CS4400 Database Project
Summer Semester 2019
Version 1.1
GroceryTech.com

Look at the last page for edits made for each version. Please read the entire description of the project before starting to work on it.

Purpose of the Project

Analyze, specify, design, implement, document and demonstrate an online system for a grocery delivery service at GroceryTech.com. You are required to use the classical methodology for database development. The system should be implemented using a relational DBMS that supports standard SQL queries. Class administrators will provide you with information about how to access a college-managed MySQL server in order to implement your database and the application. The professors must approve any other alternative implementations. ***In no circumstances can you use a tool that automatically generates SQL or automatically maps programming objects into the database. You also cannot use any other software like Access.*** Ask professors or TAs if you have doubts in which tools/languages/software are allowed.

Project Phases

The three phases of the project cover the following work-processes from the Classical Methodology for Database Development (see notes on Canvas under resources). Slides on database design methodology will be useful for Phases I and II: These slides have been posted on Canvas.

Groups

Project groups may have 3 or 4 members. Groups of more than 4 or less than 3 will **NOT** be allowed. A group may remove a member from further participation in the group when Phase I is turned in or when Phase II is turned in. A written notification with a proper justification must be provided to the professor and the head TA at that time in hard-copy form.

Deliverables

Phase I (Electronic copy and hard copy)
Deadline: June 16

The deliverables include:

1. A cover page listing all members in the team with their respective sections, GT official email addresses and Canvas usernames.
2. Enhanced Entity Relationship (EER) Diagram
3. Information Flow Diagram
4. A list of logical constraints that will be enforced. Do not include any constraints that can be shown in the EER diagram, but rather semantic, business logic related constraints. You are required to include at least three constraints, although a fully-specified system will probably have more than that. **Constraints that can be specified directly using EER notation will not count towards the three required.** Constraints related to data type are not accepted as constraints.
5. Any assumptions made with explanations.

Notes:

1. The EER must capture the constraints of the system as much as possible whenever applicable, i.e. total participation, super/sub class, weak entities.
2. The design of your system must satisfy all the constraints. You are allowed to make up additional assumptions and constraints as long as they do not conflict with the specified constraints and requirements. If possible, those additional assumptions and constraints should be included in the EER diagram. You must list all your assumptions and constraints; otherwise TA would mark your EER diagram wrong since they would not be able to know you have made your own assumptions.

Each group needs to turn in one hard copy (only one for the entire group), and each group member should upload an electronic copy on Canvas individually. You will receive -5 penalty if you do not submit an electronic copy. Group numbers will be assigned to the groups after they are declared in Phase 1. **Please write down your Group Number clearly on all subsequent submissions.**

Phase II (Soft copy and hard copy)
Deadline: July 9

The deliverables include:

1. A cover page listing all members in the team with their respective sections, GT official email addresses and Canvas usernames, **and group number** assigned in phase 1. **If you don't write your group number on the cover page, we will deduct 5 points.**
2. Copy of the EER Diagram (either from phase I (with any revisions) or from the solution provided)
3. Copy of the Information Flow Diagram from phase I (either from phase I (with any revisions) or from the solution provided)
4. Relational Schema Diagram (Identify primary and foreign keys and show referential integrity using arrows)
5. Create Table statements, including domain constraints, integrity constraints, primary keys, and foreign keys.

Note:

1. **Only one hard copy** should be turned in for the entire group, and each group member should upload an electronic copy on Canvas individually. You will receive -5 penalty if you do not submit an electronic copy.

Phase III (Soft copy and hard copy)
Electronic Submission Deadline: July 25 (prior to first demonstration)
Project Demo Dates: July 25, 26

The electronic deliverables include:

1. A cover page with the **group number** and the group members' names.
2. A text file with all SQL statements for each task (follow the template in the phase II design methodology)

   Note: A set of SQL statements may be required in order to complete one task. However, in such cases, the last SQL statement should show the output according to the specification. Views and nested queries may be used to support the tasks.

3. For heavy weight option, you also need to submit your source code. You need to develop the entire application as a stand-alone application including the front end, menu options and the control flow. The application must have all functionalities described in this document. The TAs must be able to run the application without assistance from the students.

Note: Prior to the demo, the TAs will give guidelines for populating the database with data. The database has to be populated with this data set prior to the demo.

You need to submit your electronic copy of phase 3 to T-Square before July 25 before the first demonstration. Each group member should upload an electronic copy on Canvas individually. You will receive -5 penalty if you do not submit an electronic copy.

On demo day:

Bring your laptop and make sure you have a text file on your laptop with all your SQL queries just in case your application does not work. More details about demo will be discussed later this semester.

Grading

The project will consist of three phases (deliverables) as well as a final demo to the TAs.

Phase I and Phase II of the project are each worth 10% credit.

Phase III (20% for heavy-weight or 10% credit for light-weight, depending on option):

Heavy Weight Option (20%): The students would be required to use the embedded SQL feature of MySQL which allows you to embed SQL statements in a standalone application.

Lightweight option (10%): The students would be required to demo the SQL queries on the MySQL console. Those who choose the light weight option would be required to take the Final exam.

Note that you can always change your option until the demo starts. Once TA starts to demo your project, you cannot change heavy-weight option to lightweight or vice versa.

Final Exam (10%): This would be only taken by students who have opted for the lightweight phase III. Under no circumstances would a heavy weight option student be allowed to take the Final.

GroceryTech.com

GroceryTech.com is a grocery to home delivery service. There are three types of users: *buyers, deliverers, and managers.*

The following sections contain a functional description of the system along with some mockup screens. Each section would explain a particular functionality and then present an example screen about it. **You don't have to follow the UI designs, but your program needs to support all the functionalities.** These mockups are just for helping you to understand all the functionalities. A complete reorganization of the user interface is permissible as long as your application supports all the functionality listed below. The sections have been grouped by customer's functionalities and managers' functionalities.

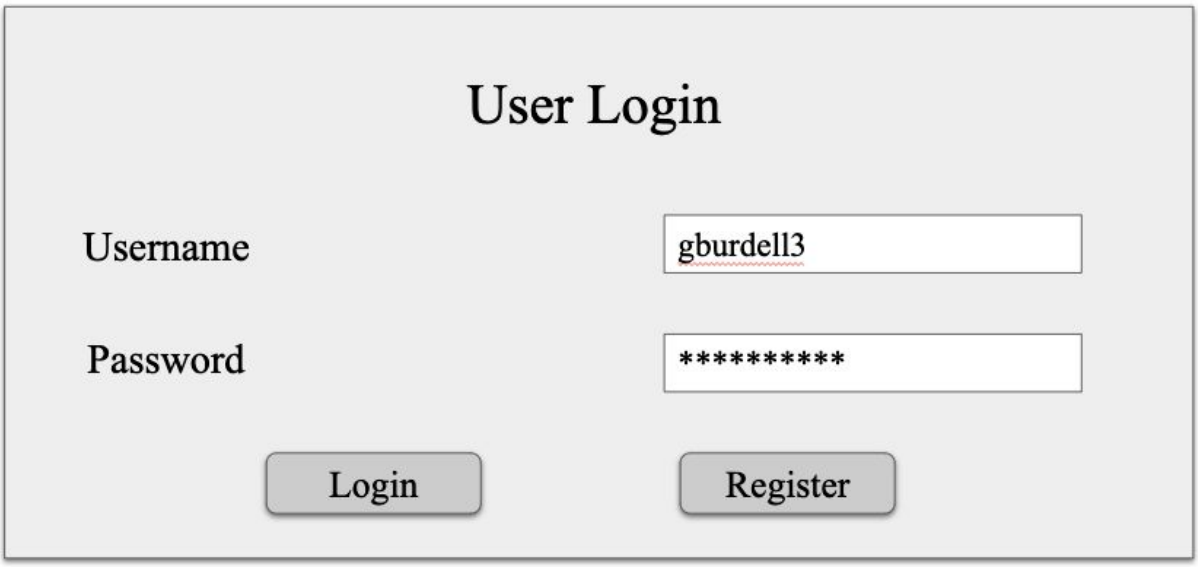
For heavy option, you may implement the project as a traditional standalone application (e.g., using Java GUIs) or as a web application (e.g., using a web scripting language like PHP). There is no restriction on the choice of language (e.g,. Java, Python, Javascript). We will also send an announcement about which languages/tools/software/platforms are allowed later this semester. (Ask the professors for permission if in doubt.)

Initialization Functionality

Log In

Screen 1 shows the login screen. All users must login before using this application. A valid username and password combination is required. If the user provides invalid login credentials, an error message should be shown on the screen. If the user does not have an account yet, the user can click on the register button to create an account.

(1) User Login



Screen 1 User Login

Notes

- All users must login before using the application
- Username is unique for every user
- All users must be directed to the correct functionality screens after successful login
- All users share the same login screen
- Username and password combinations must exist in the database in order for a successful login
- New users must register before login

New User Registration

After clicking the register button in Screen 1, the user will be directed to the new user registration page where the user needs to indicate what type of account they are creating between buyer, deliverer, or manager (Screen 2).

To register a buyer account (Screen 3):

- The system needs to verify that all fields are filled, Username is available, and Password and Confirm Password are the same. Email address does not have to be unique but valid. An error message should be shown if any of these requirements fails. All these requirements also apply to creating deliverer account or manager accounts.

To register a deliverer/manager account (Screen 4/5):

- The user needs to have Deliverer/Manager Password in order to create a deliverer/manager account. (Hence only people who know the deliverer/manager password can create deliverer/manager accounts.) The system also needs to check if the deliverer/manager code is correct.

Notes:

- Email is **not unique**. This way a user has the ability to sign up to be both a buyer, deliverer, and/or manager if the user has the necessary credentials. However, the Username must be **unique.**
- Hint: You could have a ‘System Info’ entity in the database to store system information, such as the deliverer/manager code.

(2) Register Navigation

Screen 2 User Registration Navigation

(3) Register Buyer

Screen 3 Buyer Registration

Notes

- All fields are required
- Username is **unique**
  - Could have more than one account per email, e.g. if uses is deliverer and buyer
- *Password* and *Confirm Password* must match
- Email format must be:
  - alphanumeric values + “@” + alphanumeric values + “.” + alphanumeric values
- *Phone* is a 10-digit number
- *Zipcode* is a 5-digit number
- Account type will be “Buyer”
- Throw an error if any of these requirements are not met

(4) Register Deliverer

Screen 4 Deliverer Registration

(5) Register Manager

Screen 5 Manager Registration

Notes

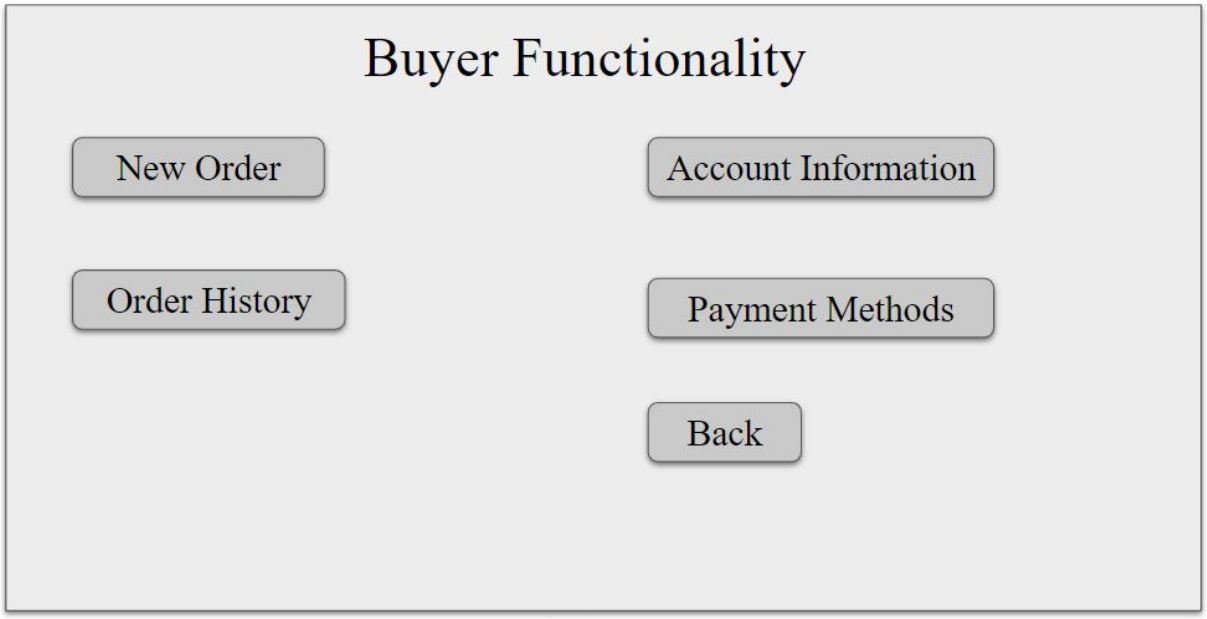
- Confirmation code required to register as a deliverer/manager
- Assign a store as a requirement

Buyer Functionality

Buyer Home Page

After logging in as a Buyer, the user will be taken to the Buyer Home Page (see Screen 6). This page lists Account Information, New Order, and Order History.

(6) Buyer Functionality



Screen 6 Buyer Functionality

Account Information

On the Buyer Home Page page, there is an Account Information button. Clicking on this button, the buyer will be directed to Account Information page (Screen 7), where the user can view saved card credit card information (account number and routing number), saved preferred grocery store (name, address), phone number, and buyer address (building number, street, zip code, city, and state). This information should have the functionality to be updated with a Manage Buyer Profile page.

(7) Buyer Account Information

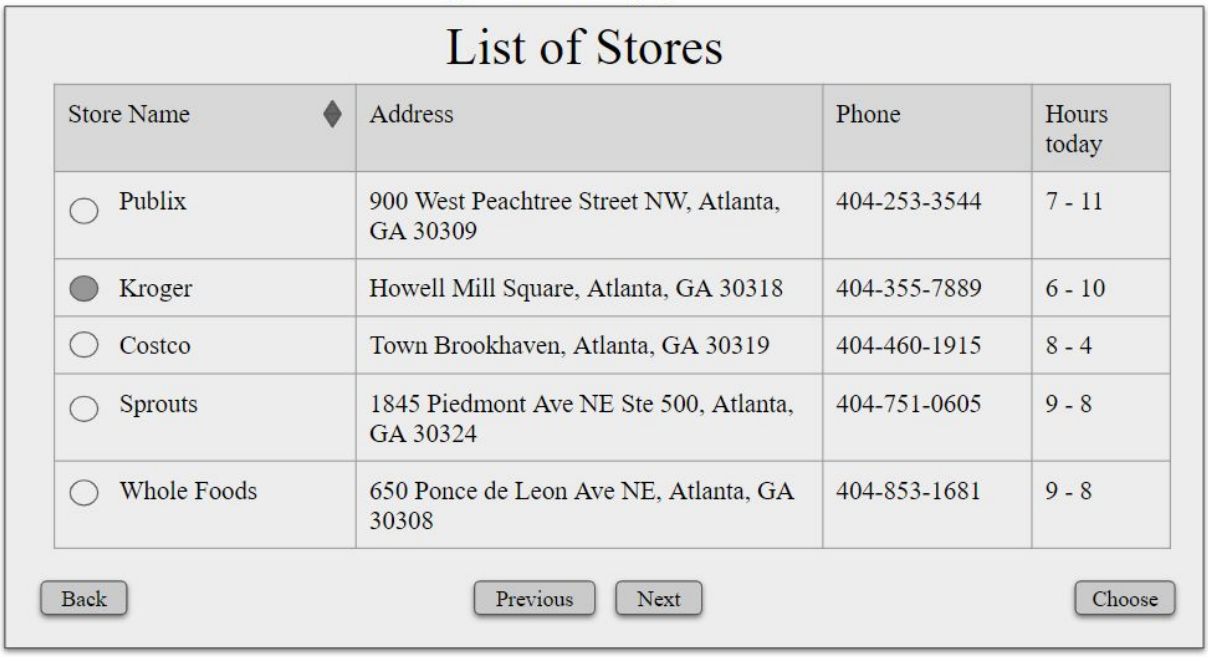
Screen 7 Buyer Account Information

New Order

The new order button will direct the buyer to a page where they are asked what store to choose from (Screen 8).

Note: *You do not have to add functionality to measure distance and populate the closest store. You are welcome to implement this feature but this is outside of the focus of this class.*

(8) Store Homepage



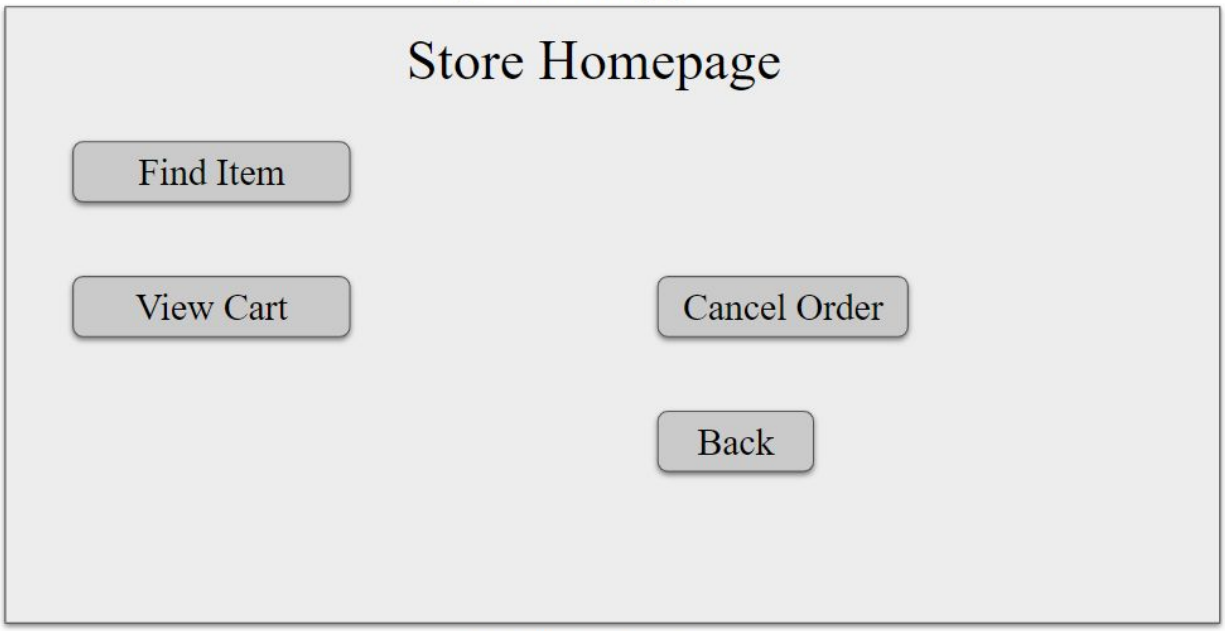
Screen 8 Store Homepage

Notes

- Order by store name functionality
- *Back Button* navigates to New Order page
- *Previous Button* navigates to previous 5 stores
- *Next* navigates to next 5 stores
- Must have selected a store to click *Choose*
    - The user can only select one store at a time

After the store is selected, the buyer should be brought to a page that has look up for items in that store listed by type of item (Screen 9/10/11). Type of items include: **Beverages, Baking Goods, Canned Goods, Dairy, Frozen Foods, Meat, Produce, Cleaning Products, Personal Care, Others.** A list should be populated by the item search that contains the following information: Name of Item, Quantity (remaining in the store), Store Price, Expiration Date, and Small Description of the Item. The buyer should then be able to add the item to their 'Cart.' When the buyer is ready, they should be able to click a button that says 'Checkout.'

(9) Store Homepage



Screen 9 Store Homepage

(10) Find Item

Screen 10 Find Item

(11) Beverages

Screen 11 Beverages

Checkout

This page will populate the items the buyer has indicated what they want to purchase (Screen 12). A remove options should exist for each item as well as the total amount for the items in the cart. A field should indicate a delivery time with the default option being 'as soon as possible.' An error should be thrown if the store is not open during the delivery time. A 'Checkout' button should be at the bottom of the page to direct the user to the Checkout page (Screen 13).

(12) Cart

Cart

Total items: 13

Item Name	Description	Quantity	Price	In Stock
Dasani Water	1.5 L bottled water	3	3.99	yes
Sprite	Lemon Lime Soft Drink, 12 fl oz, 12 pack	2	4.69	yes
Coke	Coca Cola Cherry Coke, 12 oz, 12 pack	2	3.98	no
Pepsi	Pepsi, bottles 16.9 fl oz, 6 pack	1	3.49	yes
Lipton Tea	Diet Lipton Green Tea, Citrus, 12 count, 16.9 fl oz	5	4.98	yes

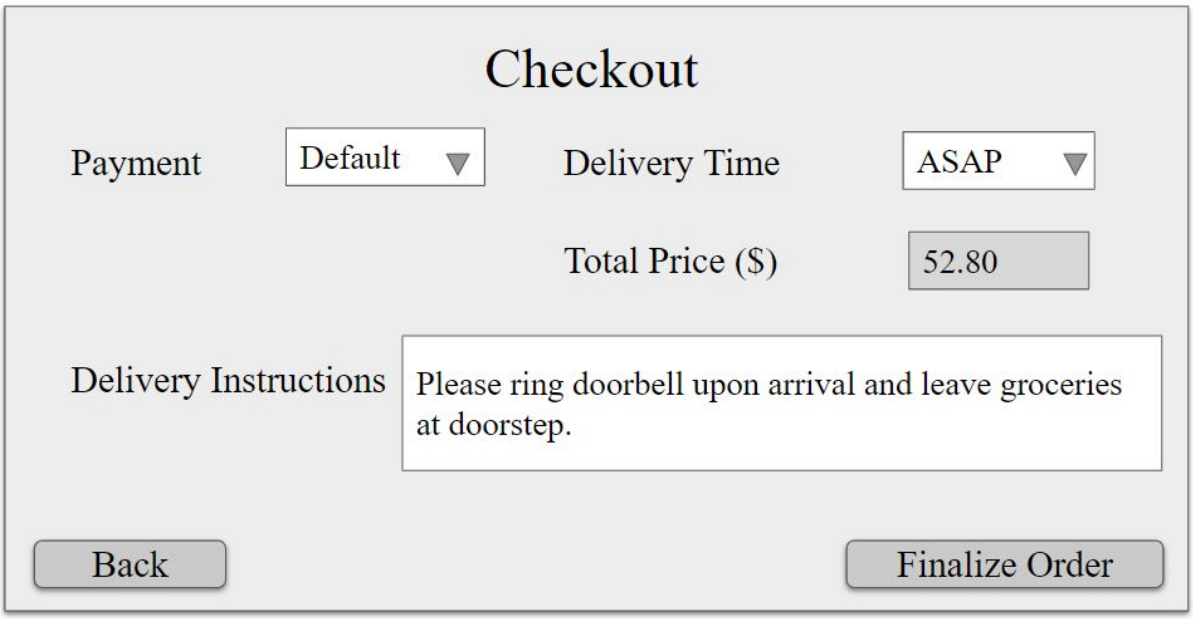
Back | Previous | Next | Delete | Checkout

Screen 12 Cart

Notes

1. To delete an item from the cart, either decrease quantity using down arrow until 0 or select item and press delete
    a. Only one item may be selected at a time
    b. A check should be in place to remove 0 quantity items in the cart
2. *Back* will navigate to Find Item page
3. Total number of items should be derived and displayed

(13) Checkout



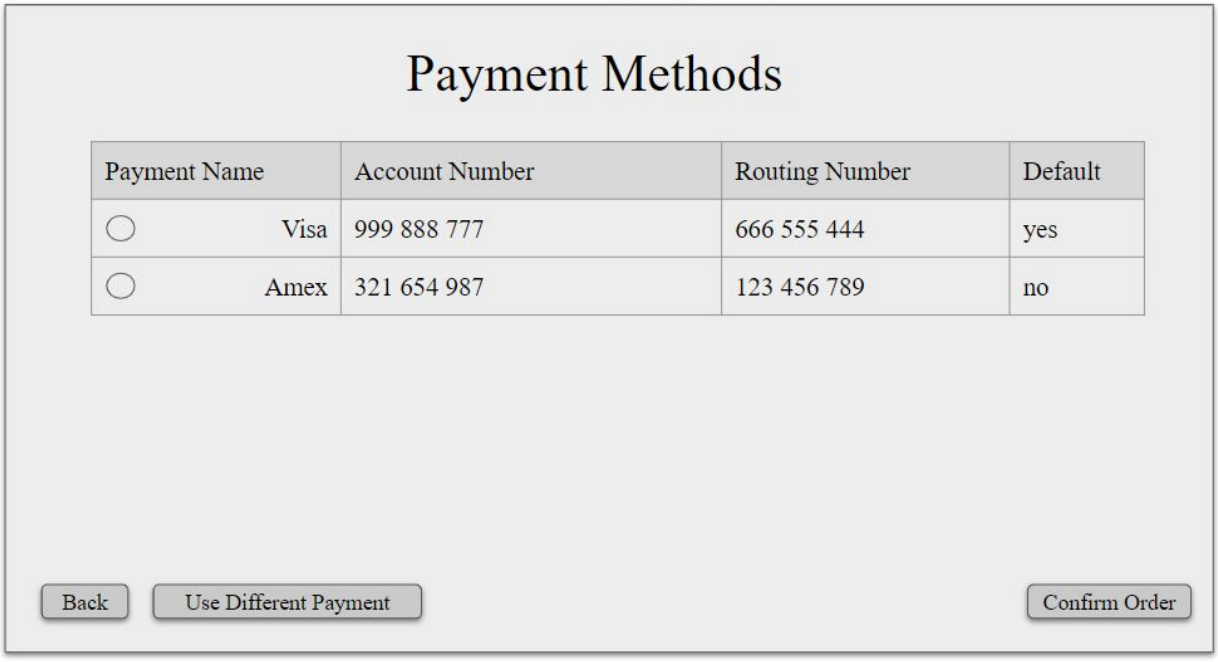
Screen 13 Checkout

Notes

1. Payment dropdown from payment methods of Screen 14
2. Delivery times
    a. Drop down of: ASAP, in 1 hour, in 2 hours, 5 hours, in 10 hours, in 12 hours, in 24 hours
3. *Back* navigates to Cart page
4. *Finalize Order* navigates back to respective user's homepage

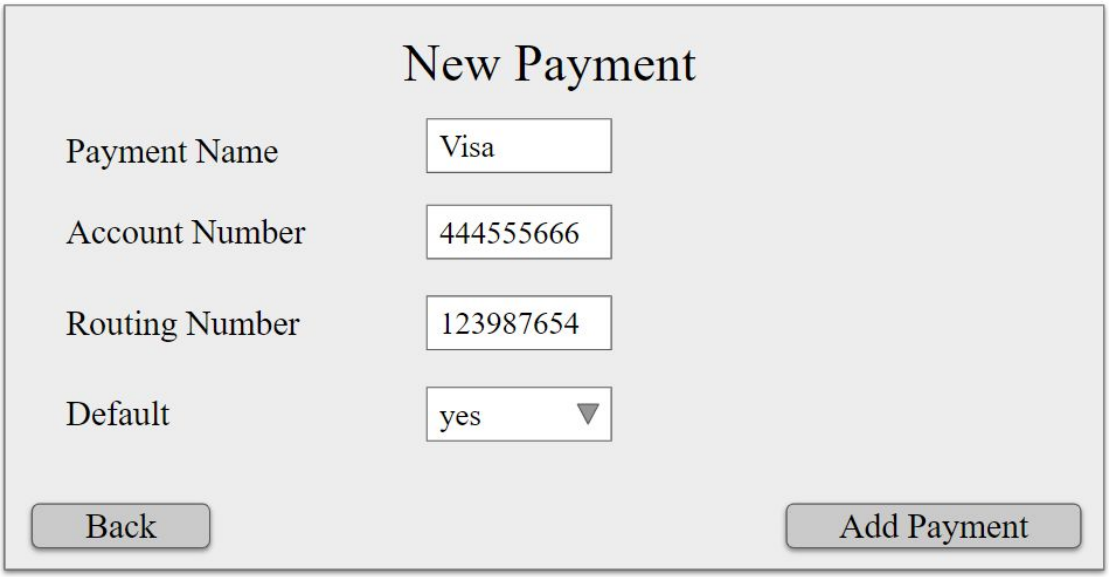
In the Payment Methods page (Screen 14), the buyer should see their saved credit card information on is page as well as other registered credit cards. If the ‘Use Different Payment’ option is indicated, a page will populate to input a new credit card number and routing number for the order as well as a button to ‘add payment’ (Screen 15). A ‘Confirm Order’ will be on Screen 14 and by clicking the Confirm Order button, one of the store’s deliverers will be assigned to deliver the order. The buyer will be brought to a Receipt page that shows the order number, number of items ordered, payment name, time order placed, time of delivery, and the deliverer they are assigned to (Screen 16). A ‘Home’ button should take a user back to the Buyer Functionality page.

(14) Payment Methods



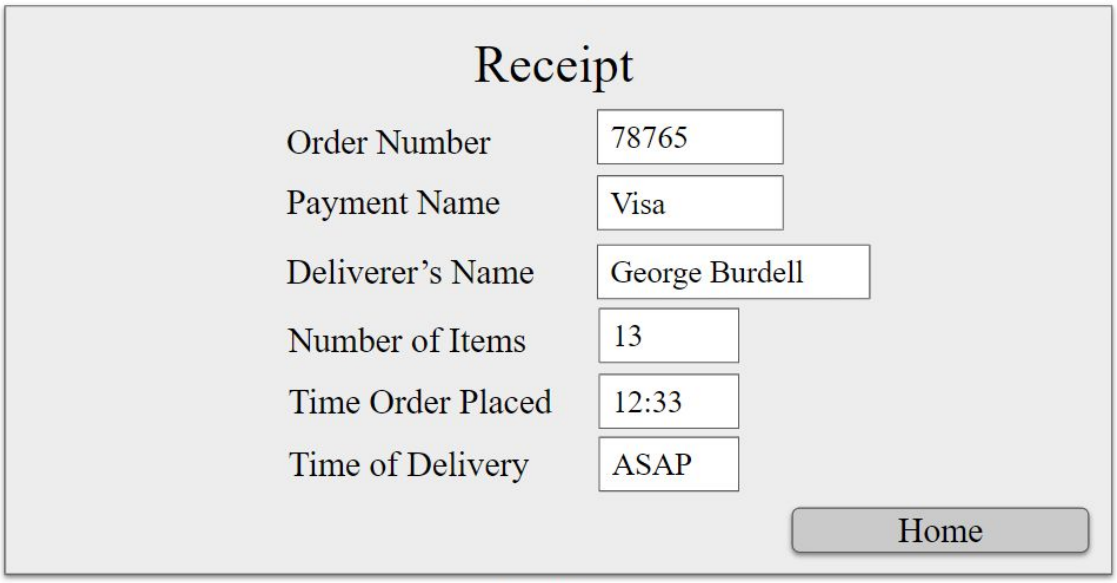
Screen 14 Payment Methods

(15) New Payment



Screen 15 New Payment

(16) Receipt



Screen 16 Receipt

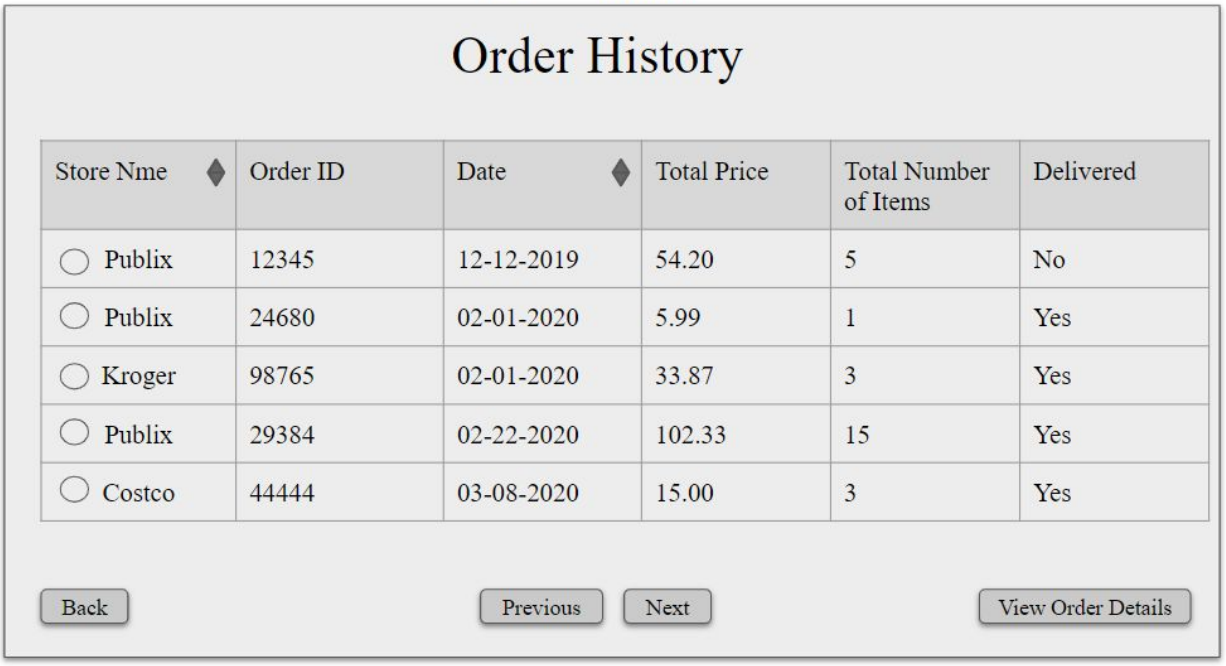
Notes

1. *Account Number* 9 digit number
    a. Spaces between every 3 numbers not necessary
2. *Routing Number* 9 digit number
    a. Spaces between every 3 numbers not necessary
3. Only one default payment method allowed
4. *Back* navigates to respective user's homepage

Order History

This page will populate all orders (including and indicating orders that have not been delivered yet) in ascending order of time the order was placed. When viewing an order, the page should include: the store, order ID, date, total price, total number of items, and whether the order has been delivered yet (Screen 17).

(17) Order History



Screen 17 Order History

Notes

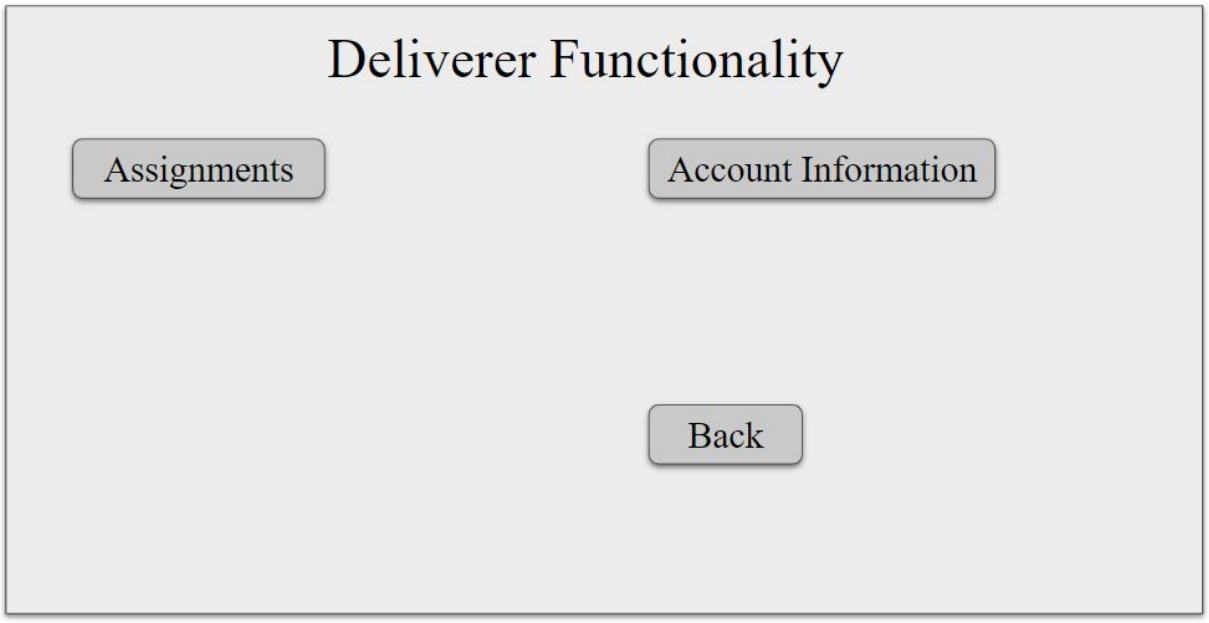
1. Must select one order to see order details
    a. Can only select one order at a time
2. *Back* navigates to Buyer Functionality Homepage

Deliverer Functionality

Deliverer Home Page

After logging in as a Deliverer, the user will be taken the Deliverer Home Page (Screen 18). This page lists Account Information and Assignments.

(18) Deliverer Functionality



Screen 18 Deliverer Functionality

Account Information

On the Deliverer Home Page page (Screen 19), there is an Account Information button. Clicking on this button, the deliverer will be directed to Account Information page, where the user can view name, username, and associated email.

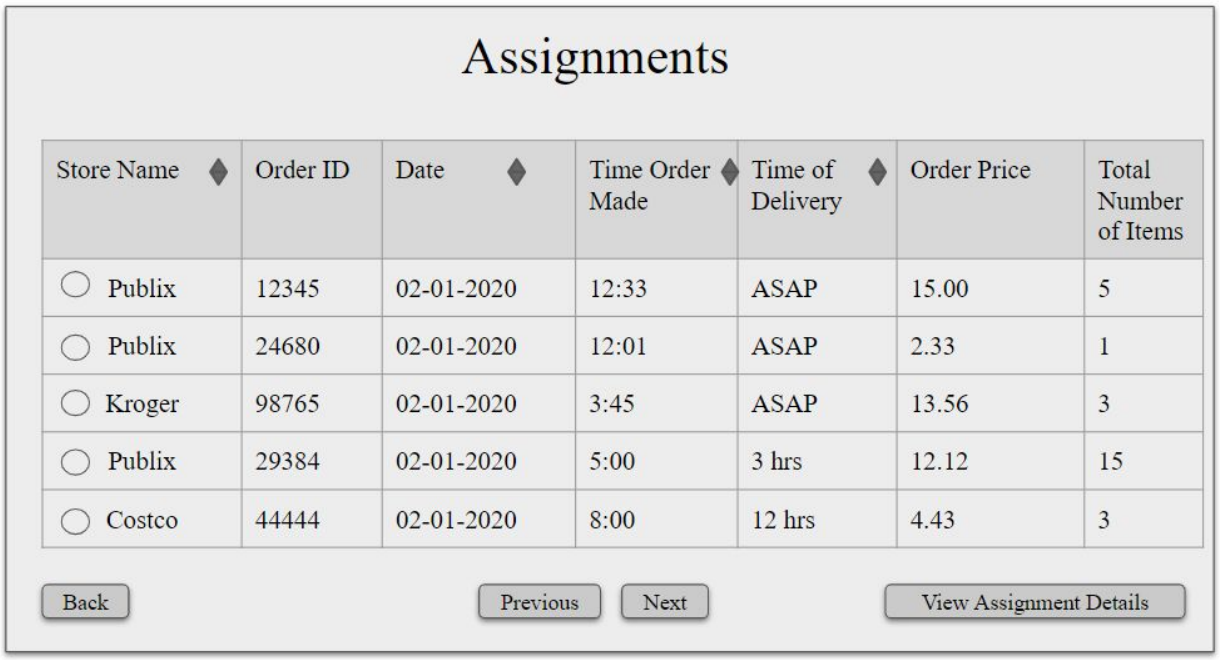
(19) Deliverer Account Information

Screen 19 Deliverer Account Information

Assignments

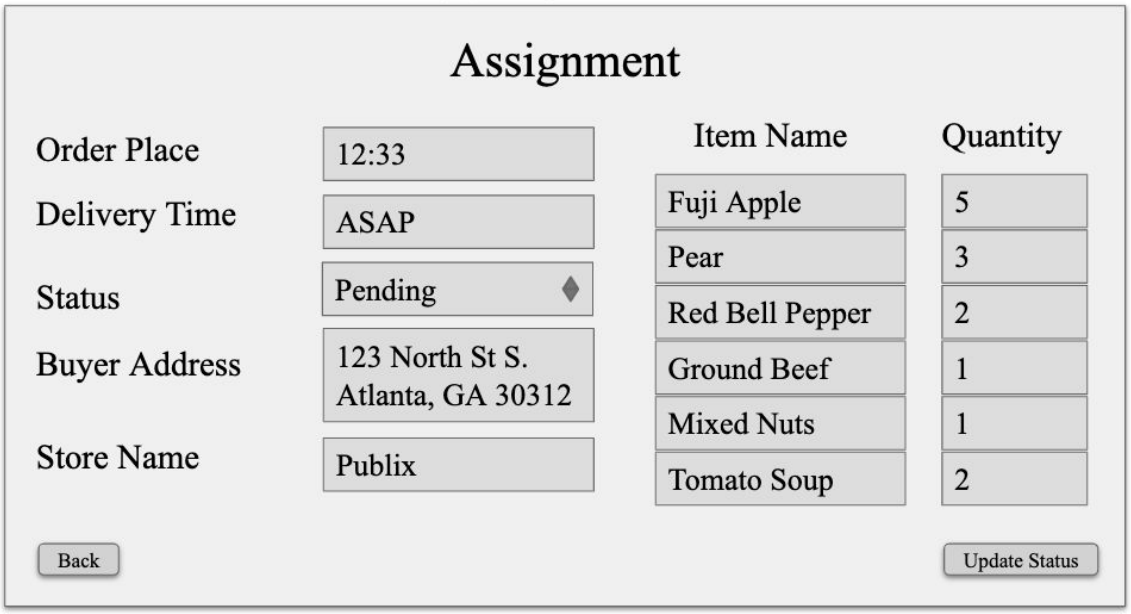
A page will populate with the outstanding orders assigned to the deliverer with dates for each order placed. This will list number items from the store, the store name, date placed, time of the order, time of delivery, and order price (Screen 20). A ‘view assignment details’ button will populate time the order was made, time of delivery, the address of buyer, store name, and the item name and quantity (Screen 21). This screen will also indicate an option for the deliverer to say whether or not the order has been successfully fulfilled.

(20) Assignments



Screen 20 Assignments

(21) Assignment



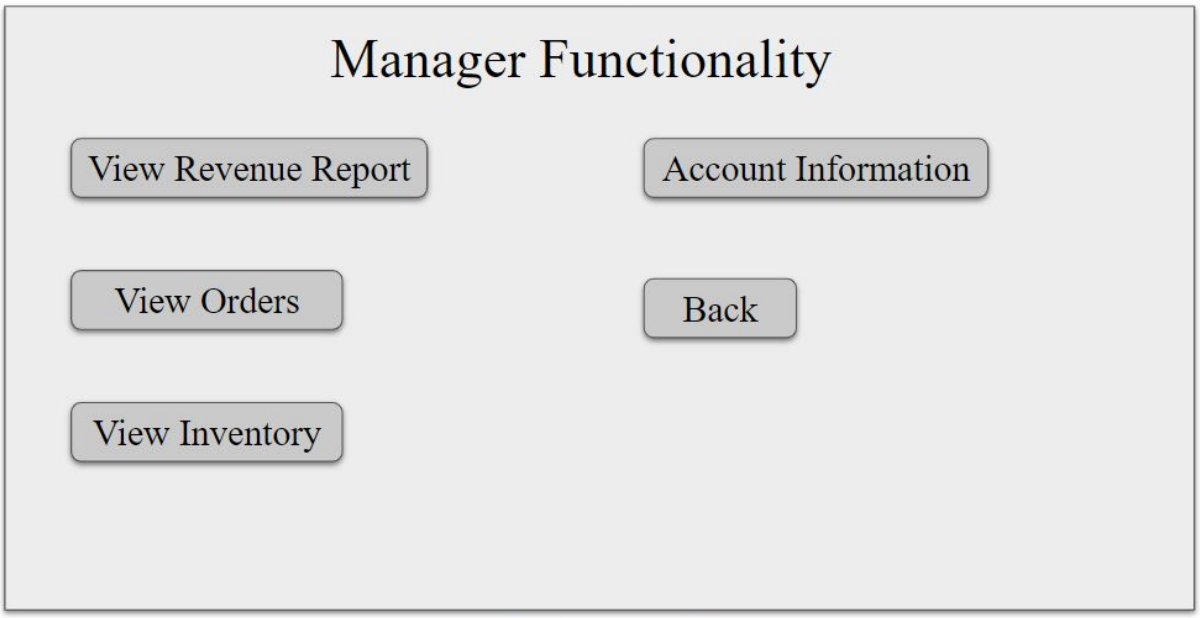
Screen 21 Assignment

Manager Functionality

Manager Home Page

After logging in as a Manager, the user will be taken the Manager Home Page (Screen 22). This page lists Account Information, View Outstanding Orders, View Inventory, View Revenue Report.

(22) Manager Functionality



Screen 22 Manager Functionality

Account Information

On the Manager Functionality page (Screen 23), there is an Account Information button. Clicking on this button, the user will be directed to Account Information page, where the user can view the name of the manager, the username, phone number, grocery store name, and store address.

(23) Manager Account Information

Screen 23 Manager Account Information

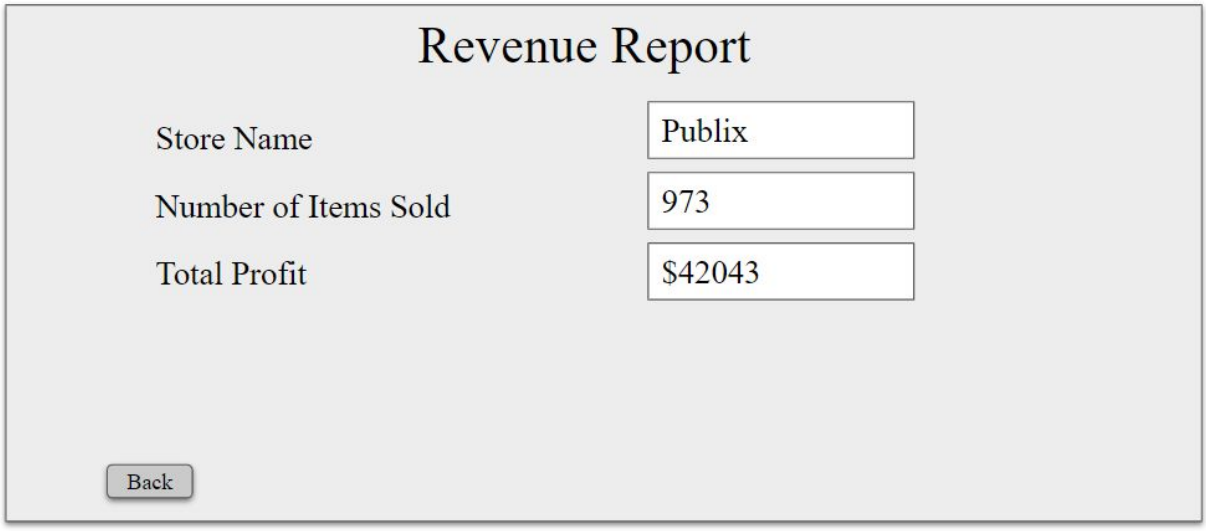
Notes

1. The Manager must be connected to a grocery store, cannot update to a blank store

View Revenue Report

A page will be populated with a revenue report for the *last year* of how many items have been sold, and the difference is calculated from the store price of the sold item and the wholesale price of the item (Screen 24).

(24) Revenue Report

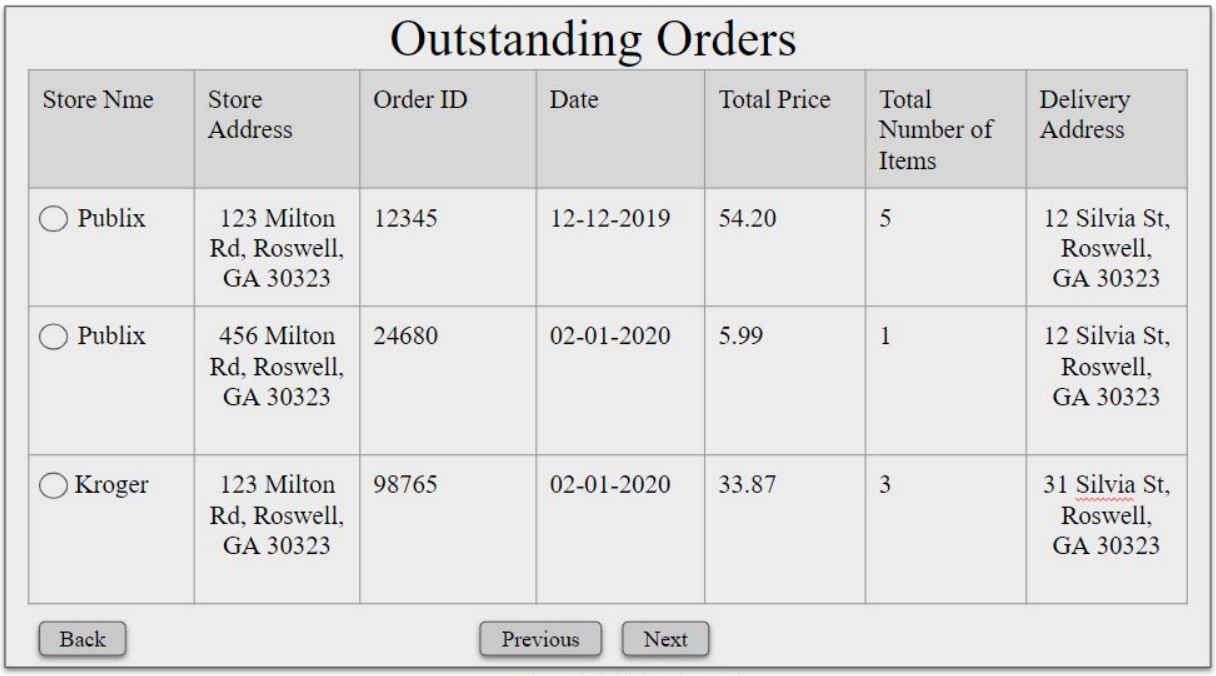


Screen 24 Revenue Report

View Outstanding Orders

A page will populate with the outstanding orders of the store the manager is assigned to with dates for each order placed. This will list all of the items from of the store, the store address, and the buyer's address (Screen 25).

(25) Outstanding Orders

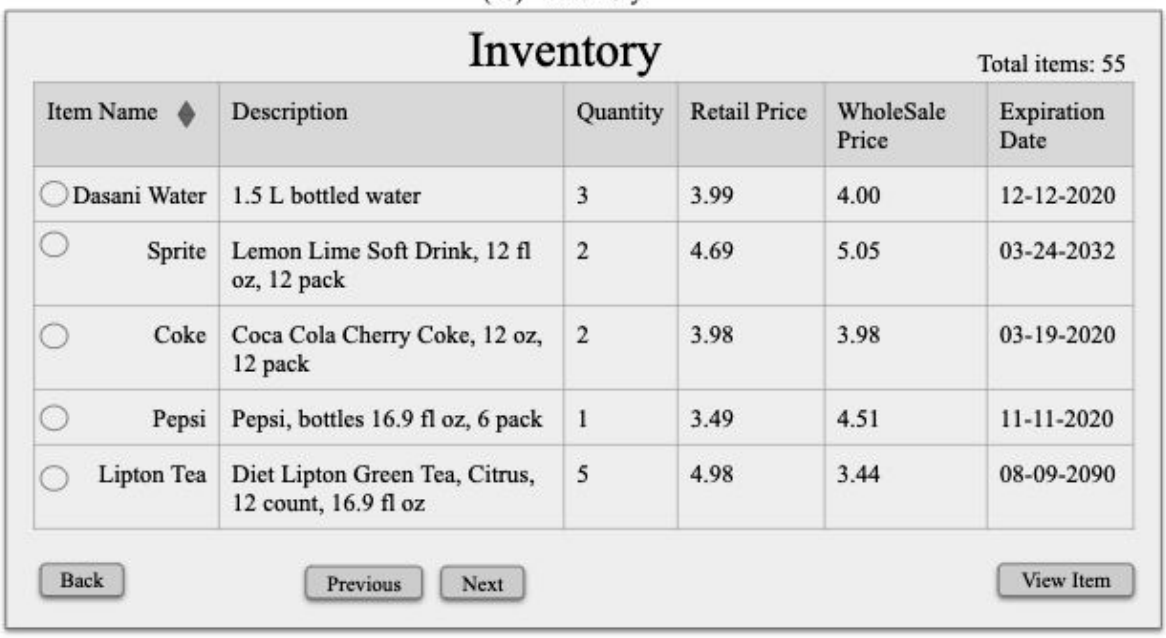


Screen 25 Outstanding Order

View Inventory

A list of items the store currently has should be populated that contains the following information: Name of Item, Quantity (remaining in the store), Store Price, Wholesale Price, Expiration Date, and Small Description of the Item. A functionality should be made to add an item (with the same properties) and a delete item button (Screen 26).

(26) Inventory



Screen 26 Inventory

Document Version Information

Version	Notes	Date
0.1	Initial Draft	5/22/2019
0.2	Revisions From Instructor Comments and Reducing the Quantity of Functionalities	5/28/2019
1.0	Project Final Draft Posted To Canvas	5/28/2019
1.1	- Added in functionality to the Assignment page for Deliverers to indicated whether an order has been delivered. - For addresses, the street name was split into street_name and house_number. - Added page numbers - Screen 7: edited “Prefered credit card” to “Prefered credit card number” - Screen 7 and 19: added “routing number” - Screens 19 and 23: removed address - Screen 26: removed add item and delete item - Small grammar corrections	6/4/2019 and 6/10/2019