Velo Improved Integrated Information System

System Proposal

INFO-361-001

Job Consumers

12/01/24

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Project Overview

VeloBikes is a Richmond-based business that's specialized in premium bicycles, parts, and accessories; With a lack of modern infrastructure, this project focuses on implementing an updated Integrated Information System for VeloBikes. This will resolve challenges within outdated systems, improving efficiency in operations, reducing manual tasks, and improvements in customer service opportunities. This proposal will also highlight cases, inventory, and report management concerns, and will create better foundation for future endeavors for VeloBikes to ensure it's caught up with updated competitors.

Overall scope for this Project:

- Update IT infrastructure
- Increase inventory size and control
- Reduce manual tasks
- Better decision making, Customer support

Original System Request

Systems Request

Project Name: Integrated Information System for Velo

Project Sponsor: Gina Lomax, CEO of Velo

Company Overview: Velo, based in Richmond, VA, specializes in high-quality bicycles, bicycle parts, and accessories. The company's mission is to provide top-notch cycling products and services that cater to both recreational and competitive cyclists. They pride themselves on a diverse product range and exceptional customer service. After starting as a small local shop, Velo has experienced substantial growth and now operates from a larger facility that includes sales, repair services, inventory, and administrative functions. Despite the growth, recent profitability concerns have prompted a need for an upgraded information system.

Business Need: Velo is struggling with operational inefficiencies and declining profitability due to its current outdated information infrastructure. The company seeks to implement an integrated information system that will streamline its operations, improve inventory management, and enhance customer service. The system should also support better decision-making through comprehensive management reporting.

Business Requirements:

- **Order Processing:** Develop an automated system for processing customer orders, including online and in-store purchases.
- **Inventory Management:** Implement a real-time inventory management system to monitor stock levels and manage reordering.
- **Billing and Payment Processing:** Integrate billing and payment processing to ensure accurate invoicing and payment tracking.
- **Repair and Service Tracking:** Create a system for tracking repair requests, service history, and customer interactions.
- **Supplier Management:** Automate the procurement process and manage supplier relationships effectively.
- **Customer Relationship Management (CRM):** Build a centralized CRM system to maintain customer information and track interactions.
- **Web Integration:** Enhance the company's online presence and e-commerce capabilities to improve customer engagement and sales.
- **Management Reporting:** Establish a robust reporting system for performance analysis, sales trends, and inventory management.

Business Value: The new system will streamline operations, reduce manual tasks, and improve overall efficiency. It will provide better inventory control, enhance customer service, and offer valuable insights through advanced reporting. These improvements are expected to boost profitability and support continued business growth.

Business Case

A. Technical Feasibilities:

Addressing risks and technical issues on the business challenges:

Technical risk	Difficulty	How to Address; Benefit the Market?
Technology requirements	Low	We compare the built system to the current system requirements to stay on task.
General IT infrastructure and Complexity	Medium	We can choose what parts to implement first before implementing other parts of the system.
Project Compatibility	Low	If a problem were to arise, It would likely just take an expert adjusting or updating the system to fix it.
Project Size	Medium	Ensuring there are tasks and goals will keep the project on track.

B. Economic Feasibilities:

Velo can afford this system, and the benefits outweigh the cost with a return on investment of **13.33%**.

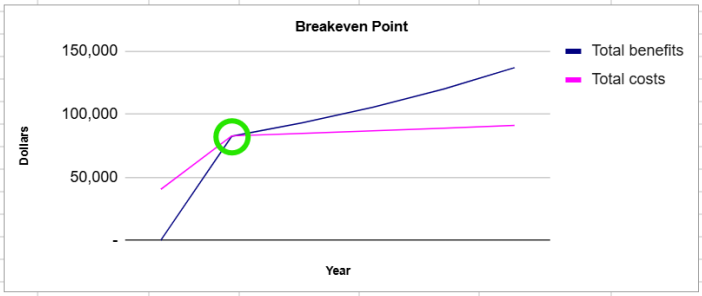
The company will break even right around the **2 year** mark. Because they already have a facility with administrative space, there's no added costs for the office space. However, we suggest hiring an additional full time administrative manager, whose tasks will include a variety of areas from website management to information system administration. This could potentially be reduced to a part time position depending on Velo's needs after one year.

In addition, the CRM system is an additional income stream from improved customer service.

Here is a snapshot of the finished calculations for ROI, NPV, and BEP.

Total operational costs	**4,700**	**82,750**	**84,753**	**86,816**	**88,943**	**91,134**	**222,303**
Total costs	**40,425**	**82,750**	**84,753**	**86,816**	**88,943**	**91,134**	**474,821**
Net benefits	**(40,425)**	**(250)**	**8,373**	**18,700**	**31,062**	**45,851**	**63,310**
Return on Investment							**13.33%**
NPV of Net benefits (@ 5% discount rate)							**$42,442.71**

NOTES: Assumptions	
Annual Projected Sales Revenue Growth--Bike Sales	20%
Annual Website suppliers link fees	5%
Projected annual salary adjustment %	3%
Anticipated annual lease increase	5%
Advertising fee(s) annual increase	5%
Annual Project Sales Revenue Growth--Repair Services	7%



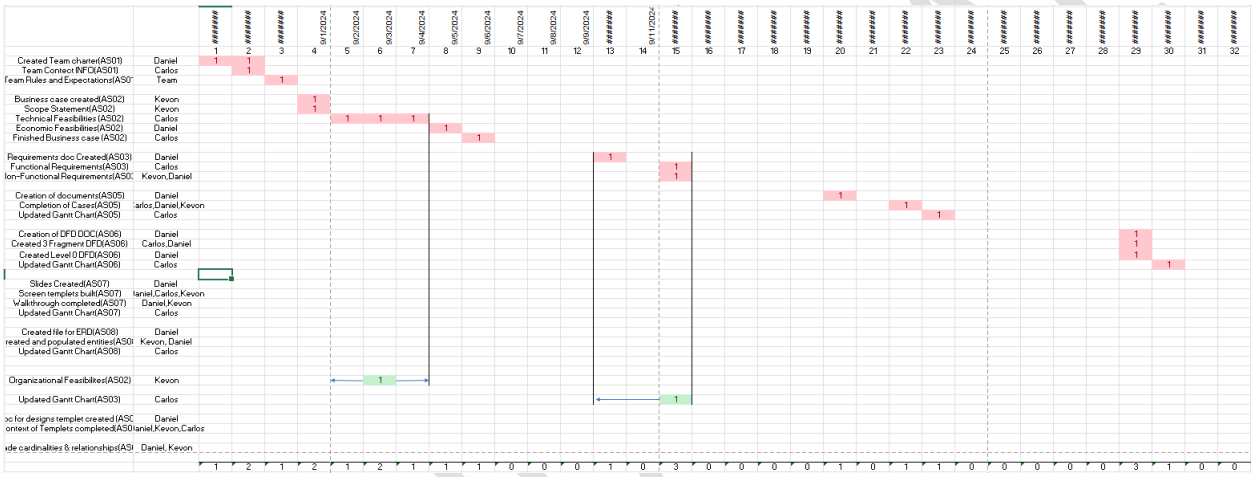
This proposal in the end has a **low** economic risk, with plenty of room for small unexpected costs. Most of the costs are one-time upfront purchasing costs. The administrative manager is the only **wildcard**, depending on the workload that's required. If the workload is too much, hiring an additional part time staff should solve the problem with minimal cost. If the workload is less than expected, reducing the role to part time as listed earlier would greatly reduce costs.

Gantt Chart

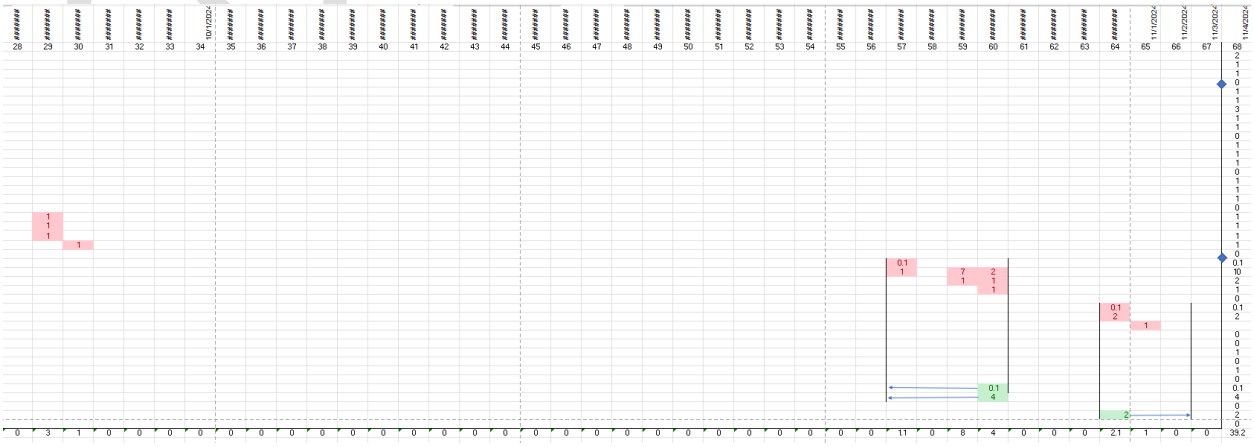
This Gantt Chart follows contributions by the following months.

The full Gantt Chart will be available here: [Full Gantt Chart]

First Half of Gantt Chart:



Second Half of Gantt Chart



Requirements Definitions

The functional requirements will cover what the core of the system will do according to the system request document.

A. Functional Requirements:

1. Operational

    1. The system will streamline customer order processes like ordering online and in-store for quicker service.
    2. The system will track repair requests, service history, and customer interaction through a database.

2. Performance

    1. The system will automate manual tasks like reports, ticketing, data processing, etc. to reduce manual labor.
    2. The system will monitor stock levels and manage reordering to reduce manual tasks and have more on time and documented deliveries.
    3. The system will update the company's online presence and e-commerce capabilities by changing the format and adding new features for increased customer engagement and sales.

3. Security

1. The system will take customer information and interactions and store them in a database for analysis.
2. The system will output robust reports for performance, sales trends, and inventory management to make better business decisions.

4. Cultural and Political

1. The system will communicate effectively with suppliers via email to maintain relationships.

The non-functional requirements will cover how people will interact with the system and what they see. It will also cover some special features of the system.

B. Nonfunctional Requirements:

2. Operational

1. Customers can issue tickets via browser to purchase VeloBikes products.
2. Customers can maintain appointments for any product replacements or repairs.
3. Information Database can provide customers with recommendations on products based on previous VeloBikes purchases.

3. Performance

4. Updated UI grants customers simple and intuitive navigation through various VeloBikes products.

5. VeloBikes website grants customers 3 second response times upon navigation.
6. VeloBikes website has high bandwidth, allowing for 200 simultaneous users.

4. Security

1. Customer accounts will be kept secure from the public.
2. The system will operate on a least privilege principle.
3. All different main sections (Repair Services, Sales, CRM, etc.) of the system will have firewalls and authentication checks when accessing them.

5. Cultural and Political

1. The system will accept only US dollars ($).
2. The system will automatically take out taxes from payroll and generate all necessary tax documents in compliance with the US government.
3. The system will be available in both English and Spanish.

Use Cases

Velo Improved Integrated Information System

A. Casual Use Cases:

Use Case Name: Customer making an appointment	ID: VB01	Priority: Low
Actor: Customer		
Description: The customer is seeking repair or maintenance for a bike		
Trigger: Customer broke their bike or wants to make changes		
Type: External		
Normal Course: 1.0 Scheduling an appointment 1. The customer opens the VeloBikes website 2. The page displays many features and services for the customer 3. The customer selects “make an appointment” A.Customer chooses repair service B.Cusotmer chooses ‘other’ 4. The system then displays all available dates for the next month. 5. The customer selects a date 6. The system then prompts the user for their email address 7. The system then sends a confirmation email to the customer 8. The system notifies the team leader responsible for the service		

Use Case Name: Customers issuing queue tickets	ID: VB02	Priority: Medium
Actor: Customer		
Description: Customers can issue tickets via browser when purchasing out-of-stock VeloBikes products.		
Trigger: Customer ordering an out-of-stock VeloBikes product		
Type: External		
Normal Course: 1.0 Purchasing an out of stock product online 1. The customer navigates to the VeloBikes website 2. The customer decides on a product and places an order 3. The product purchased is out of stock 4. The customer is placed in a queue with their purchase id 5. The customer is sent an email with a ticket number on their queue placement. 6. Systems stores tickets until item is back in stock, notifying the appropriate departments		

Use Case Name: Email customers to encourage loyalty	ID: VB03	Priority: Low
Actor: Employee		
Description: The employee emails the customer to encourage them to shop with the company again		
Trigger: VeloBikes wishes to remind customers of something or inform them about a new deal		
Type: External		
Normal Course: 1.0 Send an email through the CRM system 1. The employee logs into the CRM system with valid credentials 2. The employee requests certain customer emails according to employee-determined parameters 3. The system filters and provides requested emails 4. The employee may deselect any unwanted customer emails 5. The system allows the employee to draft an email to the selected customers 6. When the employee finishes the email, the system requests approval from upper management 7. Upper management may return the employee to step 5, go to step 5 himself, delete the email, or send the email through to the customers 8. Upper management is informed upon the successful sending of the email 9. The system archives the email for later retrieval in the CRM system		

Use Case Name: Displays recommendations on products based on previous VeloBikes purchases.	ID: VB04	Priority: Low
Actor: Customer		
Description: The information database can provide customers with product recommendations based on previous VeloBikes purchases.		
Trigger: Customers purchasing VeloBikes products		
Type: External		
Normal Course: 1.0 The customer browses and orders a VeloBikes product via the VeloBikes website 1. The website monitors customer interactions on the website 2. Cookies are saved by customer user data 3. Website refers to previous website interactions and cookies to dictate similar products 4. The website home-page presents similar products that customers may be interested in		

Use Case Name: Authenticate system user	ID: VB05	Priority: High
Actor: System		
Description: The system checks if the user has permission to access the system		
Trigger: User wants to log into the system		
Type: External		
Normal Course: 1.0 User logs into the system 1. The user navigates to the VeloBikes portal 2. The user enters their username and password 3. The system compares the entered username and password with that of approved employees in the database 4. The system denies the user if their information doesn't match that of an approved employee, sending the user back to step 2 5. The user selects which specific system they want to access (examples: Sales, Repair services, CRM) 6. The system checks the permissions of the now-approved employee to access the chosen system 7. The system denies the user access to the chosen system if they aren't approved to access that system.		

B. Fully Dressed Cases:

Use Case Name: Increasing operational efficiencies	**ID: VB06**	**Priority: High**
Actor: System		
Description: The system will automate many manual tasks		
Trigger: Multiple users submitting information and interacting with the system.		

Type: Temporal

Preconditions:

- **The system is ready to accept any new data from users like purchase information, requests, and any other relevant data.**
- **Systems that interact with customers, employees, and managers must be readily available to input data.**

Normal Course:

1.0 The system receives data for reports, requests, or anything relevant to manual tasks, depending on the stakeholder. (for this case, reports showing statistics to managers and shop owners)

1. **The system takes data from purchase records**
2. **The system will turn it into visual graphs and reports**
3. **Managers will be able to request to see certain statistics depending on business function**
4. **The system will then pull the relevant data and display what the manager requested**
5. **After the day, the system will store the collected data in a database**
6. **The system will remain active 24/7 to take in data from overnight**
7. **This system will work automatically every week, unless requested otherwise**

Alternative Course:

1.1 System does inventory management

1. **The system checks the results of processed data for different business functions**
2. **The system will compare those numbers to pre-configured thresholds**
3. **The system will take count of the current inventory**
4. **Before the system makes purchases, the manager will be notified for approval**
5. **Based on those thresholds, the system will make orders with the necessary suppliers**
6. **The system will generate a report of purchases and quantity, with reasonings**
7. **It will continue this process every week.**

Postconditions:

1. **All produced data of the week is stored in a database**
2. **Inventory will be updated on needed products and deliveries**
3. **The system will generate a general report of the week of business**

Summary Inputs	Source	Summary Outputs	Destination
Purchase data Ticket data Employee data Financial data Customer data	Website Customer phones Company tablets Customer/Company - Computers	Reports on dashboards Graphs Storing data Email of needed inventory items	Customers Managers Employees Shop owners

Inventory data		**Notifications on tablets of - appointments** **Confirmation emails**	

Use Case Name: Database storage	**ID: VB07**	**Priority: Medium**
Actor: System		
Description: The database will accommodate data and stock.		
Trigger: Storing products and data		
Type: External		
Preconditions: • **The database has a set number of products in inventory and stock**		
Normal Course: **1.0 Restocking inventory** 1. **An employee notices a product is low/out of stock via inventory** 2. **An employee checks the demand for a product via the database** 3. **An employee orders a new set of products based on the demand for the product** 4. **The products purchased are configured into the database** 5. **The number of products is shipped to VeloBikes** 6. **The shipped product is counted within the inventory** 7. **The database is updated to reflect the new inventory of products**		
Alternative Course: **1.1 Deducting inventory** 1. **A customer wants to purchase a product** 2. **The employee checks the stock of products in the database** 3. **If available, the customer transaction is completed** 4. **The amount of product bought is deducted from the inventory** 5. **The database is updated to reflect the current inventory of products.**		

Postconditions:

1. **Data reflects the current inventory of VeloBikes products**
2. **A product of VeloBikes is updated within the Database**

Summary Inputs	Source	Summary Outputs	Destination
Product Id **Current Inventory** **Current stock**	**Employee** **Customer/Employee** **System**	**Updated Inventory** **Updated Data**	**Employee** **Customer/Employee**

Use Case Name: Purchase a VeloBikes product	**ID: VB08**	**Priority: High**

Actor: Customer

Description: The customer purchases a VeloBikes product

Trigger: The customer enters the store or navigates to the VeloBikes website

Type: External

Preconditions:

- **Order processing system is online**
- **(Normal Course only) An employee is present in the store front and successfully logged into the system**

Normal Course:

1.0 Customer purchases a VeloBikes product in the store front

1. **The customer selects all the VeloBikes products they wish to purchase**
2. **The customer brings the desired products to the cashier**
3. **The cashier scans the products' barcodes to fulfill the order**
4. **The system totals the price of scanned items and displays that to the employee and customer**
5. **The employee adds any discounts or coupons and the system reevaluates the total**
6. **The employee asks if the customer would like to enter their contact information and opens up the terminal for the customer to enter that information**

7. **Depending on method of payment, the employee activates the card scanner or accepts the cash payment**
8. **The employee may cancel the order during this or any previous steps (example: the card is declined)**
9. **The system processes the payment and prints a receipt for the customer**

Alternative Course:

1.1 Customer purchases a VeloBikes product online

1. **The customer navigates to the VeloBikes website and signs in if they have an account**
2. **The customer adds to their virtual "cart" all the VeloBikes products they wish to purchase**
3. **The system totals the price of the items in the cart and displays that to the customer**
4. **The customer clicks the "check out" button when ready**
5. **The customer enters any coupon codes and the system reevaluates the total**
6. **The system prompts the customer to create an account with their contact and billing information if they don't have an account**
7. **The customer finalizes their payment**
8. **The system processes the payment and emails a receipt to the customer**

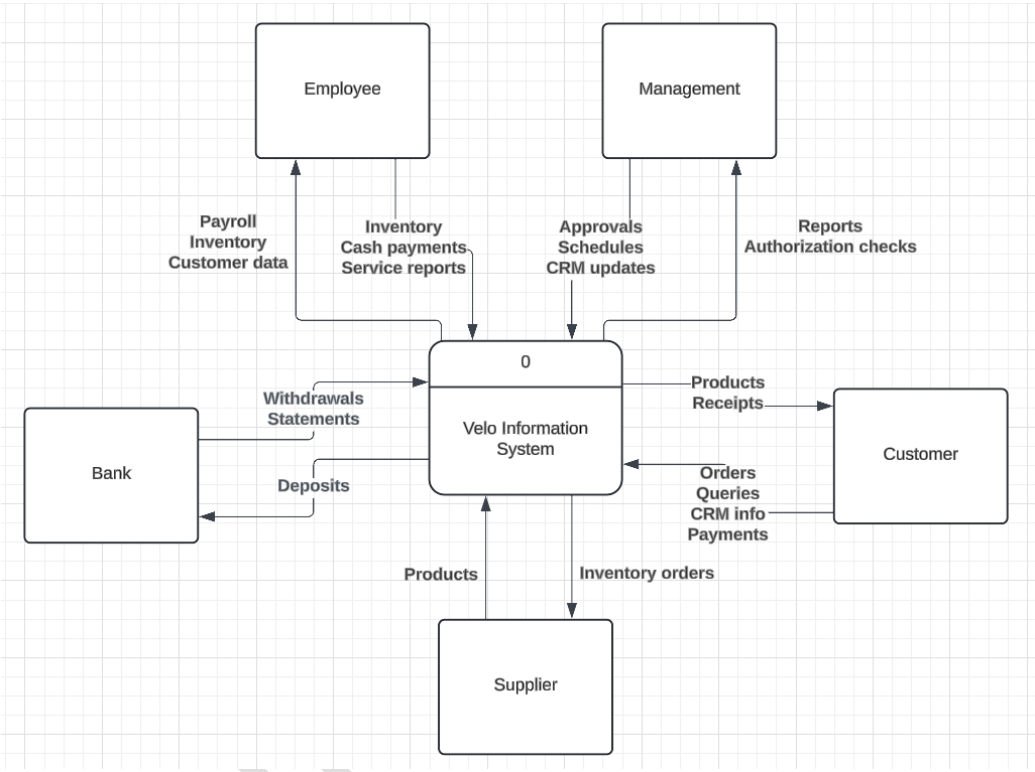
Postconditions:

1. **The system records the transaction in the inventory management system**
2. **The system resets for the next purchase**

Summary Inputs	Source	Summary Outputs	Destination
Scanned or virtual cart items	Customer/Employee	Order total	Customer
Discounts or coupons	Customer	Receipt	Customer
Contact and billing information	Customer		

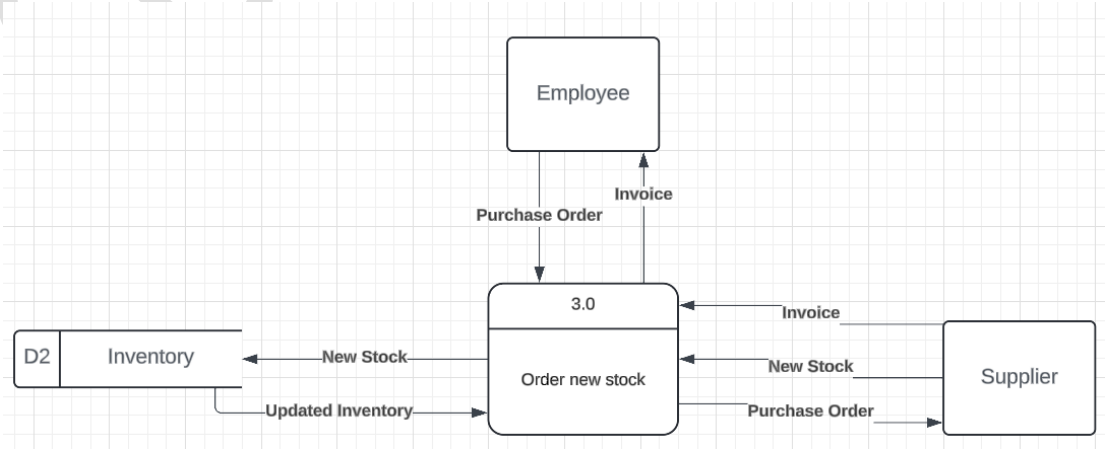
DFD Diagrams

Context Diagram:



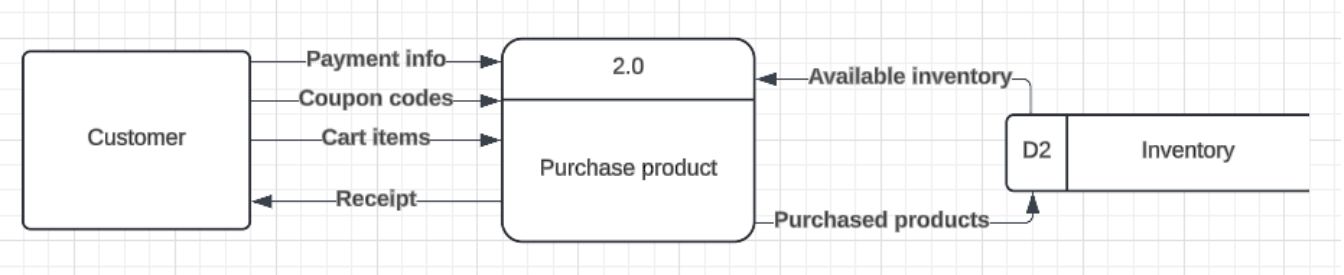
Data Flow Fragment 1

(Based on Use Case VB07)



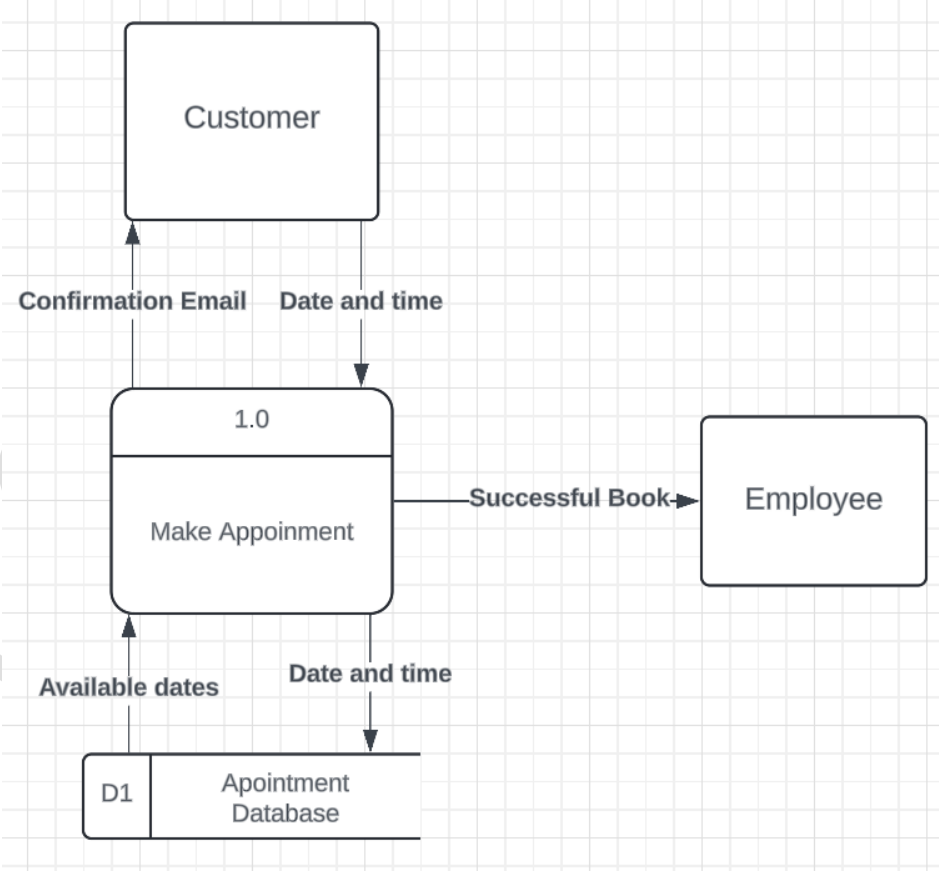
Data Flow Fragment 2

(Based on Use Case VB08)



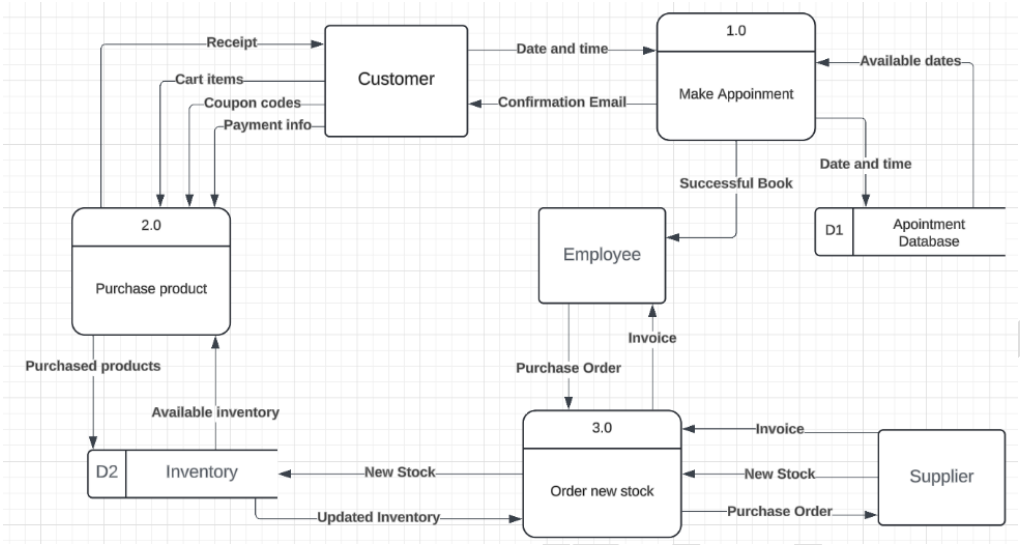
Data Flow Fragment 3

(Based on Use Case VB01)

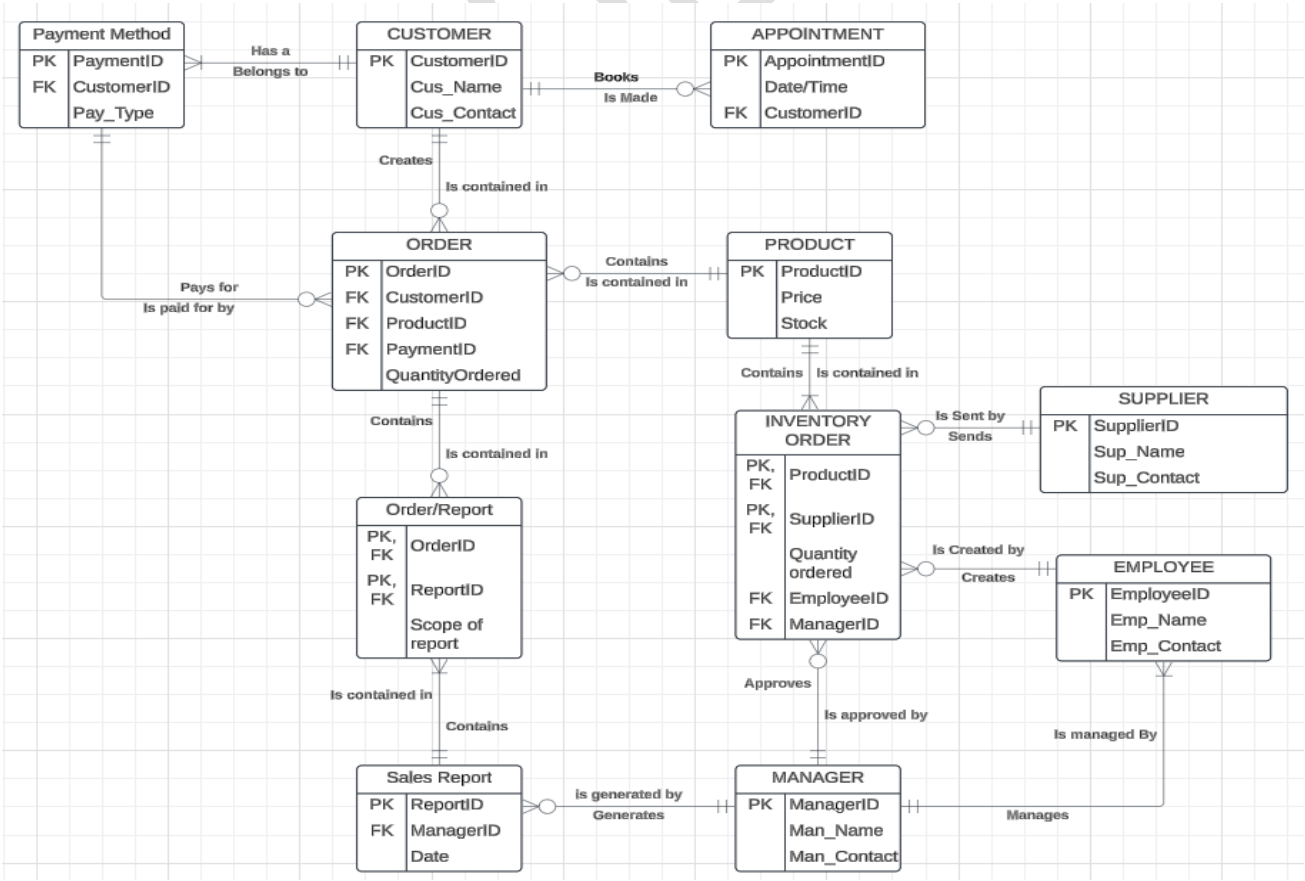


Level 0 DFD

(Combined Data Flow Fragments)



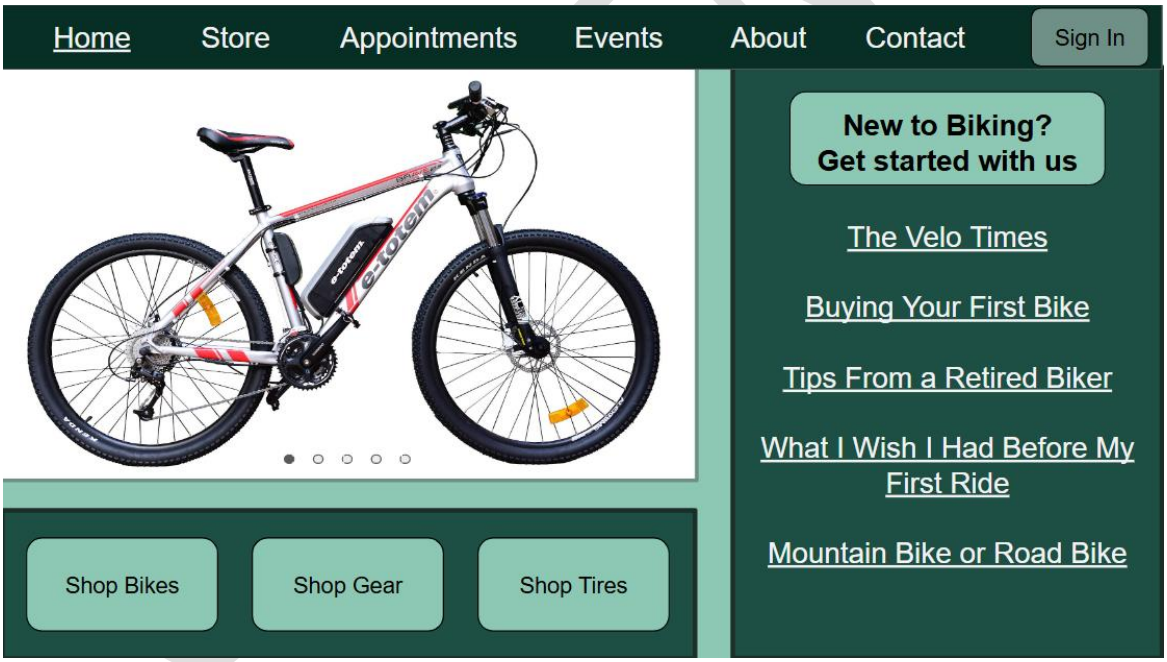
Entity Relationship Diagram of Velo Operations:



User Interface Design

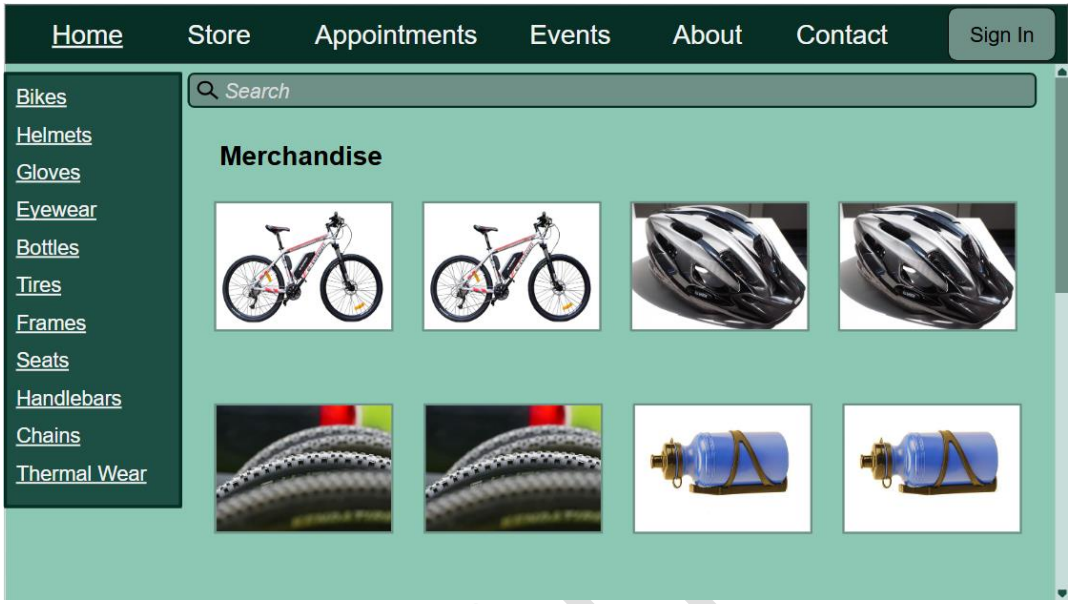
1. Here we have a sample of the Velo website. This will be the customer's first impression of Velo online.

- Along the top you have various tabs for the customer to navigate through.
- Your right side bar is to attract the attention of anyone interested in cycling with multiple helpful guides or whatever resources you think they might need.
- Along the bottom you have a few quick links to your most visited store sections. In the top right is the sign in for both the customers and any employees who are using a web browser.

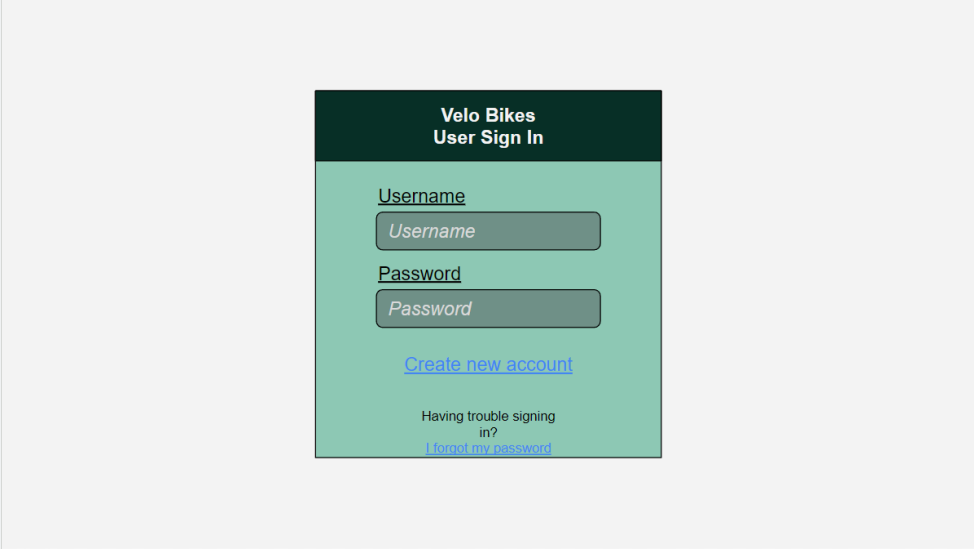


2. Here we have the main store page

- General merchandise in the main area and different sections for specific items on the left.
- These pictures are merely placeholders for whatever products you wish to be seen first.

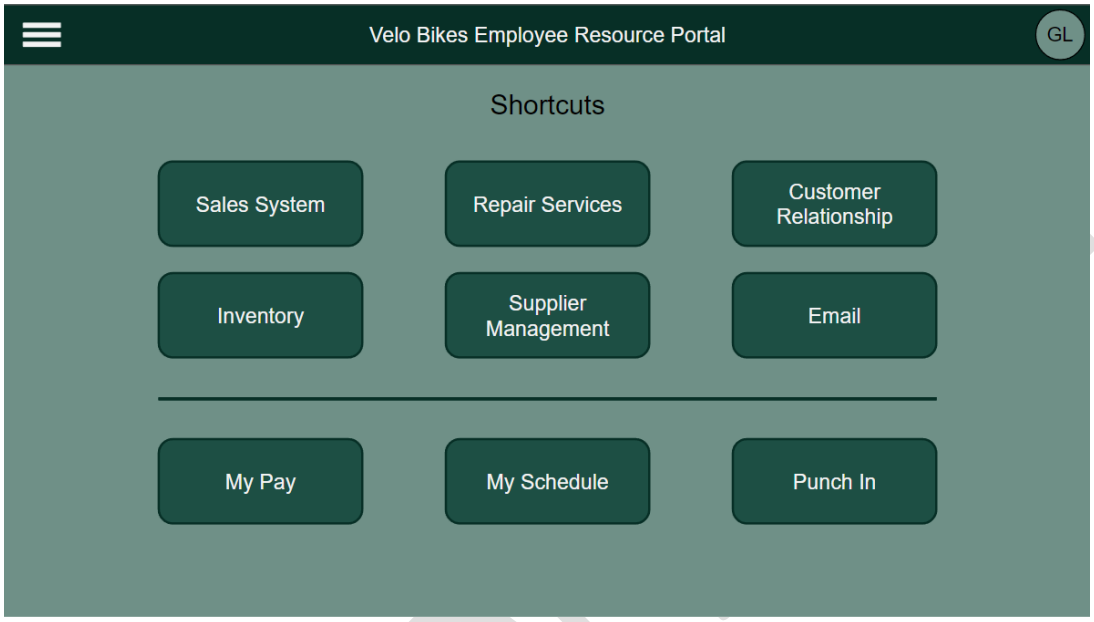


3. Here is the sign-in screen for both customers and employees.
    - This will be seen as the first screen on the Velo application on Velo computers.



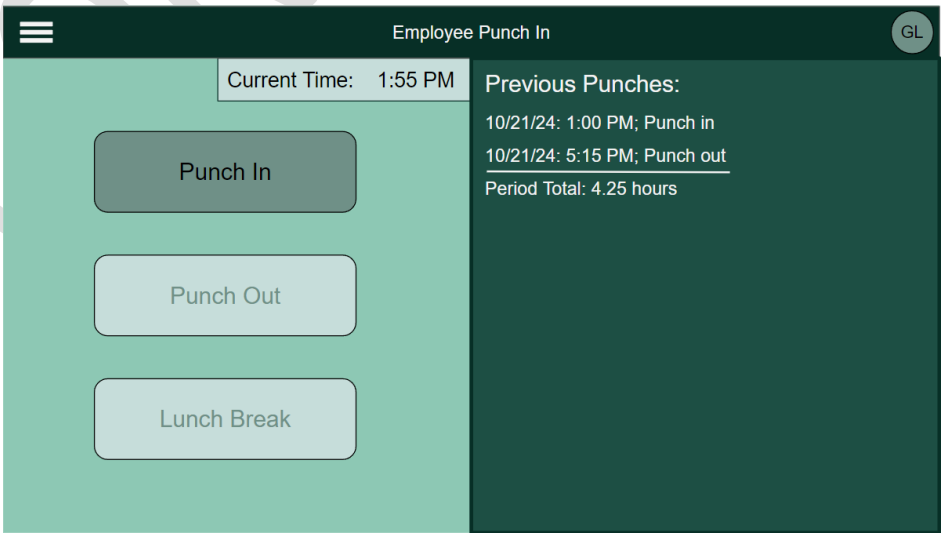
4. Here we have a sample home screen for the employee portal.
    - Will allow the employee to quickly access whatever parts of the system he needs, of course with permission checks throughout.

- The three lines in the upper left will show any other pertinent information or links to aspects of the system.
- Personal shortcuts are separated from the more general shortcuts, to add contrast.



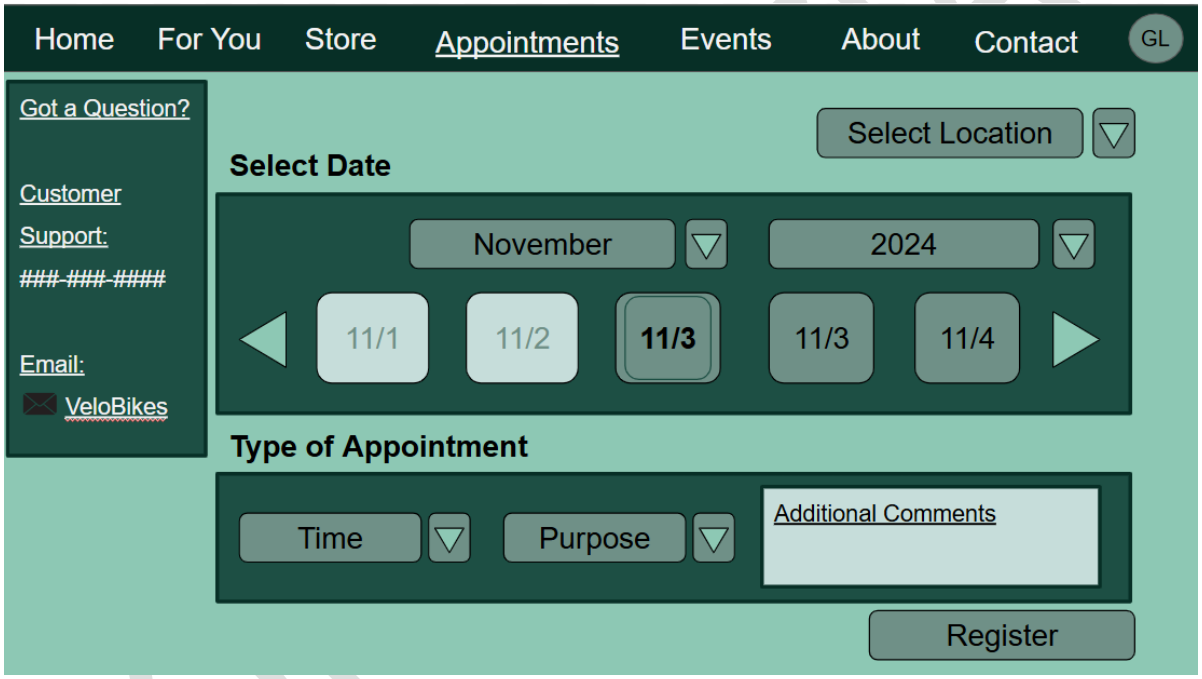
5. Here is the "Punch In" button from the employee portal.

- This displays the current time, previous punches, and total hours worked, as well as multiple buttons for punching in, out, and a lunch break.
- Currently, the user is punched out, so the "Punch Out" and "Lunch Break" buttons are both faded. If they were to punch in, those buttons would become available and the "Punch In" button would fade.



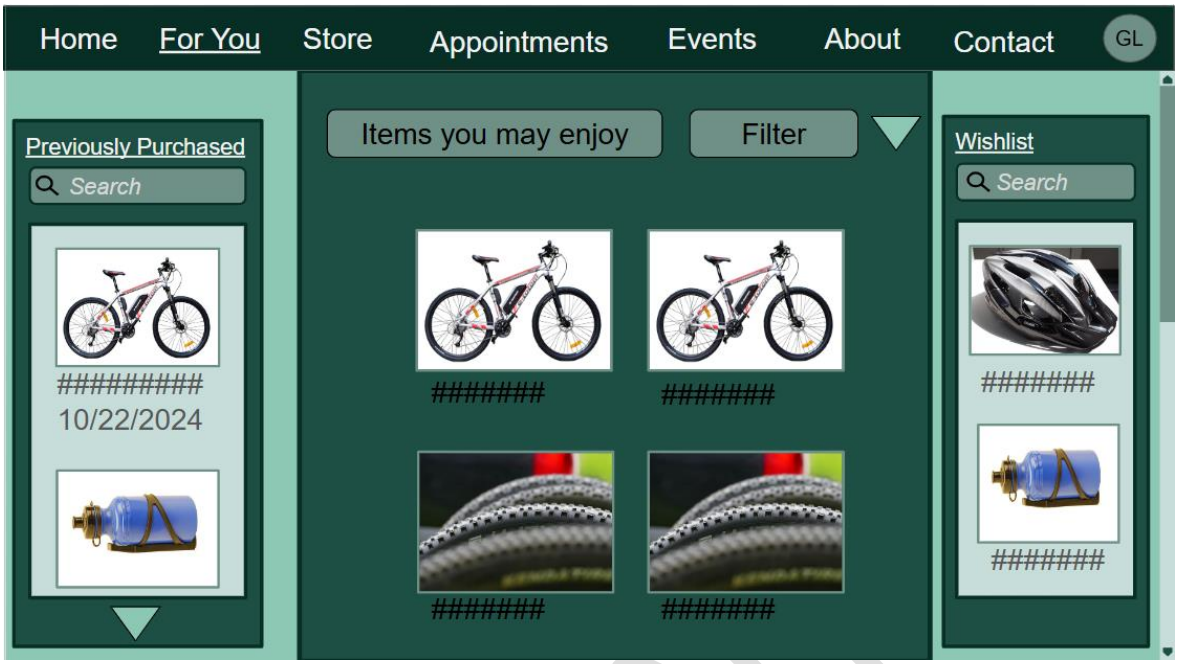
6. Here is the “Appointment Schedule.”

- An appointment can only be placed when signed in. Once signed in, users can select the year, month, and available days (Available days in darker green).
- You can assign the time and purpose (Examples of purposes being: Repairs and Replacements).
- Give your specifics on your reasoning for your appointments in “Additional Comments”. You can also call customer support and email Velobikes support if customers need another means of assistance.



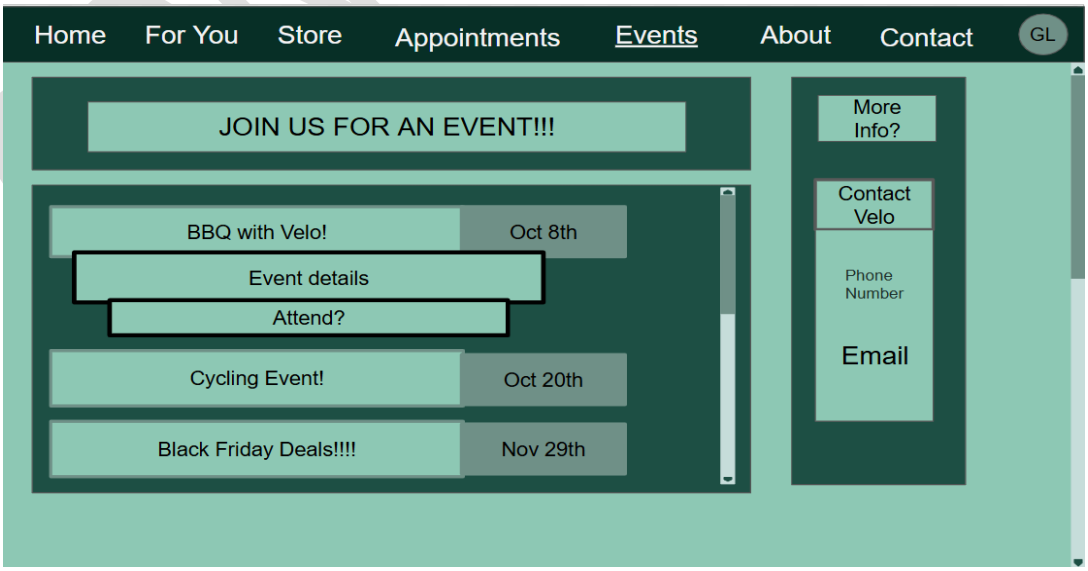
7. When signed in, the “For you” tab appears on the top of your bar.

- Here you can review previously purchased items on the left.
- Items that may interest you based on your search and previous purchases.
- You can view your wishlist of items marked on the website, allowing you to view if an item is in stock or on sale.



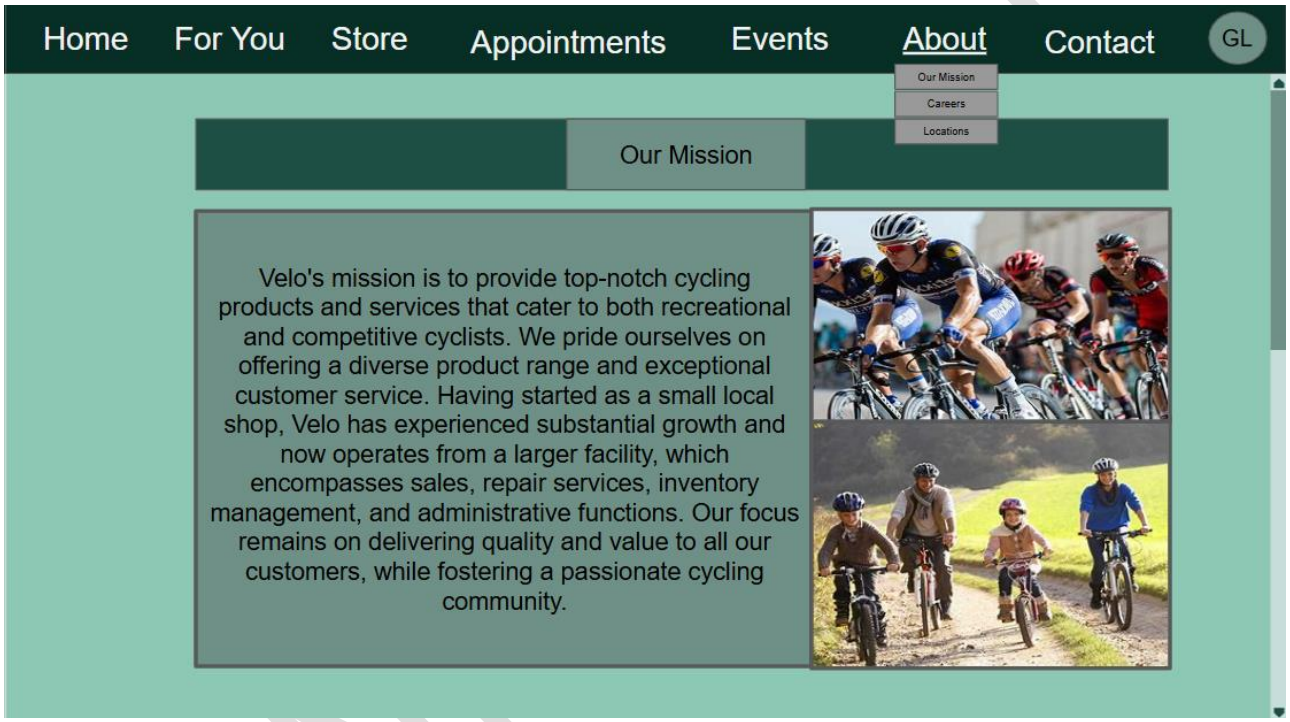
8. You can look at upcoming events for Velo Bikes.

   - You can scroll down to see the ones coming later in the year. Every event has a date attached to it showing when it is.
   - All events are hosted or collaborated by Velo, you can quickly ask questions or concerns to Velo Bikes.
   - Velo will have information about each event in their system. When an event is clicked on, a summary pops up with details and asks if you would like to attend.



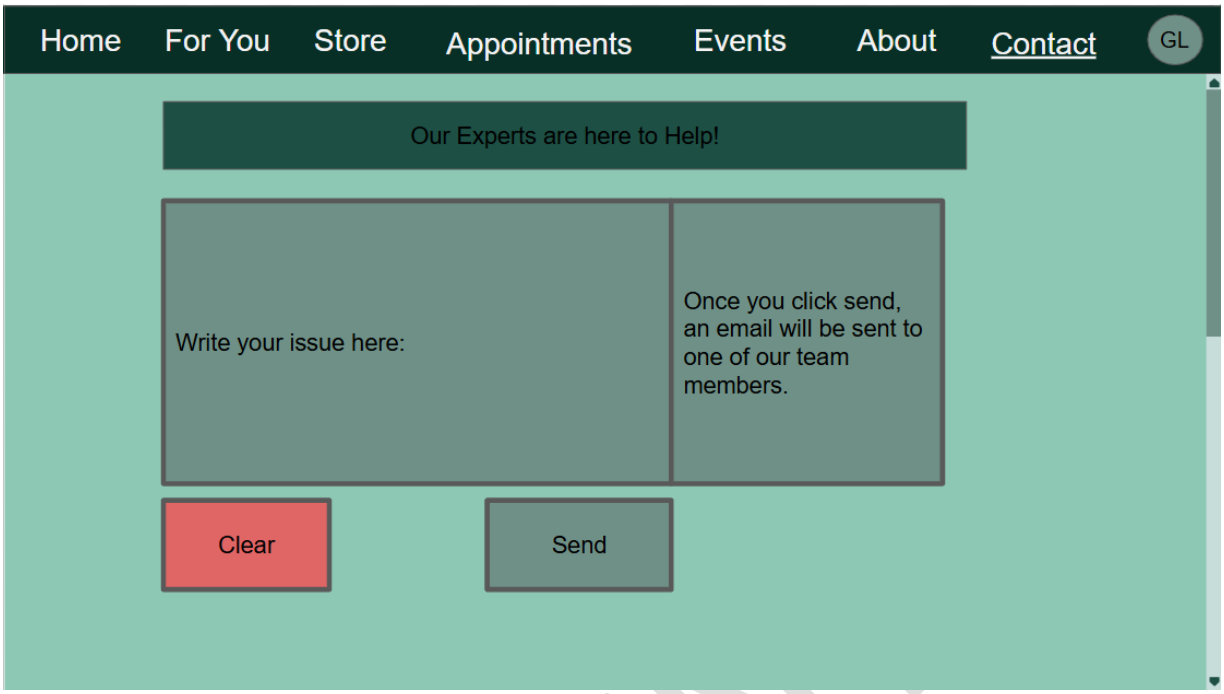
9. The ‘About’ section, a drop-down menu appears with tabs that could relate to the title.

- The tabs include Our Mission, Careers, and Locations.
- This screen shows the Mission statement which was retrieved and tailored for customers to read.



10. This screen shows what customers with complaints or questions come to contact Velo Bike.

- The user can write the inquiry in the large left box.
- At the bottom, is a ‘Send’ button which will send an email to a Velo Bike employee with the customer's message.
- To the bottom left, a ‘Clear’ button is there to empty the box of all text.



Usability test report

Walk-Through Evaluation

Usability test report 1: Navigating to store page

Daniel's wife was the first subject. She was first asked to navigate to the store page as if she wanted to buy a bike, which she did using one of the appropriate options and continued on with no issues.

She was then asked to take the role of an employee and clock in for the day. She signed in with no problems and after looking through the employee portal, went straight to the "Punch In" button.

Her feedback was about switching the positions of some buttons in the "Punch In" section of the employee portal to make your eyes be drawn to the main button more. We enlarged the "Punch In" button and added two more buttons below it.

She also suggested changing the color palette of the system. Originally the palette was lots of light, pale, greens and grays, without much contrast. She suggested adding in darker colors, changing the font colors, and making the borders more visible.

In conclusion: She recommended changing the design of the “Store” tab on the website to have multiple product options right in the main area, and the ability to scroll through, down.

Usability test report 2: Registering an appointment

Kevon's brother was asked to register an appointment. Easily he noticed the appointments icon on the home page.

Once moved to the appointments screen he took a moment to analyze the screen. He chose a date, his time, and purpose. He gave a simple comment “For bike repairs” and registered.

I noticed that he never selected a location, and his feedback was very intuitive. He thought the UI was very cluttered, and although he understood the navigation easily, it took him a moment to analyze the page. He suggested removing some buttons, and moving them around.

In conclusion: He suggested UI changes to not clutter the users eyes, this is further exemplified by the fact he forgot to fill the location of appointment.

Executive Summary

Completed Tasks:

1. Updated Infrastructure: Velo’s IT system has been upgraded to in modern formats to streamline operations.
2. Functional Requirements: Core systems such as order processing, inventory management, repair tracking, and supplier management have been implemented for greater proficiency.
3. E-Commerce Operation Integration: Enhancements to the online platform have improved customer engagement and supported online sales.
4. Usability Testing: Initial user testing provided feedback on navigation, design, and functionality improvements.

5. Management Reporting: Reporting tools have been added for better decision-making and operational oversight.

Remaining Tasks:

- System Performance Optimization: Address feedback to reduce clutter in the user interface and improve the visual design.
- Scalability Adjustments: Tune features like appointment scheduling and location selection.
- Full Integration of Non-Functional Requirements: Secure data handling processes, test compliance with cultural and security specifications.
- Employee Training: Conduct training sessions for the new IT infrastructure system.

Suggestions for Enhancements:

- Advanced Analytics: Integrate new ai policies to include predictive analytics for inventory and sales trends.
- Mobile Application: Develop a mobile app to extend customer and employee access.
- Expanded Language Support: Broaden language options to reach a more diverse audience.

Recommendations:

1. Prioritize Feedback-Driven Adjustments: Address usability concerns during testing to improve user experience.
2. Deploy Incrementally: Roll out additional features in phases to allow for improvements and minimize disruption.
3. Invest in Continuous Support: Hire an administrative manager to oversee ongoing system management and address any technical challenges.
4. Evaluate Long-Term Goals: Explore additional integrations and technologies to maintain competitive positioning in the market.

With these details in mind, and addressing these remaining tasks and enhancements, VeloBikes will be positioned to leverage its new system for sustainable growth.