

Agile Software Processes

Assignment 1

Submitted By
Group AX

Team Members

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Part 1: Agile Project Planning

1) Product Vision and Roadmap

a) Product Vision:

The product vision for our mobile e-commerce application is to create a convenient, accessible, and personalized shopping experience that connects users with a wide range of products. The app aims to empower users by making it simple and secure to browse, select, and purchase items. By offering features such as personalized recommendations, efficient order tracking, and seamless payment options, the application will foster trust and loyalty, providing users with a one-stop solution for all their shopping needs.

b) Product Roadmap for three Major Releases:

Our roadmap outlines three major releases over six months, with each release progressively adding features based on user needs and feedback. This approach helps us quickly deliver the features.

- Release 1 prioritizes on critical features to achieve an MVP, focusing on user registration, product browsing, and checkout. These features form the foundation of the app, enabling users to create accounts, find products, and make purchases.
- Release 2 builds on this foundation by enhancing the user experience with personalized recommendations, product reviews, and expanded payment options. These improvements make the app more engaging, encouraging users to return and make more informed purchase decisions.
- Release 3 focuses on customer retention and improved functionality for a polished, complete app experience. Order tracking, push notifications, and a loyalty program help drive long-term user satisfaction and repeat engagement. Advanced search capabilities further enhance usability, making it easier for users to find specific products.

Release	Timeline	Objective	Key Features
Release 1 MVP	Month 1-2	Establish essential e-commerce functionality for user onboarding, browsing, and checkout.	<p>User Registration & Authentication - Allow new users to sign up with email/phone and create profiles.</p> <p>Product Browsing & Search - Users can view and search product catalog with basic filters (e.g., category, price, popular).</p> <p>Shopping Cart - Users can add items to their cart and view the cart contents.</p> <p>Basic Checkout - Users can proceed to check out with a single payment option (e.g., credit card).</p> <p>Order Confirmation - Display confirmation message after purchase completion with order summary.</p>
Release 2	Month 3-4	Enhance user engagement and experience by adding personalization and more robust purchasing options.	<p>Personalized Recommendations - Show recommended products based on user behavior (browsing and purchase history).</p> <p>Product Reviews & Ratings - Users can view product reviews and ratings to help with purchase decisions.</p> <p>Expanded Payment Options - Integrate additional payment methods like digital wallets (e.g., Paytm, UPI).</p>

			<p>Enhanced Filtering & Sorting - Add additional filters (e.g., brand, rating) and sorting options (e.g., price, popularity).</p> <p>Wishlist - Allow users to save products for later purchase.</p>
Release 3	Month 5-6	Refine app functionality with improved order management and customer engagement features.	<p>Order Tracking - Provide real-time tracking for orders, including delivery status updates.</p> <p>Push Notifications - Send notifications for order updates, offers, and personalized recommendations.</p> <p>User Profile & Order History - Enable users to view and manage their profile information and order history.</p> <p>Advanced Search Capabilities - Implement more sophisticated search for a smoother shopping experience.</p>

2) User Stories and Backlog

a) User Stories:

Each user story is created following the **INVEST** principle to ensure that each story is independent, negotiable, valuable, estimable, small, and testable as well.

- **User Story 1:** As a new user, I want to create an account using my email or phone number so that I can securely log in and save my preferences.

- Acceptance Criteria:
 - User should be able to enter an email/phone number and password.
 - Registration is successful only after verifying a unique email or phone number.
 - Confirmation message after successful registration.
- **User Story 2:** As an existing customer, I want to browse products by category and filter them by price, brand, and ratings so that I can easily find what I'm looking for.
 - Acceptance Criteria:
 - Users can select product categories and apply filters.
 - Filtered results display accurately based on selected criteria.
- **User Story 3:** As a user, I want to add items to a shopping cart and view my cart at any time so that I can review my selected items before purchasing.
 - Acceptance Criteria:
 - Users can add items from the product page.
 - Cart shows items, quantities, and a total price.
 - Users can adjust quantities or remove items from the cart.
- **User Story 4:** As a user, I want to securely checkout and make payments using multiple payment options so that I can complete my purchase with confidence.
 - Acceptance Criteria:
 - Checkout page includes secure payment methods (e.g., credit card, digital wallets).
 - Order summary displays all selected items, quantities, and total cost.
 - Confirmation message after successful payment.

- **User Story 5:** As a returning user, I want to see personalized recommendations based on my purchase history so that I can discover products relevant to my preferences.
 - Acceptance Criteria:
 - System analyzes purchase history and displays recommendations.
 - Recommended products update based on recent purchases or viewed items.

b) Initial Product Backlog:

User Story	Priority	Description	Story Points (Fibonacci)
User Registration & Authentication	High	As a user, I want to create an account or log in to the app, so I can access my profile and make purchases.	5
Product Browsing & Search	High	As a user, I want to browse and search for products by category or keywords, so I can find items that meet my needs.	8
Shopping Cart	High	As a user, I want to add, remove, and view items in my shopping cart, so I can manage the products I intend to buy.	3
Basic Checkout Process	High	As a user, I want to complete a purchase by entering my payment details and shipping address, so I can receive my order.	13
Order Confirmation	Medium	As a user, I want to receive an order confirmation message after completing a purchase, so I know my order was successful.	3
Product Reviews & Ratings	Medium	As a user, I want to read reviews and ratings from other customers on product pages, so I can make informed decisions before purchasing.	5

Wishlist	Medium	As a user, I want to add items to a wish list, so I can save products for future purchases.	5
Personalized Recommendations	Medium	As a user, I want to receive product recommendations based on my browsing history, so I can discover relevant items.	8
Advanced Filtering & Sorting	Medium	As a user, I want to filter and sort products by price, rating, and other criteria, so I can find the most suitable products.	5
Expanded Payment Options	Medium	As a user, I want to pay with digital wallets like Paytm, so I have more flexibility in payment options.	8
Order Tracking	Low	As a user, I want to track my order status in real-time, so I know the current location and expected delivery date.	8
Push Notifications for Order Updates	Low	As a user, I want to receive notifications about my order status, so I'm updated on delivery progress and any issues.	3
User Profile & Order History	High	As a user, I want to view and update my profile information and see my order history, so I can track my previous purchases.	5

This backlog helps us prioritize high-value features (like account creation, browsing, and checkout) in the early stages to deliver a functional product quickly.

3) Sprint Planning

Assumptions:

Sprint Duration: Two weeks (10 working days)

Team Velocity: 30 Story Points

a) Sprint Goal:

Enable users to create an account, browse products, manage a shopping cart, and complete a purchase to establish a functional e-commerce flow that forms the MVP for the mobile application.

b) Selected User stories for Sprint:

To achieve our sprint goal, we have selected the following high-priority user stories from the product backlog:

1. User Registration & Authentication (5 Story Points)
2. Product Browsing & Search (8 Story Points)
3. Shopping Cart Management (3 Story Points)
4. Basic Checkout Process (13 Story Points)
5. Order Confirmation (3 Story Points)

Total Story Points: $5 + 8 + 3 + 13 + 3 = 32$ Story Points

Task Breakdown:

Here's a detailed breakdown of tasks for each user story, along with estimated time (in hours) for each task. Tasks are organized based on development and testing responsibilities within the team.

1. User Registration & Authentication (5 Story Points)

- Task 1: Set up user registration form (UI) – 4 hours
- Task 2: Implement backend for user registration and authentication – 6 hours
- Task 3: Encrypt passwords and secure data – 3 hours

- Task 4: Create user session management – 4 hours
- Task 5: Test registration and login functionality – 3 hours

Total Time: 20 hours

2. Product Browsing & Search (8 Story Points)

- Task 1: Develop product catalog UI and layout – 5 hours
- Task 2: Implement search functionality with filters – 6 hours
- Task 3: Set up backend API for product catalog and search – 6 hours
- Task 4: Integrate product details display (images, descriptions) – 4 hours
- Task 5: Test product browsing and search functionality – 4 hours

Total Time: 25 hours

3. Shopping Cart Management (3 Story Points)

- Task 1: Develop shopping cart UI – 2 hours
- Task 2: Implement add to cart/remove from cart functionality – 4 hours
- Task 3: Link cart updates to backend – 3 hours
- Task 4: Test cart operations (add, remove, view) – 2 hours

Total Time: 11 hours

4. Basic Checkout Process (13 Story Points)

- Task 1: Create checkout page UI with payment fields – 5 hours
- Task 2: Implement backend integration for payment gateway – 12 hours
- Task 3: Validate user input for checkout – 4 hours
- Task 4: Secure payment information – 6 hours
- Task 5: Test end-to-end checkout functionality – 5 hours

Total Time: 32 hours

5. Order Confirmation (3 Story Points)

- Task 1: Display order summary after successful payment – 3 hours
- Task 2: Send confirmation email to user – 3 hours
- Task 3: Test order confirmation process – 2 hours

Total Time: **8 hours**

Total Sprint Effort: **96 hours**

Justification for Story Selection:

1. **Alignment with Sprint Goal:** Every story selected contributes to the MVP goal of creating a functional e-commerce flow, from creating an account to checking out, making this a meaningful and achievable sprint.
2. **High Priority for MVP:** There are several stories in this backlog that cover fundamental functionalities required for the app to fulfill its primary purpose. These include user onboarding, browsing products, completing a purchase, and completing other requirements that are high priorities.
3. **Fit Within Velocity:** In total, the selected stories amount to 32 story points, which aligns with the team's expected velocity of 30 story points. The team can deliver valuable, functional features within a sprint without overloading the sprint capability by deciding to make this choice.
4. **Balanced Task Complexity:** By selecting stories with varied levels of complexity (from 3 to 13 story points), the sprint includes both straightforward and moderately complex tasks, promoting balanced workflow and enabling efficient distribution of tasks among team members.

Part 2: Sprint Execution and Review

Assumptions:

Team Velocity: 30 story points per sprint

Team Composition: Four developers, one tester, one ScrumMaster

1) Daily Scrum Simulation:

Day 1:

Member	Completed	Will do	Blockers
Developer 1	NA – Day 1	Will work on setting up user registration table in database and continue with backend changes.	No
Developer 2	NA – Day 1	Will start working on creating product database tables.	Required designs for product screens from Creative team.
Developer 3	NA – Day 1	Will start working on payment gateway integration going through the docs as it's an external provider.	No
Developer 4	NA – Day 1	Will start working on the cart and ordering UI screens.	No

Tester	NA – Day 1	Will be preparing test cases for login and registration functionality.	No
Scrum Master	Reviewed the sprint backlog and assigned tasks to each team member.	Will connect with creative team and get the product screens designs.	No

Day 2:

Member	Completed	Will do	Blockers
Developer 1	Completed the UI designs for login and registration screens.	Will work on setting up user registration table in database and continue with backend changes.	No
Developer 2	Completed product database table.	Got designs from creative, will start working on product list screen functionality.	No
Developer 3	Gone through the payment gateway provider docs to get understanding for integration.	Will start making changes to integrate our system with the payment gateway provider.	Need a walkthrough to all available services to integrate from external team.
Developer 4	Completed the cart and checkout screen based on the designs.	Will be working on displaying orders screen using the sample Json data provided.	No

Tester	Completed test cases for login and register functionality.	Will start working on product list screen test cases.	No
Scrum Master	Connected with Creative team to get the product screen designs and also scheduled a 15 min daily scrum meeting.	Will check with payment gateway team's availability and schedule a walkthrough with the team.	No

Day 3:

Member	Completed	Will do	Blockers
Developer 1	Completed the backend functionality of authentication and authorization/registering users.	Will be doing an integration testing and will be fixing if any bugs noticed.	No
Developer 2	Completed product list screen along with pagination functionality.	Will start working the individual product screen UI screen.	No
Developer 3	Connected with external team and got the required information from them.	Working on the integration part and I can say like 40% changes are done.	No
Developer 4	Basic displaying orders screen functionality is completed.	Will be working increasing or decreasing product quantities in cart	No
Tester	Completed test cases for product list screen.	Will start working on individual	No

		product screen test cases.	
Scrum Master	Connected and organized a walkthrough to the team by payment gateway team.	Will be checking for any impediments we would get.	No

2) Burndown Chart and Task Board:

Burndown Chart:

The Total Estimated Effort for Sprint 1 is 96 Hours.

Tracking the Daily Progress:

Day/Task	Task 1	Task 2	Task 3	Task 4	Task 5
Day 1	1	1	0	1	2
Day 2	3	2	0	1	3
Day 3	5	3	0	3	3
Day 4	2	2	0	2	0
Day 5	4	3	0	0	0
Day 6	2	4	3	3	0
Day 7	0	3	2	5	0
Day 8	3	0	2	5	0
Day 9	0	3	2	6	0

Day 10	0	4	2	6	0
Total	20	25	11	32	8

Computing the Actual Effort:

Day	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Effort Remaining	91	82	68	62	55	43	33	23	11	0

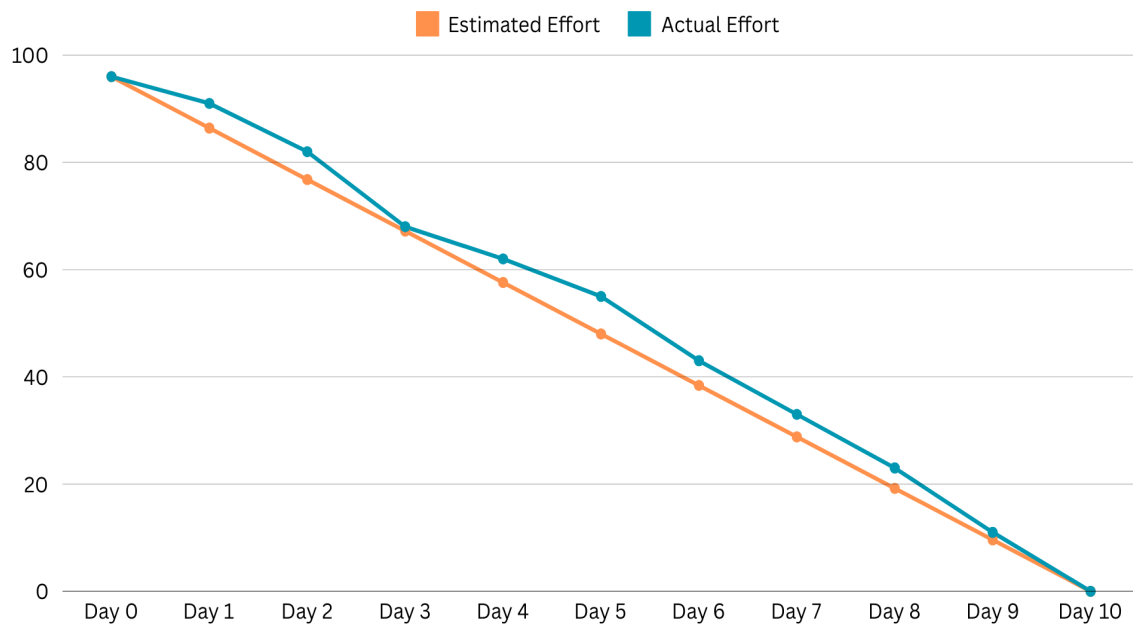
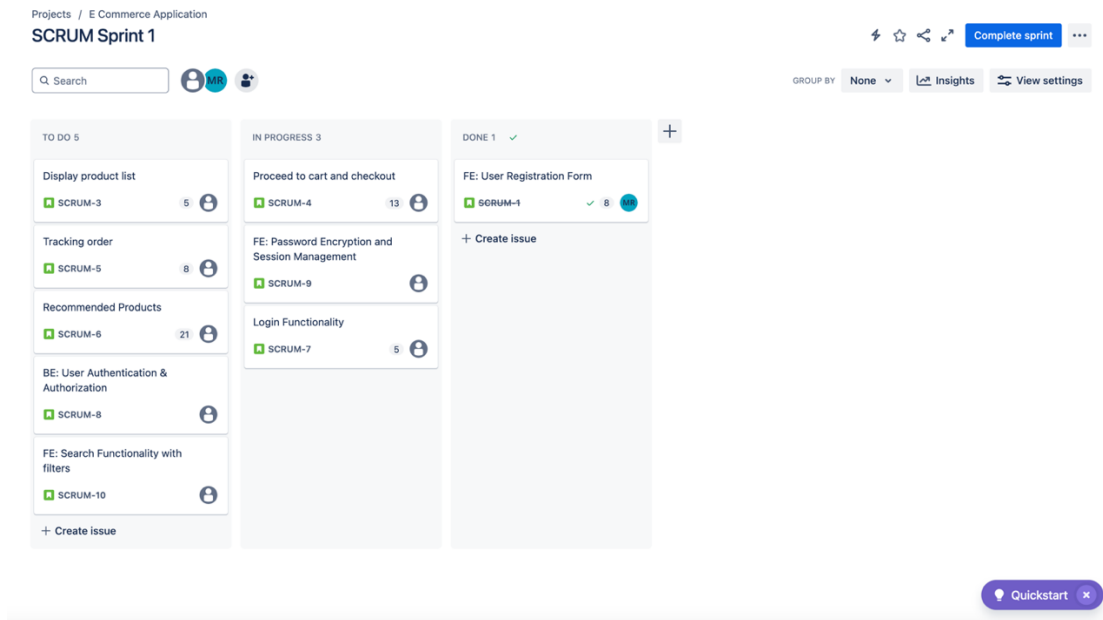


Fig: - Burndown Chart

Task Board:



3) Sprint Review

Completed and Incomplete Stories:

Completed: User registration and login, product browsing and search, filtering with category Basic Cart and Checkout process.

Incomplete: Advanced features in Cart and Checkout flow like changing address etc. needs to be implemented.

Stakeholder Feedback:

Stakeholders were impressed with the progress made so far. They suggested adding a feature to allow users to save their shipping addresses for faster checkout. They also requested a more detailed product description page and to add more sorting options in product browsing.

4) Sprint Retrospective

Start: Daily task check-ins, to have more transparency on current sprint progress.

Stop: Overloading sprints with low-priority items.

Continue: Daily stand-ups, regular code reviews, and improved focus on high priority items and blockers.

Part 3: Metrics, Flow, and Communication

1) Agile Metrics Analysis

a) Velocity Trend Analysis:

Current Velocity: The team's velocity for Sprint 1 was calculated at 30 story points, based on a total of 96 hours. Analyzing this velocity over subsequent sprints will be crucial to ensure consistency.

Identifying Inconsistencies: If future sprints show significant deviations in story points completed, this may suggest issues with story sizing, unexpected task complexity, or blockers affecting task flow. Solution:

Refinement of Story Sizing: Using Planning Poker or the Fibonacci sequence for story points consistently across sprints will help standardize estimations and improve velocity predictability.

Estimation Review: At the end of each sprint, the team can review estimations versus actuals, focusing on any gaps. This feedback loop will help fine-tune future estimates.

b) Defect Rate and Lead Time:

Defect Rate: Tracking defects (e.g., bugs found during testing) per sprint helps measure product quality. Higher defect rates may indicate the need for clearer acceptance criteria, thorough code reviews, or more comprehensive testing.

Lead Time: Lead time, defined as the time taken from starting a task to completion, highlights bottlenecks and dependencies within the sprint.

Suggestions to Improve Quality:

Implement Automated Testing: Setting up automated testing for critical features (e.g., checkout, login) in CI/CD pipelines would ensure early detection of recurring issues.

Clear Acceptance Criteria: Each user story should have specific, measurable acceptance criteria. For example, for a checkout feature, the criteria might include successful payment processing, correct order summary display, and error handling for failed transactions.

Continuous Feedback Loop: Gathering feedback from testers or stakeholders within each sprint allows the team to address defects earlier, improving the defect rate and overall product quality.

2) Task Flow Management:

To address tasks getting stuck in "In Progress" due to unresolved dependencies, the team can apply a strategy that includes swarming, limiting WIP, and enhanced communication.

Swarming: Team members can swarm (collaborate) on high-priority or stalled tasks to resolve blockers faster. For example, if payment integration is delayed due to a dependency, several team members could assist in troubleshooting or resolving the issue collectively.

Limiting Work in Progress (WIP): Setting WIP limits ensures that the team completes existing tasks before starting new ones, reducing the likelihood of bottlenecks. For example, setting a maximum of two concurrent tasks per developer will help prioritize work completion over starting new tasks.

Effective Communication:

Daily Stand-Up: Use daily stand-ups to discuss each task's status and surface any dependencies or blockers.

Communication Tools: Utilize tools like Slack channels or JIRA comments to provide real-time updates on task dependencies.

Escalation by Scrum Master: For blockers unresolved within a set timeframe (e.g., 24 hours), the Scrum Master should escalate the issue to relevant stakeholders for quicker resolution.

3) Information Radiator & Communication

An effective information radiator could include both a task board and a burndown chart for real-time tracking of sprint progress.

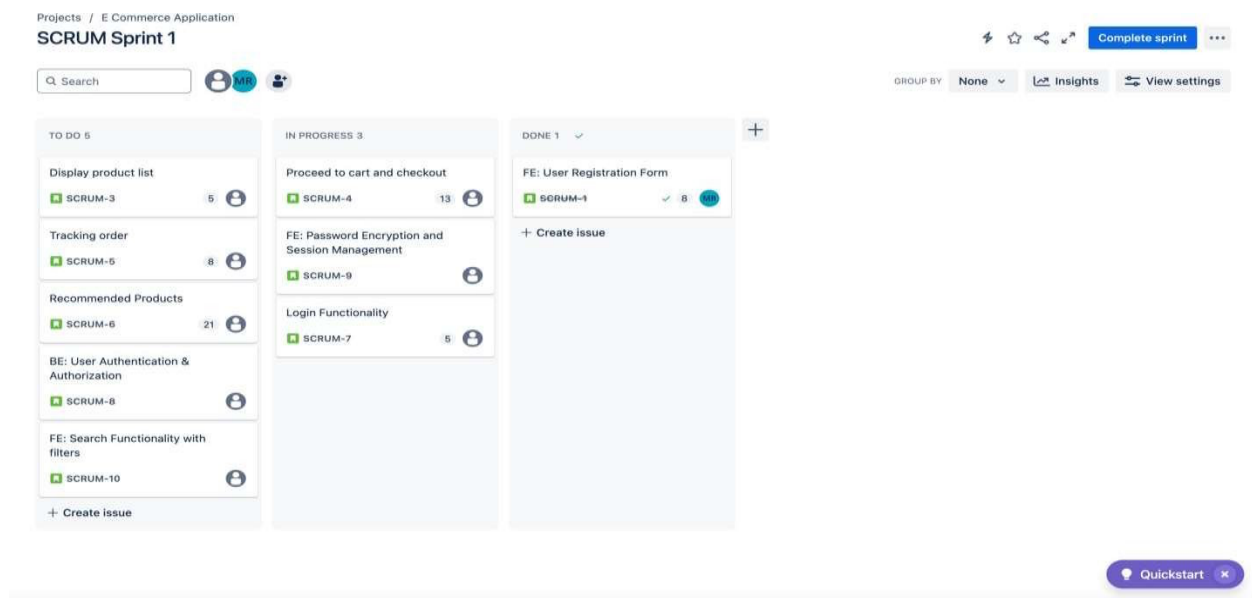
Task Board:

Structure: Organize the task board with columns like "To Do," "In Progress," "Blocked," "Testing," and "Done." Each task moves through these stages as the sprint progresses.

Real-Time Updates: Team members update the board daily, making the status of each task visible to everyone.

Tools: Digital tools like MS Azure, JIRA or Trello are ideal for distributed teams, while physical boards are useful for co-located teams.

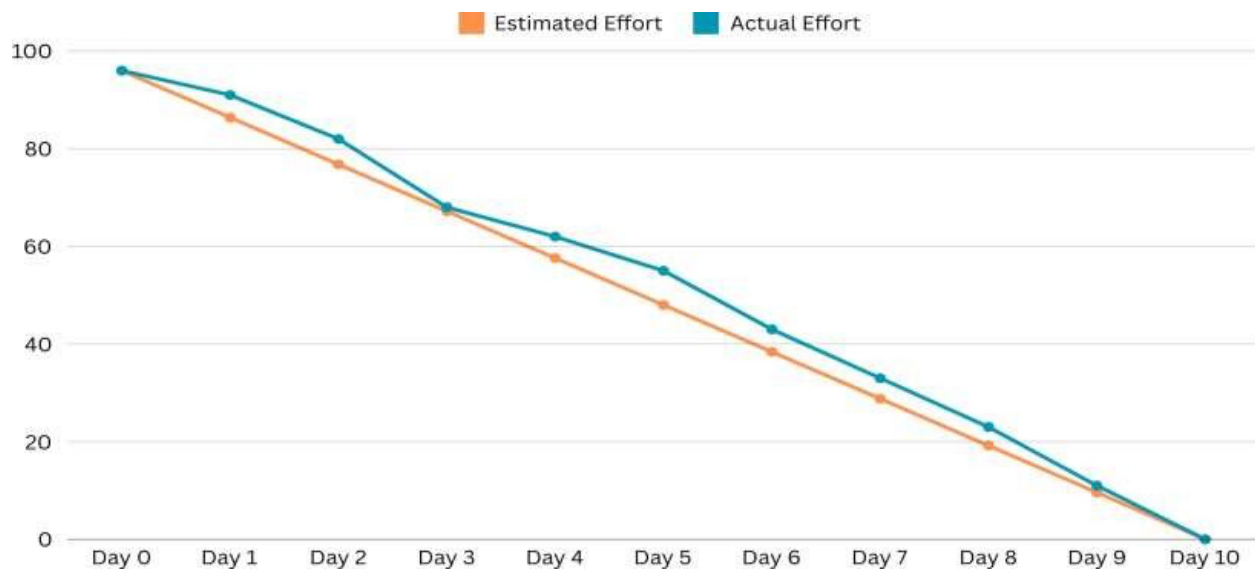
Below is the designed task board for the sprint.



Burndown Chart: (refer below image for the sprints)

Purpose: The burndown chart tracks the total remaining work overtime. As tasks are completed, the chart shows a downward trend, allowing the team to visualize sprint progress and detect if they're on track.

Daily Tracking: Update the chart daily, adjusting for completed and remaining effort. This helps the team spot delays and adjust accordingly.



Benefits of task board and burndown chart for team Communication and Transparency:

Enhanced Visibility: The information radiator provides live updates for team members and stakeholders, reducing the need for frequent status checks.

Proactive Issue Identification: Team members can quickly see if tasks are delayed or if any are in the "Blocked" column, allowing them to take corrective actions sooner.

Transparency for Stakeholders: With visible progress tracking, stakeholders can monitor sprint health and see if any adjustments are needed to achieve the sprint goal.

By implementing above task board and burndown chart, it helped streamline task flow, improve team communication, and foster transparency, enabling the team to respond quickly to issues and maintain a steady sprint pace.