## IB Computer Science IA

## Criterion A: Planning

## The Scenario

My uncle, Mr Y, runs a small but growing business in a plant nursery and rabbit farm in the city. He deals in flowers, herbs, and rabbits as pets. At the moment, he does everything manually with pen and paper or basic spreadsheets. This means he has a tendency to do things wrong like forgetting what plants need special attention, providing rabbits with the wrong feeding times, or even selling plants when they are not in stock. He also struggles to keep season-based work like protecting certain plants from the cold season and does not have a structured system to help him do so. Customers are not always given the information that they need before they buy either, e.g., whether a plant is suitable to be placed indoors or if it needs plenty of sunlight.

To make matters worse, Mr Y lacks a clear means of managing customer orders, seeing stock held, or examining past data like rabbit birth dates or feeding times. It's everywhere, and it's getting to the point where it's more and more difficult for him to handle with the company growing. It's plain to see that he needs something better that has everything where it belongs and lets him stay ahead of the curve without all the hassle.

## Rationale for the Proposed Product

To help Mr Y, I'm going to build a simple but powerful web app that puts everything in one place and makes his work easier.

The app will be a clean front-end using React.js, which helps to make pages fast and easy to use. I can also use Vue.js in certain sections to leave it with some flexibility. The back-end will be coded using Django because it is ideal for doing things fast and securely. I will store the data e.g., plant types, rabbit information, and customer orders using PostgreSQL, which is a strong and secure database. I also plan to add a scanning feature using QR codes or maybe even RFID, so Mr Y can scan a plant and instantly get all the information about it. He will not have to type things out anymore. For reminders, I'll use Twilio to send SMS alerts about watering, feeding, or any other important tasks. The app will be hosted using something like AWS or Azure so it's always online and runs smoothly. I'll also make sure there's a dashboard to show inventory levels, rabbit care schedules, and customer orders all at a glance. It will have secure logins, a search bar to find things quickly, and the ability to edit or delete records when needed.

The aim is to offer Mr Y a system which is time efficient, faultless, and less irritating to him so that he can manage his business more conveniently. It will also help customers with better information prior to purchase, thus making the whole process better for all involved.

## Success Criteria

### Admin-Specific Interface Features

1. Register plant species, care requirements, and placement recommendations.
2. Log rabbit mating/birth dates and track breeding schedules.
3. Generate exportable inventory/sales reports (PDF/CSV).
4. Create employee accounts with SMS/email invite codes.
5. Edit/delete records with audit trails.

### Employee-Specific Interface Features

6. View/administer tasks (e.g., "Water Aloe Vera by 2 PM") from admin schedules.
7. Scan plant/rabbit IDs to log care completion.
8. Report equipment failures/pests with photo attachments.

### Customer-Specific Interface Features

9. View indoor/outdoor plant classifications during browsing.
10. Access rabbit care guides and mental health benefits.
11. Input/update contact details during guest or registered checkout.

### General Interface Features for Both Admin and Employees

12. Unified keyword search for plants, rabbits, or records.
13. Receive SMS notifications for time-sensitive tasks.

### General Interface Features for Both Admin and Customers

14. Real-time pricing displays with low-stock alerts.
15. Transparent pricing during customer checkout.

### General Interface Features for All Users (Admin, Employees, and Customers)

16. Role-specific login with OTP password recovery.
17. Contextual help (Admin: IT credentials; Employee: Issue reporting; Customer: FAQ).

## Criterion B: Design Overview

### Proposed Data Dictionaries for PostgreSQL Database

Table 1: User Accounts

This table manages authentication and role-based access for all system users. It stores credentials for admins, employees, and customers. Invite codes are used for secure employee onboarding through SMS or email. Role-based permissions determine what features and portals a user can access.

| Field Name | Data Type | Validation | Example |
|---|---|---|---|
| user_id | SERIAL | PRIMARY KEY | 101 |
| email | VARCHAR(100) | UNIQUE, NOT NULL, FORMAT: `_____@____._____` | admin@nursery.com |
| password_hash | VARCHAR(255) | NOT NULL, BCRYPT ENCRYPTION | ******** |
| full_name | VARCHAR(50) | NOT NULL | John Doe |
| phone | VARCHAR(20) | NOT NULL, FORMAT: `+[country code][number]` | +1234567890 |
| role | VARCHAR(10) | NOT NULL, CHECK: role IN ('admin','employee','customer') | admin |
| invite_code | VARCHAR(8) | UNIQUE, NULLABLE, FORMAT: XXX-XXXX | EMP-5A3B |
| date_created | TIMESTAMP | NOT NULL, DEFAULT: CURRENT_TIMESTAMP | 2023-10-01 09:30:00 |

Table 2: Plant Inventory

This table tracks plant species, their care requirements, pricing, and stock levels. It serves as the central repository for displaying plant information to customers and managing care schedules. Placement classifications guide purchasing decisions, and low stock triggers alerts on the admin dashboard.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| plant_id | SERIAL | PRIMARY KEY | 201 |
| species | VARCHAR(50) | NOT NULL | Aloe Vera |
| care_instructions | TEXT | NOT NULL, LENGTH: 10-500 CHARACTERS | Water weekly... |
| placement | VARCHAR(10) | NOT NULL, CHECK: placement IN ('indoor','outdoor') | indoor |
| price | DECIMAL(6,2) | NOT NULL, RANGE: 0.01 TO 9999.99 | 20.00 |
| stock_quantity | INTEGER | NOT NULL, RANGE: 0 TO 1000 | 15 |
| last_updated | TIMESTAMP | NOT NULL, DEFAULT: CURRENT_TIMESTAMP | 2023-10-05 14:20:00 |

Table 3: Rabbit Inventory

This table manages rabbit breeds, breeding schedules, care details, and pricing. It logs important breeding events to automate care planning and syncs with employee task lists. Stock quantities are reflected in the customer interface to indicate availability.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| rabbit_id | SERIAL | PRIMARY KEY | 301 |
| breed | VARCHAR(50) | NOT NULL | Rex Lop |
| care_instructions | TEXT | NOT NULL, LENGTH: 10-500 CHARACTERS | Feed daily... |
| price | DECIMAL(6,2) | NOT NULL, RANGE: 0.01 TO 9999.99 | 50.00 |
| birth_date | DATE | NULLABLE, FORMAT: YYYY-MM-DD | 2023-05-15 |
| mating_date | DATE | NULLABLE, FORMAT: YYYY-MM-DD | 2023-10-01 |
| stock_quantity | INTEGER | NOT NULL, RANGE: 0 TO 100 | 5 |

Table 4: Customer Orders

This table records the details and status of each customer order. It supports the full order lifecycle, including auto-filling of shipping addresses for registered users. Total amounts are cross-validated with item prices and quantities.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| order_id | SERIAL | PRIMARY KEY | 1001 |
| user_id | INTEGER | FOREIGN KEY: user_accounts.user_id, NOT NULL | 102 |
| total_amount | DECIMAL(8,2) | NOT NULL, RANGE: 0.01 TO 999999.99 | 70.00 |
| status | VARCHAR(10) | NOT NULL, CHECK: status IN ('pending','accepted','declined'), DEFAULT: 'pending' | accepted |
| shipping_address | TEXT | NOT NULL, LENGTH: 10-200 CHARACTERS | 123 Green St, City |
| order_date | TIMESTAMP | NOT NULL, DEFAULT: CURRENT_TIMESTAMP | 2023-10-05 11:45:00 |

Table 5: Order Line Items

This table connects orders with the plants or rabbits purchased, preserving the price at the time of purchase. It ensures quantities match stock availability during checkout and prevents ordering of unavailable items. This is essential for financial accuracy and order integrity.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| line_item_id | SERIAL | PRIMARY KEY | 501 |
| order_id | INTEGER | FOREIGN KEY: customer_orders.order_id, NOT NULL | 1001 |
| plant_id | INTEGER | FOREIGN KEY: plant_inventory.plant_id, NULLABLE | 201 |
| rabbit_id | INTEGER | FOREIGN KEY: rabbit_inventory.rabbit_id, NULLABLE | 301 |
| quantity | INTEGER | NOT NULL, RANGE: 1 TO 100 | 1 |
| price_at_purchase | DECIMAL(6,2) | NOT NULL, RANGE: 0.01 TO 9999.99 | 20.00 |

Table 6: Care Schedules

This table stores automated maintenance tasks for plants and rabbits. Each task can be assigned to specific employees and includes optional SMS alerts triggered an hour before due time. Recurrence patterns support flexible scheduling based on care needs.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| schedule_id | SERIAL | PRIMARY KEY | 401 |
| plant_id | INTEGER | FOREIGN KEY: plant_inventory.plant_id, NULLABLE | 201 |
| rabbit_id | INTEGER | FOREIGN KEY: rabbit_inventory.rabbit_id, NULLABLE | NULL |
| task_type | VARCHAR(20) | NOT NULL, CHECK: task_type IN ('watering','feeding','mating') | watering |
| start_time | TIMESTAMP | NOT NULL | 2023-10-06 14:00:00 |
| recurrence | VARCHAR(20) | NULLABLE, CHECK: recurrence IN ('daily','weekly','custom') | daily |
| assigned_to | INTEGER | FOREIGN KEY: user_accounts.user_id, NOT NULL | 103 |
| sms_alert_enabled | BOOLEAN | NOT NULL, DEFAULT: TRUE | TRUE |

Table 7: Reported Issues

This table logs issues reported by employees, including pest, disease, and equipment problems. Photos must be submitted as valid image links, and status updates are managed by admins. Resolution timestamps help track response efficiency.

| Field Name | Data Type | Validation | Example |
|---|---|---|---|
| issue_id | SERIAL | PRIMARY KEY | 601 |
| reporter_id | INTEGER | FOREIGN KEY: user_accounts.user_id, NOT NULL | 103 |
| issue_type | VARCHAR(20) | NOT NULL, CHECK: issue_type IN ('pest','disease','equipment') | equipment |
| description | TEXT | NOT NULL, LENGTH: 10-1000 CHARACTERS | Sprinkler broken... |
| photo_url | VARCHAR(255) | NULLABLE, FORMAT: VALID URL | http://nursery.com/photo1.jpg |
| status | VARCHAR(15) | NOT NULL, CHECK: status IN ('open','resolved'), DEFAULT: 'open' | open |
| reported_at | TIMESTAMP | NOT NULL, DEFAULT: CURRENT_TIMESTAMP | 2023-10-05 15:30:00 |

Table 8: System Audit Logs

This table records critical admin actions for compliance and security monitoring. It stores before and after changes using JSONB and logs every edit or deletion made in the system. Only actions by admin users are recorded here.

| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| log_id | SERIAL | PRIMARY KEY | 701 |
| user_id | INTEGER | FOREIGN KEY: user_accounts.user_id, NOT NULL, ROLE: 'admin' | 101 |
| action | VARCHAR(10) | NOT NULL, CHECK: action IN ('edit','delete') | delete |
| table_name | VARCHAR(20) | NOT NULL, CHECK: table_name IN (...) | Plants |
| record_id | INTEGER | NOT NULL | 201 |
| old_value | JSONB | NULLABLE | {"price": 20.00} |
| new_value | JSONB | NULLABLE | {} (deleted) |
| timestamp | TIMESTAMP | NOT NULL, DEFAULT: CURRENT_TIMESTAMP | 2023-10-05 16:45:00 |

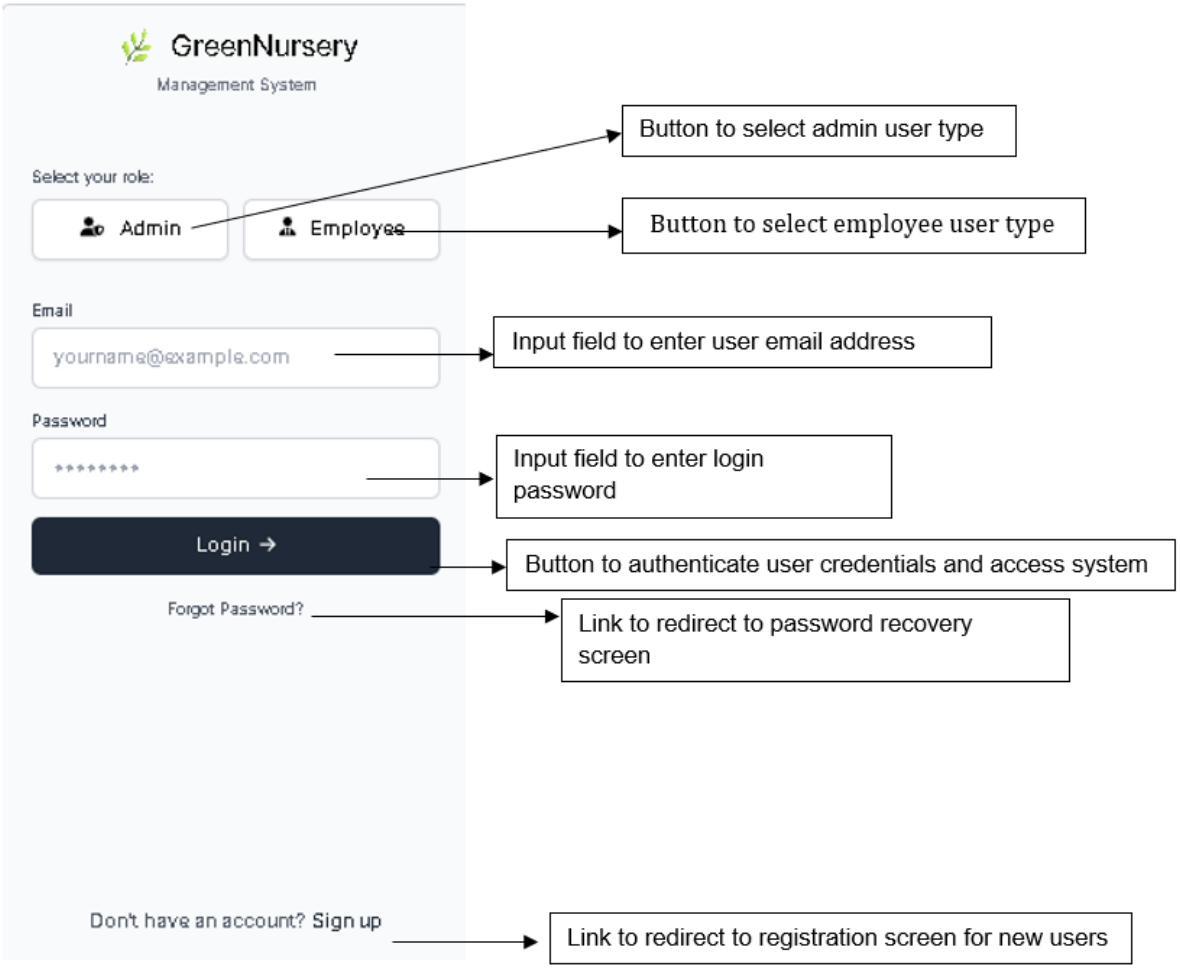
Table 9: Educational Content

This table stores informational content about plants and rabbits for customers. Each entry is linked to a specific inventory item and is tagged by type for easy filtering. Recent publications appear in customer dashboards as tips and facts.

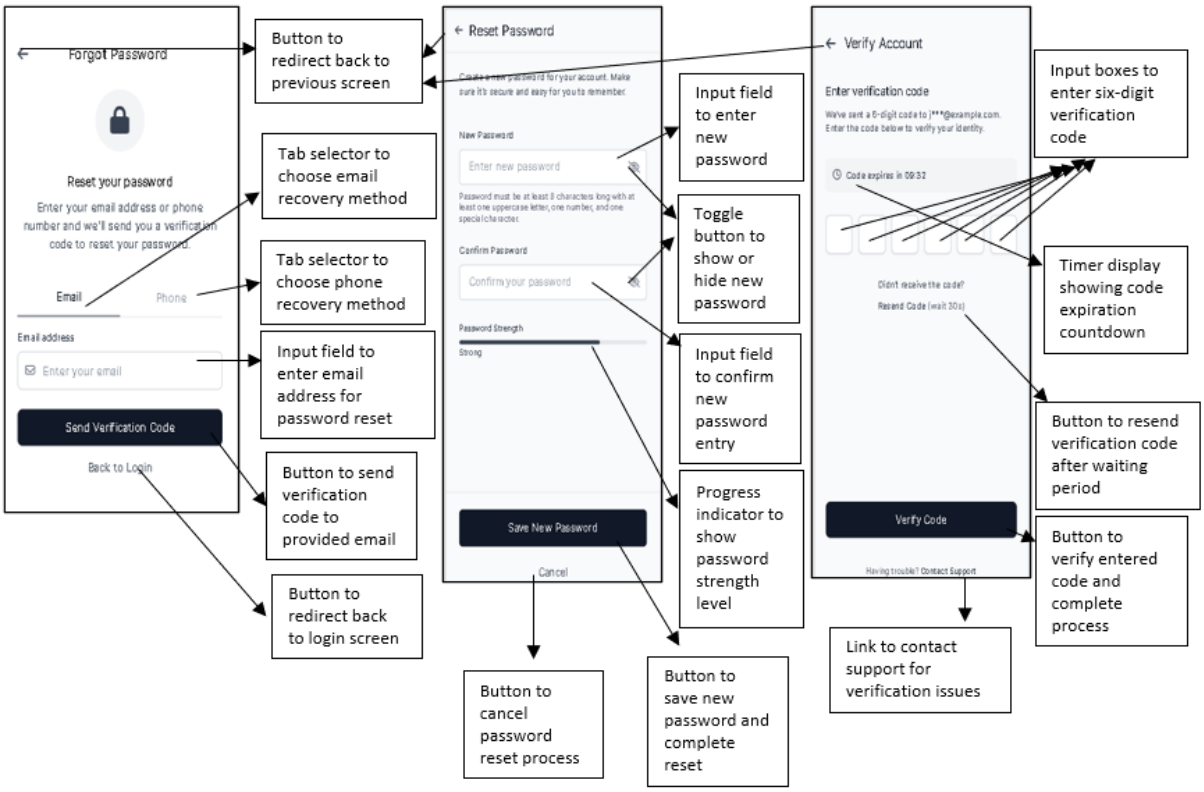
| **Field Name** | **Data Type** | **Validation** | **Example** |
|---|---|---|---|
| content_id | SERIAL | PRIMARY KEY | 801 |
| title | VARCHAR(100) | NOT NULL | Rabbits as Pets |
| description | TEXT | NOT NULL, LENGTH: 50-2000 CHARACTERS | Rabbits reduce stress... |
| content_type | VARCHAR (10) | NOT NULL, CHECK: content_type IN ('plant’, ‘rabbit') | rabbit |
| associated_id | INTEGER | FOREIGN KEY: plant_inventory.plant_id OR rabbit_inventory.rabbit_id | 301 |
| date_published | DATE | NOT NULL, DEFAULT: CURRENT_DATE | 2023-10-01 |

## Product Designs

## General Interface Designs:

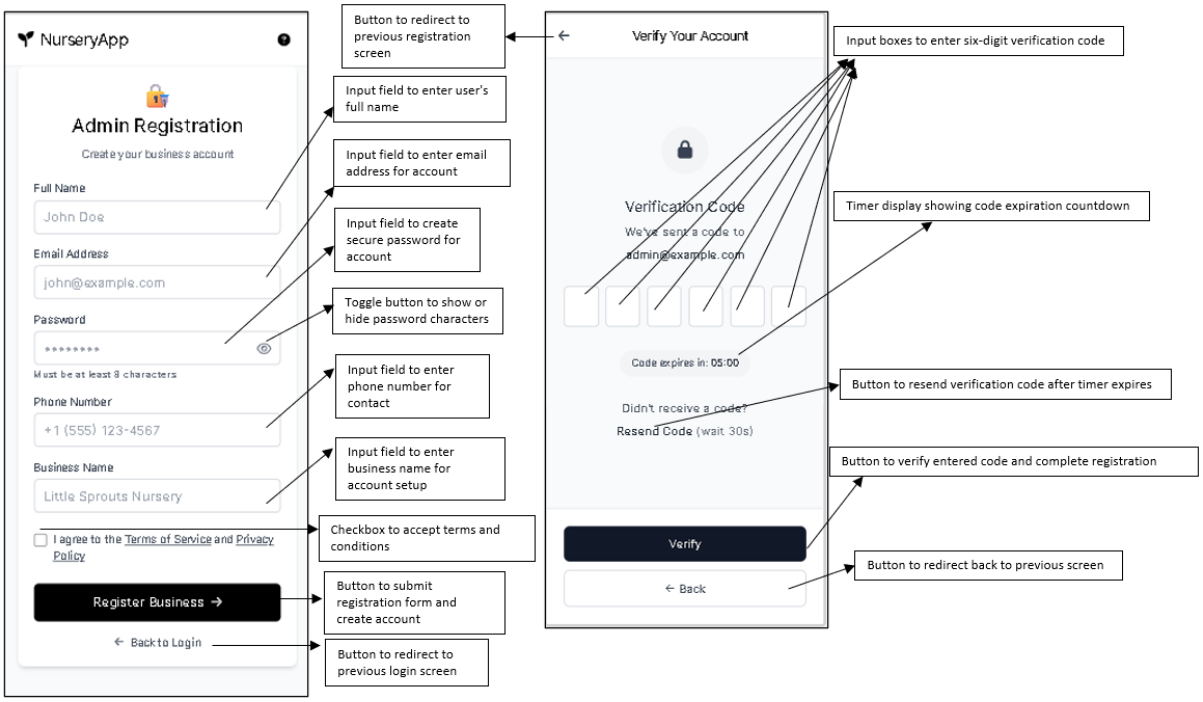



Frame 1: Initial Login Screen

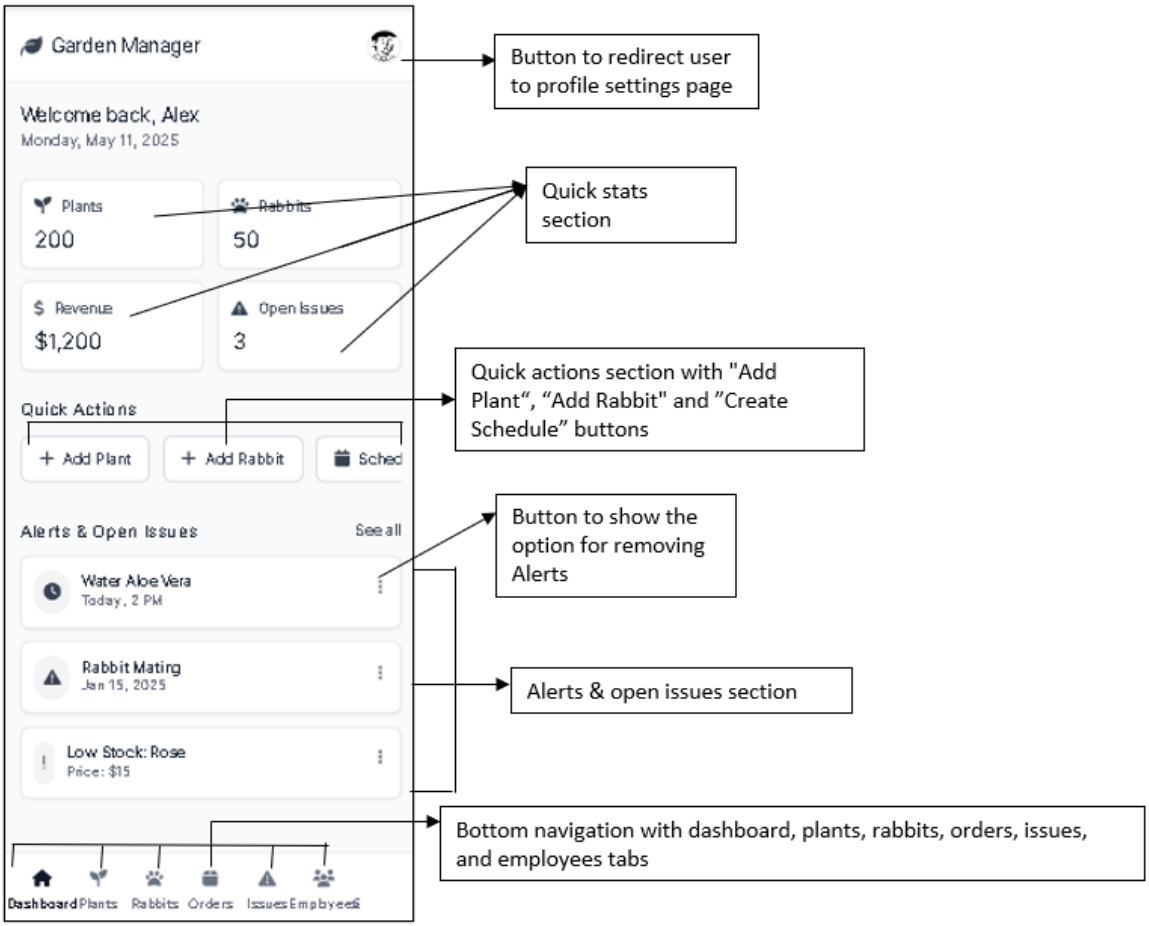



Frame 2: Forgot Password workflow

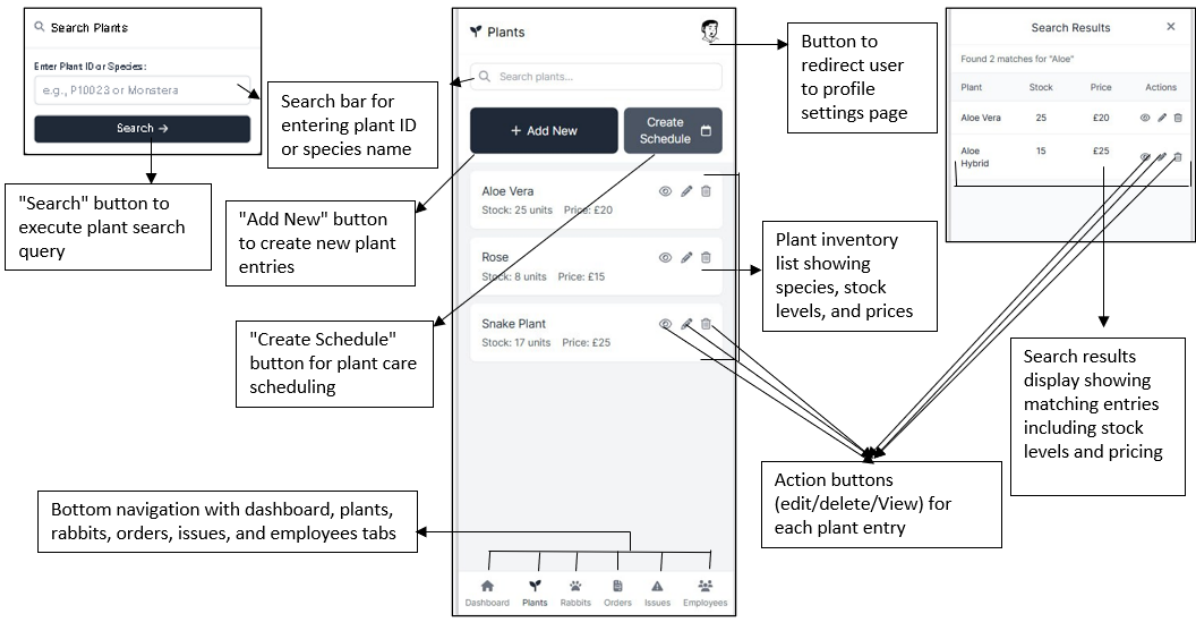
## Admin portal Interface Designs:



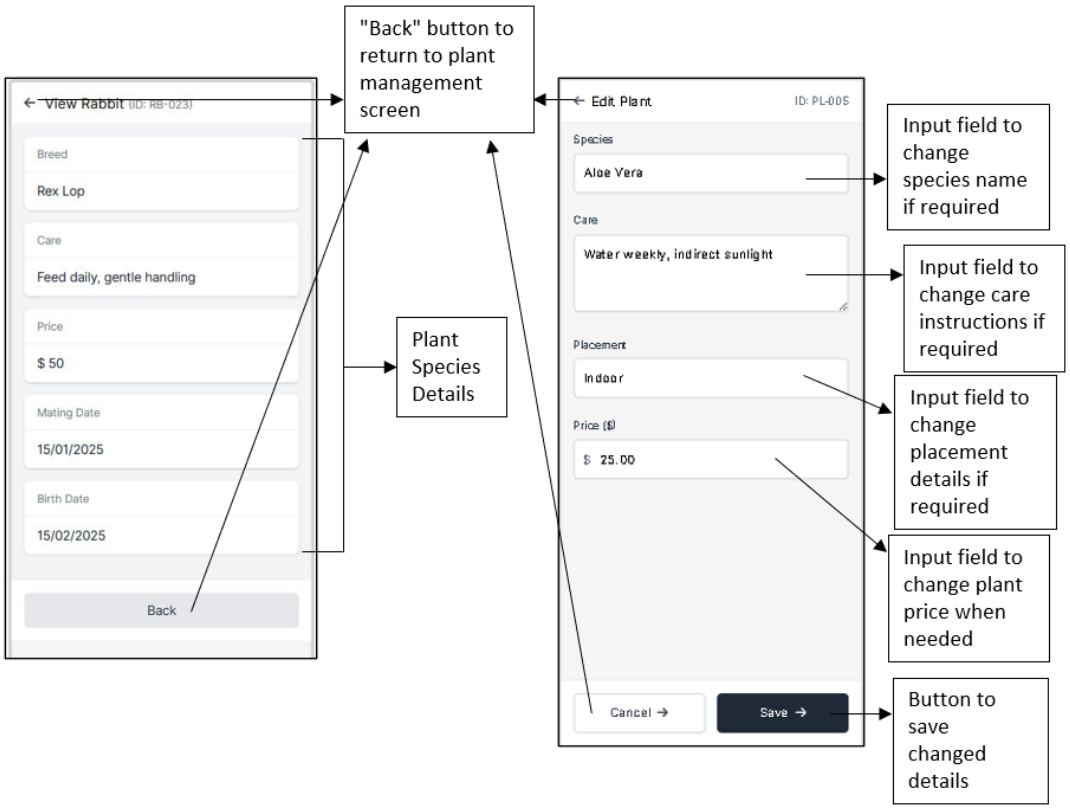

Frame 3: Admin Registration And Account Verification Workflow




Frame 4: Garden Manager Dashboard

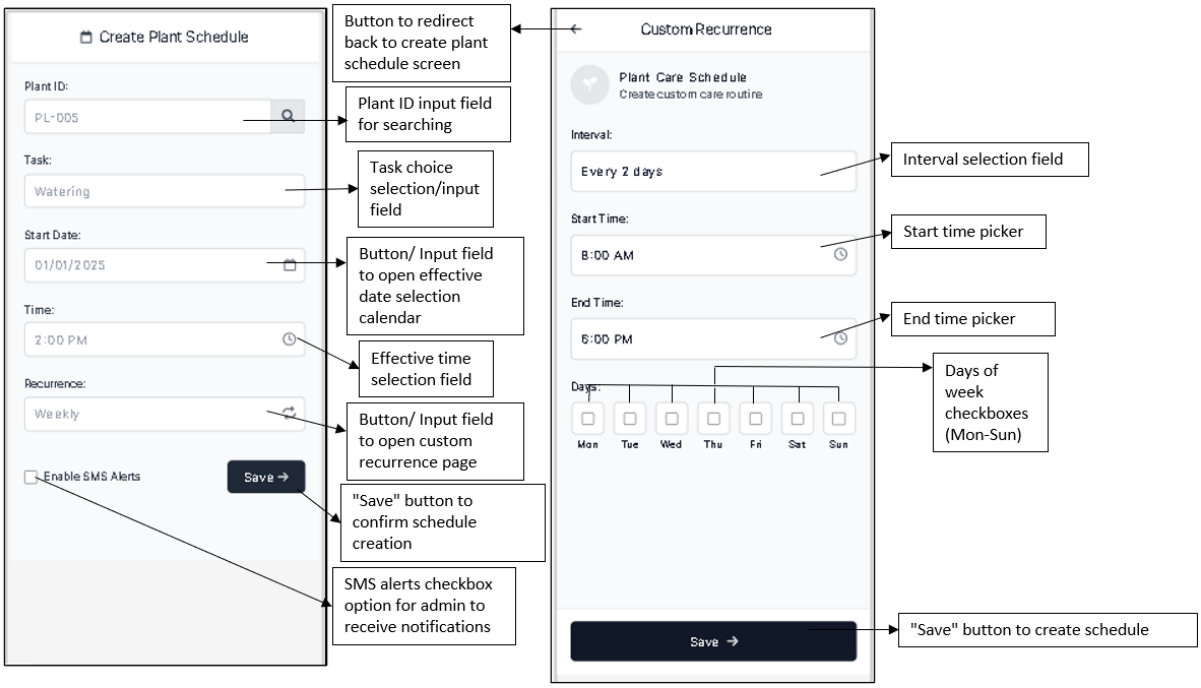



Frame 5: Plants Management Screen And Search Plants Interface

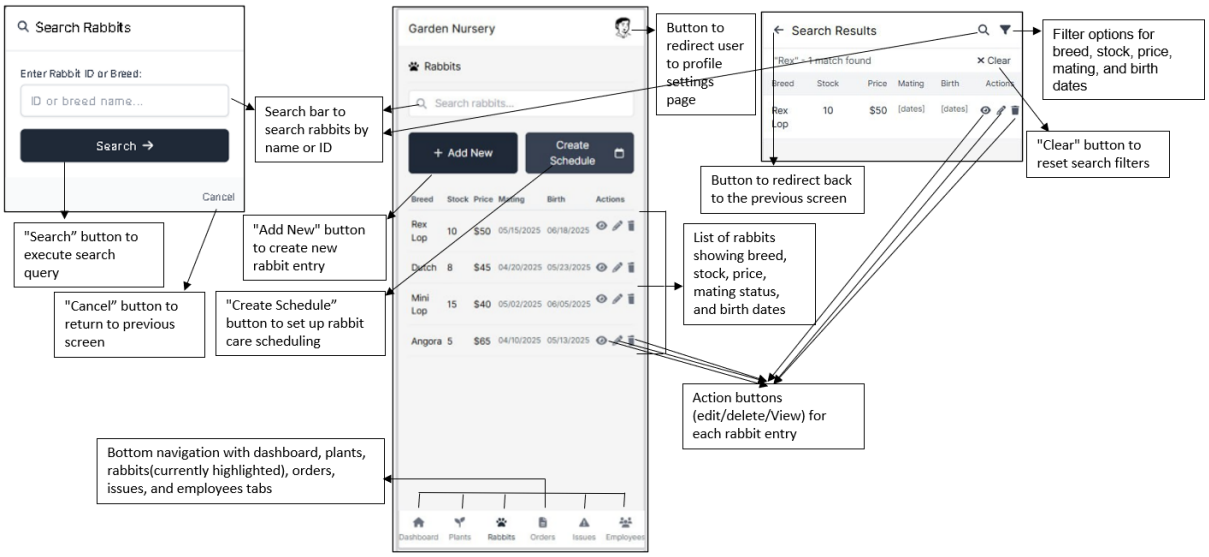



Frame 6: Plant Details View And Edit Interfaces

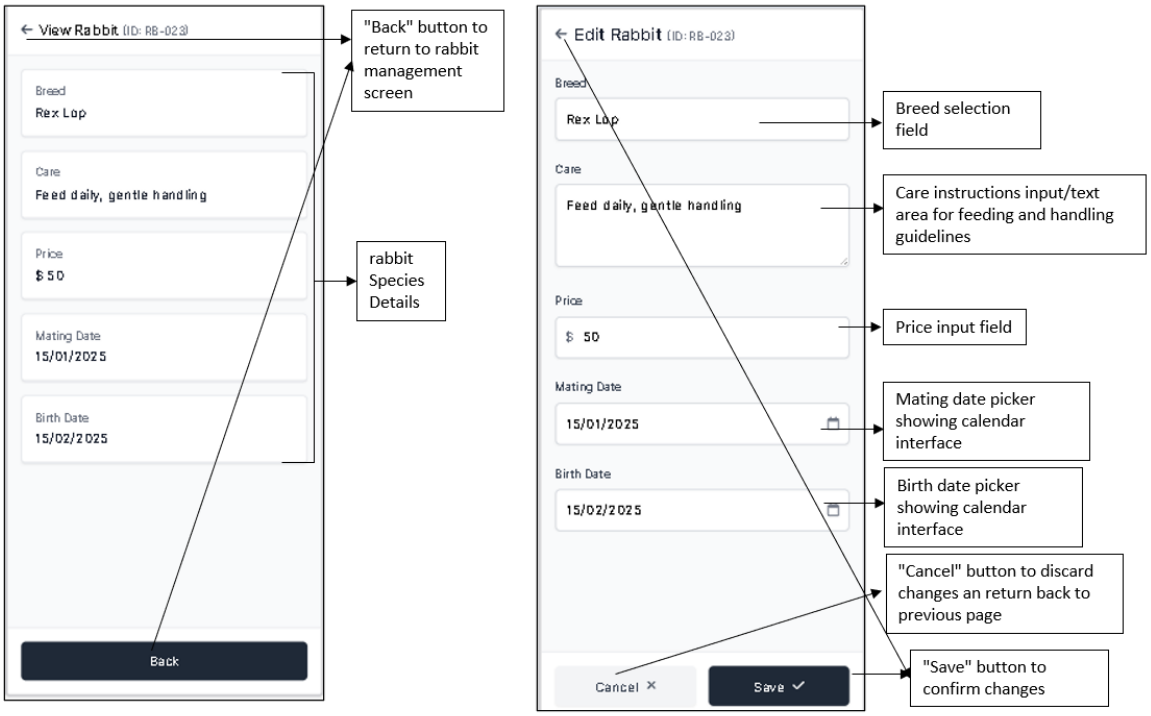

Frame 7: Scan Plant Interface, Manual Plant Entry Form And Confirmation Screen



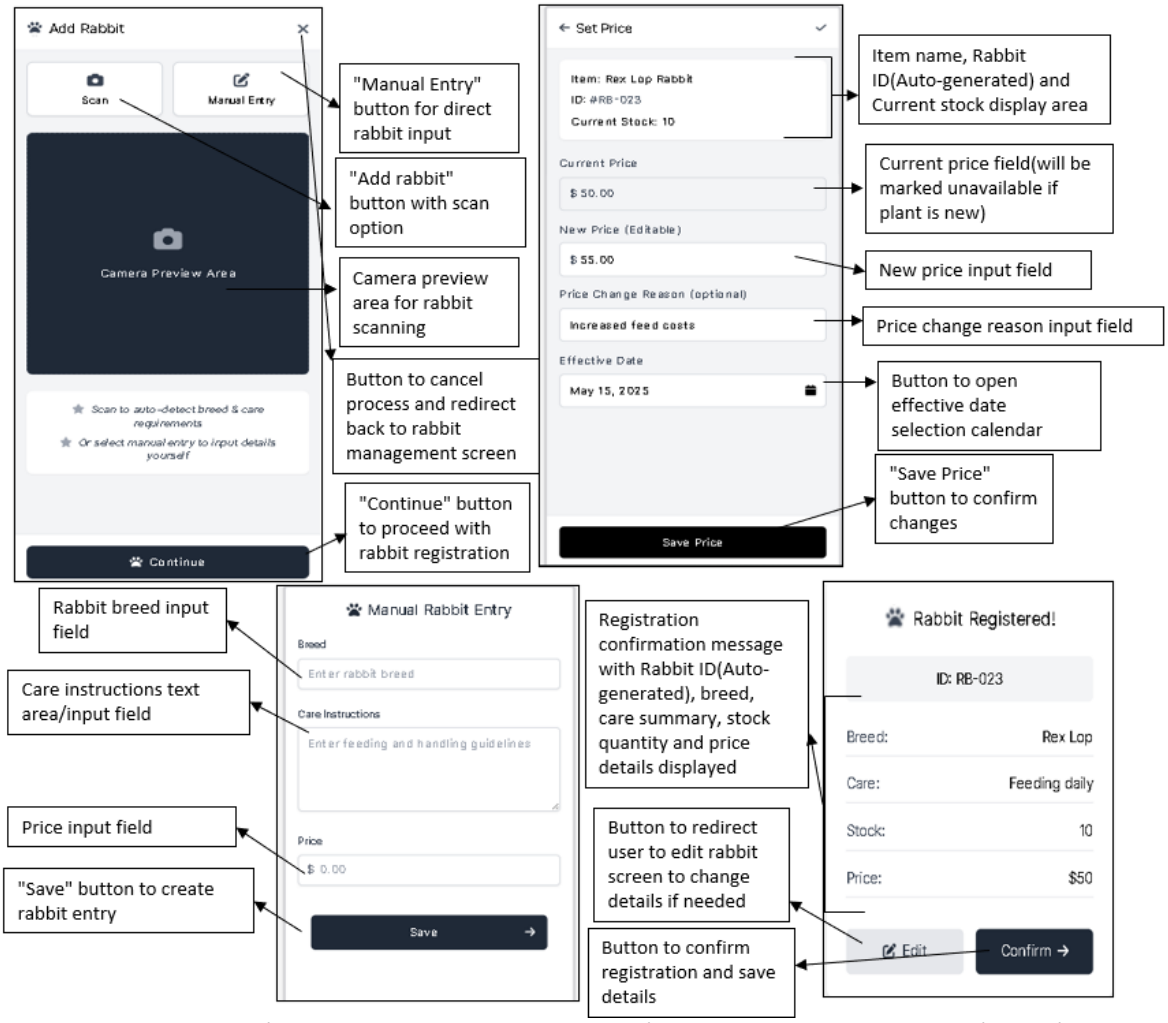

Frame 8: Create Plant Schedule Form And Custom Recurrence Schedule Screen



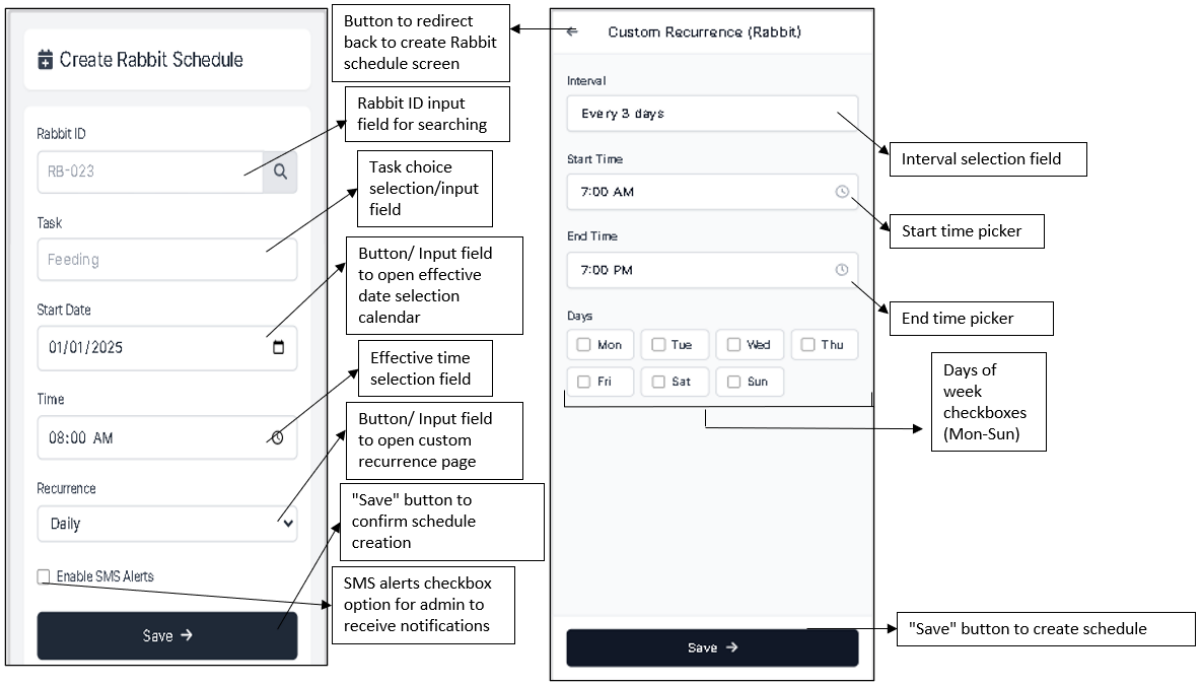

Frame 9: Rabbits Management Screen And Search Rabbits Interface



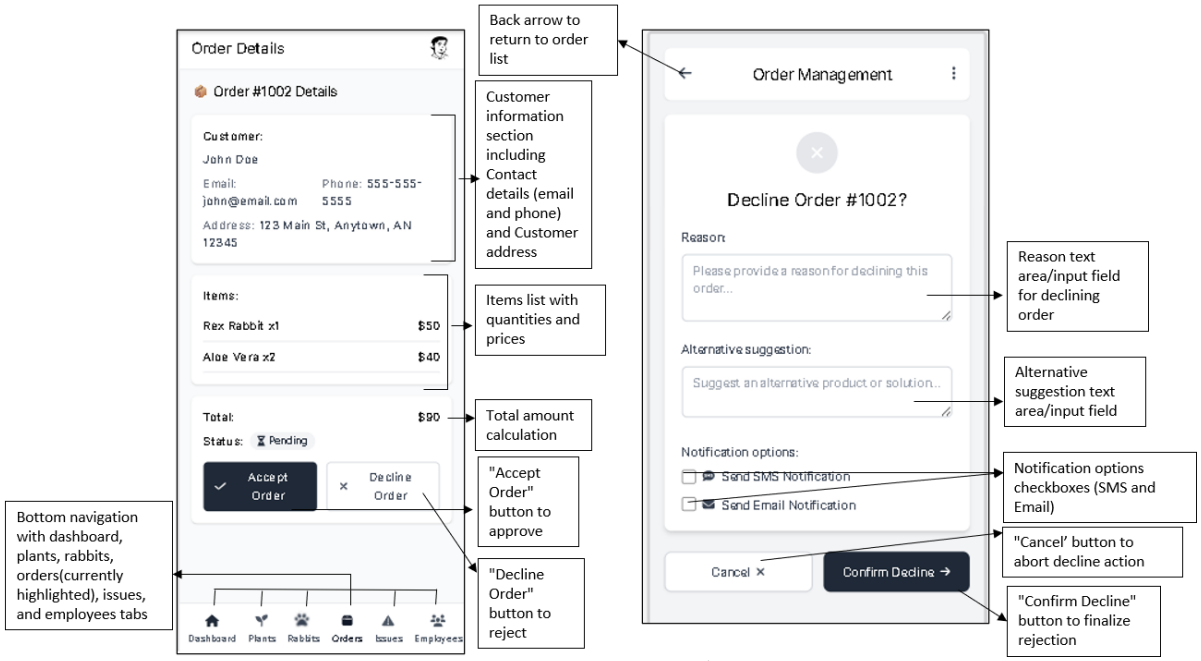

Frame 10: Rabbit Details View And Edit Interfaces



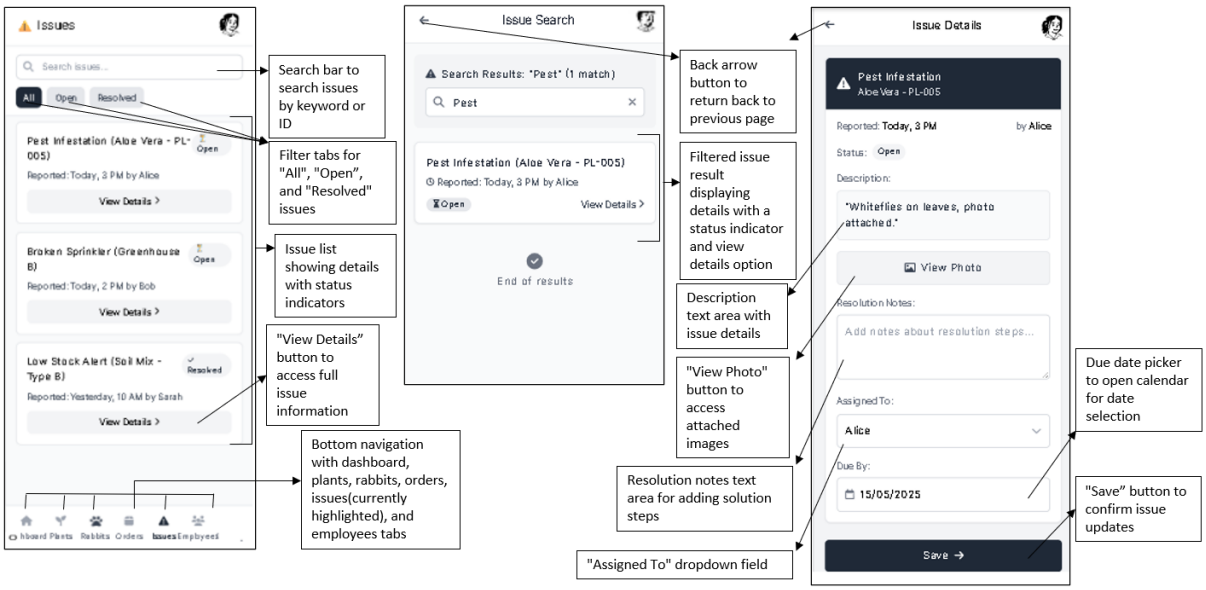

Frame 11: Scan Rabbit Interface, Manual Rabbit Entry Form And Confirmation Screen



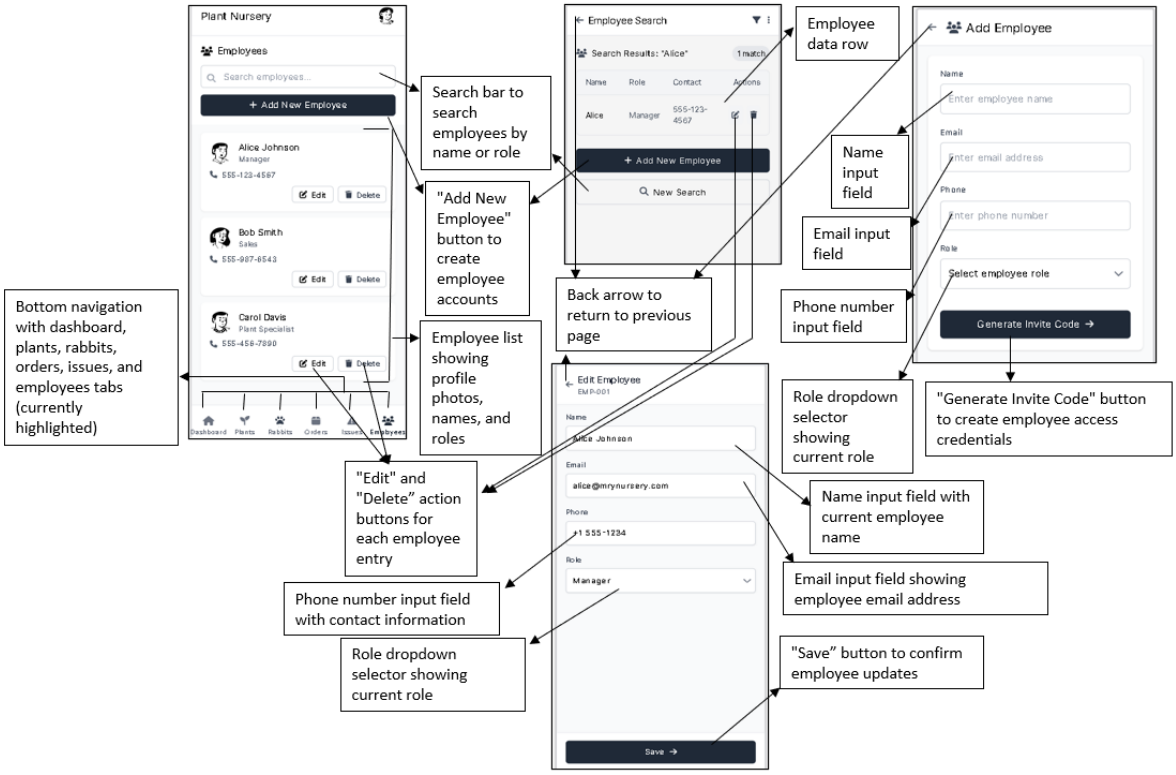

Frame 12: Create Rabbit Schedule Form And Custom Recurrence Schedule Screen



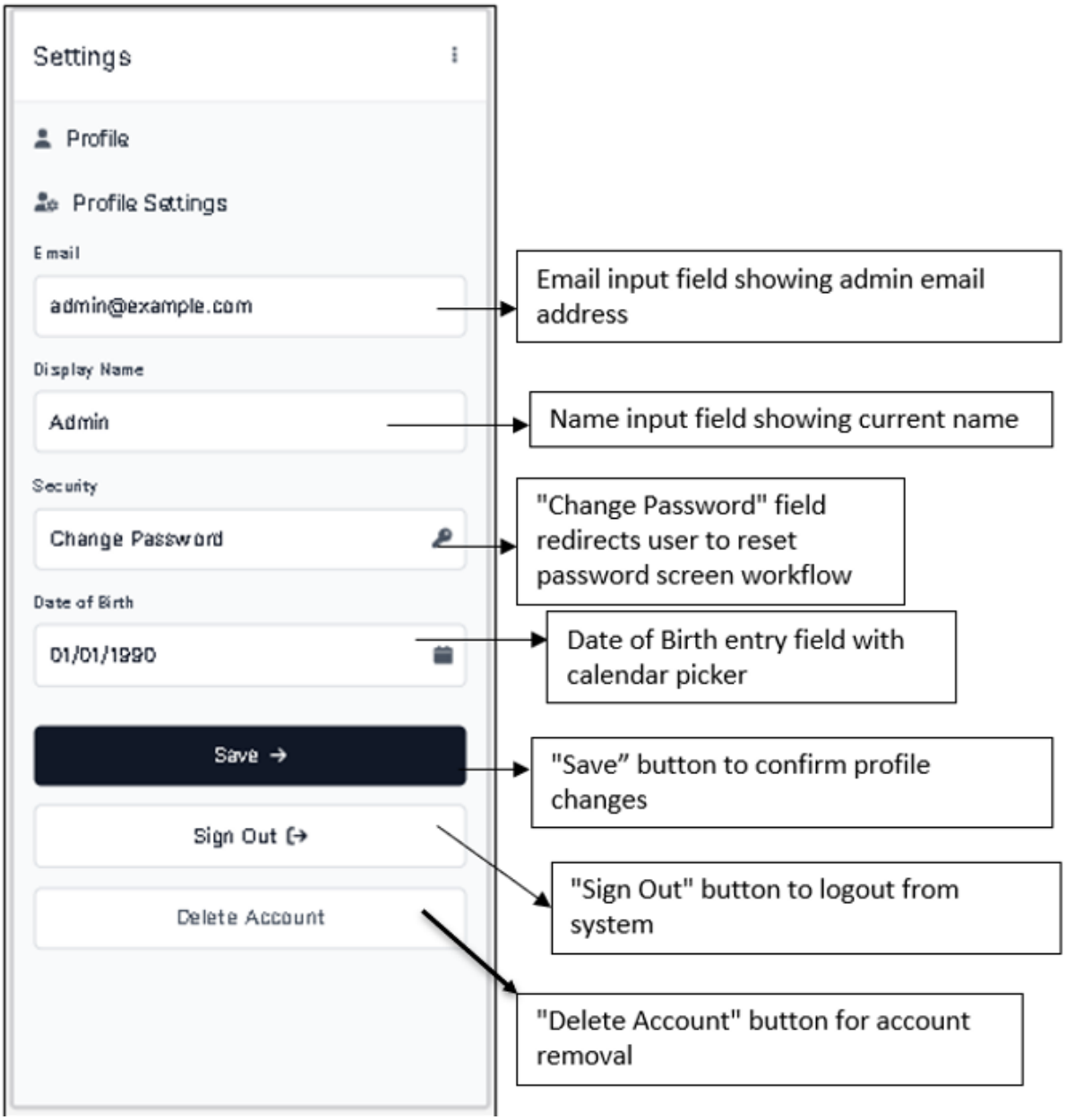

Frame 13: Order Details And Order Management/Decline Screens




Frame 14: Issues Tab, Issue Search Interface And Issue Details View Screen

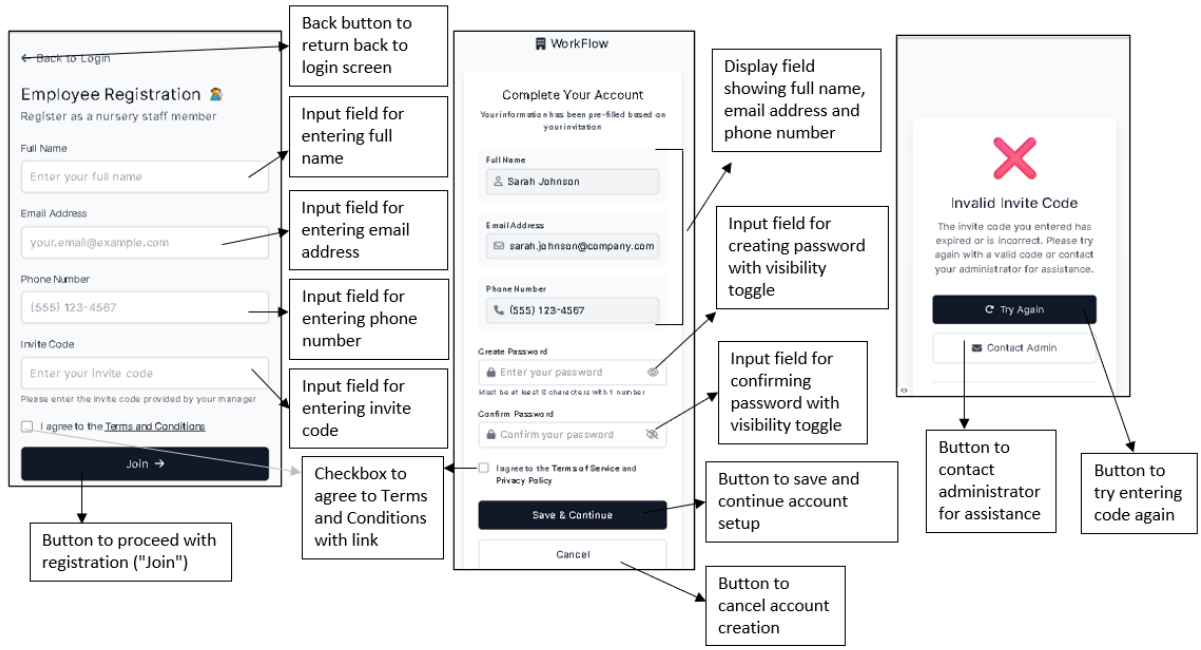



Frame 15: Employee Management tab, Employee Search Results, Edit Employee Form And Add Employee Form Interfaces

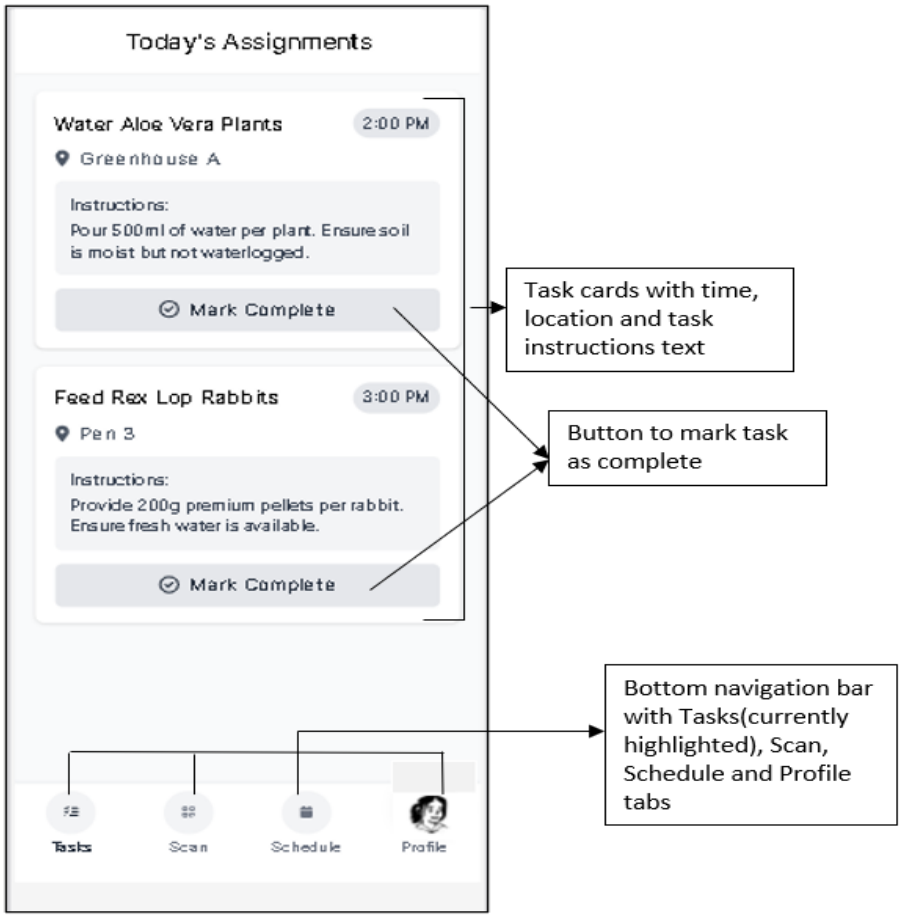



Frame 16: Settings/Profile Management Interface

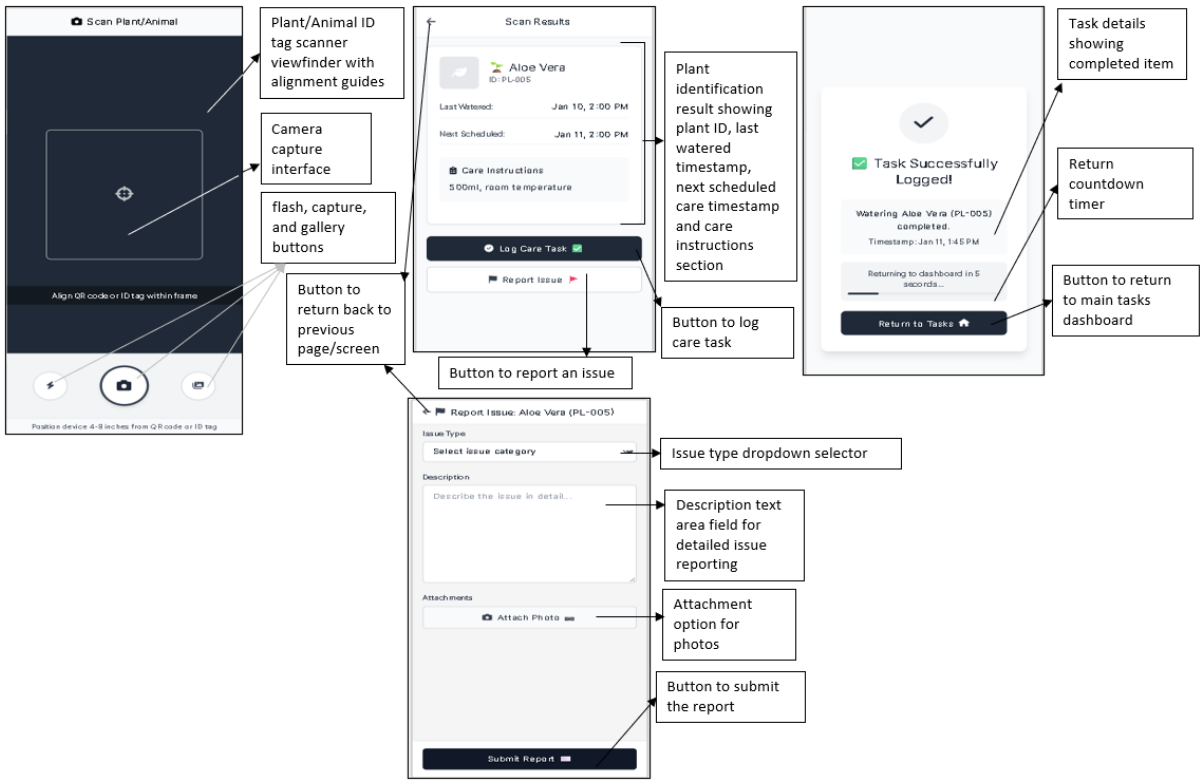
## Employee portal Interface Designs:



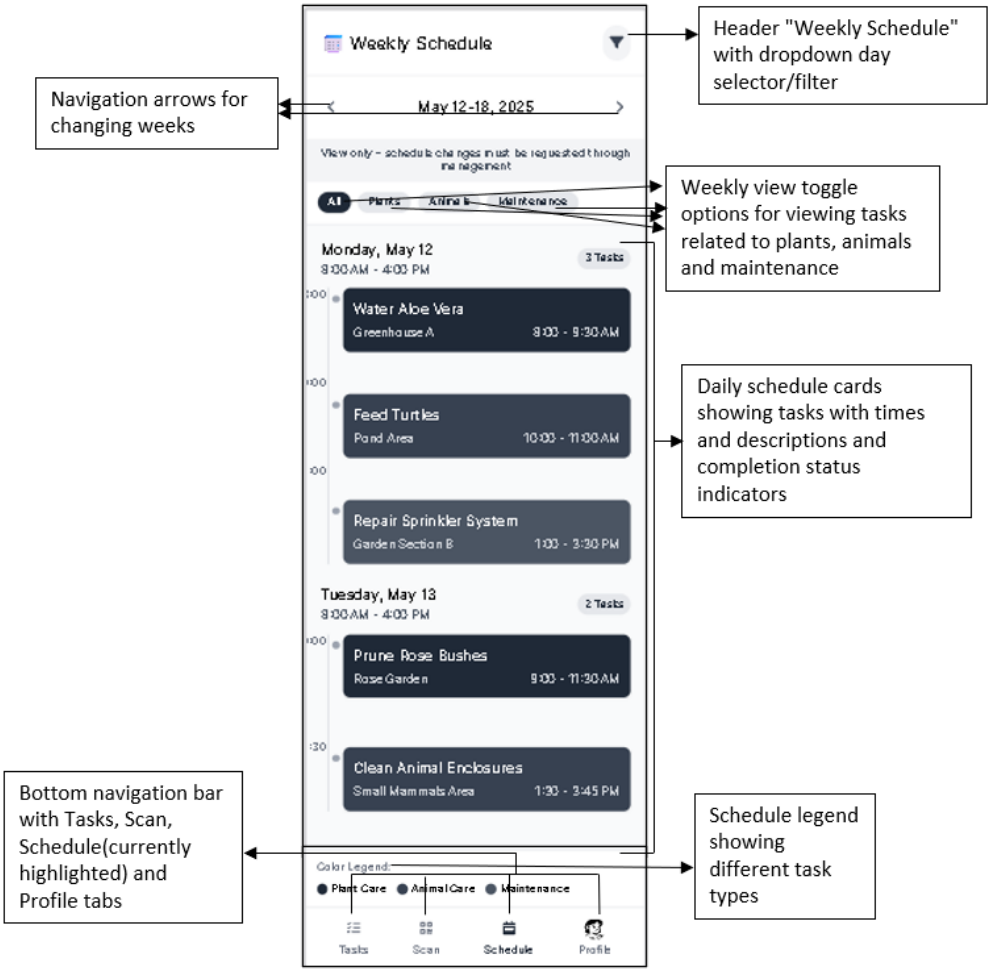

Frame 17: Employee Registration, Account Completion And Error Dialog Screens



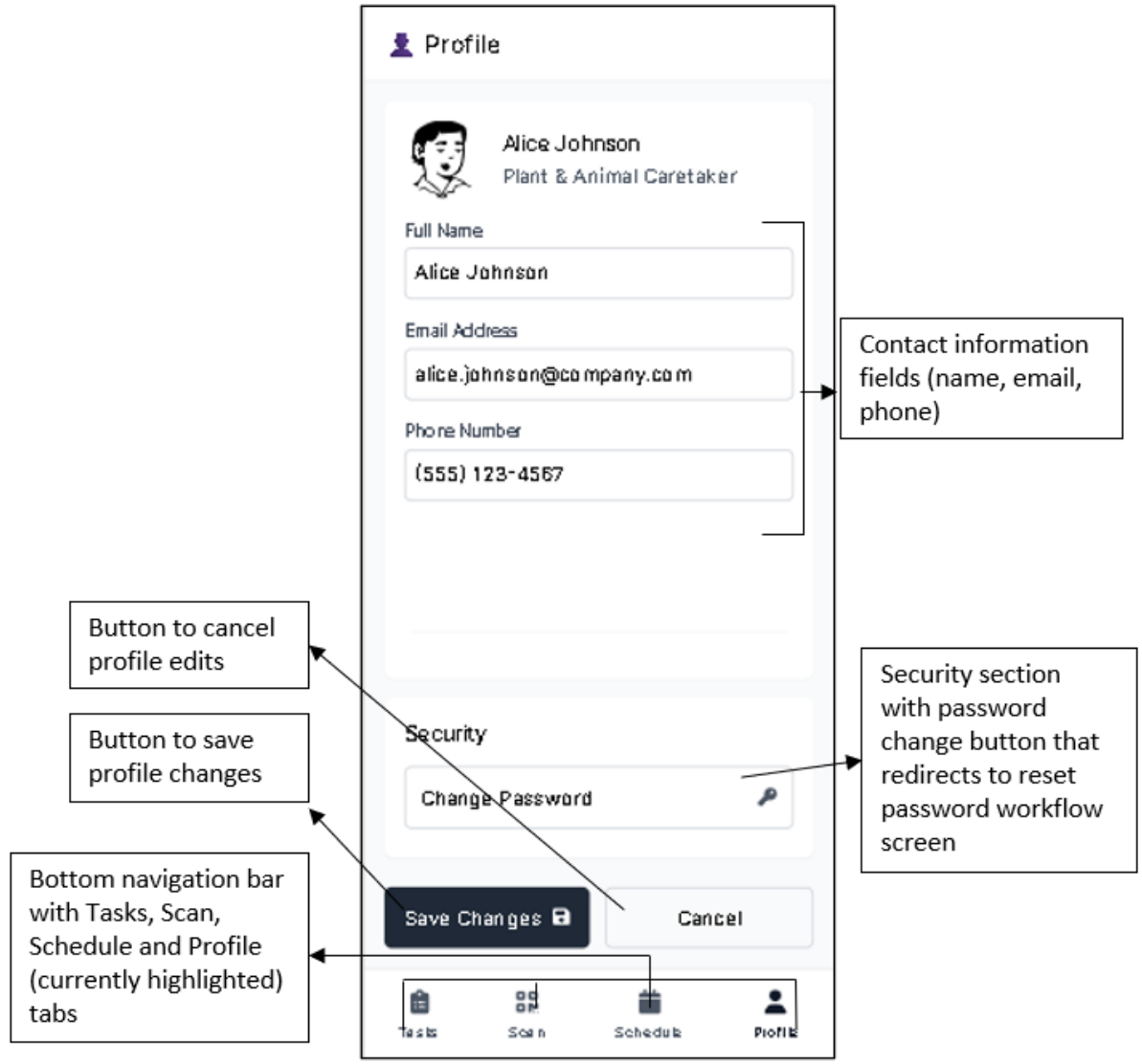

Frame 18: Employee Assignments Dashboard




Frame 19: Scan Plant/Animal ID Tag Interface, Scan Results, Task Completion Confirmation And Report Issue Screens

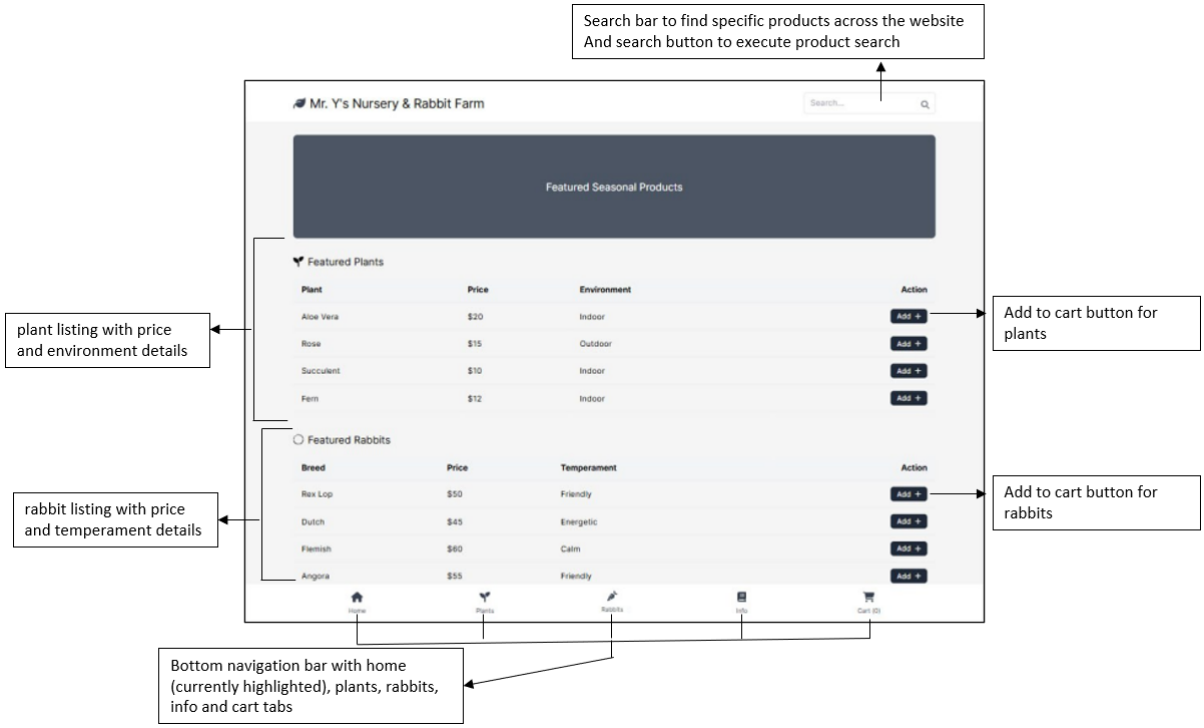


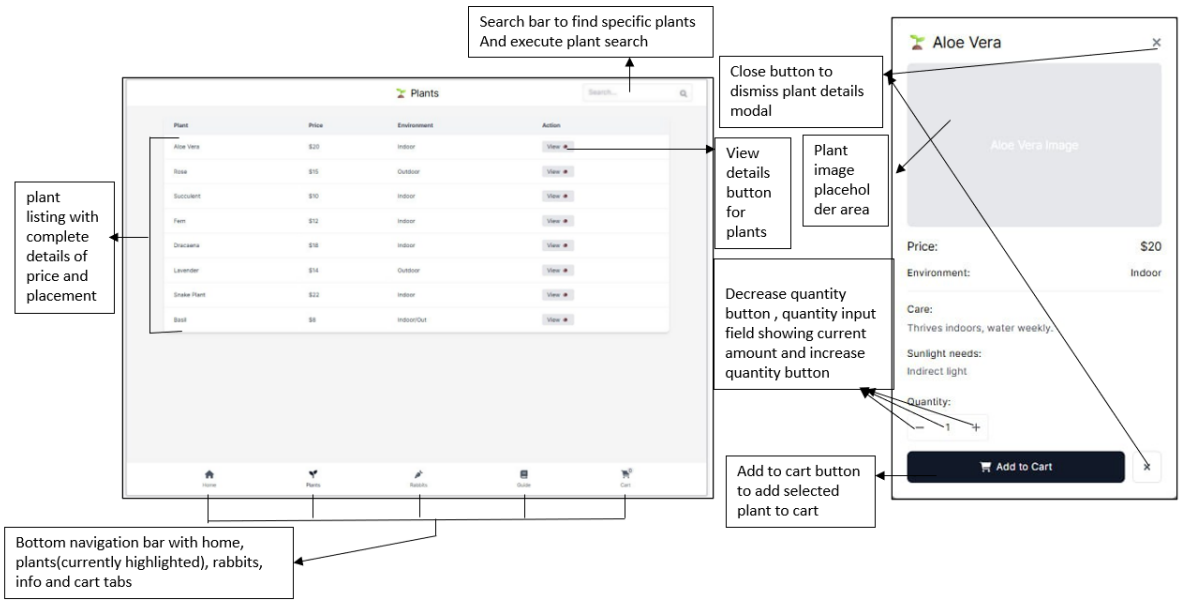

Frame 20: Weekly Schedule View

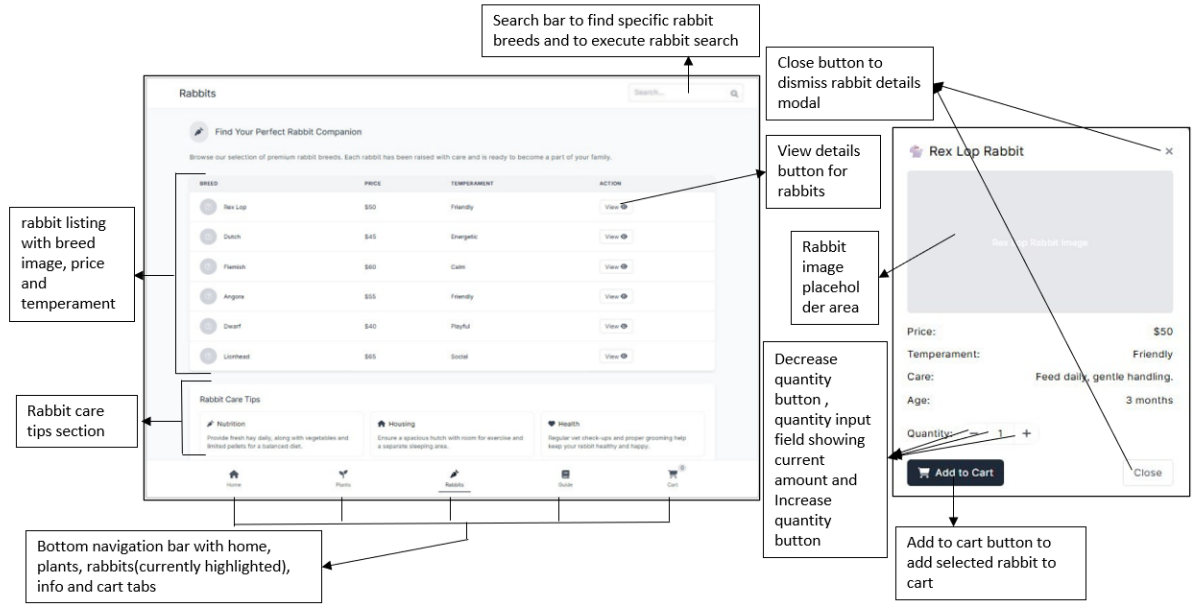


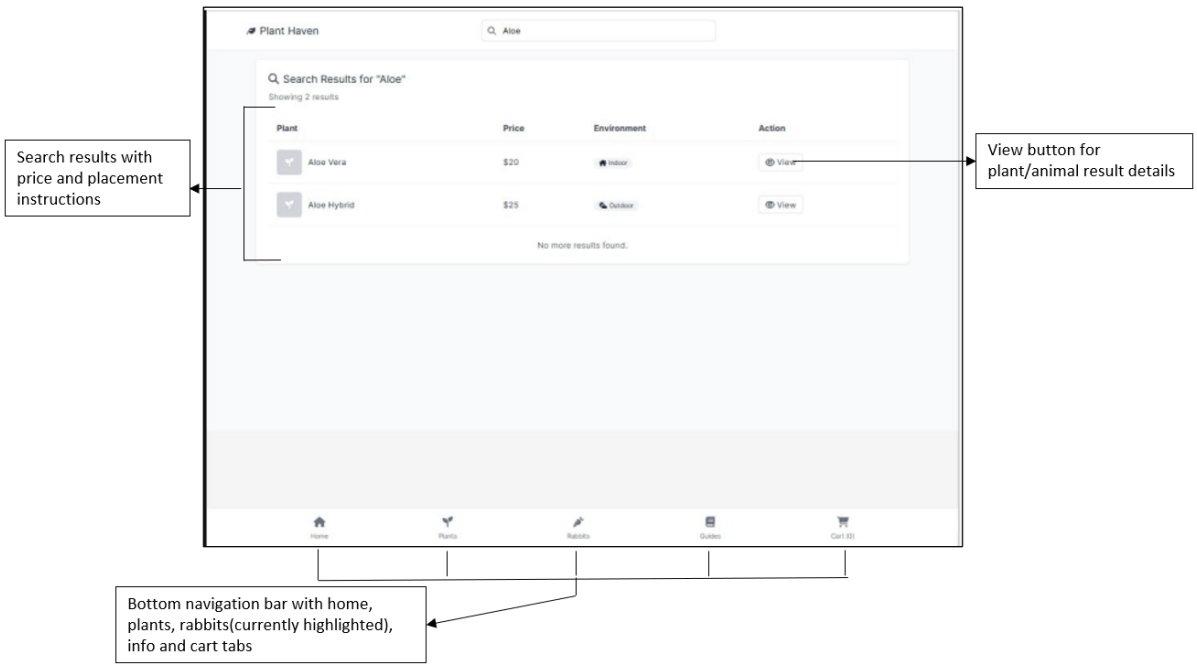

Frame 21: Employee Profile Section Interface

# Customer portal Interface Designs:

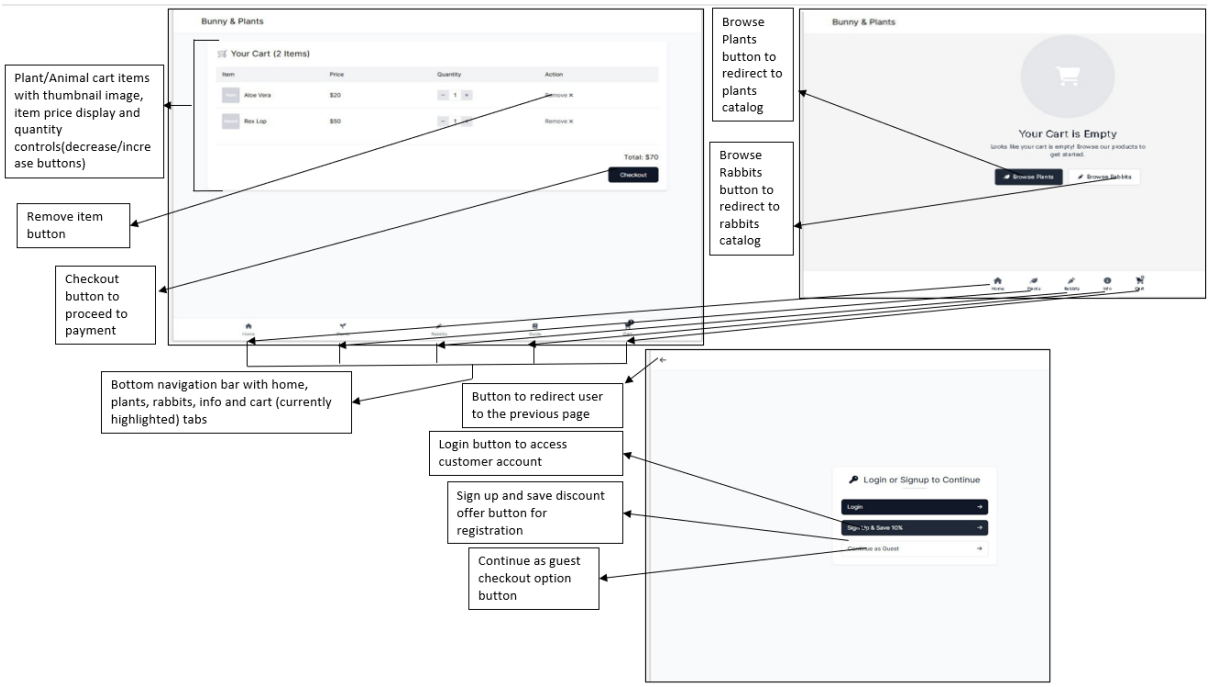


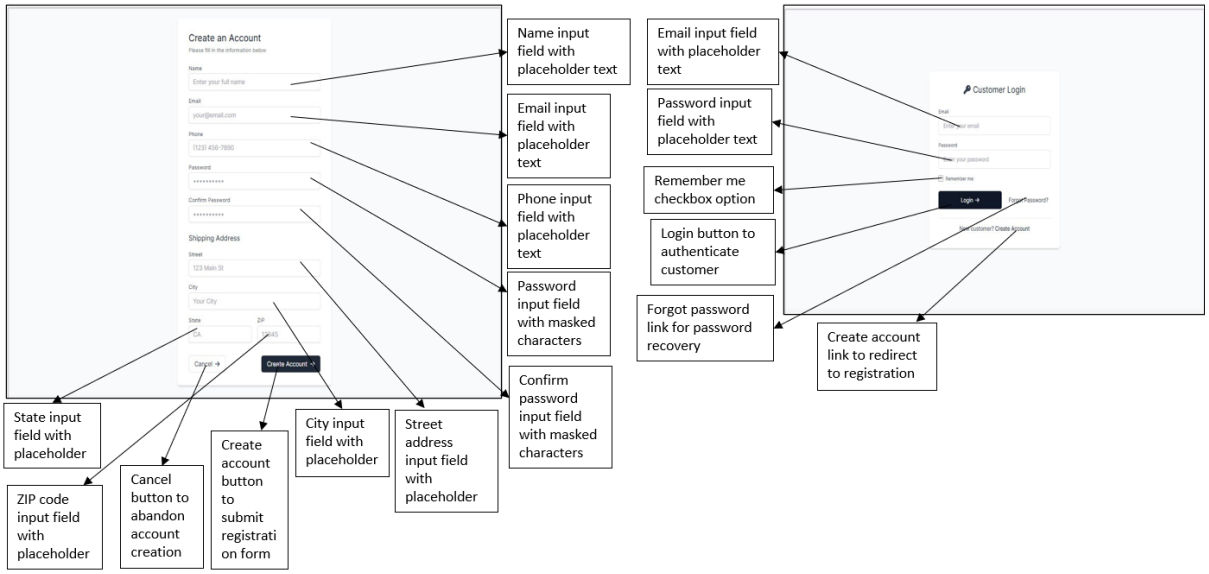



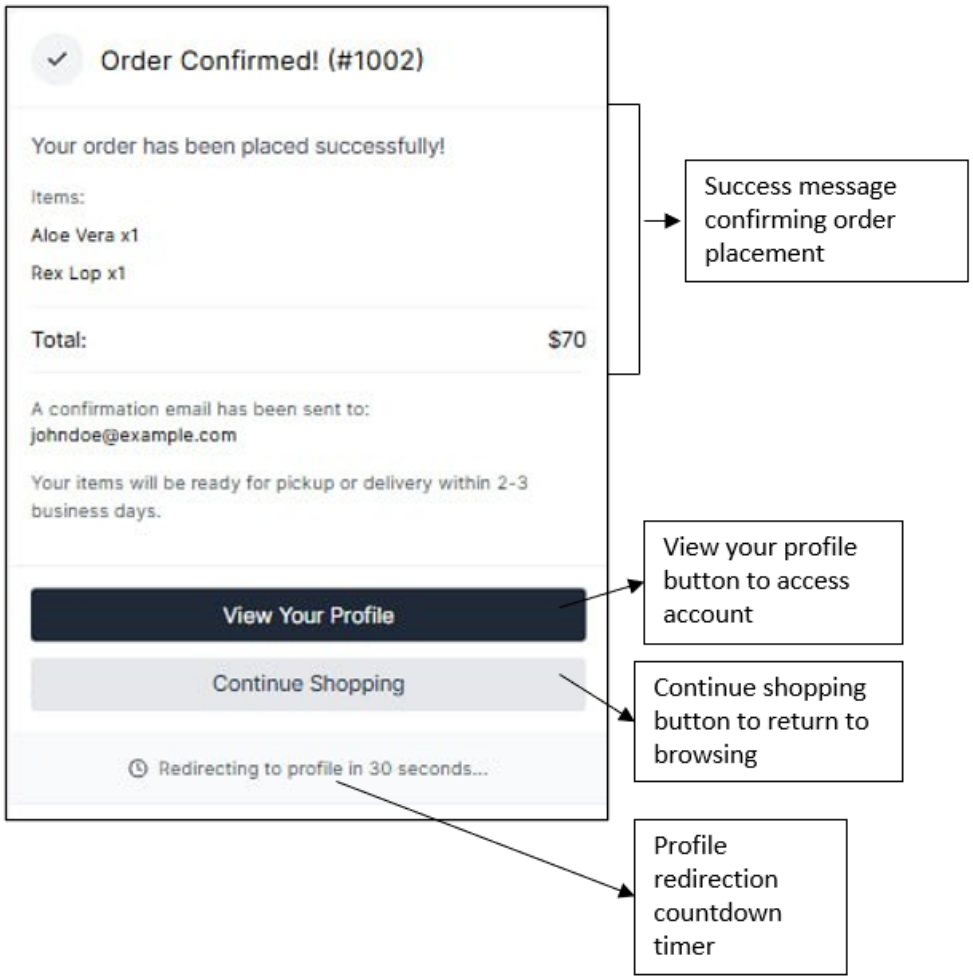

Search bar to find specific rabbit breeds and to execute rabbit search
Close button to dismiss rabbit details modal
View details button for rabbits
rabbit listing with breed image, price and temperament
Rabbit image placehol der area
Rabbit care tips section
Decrease quantity button , quantity input field showing current amount and Increase quantity button
Add to cart button to add selected rabbit to cart
Bottom navigation bar with home, plants, rabbits(currently highlighted), info and cart tabs
Rabbits
Find Your Perfect Rabbit Companion
Rex Lop Rabbit
Price:
$50
Temperament:
Friendly
Care:
Feed daily, gentle handling.
Age:
3 months
Add to Cart
Close
Rabbit Care Tips

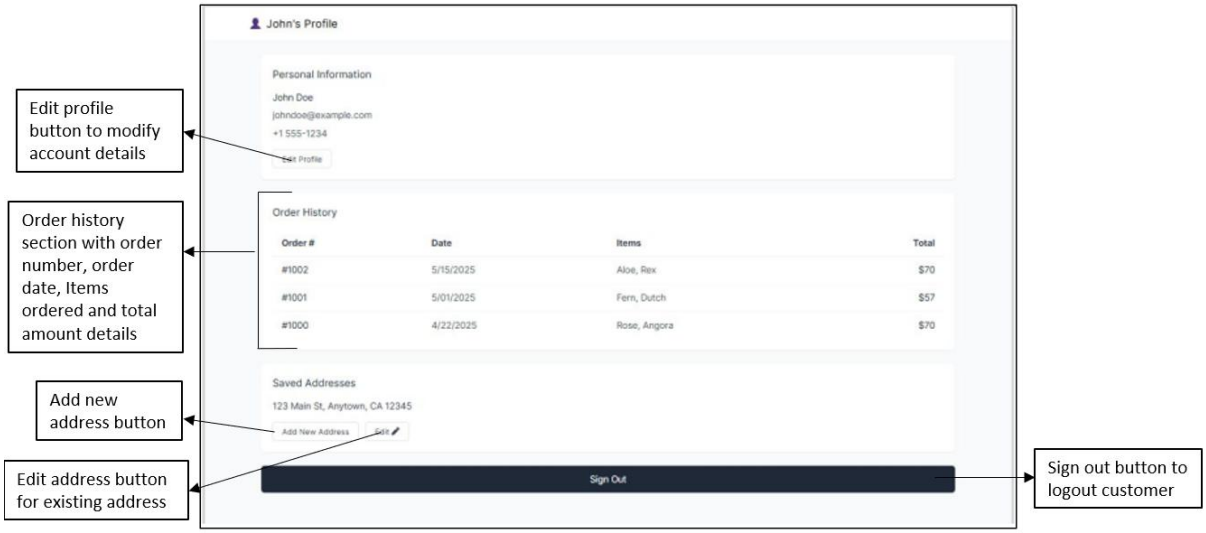

Search results with price and placement instructions
View button for plant/animal result details
Bottom navigation bar with home, plants, rabbits(currently highlighted), info and cart tabs
Plant Haven
Aloe
Search Results for "Aloe"
Showing 2 results
Plant
Price
Environment
Action
Aloe Vera
$20
Aloe Hybrid
$25
No more results found.

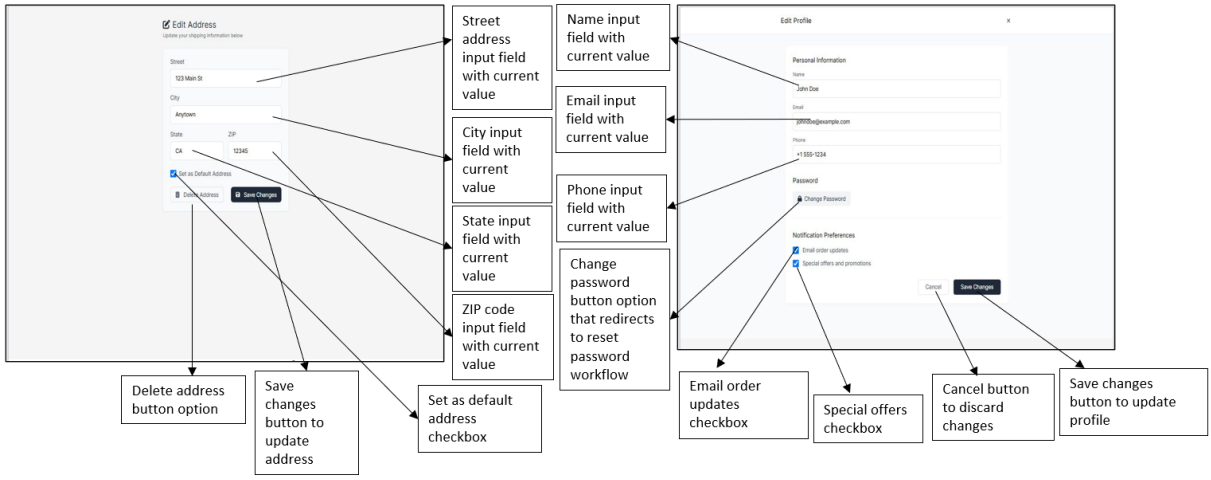

Plant & Animal Facts
Aloe Vera Plant Image
Aloe Vera
Purifies air and thrives in indirect sunlight! Contains healing gel that can be used for minor burns and skin irritation.
Low maintenance
Indirect light
Medicinal
Rex Lop Rabbit Image
Rex Lop
Known for their floppy ears and gentle nature. These rabbits make excellent indoor pets and can be litter trained.
Gentle
Indoor pet
Litter trainable
Home
Plants
Rabbits
Info
Cart
plant information section
rabbit information section
image placeholder
Bottom navigation bar with home, plants, rabbits, info(currently highlighted) and cart tabs

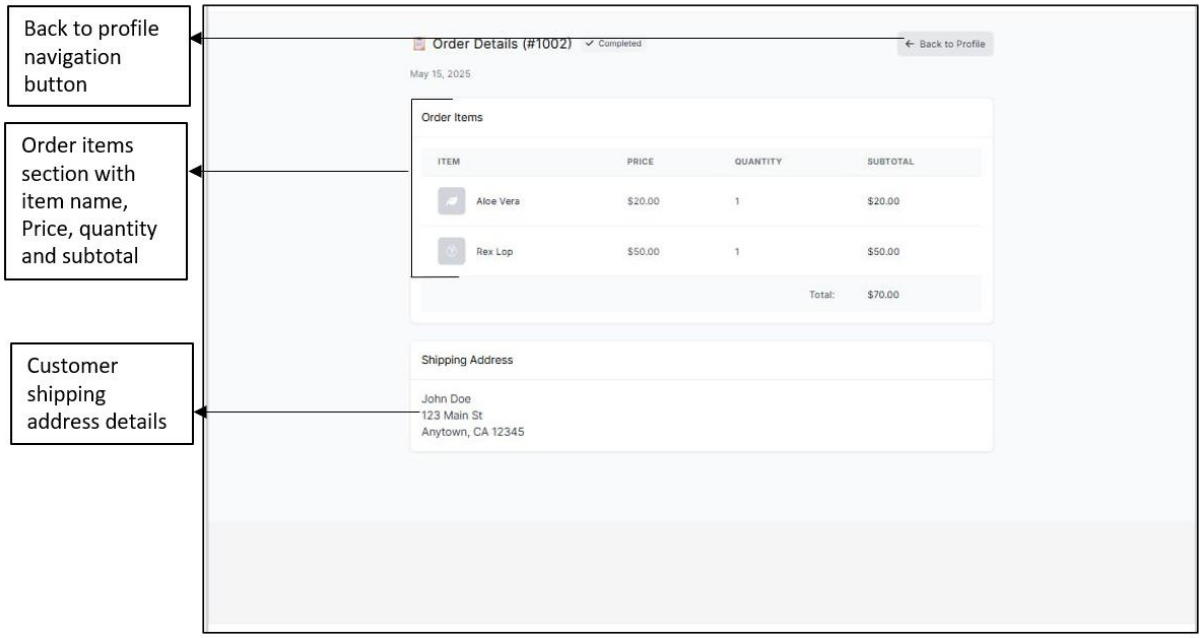

Bunny & Plants
Your Cart (2 Items)
Item
Price
Quantity
Action
Aloe Vera
$20
Remove
Rex Lop
$50
Remove
Total: $70
Checkout
Plant/Animal cart items with thumbnail image, item price display and quantity controls(decrease/increase buttons)
Remove item button
Checkout button to proceed to payment
Bottom navigation bar with home, plants, rabbits, info and cart (currently highlighted) tabs
Browse Plants button to redirect to plants catalog
Browse Rabbits button to redirect to rabbits catalog
Bunny & Plants
Your Cart is Empty
Looks like your cart is empty! Browse our products to get started.
Browse Plants
Browse Rabbits
Button to redirect user to the previous page
Login button to access customer account
Sign up and save discount offer button for registration
Continue as guest checkout option button
Login or Signup to Continue
Login
Sign Up & Save 10%
Continue as Guest

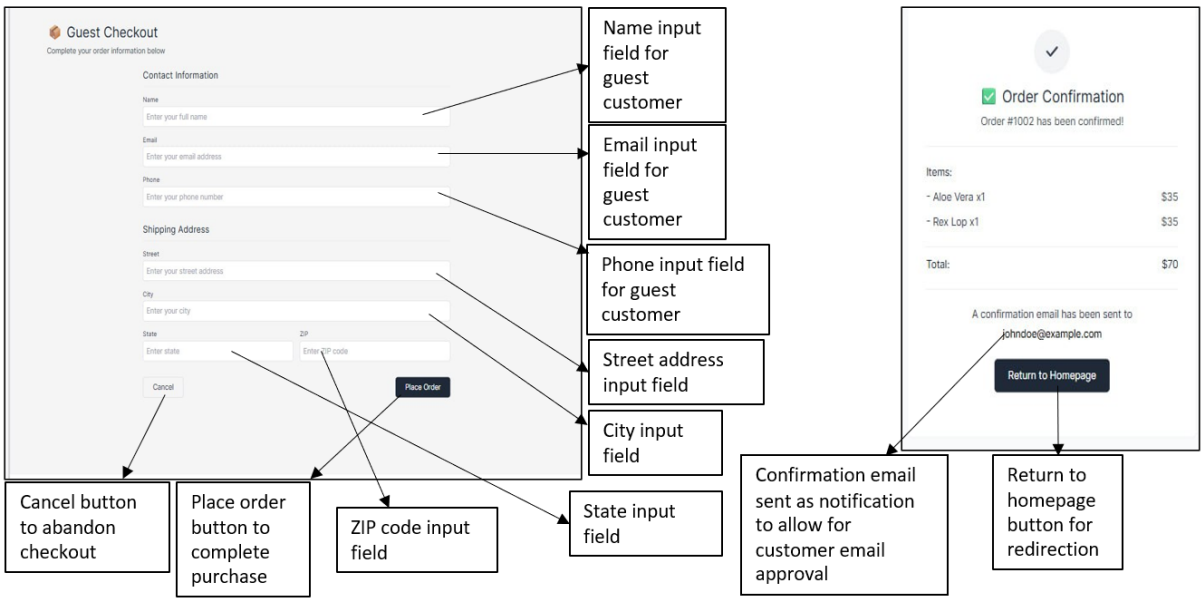

Create an Account
Name input field with placeholder text
Email input field with placeholder text
Phone input field with placeholder text
Password input field with masked characters
Confirm password input field with masked characters
Street address input field with placeholder
City input field with placeholder
Create account button to submit registrati on form
Cancel button to abandon account creation
ZIP code input field with placeholder
State input field with placeholder
Customer Login
Email input field with placeholder text
Password input field with placeholder text
Remember me checkbox option
Login button to authenticate customer
Forgot password link for password recovery
Create account link to redirect to registration

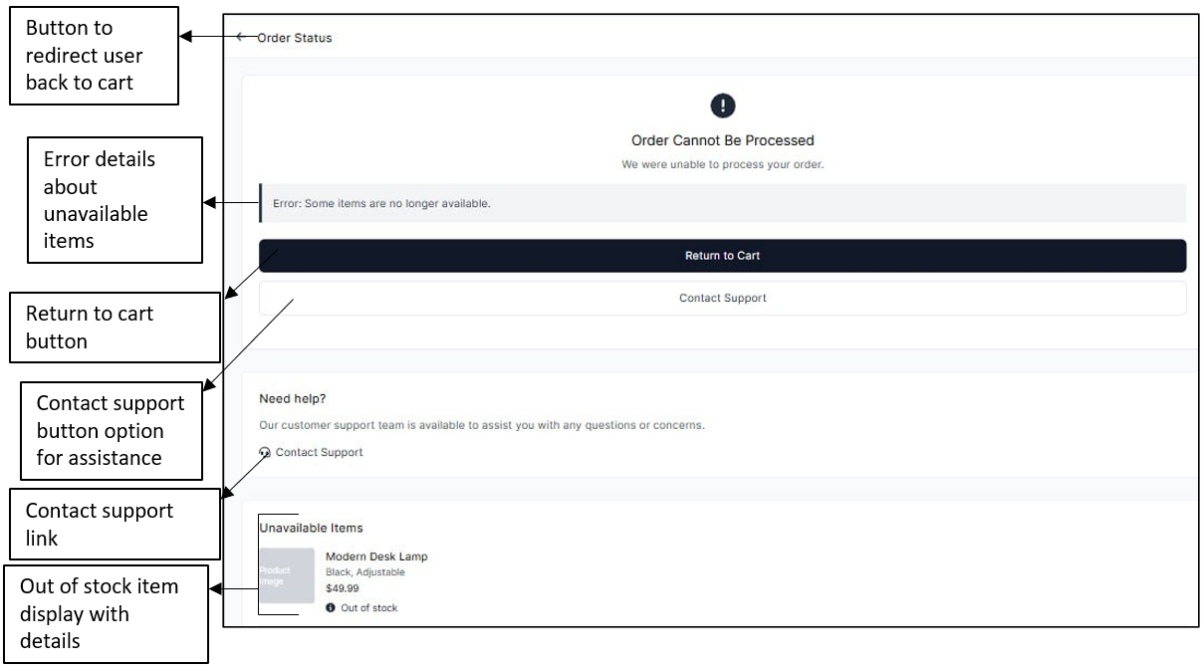

Order Confirmed! (#1002)
Your order has been placed successfully!
Items:
Aloe Vera x1
Rex Lop x1
Total:
$70
A confirmation email has been sent to:
johndoe@example.com
Your items will be ready for pickup or delivery within 2-3 business days.
View Your Profile
Continue Shopping
Redirecting to profile in 30 seconds...
Success message confirming order placement
View your profile button to access account
Continue shopping button to return to browsing
Profile redirection countdown timer


John's Profile
Personal Information
John Doe
johndoe@example.com
+1 555-1234
Edit Profile
Order History
Order #
Date
Items
Total
#1002
5/15/2025
Aloe, Rex
$70
#1001
5/01/2025
Fern, Dutch
$57
#1000
4/22/2025
Rose, Angora
$70
Saved Addresses
123 Main St, Anytown, CA 12345
Add New Address
Edit
Sign Out
Edit profile button to modify account details
Order history section with order number, order date, Items ordered and total amount details
Add new address button
Edit address button for existing address
Sign out button to logout customer


Edit Address
Update your shipping information below
Street
123 Main St
City
Anytown
State
CA
ZIP
12345
Set as Default Address
Delete Address
Save Changes
Edit Profile
Personal Information
Name
John Doe
Email
johndoe@example.com
Phone
+1 555-1234
Password
Change Password
Notification Preferences
Email order updates
Special offers and promotions
Cancel
Save Changes
Street address input field with current value
City input field with current value
State input field with current value
ZIP code input field with current value
Name input field with current value
Email input field with current value
Phone input field with current value
Change password button option that redirects to reset password workflow
Delete address button option
Save changes button to update address
Set as default address checkbox
Email order updates checkbox
Special offers checkbox
Cancel button to discard changes
Save changes button to update profile


Back to profile navigation button
Order items section with item name, Price, quantity and subtotal
Customer shipping address details
Order Details (#1002)
Completed
Back to Profile
May 15, 2025
Order Items
ITEM
PRICE
QUANTITY
SUBTOTAL
Aloe Vera
$20.00
1
$20.00
Rex Lop
$50.00
1
$50.00
Total:
$70.00
Shipping Address
John Doe
123 Main St
Anytown, CA 12345


Guest Checkout
Complete your order information below
Contact Information
Name
Enter your full name
Email
Enter your email address
Phone
Enter your phone number
Shipping Address
Street
Enter your street address
City
Enter your city
State
Enter state
ZIP
Enter ZIP code
Cancel
Place Order
Name input field for guest customer
Email input field for guest customer
Phone input field for guest customer
Street address input field
City input field
State input field
ZIP code input field
Cancel button to abandon checkout
Place order button to complete purchase
Order Confirmation
Order #1002 has been confirmed!
Items:
- Aloe Vera x1
$35
- Rex Lop x1
$35
Total:
$70
A confirmation email has been sent to johndoe@example.com
Return to Homepage
Confirmation email sent as notification to allow for customer email approval
Return to homepage button for redirection


Button to redirect user back to cart
Error details about unavailable items
Return to cart button
Contact support button option for assistance
Contact support link
Out of stock item display with details
Order Status
Order Cannot Be Processed
We were unable to process your order.
Error: Some items are no longer available.
Return to Cart
Contact Support
Need help?
Our customer support team is available to assist you with any questions or concerns.
Contact Support
Unavailable Items
Modern Desk Lamp
Black, Adjustable
$49.99
Out of stock

## System Flowcharts:

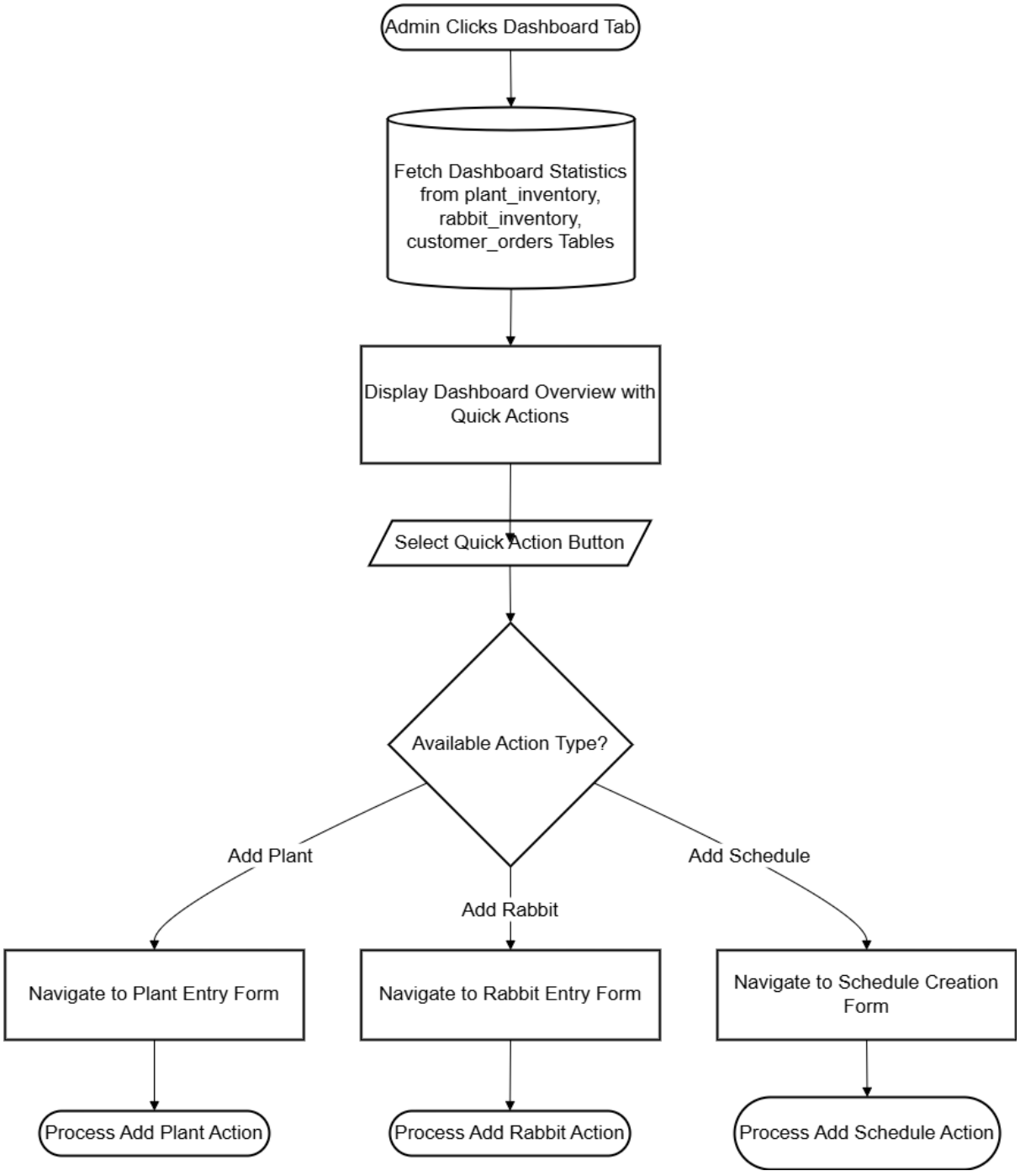



Figure 1: Admin dashboard Interface system flow diagram

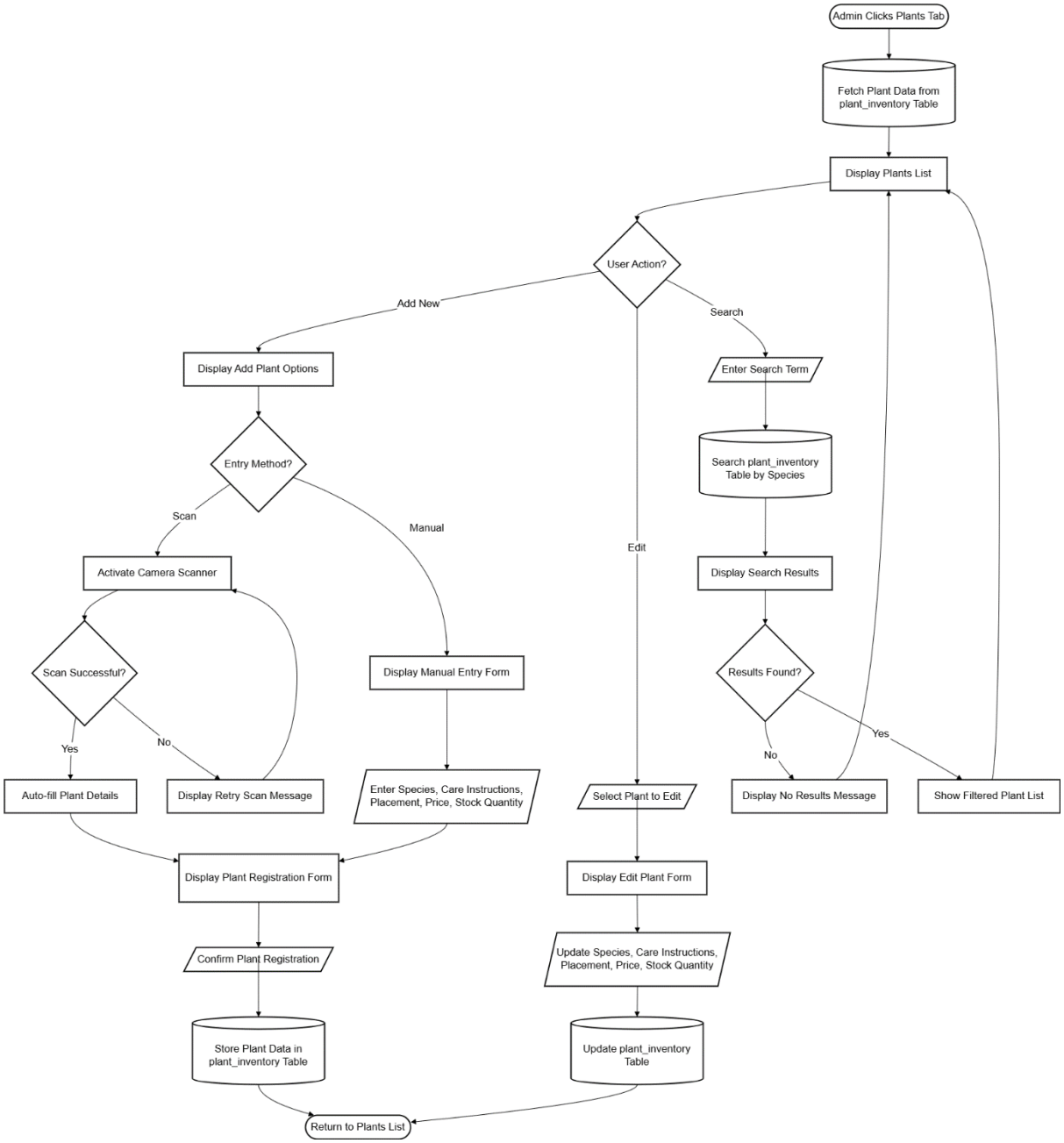



Figure 2: Admin plant management Interface system flow diagram

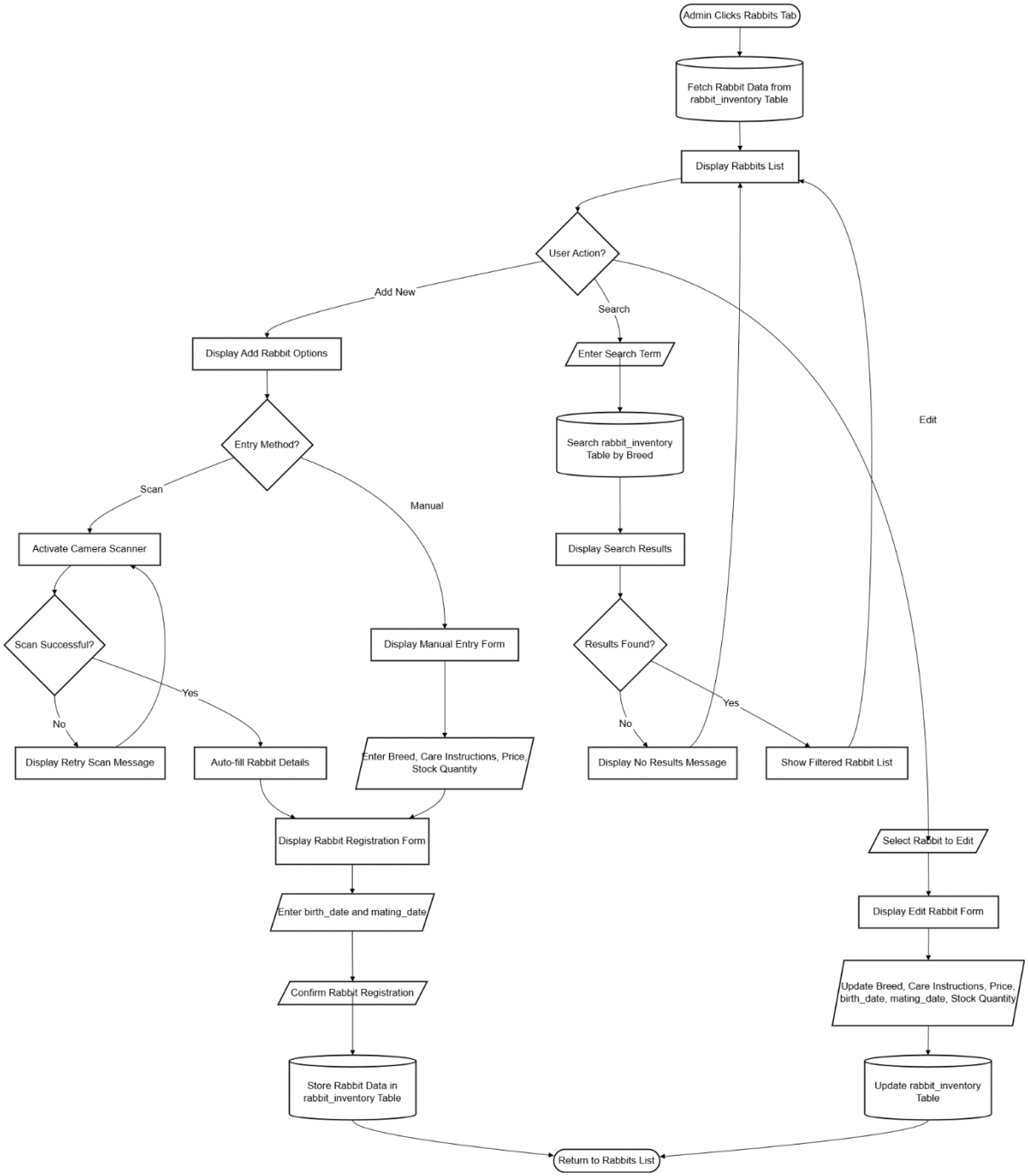



Figure 3: Admin rabbit management Interface system flow diagram

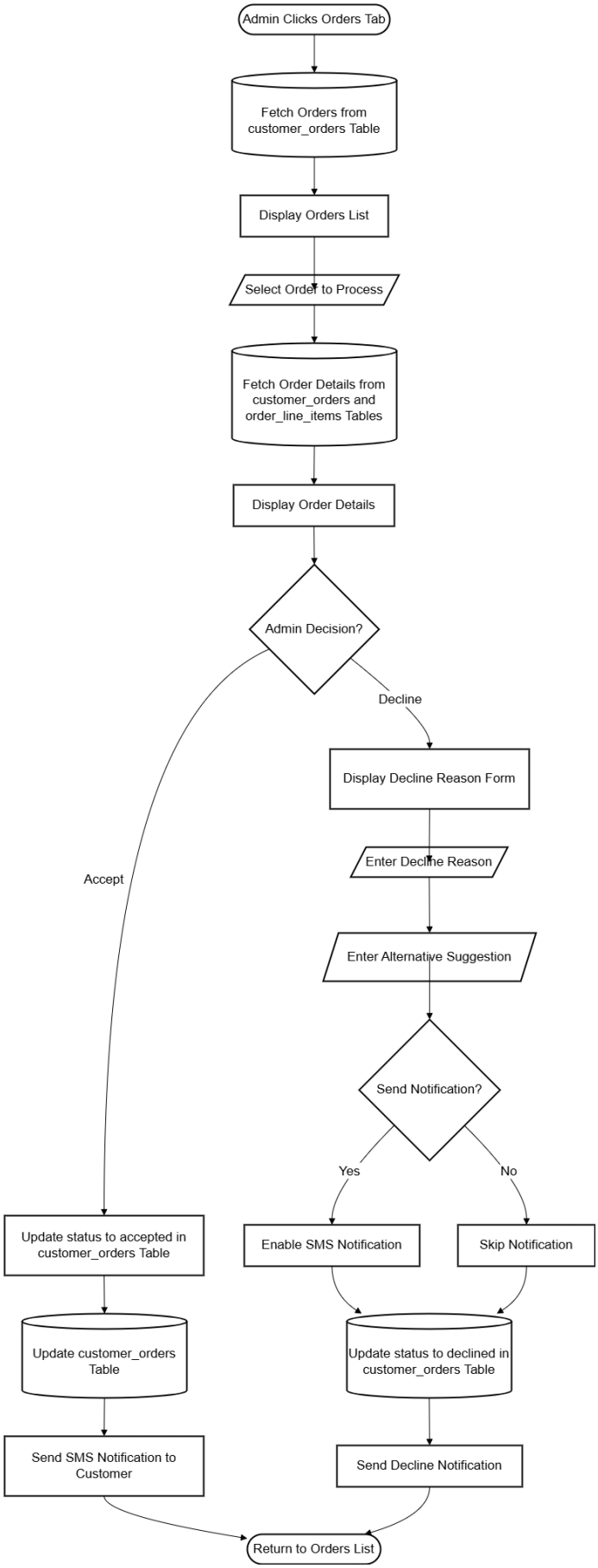



Figure 4: Admin order management Interface system flow diagram

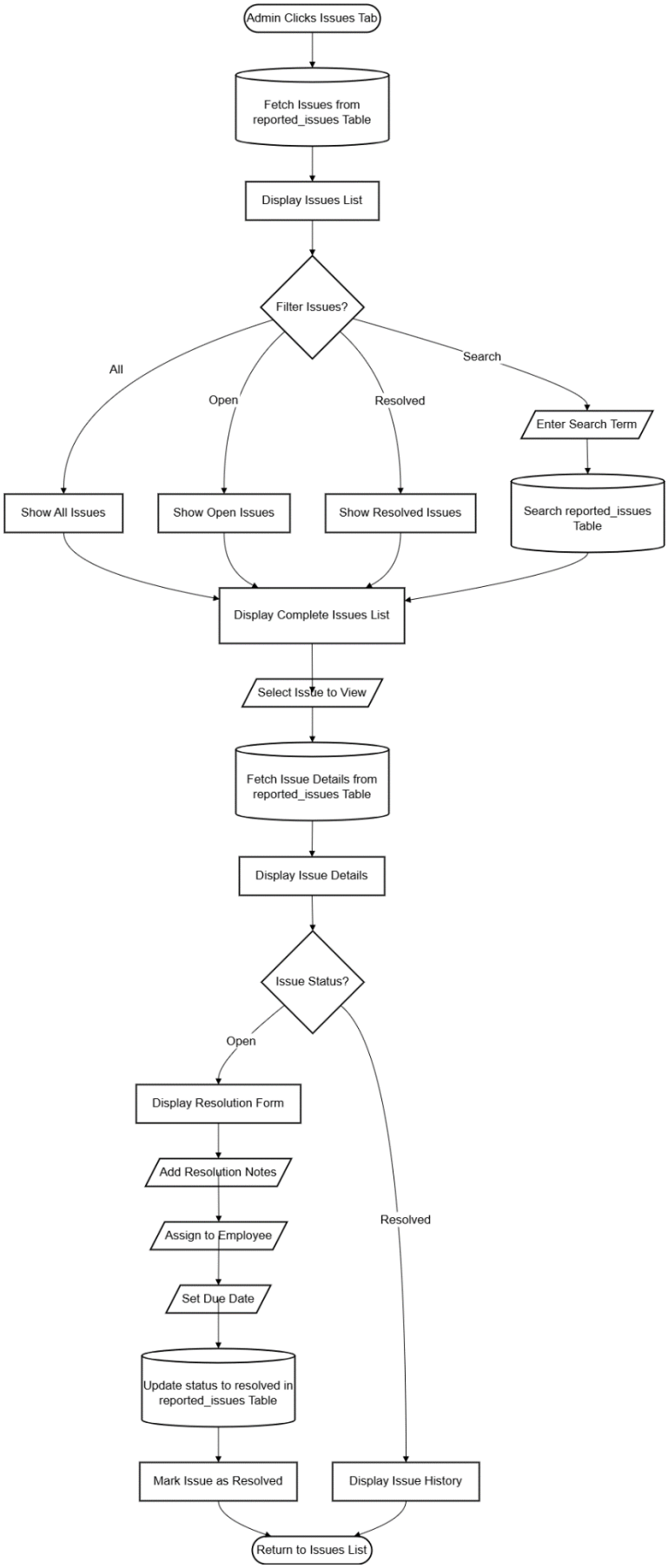



Figure 5: Admin issue management Interface system flow diagram

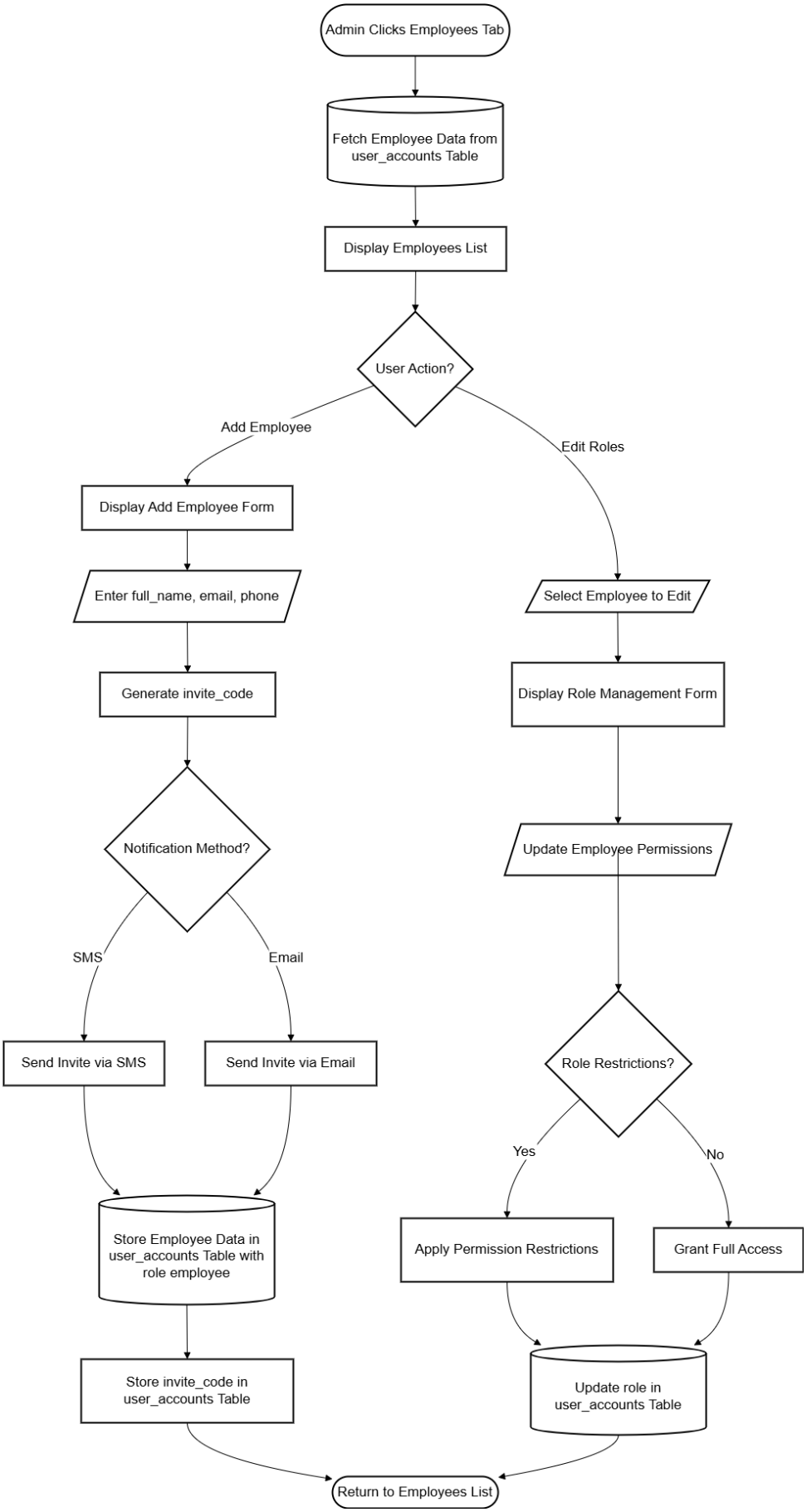



Figure 6: Admin employee management Interface system flow diagram

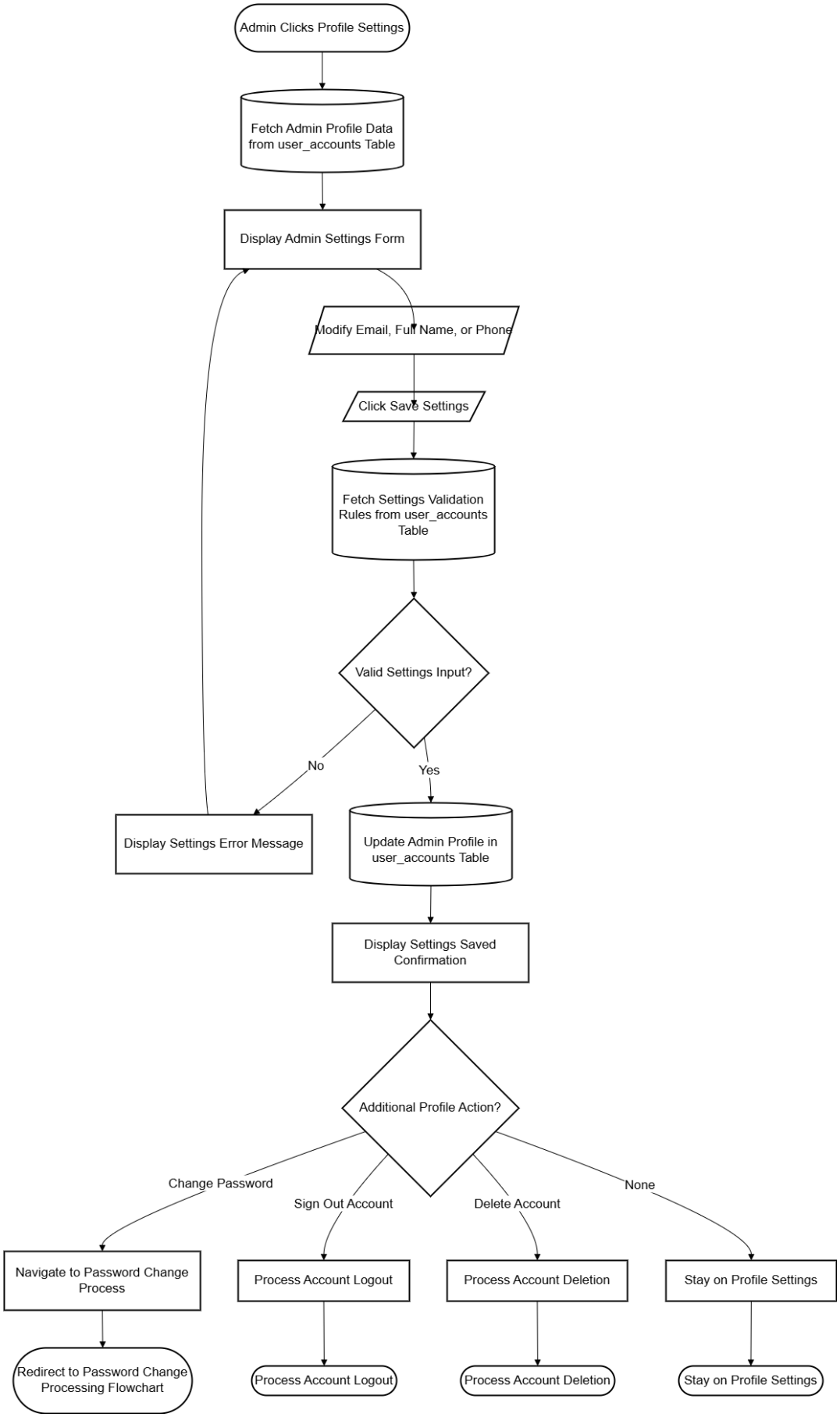



Figure 7: Admin profile settings Interface system flow diagram

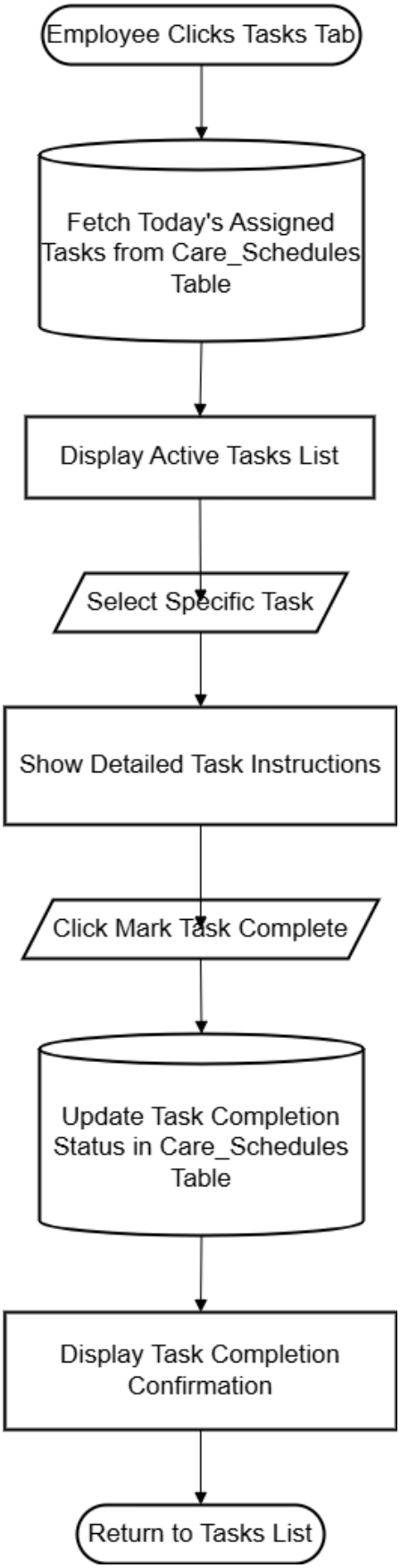



Figure 8: Employee tasks Interface system flow diagram

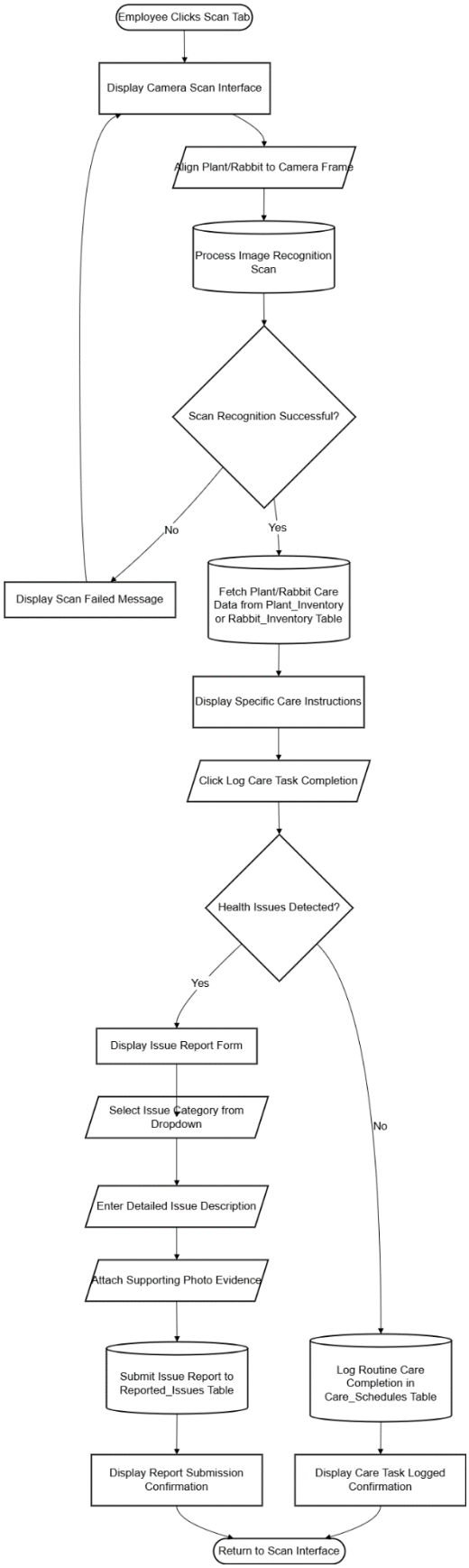



Figure 9: Employee scan Interface system flow diagram

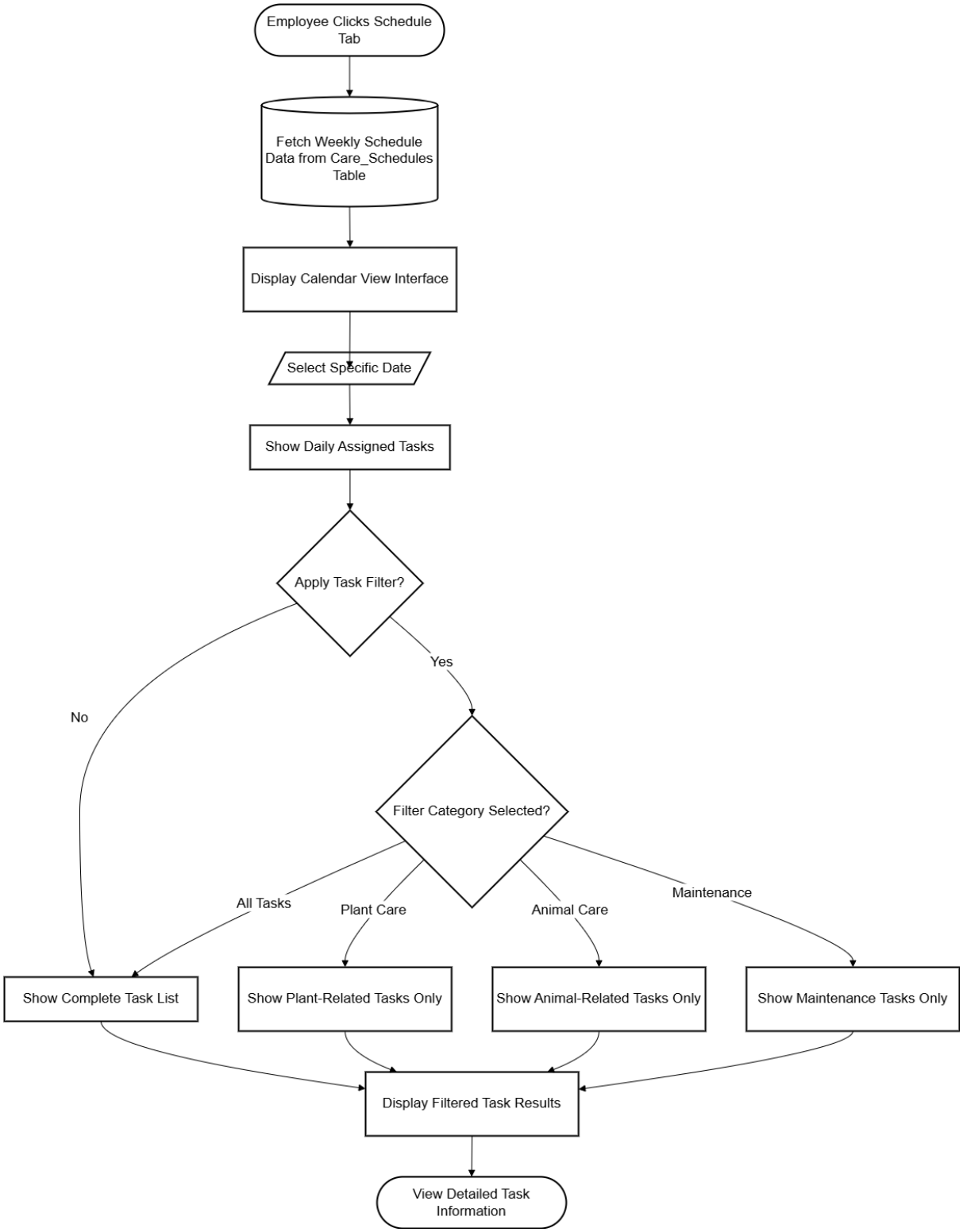



Figure 10: Employee schedule Interface system flow diagram

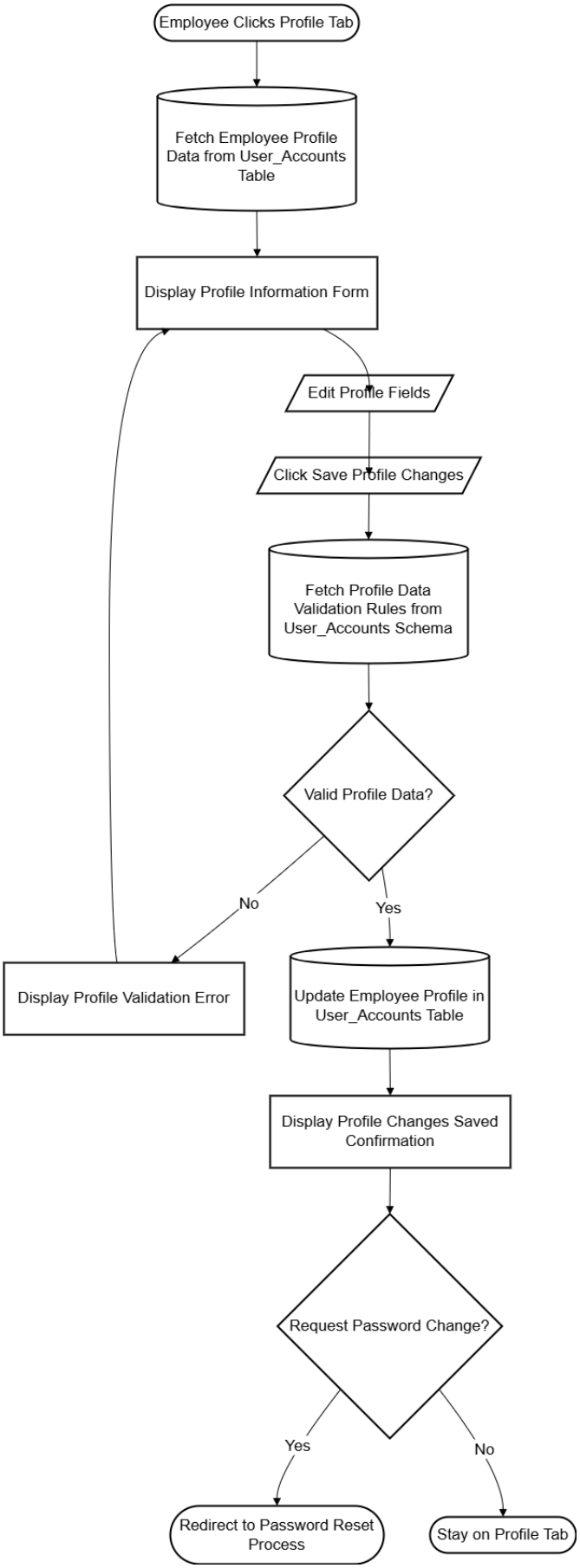



Figure 11: Employee profile Interface system flow diagram

## Processing Flowcharts:

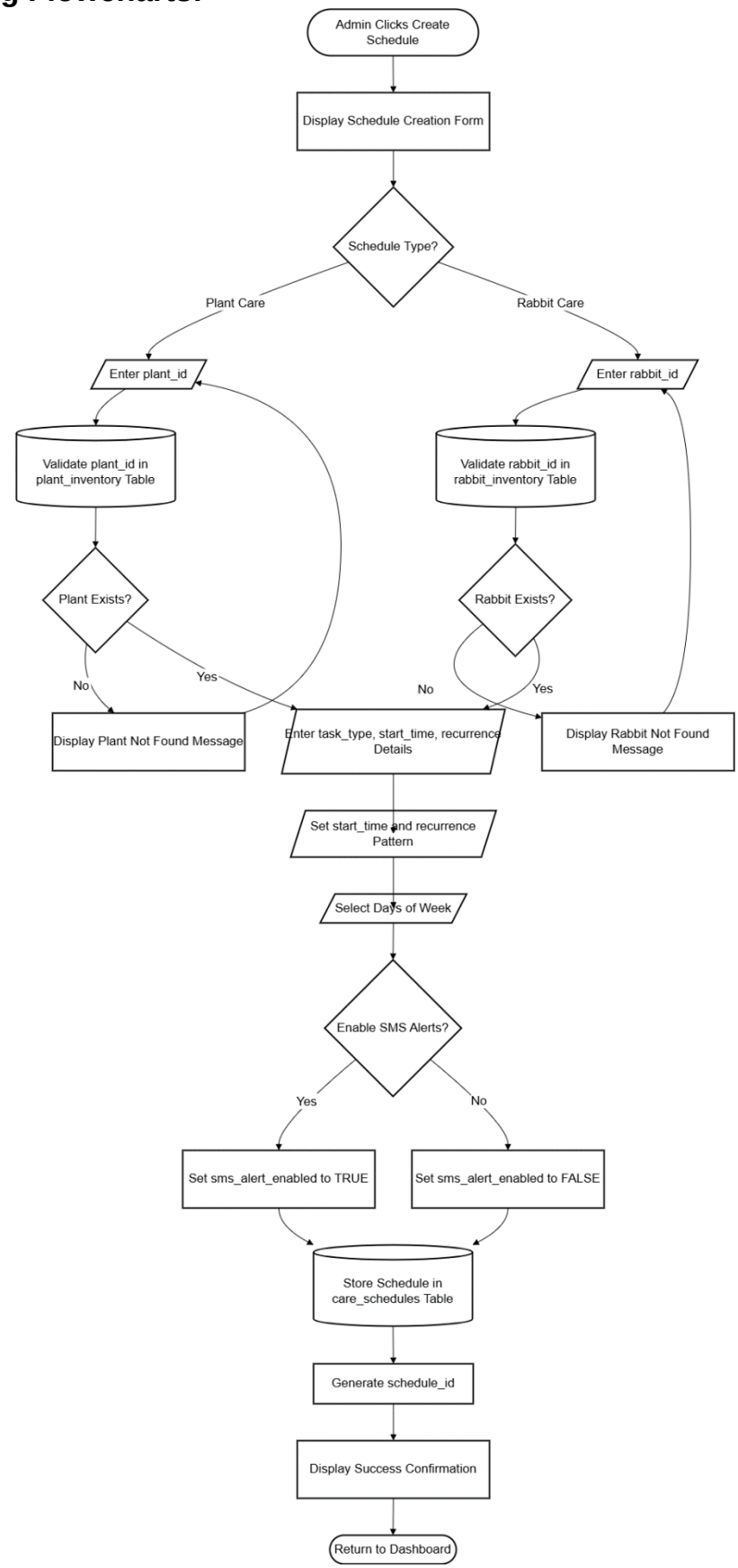



Figure 1: Schedule creation processing flowchart

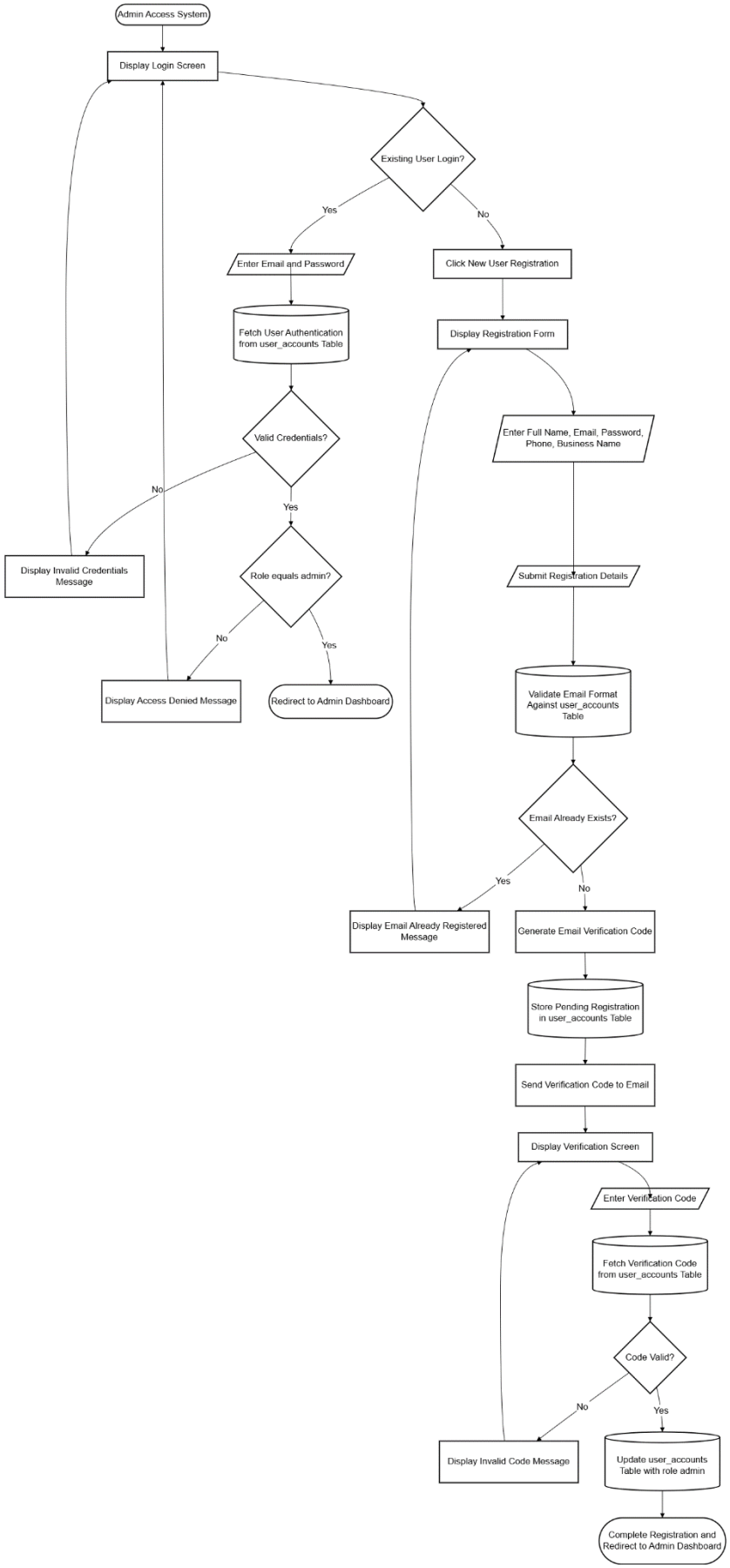



Figure 2: Admin login and registration processing flowchart

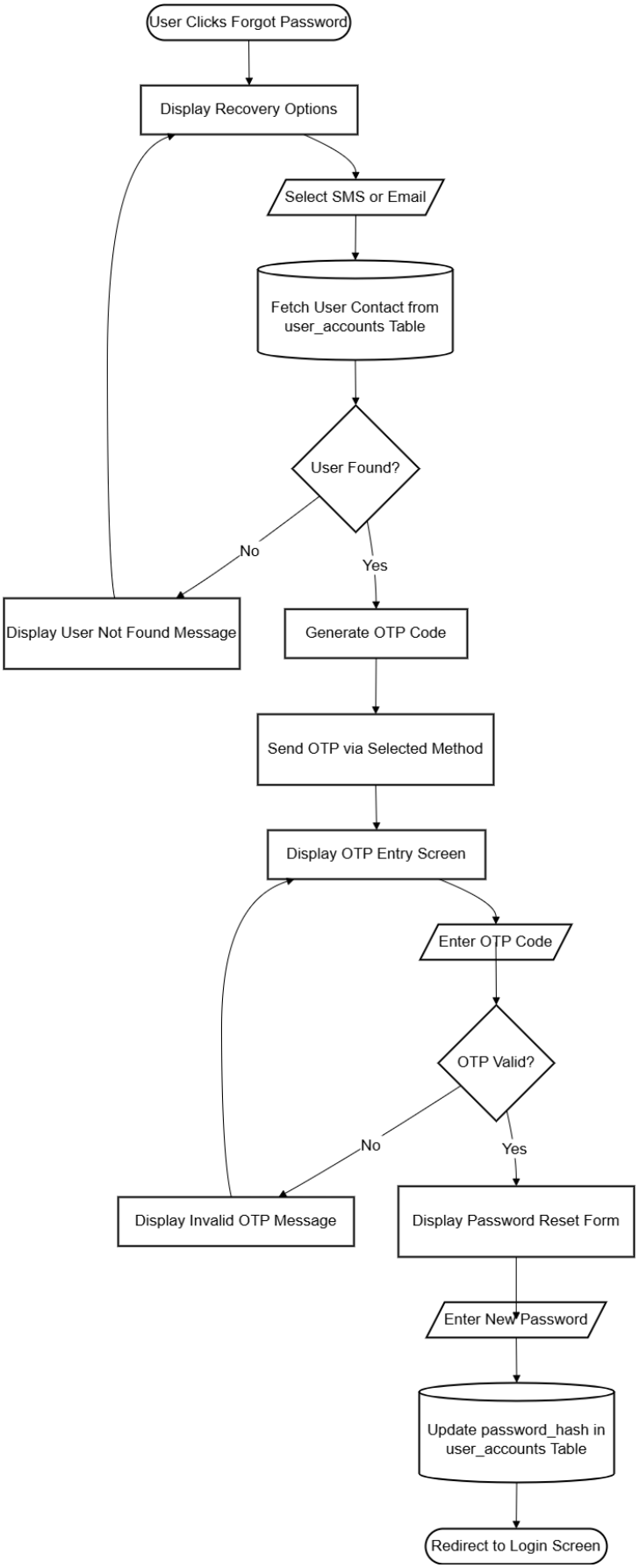



Figure 3: Admin password recovery processing flowchart

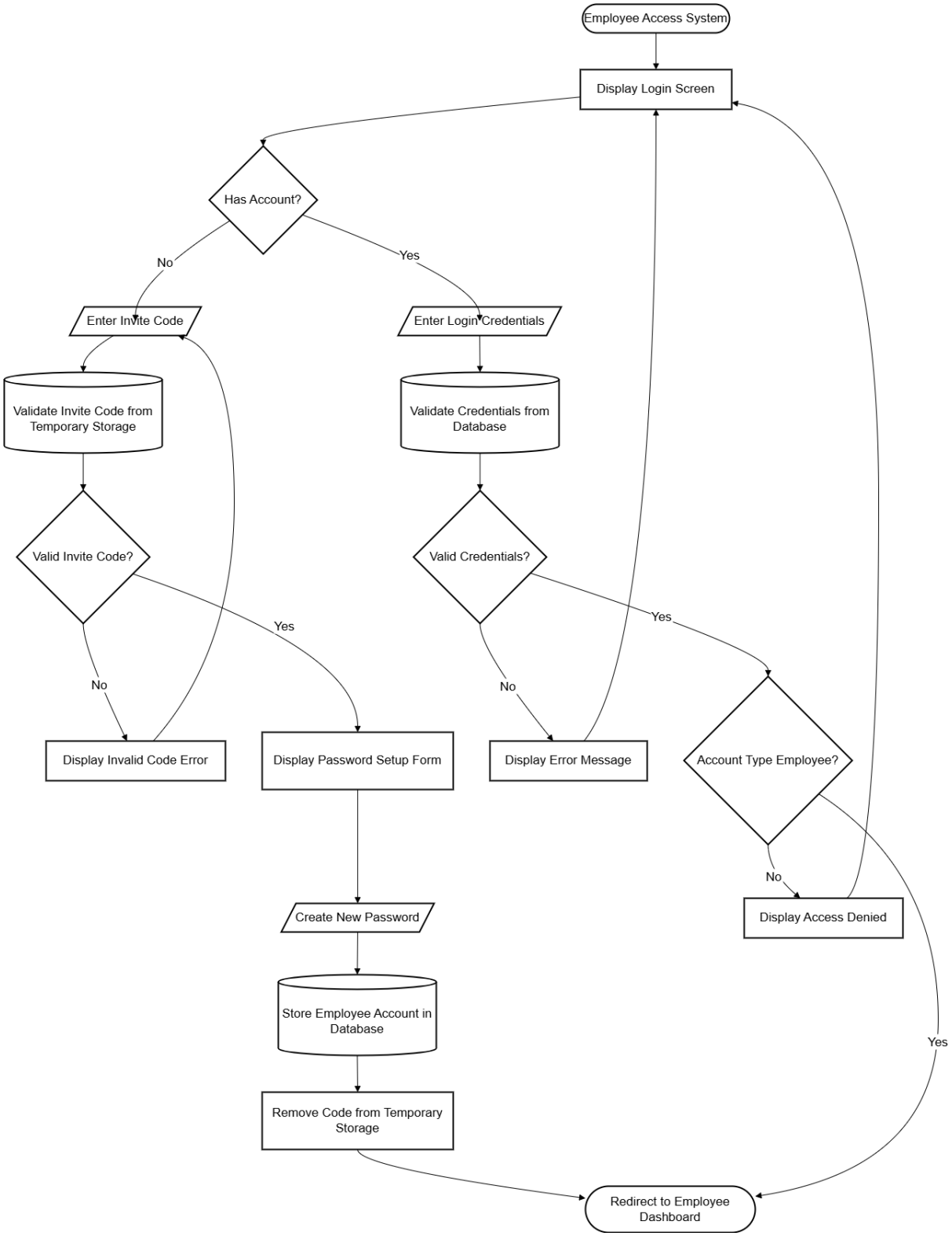



Figure 4: Employee login processing flowchart

## Test Plan

| Test # | Actions to Test | Method of Testing & Expected Result |
|---|---|---|
| TC #1 | Verify admin can register plant species, care requirements, and placement recommendations. | Normal: Admin fills valid plant details (species, care, placement). Expected: Plant is saved; confirmation message appears. Abnormal: Admin submits incomplete data. Expected: Error message highlights missing fields. |
| TC #2 | Verify admin logs rabbit mating/birth dates and tracks breeding schedules. | Normal: Admin enters valid mating/birth dates. Expected: Schedule updates; calendar reflects deadlines. Abnormal: Admin enters future birth date. Expected: Error: Birth date cannot be future. |
| TC #3 | Verify admin generates exportable inventory/sales reports (PDF/CSV). | Normal: Admin selects date range → clicks Export. Expected: PDF/CSV file downloads. Abnormal: No data in selected range. Expected: Error: No records found. |
| TC #4 | Verify admin creates employee accounts via SMS/email invite codes. | Normal: Admin adds employee email → sends invite. Expected: Employee receives code; account activates. Abnormal: Admin uses invalid email. Expected: Error: Invalid email format. |
| TC #5 | Verify edit/delete actions create audit trails. | Normal: Admin edits plant record. Expected: Timestamp/user ID logged in audit trail. Abnormal: Unauthorized edit attempt. Expected: Error: Access denied. |
| TC #6 | Verify employees view/administer tasks from admin schedules. | Normal: Employee logs in → sees Water Aloe Vera by 2 PM. Expected: Task |

| | | |
|---|---|---|
| | | appears with deadline. Abnormal: Task expired. Expected: Task marked Late. |
| TC #7 | Verify employees scan IDs to log care completion. | Normal: Employee scans plant QR code → Done. Expected: Log timestamped; task removed. Abnormal: Scan invalid ID. Expected: Error: ID not recognized. |
| TC #8 | Verify employees report equipment issues with photos. | Normal: Employee uploads photo + description → submits. Expected: Report saved; admin notified. Abnormal: Photo missing. Expected: Error: Attachment required. |
| TC #9 | Verify customers see indoor/outdoor classifications while browsing plants. | Normal: Customer filters Indoor Plants. Expected: Only indoor plants displayed. Abnormal: No classification data. Expected: Placeholder: Classification pending. |
| TC #10 | Verify customers access rabbit care guides and mental health resources. | Normal: Customer clicks Rabbit Care. Expected: Guide opens; mental health section visible. Abnormal: Guide missing. Expected: Redirect to FAQ. |
| TC #11 | Verify customers input/update contact details during checkout. | Normal: Guest enters valid phone/email. Expected: Details saved; order proceeds. Abnormal: Invalid phone number. Expected: Error: Enter 10-digit number. |
| TC #12 | Verify unified keyword search returns plants, rabbits, or records. | Normal: Admin searches Aloe. Expected: Plants/rabbits with Aloe appear. Abnormal: No results. |

| | | |
|---|---|---|
| | | Expected: No matches found. |
| TC #13 | Verify SMS notifications for time-sensitive tasks. | Normal: Task due in 30 mins → employee receives SMS.<br>Abnormal: SMS gateway offline. Expected: Fallback email notification. |
| TC #14 | Verify real-time pricing with low-stock alerts. | Normal: Plant stock = 3 → customer sees Low stock.<br>Abnormal: Stock data fails. Expected: Placeholder price; admin alert. |
| TC #15 | Verify transparent pricing during checkout. | Normal: Customer checks out → sees itemized costs (tax, shipping).<br>Abnormal: Shipping API down. Expected: Shipping unavailable; try later. |
| TC #16 | Verify role-specific login + OTP recovery. | Normal: Employee forgets password → OTP sent → resets.<br>Abnormal: Invalid OTP. Expected: OTP expired; resend. |
| TC #17 | Verify contextual help displays role-specific content. | Normal: Admin clicks Help → sees IT support.<br>Abnormal: User role undefined. Expected: Generic FAQ. |

## Record Of Tasks

| Task # | Planned Action | Follow Up Outcome | Estimate Time | Completion Date | Criterion |
|---|---|---|---|---|---|
| 1 | Initial client meeting to finalize success criteria. | Documented 17 approved success criteria with client sign-off. | 1 Day | April 3, 2025 | A |
| 2 | Research Firebase Auth for role-specific logins (SC #16). | Confirmed Firebase supports OTP; drafted auth flow. | 2 Days | April 5, 2025 | B |
| 3 | Design database schema for plant/rabbit records (SC #1, #2). | Created Firestore collections: `plants`, `rabbits`, `audit_trails`. | 3 Days | April 10, 2025 | B |
| 4 | Prototype admin report generator (SC #3). | Implemented PDF/CSV export using `pdf-lib`/`csv-writer`; tested with mock data. | 4 Days | April 15, 2025 | B |
| 5 | Define employee task protocols (SC #6, #13). | Integrated Twilio SMS API; designed task scheduler. | 2 Days | April 18, 2025 | B |
| 6 | Draft test plan covering all 17 success criteria. | Created 17 test cases; validated with client. | 5 Days | April 25, 2025 | B |
| 7 | Develop QR scanner for care logging (SC #7). | Used `react-native-camera`; tested on Android/iOS. | 4 Days | May 1, 2025 | B |
| 8 | Design UI for customer plant/rabbit browsing (SC #9, #10). | Built Figma prototypes; added indoor/outdoor filters. | 3 Days | May 5, 2025 | B |
| 9 | Implement audit trails for | Added `history` subcollection | 2 Days | May 8, 2025 | B |

| | | | | | |
|---|---|---|---|---|---|
| | edits/deletes (SC #5). | with user/timestamp metadata. | | | |
| 10 | Configure real-time pricing/low-stock alerts (SC #14). | Linked Firestore to UI; triggers when stock ≤5. | 3 Days | May 12, 2025 | B |
| 11 | Integrate contextual help (SC #17). | Role-based content served via Firebase dynamic links. | 2 Days | May 15, 2025 | B |
| 12 | Validate checkout flow transparency (SC #15). | Added tax/shipping calculators; tested edge cases. | 3 Days | May 20, 2025 | B |
| 13 | Alpha-test employee task features (SC #6–#8). | Fixed QR scan false positives; optimized SMS latency. | 4 Days | May 25, 2025 | B |
| 14 | Document system design for Criterion B submission. | Compiled flowcharts, schemas, test plans into PDF. | 5 Days | June 5, 2025 | B |
| 15 | Client review of design documentation. | Approved with minor UI tweaks requested. | 2 Days | June 8, 2025 | B |
| 16 | Finalize Criterion A planning document. | Added success criteria, problem definition, solution scope. | 3 Days | June 12, 2025 | A |
| 17 | Submit Criteria A/B to computer science teacher and get it approved. | Uploaded PDFs; confirmed. | 1 Day | June 18, 2025 | A/B |