DrugDev

New Product Development System

Group Members

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Project Overview

Purpose:

- To digitize and centralize drug development processes in the pharmaceutical industry.

Key Features:

- Automated workflows for research, trials, approvals, and compliance.
- Real-time monitoring of drug development progress.
- Integration of regulatory requirements to ensure compliance.

Goals:

- Streamline operations and reduce manual errors.
- Minimize the time required to develop and approve new drugs.
- Improve collaboration among researchers, regulators, and manufacturers.

Target Users:

- Pharmaceutical companies, regulatory authorities, and research organizations.

Functional Requirements

1. Submit New Idea
Record idea details with unique ID and initial status.

2. Review Idea
View, filter, sort ideas.
Add reviewer comments.

3. Approval by M-Level
Approve/disapprove pending ideas.
Update status to "Approved by M-Level."

4. Approval by C-Level
Review M-Level approved ideas.
Update status to "Approved by C-Level."

5. Track Idea
View status updates and progress timeline.

6. Regulatory Compliance
Prepare and approve compliance documents.
Update status to "Approved Compliance."

7. Sales Plan
Develop and generate sales plans with templates.

8. Manage Testing
Track test progress and results.
Approve or request retesting.

9. Product Launch
Plan and track launch milestones.
Update status to "Launch."

Non- Functional Requirements

1**. Performance Requirements**
Supports up to 100 simultaneous users without degradation.

2. Safety Requirements
Ensures data integrity and accuracy for regulatory compliance and patient safety.

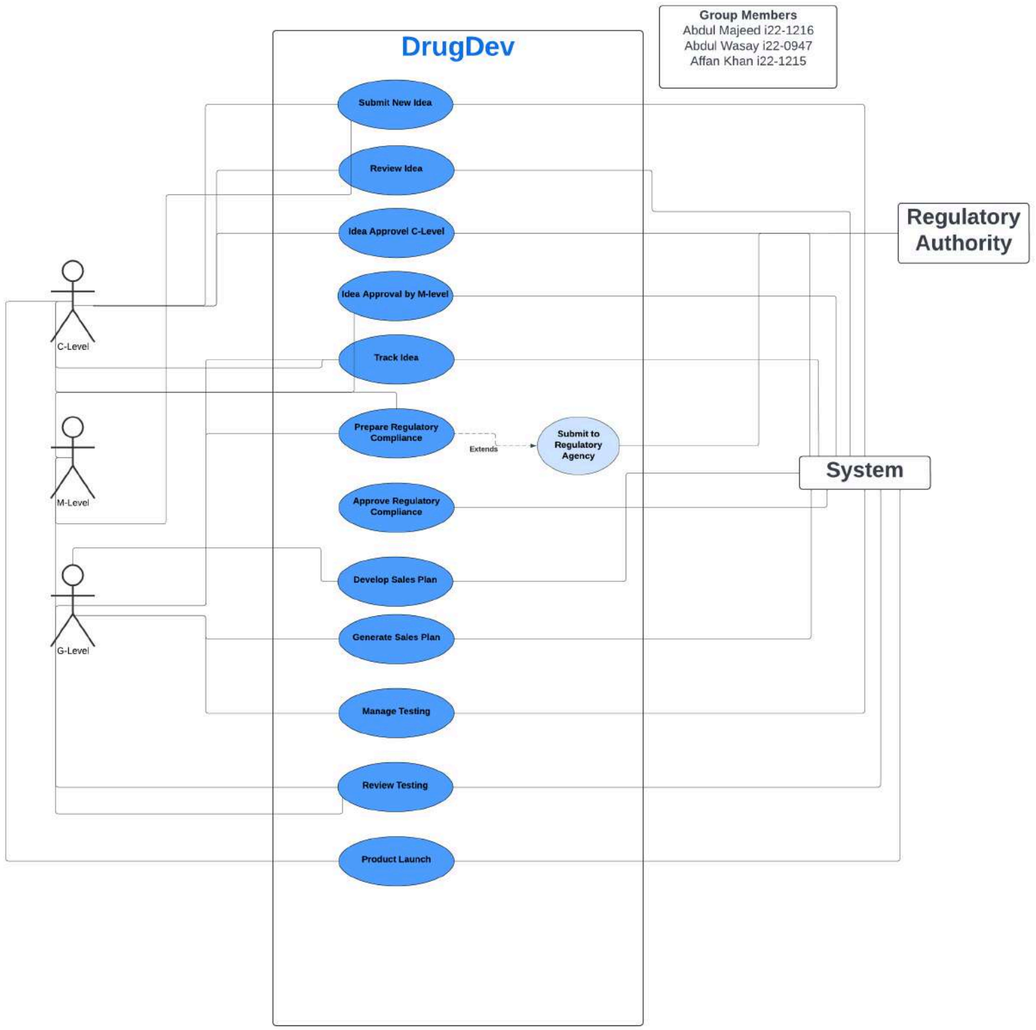
3. Security Requirements
Adheres to global data protection regulations.
Guarantees secure storage and transmission of sensitive data.

4. Software Quality Attributes
Reliability: 99.9% uptime.
Usability: Intuitive interface for users with varying technical expertise.
Maintainability: Modular, well-documented code for easy updates.

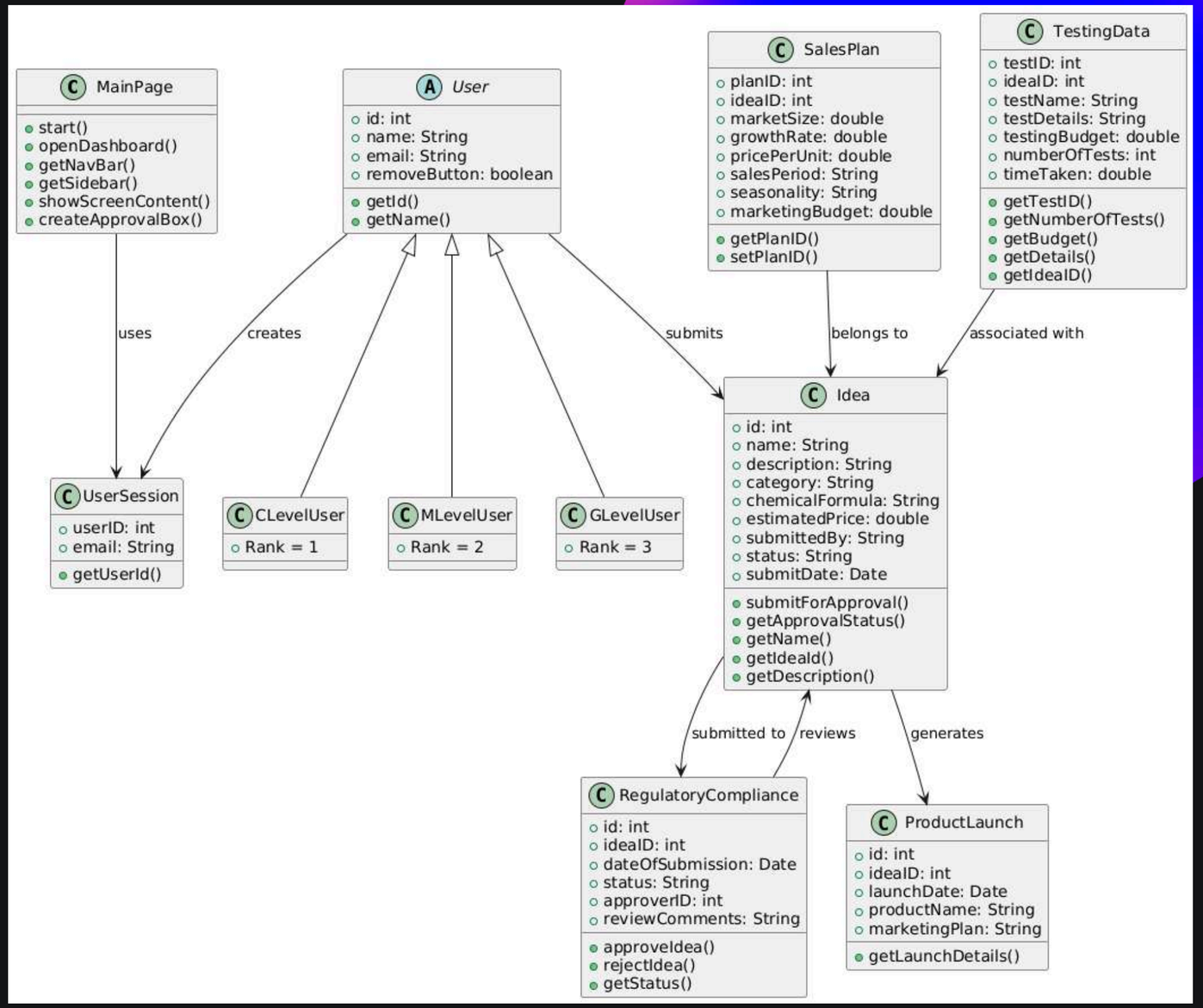
5. Business Rules
Only authorized personnel can approve ideas.
All data submissions must be audited and traceable.

6. Operating Environment
Runs on standard hardware and integrates with major databases and cloud platforms for scalability.

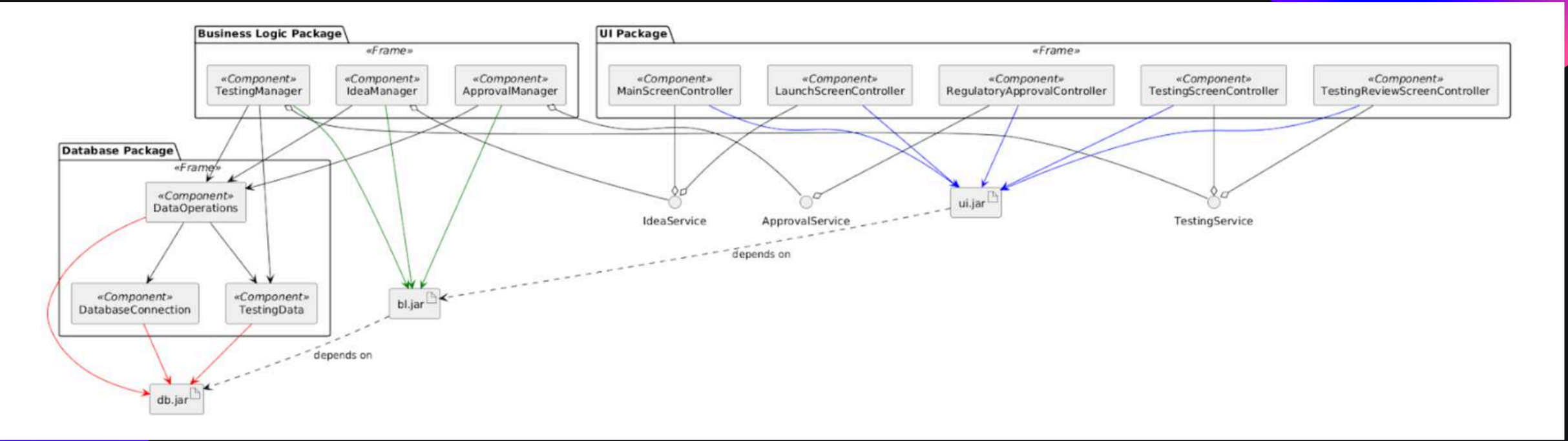
Use Case Diagram



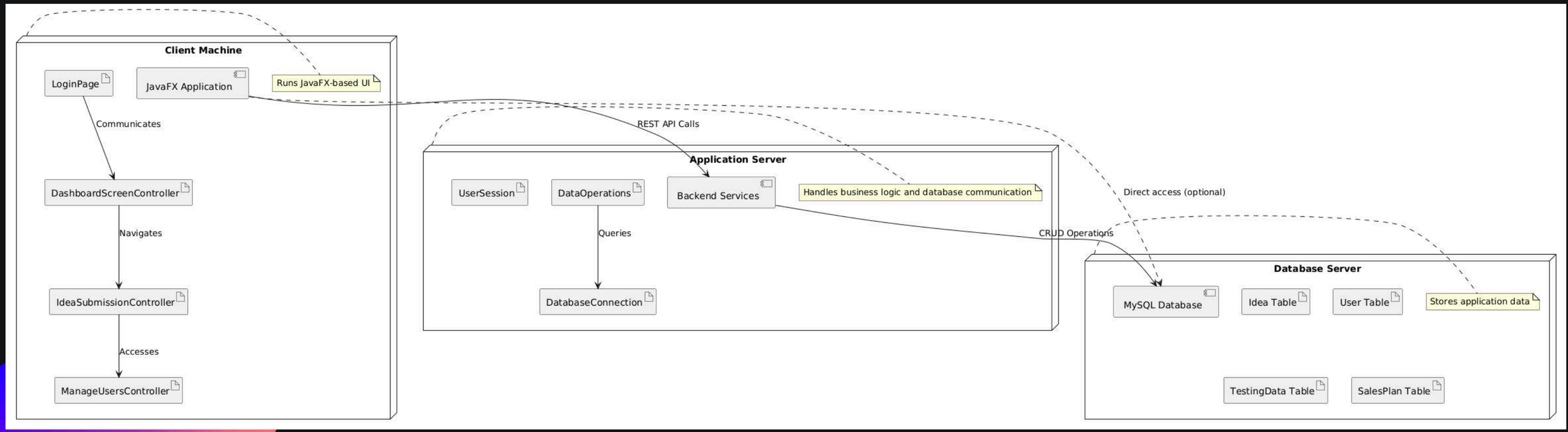
Class Diagram



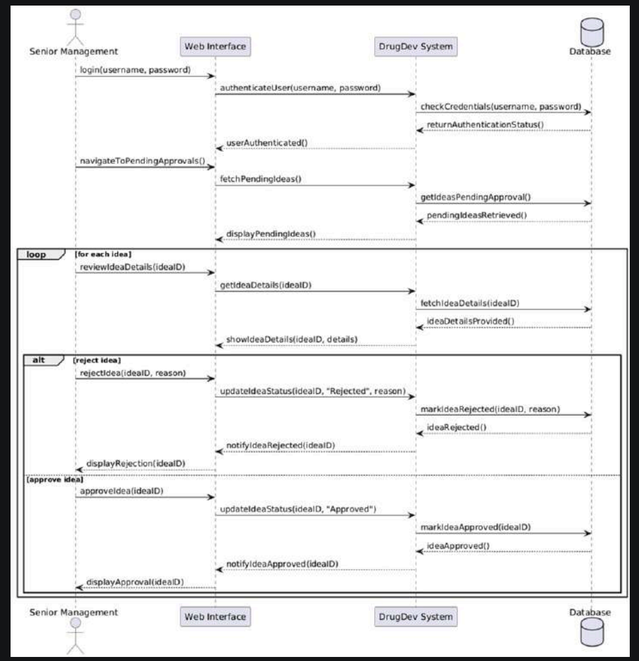
Component Diagram

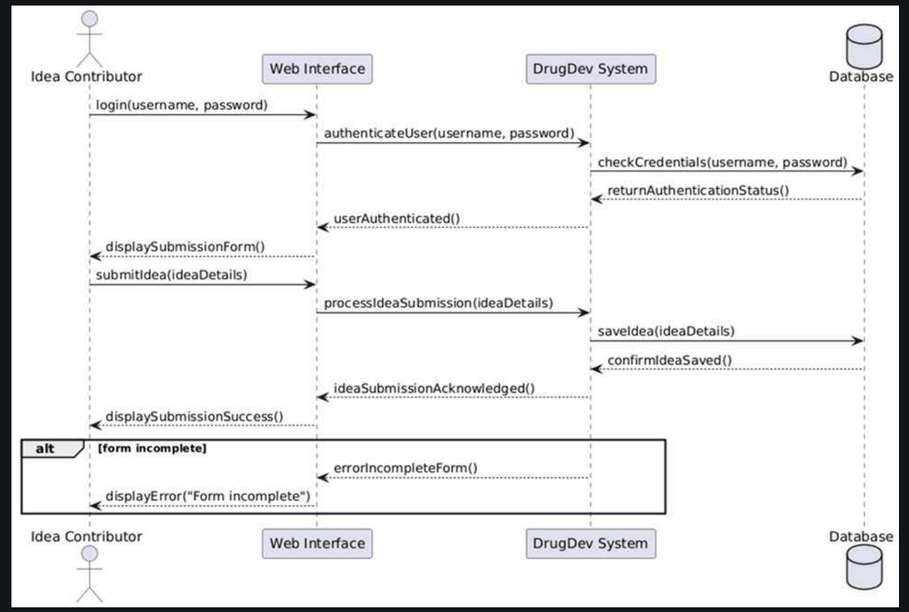


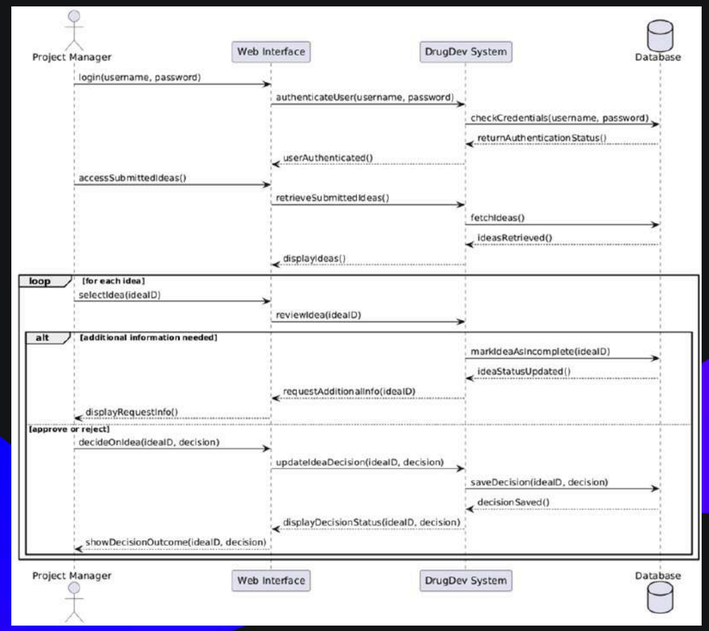
Deployment Diagram

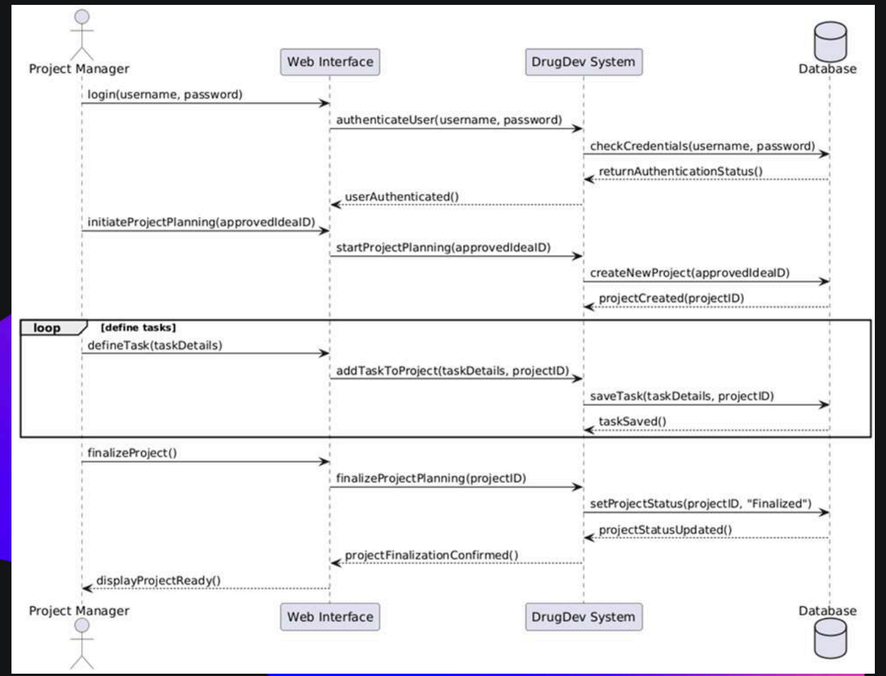


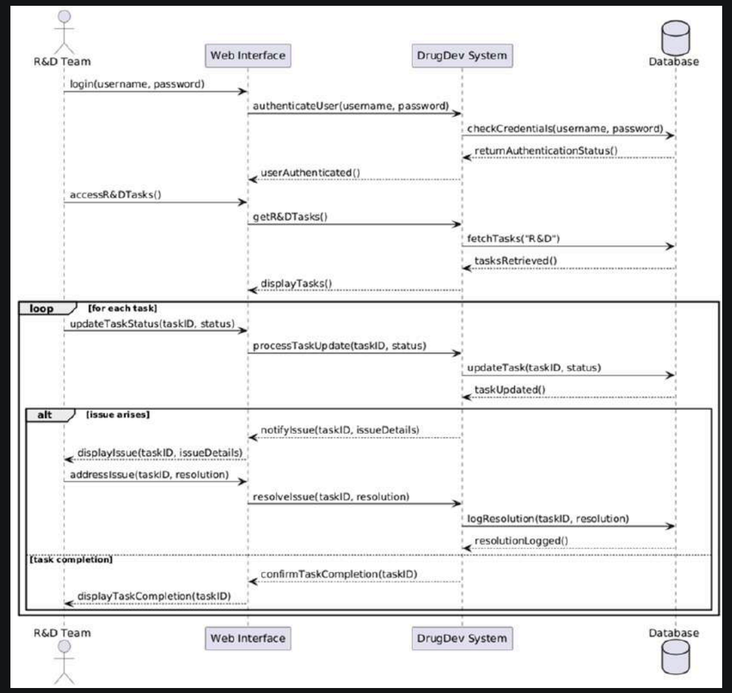
Sequence Diagram

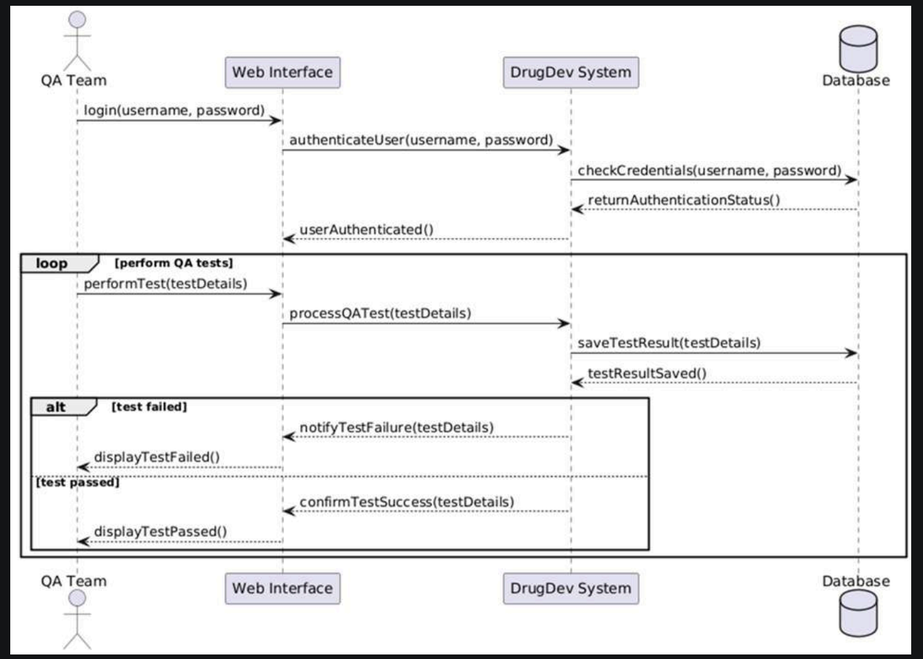


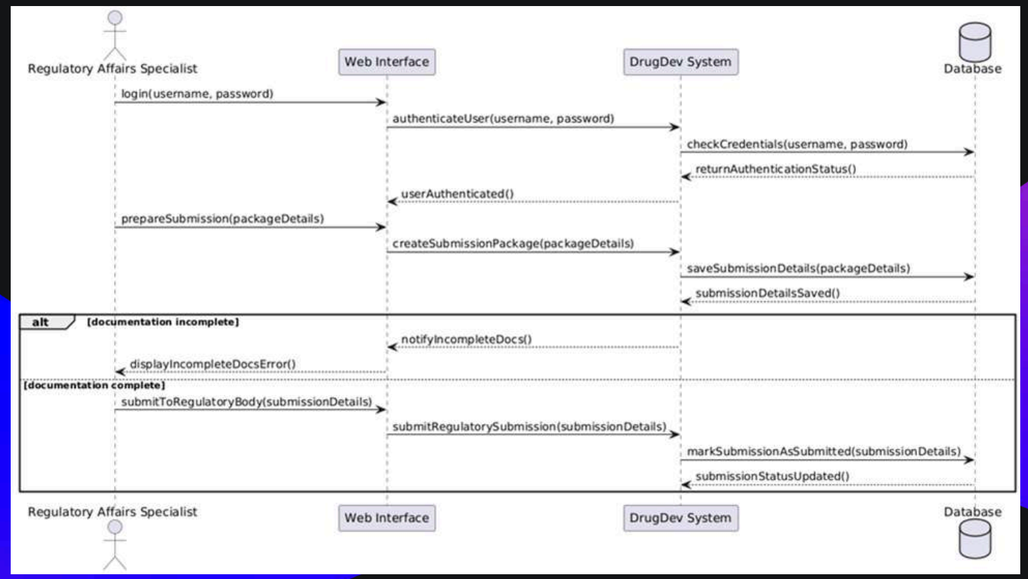


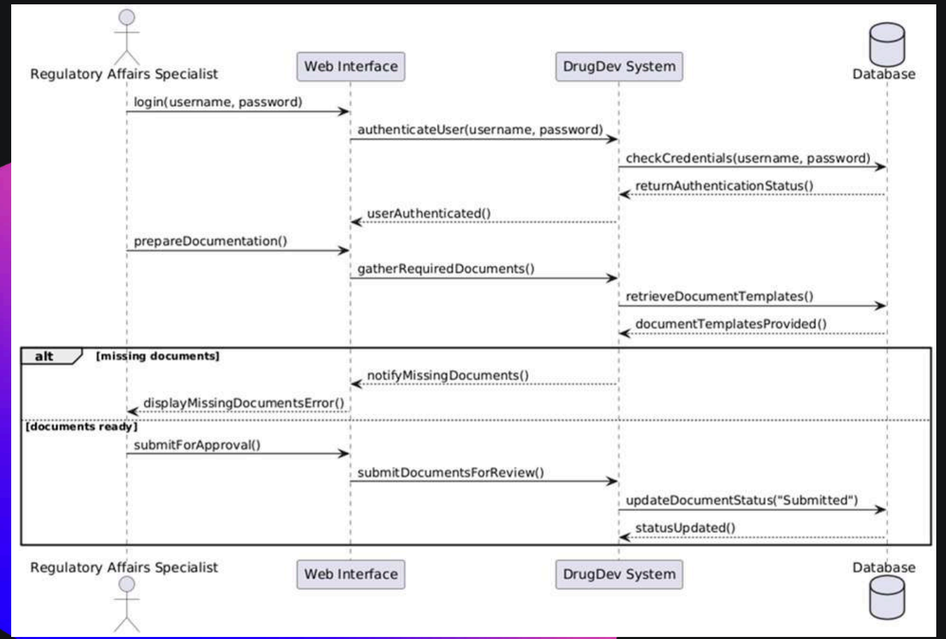


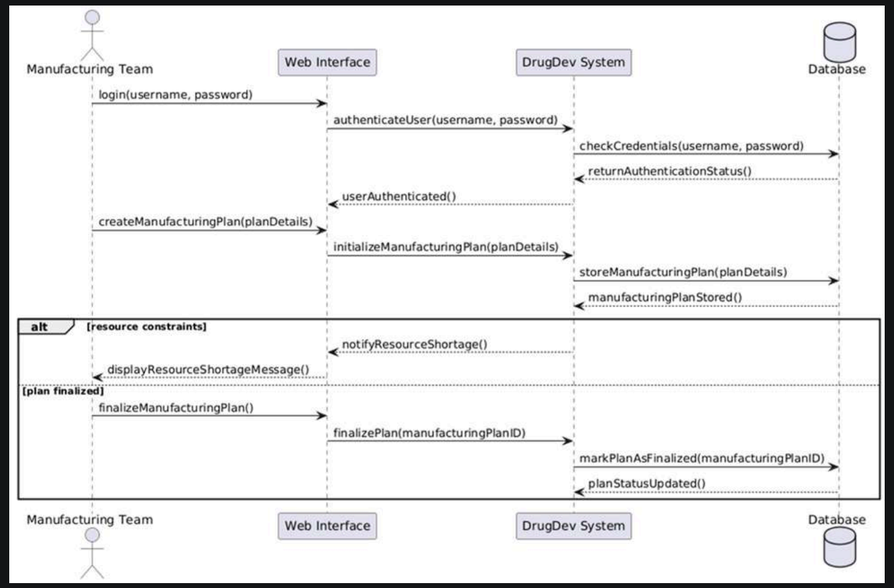


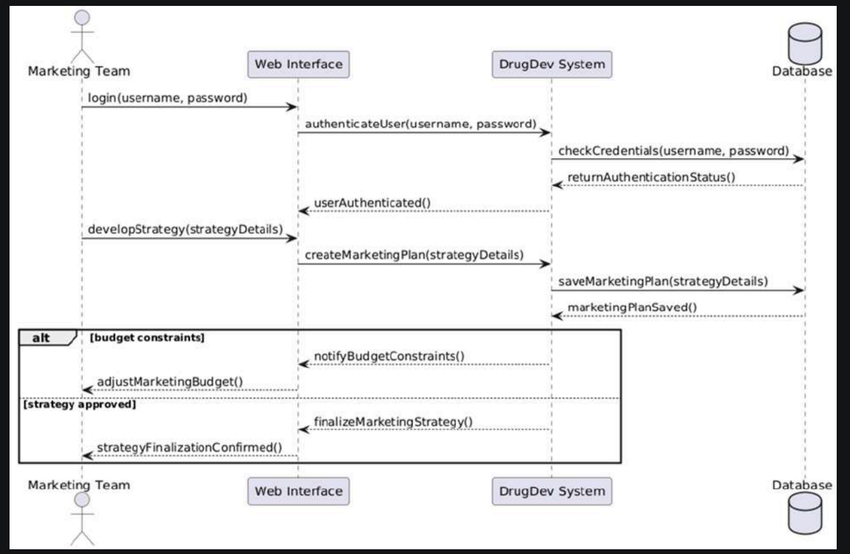

R&D Team
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
accessR&DTasks()
getR&DTasks()
fetchTasks("R&D")
tasksRetrieved()
displayTasks()
loop [for each task]
updateTaskStatus(taskID, status)
processTaskUpdate(taskID, status)
updateTask(taskID, status)
taskUpdated()
alt [issue arises]
notifyIssue(taskID, issueDetails)
displayIssue(taskID, issueDetails)
addressIssue(taskID, resolution)
resolveIssue(taskID, resolution)
logResolution(taskID, resolution)
resolutionLogged()
[task completion]
confirmTaskCompletion(taskID)
displayTaskCompletion(taskID)

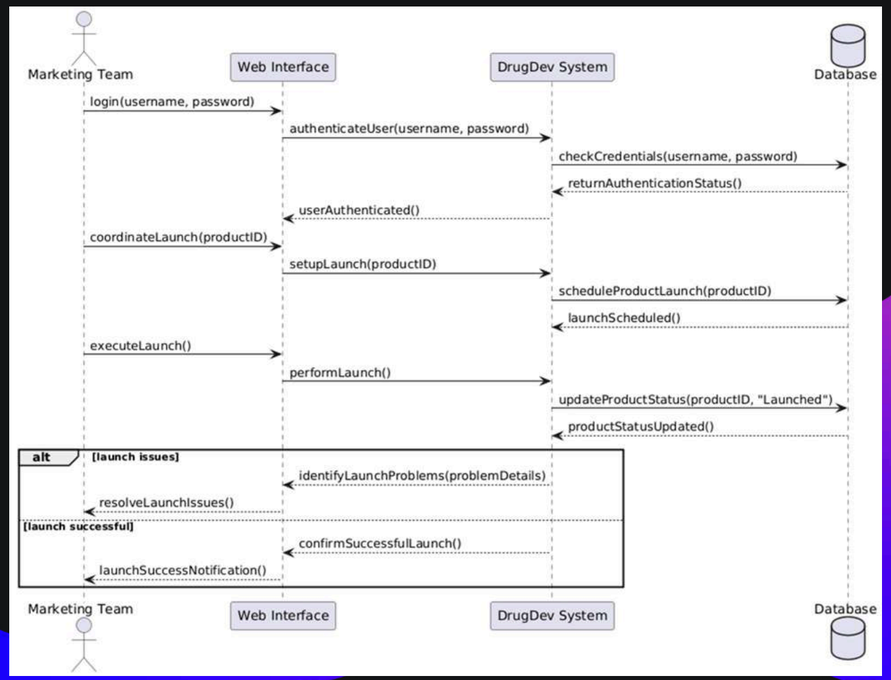

QA Team
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
loop [perform QA tests]
performTest(testDetails)
processQATest(testDetails)
saveTestResult(testDetails)
testResultSaved()
alt [test failed]
notifyTestFailure(testDetails)
displayTestFailed()
[test passed]
confirmTestSuccess(testDetails)
displayTestPassed()

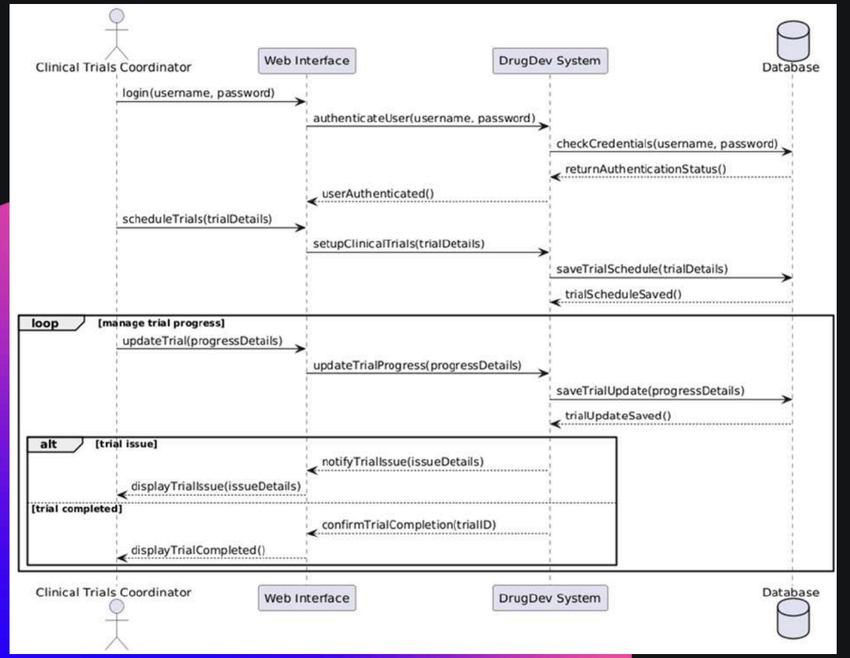

Regulatory Affairs Specialist
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
prepareSubmission(packageDetails)
createSubmissionPackage(packageDetails)
saveSubmissionDetails(packageDetails)
submissionDetailsSaved()
alt [documentation incomplete]
notifyIncompleteDocs()
displayIncompleteDocsError()
[documentation complete]
submitToRegulatoryBody(submissionDetails)
submitRegulatorySubmission(submissionDetails)
markSubmissionAsSubmitted(submissionDetails)
submissionStatusUpdated()


Regulatory Affairs Specialist
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
prepareDocumentation()
gatherRequiredDocuments()
retrieveDocumentTemplates()
documentTemplatesProvided()
alt [missing documents]
notifyMissingDocuments()
displayMissingDocumentsError()
[documents ready]
submitForApproval()
submitDocumentsForReview()
updateDocumentStatus("Submitted")
statusUpdated()

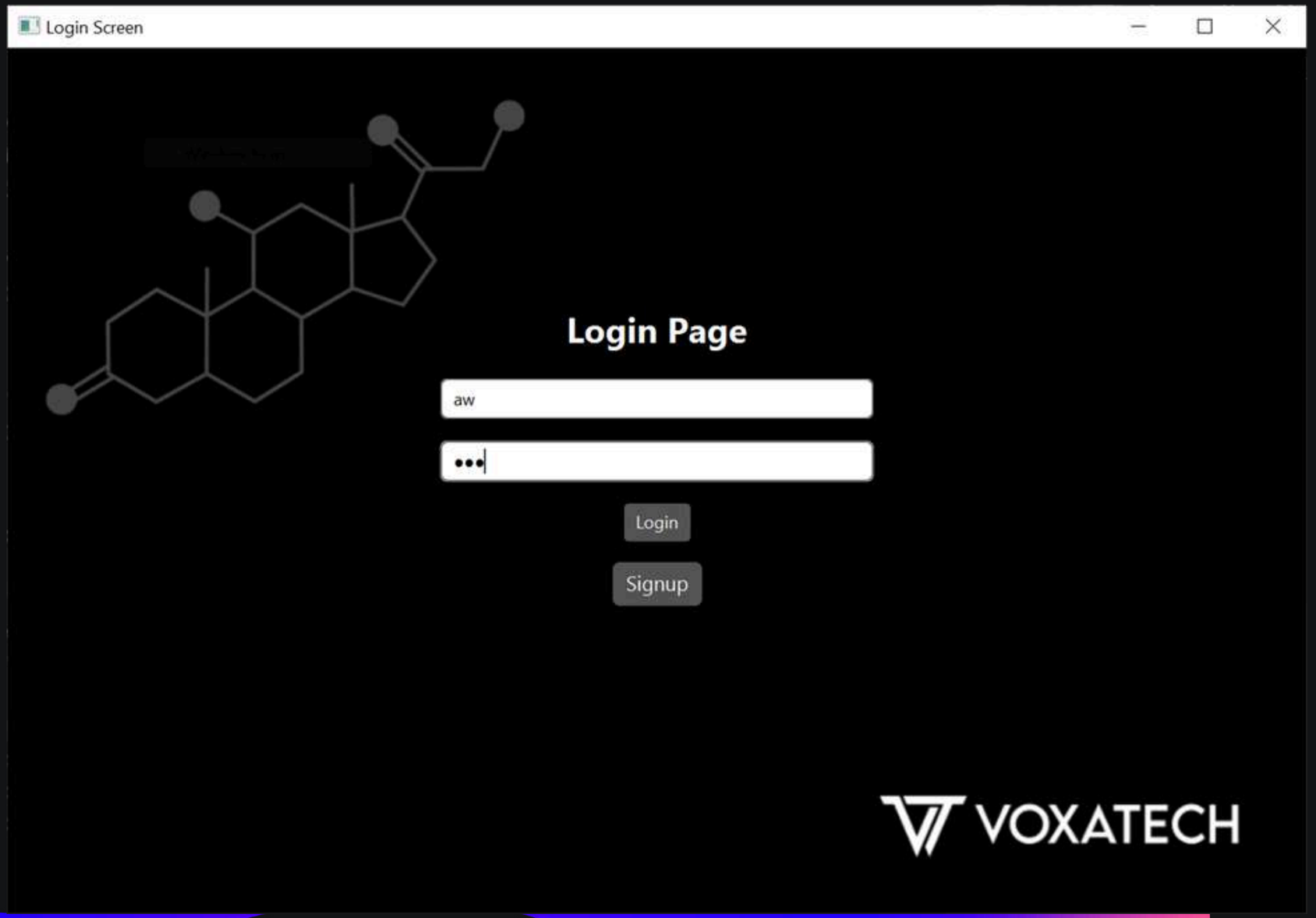

Manufacturing Team
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
createManufacturingPlan(planDetails)
initializeManufacturingPlan(planDetails)
storeManufacturingPlan(planDetails)
manufacturingPlanStored()
alt
[resource constraints]
notifyResourceShortage()
displayResourceShortageMessage()
[plan finalized]
finalizeManufacturingPlan()
finalizePlan(manufacturingPlanID)
markPlanAsFinalized(manufacturingPlanID)
planStatusUpdated()
Manufacturing Team
Web Interface
DrugDev System
Database

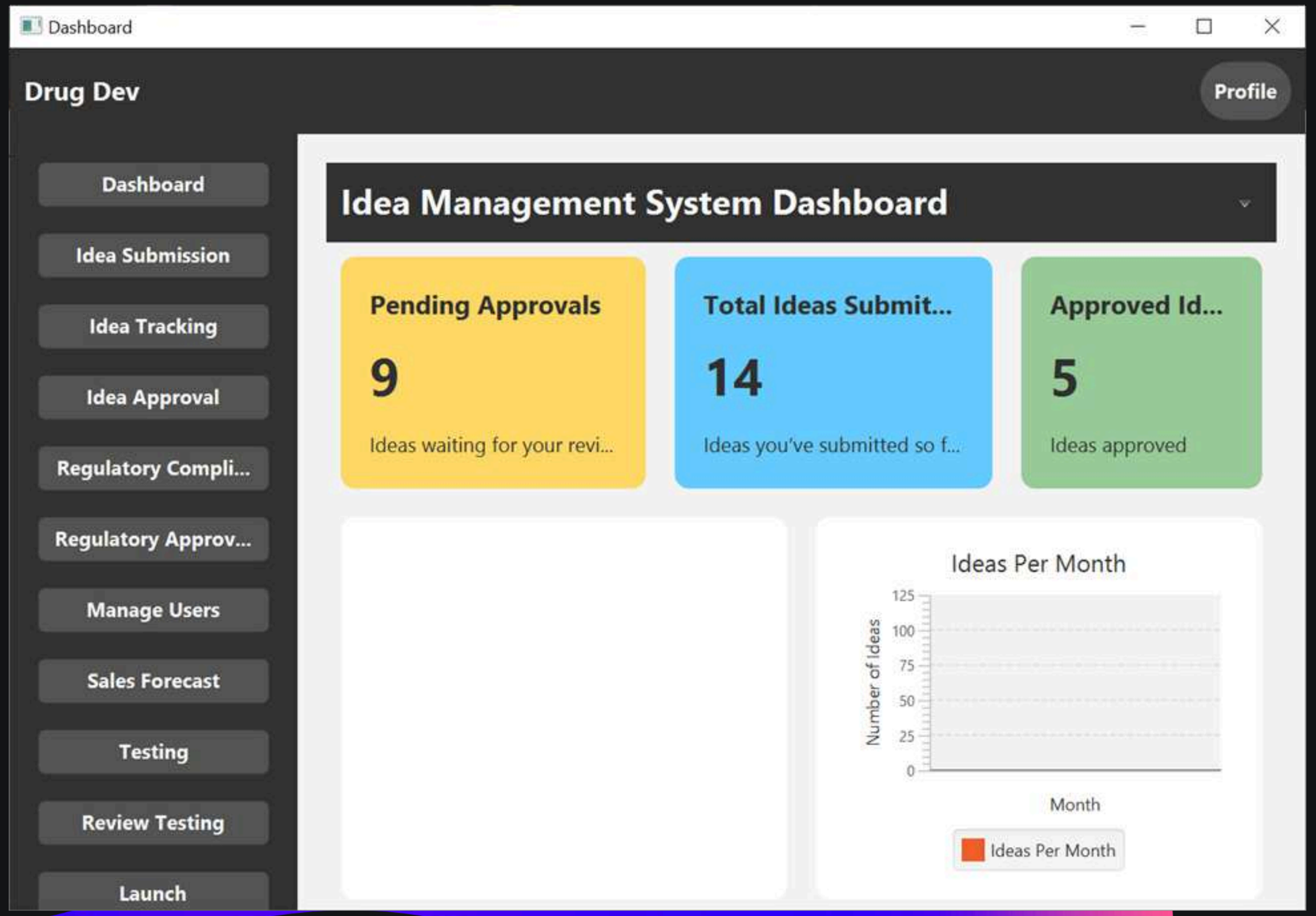

Marketing Team
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
developStrategy(strategyDetails)
createMarketingPlan(strategyDetails)
saveMarketingPlan(strategyDetails)
marketingPlanSaved()
alt
[budget constraints]
notifyBudgetConstraints()
adjustMarketingBudget()
[strategy approved]
finalizeMarketingStrategy()
strategyFinalizationConfirmed()
Marketing Team
Web Interface
DrugDev System
Database

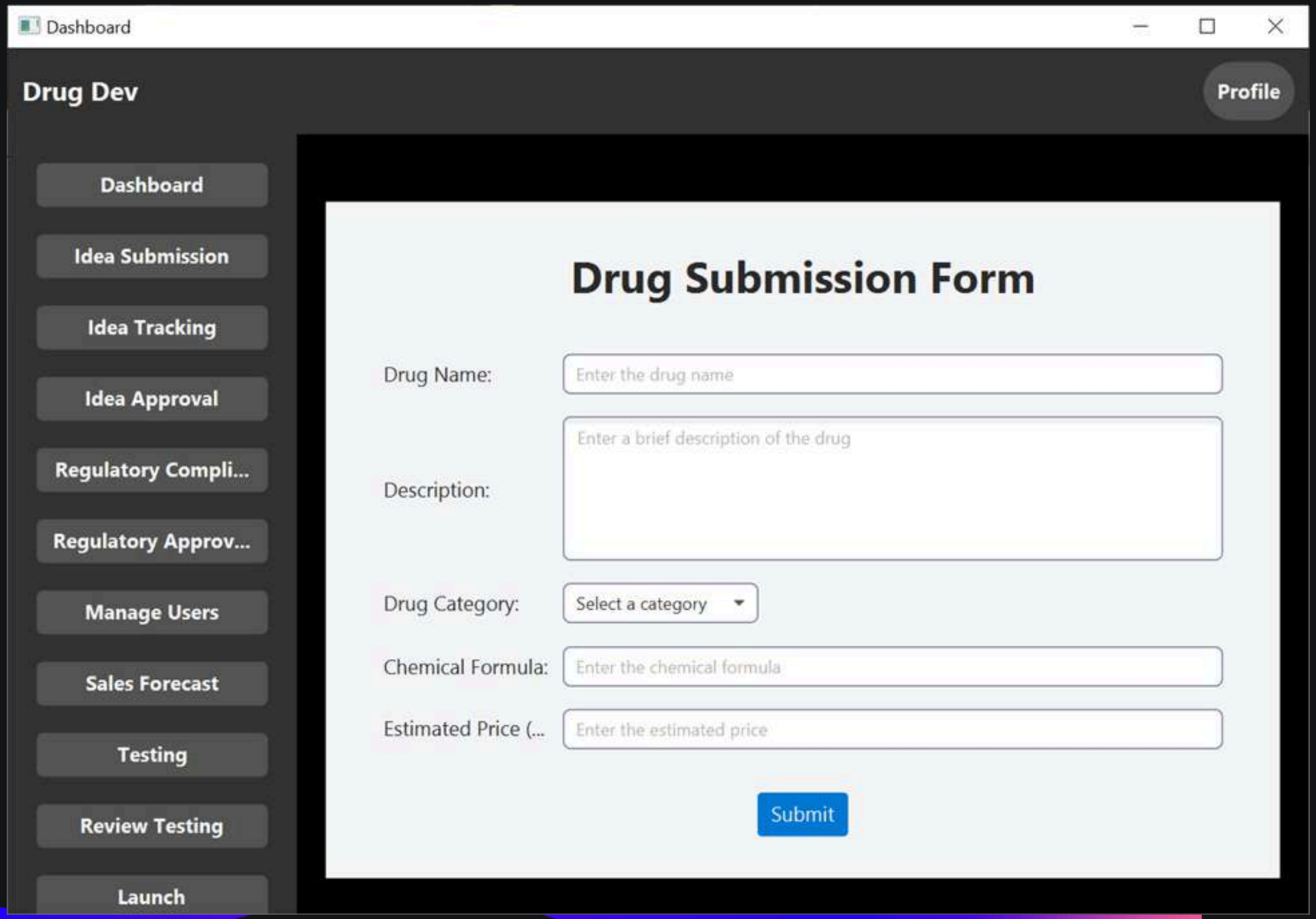

Marketing Team
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
coordinateLaunch(productID)
setupLaunch(productID)
scheduleProductLaunch(productID)
launchScheduled()
executeLaunch()
performLaunch()
updateProductStatus(productID, "Launched")
productStatusUpdated()
alt
[launch issues]
identifyLaunchProblems(problemDetails)
resolveLaunchIssues()
[launch successful]
confirmSuccessfulLaunch()
launchSuccessNotification()
Marketing Team
Web Interface
DrugDev System
Database

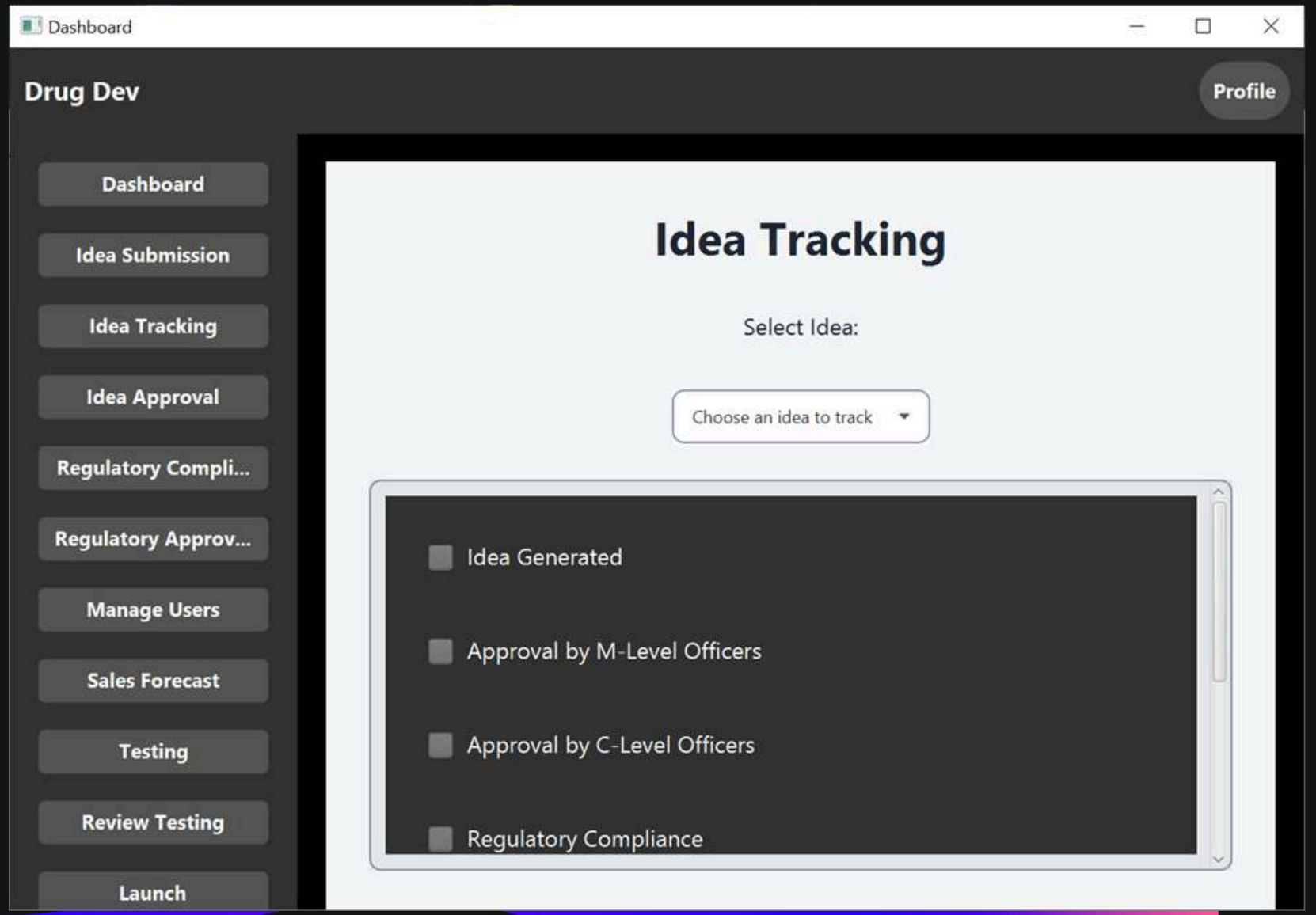

Clinical Trials Coordinator
Web Interface
DrugDev System
Database
login(username, password)
authenticateUser(username, password)
checkCredentials(username, password)
returnAuthenticationStatus()
userAuthenticated()
scheduleTrials(trialDetails)
setupClinicalTrials(trialDetails)
saveTrialSchedule(trialDetails)
trialScheduleSaved()
loop
[manage trial progress]
updateTrial(progressDetails)
updateTrialProgress(progressDetails)
saveTrialUpdate(progressDetails)
trialUpdateSaved()
alt
[trial issue]
notifyTrialIssue(issueDetails)
displayTrialIssue(issueDetails)
[trial completed]
confirmTrialCompletion(trialID)
displayTrialCompleted()
Clinical Trials Coordinator
Web Interface
DrugDev System
Database

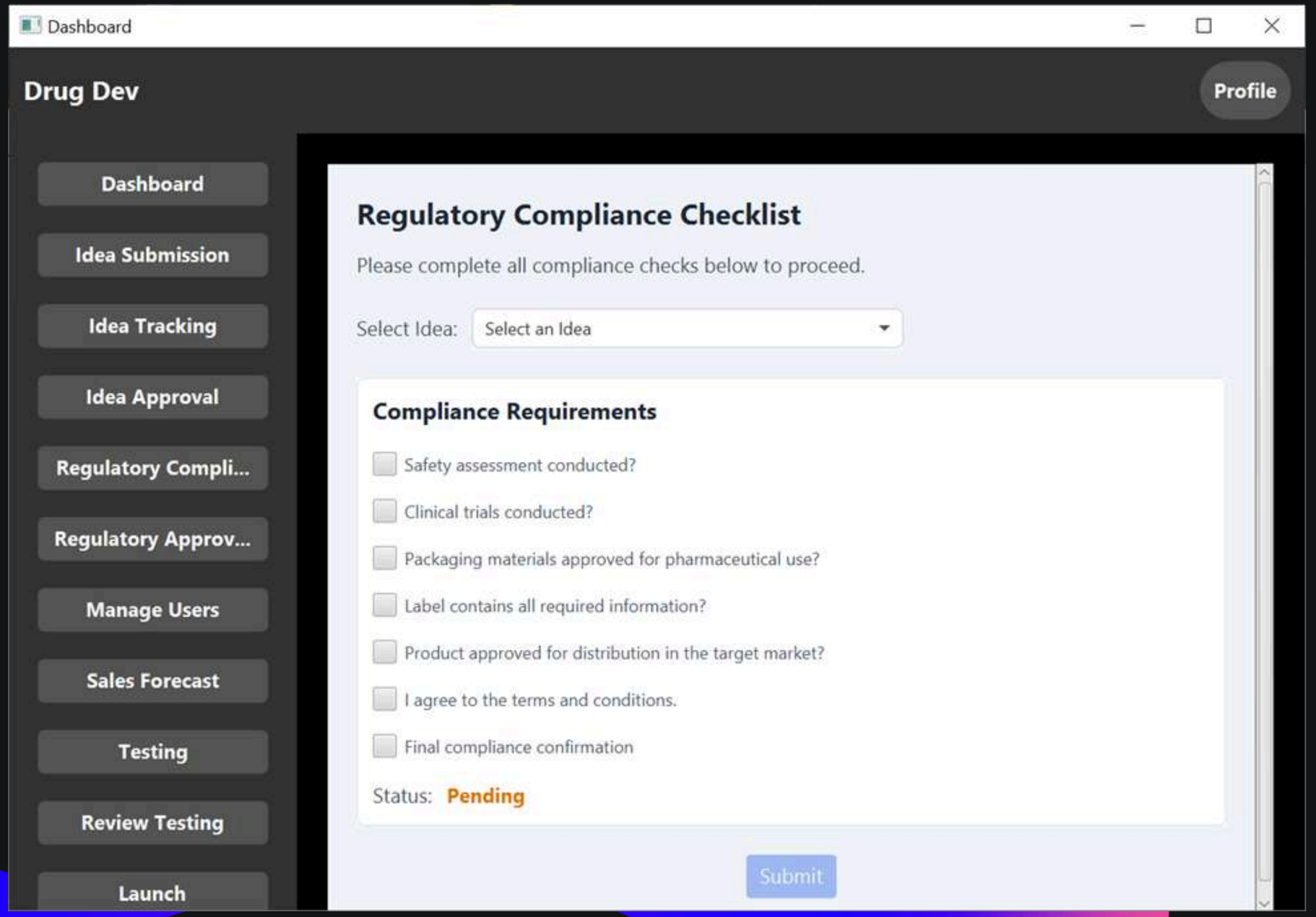
UI of DrugDev

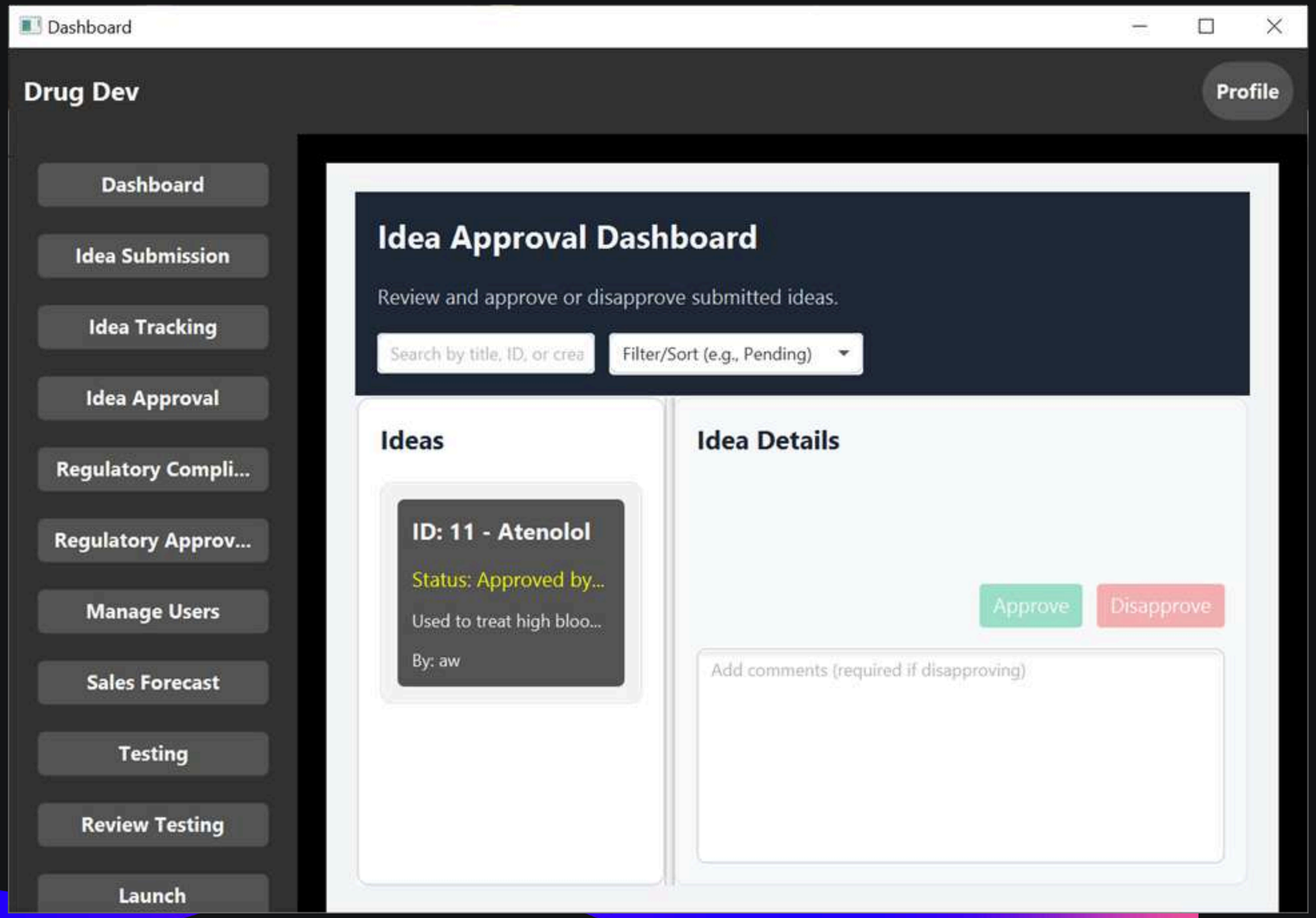

Login Screen
Login Page
aw
Login
Signup
VOXATECH

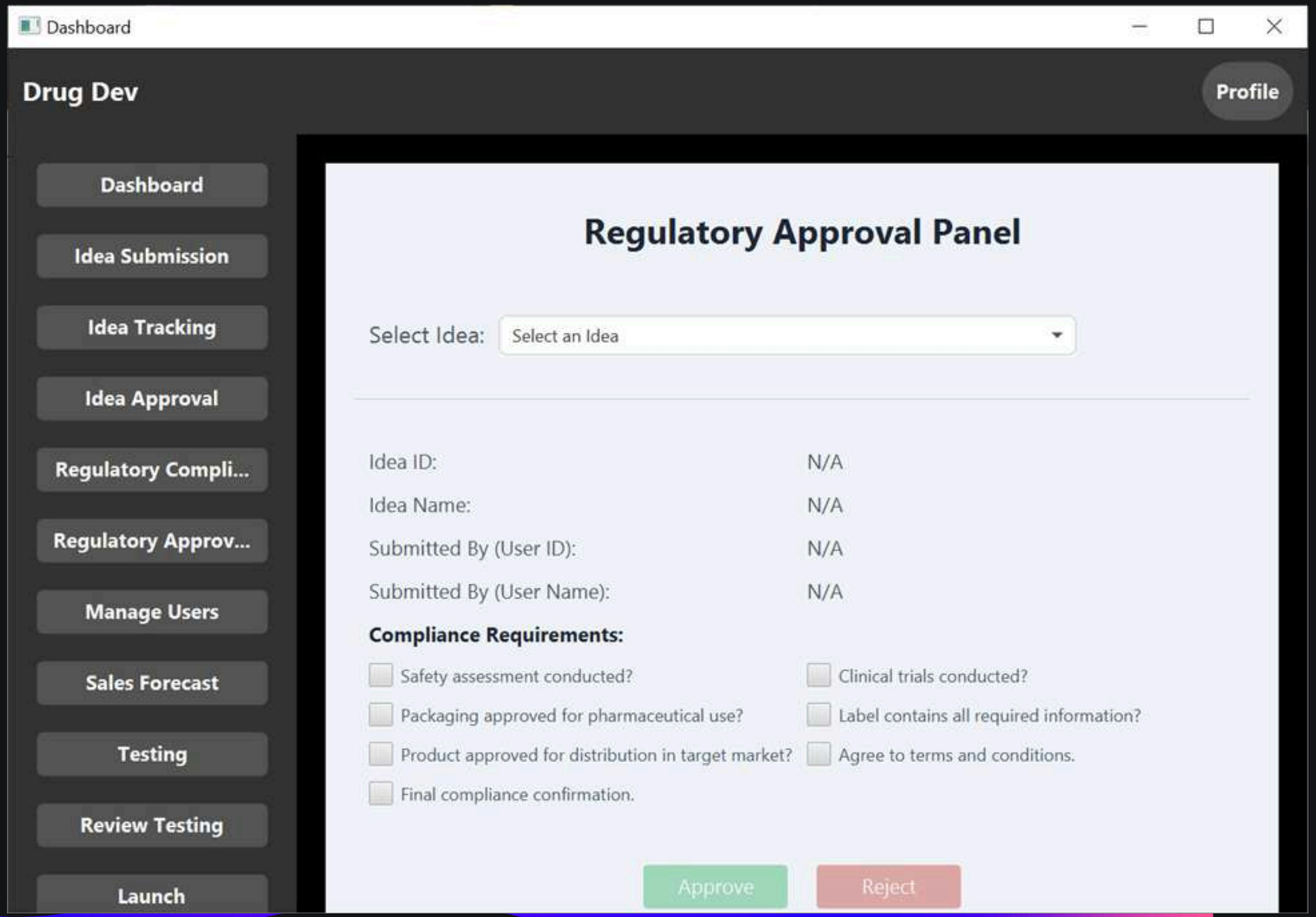

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Idea Management System Dashboard
Pending Approvals
9
Ideas waiting for your revi...
Total Ideas Submit...
14
Ideas you've submitted so f...
Approved Id...
5
Ideas approved
Ideas Per Month
125
100
75
50
25
0
Number of Ideas
Month
Ideas Per Month

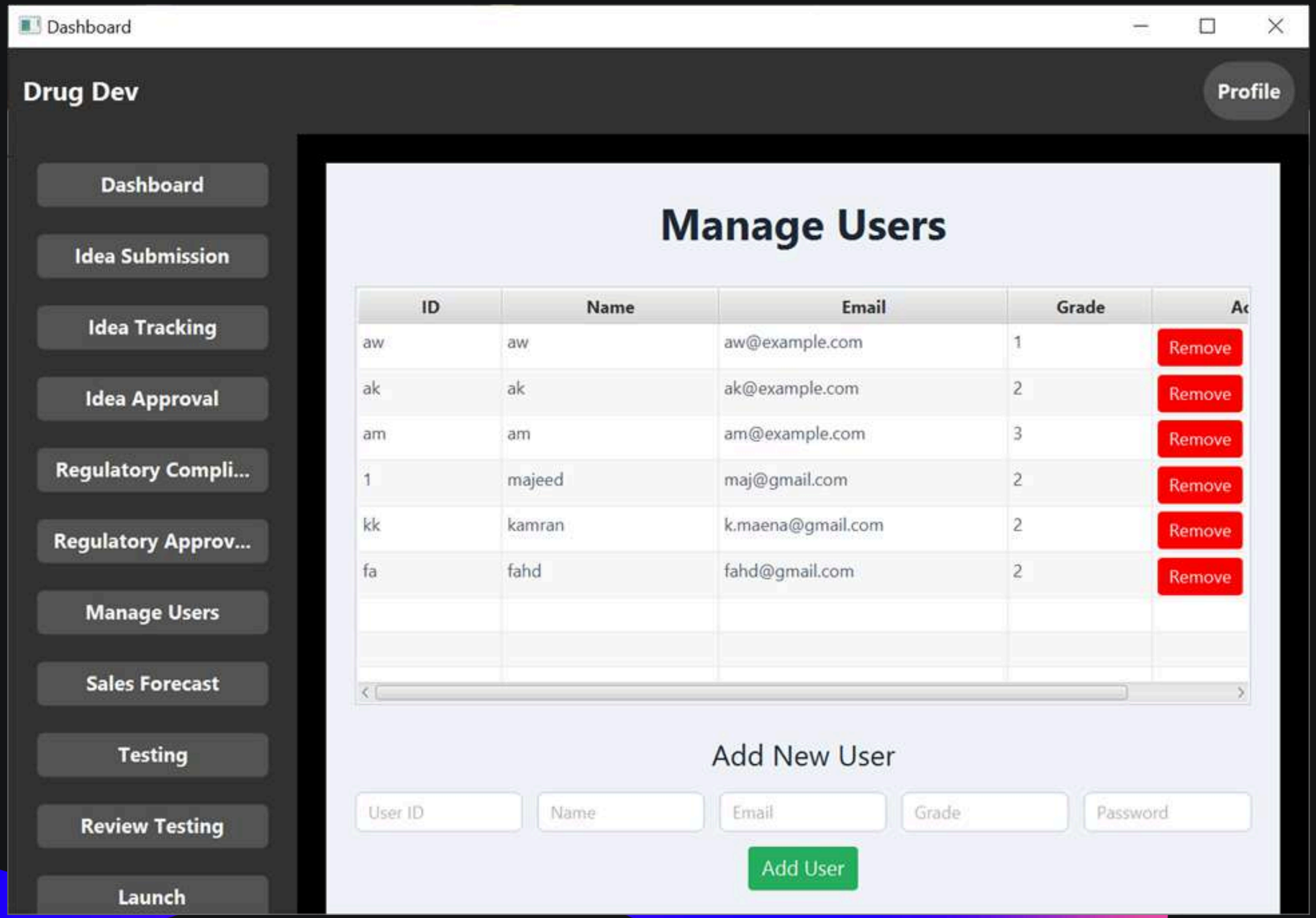

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Drug Submission Form
Drug Name:
Enter the drug name
Description:
Enter a brief description of the drug
Drug Category:
Select a category
Chemical Formula:
Enter the chemical formula
Estimated Price (...
Enter the estimated price
Submit

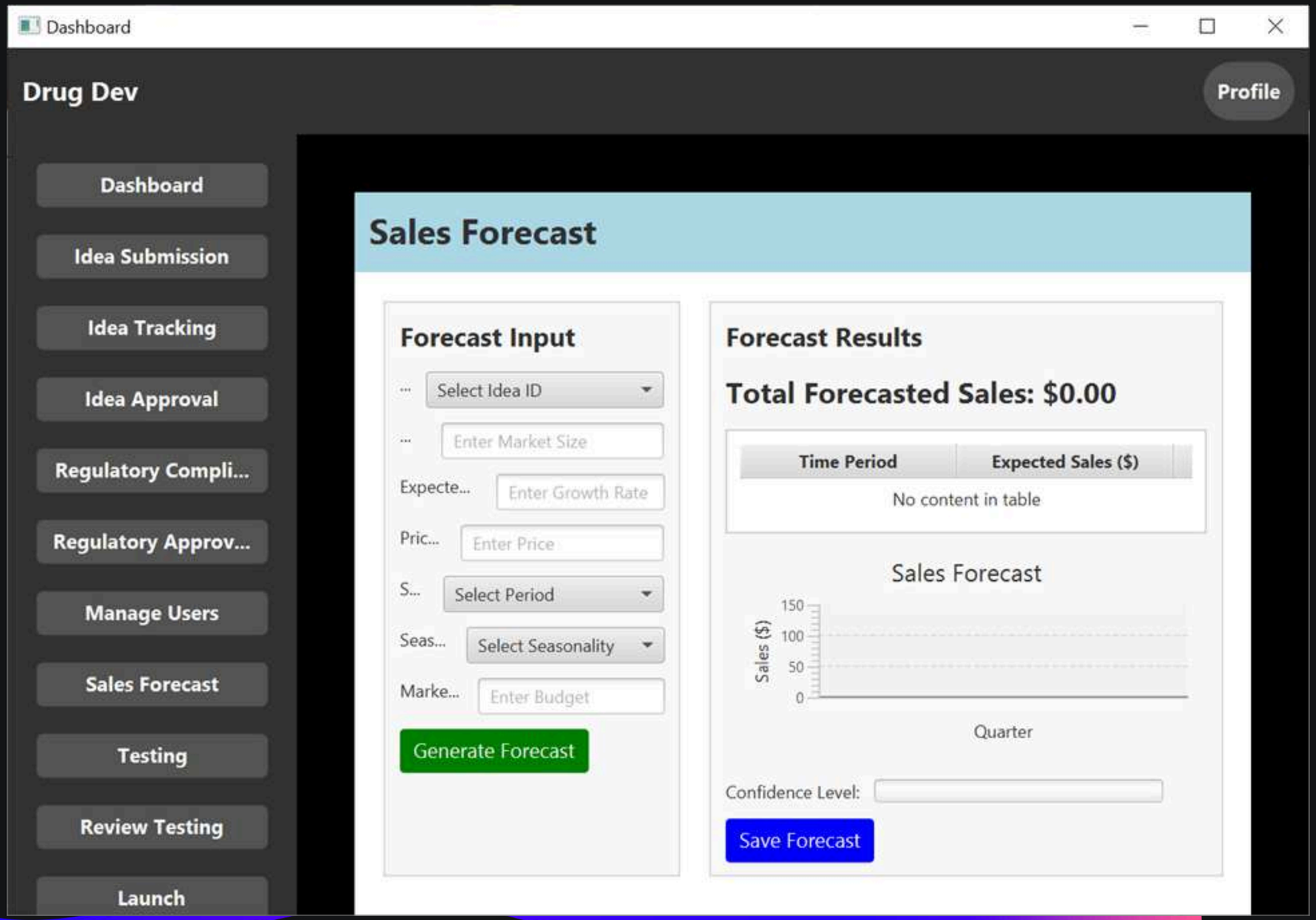

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Idea Tracking
Select Idea:
Choose an idea to track
Idea Generated
Approval by M-Level Officers
Approval by C-Level Officers
Regulatory Compliance

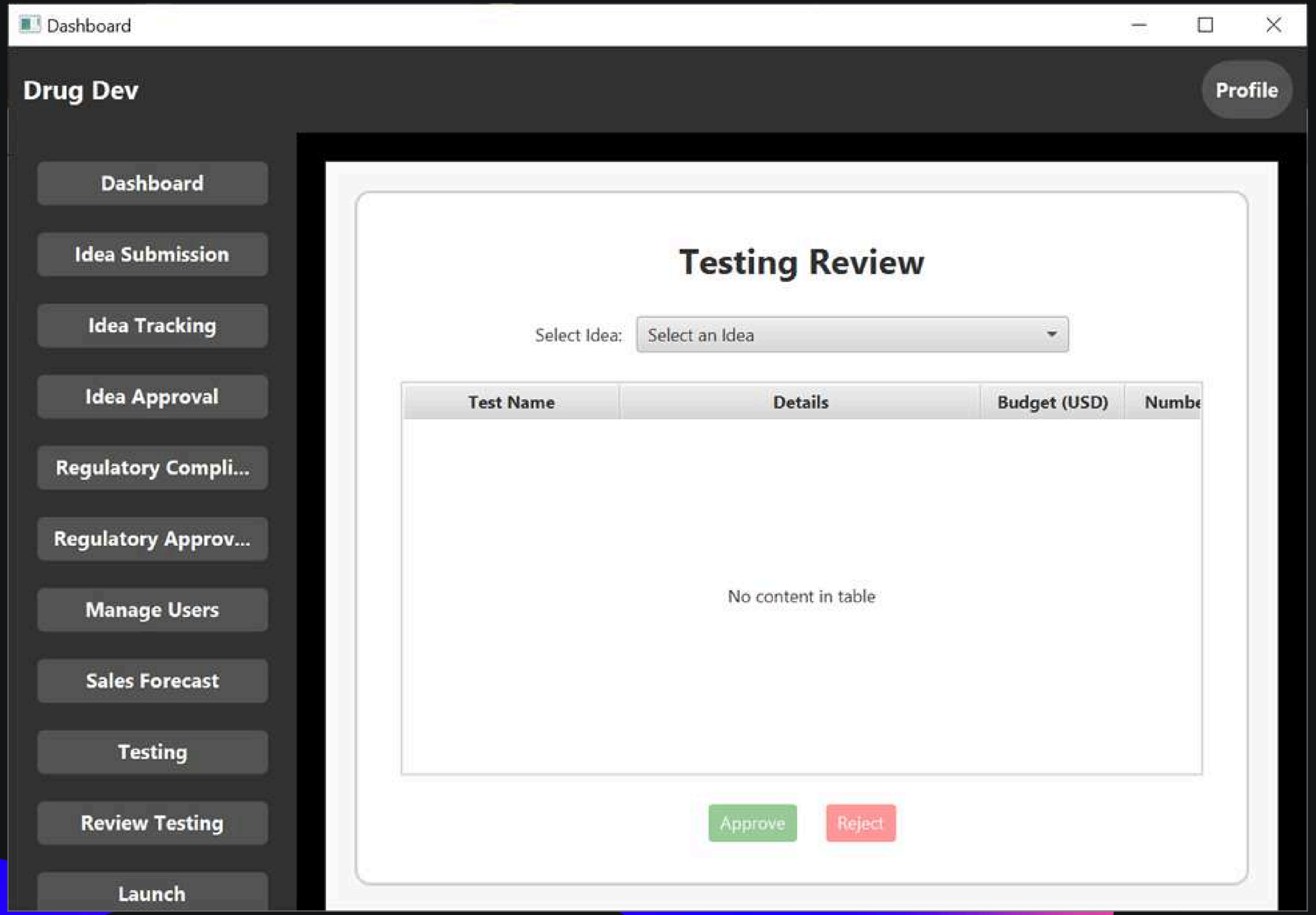

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Regulatory Compliance Checklist
Please complete all compliance checks below to proceed.
Select Idea:
Select an Idea
Compliance Requirements
Safety assessment conducted?
Clinical trials conducted?
Packaging materials approved for pharmaceutical use?
Label contains all required information?
Product approved for distribution in the target market?
I agree to the terms and conditions.
Final compliance confirmation
Status: Pending
Submit

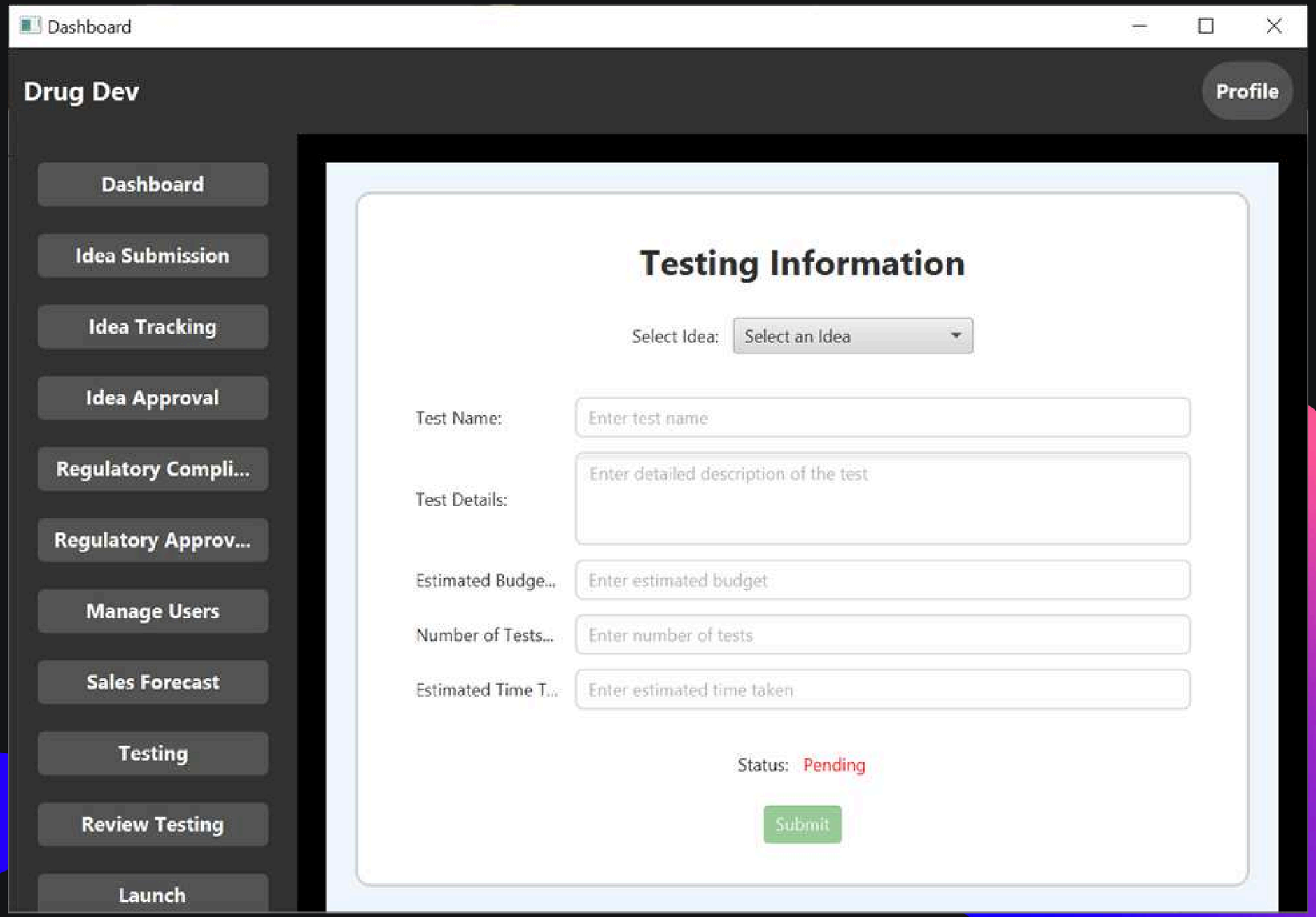

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Idea Approval Dashboard
Review and approve or disapprove submitted ideas.
Search by title, ID, or crea
Filter/Sort (e.g., Pending)
Ideas
ID: 11 - Atenolol
Status: Approved by...
Used to treat high bloo...
By: aw
Idea Details
Approve
Disapprove
Add comments (required if disapproving)

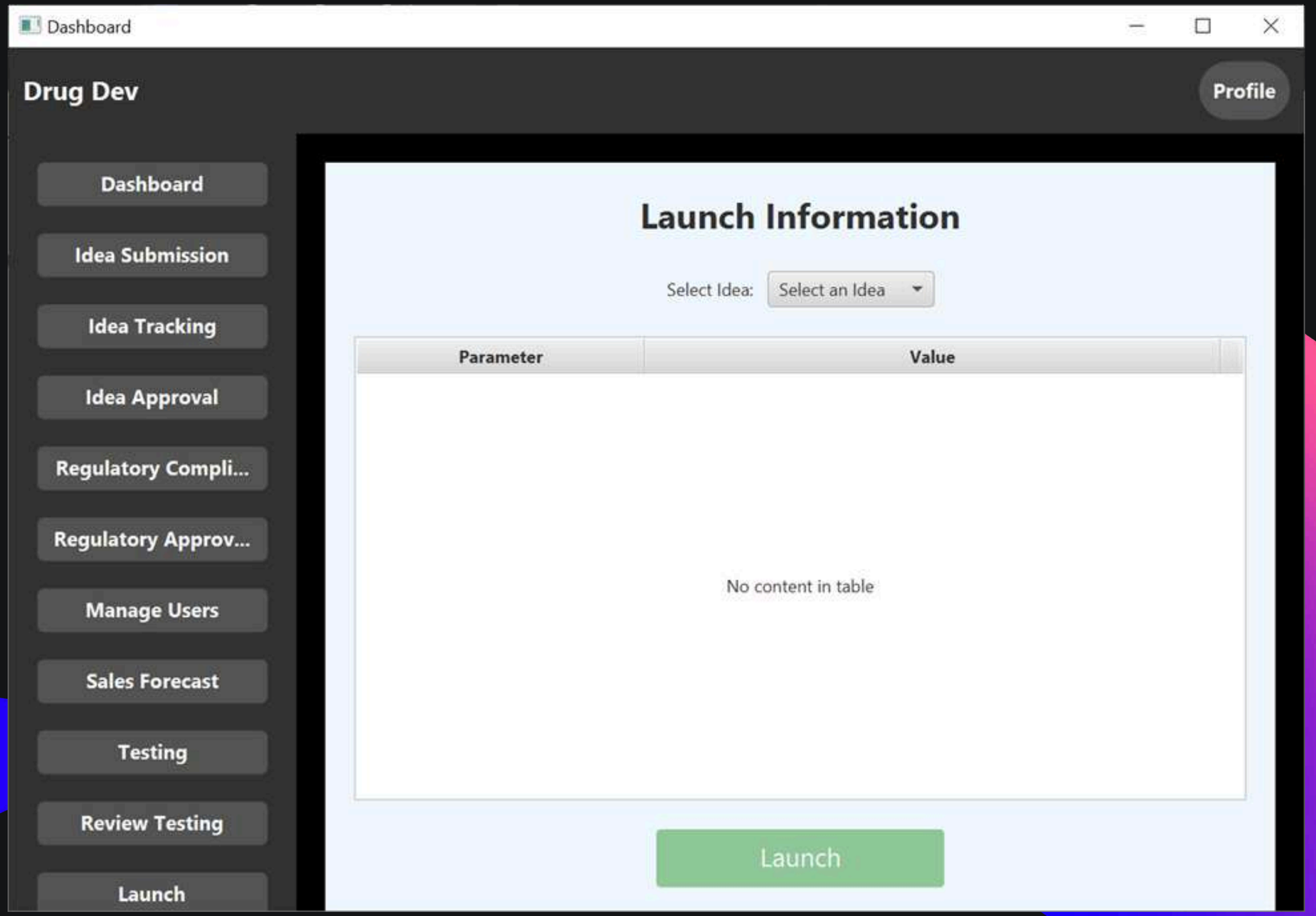

Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Regulatory Approval Panel
Select Idea:
Select an Idea
Idea ID:
N/A
Idea Name:
N/A
Submitted By (User ID):
N/A
Submitted By (User Name):
N/A
Compliance Requirements:
Safety assessment conducted?
Clinical trials conducted?
Packaging approved for pharmaceutical use?
Label contains all required information?
Product approved for distribution in target market?
Agree to terms and conditions.
Final compliance confirmation.
Approve
Reject


Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Manage Users
ID
Name
Email
Grade
Ac
aw
aw
aw@example.com
1
Remove
ak
ak
ak@example.com
2
Remove
am
am
am@example.com
3
Remove
1
majeed
maj@gmail.com
2
Remove
kk
kamran
k.maena@gmail.com
2
Remove
fa
fahd
fahd@gmail.com
2
Remove
Add New User
User ID
Name
Email
Grade
Password
Add User


Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Sales Forecast
Forecast Input
... Select Idea ID
... Enter Market Size
Expecte... Enter Growth Rate
Pric... Enter Price
S... Select Period
Seas... Select Seasonality
Marke... Enter Budget
Generate Forecast
Forecast Results
Total Forecasted Sales: $0.00
Time Period
Expected Sales ($)
No content in table
Sales Forecast
Sales ($)
150
100
50
0
Quarter
Confidence Level:
Save Forecast


Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Testing Review
Select Idea:
Select an Idea
Test Name
Details
Budget (USD)
Numbe
No content in table
Approve
Reject


Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Testing Information
Select Idea:
Select an Idea
Test Name:
Enter test name
Test Details:
Enter detailed description of the test
Estimated Budge...
Enter estimated budget
Number of Tests...
Enter number of tests
Estimated Time T...
Enter estimated time taken
Status: Pending
Submit


Dashboard
Drug Dev
Profile
Dashboard
Idea Submission
Idea Tracking
Idea Approval
Regulatory Compli...
Regulatory Approv...
Manage Users
Sales Forecast
Testing
Review Testing
Launch
Launch Information
Select Idea:
Select an Idea
Parameter
Value
No content in table
Launch

Design Patterns

1. **Singleton Pattern in database connection**

Justification:

- Where: DatabaseConnection.java
- Justification:
  - "The DatabaseConnection class implements the Singleton pattern by maintaining a single shared instance of the database connection. This ensures efficient resource utilization and prevents multiple conflicting connections."

Design Patterns

2.Singleton Pattern in User Session

Justification:

- Where: User session management across the application.
- Evidence:
  - If there's a single session instance used to store details about the currently logged-in user (e.g., username, role, or preferences), this is inherently a Singleton.
  - Check whether there’s a shared static object, a globally accessible variable, or a similar mechanism for session management.

Design Patterns

3. Strategy Pattern
Justification:

- **Where**: Controllers in the ui package (e.g., LoginFormController.java)
- **Example Justification**:
  - The LoginFormController and other controllers utilize the Strategy pattern to dynamically handle various user actions, such as login and logout. This separation of concerns enhances flexibility and modularity.

Design Patterns

4. Observer Pattern
Justification:

- **Where**: Views like IdeaTrackingView.java and business entities like Idea.java
- **Justification**:
  - The IdeaTrackingView interacts with Idea objects in a manner consistent with the Observer pattern, where the view observes changes in the data and updates dynamically.

GRASP Patterns

1. **Controller**
   - **Justification**:
     - **Where**: Controllers in ui (e.g., LoginFormController, DashboardScreenController)
     - **Evidence**: These classes handle user inputs and coordinate between views and the backend logic.
       - "The LoginFormController adheres to the GRASP Controller pattern by managing user input, orchestrating application logic, and delegating tasks to the business layer."

GRASP Patterns

2. Information Expert
- Justification:
  - Where: Business logic classes like User.java, Idea.java, TestingData.java
  - Evidence: These classes encapsulate data and methods closely tied to the data they own.
    - "The Idea class demonstrates the Information Expert pattern by encapsulating attributes like title and description and providing methods for operations directly related to its state."

GRASP Patterns

3. Low Coupling
- Justification:
  - Where: Separation between ui, bl, and db layers.
  - Evidence: Different layers focus on distinct responsibilities, reducing dependencies.
    - "The code achieves low coupling by separating concerns across ui, bl, and db layers, ensuring each component can evolve independently."

GRASP Patterns

4. High Cohesion
   - Justification:
     - Where: Smaller classes like DatabaseSetup.java, SidebarView.java
     - Evidence: These classes focus on specific, well-defined tasks.
       - "The SidebarView class exhibits high cohesion by exclusively managing the sidebar's UI logic, making the code more readable and maintainable."

Thank You