Requirements Specification Document

Best SENG Painting Company (BSPC)
Mobile Ordering System

Brainstorm Consulting

November 8, 2018

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

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Revision History

Name	Date	Reason for Changes	Version
Requirement Document	02/10/2018	Initial Document	1.0
Requirement Specification Document	30/10/2018	Addition of Modelling, Incorporation of Client Feedback	0.9
Requirement Specification Document	07/11/2018	Client feedback for version 0.9	1.0

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1. Introduction

1.1. Purpose

This is the second release of the Requirements Specification Document for the Best SENG Painting Company Mobile Ordering System project (hereafter known as the Mobile Ordering System). It follows the Requirements Document that was previously written for the Mobile Ordering System. The following is a response to the Request for Proposals (RFP) offered by the Best SENG Painting Company (hereby referred to as BSPC). BSPC is searching for a mobile-based software system that offers new ways to order paint that complement the current paint ordering procedures. The following document details the requirements of the overall system, its features, external interface, non-functional features as per the RFP, elicitation from the clients, and feedback from a previously written Requirement Document. The document also contains models of the new system to be developed by Brainstorm Consulting.

1.2. Project Scope

The Mobile Ordering System will complement the existing ordering methods and provide customers of the BSPC with an additional method to purchase paints. Extending the existing system will allow customers to make more informed decisions on the paint they should purchase and reduce the amount of time employees use to process orders.

The Mobile Ordering System will be used primarily by both individual customers with small orders (for example those painting their own homes) and contractor customers (for example those purchasing paint on a regular basis). The employee's participation in the Mobile Ordering System will be limited to receive pick slips from the printer. The further actions taken by the employees are not considered part of the Mobile Ordering system.

The Mobile Ordering System must:

- Allow customers to order paint with ease and speed.
- Reduce the amount of manual input (such as inputting received orders) by employees, reducing demand on employee time.
- Allow automation of the order processes, freeing employees to perform another task.
- Allow each customer to access their own order history and use past orders to add to new orders.

1.3. Glossary of Terms

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

Back end system: The server that receives and processes incoming orders, stores data for the company and generates output including pick slips.

Cart: A list of products the user has selected for purchase.

Contractor: A customer that can be identified by a unique Contractor ID and may receive discounts.

Customer: Intended user of the Mobile ordering system.

Customer profiles: Information that the system stores about customers.

Model: A diagram representation of a process.

Must: Mandatory feature that needs to be incorporated into the Mobile Ordering System.

Pick Slips: A slip containing order information and customer information. Employees use pick slips to fill orders.

Pick System: The existing system used by employees to track orders; generates pick slips.

Place Order: Functionality allowing customer to submit the products in their cart as a finalized order.

Should: Not mandatory behavior, but highly desirable.

Source: The page from which the customer navigated from to reach the current page. i.e. If a ‘back’ button is pressed the customer will return to the source page.

1.4. References

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IEEE Software Requirements Specification Template: used for guidelines for requirements document.

(Not properly referenced!)

1.5. Overview

The next sections provide information on:

- The problem domain and features of the Mobile Ordering System, including the major users of the system, design considerations, assumptions, and constraints.
- Major system features and models describing them.
- External interfaces with which the Mobile Ordering System will be required to work.
- Additional non-functional or other requirements.
- Models explaining the design of the Mobile Ordering System.

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2. Overall Description

2.1. Product Perspective

The product will be a mobile application-based system. The existing methods of purchasing paint are to place an order via email, phone or text message, or in person. In the existing system each order is inputted to the pick system which generates a pick slip, and an employee uses that pick slip to process the order. The Mobile Ordering System should work seamlessly alongside the existing ordering system.

2.2. Product Features

Primary Features:

- Each customer must be able to obtain automated paint selection guidance. Paint selection guidance should accommodate a varying degree of customer knowledge.
- Each customer creating a mobile order must have the option to add a paint to their order using its serial number.
- Each customer must be able to access their previously placed orders and add any items from previous orders to their current order.
- Each customer that places an order must be provided with an approximate time the order will be ready.
- Each customer must have access to detailed specifications of each paint.
- After order confirmation, a pick slip must be generated and printed automatically.
- There must exist a method of alerting employees when each mobile order is placed.

2.3. User Classes and Characteristics

1. Customer

The customer user class consists people who purchase paint. Customers may

- Be using the system for the first time, and thus may require guidance in selecting the correct type of paint for their purpose.
- Know the exact type of paint they want to purchase by its serial number.
- Have used the Mobile Ordering System before and have past orders saved to their account.

2. Employee

The employee user class consists any person currently working at BSPC.

2.4. Operating Environment

The Mobile Ordering System must run on both iOS and Android devices manufactured from 2010 onwards.

2.5. Design and Implementation Constraints

- To accommodate a variety of phone-user skill sets, the mobile ordering System should be descriptive enough that first time users are able to complete an order without contacting BSPC for assistance.
- There must be an interface between the Mobile Ordering System and the existing pick-slip system.
- Existing phone and in-person ordering methods must not be disrupted.

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2.6. Assumptions and dependencies

- Users can read and write in English or in French.
- Users have internet access on their devices.

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3. System Features

3.1. Register / Login Customer Account

1. Description and Priority

A customer account is integral to the core functionality of the Mobile Ordering System. This allows the customer to be linked to their order history and to provide their contact information. Customer contact information can be used for order confirmation, if the employees of the receiving store deem confirmation to be necessary.

2. Functional Requirements

2.1. The option to create a new account or log in to an existing one should be accessed from the same menu.

2.2. The login/register feature should be accessible from any stage of the ordering process.

2.3. After a successful login/registration, the customer should be returned to whichever screen they were last using before choosing to login/register.

2.4. Successful login/registration will be a required intervening step before the user can access order history (feature 3.4) or place an order (feature 3.5)

2.5. Contractors have the option to input a code into the Contractor ID field in the new customer form to be associated with a company and receive company discounts when logged in.

3. Associated Use Case: Register/Login

Allows the customer to create a customer account on the Mobile Ordering System

Actors

- Customer

Preconditions

- Not logged in to the Mobile Ordering System or not registered under the desired email

Post Condition

- Customer will have access to their list of previously placed orders
- Customer will be able to complete the order process by including the place order use case

Flow of Events

1. Customer selects R*egister* (the R is a different font than "egister") button (Alternate Path A)
2. Customer is redirected to registration form
3. Customer fills out registration form
4. Customer returns to the previous page they were on, and now the customer can include *View Past Orders* and *Place Order* use case.

Alternate Path A

1. Customer selects *Login* button
2. Customer is returned to the previous page they were on

Note: during any step, the user can exit the process and register later.

(In 1, there is indentation but in 2 there isn't)

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

4. Associated Sequence Diagram and UI Model: Register/Login

The customer begins by requesting the registration page from the main page. The Mobile Ordering System then displays the registration form to the customer. The user then inputs their information to the page, including their name, phone number, email, contractor ID (if applicable) and password. The customer then submits this information. If the email is valid, the Mobile Ordering System will confirm the registration to the customer and return them to the sign in/register page. If the email is invalid (for example, the value provided in the email field is already in use by another account, or the email supplied is not formatted as an email address) then the Mobile Ordering System will display an error message explaining the error, and provide the page again with the forms already filled with what the customer filled in.(This sentence is too long) Assuming the customer provided a valid email, the user can then authenticate with the email and password they provided, and the system will confirm the login.

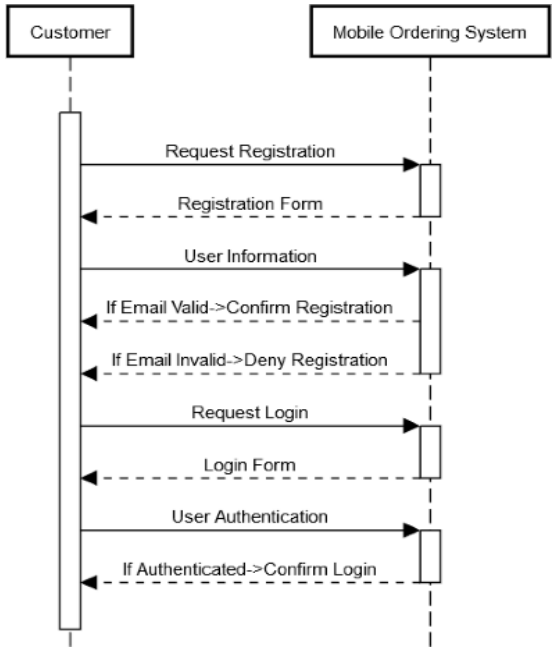

Figure 1:Sequence Diagram for Registration and Sign In

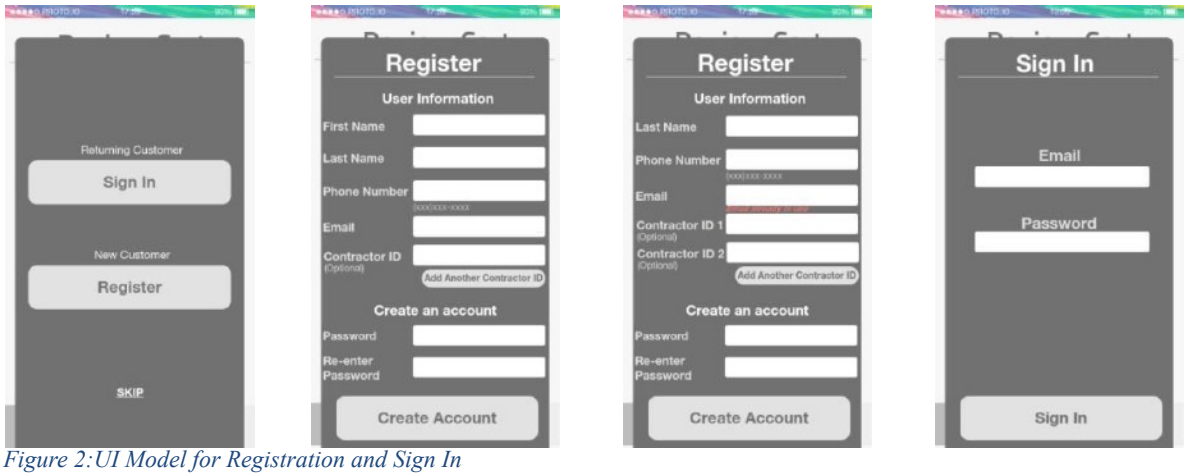

Figure 2:UI Model for Registration and Sign In

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2. Selection Guide

2.1. Description and Priority

The Selection Guide should elicit the customer's needs, and recommend an item based on the information gathered. This is a high priority feature of the system as per BSPC request, and is expected to parallel the elicitation system used by the employees in-store.

2.2. Functional Requirements

2.2.1. The Selection Guide should give the user the opportunity to define their paint needs (e.g. outdoor/indoor) with respect to a variety of categories and be presented with a recommendation upon completion. Please specify categories, or refer to where they are specified.

2.2.2. The Selection Guide should be displayed prominently on the landing page of the Mobile Ordering System – with the expectation that first-time customers will naturally begin by using it – but the Selection Guide should also be easily bypassed by returning customers.

2.2.3. In situations where multiple items may fit a customer's needs, the recommendation page should present a top choice and alternatives.

2.3. Associated Use Case: Search by Selection Guide

Allows the customer to use the Selection Guide. The Selection Guide provides a list of at least 3 products.

Actors

- Customer

Preconditions

- None Weird form attin g

Post Condition

- Customer's desired items will be added to cart

Flow of Events

1. Customer selects the *Selection Guide* button from the starting menu.
2. The *Selection Guide* asks the customer a series of questions before offering suggestions.
3. This question list consists of 5 question; they are as followed:
    a) What environment will the paint be used in?
    b) What type of surface will the paint be applied to?
    c) How will the surface be prepared before paint is applied?
    d) What are the properties of the paint?
    e) What is the specified price range of the paint?
4. The customer answers a minimum set of the questions (questions 'a' and 'b' are the mandatory questions) that the system proposes to them How many is a minimum set?
5. The Mobile Ordering System provides at least 3 suggestions on a paint for the user according to the answer(s) given to the *Selection Guide*
6. The customer selects one or more of the items suggested, views the item description, and adds item to the cart
7. The Mobile Ordering System adds the item(s) to the cart and takes the customer to the V*iew/Modify Order* page.

Alternate Path

1. During any step the user can exit the process and not add an item to cart.
2. If the customer wants to change an answer they provided previously, a customer can return to the previous question.

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2.4. Associated Sequence Diagram and UI Model: Search by Selection Guide

Assuming the customer is logged in and on the launch page, they will click on the Selection Guide button. The Mobile Ordering System will display the Selection Guide, which provides several questions that the customer can answer to allow the Selection Guide to make an informed suggestion. These questions can be read in section 3.2.3. The customer must answer at least one of these questions but can provide answers to as many as the customer wishes. The customer has to answer more than one question to proceed. I believe we specified 4 and 5 as mandatory questions last meeting, with power users being able to skip the questions after they have at least filled them out once. The customer then submits the questions, and the Mobile Ordering System provides the customer with a page with paint suggestions. The customer can then select one of the suggested paints. The Mobile Ordering System then returns the paint description for that paint. The customer can then request the more detailed product specification. The Mobile Ordering System will return the product specification page. From this page, the customer can select a colour and a quantity. The customer will then choose the *Add to Cart* option. The Mobile Ordering System will confirm the order and take the customer to the *View/Modify Order* page.

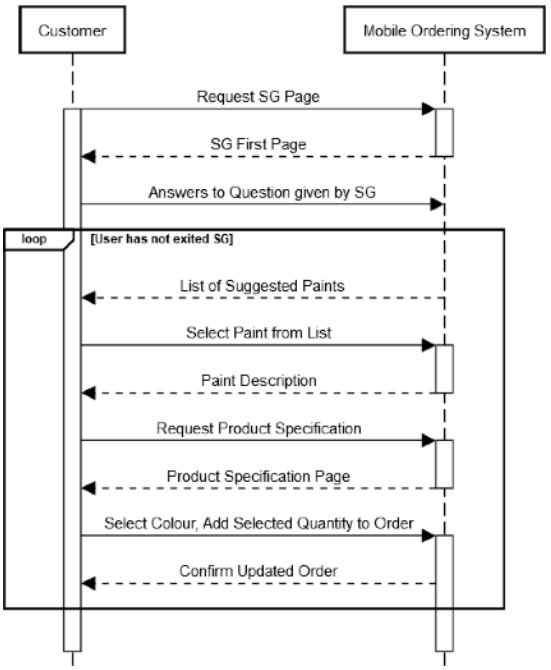

Figure 3: Sequence Diagram for Selection Guide

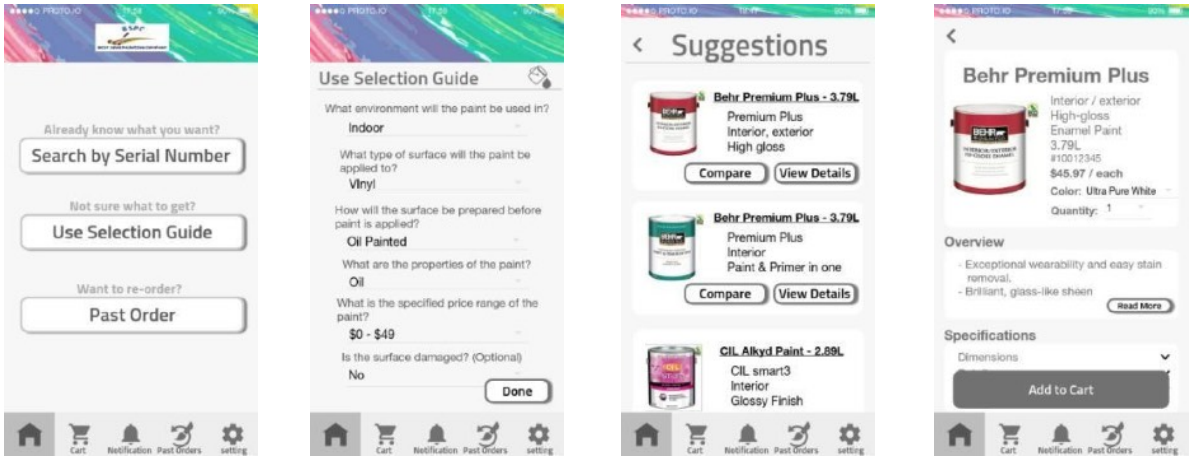

Figure 4:UI Models for Selection Guide

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

3. Serial Number

3.1. Description and Priority

The search function should allow each customer who knows the serial number of a desired paint, to search for specific items. As a large portion of the userbase Typo is expected to be returning customers, this is considered an important part of the app and is given high priority.

3.2. Functional Requirements

3.2.1. The search function should be displayed on the landing page.

3.2.2. The search function must accept any valid serial number as input.

3.2.3. Any attempt to search for something other than a valid paint serial number should yield an error message explaining the search function accepts serial numbers only.

3.3. Associated Use Case: Search by Serial Number

Allows the customer to add paint to order using the paint's serial number

Actors

- Customer

Preconditions

- Customer knows the serial number of a desired item

Post Condition

- An item will be added to the cart

Flow of Events

1. Customer selects the Search by Serial Number from the starting menu.
2. Customer enters serial number
3. Customer views the paint information
4. Customer may view item specification by selecting View Details button
5. Selects the colour and quantity of the item
6. Customer adds item to cart

Alternate Path

1. During any step the user can exit the process and not add an item to cart.

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3.4. Associated Sequence Diagram and UI Model: Search by Serial Number

Assuming the customer is logged in and on the landing page, they will click on the *Search by Serial Number* button. The Mobile Ordering System will provide a page prompting the user for the serial number. The customer will then enter a serial number and submit. If the serial number is invalid, the Mobile Ordering System will display a message asking the customer to enter a valid serial number and redisplay the search by serial number page. If the serial number is valid, the Mobile Ordering System will display the paint associated with that serial number. The customer will then choose to view the detailed product specification for the paint. The Mobile Ordering System will display the detailed product specification. From this page, the customer can select a colour and a quantity. The customer will then choose to *Add to Cart.* The Mobile Ordering System will confirm the order and take the customer to the *View/Modify Order* page.

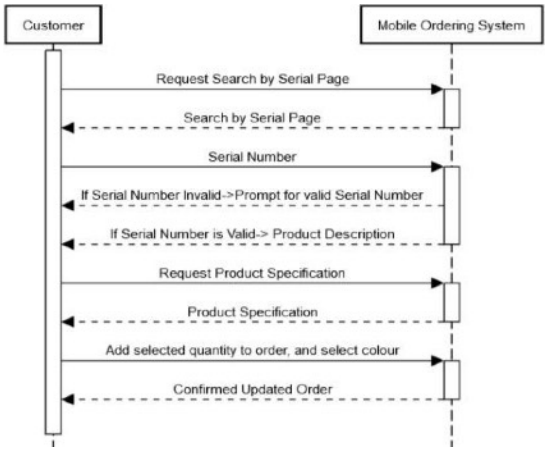

Figure 5:Sequence Diagram for Search by Serial Number

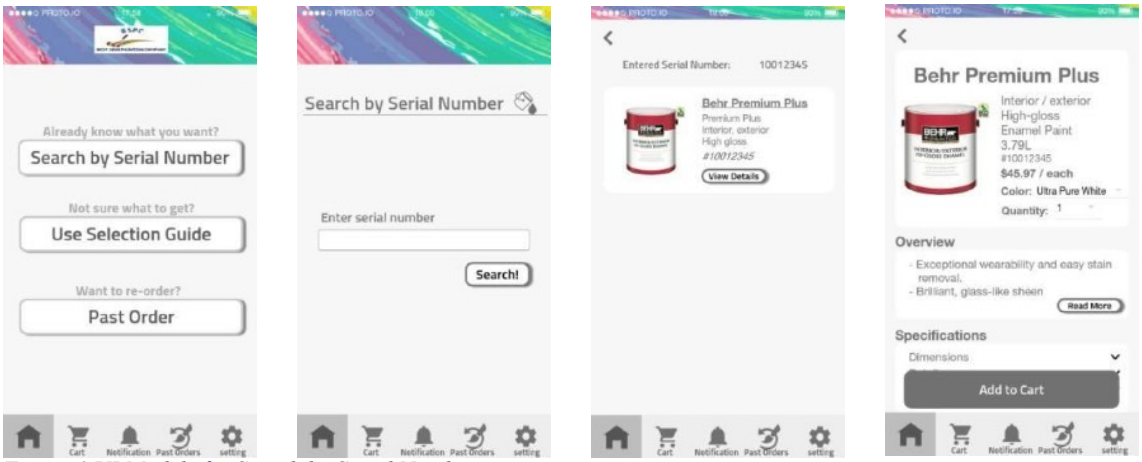

Figure 6:UI Models for Search by Serial Number

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

4. Past Order

4.1. Description and Priority

Returning customers should be able to easily view their past orders and use them as a basis for creating new orders. As a large portion of the user base will be returning customers is given high priority. Grammar

4.2. Functional Requirements

4.2.1. A link to view past orders should be available immediately upon signing into the Mobile Ordering System.

4.2.2. Customer must be able to add items to the cart from past orders.

4.2.3. For anyone who is not registered or logged in, this feature would not be available.

4.3. Associated Use Case: Add item using past orders

Allows the customer to add paint(s) to their cart from past orders

Actors

- Customer

Preconditions

- Customer is logged in
- Customer has placed an order in the past

Post Condition

- Customer's desired items will be added to cart

Flow of Events

1. Customer selects the *Past Order* button from the starting menu
2. Customer's list of past orders is displayed
3. Customer selects a specific past order
4. List of items from the selected order is displayed
5. Customer selects *View Details* to view item specification
6. Customer selects quantity and colour of the item and adds to cart

Alternate Path

1. During any step the customer can exit the process and not add an item to cart.

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4.4. Associated Sequence Diagram and UI Model: Add Product to Order by Past Order

Assuming the customer is logged in and on the landing page, they will click on the *Past Order* button. The Mobile Ordering System will display the previous orders. The customer will then select a past order from the list. The Mobile Ordering System will provide the details of the specific past order, and each paint that was in the past order. A customer will then select one of the paints from the last order. The Mobile Ordering System will then provide a description of that paint. The customer can then request more detailed information on that paint. The Mobile Ordering System will then provide the more detailed specification of the paint. The customer can then select the paint colour and quantity and then add to cart. The Mobile Ordering System will confirm the order and take the customer to the *View/Modify Order* page.

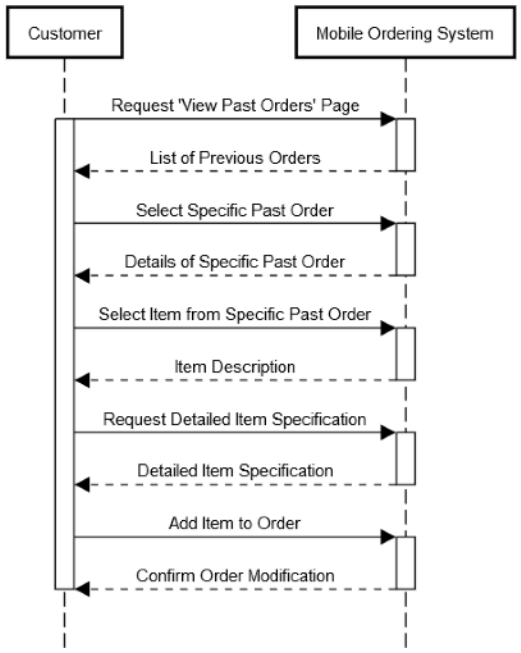

Figure 7: Sequence Diagram for Past Order

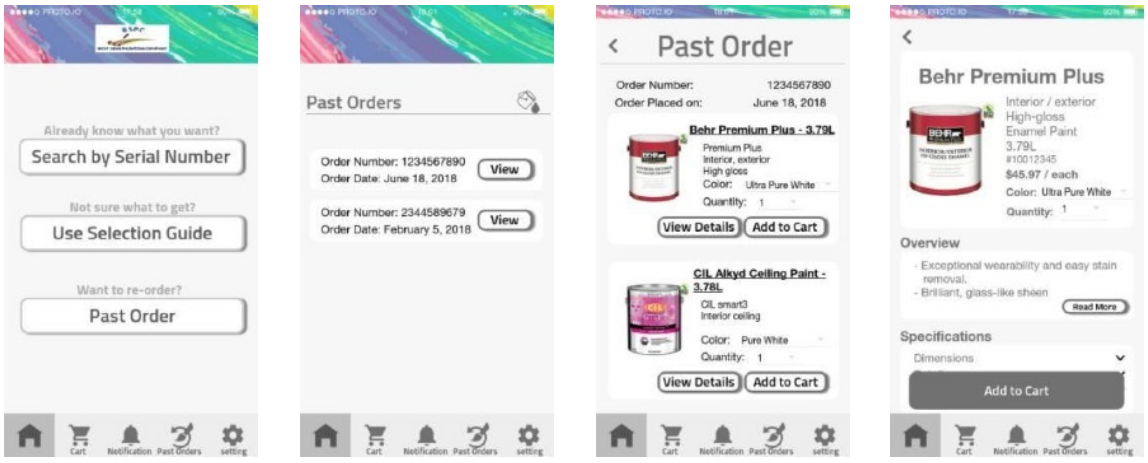

Figure 8: UI Model for Past Order

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

5. Virtual Shopping Cart

5.1. Description and Priority

The customer should have the ability to pick out products they are interested in, and view/edit a list of these products before finalizing the placement of an order. As the virtual shopping cart is used for each order, this feature is assigned high priority.

5.2. Functional Requirements

5.2.1. After an order is placed, the Mobile Ordering Service should produce an estimate as to when the order will be ready for pickup.

5.2.2. The criteria for determining wait time is yet to be determined but may It will be based on the order size and volume of other current orders be based on order size and existence of other orders currently being handled by the selected store.

5.3. Associated Use Case: View/Modify Order

Allows customer to view and adjust their order prior to completion

Actors

- Customer

Preconditions

- At least one product has been added to cart

Post Conditions

- None

Flow of Events

1. Customer is presented with a list of the item(s) they have added to their cart.
   a. Customer adjust colour and/or quantity
   a. Customer can remove any item(s)
2. When customer is satisfied, and there is still at least one item they wish to purchase, they select the *Place Order* option.
3. Since user is logged in, order proceeds to *Place Order*, which is a separately defined use-case.

Alternate Flow

1. If the customer has removed all items from cart before step 2, or the customer has chosen to view their cart before adding any items to it (precondition of having at least one item has not been met), the cart will be displayed as empty and the *Place Order* option will not be available. The customer must return to browsing and add at least one item before this action is possible.
2. If cart is empty, *Place Order* option is greyed out. Customer returns to browsing to add an item before returning to cart (there is a separate use-case for each of the three methods in this process)
3. Customer resumes at step 6 in above Flow of Events.

5.4. Associated Sequence Diagram and UI Model: View/Modify Order

The customer begins by selecting the *View/Modify Order* option. They are then presented with a list of all items and quantities in their current order. From here the customer can select an item from the list to view that item's detailed specifications. They will then be presented with that products specification page. From here the customer can click the *back* button to return to the list of products page. From here the customer can click the *back* button to return to the list of items page. When viewing the list of items the customer can choose to modify the quantity of any existing item on the list. They will then be presented with an updated list of items in their order. When viewing the list of items, the customer can choose to remove an item from the list. They will then be presented with an updated list of items in their order.

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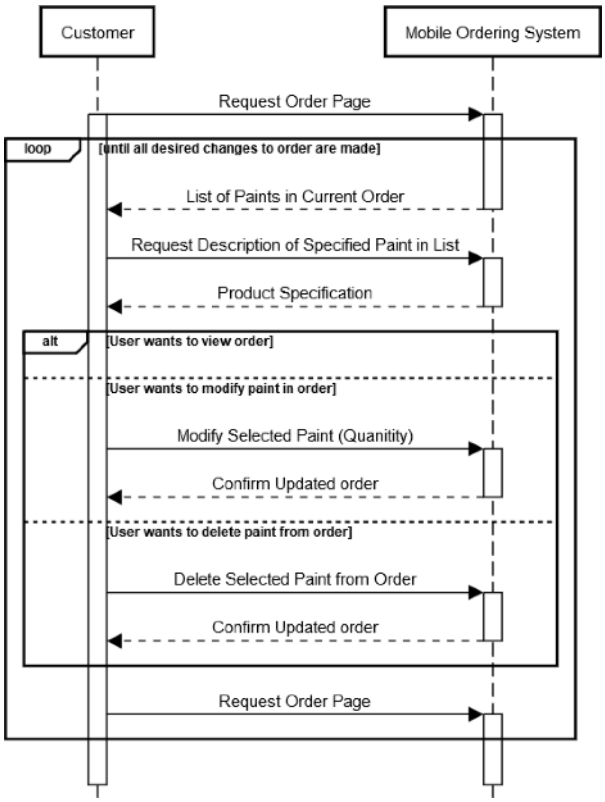

Figure 9: Sequence Diagram for View/Modify Order

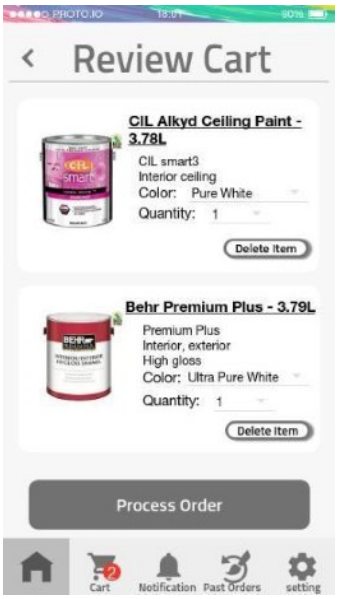

Figure 10: UI model for View/Modify Order

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

6. Select Pick-up Location

6.1. Description and Priority

As part of the order placement process the customer must select a store to pick up from. This feature is high priority.

6.2. Functional Requirements

6.2.1. The select location feature should present the customer with a list of stores as a final step in the ordering process.

6.2.2. Stores near the customer's location (which can be assumed based on the area code of the phone number they used to register with) should appear at the top of the list. Use GPS when applicable, since people sometimes can change location without changing phone number. A person should also be able to search for a store by themselves as well.

6.3. Associated Use Case: Place Order

Allows the customer to order the contents of the cart.

Actors

- Customer

Preconditions

- Customer is registered and logged in.
- Customer has a minimum of one product in the cart.

Post Condition

- Item(s) in the cart are ordered.
- Customer's cart is emptied.
- Printer at selected location prints the pick slip.
- Order is added to the past order.

Flow of Events

1. Customer selects *Process Order*.
2. List of stores is shown with addresses and contact information.
3. Customer selects specific store.
4. Customer selects *Place Order*.
5. Order number, order date, order pick up date and time and store contact information are provided in case of follow up query or order cancelation.
6. Printer at selected store prints the pick slip.

Alternate Paths

1. At any point before step 5, customer can decide to go back and modify order.
2. After step 5 the customer may call the store to make changes or cancel the order.

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

6.4. Associated Sequence Diagram and UI Model: Place Order

Assuming the customer is logged in and on the landing page, they will begin by selecting cart. The Mobile Ordering System then displays the current virtual shopping cart contents. The customer then selects the *Place Order* button. The Mobile Ordering System then presents the details of their order, including items and quantities. The customer must then select a *Pick Up Location*. Once this is done, they may select *Confirm Order*. The Mobile Ordering System then presents a page confirming that the order has been placed and provides the customer with an approximate date and time the order will be ready for pickup along with order number and order date.

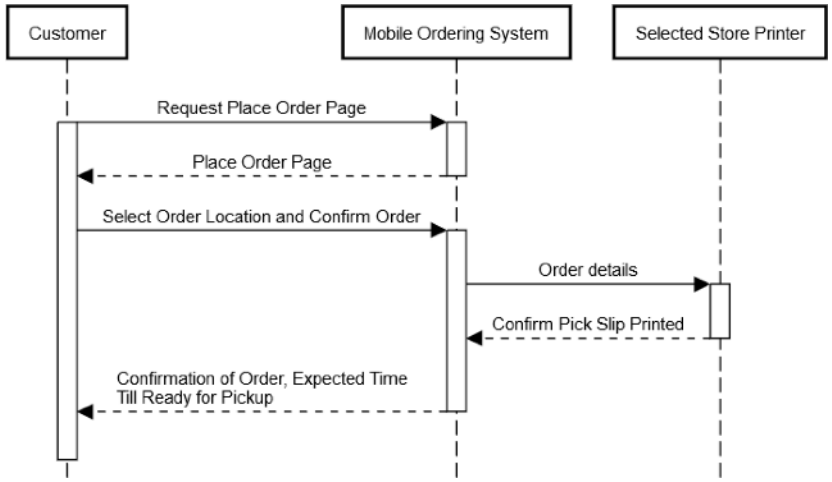

Figure 11: Sequence Diagram for Place Order

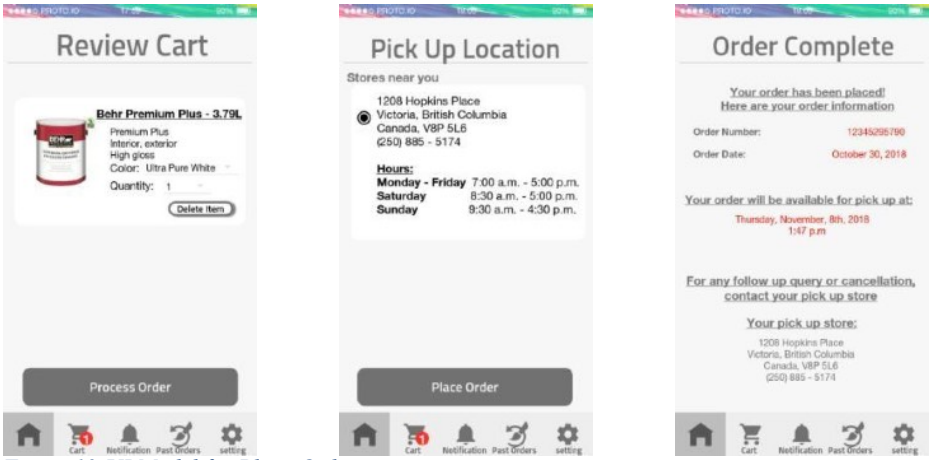

Figure 12:UI Model for Place Order

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

7. Wait time estimator

7.1. Description and Priority

Upon placing an order, the user should be presented with an estimate on when the order will be ready for pickup. This is a medium priority.

7.2. Functional Requirements

7.2.1. After an order is placed, the Mobile Ordering System must produce an estimate as to when the order will be ready for pickup.

7.2.2. The criteria for determining wait time is yet to be determined, but may be based on order size, time of day relative to store hours, and possibly the existence of other orders currently being handled by the selected store.

7.3. Associated Use Case: Place Order (See Section 3.6.3)

7.4. Associated Sequence Diagram and UI Model: Place Order (See Section 3.6.4)

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

8. Product Comparison

8.1. Description and Priority

The user should be presented with the choice of selecting two products and comparing product specifications. This is a medium priority.

8.2. Functional requirements

8.2.1. The product comparison feature should allow the customer select two products at a time and produce a product description and specification of each product side by side.

8.2.2. The user should be able to place orders based on compared products.

8.3. Associated Use Case: Compare Product

Allows the customer to compare two products at a time.

Actors

- Customer

Preconditions

- Customer has completed one of the selection processes (features 3.2, 3.3, 3.4), and has identified one product against which they wish to make comparisons.

Post Condition

- Customer is given a list of specification and description of two selected products.

Flow of Events

1. Customer selects a product to compare using a selection process (features 3.2, 3.3, 3.4).
2. Customer selects a second product to compare using a selection process (features 3.2, 3.3, 3.4).
3. Customer selects ‘Compare Items’
4. List of both products including the product description and detailed specifications are displayed.

Alternate Paths

1. At any after step 1 customer can deselect any product and replace it with another.

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

8.4. Associated Sequence Diagram and UI Model: Compare Paints

Once a customer has been presented with various recommended paints from the Selection Guide they begin by clicking one of the Compare buttons located next to each item listed. The Mobile Ordering System will then return a Product Comparison Page. The customer must then select a second item. The system will then return a page showing specifications for both items selected. The customer can specify a quantity and colour and add one of the items to their current order (quantity and colour selecting option is displayed below 'Specification'). The Mobile Ordering System will then return a page to the customer confirming that the item has been added to the order. From the Product Comparison Page a customer can click the *back* button. The Mobile Ordering System will return the customer to the source page.

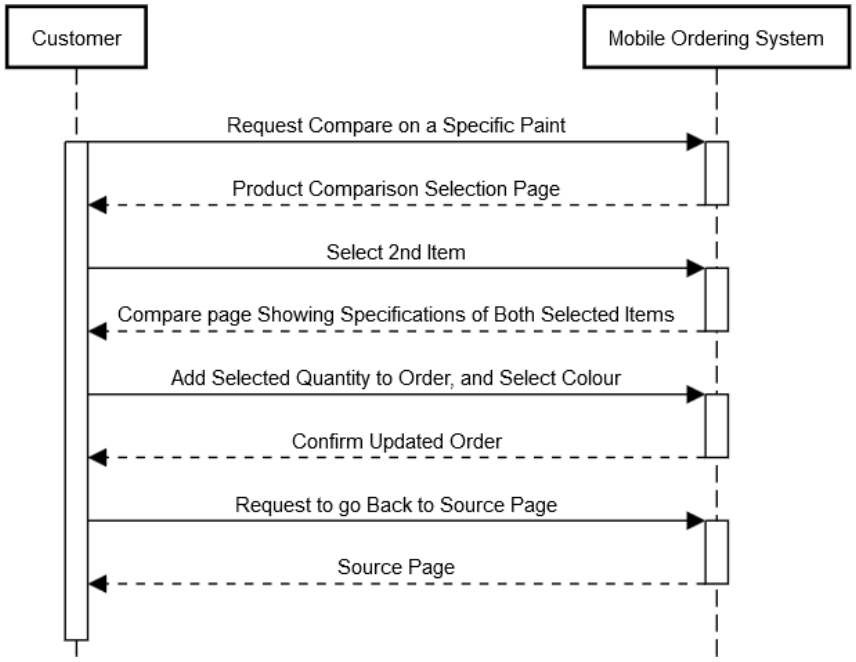

Figure 13:Sequence Diagram for Compare Product

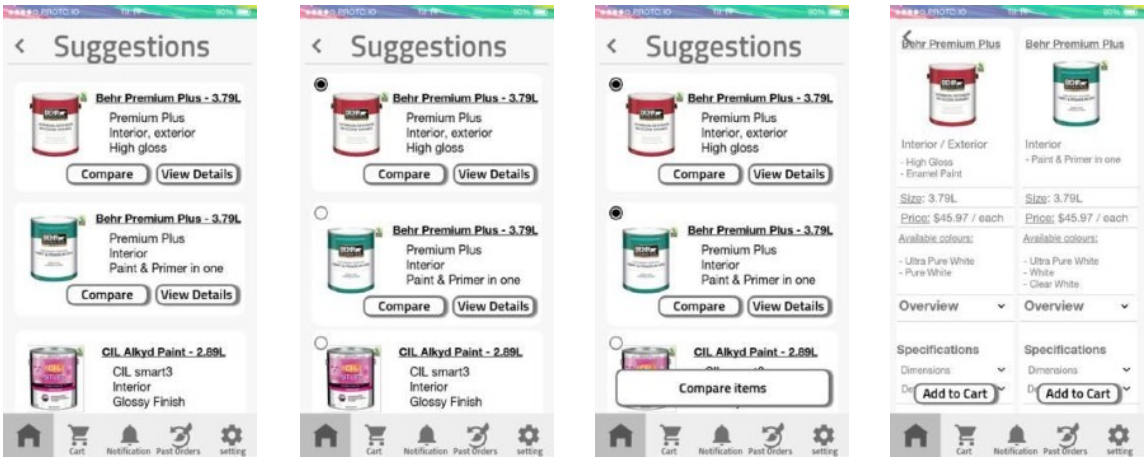

Figure 14: UI Model for Product Comparison

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4. External Interface Requirements

4.1. User Interfaces

The Mobile Ordering System must have the following user interface characteristics to satisfy overall user experience:

- **Simplicity:** There must be no unnecessary what defines unnecessary? elements to confuse the customers.
- **Clarity:** Buttons and functions must have clear meaning to avoid confusion and prevent customers from pressing wrong buttons. The interface must be written using simple language to facilitate easy navigation.
- **Familiarity:** The design must have an intuitive interface that uses the design language of the target device (i.e. Android design must use Material Design; iOS design must use iOS's Human Interface Guidelines)
- **Consistency:** The design must have similar options available from any screen in the Mobile ordering System. How to quantify this?
- **Efficiency:** The design must allow customers to perform tasks with speed and ease. 80% of first-time customers must be able to place an order unassisted within 10 minutes of installing the Mobile Ordering System.
- **Responsiveness:** The Mobile Ordering System must respond to customer actions within 0.1 seconds (the response may be a loading indicator if network coverage does not allow a fast response)

The buttons and functions that will be used most frequently must be on every screen for easy access. These include pages such as the *Selection Guide* page and the *View/Modify Order* page

4.2. Hardware Interfaces

The Mobile Ordering System will run on smartphones (Apple and Android) from 2010 onwards. The back end of the Mobile Ordering System will integrate with the Pick Slip System already being used by BSPC's paint stores.

4.3. Software Interfaces

The system will communicate with a database that stores all registered customer information (such as name, phone number, and email) as well as all paints carried by BSPC (along with their attributes). The customer information and the data regarding their current and past orders must be available.
The Mobile Ordering System must be available on both the iOS and Android operating systems. The application must be available for iPhone 4 and newer devices and Samsung Galaxy S3 devices (or equivalent) and newer devices.
The Mobile Ordering System should automatically submit an order to the printer at the desired store when a customer submits an order. This pick slip will then be used by employees to prepare the order for the customer.

4.4. Communications Interfaces

When an order is submitted by a customer the Mobile Ordering System must send the printer at the corresponding store a command to print the pick slip, and associated order information.

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5. Other Non-Functional Requirements

5.1. Performance Requirements

- Paint order placements must be made in real time to ensure that employees are able to receive the order as quickly as possible.

5.2. Security Requirements

- The Mobile Ordering System must be required to keep all user data private according to user data legislation by the Government of Canada.
- In order to make an account in the Mobile Ordering System, a customer must provide a unique email and password in order to ensure the customer's personal information can be secured and is only accessible to the customer. In order to access or change the personal information, the customer must provide these credentials again.
- To login, a customer must provide the email and password the customer submitted during account creation
- Each customer must be logged in as a requirement to have access to their previous order data and place orders.

5.3. Software Quality Attributes

1. Availability

- Each customer should be able to place a paint order to any of BSPC paint stores across Canada.
- Each customer must be able to place paint orders 24 hours a day.

2. Robustness

- The Mobile Ordering system must process up to 5000 orders an hour.
- The Mobile Ordering System must be integrable with BSPC's API that they are using on their current software system.

3. Interpretability

- The Mobile Ordering System should be descriptive enough that each first-time user is able to complete an order without contacting BSPC for assistance. May want to add a quantifiable number here, something you can use to test this requirement (Ex. Should be able to make an order within x minutes or so.)

4. Usability

- Each customer must be able to use the Mobile order system in an effective and efficient manner. Each step in the ordering process must not be redundant. An experienced customer must be able to place an order within 2 minutes.

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6. Analysis Models

6.1. Use Case Model

The following use case model (See Figure 15) demonstrates the flow between the use cases belonging to the Mobile Ordering System. As described in Section 3, after opening and loading the Mobile Ordering System, the customer is given the option to *Login or Register*; or to choose one of three product selection actions: *Search by Serial Number*, use the *Selection Guide* or *View Past Orders*. In order to *View Past Orders* the customer must be authenticated and identified by the Mobile Ordering System; therefore, *View Past Orders* includes the *Register/Login* use case. Following the use of one of the product selection actions, the customer can return to use another action or proceed to the *View/Modify Order* use case. Following the *View/Modify Order* use case, the customer can proceed to *Place Order* or to *Register/Login* if they haven't already. as in View *Past Orders*, *Place Order* also requires the customer to be logged in; therefore, it also includes *Register/Login*.

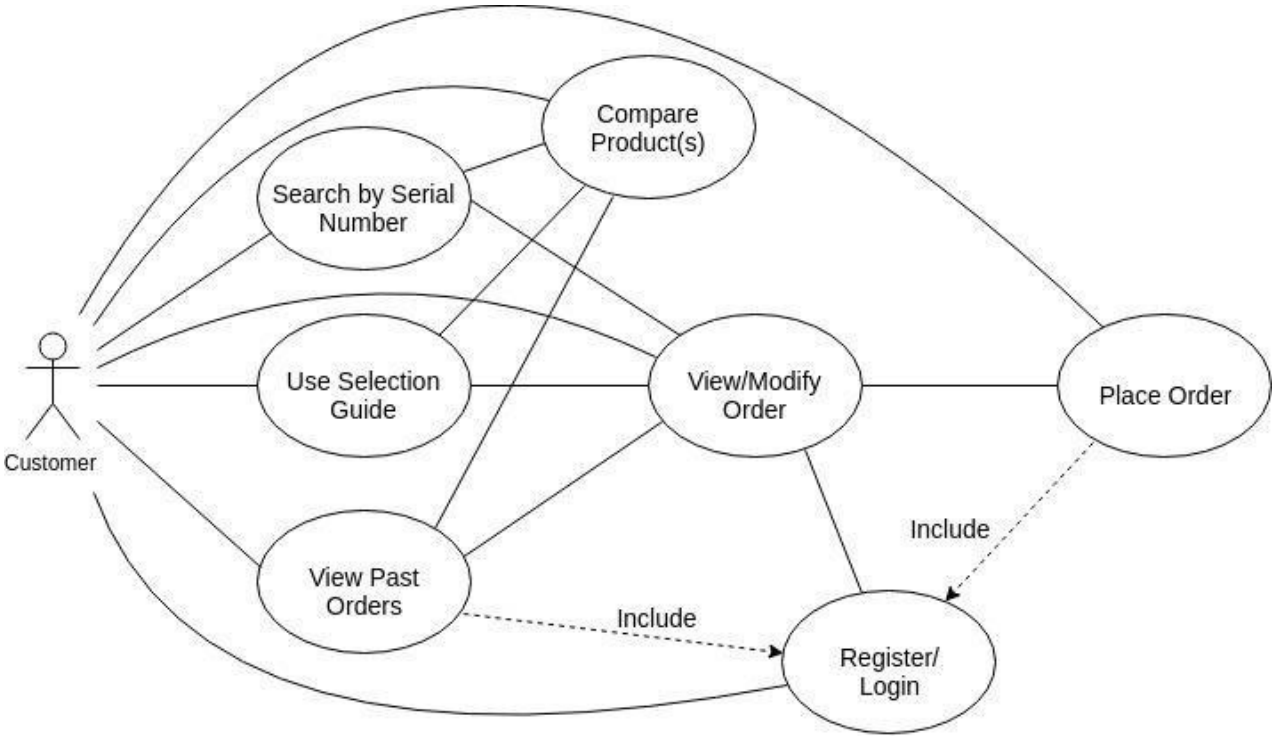

Figure 15:Use Case Model

Edits and commentary are done in red, sometimes accompanied by yellow highlighting for the statement in question. (Good job by the way! There are barely any mistakes.)

6.2. Entity Relationship Diagram

This Entity Relationship Diagram for the Mobile Ordering System (See Figure 16) illustrates the relationship between four entities: the *Customer*, their *Order, their organization(s)*, and the *Paint* they are ordering through the Mobile Ordering System. The four entities are linked via their relationships, the customer is linked to order by *places*, and the paint is related to the order by *contains, the customer is a part of organizations*. All attributes related to the Mobile Ordering System are denoted by the ellipses. Primary key attributes are *Email Address, Order Number, Serial Number,* and *Color*; and are denoted by their underlined titles.

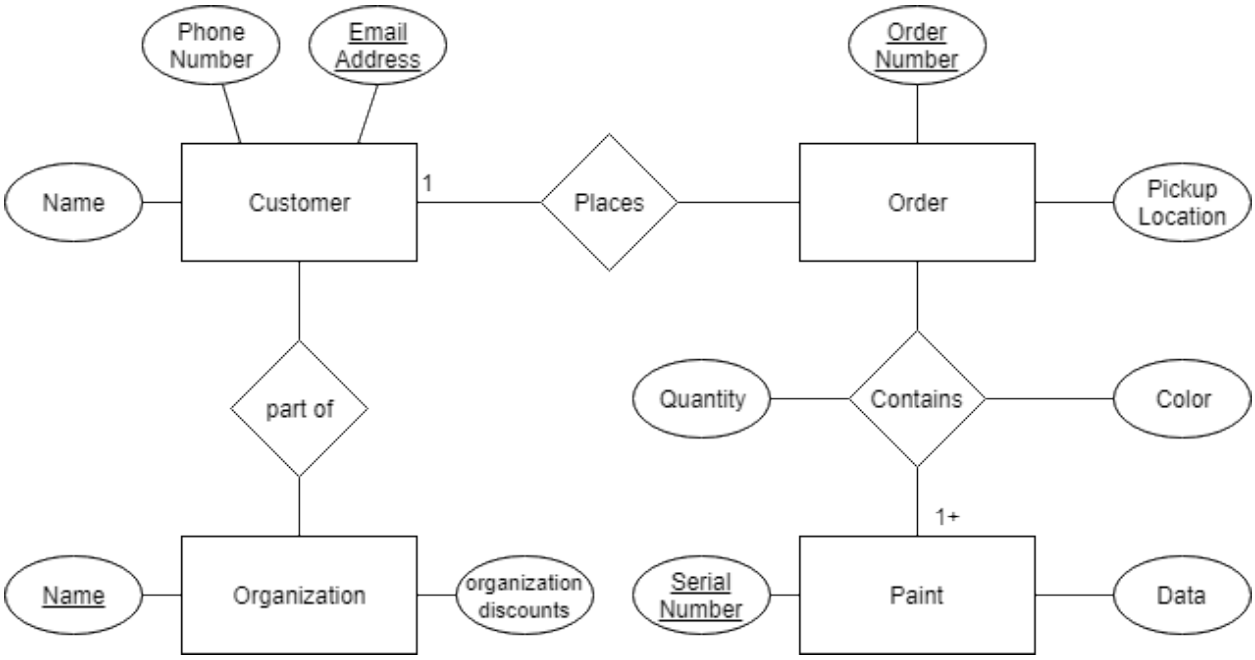

Figure 16: Entity Relationship Model

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6.3. Data Flow Diagrams

The following diagram is a Level 1 Data Flow Diagram depicting the Mobile Ordering System (See Figure 17). The Mobile Ordering System contains six processes, two external entities and one database. Based on the diagram, the entity *Customer* can use any of the six process: *Login/Register, Selection Guide, Serial Number, View Past Order, Compare Products, View/Modify Order* and *Place Order.* Each of those processes both deliver and receive data from the *Database*. *Place Order* also delivers the *Order* data to the *Printer* entity.

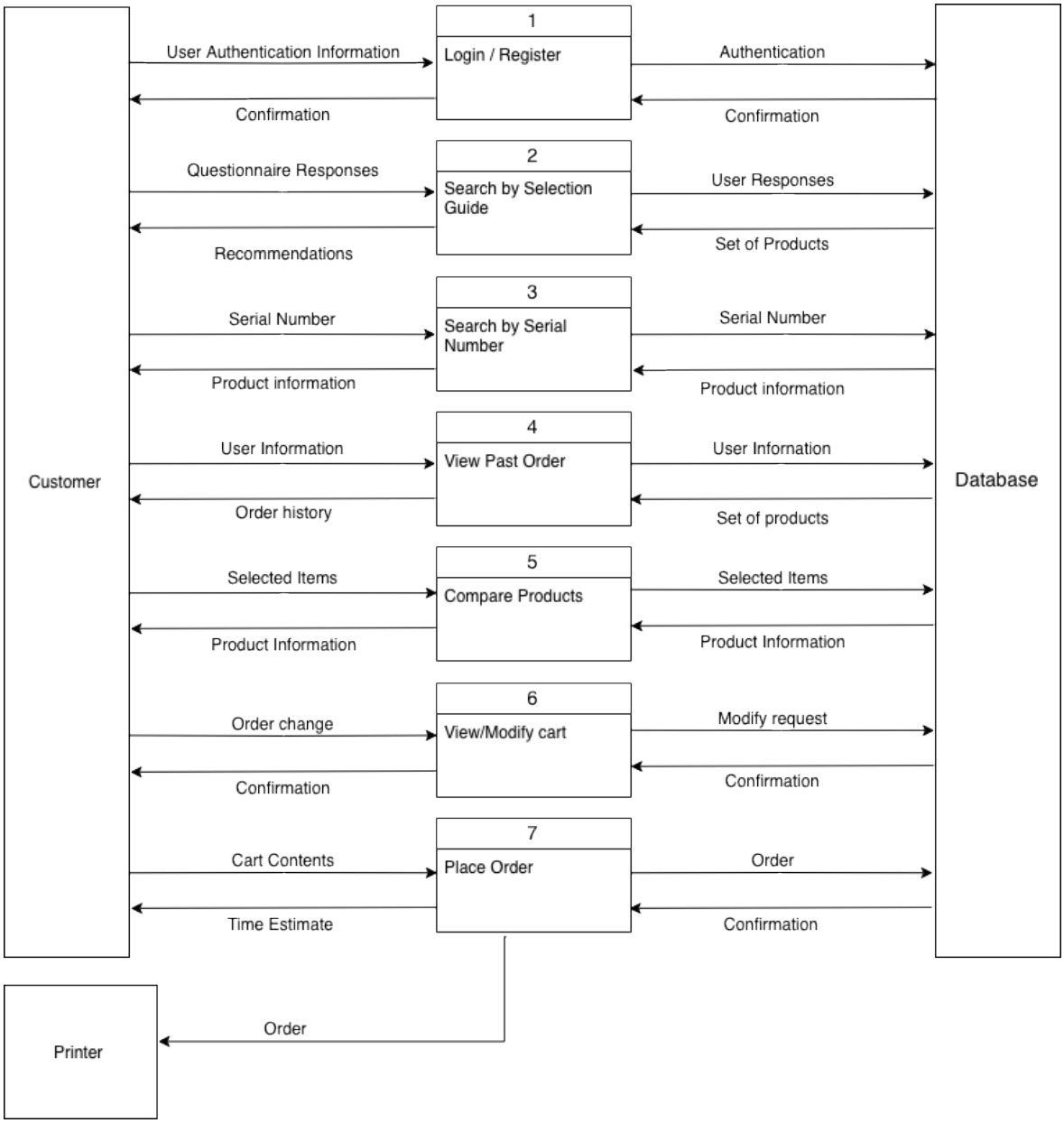

Figure 17: Data Flow Diagram