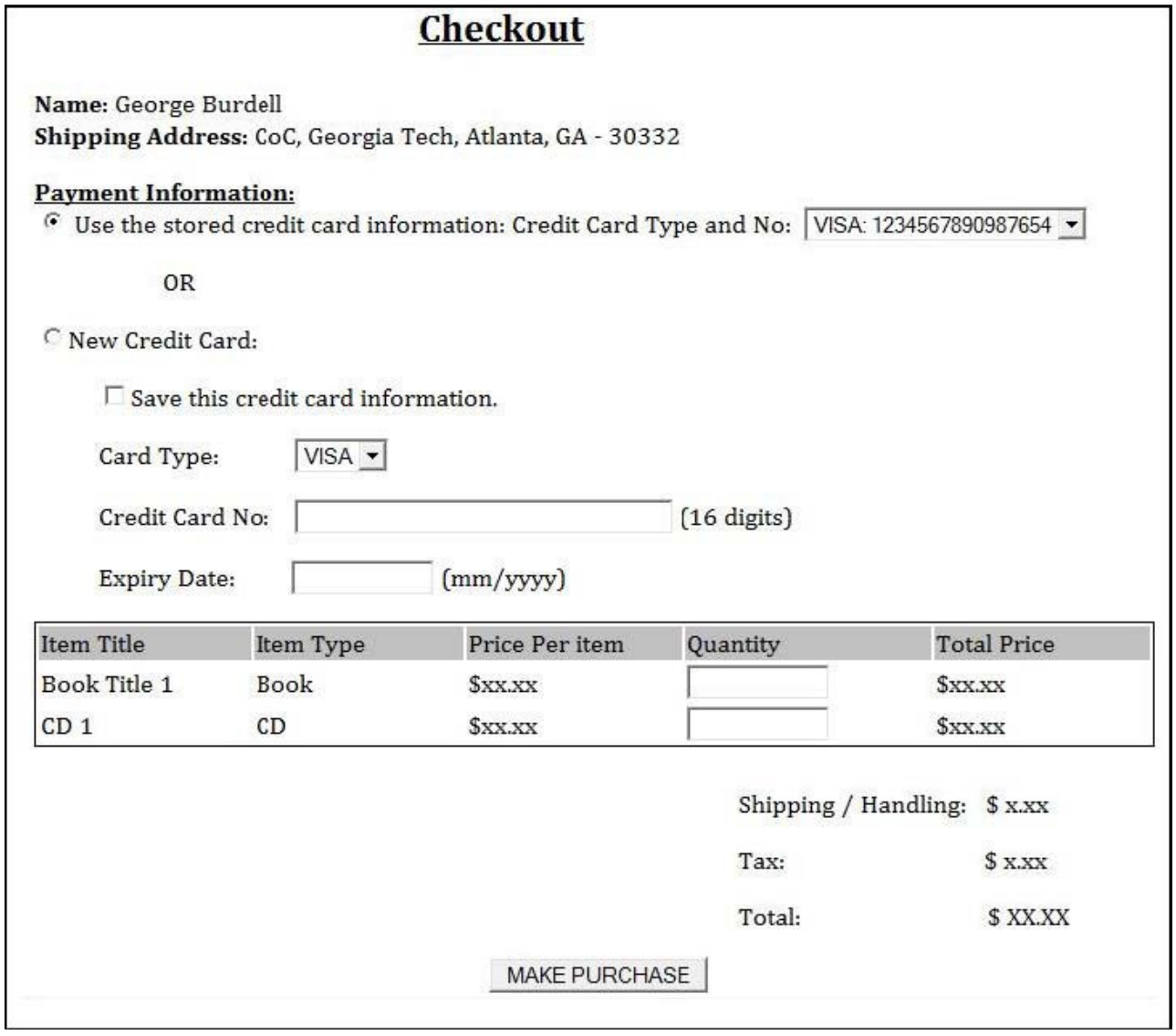


Fig5: Final Checkout Screen Use a standard shipping cost of $5 and the add tax at 10% of the total price.

The customer makes the payment and is shown the confirmation receipt which is similar to above screen but with all values filled and no options for input.

Receipt

Purchase ID: xxxxxxxx

Name: George Burdell
Shipping Address: CoC, Georgia Tech, Atlanta, GA - 30332

Item Title	Item Type	Price Per item	Quantity	Total Price
Book Title 1	Book	$xx.xx	x	$xx.xx
CD 1	CD	$xx.xx	x	$xx.xx

Shipping / Handling: $ x.xx

Tax: $ x.xx

Total: $ XX.XX

An order is considered to be an order to replenish one or more items in the inventory. An order can contain multiple items.

The purchase transaction made by a customer and an order generated to replenish inventory are two entirely distinct events.

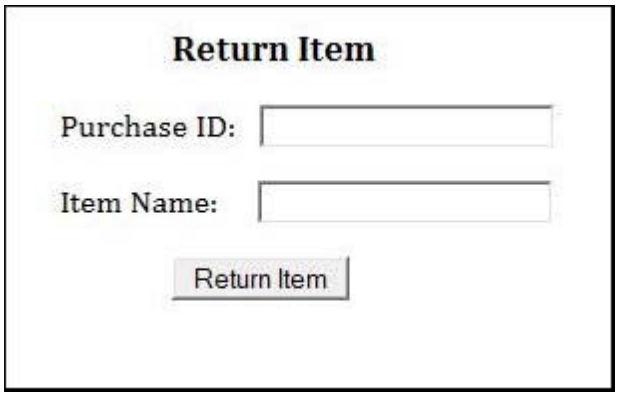
An order has the intent of replenishing the inventory with an order-quantity which is pre-defined for each item.

After this transaction has been completed (i.e. purchase has been made), inventory is updated for the items present in the purchase. If the quantity in the inventory for the item(s) is below the minimum quantity required, then order(s) are generated for that item(s).

Task 4: Return Items:

The customer has the option of returning an item from a purchase. Only one item can be returned at a time. The customer can only return an item if it belongs to a particular purchase.

For example, the screen might look like this:



The check should be made that the purchase id belongs to the customer who has logged in.

For this project, we will assume that the product is delivered by the customer to the company after the form is submitted. Hence necessary updates have to be made to the inventory after the return is complete.

Warehouse / Inventory:
The company has various warehouses located at various locations. The warehouse houses the items sold by the company. The warehouses are managed by multiple managers.

Task 5: Manager Tasks

The managers of Online ShopMart are responsible to efficient managing of items in the store. They are responsible for adding new items, deleting items, approving orders, etc.

The managers have been hard coded into the system. That means that you can enter a set of three managers and assume they are valid as managers.

After logging in the manger will see the screen similar to one shown below.

The manager also needs to login to the system to perform the operations. However once he logs in he will see the options as follows:

Fig 6: Operations to be supported after user logs in to the system.

Task 5a: Adding a new Book

Add Book will enter the properties of the item along with the minimum number of inventory to be maintained for that book as shown in figure 7.

Similarly for modifying and deleting, the manger will have similar interfaces.

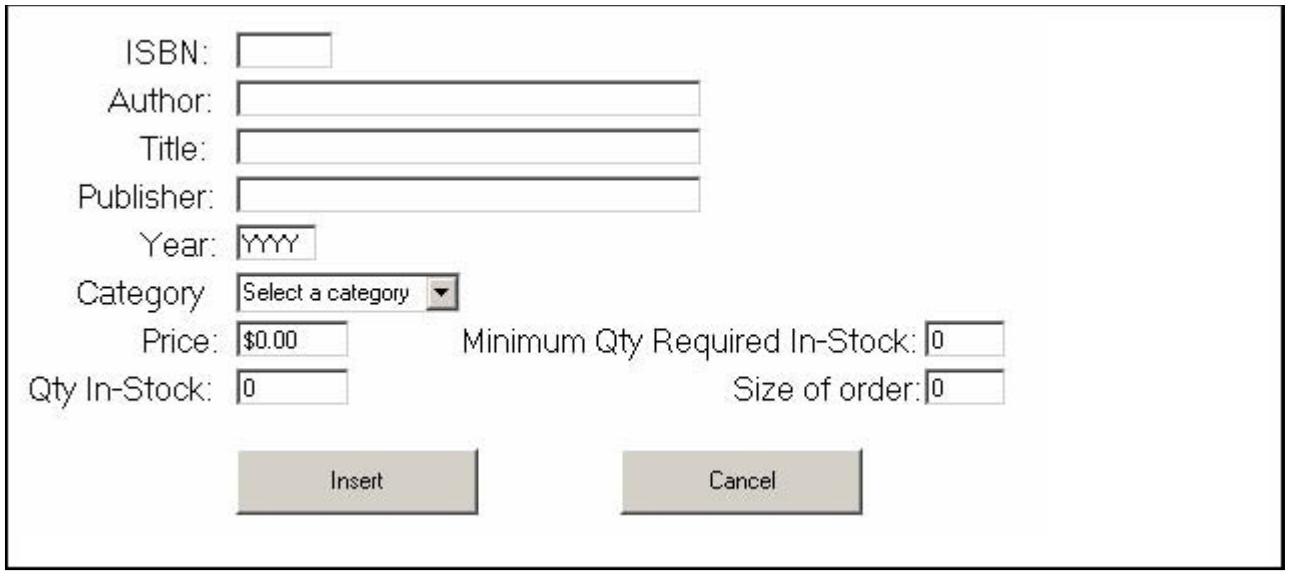


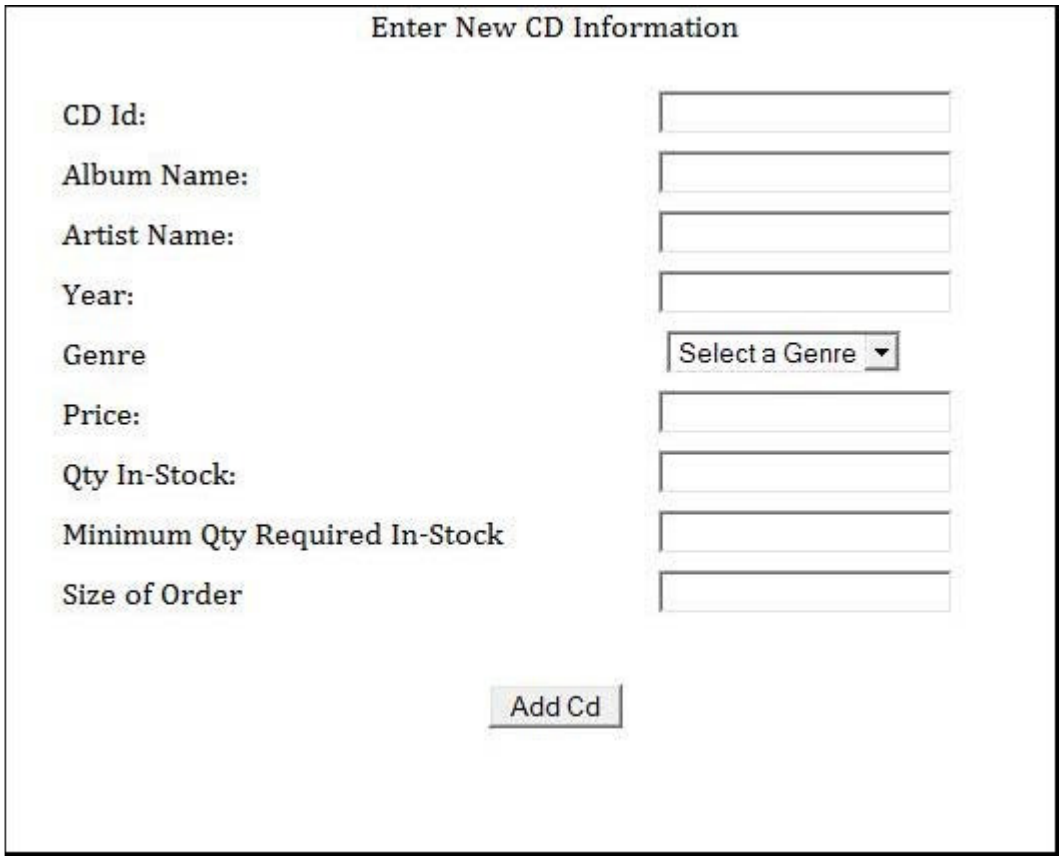
Figure 7: Inserting a new book

The item to be modified will be searched by the manager through a similar interface as shown in figure 2.

Task 5b: Adding a new CD

Similarly there is an interface to enter CD information as shown in figure below.

After adding a new book or a CD, an order is placed which is later approved by a manager. (It can be the same manager who inserted it or it can be some other manager).



Task 5c: Place Orders

The orders generated as a result of items being sold are viewed by the manager. The manager then places orders for those items. When placing orders, he specifies the quantity for that item (but the quantity must ensure that the stock of that item in the inventory will be greater than minimum quantity required in stock).

The order information can be similar to one shown in figure 8. There can be more attributes (which can give more information about the item) in the table so that the manger can easily deduce which item is to be ordered

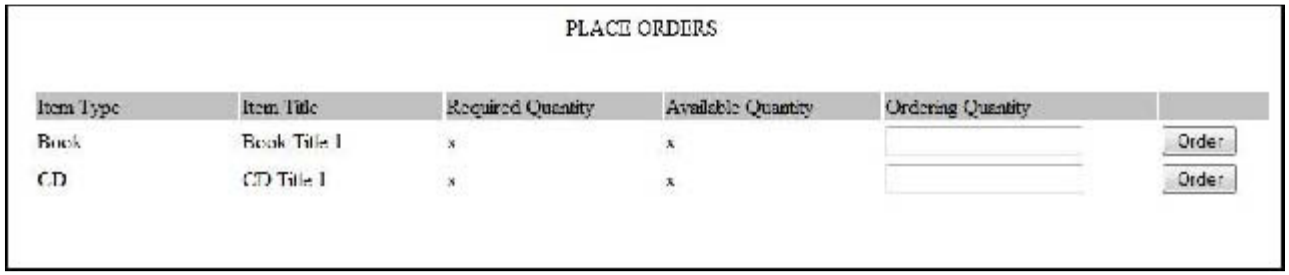


Fig 8: Place Order Screen

Task 6: Reports

The manager also needs to see various reports.

1. View the total sales for Books and total sales for CDs in the current month.
2. View the top 5 customers who purchase the most (purchase amount) in descending order for a given period.
3. View the top 10 selling books and least 10 (lowest 10) selling CD's.
4. Amount of tax payable for a given month.
5. Number of items returned back in a given time period.
6. View total number of distinct buyers for each book category.
7. The owner of the company (a hypothetical person, doesn't need to be shown in the ER diagram) views the information regarding which manager approves the orders and how quickly the orders are approved after they are generated.
8. The owner also views which manager is responsible for which warehouse.

NOTE:
When implementing report no. 7 and report no. 8, you can have a specific username and password which will indicate that he/she is the owner of the company. After logging in the owner must be able to view the report no. 7 and report no. 8.