



National University of Computer and Emerging Sciences

Software Engineering

Project Report

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Degree Program: BS-CS

Section: A

Subject Name: Software Engineering

Date of Submission: 4th May 2025

Introduction:

Our project is a Petrol Station Management System called PetroPulse. It is a full-stack web-based solution designed using the MERN stack (MongoDB, Express.js, React.js, Node.js) to streamline and automate petrol station operations. PetroPulse enables station owners, workers, and customers to interact with the system through role-specific dashboards. Core functionalities include user registration and login, station and employee management, real-time fuel inventory tracking, sales reporting, secure payments (cash and card), and low-fuel alerts. The system leverages cloud deployment via Vercel and real-time communication for updates such as fuel inventory changes and alerts. The platform is responsive and optimized for both desktop and mobile use.

Project Rational:

We designed this system to address the current limitations faced by petrol station operators and their staff in managing fuel sales, inventory, employee assignments, and customer engagement. Traditional methods involve manual records and are prone to human error, inefficiency, and data inconsistency. PetroPulse offers a centralized, scalable digital platform that provides automation, real-time updates, and data analytics. For example, owners can monitor station-specific fuel levels and sales performance across multiple branches from a single dashboard. Workers can log sales and manage operations, while customers benefit from loyalty points and convenient payment options. The system also includes smart features such as low-fuel alerts and refill ordering, ensuring continuous service availability. We adopted an Agile Scrum methodology for development, breaking down the project into multiple sprints with incremental deliveries and thorough sprint evaluations.

Project Architecture:

PetroPulse is built on a three-tier layered architecture comprising:

- **Presentation Layer:** The user interface, implemented using React.js, provides intuitive dashboards and forms for all roles - owners, workers, and customers. The design uses Material UI for responsiveness and accessibility.

- Business Logic Layer: This layer is handled by Node.js and Express.js, where all APIs and business rules reside. It manages tasks such as role-based access control, transaction handling, fuel inventory calculations, and authentication using JWT.
- Database Layer: The backend data is stored in MongoDB, enabling a flexible, document-based schema that supports the dynamic needs of station management, sales logs, and loyalty programs.

This layered structure improves maintainability, scalability, and security. For instance, separating the API from the frontend allows independent updates to each module. The architecture also supports cloud hosting, ensuring high availability and performance. The application is modular, with clear boundaries between user interfaces, logic, and data, enabling multiple developers to work on different layers simultaneously.

Product Backlog:

Table 1: Product Backlog

ID	User Story	Acceptance Criteria	Estimation	Priority
1	User Registration - As a new user, I want to register on the system so that I can access PetroPulse services.	Given: A new user navigates to the registration page. When: They provide valid details (name, email, phone, password). Then: The system successfully creates an account and sends a confirmation email.	3	High
2	User Login - As a registered user, I want to log into the system so that I can access my dashboard.	Given: A user is on the login page. When: They enter valid credentials. Then: The system grants access to their dashboard.	2	High
3	Password Reset - As a user, I want to reset my password so that I can regain access to my account if I forget it.	Given: A user is on the login page. When: They click on "Forgot Password" and enter their email. Then: The system sends a password reset link to their email.	3	Medium
4	Add Fuel Station - As an owner, I want to add new fuel	Given: An owner is logged in. When: They enter station details and submit	3	High

ID	User Story	Acceptance Criteria	Estimation	Priority
	stations so that I can manage multiple stations in the system.	the form. Then: The system registers the new station and updates the list.		
5	View Fuel Stations - As an owner, I want to view a list of my fuel stations so that I can manage their operations efficiently.	Given: The owner is on the dashboard. When: They navigate to the "Manage Stations" section. Then: The system displays a list of owned stations.	2	High
6	Update Fuel Station Details - As an owner, I want to update my fuel station details so that I can keep the information accurate.	Given: The owner is on the "Manage Stations" page. When: They update station details and save changes. Then: The system reflects the updated details.	3	Medium
7	Remove Fuel Station - As an owner, I want to remove a fuel station so that I can stop managing a closed or sold station.	Given: The owner is on the "Manage Stations" page. When: They click delete and confirm the action. Then: The system removes the station from the database.	3	Medium
8	Register Workers - As a station owner, I want to register workers so that they can manage station activities.	Given: The owner is on the "Manage Workers" page. When: They enter the worker's details and submit. Then: The system registers the worker.	3	High
9	Assign Workers to Stations - As an owner, I want to assign workers to specific stations so that they can operate in their designated locations.	Given: An owner is on the worker management page. When: They select a worker and assign a station. Then: The system updates the worker's assigned station.	3	Medium
10	Record Fuel Sales - As a worker, I want to record fuel sales so that the system tracks all transactions.	Given: A worker is logged in. When: They enter fuel sale details. Then: The system stores the transaction.	3	High
11	Generate Sales Reports - As an owner, I want to generate	Given: The owner is on the reports page. When: They select a date range	3	High

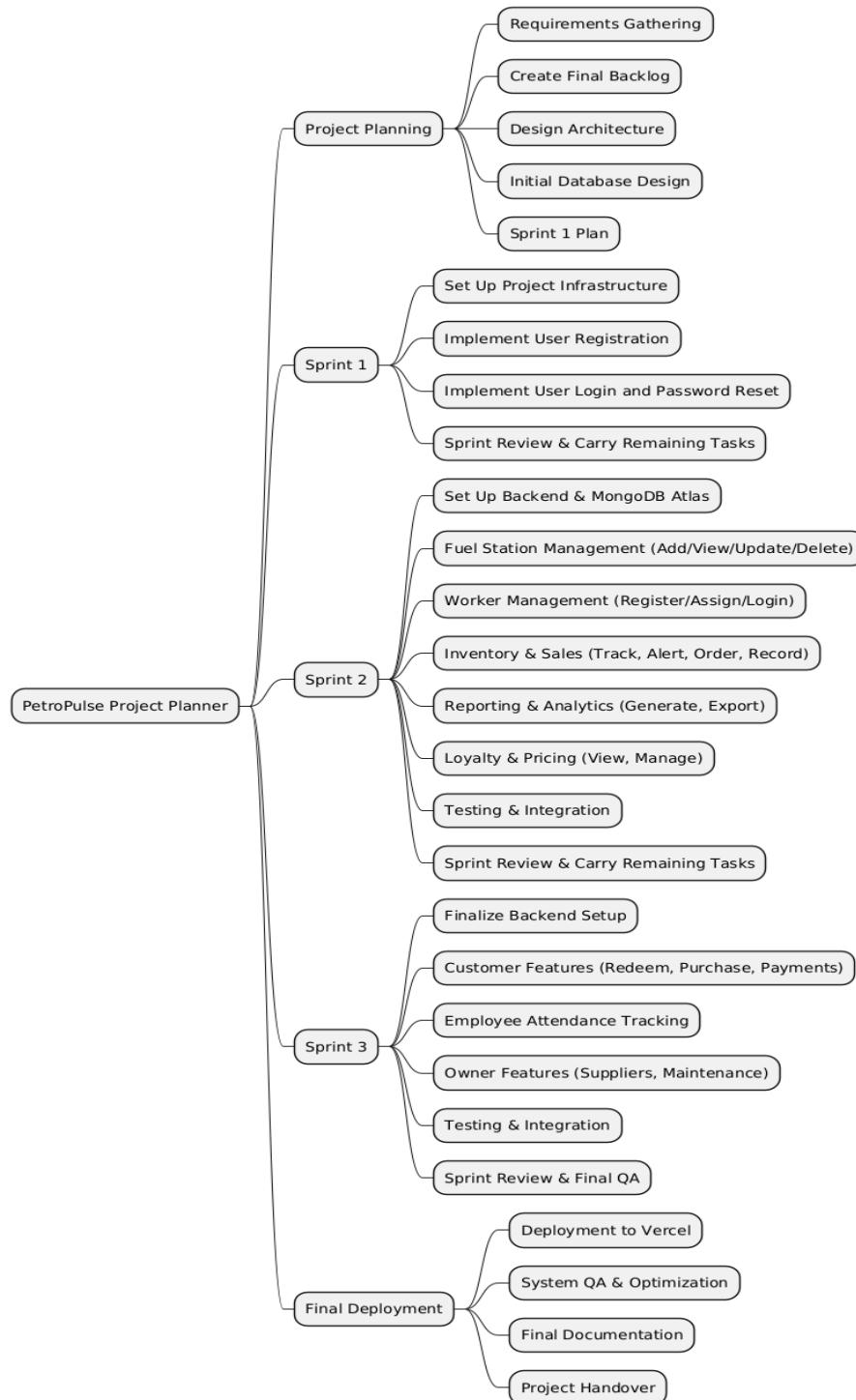
ID	User Story	Acceptance Criteria	Estimation	Priority
	sales reports so that I can analyze revenue and performance.	and generate a report. Then: The system displays the sales data.		
12	Track Fuel Inventory - As a station owner, I want to track fuel levels so that I can ensure continuous supply.	Given: The owner is on the dashboard. When: They check the station inventory. Then: The system displays real-time fuel levels.	4	High
13	Alert for Low Fuel Levels - As a station owner, I want to receive alerts for low fuel levels so that I can order refills in time.	Given: A station's fuel level drops below a threshold. When: The system detects the low level. Then: It sends an alert to the owner.	3	High
14	Order Fuel Supply - As an owner, I want to order fuel refills so that my stations never run out of stock.	Given: The owner is on the fuel supply page. When: They place an order for fuel. Then: The system processes and confirms the order.	4	High
15	View Loyalty Points - As a customer, I want to view my loyalty points so that I can track my rewards.	Given: A customer is logged in. When: They navigate to the "Loyalty Points" page. Then: The system displays their current balance.	2	Medium
16	Customer Fuel Purchase - As a customer, I want to purchase fuel from the station so that I can refuel my vehicle.	Given: A customer is at a station. When: They choose the fuel type, quantity, and payment method. Then: The system processes the payment and updates inventory.	4	High
17	Manage Pricing for Fuel Types - As a station owner, I want to update fuel prices so that I can adjust them based on market conditions.	Given: The owner is on the pricing page. When: They update the price of a fuel type. Then: The system reflects the new pricing in real time.	3	High
18	Manage Maintenance Requests - As a station owner, I want to log maintenance	Given: A station has an issue. When: The owner submits a maintenance	3	Medium

ID	User Story	Acceptance Criteria	Estimation	Priority
	requests so that I can ensure station upkeep.	request. Then: The system records and tracks the request.		
19	View Transaction History - As a customer, I want to view my transaction history, so that I can track my fuel purchases.	Given: A customer is logged in, When: They navigate to the transactions section, Then: The system displays all past fuel purchases.	2	Medium
20	Payment via Cash - As a customer, I want to pay for fuel using cash, so that I can complete my purchase without a card.	Given: A customer selects fuel, When: They choose cash as the payment method, Then: The system registers the payment and updates records.	3	High
21	Payment via Card - As a customer, I want to pay for fuel using my debit/credit card, so that I can make transactions easily.	Given: A customer selects fuel, When: They choose card as the payment method, Then: The system processes the payment and updates records.	3	High
22	Manage Supplier Information - As an owner, I want to manage my fuel suppliers, So that I can track orders and deliveries.	Given: The owner is on the supplier management page, When: They add, edit, or remove a supplier, Then: The system updates the supplier database.	3	Medium
23	Generate Maintenance Reports - As an owner, I want to track station maintenance, so that I can schedule repairs and ensure smooth operations.	Given: The owner is on the reports page, When: They request a maintenance report, Then: The system provides a list of	3	Medium

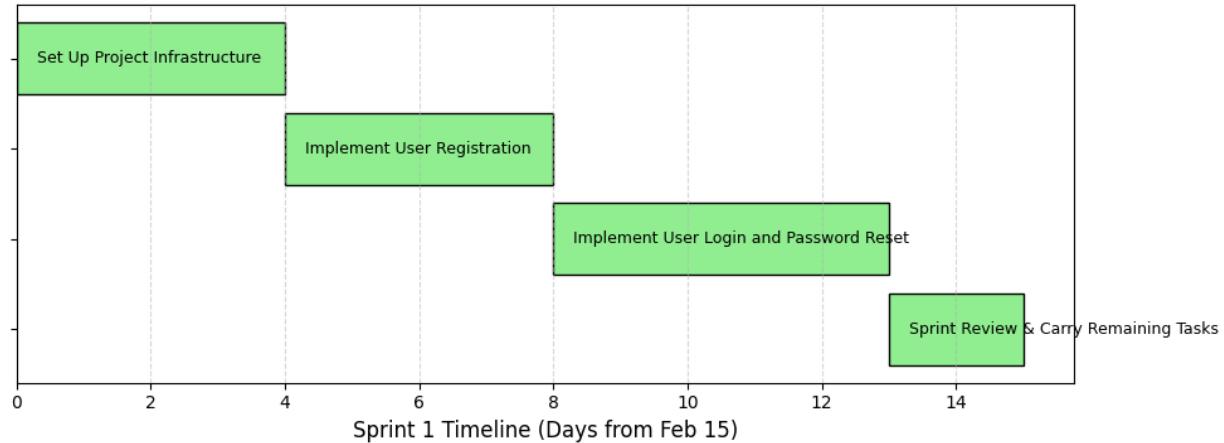
ID	User Story	Acceptance Criteria	Estimation	Priority
		past and upcoming maintenance tasks.		
24	Employee Attendance Tracking - As a station owner, I want to track employee attendance, so that I can monitor working hours.	Given: A worker logs into the system, When: They mark attendance for the shift, Then: The system records their working hours.	3	Medium
25	Secure Access - As a user, I want to have secure access to system configurations, so that I can manage system settings safely.	Given: The user is on the login page, When: They enter valid admin credentials, Then: The system grants access to the admin panel.	3	High
26	View Worker Profiles - As an owner, I want to view worker profiles, so I can manage their information and roles.	Given: The owner is on the "Manage Workers" page. When: They select a worker profile. Then: The system displays the worker's details.	2	Medium

Project Planner and Gantt Chart:

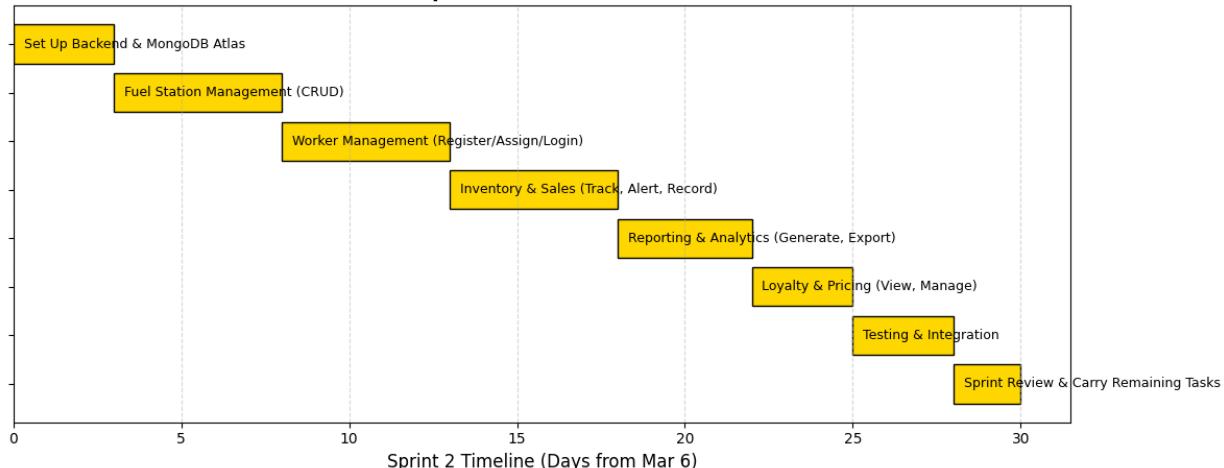
Figure 1: Work Breakdown Structure



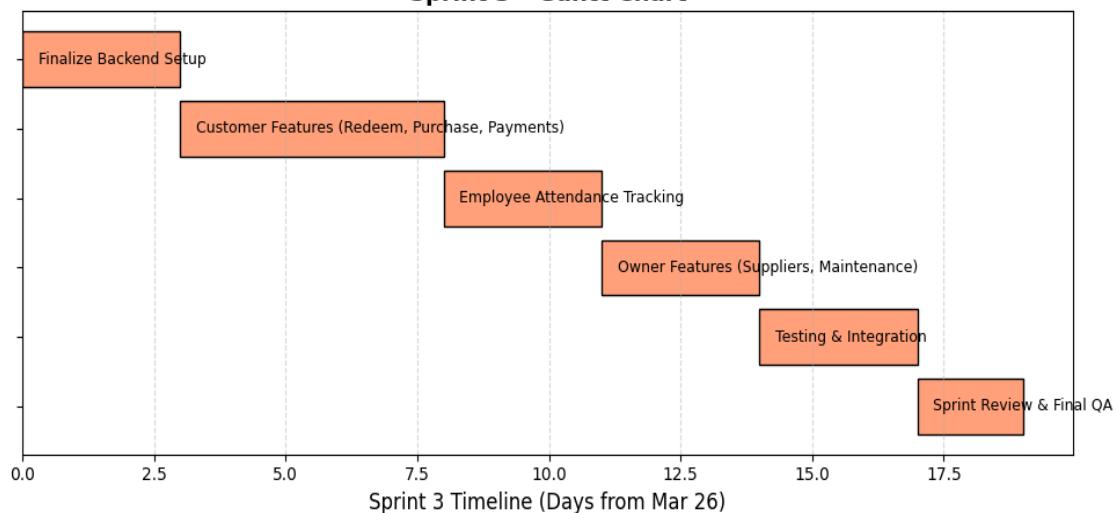
Sprint 1 - Gantt Chart



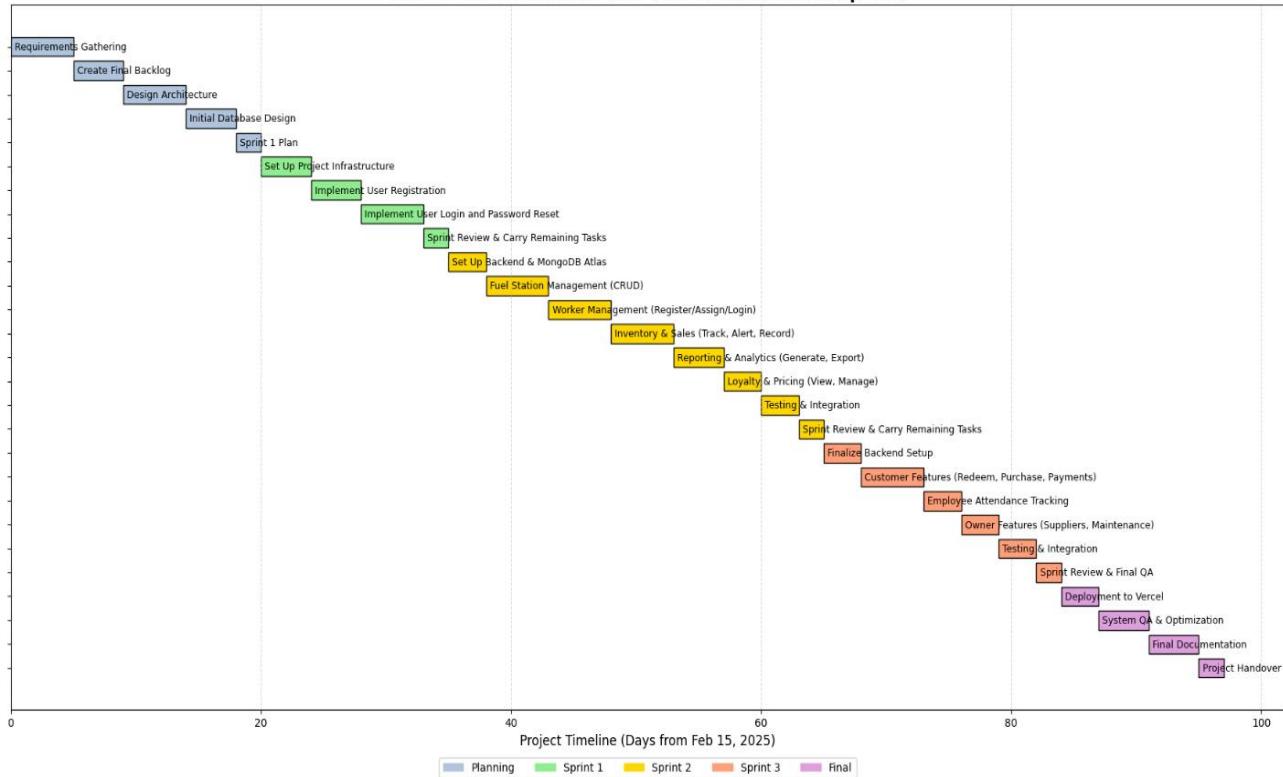
Sprint 2 - Gantt Chart



Sprint 3 - Gantt Chart

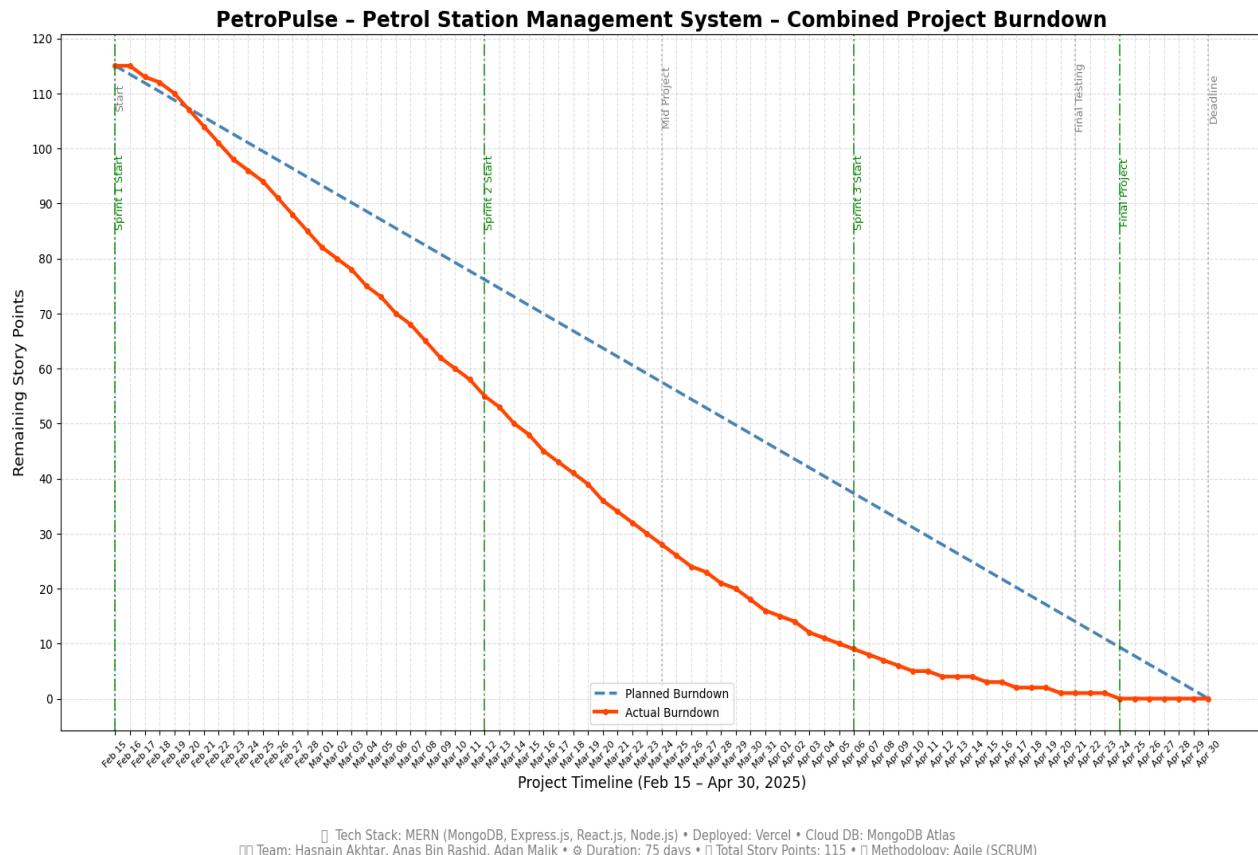


PetroPulse - Detailed Gantt Chart with Accurate Sprints



Product Burndown Chart:

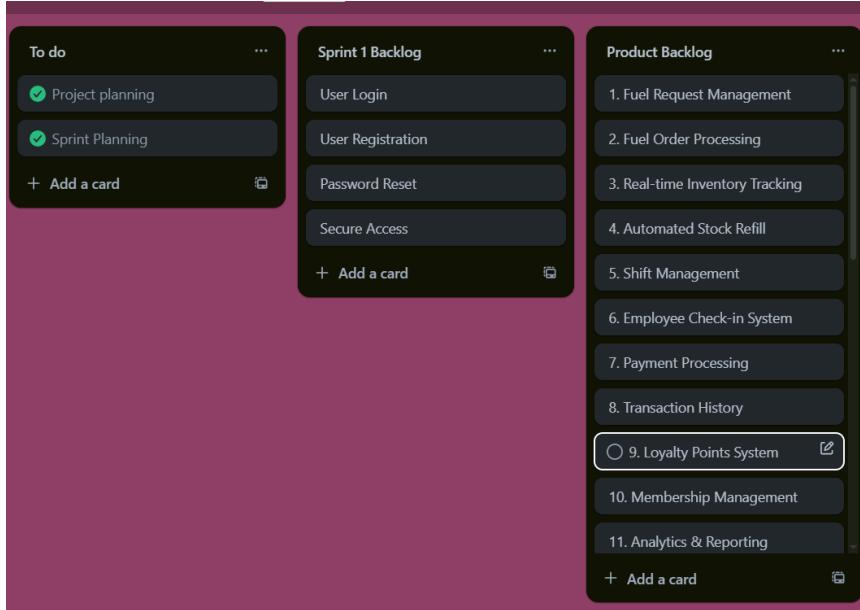
Figure 12: Product Burndown Chart



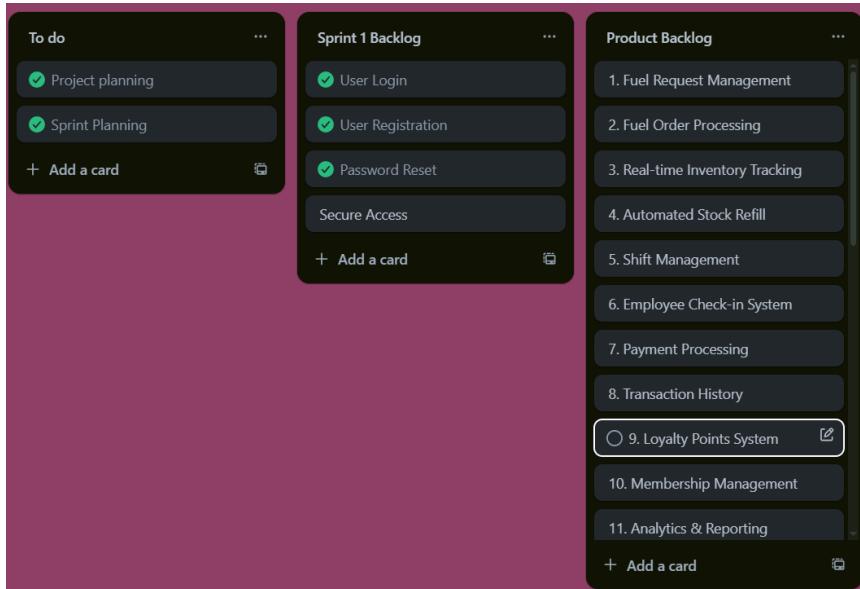
Trello Snapshots:

Sprint-1:

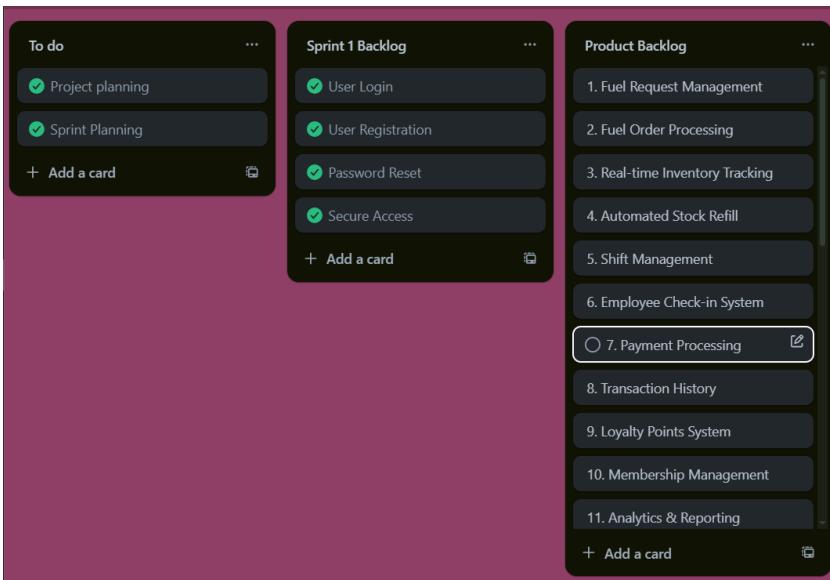
Start of Sprint



Middle of Sprint

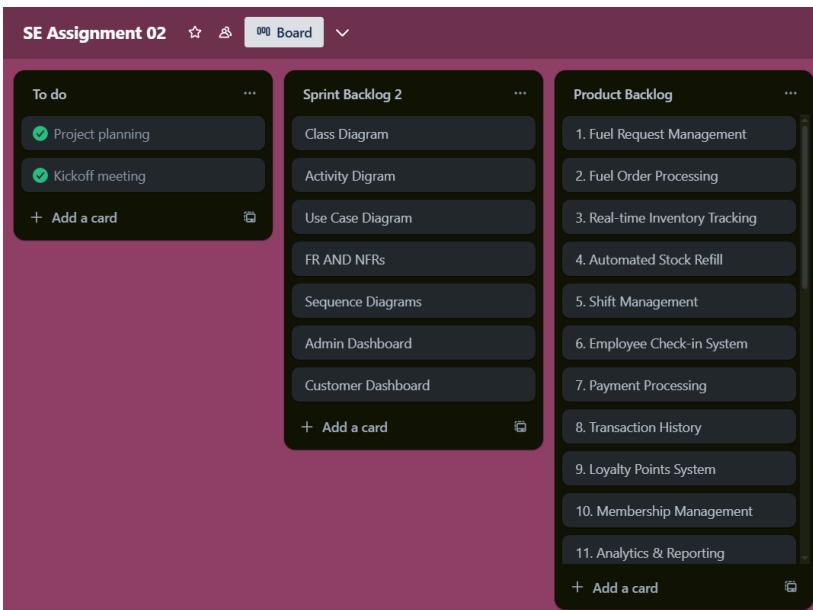


End of Sprint

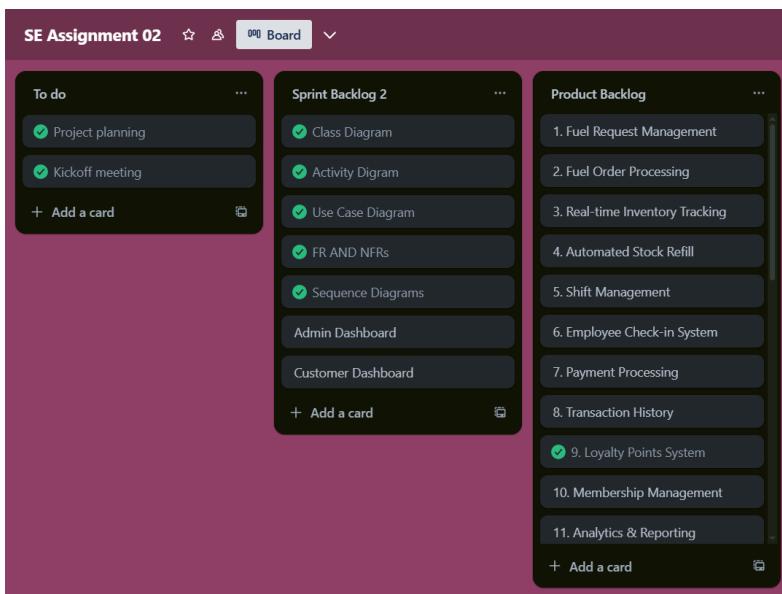


Sprint-2:

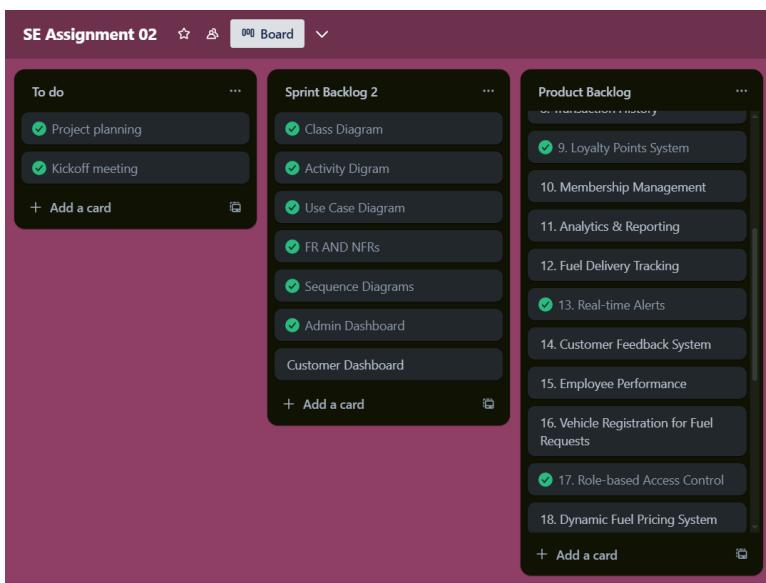
Start of Sprint



Middle of Sprint



End of Sprint



Sprint-3 (Project Completion):

Start of Sprint

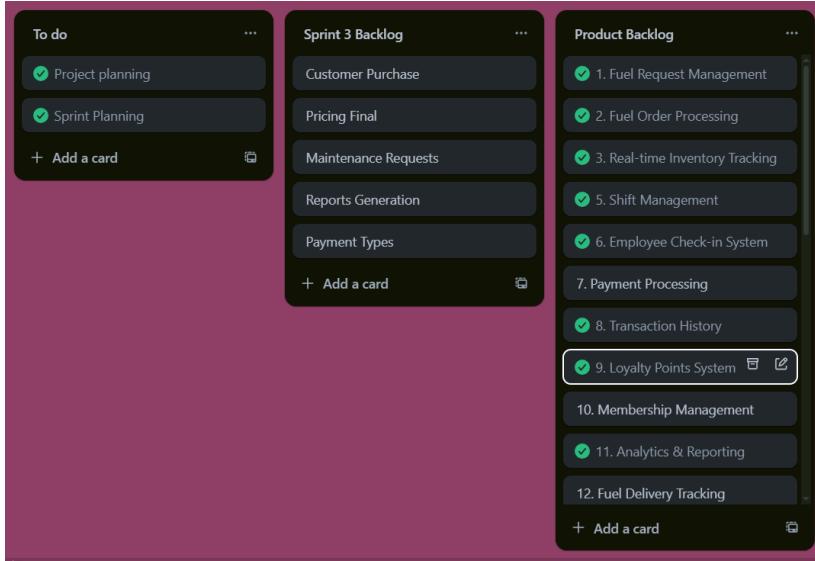
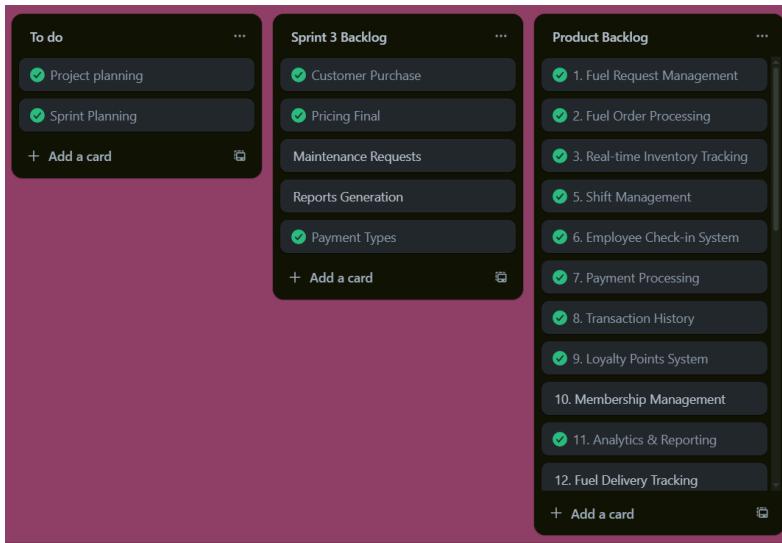
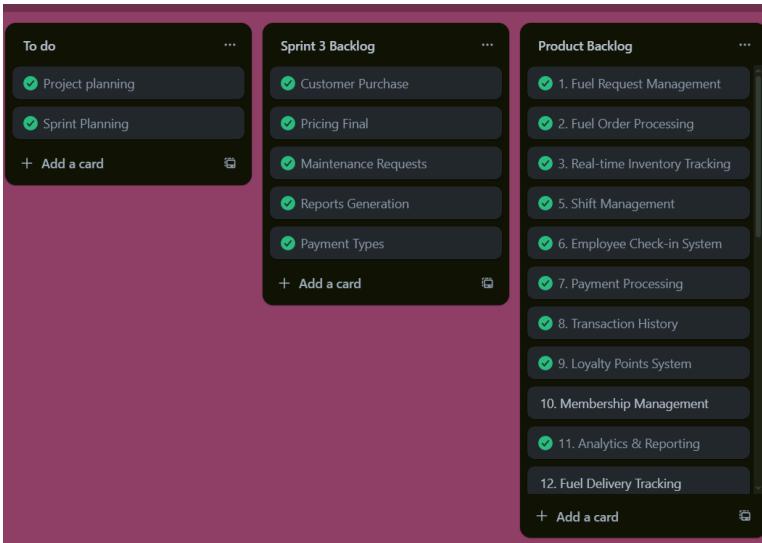


Figure 3: Snapshot-2 Sprint-3

Middle of Sprint

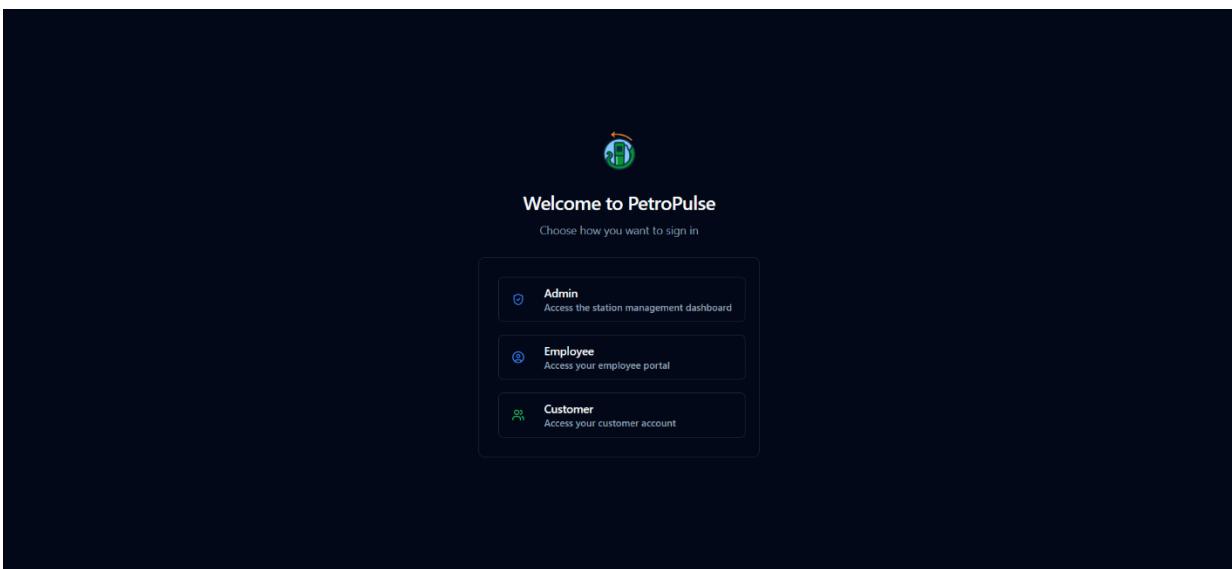


End of Sprint

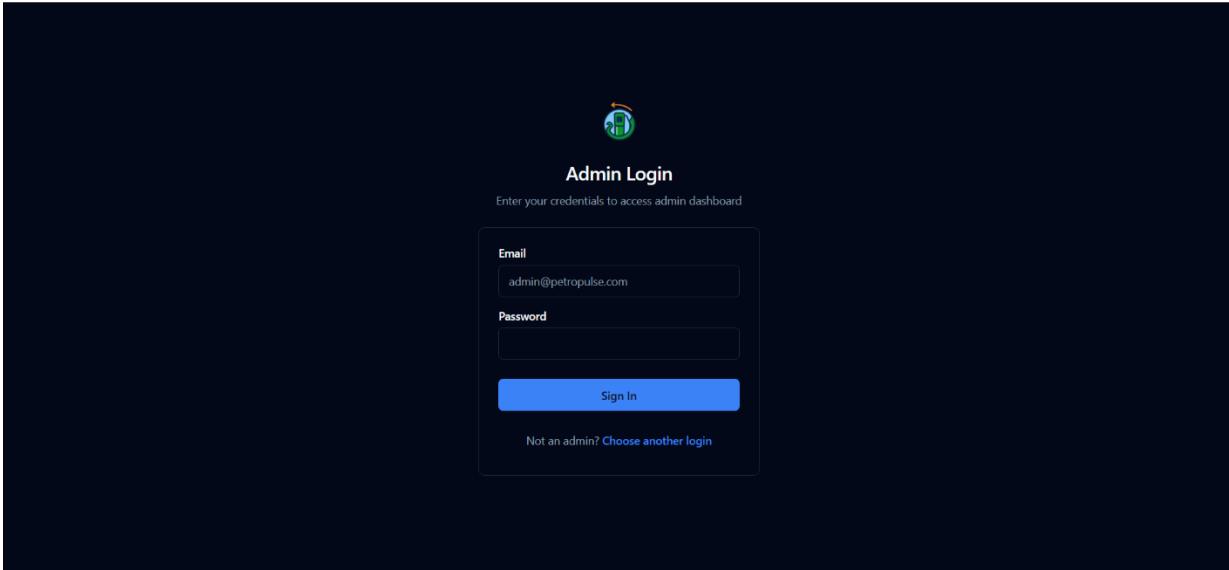


GUI of Project:

The welcome page has three options to choose from being Admin, Employee and Customer.



Login page for Administrator.



Admin Dashboard page shows summary of all required details.

A screenshot of the Admin Dashboard page. The left sidebar contains a navigation menu with items: Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The main area is titled "Dashboard" and includes several summary cards: "Total Revenue \$24,850.75" (Last 7 days +8.5% from last week), "Fuel Sales 3,240 gallons" (Last 7 days +5.2% from last week), "Transactions 428" (Last 7 days +3.7% from last week), and "Customers 10" (Repeat customers this week +6.3% from last week). Below these are two larger sections: "Fuel Inventory Levels" (a horizontal bar chart showing levels for regular, premium, diesel, e85, other, premium-5, other-6, and premium-7) and "Top Selling Products" (a list of products with their names, categories, prices, and unit counts). To the right, there is a section titled "Recent Transactions" listing five purchases with their details.

This page shows the entire Fuel Inventory for the station.

The screenshot displays the 'Fuel Inventory Management' section of the PetroPulse application. On the left, a vertical navigation menu lists various modules: Dashboard, Inventory (selected), Fuel Stock, Products, Sales, Transactions, Customers, Employees, Maintenance, Finance (selected), Expenses, Revenue, Reports, and Settings. The main content area features a search bar at the top. Below it, three summary boxes provide key information: 'Total Fuel Capacity' (92,659 gal across all tanks), 'Current Stock' (52,074.5 gal, 56.2% of capacity), and 'Last Delivery' (4/10/2025, premium). A search bar labeled 'Search fuels...' is positioned below these boxes. The central part of the screen is titled 'Fuel Inventory' and contains a table with the following data:

Fuel Type	Stock Level	Capacity	Price	Supplier	Status	Actions
Regular	86%	10,291 / 11,982 gal	\$3.55/gal	Fuel Distributor Inc.	available	Edit Order
Premium	63%	9,110.9 / 14,513 gal	\$4.00/gal	Fuel Distributor Inc.	available	Edit Order
Diesel	46%	6,556.2 / 14,174 gal	\$3.80/gal	Fuel Distributor Inc.	available	Edit Order
E85	59%	7,101.4 / 11,988 gal	\$3.30/gal	Fuel Distributor Inc.	available	Edit Order
Other	90%	9,000 / 10,000 gal	\$5.00/gal	General Distributors Inc.	—	Edit Order
Premium	90%	9,000 / 10,000 gal	\$3.00/gal	Pakistan	—	Edit Order
Other	0%	10 / 10,000 gal	\$5.00/gal	India	—	Edit Order
Premium	10%	1,000 / 10,000 gal	\$5.00/gal	Pakistan	—	Edit Order
E85	250%	5 / 2 gal	\$5.00/gal	Anas	—	Edit Order

This page shows the Products Inventory for the Stores.

PetroPulse

Dashboard

Inventory

Fuel Stock

Products

Sales

Transactions

Customers

Employees

Maintenance

Finance

Expenses

Revenue

Reports

Settings

Store Products Inventory

Search...

Add New Product

All Categories

Total Products: 11 Unique products in inventory

Total Stock Value: \$3600.53 Retail value

Low Stock Items: 0 Items below reorder point

Store Products

Manage convenience store products and merchandise.

Product Name	Category	Stock ↕	Price ↑	Supplier	Actions
Pakistan	personal_care	23	\$0.50	General Distributors Inc.	Edit Reorder
Soda	beverage	81	\$1.99	General Distributors Inc.	Edit Reorder
USB Cable	electronics	67	\$9.99	General Distributors Inc.	Edit Reorder
Energy Drink	beverage	65	\$3.99	General Distributors Inc.	Edit Reorder
Potato Chips	food	34	\$2.49	General Distributors Inc.	Edit Reorder
Cigarettes	tobacco	72	\$8.99	General Distributors Inc.	Edit Reorder
Motor Oil	automotive	73	\$12.99	General Distributors Inc.	Edit Reorder
Wiper Fluid	automotive	73	\$4.99	General Distributors Inc.	Edit Reorder
Air Freshener	household	41	\$2.99	General Distributors Inc.	Edit Reorder
Hand Sanitizer	personal_care	61	\$3.49	General Distributors Inc.	Edit Reorder
Candy Bar	food	80	\$1.49	General Distributors Inc.	Edit Reorder

This page shows all the Transactions that have been made to this station yet.

The screenshot displays the 'Sales Transactions' section of the PetroPulse application. On the left, a sidebar menu includes options like Dashboard, Inventory, Sales (selected), Customers, Employees, Maintenance, Finance, Expenses, Revenue, Reports, and Settings. The main area shows a summary of sales: Total Sales \$1220.73, Fuel Sales \$904.19 (74.1% of total), and Product Sales \$99.54 (8.2% of total). A search bar at the top allows filtering by date (Apr 25, 2025 - May 02, 2025) and type (All Types). Below the summary is a table titled 'Transaction History' with columns: Transaction ID, Date, Type, Items, Amount, Payment Method, and Status. The table lists numerous transactions from April 26, 2025, involving various service and fuel types, paid via mobile pay, debit card, or cash.

Transaction ID	Date	Type	Items	Amount	Payment Method	Status
680c970a	2025-04-26 13:19:22	Service	1 x \$66.17	\$70.14	Mobile Pay	⌚ Paid
680c970a	2025-04-26 13:19:22	Service	1 x \$54.26	\$57.52	Debit Card	⌚ Paid
680c9709	2025-04-26 13:19:21	Service	1 x \$84.28	\$89.34	Debit Card	⌚ Paid
680c9709	2025-04-26 13:19:21	Product	3 items	\$14.27	Credit Card	⌚ Paid
680c9708	2025-04-26 13:19:20	Product	2 items	\$2.73	Credit Card	⌚ Paid
680c9708	2025-04-26 13:19:20	Product	3 items	\$14.27	Debit Card	⌚ Paid
680c9707	2025-04-26 13:19:19	Product	2 items	\$13.74	Mobile Pay	⌚ Paid
680c9707	2025-04-26 13:19:19	Product	3 items	\$14.80	Cash	⌚ Paid
680c9706	2025-04-26 13:19:18	Product	2 items	\$11.19	Credit Card	⌚ Paid
680c9706	2025-04-26 13:19:18	Product	2 items	\$11.63	Mobile Pay	⌚ Paid
680c9705	2025-04-26 13:19:17	Product	2 items	\$14.80	Credit Card	⌚ Paid
680c9705	2025-04-26 13:19:17	Product	1 x \$1.99	\$2.11	Debit Card	⌚ Paid
680c9704	2025-04-26 13:19:16	Fuel	12.24 x \$3.99	\$48.84	Credit Card	⌚ Paid
680c9703	2025-04-26 13:19:15	Fuel	9.34 x \$3.99	\$37.27	Mobile Pay	⌚ Paid
680c9702	2025-04-26 13:19:14	Fuel	15.22 x \$3.79	\$57.68	Mobile Pay	⌚ Paid
680c9702	2025-04-26 13:19:14	Fuel	12.61 x \$3.59	\$45.27	Debit Card	⌚ Paid
680c9701	2025-04-26 13:19:13	Fuel	8.61 x \$3.99	\$34.35	Debit Card	⌚ Paid
680c9700	2025-04-26 13:19:12	Fuel	17.1 x \$3.59	\$61.39	Cash	⌚ Paid
680c9700	2025-04-26 13:19:12	Fuel	16.12 x \$3.79	\$61.09	Debit Card	⌚ Paid
680c96ff	2025-04-26 13:19:11	Fuel	17.28 x \$3.99	\$68.95	Credit Card	⌚ Paid
680c96fe	2025-04-26 13:19:10	Fuel	11.8 x \$3.99	\$47.08	Credit Card	⌚ Paid
680c96fe	2025-04-26 13:19:10	Fuel	19.83 x \$3.59	\$71.19	Debit Card	⌚ Paid
680c96fd	2025-04-26 13:19:09	Fuel	6.88 x \$3.79	\$26.08	Cash	⌚ Paid
680c96fc	2025-04-26 13:19:08	Fuel	12.18 x \$3.99	\$48.60	Credit Card	⌚ Paid
680c96fc	2025-04-26 13:19:08	Fuel	9.92 x \$3.79	\$37.60	Mobile Pay	⌚ Paid
680c96fb	2025-04-26 13:19:07	Fuel	5.05 x \$3.59	\$18.13	Debit Card	⌚ Paid

This page shows Customer details for the Admin to manage.

The screenshot displays the 'Customer Management' section of the PetroPulse application. On the left, a sidebar menu lists various administrative functions: Dashboard, Inventory, Sales, Customers (selected), Employees, Maintenance, Finance, Expenses, Revenue, Reports, and Settings. The main area features a search bar at the top and a summary dashboard with four key metrics: Total Customers (32), Regular Customers (5), Premium Members (20), and New Customers (7). Below this is a 'Customer Directory' table with columns for Customer, Status, Loyalty Points, Last Visit, Vehicle, Contact Info, and Actions. The table lists numerous customer entries, each with a profile picture, name, status (e.g., Premium, Regular, New), loyalty points, last visit date, vehicle model, contact email and phone number, and a three-dot 'Actions' menu.

Customer	Status	Loyalty Points	Last Visit	Vehicle	Contact Info	Actions
JW Joseph Wilson Since Mar 15, 2024	Premium	3,359	Apr 13, 2025	Toyota Camry 2019	joseph.wilson932@example.com 386-925-1621	...
WM William Martin Since Dec 16, 2024	Premium	2,269	Apr 11, 2025	Hyundai Tucson 2020	william.martin427@example.com 354-375-6817	...
AG Amelia Gonzalez Since Mar 12, 2025	Premium	3,303	Apr 1, 2025	Chevrolet Silverado	amelia.gonzalez428@example.com 301-190-3690	...
DM Daniel Moore Since Dec 20, 2024	Premium	8,659	Apr 8, 2025	Chevrolet Silverado 2018	daniel.moore144@example.com 124-275-7311	...
SI Sophia Johnson Since Nov 17, 2025	New	839	Jan 20, 2025	Subaru Outback 2021	sophia.johnson908@example.com 621-982-9246	...
WH William Hernandez Since Nov 27, 2024	Premium	2,515	Apr 15, 2025	Audi A4	william.hernandez903@example.com 320-985-9304	...
IW Isabella Wilson Since Jan 21, 2025	Premium	5,958	Apr 13, 2025	Volkswagen Tiguan 2021	isabella.wilson509@example.com 611-477-3947	...
IG Isabella Garcia Since Feb 10, 2025	Regular	707	Apr 2, 2025	Lexus RX 2019	isabella.garcia708@example.com 785-560-7526	...
IM Isabella Moore Since Nov 25, 2024	Premium	10,247	Apr 1, 2025	Honda Civic	isabella.moore137@example.com 394-568-6545	...
RW Robert Wilson Since May 25, 2024	Regular	93	Apr 4, 2025	Volkswagen Tiguan 2021	robert.wilson214@example.com 409-667-8455	...
MW Matthew Martin Since Apr 11, 2024	New	5,79	Apr 6, 2025	Tesla Model 3	matthew.martin922@example.com 716-446-7424	...
HJ Harper Johnson Since Apr 17, 2023	Premium	7,476	Mar 31, 2025	Honda Civic	harper.johnson286@example.com 971-701-5576	...
DM David Moore Since Oct 16, 2023	Premium	3,065	Mar 26, 2025	Tesla Model 3	david.moore481@example.com 385-131-8131	...
DW Daniel Williams Since Feb 28, 2024	Regular	761	Mar 25, 2025	Lexus RX 2019	daniel.williams551@example.com 400-915-1476	...
HH Harper Hernandez Since Jun 21, 2023	New	778	Feb 8, 2025	Volkswagen Tiguan 2021	harper.hernandez547@example.com 574-915-6601	...
DM Daniel Martin Since May 9, 2023	New	443	Mar 17, 2025	Tesla Model 3	daniel.martin198@example.com 359-990-7997	...
AB Andrew Brown Since Apr 17, 2025	Premium	1,830	Mar 31, 2025	Kia Telluride 2022	andrew.brown571@example.com 975-596-8752	...
RM Robert Martinez Since Apr 4, 2024	New	896	Feb 7, 2025	BMW 3 Series	robert.martinez457@example.com 481-640-9876	...
HH Harper Hernandez Since Jun 25, 2023	Premium	2,312	Apr 12, 2025	Kia Telluride 2022	harper.hernandez518@example.com 981-661-7987	...
DW David Williams Since Nov 8, 2024	Premium	10,093	Apr 14, 2025	Volkswagen Tiguan 2021	david.williams52@exemple.com 917-235-2145	...
JT James Taylor Since Sep 15, 2024	Premium	4,045	Apr 3, 2025	Chevrolet Silverado	james.taylor951@example.com 546-574-7259	...
AD Andrew Davis Since Mar 15, 2024	Premium	11,427	Apr 7, 2025	Audi Q5 2021	andrew.davis322@example.com 810-617-3452	...
CM Charlotte Martin Since May 26, 2024	Premium	1,495	Mar 23, 2025	Lexus RX 2019	charlotte.martin68@example.com 171-815-8531	...
IW Isabella Wilson Since Mar 18, 2024	Premium	1,961	Apr 4, 2025	Subaru Outback 2021	isabella.wilson76@example.com 700-104-8412	...
AW Andrew Williams Since Mar 20, 2025	Premium	3,546	Apr 15, 2025	Hyundai Tucson 2020	andrew.williams251@example.com 541-882-4675	...
EL Evelyn Lopez Since Jan 20, 2025	Premium	2,453	Apr 11, 2025	Toyota Camry 2019	evelyn.lopez189@example.com 140-051-8659	...
AM Andrew Miller Since Dec 12, 2023	Premium	1,960	Apr 18, 2025	Tesla Model 3	andrew.miller282@example.com 180-491-5366	...
DH David Hernandez Since Jul 21, 2024	Regular	363	Apr 6, 2025	BMW 3 Series	david.hernandez401@example.com 860-773-9733	...

This page shows Customer details for the Admin to manage.

PetroPulse

- Dashboard
- Inventory >
- Sales >
- Customers >
- Employees**
- Maintenance
- Finance >
- Expenses
- Revenue
- Reports
- Settings

Search... (1) User icon

Employee Management

+ Add New Employee

Total Employees **12** Currently employed

Active Employees **12** Ready for duty

On Leave/Inactive **0** Temporarily unavailable

Search employees... Filter

Employee Directory

Manage your station staff and their information.

Employee	Role	Status	Contact Info	Start Date	Shift	Actions
EL Employee LastName9	Security	active	employee9@petropulse.com 555-773-9758	Apr 27, 2025	morning	...
EL Employee2 LastName2	Stock Clerk	active	employee2@petropulse.com 555-888-5352	May 2, 2025	morning	...
EL Employee3 LastName3	Stock Clerk	active	employee3@petropulse.com 555-124-6971	May 2, 2025	morning	...
EL Employee4 LastName4	Fuel Attendant	active	employee4@petropulse.com 555-656-4866	May 2, 2025	morning	...
EL Employee5 LastName5	Stock Clerk	active	employee5@petropulse.com 555-592-7356	May 2, 2025	morning	...
EL Employee10 LastName10	Stock Clerk	active	employee10@petropulse.com 555-189-9376	May 2, 2025	morning	...
EL Employee1 LastName1	Cashier	active	employee1@petropulse.com 555-893-2136	May 2, 2025	morning	...
EL Employee6 LastName6	Stock Clerk	active	employee6@petropulse.com 555-877-3815	May 2, 2025	morning	...
EL Employee7 LastName7	Cashier	active	employee7@petropulse.com 555-375-8221	May 2, 2025	morning	...
EL Employee8 LastName8	Manager	active	employee8@petropulse.com 555-239-5997	May 2, 2025	morning	...
AM Adan Malik	Security	active	adanmalik159@gmail.com 03000329373	Apr 27, 2025	morning	...
AM Adan Malik	Security	active	adanmalik124@gmail.com 030021342144	Apr 28, 2025	morning	...

This page shows Maintenance Requests made by the Admin.

The screenshot displays the 'Maintenance Management' section of the PetroPulse application. On the left, a sidebar menu includes 'Dashboard', 'Inventory', 'Sales', 'Customers', 'Employees', 'Maintenance' (which is selected), 'Finance', 'Expenses', 'Revenue', 'Reports', and 'Settings'. The main area features a search bar at the top, followed by four summary boxes: 'Overall Progress' (20% completed), 'Completed' (2 out of 10 tasks), 'In Progress' (2 active tasks), and 'Pending' (1 upcoming task). Below these is a search bar labeled 'Search tasks...'. A 'Filter' button is located in the top right corner of the main content area. The central part of the screen is titled 'Maintenance Tasks' and contains a table listing ten tasks:

Task	Status	Priority	Due Date	Assigned To	Actions
Fuel Pump #1 Maintenance	completed	critical	Apr 14, 2025	Unassigned	...
Security Camera Installation	completed	low	Apr 15, 2025	Unassigned	...
Lighting Replacement	cancelled	critical	Apr 16, 2025	Unassigned	...
Bathroom Renovation	cancelled	high	Apr 19, 2025	Unassigned	...
Store AC Repair	cancelled	medium	Apr 20, 2025	Unassigned	...
Fire Safety Equipment Check	cancelled	high	Apr 22, 2025	Unassigned	...
POS System Update	deferred	low	Apr 25, 2025	Unassigned	...
Parking Lot Repair	pending	critical	Apr 25, 2025	Unassigned	...
Tank Inspection	in progress	high	May 2, 2025	Unassigned	...
Air Compressor Maintenance	in progress	medium	May 11, 2025	Unassigned	...

This page shows Expenses for the station.

The screenshot shows the 'Expense Management' section of the PetroPulse application. On the left, a dark sidebar menu includes 'Dashboard', 'Inventory', 'Sales', 'Customers', 'Employees', 'Maintenance', 'Finance' (selected), 'Expenses' (selected), 'Revenue', 'Reports', and 'Settings'. The main area has a search bar and four summary boxes: 'Total Expenses' (\$0.00, For selected period), 'Paid' (\$0.00, 0% of total), 'Pending' (\$0.00, 0% of total), and 'Upcoming' (\$0.00, 0% of total). Below these is a search bar for 'Search expenses...' and a date range selector 'Apr 02, 2025 - May 02, 2025'. A button '+ Add New Expense' is at the top right. The 'Expense Transactions' section displays a table with columns: Date, Description, Category, Vendor, Amount ↑, Payment Method, Status, and Actions. A note says 'Track and categorize all business expenses.'

This page shows station Revenue.

The screenshot shows the 'Revenue Analysis' section of the PetroPulse application. The sidebar is identical to the previous screen. The main area features three summary boxes: 'Total Revenue' (\$0.00, For selected period), 'Daily Average' (\$0.00, Average daily revenue), and 'Top Source' (N/A, No data available). It includes a search bar for 'Search sources...', a date range selector 'Apr 25, 2025 - May 02, 2025', and a 'Export Report' button. The 'Daily Revenue Trend' section contains a bar chart showing revenue breakdown by day for June 1 through June 7. The chart shows 'Fuel Revenue' in blue and 'Store Revenue' in green. The 'Revenue Transactions' section shows a table with columns: Date, Source, Category, and Amount. The 'Revenue by Category' section provides a breakdown of revenue across different categories.

This page shows all the Reports and lets the Admin download them.

The screenshot displays the 'Reports & Analytics' section of the PetroPulse application. On the left, a sidebar menu lists navigation options: Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports (which is currently selected), and Settings. The main area features a search bar at the top. Below it, a header bar includes a date range from 'Apr 02, 2025 - May 23, 2025' and a 'Filter' button. The page is titled 'Reports & Analytics' and contains nine report cards arranged in a grid:

- Financial Overview**: financial • Last updated: 4/13/2025. A summary of financial performance. Includes 'View' and 'Download' buttons.
- Inventory Status**: inventory • Last updated: 4/13/2025. Current inventory levels and stock details. Includes 'View' and 'Download' buttons.
- Personnel Report**: personnel • Last updated: 4/13/2025. Employee performance and attendance. Includes 'View' and 'Download' buttons.
- Marketing Campaigns**: marketing • Last updated: 4/13/2025. Performance of recent marketing campaigns. Includes 'View' and 'Download' buttons.
- Operational Efficiency**: operations • Last updated: 4/13/2025. Metrics on operational performance. Includes 'View' and 'Download' buttons.
- Sales Report**: financial • Last updated: 4/13/2025. Detailed sales data for the last quarter. Includes 'View' and 'Download' buttons.
- Customer Feedback**: marketing • Last updated: 4/13/2025. Analysis of customer feedback and reviews. Includes 'View' and 'Download' buttons.
- Supply Chain Report**: operations • Last updated: 4/13/2025. Details on supply chain performance. Includes 'View' and 'Download' buttons.
- Budget Allocation**: financial • Last updated: 4/13/2025. Overview of budget allocation and usage. Includes 'View' and 'Download' buttons.
- Training Programs**: personnel • Last updated: 4/13/2025. Details of employee training programs. Includes 'View' and 'Download' buttons.

The Admin can view and edit their Personal Information here.

The screenshot shows the 'Settings' page of the PetroPulse application. On the left is a dark sidebar with navigation links: Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings (which is selected). The main content area has a header with a search bar, a notifications icon, and a user profile icon. Below the header is a 'Settings' section with tabs for Profile, Business, Notifications, Security, Billing, Locations, and Support. A 'Save Changes' button is located at the top right of the main content area. The 'Profile Information' section contains fields for First Name (John), Last Name (Smith), Email Address (john.smith@example.com), and Phone Number ((555) 123-4567). There is also a placeholder for a Bio: 'Station manager with 5 years of experience in the fuel retail industry.' The 'Preferences' section includes two toggle switches: 'Marketing Emails' (on) and 'Usage Data' (on).

Profile Information
Update your personal information and how it appears on your account.

First Name: John Last Name: Smith

Email Address: john.smith@example.com

Phone Number: (555) 123-4567

Bio:
Station manager with 5 years of experience in the fuel retail industry.

Preferences

Marketing Emails
Receive emails about new features and updates.

Usage Data
Share anonymous usage data to help us improve our product.

The admin can edit their security settings here.

The screenshot shows the 'Settings' page of the PetroPulse application. The left sidebar includes links for Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The main content area has a search bar and navigation tabs for Profile, Business, Notifications, Security (which is selected), Billing, Locations, and Support. A 'Save Changes' button is located in the top right of the main content area.

Security Settings
Manage your password and account security preferences.

Password

Current Password:
New Password: Confirm New Password:

Change Password

Two-Factor Authentication

Enable 2FA
Add an extra layer of security to your account.

✓ Two-factor authentication is enabled
Your account is currently protected with authenticator app.
[Configure 2FA](#)

Login Sessions

Current Session
Windows • Chrome • San Francisco, CA [Active Now](#)

Previous Session
MacOS • Safari • San Francisco, CA [Revoke](#)

[Sign Out of All Sessions](#)

Settings saved
Your settings have been saved successfully.

The admin can edit their Business details here.

The screenshot shows the 'Business' tab selected in the navigation bar. The 'Business Information' section contains fields for Business Name (PetroPulse Gas Station), Tax ID / EIN (12-3456789), Business Phone ((555) 987-6543), Business Email (info@petropulse.com), and Website (<https://petropulse.com>). The 'Business Address' section includes fields for Street Address (123 Fuel Lane), City (Gastonville), State / Province (California), ZIP / Postal Code (95123), and Country (United States). The 'Business Hours' section shows Weekday Hours (6:00 AM - 10:00 PM) and Weekend Hours (7:00 AM - 9:00 PM), with a checkbox for 'Special hours for holidays'.

The admin can view their Billing details here.

The screenshot shows the 'Settings' section of the PetroPulse application. On the left is a sidebar with navigation links: Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The 'Settings' link is highlighted. At the top right are search, filter, and user icons. Below the header is a navigation bar with tabs: Profile, Business, Notifications, Security, Billing (which is selected), Locations, and Support. A 'Save Changes' button is at the top right of the main content area. The main content is titled 'Billing & Subscription' and describes managing billing information and subscription plans. It shows a 'Premium Plan' section with a note that the subscription renews on August 1, 2023, and an 'Active' status indicator. Below this is a 'Payment Method' section showing a Visa card ending in 4242, which expires on 04/24. There is an 'Edit' button next to it and a 'Add Payment Method' button. The final section is 'Billing History', listing three recent invoices: 'Premium Plan - July 2023' (Jul 1, 2023) for \$49.99 with a 'Download' link; 'Premium Plan - June 2023' (Jun 1, 2023) for \$49.99 with a 'Download' link; and 'Premium Plan - May 2023' (May 1, 2023) for \$49.99 with a 'Download' link. A 'View All Invoices' button is at the bottom of this section.

The admin can change and add Station locations here.

The screenshot shows the 'Settings' page of the PetroPulse application. The left sidebar has a dark theme with white text and icons. It includes links for Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The 'Settings' link is highlighted with a blue background. The main content area has a light gray background. At the top, there is a search bar with placeholder text 'Search...', and three small icons: a magnifying glass, a gear, and a user profile. Below the search bar is a navigation bar with tabs: Profile, Business, Notifications, Security, Billing, Locations (which is selected and highlighted in blue), and Support. To the right of the navigation bar is a blue 'Save Changes' button. The main content is divided into sections: 'Locations' (with a sub-section 'Your Locations' containing 'Main Station - Downtown' and 'Northside Location'), 'Location Settings' (with sub-sections 'Time Zone Settings' and 'Location Display'), and 'Centralized Inventory Management'. The 'Time Zone Settings' section shows 'Default Time Zone' set to 'Pacific Time (US & Canada)'. The 'Location Display' section has two toggle switches: one for 'Show All Locations in Reports' (which is turned on) and another for 'Centralized Inventory Management' (which is also turned on). The 'Centralized Inventory Management' section describes managing inventory across all locations from a single dashboard.

The admin can Edit Notification Settings here.

The screenshot shows the 'Settings' page of the PetroPulse application. The left sidebar includes links for Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The main content area has a header with a search bar, a notifications icon, and a user profile icon. Below the header, the 'Notifications' tab is selected. The page is titled 'Settings' and describes managing account settings and preferences. It features sections for 'Notification Preferences', 'System Notifications', 'Delivery Methods', and 'Notification Schedule'. Under 'Notification Preferences', there are three categories: 'Inventory Alerts', 'Maintenance Reminders', and 'Financial Reports', each with a toggle switch. Under 'Delivery Methods', there are three categories: 'Email Notifications', 'SMS Notifications', and 'Push Notifications', also with toggle switches. Under 'Notification Schedule', there is a dropdown menu for 'Preferred Time for Daily Digest' set to 'Morning (8:00 AM)', with a note stating 'We'll send your daily summary at this time.' A 'Save Changes' button is located in the top right corner of the main content area.

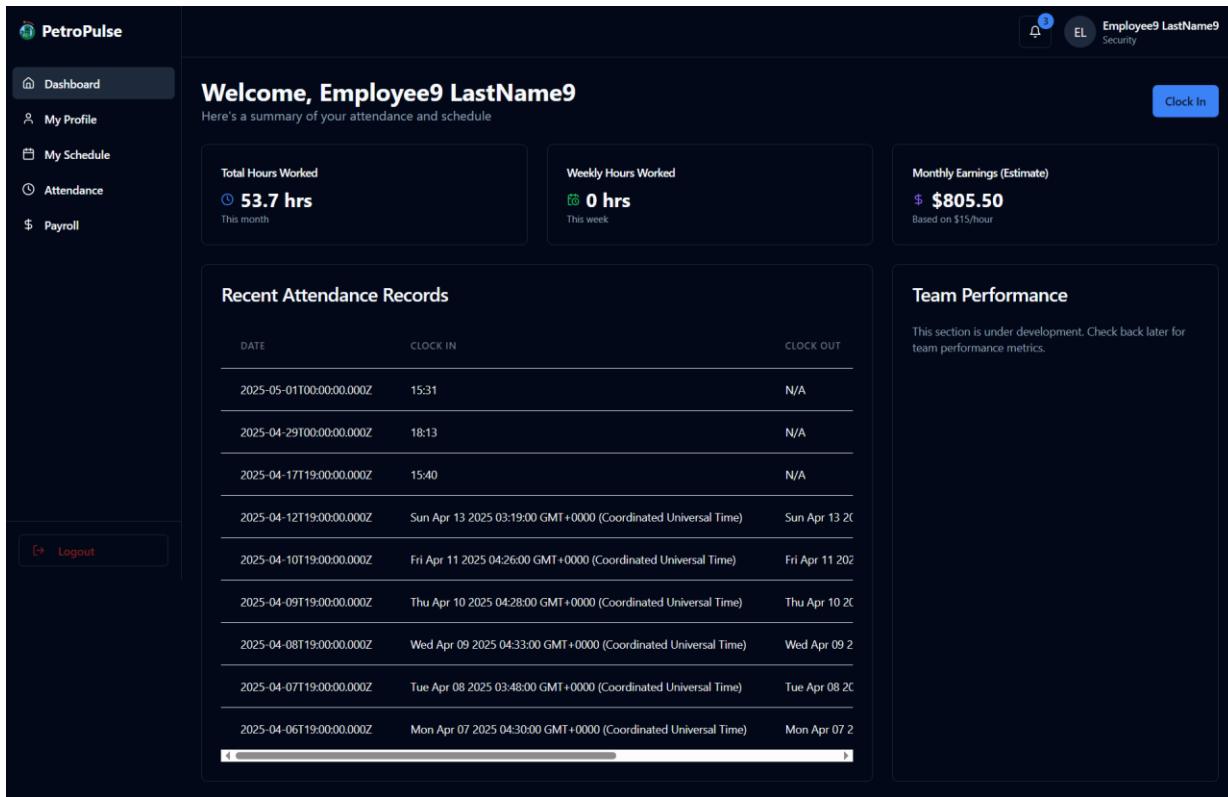
The admin can refer to Help and Support here.

The screenshot shows the 'Settings' page of the PetroPulse application. On the left is a sidebar with navigation links: Dashboard, Inventory, Sales, Customers, Employees, Maintenance, Finance, Reports, and Settings. The 'Settings' link is highlighted. At the top right are search, filter, and user icons. Below the header is a sub-header 'Manage your account settings and preferences.' followed by tabs: Profile, Business, Notifications, Security, Billing, Locations, and Support. The 'Support' tab is selected. A blue 'Save Changes' button is at the top right of the main content area. The main content area has a dark background with white text. It features a 'Help & Support' section with a sub-section '24/7 Customer Support' containing a 'Contact Support' button and a 'View Knowledge Base' link. Below this are sections for 'Email Support' (support@petropulse.com) and 'Phone Support' ((800) 555-1234). There is also a 'Frequently Asked Questions' section with three collapsed items: 'How do I add a new employee to the system?', 'How do I update fuel prices?', and 'How do I generate a custom report?'. Finally, there is a 'Training Resources' section with 'Getting Started Guide' (a link to learn basics) and 'Video Tutorials' (a link to watch step-by-step video guides).

Login Page for Station Employees.

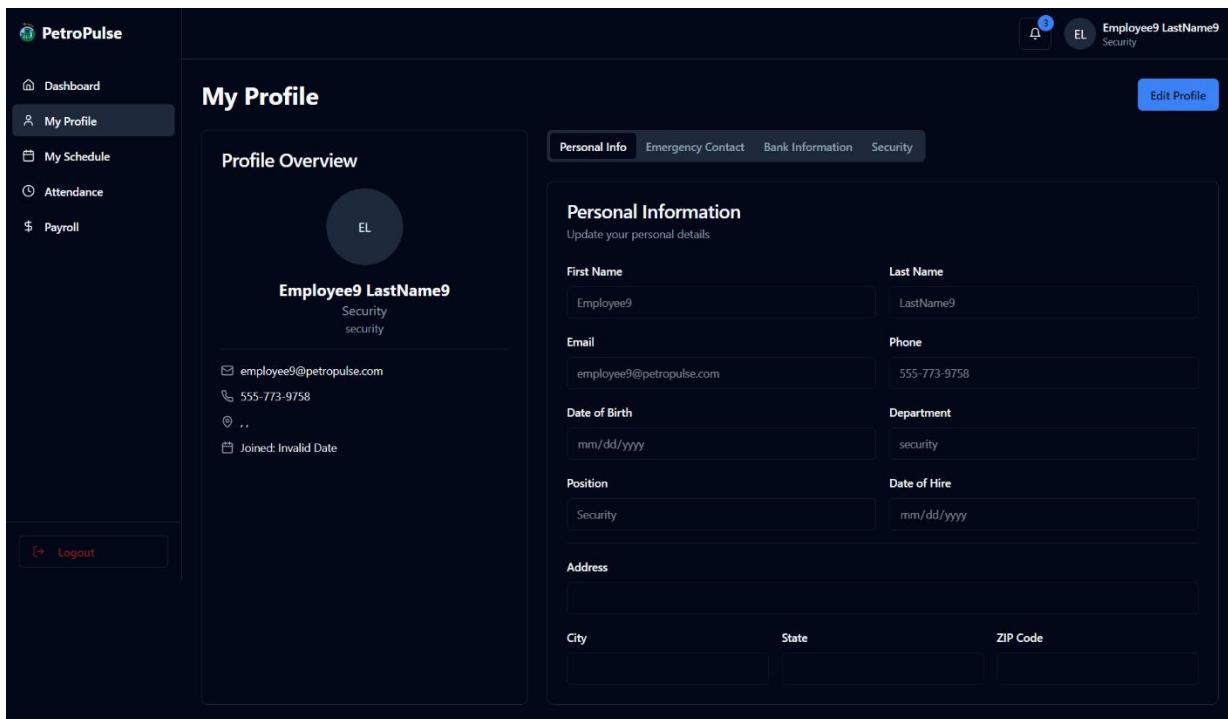
The screenshot shows the 'Employee Login' page. At the top center is a green circular logo with a white icon. Below it is the heading 'Employee Login' and a sub-instruction 'Enter your credentials to access your account'. The login form consists of two input fields: 'Email' (containing 'employee@petropulse.com') and 'Password' (an empty field). Below these is a blue 'Sign In' button. At the bottom of the form is a link 'Not an employee? Choose another login'.

This is Dashboard for Employees.



The screenshot shows the PetroPulse Employee Dashboard. The top navigation bar includes a logo, a bell icon with a notification count of 1, the employee's name "Employee9 LastName9", and a "Clock In" button. The left sidebar has links for Dashboard, My Profile, My Schedule, Attendance, and Payroll, with a "Logout" button at the bottom. The main content area starts with a welcome message "Welcome, Employee9 LastName9" and a summary of attendance and schedule. It displays three boxes: "Total Hours Worked" (53.7 hrs this month), "Weekly Hours Worked" (0 hrs this week), and "Monthly Earnings (Estimate)" (\$805.50 based on \$15/hour). Below this is a section titled "Recent Attendance Records" showing a list of clock-in and clock-out times from April 2025. To the right is a placeholder section for "Team Performance" which is under development.

This page allows Employees to edit or view their Personal Information.



The screenshot shows the "My Profile" page. The top navigation bar includes a logo, a bell icon with a notification count of 1, the employee's name "Employee9 LastName9", and a "Edit Profile" button. The left sidebar has links for Dashboard, My Profile, My Schedule, Attendance, and Payroll, with a "Logout" button at the bottom. The main content area is titled "My Profile" and contains a "Profile Overview" section with a placeholder profile picture (labeled "EL"), the employee's name "Employee9 LastName9", and the job title "Security security". Below this are contact details: email (employee9@petropulse.com), phone (555-773-9758), and a note about joining (Joined: Invalid Date). To the right is a "Personal Information" section with tabs for Personal Info, Emergency Contact, Bank Information, and Security. The Personal Info tab is active, showing fields for First Name (Employee9), Last Name (LastName9), Email (employee9@petropulse.com), Phone (555-773-9758), Date of Birth (mm/dd/yyyy), Department (security), Position (Security), Date of Hire (mm/dd/yyyy), Address (empty), City (empty), State (empty), and ZIP Code (empty).

Employees can edit their Security Settings here.

The screenshot shows the 'My Profile' section of the PetroPulse application. On the left is a sidebar with links: Dashboard, My Profile (which is selected and highlighted in blue), My Schedule, Attendance, and Payroll. The main content area has a header 'My Profile' and tabs for Personal Info, Emergency Contact, Bank Information, and Security (which is selected). Below the tabs is a 'Profile Overview' box containing a placeholder profile picture (labeled 'EL'), the name 'Employee9 LastName9', and the word 'Security'. It also lists contact information: email (employee9@petropulse.com), phone (555-773-9758), and a note about joining (Joined: Invalid Date). To the right is a 'Security Settings' box with fields for Current Password, New Password, and Confirm New Password, along with a 'Change Password' button. At the top right of the main content area is a user icon with a notification badge (1) and the text 'Employee9 LastName9 Security'. A blue 'Edit Profile' button is located in the top right corner of the main content area.

The employees can enter their Bank Details here.

This screenshot is similar to the previous one but shows the 'Bank Information' tab selected instead of 'Security'. The main content area now displays a 'Bank Information' box with the heading 'Your banking details for direct deposit'. It contains fields for Account Type, Account Number, and Routing Number. Below these fields is a note: 'Note: For security reasons, your full account and routing numbers are not displayed.' The rest of the interface is identical to the previous screenshot, including the sidebar, header, and 'Edit Profile' button.

This page allows employees to enter their Emergency Contact details.

The screenshot shows the 'My Profile' section of the PetroPulse application. On the left, there's a sidebar with links: Dashboard, My Profile (which is selected and highlighted in blue), My Schedule, Attendance, and Payroll. The main area has a dark header with the user's name 'Employee9 LastName9' and title 'Security'. Below the header, the 'Emergency Contact' tab is active, showing a form to enter contact information. The form fields include 'Contact Name' (with a placeholder 'Person to contact in case of emergency'), 'Relationship' (with a placeholder 'Relationship'), and 'Phone' (with a placeholder 'Phone'). To the left of the form, there's a 'Profile Overview' box containing the user's profile picture (a placeholder 'EL'), name ('Employee9 LastName9 Security'), email ('employee9@petropulse.com'), phone ('555-773-9758'), and a note ('Joined: Invalid Date'). At the top right of the main area, there's an 'Edit Profile' button. A small notification icon with a '1' is visible in the top right corner of the header.

This page displays the assigned schedule to a worker.

The screenshot shows the 'My Schedule' section of the PetroPulse application. At the top, there's a navigation bar with links for Dashboard, My Profile, My Schedule (which is highlighted), Attendance, and Payroll. On the right, there are icons for notifications (1), security, and user information (Employee9 LastName9 Security). A 'Refresh Schedule' button is also present.

The main area is titled 'My Schedule' and contains a 'Calendar' section for May 2025. The calendar shows days from 27 to 31. The 2nd of May is highlighted with a blue box. Below the calendar is a 'Schedule' section for the week of April 27 - May 3, 2025. It lists days from Sunday to Saturday, each with a 'Day' and 'Events' column. All days show 'No events'.

Day	Events
Sunday April 27	No events
Monday April 28	No events
Tuesday April 29	No events
Wednesday April 30	No events
Thursday May 1	No events
Friday May 2	No events
Saturday May 3	No events

Attendance History is shown on this page.

The screenshot shows the PetroPulse Attendance Management interface. At the top, there are four summary cards: Attendance Rate (0%), Present Days (0/6), Absences/Late (0/6), and Hours Worked (53.7). Below these are two navigation buttons: 'List View' and 'Calendar View'. A search bar is followed by a date range selector: 'Apr 02, 2025 - May 02, 2025'. The main section is titled 'Attendance History' and displays a table of attendance records from April 7 to April 13, 2025. The table includes columns for Date, Clock In, Clock Out, Status, Hours, Notes, and Self Reported.

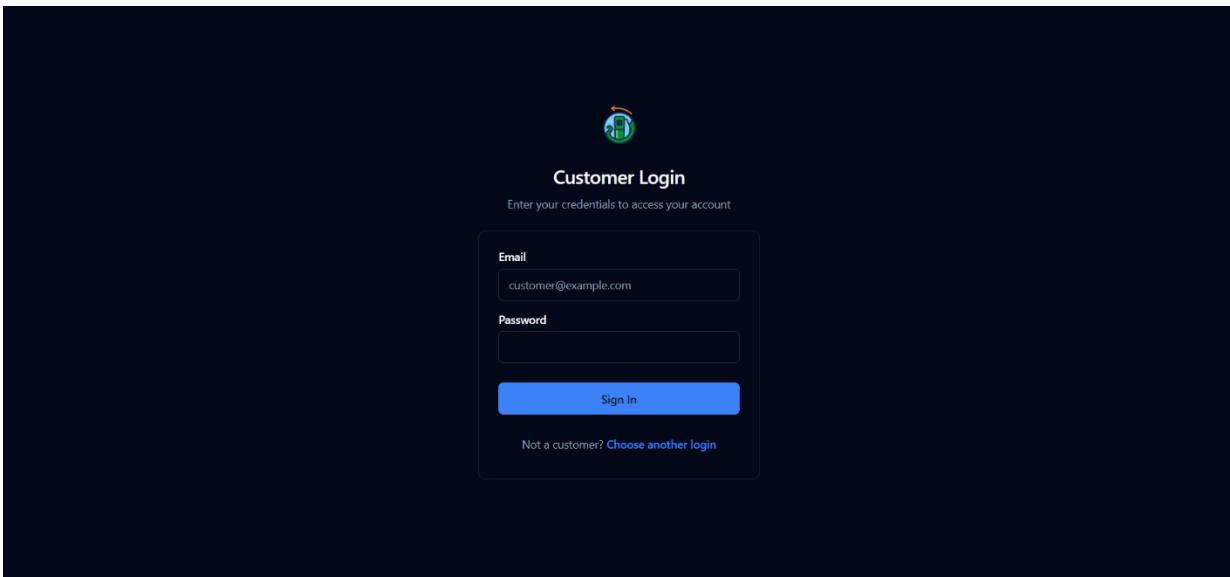
Date	Clock In	Clock Out	Status	Hours	Notes	Self Reported
4/13/2025	08:19	17:11	Late	8.87	Regular shift	--
4/11/2025	09:26	18:19	Late	8.88	Regular shift	--
4/10/2025	09:28	18:11	Late	8.72	Regular shift	--
4/9/2025	09:33	18:47	Late	9.23	Regular shift	--
4/8/2025	08:48	18:57	Late	10.15	Regular shift	--
4/7/2025	09:30	17:21	Late	7.85	Regular shift	--

The employees can see their Payroll on this page.

The screenshot shows the PetroPulse My Payroll interface. At the top, there are two tabs: 'Payment History' (selected) and 'Tax & Deductions'. Below these is a date selector set to '2025' and a 'Refresh' button. The main section is titled 'Payment History' and displays a table of payment records for the period from April 1, 2025, to April 30, 2025. The table includes columns for Pay Period, Payment Date, Hours, Gross Pay, Net Pay, Status, and Actions.

Pay Period	Payment Date	Hours	Gross Pay	Net Pay	Status	Actions
Apr 1, 2025 - Apr 30, 2025	Apr 30, 2025	160 (6 OT)	\$42,751.72	\$32,774.63	Paid	

Login Page for Customers.



Customer Dashboard.

A screenshot of a customer dashboard for "PetroPulse". The dashboard has a dark theme with light-colored cards. On the left is a sidebar with navigation links: "Dashboard" (selected), "My Profile", "Fuel Purchases", "Invoices", and "Payment Methods". At the bottom of the sidebar is a "Logout" button. In the top right corner, there is a user profile icon with initials "JW" and the name "Joseph Wilson Customer".

Welcome, Joseph Wilson

Here's a summary of your fuel purchases and transactions

Total Spent (YTD)	Fuel Purchased (YTD)	Total Transactions	Loyalty Points
\$ 551.69 +12% from last year	145.22 gal +5% from last year	10 This year	3339 Available to redeem

Monthly Fuel Purchases

The chart shows fuel purchases for January, March, and April. Diesel is the most purchased fuel type in all three months.

Spending Trend

The spending trend shows a peak in March followed by a decline in April.

Recent Transactions

Date	Fuel Type	Amount	Cost
2025-04-17T11:51:45.388Z	diesel	11.2 gal	\$0.00 debit
2025-03-11T08:34:16.068Z	diesel	20.3 gal	\$0.00 debit
2025-03-03T15:35:52.345Z	diesel	10.4 gal	\$0.00 debit
2025-03-02T21:26:50.712Z	diesel	13.3 gal	\$0.00 debit
2025-01-24T07:12:38.289Z	diesel	12.6 gal	\$0.00 debit

Payment Methods

Customers can view their Personal Information here.

The screenshot shows the 'My Profile' section of the PetroPulse app. On the left is a sidebar with navigation links: Dashboard, My Profile (which is selected and highlighted in blue), Fuel Purchases, Invoices, and Payment Methods. The main content area has a header 'My Profile' with tabs for 'Profile Information' (selected) and 'Security'. Below this is a 'Profile Overview' section for 'Joseph Wilson' (joseph.wilson932@example.com). It displays the following information:

- Status: premium
- Membership: gold
- Loyalty Points: 3339 points
- Member Since: March 15, 2024
- Last Visit: April 13, 2025
- Phone: 388-929-1821
- Vehicle: Toyota Camry 2019
- Address: 3202 Maple Ave, Houston, AZ 81266

A small 'Edit' icon is located in the top right corner of the profile overview box. At the bottom of the screen is a 'Logout' button.

Customers can edit their Personal Information here.

This screenshot shows the same 'My Profile' screen as above, but with several input fields active for editing. The 'Profile Information' tab is selected. The 'Profile Overview' section now includes the following fields:

- First Name: Joseph
- Last Name: Wilson
- Phone Number: 388-929-1821
- Vehicle: Toyota Camry 2019
- Address: 3202 Maple Ave, Houston, AZ 81266

At the bottom of the screen are two buttons: 'Save Changes' (in blue) and 'Cancel'.

This page shows the fuel purchase history for a customer.

PetroPulse

- Dashboard
- My Profile
- Fuel Purchases
- Invoices
- Payment Methods

Logout

Fuel Purchases

Total Fuel Purchased
145.2 gal In selected period

Total Amount Spent
\$551.69 In selected period

Average Purchase
\$55.17 Per transaction

Export to CSV

Search fuel purchases... Apr 02, 2025 - May 02, 2025 Fuel Type Location

Purchase History

View all your fuel purchases and transaction details

Date	Fuel Type	Gallons	Price	Total	Payment
4/17/2025	diesel	11.2	\$3.80	\$42.51	debit
3/11/2025	diesel	20.3	\$3.80	\$77.08	debit
3/3/2025	diesel	10.4	\$3.80	\$39.40	debit
3/3/2025	diesel	13.3	\$3.80	\$50.68	debit
1/24/2025	diesel	12.6	\$3.80	\$47.83	debit
1/19/2025	diesel	14.7	\$3.80	\$55.77	debit
12/21/2024	diesel	17.5	\$3.80	\$66.41	debit
11/23/2024	diesel	18.9	\$3.80	\$71.76	debit
11/19/2024	diesel	17.8	\$3.80	\$67.58	debit
10/21/2024	diesel	8.6	\$3.80	\$32.67	debit

This shows the history of invoices for a customer.

The screenshot shows the 'Invoices' section of the PetroPulse customer portal. At the top, there's a navigation bar with links for Dashboard, My Profile, Fuel Purchases, Invoices (which is selected and highlighted in blue), and Payment Methods. On the right, a user profile for 'Joseph Wilson Customer' is shown with initials 'JW'. Below the navigation, a 'Filter Invoices' section includes a search bar ('Search') and dropdowns for 'Date Range' and 'Status' (set to 'All Statuses'). A 'Reset Filters' button is also present. The main area is titled 'Invoice History' with the sub-instruction 'View and manage your past invoices'. It displays a table of invoices with columns for Date, Invoice #, Amount, Status, and Actions (represented by download icons). The invoices listed are:

Date	Invoice #	Amount	Status	Actions
August 5, 2023	INV-2023-004	\$42.80	Pending	Download
July 10, 2023	INV-2023-003	\$178.95	Pending	Download
June 20, 2023	INV-2023-002	\$89.25	Paid	Download
May 15, 2023	INV-2023-001	\$125.50	Paid	Download
April 1, 2023	INV-2023-005	\$250.00	Overdue	Download

Customers can view their Payment Methods here,

The screenshot shows the 'Payment Methods' section of the PetroPulse customer portal. The left sidebar has the same navigation as the previous screen. The main area is titled 'Payment Methods' and features a large blue 'Add Payment Method' button. It lists three payment methods:

- John Doe's Credit Card**: Shows the last four digits '1111', a billing address '123 Main St, Anytown, USA 12345', and buttons for 'Edit' and 'Remove'. A 'Default' button is shown to the right.
- John Doe's Debit Card**: Shows the last four digits '4444', a billing address '456 Business Ave, Commerce City, USA 67890', and buttons for 'Edit' and 'Remove'. A 'Set as Default' button is shown to the right.
- Acme Corp's Fleet Card**: Shows the last four digits '0051', a billing address '456 Business Ave, Commerce City, USA 67890', and buttons for 'Edit' and 'Remove'. A 'Set as Default' button is shown to the right.

Below the payment methods is a 'Payment Security' section with the following bullet points:

- Secure Encryption**: All payment information is encrypted using industry-standard SSL technology.
- PCI Compliance**: Our payment processing adheres to Payment Card Industry Data Security Standards.
- Never Share Your Information**: We will never ask for your CVV or full card details over email or phone.

Customers can add Payment Methods here.

The screenshot shows the PetroPulse mobile application interface. On the left, there's a sidebar with navigation links: Dashboard, My Profile, Fuel Purchases, Invoices, and Payment Methods. The main area is titled "Payment Methods" and lists three payment methods: "John Doe's Credit Card", "John Doe's Debit Card", and "Acme Corp's Fleet Card". Each card has an "Edit" and "Remove" option below it. A modal window titled "Add New Payment Method" is open in the center. It contains fields for "Card Type" (set to "Credit Card"), "Card Number" (1234 5678 9012 3456), "Expiry Date" (MM/YY), "CVV" (123), "Cardholder Name" (John Doe), and "Billing Address (Optional)" (123 Main St, Anytown, USA). There's also a checkbox for "Set as default payment method". At the bottom of the modal are "Cancel" and "Add Payment Method" buttons. To the right of the modal, there's a preview of a payment method card with a "Default" button, an expiry date of "05/25", and a "Set as Default" link. Below that is another card with an expiry date of "10/24" and a "Set as Default" link. At the bottom right is another card with an expiry date of "02/26" and a "Set as Default" link.

Equivalent Class Partitions and Boundary Values:

Login

Field Name	Input Type	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values	Remarks
Email	Text (email)	Valid format (e.g., abc@xyz.com)	Missing @, domain, illegal chars, blank	Min 5 (a@b.c), max 254 chars	Must match RFC 5322 email format
Password	Password (text)	8–128 characters, includes letters/numbers/symbols	<8 or >128 chars, only spaces, blank	8, 128	May enforce special character requirement

Admin – Add New Fuel Type

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Fuel Type	Text	Letters, 3–50 chars	Blank, symbols-only, >50	Min: 3, Max: 50	E.g., Diesel, Petrol

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Tank Number	Number (int)	Positive integers	0, negatives, float, blank	1, large values (9999)	Must be unique
Current Level (gal)	Number (float)	0 to Capacity	Negative, >Capacity, text	0, Capacity	≤ Capacity
Capacity (gal)	Number (float)	>0	0, negative	1, very large (e.g., 10000)	Upper limit based on tank specs
Reorder Level (gal)	Number	≤ Capacity	Negative, >Capacity	0, Capacity	Used to trigger alerts
PPG (\$)	Decimal	>0	0, negative, text	0.01, max reasonable (\$1000)	Price per gallon
Supplier	Dropdown/Text	Valid existing suppliers	Blank, unlisted string	N/A	Must match DB entry
Status	Dropdown	Active, Inactive	Empty, invalid values	N/A	System defined values
Location	Text	Valid station/location	Blank, special chars only	Min 3, Max 100	Optional GPS link
Notes	Text area	Up to 500 chars	>500, binary data	0, 500	Optional

Admin – Add Product

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Category	Dropdown/Text	Valid product category	Blank, not in list	N/A	E.g., Oil, Tools
Supplier	Dropdown/Text	Existing supplier	Blank, invalid name	N/A	Must exist

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Location	Text	3–100 characters	Blank, >100	3, 100	Shelf/station info
Price (\$)	Decimal	≥0	Negative, text	0, 10000	Must ≥ cost
Cost (\$)	Decimal	≥0	Negative, text	0, 10000	Cost ≤ price
Quantity	Integer	≥0	Negative, decimal, blank	0, large (10000)	Inventory
Reorder Level	Integer	≥0	Negative, decimal	0, 10000	Inventory
Description	Text area	≤500	>500, binary	0, 500	Optional

Admin – Add Customer

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Firstname	Text	2–50 chars	Blank, numeric only	2, 50	Alphabetic mostly
Lastname	Text	2–50 chars	Same as above	2, 50	
Email	Text (email)	Valid format	Invalid format	5, 254	Unique
Phone	Text/Number	10–15 digits	Letters, <10, >15	10, 15	Intl. support?
Password	Password	8–128, alphanumeric	<8, blank	8, 128	
Status	Dropdown	Active, Inactive	Blank, wrong value	N/A	
Customer Type	Dropdown	Individual, Corporate	Invalid strings	N/A	

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Remarks
Membership Level	Dropdown	Basic, Premium, VIP	N/A	N/A	Tied to loyalty
Vehicle	Text	Alphanum, optional	Symbols only, blank	3, 20	Optional
Loyalty Points	Integer	≥0	Negative, text	0, 100000	
Address	Text Area	Up to 500 chars	>500	0, 500	Full address
Notes	Text	≤500	>500	0, 500	Optional

Admin – Add Employee

Due to large field count, this table will be split into two:

Personal Info & Employment

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Firstname / Lastname	Text	2–50	Blank, symbols	2, 50	
Email / Phone	Email/Text	Proper format	Invalid	5–254 (email), 10–15 (phone)	Unique
Password	Password	8–128	<8	8, 128	
Status	Dropdown	Active, Inactive	Others	N/A	
Department	Dropdown	Admin, Sales, etc.	N/A	N/A	
Position	Text	2–50	Blank	2, 50	
Emp ID	Alphanumeric	Unique 3–20	Blank, duplicate	3, 20	
Main Emp ID	Same as above	Optional			

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Hire Date	Date	Valid past/future	Invalid formats	Min date, today	
Salary	Decimal	>0	0, text	0.01, upper bound	

Emergency & Banking

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Emergency Name/Relation	Text	2–50	Blank	2, 50	
Emergency Phone	Number	10–15	Non-numeric	10, 15	
Street/City/State	Text	2–100	Symbols only	2, 100	
Zip Code	Number/Text	4–10	<4	4, 10	
Country	Text	Valid ISO country	Blank	2–56	
Bank Name/Acc Name	Text	3–100	Blank	3, 100	
Bank Acc Num	Numeric	8–20	<8, letters	8, 20	
Routing Num	Numeric	6–12	<6	6, 12	
Permissions	Multi-select	Defined roles	Blank	N/A	
Notes	Text	≤500	>500	0, 500	Optional

Admin – Add Maintenance Task

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Title	Text	3–100	Blank	3, 100	
Description	Text	Up to 500	>500	0, 500	
Status	Dropdown	Open, Closed, Pending	Invalid	N/A	
Priority	Dropdown	High, Medium, Low	Invalid	N/A	

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Category	Dropdown	Fuel, Equipment, Other	Invalid	N/A	
Due Date	Date	Valid future date	Past, wrong format	Today, max future	
Location	Text	3–100	Blank	3, 100	
Equipment	Text	Valid tag	Blank	2, 50	Optional
Est. Cost / Act. Cost	Decimal	≥0	Negative	0, 10000	
Notes	Text	≤500	>500	0, 500	

Admin – Edit Profile

Split into two sections.

Personal

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
First/Last Name	Text	2–50	Blank	2, 50	
Email	Email	Valid format	Invalid	5, 254	
Phone	Text	10–15 digits	Letters	10, 15	
Bio	Text	≤300	>300	0, 300	Optional

Business

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Business Name	Text	3–100	Blank	3, 100	
Tax ID/EIN	Alphanumeric	9–15	Invalid format	9, 15	
Business Phone	Text	10–15	Letters	10, 15	

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Business Email	Email	Valid format	Invalid	5–254	
Website	URL	Valid URL	Missing protocol	N/A	Optional
Weekday Hours	Time range	e.g. 9AM–5PM	Invalid time format	Earliest, latest	
Weekend Hours	Same as above				
Address	Text parts	3–100 per part	Symbols, blank	3, 100	

Password Change

Field Name	Input Type	Valid ECs	Invalid ECs	Boundary Values	Notes
Current Password	Password	8–128	Invalid, blank	8, 128	Must match
New Password	Password	8–128, complex	<8, common	8, 128	Strength rules apply
Confirm Password	Password	Match with new	Mismatch	8, 128	

Employee – Edit Profile

Field	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values
First Name	Alphabets, min 2–50 chars	Empty, numeric-only, symbols	Min: 2 chars, Max: 50 chars
Last Name	Same as above	Same as above	Same as above
Email	Valid format (x@y.z)	Missing @, domain, special chars	Length 5–100, test: a@b.c, user@domain.com
Phone	10–15 digit numeric	Too short, too long, letters	Min: 10, Max: 15 digits
DOB	Past dates, age ≥ 18	Future dates, underage	Min: 1900-01-01, Max: today - 18 yrs
Department	Predefined list (e.g., Sales, Maintenance)	Random strings	N/A

Field	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values
Position	Job roles in company	Symbols, empty	N/A
Date of Hire	Past dates only	Future dates	Min: 2000-01-01, Max: today
Address - City	Alphabetic, 2–50 chars	Digits only, symbols	Min: 2, Max: 50 chars
Address - State	2-letter state code or full name	Numeric, symbols	e.g., NY, California
Address - Zip Code	5–10 digit numeric	Letters, too short/long	Min: 5 digits, Max: 10 digits
Emergency Contact Name	Alphabets, 2–50 chars	Empty, numbers, special chars	Min: 2, Max: 50
Emergency Contact Relation	Parent, Sibling, Spouse, etc.	Empty, undefined types	N/A
Emergency Contact Phone	10–15 digits	Letters, special chars	Min: 10, Max: 15 digits
Bank Account Type	Checking, Savings	Undefined types, empty	N/A
Bank Account Number	6–20 digit numeric	Alphanumeric, too short/long	Min: 6, Max: 20 digits
Bank Routing Number	9-digit numeric	Too short, letters	Exact: 9 digits
Current Password	6–32 char alphanumeric with special chars	Empty, <6 or >32	Min: 6, Max: 32
New Password	Same as above	Same as above	Same as above
Confirm Password	Must match New Password	Doesn't match	Must be exact match

Customer – Edit Profile

Field	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values
First Name	2–50 chars, alphabetic	Digits, symbols, empty	Min: 2, Max: 50
Last Name	Same as above	Same as above	Same as above
Phone	10–15 digit numeric	Letters, symbols	Min: 10, Max: 15
Vehicle	Alphanumeric string (e.g., "ABC-1234")	Empty, symbols-only	Min: 4, Max: 12 (plate formats)
Address	Freeform text 5–100 chars	Too short/empty	Min: 5, Max: 100
Current Password	6–32 chars, matches stored password	Wrong, empty	Min: 6, Max: 32
New Password	6–32 chars, strong rules	Weak, short, empty	Same as above
Confirm Password	Must match new password	Doesn't match	Same as above

Customer – Add Payment Method

Field	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values
Card Type	Visa, Mastercard, AMEX, etc.	Invalid card types, empty	N/A
Card Number	13–19 digit numeric (based on card type)	Letters, short/long numbers	Min: 13, Max: 19 digits
Expiration Date	MM/YY in the future	Past dates, invalid formats	Current month + 1 to future max (e.g., 10 yrs)
CVV	3 or 4 digit numeric	Letters, symbols	Visa/MC: 3 digits, AMEX: 4 digits
Cardholder Name	Alphabetic 2–50 chars	Digits-only, special chars	Min: 2, Max: 50

Field	Valid Equivalence Classes	Invalid Equivalence Classes	Boundary Values
Billing Address	Full address string, 10–100 chars	Empty, invalid format	Min: 10, Max: 100

Product Review:

- The product can be improved by introducing advanced state management libraries such as Redux or Zustand. While the current implementation uses standard React state management, adopting these libraries can enhance data flow consistency across complex components and improve scalability.
- The layered architecture can be extended by incorporating a dedicated service layer. This would separate business logic from controller logic, making the system more modular and maintainable, especially for growing feature sets such as dynamic pricing or automated supply orders.
- The product is currently deployed as a responsive web application; however, it can be further enhanced by developing native mobile apps using React Native. This will provide better accessibility and performance on mobile devices, particularly for field workers and customers.
- The application's performance may be impacted as more features and user roles are added to the layered architecture. Optimization strategies such as API caching, pagination, and lazy loading components in React can be implemented to offset these performance trade-offs and improve responsiveness.
- Deployment to Vercel has enabled smooth CI/CD and real-time testing, but for a production-ready system, implementing server-side monitoring tools (like Sentry or LogRocket) could further enhance debugging and performance tracking.