SOFTWARE ENGINEERING

Assignment-02

Submitted by:

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Jira link: https://bsce22007.atlassian.net/jira/software/projects/RSMS/boards/3

Retail Shop Management System

Part (a) – CLO2 [20 Marks Total]

1.

Use case *using user stories:*

1. As a user, I want to log in using my credentials so that I can securely access the system.
2. As an Admin, I want to add new users to the system, so that employees can access the platform.
3. As an Admin, I want to assign specific roles to users, so that access is restricted based on job responsibilities.
4. As an Admin, I want to add products with details, so that the inventory is updated correctly.
5. As an Admin, I want to update product details, so that the latest stock information is accurate.
6. As an Admin, I want to delete products from the catalog, so that discontinued items are removed.
7. As an Admin, I want to track inventory levels in real-time, so that I can manage stock effectively.
8. As an Admin, I want to receive alerts when stock is running low, so that I can reorder in time.
9. As a Cashier, I want to process customer purchases, so that sales are recorded correctly.
10. As a Cashier, I want to generate an invoice, so that customers get a proof of purchase.
11. As a Cashier, I want to apply discounts to purchases, so that customers receive promotional offers.
12. As a Cashier, I want to process product returns, so that customers can receive refunds if needed.
13. As an Admin, I want to maintain customer records, so that we can track their purchases and preferences.
14. As a Customer, I want to enroll in the loyalty program, so that I can earn rewards on my purchases.
15. As an Admin, I want to add supplier details, so that I can keep track of product sources.
16. As an Admin, I want to create purchase orders for suppliers, so that I can restock inventory efficiently.
17. As an Admin, I want to generate sales reports, so that I can analyze revenue trends.
18. As an Admin, I want to generate inventory reports, so that I can identify slow-moving products.
19. As an Admin, I want to track user activities, so that I can monitor system usage.
20. As an Admin, I want to have regular system backups, so that data is not lost in case of failure.

Context diagrams:

There is too much diagram, so I attach the link of google drive:
https://drive.google.com/drive/folders/1cwXgpJ1SeYdnLAPmCw1SPsy_Uxt7vB7w?usp=sharing

Abstract System Design

Layered architecture is ideal for medium-scale applications due to its **simplicity, maintainability, and clear separation of concerns**. It allows for **easier development and testing**, with the ability to **scale horizontally** using load balancers and containerization. It's a great choice when real-time processing isn't critical, and the system doesn't require independent module scaling like in microservices.

Architecture Diagram

Layered Architecture for Retail Shop Management System
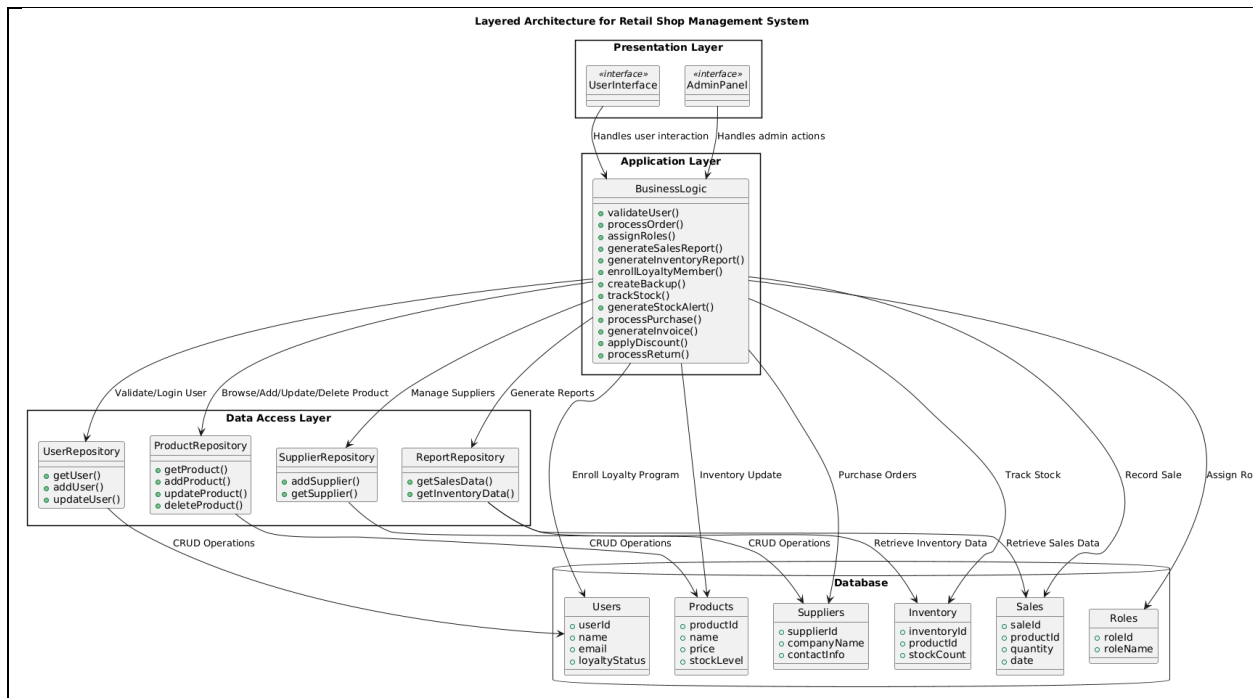
Sprint Report & Deliverables

Sprint 1: Authentication & User Management

1. Sprint Overview

- **Sprint Name:** Sprint 1 – Authentication & User Management

- **Sprint Duration:** April 2 – April 5

- **Sprint Goal:** Implement user authentication, user role assignment, and activity tracking.

- **Jira Board:** Display of task and assigned story points on Jira board.

2. Sprint Planning Meeting Summary

- **Key Discussions:**

    - The team focused on implementing a secure authentication system.

    - Defined and assigned user roles admin, manager, employee with different access to each.

    - Discussed potential challenges, such as API connectivity issues and ensuring proper user session management.

- **Jira Updates:**

    - Created user stories: **RSMS-1**, **RSMS-6**, **RSMS-7**, **RSMS-23**.

    - Assigned story points, converted into **subtasks** and estimated effort for each task.

    - Tasks moved across "To Do", "In Progress", and "Done" columns.

3. Sprint Reviews:

- **Completed Stories:**
  RSMS-1 – Implemented credentials-based login system.
  RSMS-6 – Add new users with basic details
  RSMS-23 – Implemented user activity tracking system
- **Pending Stories:**
  RSMS-7 – assign specific roles according to responsibilities.

Projects / RSMS
Backlog

Q Search   AZ +3   👤⁺   Epic ∨

> **RSMS Sprint 1** 2 Apr – 5 Apr (4 issues)   0 34 87   Complete sprint ...
Working authentication system User roles properly implemented

🟩 RSMS-1 As a user, I want to log in using my credentials so that I can securely access the syste...	DONE ∨	28	👤
🟩 RSMS-6 As an Admin, I want to add new users to the system, so that employees can access t...	DONE ∨	27	AZ
🟩 RSMS-7 As an Admin, I want to assign specific roles to users, so that access is restricted base...	IN PROGRESS ∨	34	MA
🟩 RSMS-23 As an Admin, I want to track user activities, so that I can monitor system usage.	DONE ∨	32	AZ

+ Create issue

4. Meeting records:

- **Meeting 01**

- **Key Discussion:**
  - Discussing the main goal of this sprint.
  - The work which is in progress and not done.
  - Complexity or occurrence of any issue in a specific task.
  - Ensure the proper block refinement by prioritizing tasks and user stories.
  - Keeping track of the work of each member.
  - **Meeting link: https://meet.google.com/otd-oryt-uho**
  - **Meeting recording link: LINK**

- **Meeting 02:**

  - Discuss Progress of sprint 1, the task completed and still pending.
  - Issues occurring in the task which led to the task to be still pending.
  - Handling the working on the issue with other members.
  - Meeting Link: https://meet.google.com/kjz-cpje-ckc
  - **Meeting recording link: LINK**

- **Meeting 03:**

  - Progress of report, no task is pending.
  - Compete the sprint and analyze the report.
  - **Meeting link: https://meet.google.com/kjz-cpje-ckc**
  - **Meeting recording link: LINK**

5: Burnup report:
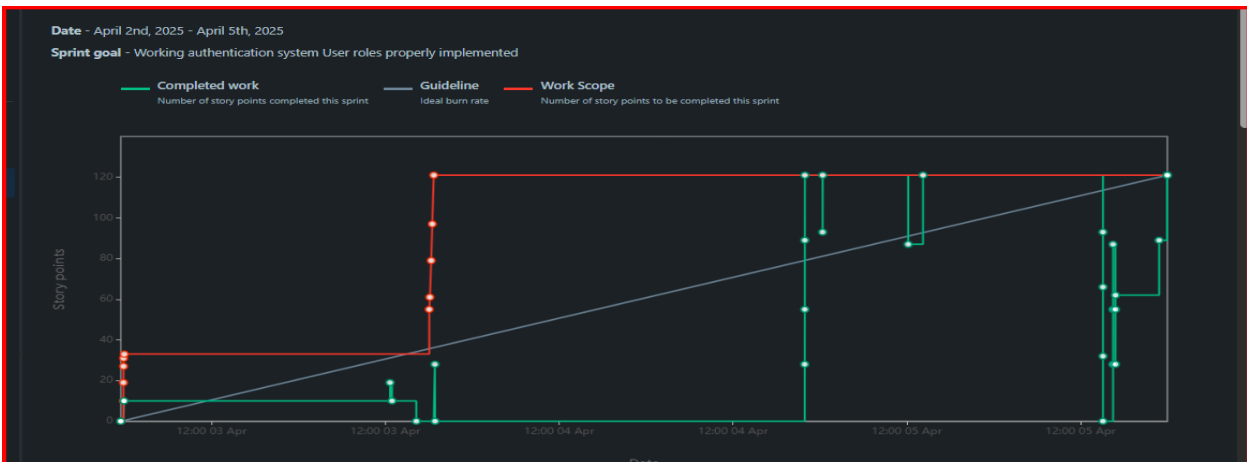
What it shows:
- **This chart tracks completed work vs. total work scope over the sprint duration.**
- **The Y-axis: Story points**
- **The X-axis: Timeline (April 2–5)**
- **Three lines:**
  - **Completed Work (green): How much work has been done.**
  - **Work Scope (red): Total planned work (story points).**
 - **Guideline: Ideal progress trajectory.**

Key Observations:
- **Initially, the scope increased early on (around April 2–3) — likely due to adding or refining tasks.**
- **The completed work rose sharply toward April 5 — again showing that major task completions happened near the end.**
- **Final output matches the total scope by the sprint end — which is good!**

Conclusion:
- **Sprint goal was achieved .**
- **But, scope adjustments early in the sprint and late task completion could pose risks in larger projects.**
- **Good effort, but try to maintain steadier progress and avoid last-day rushes in future sprints.**

6. Sprint Burndown report:
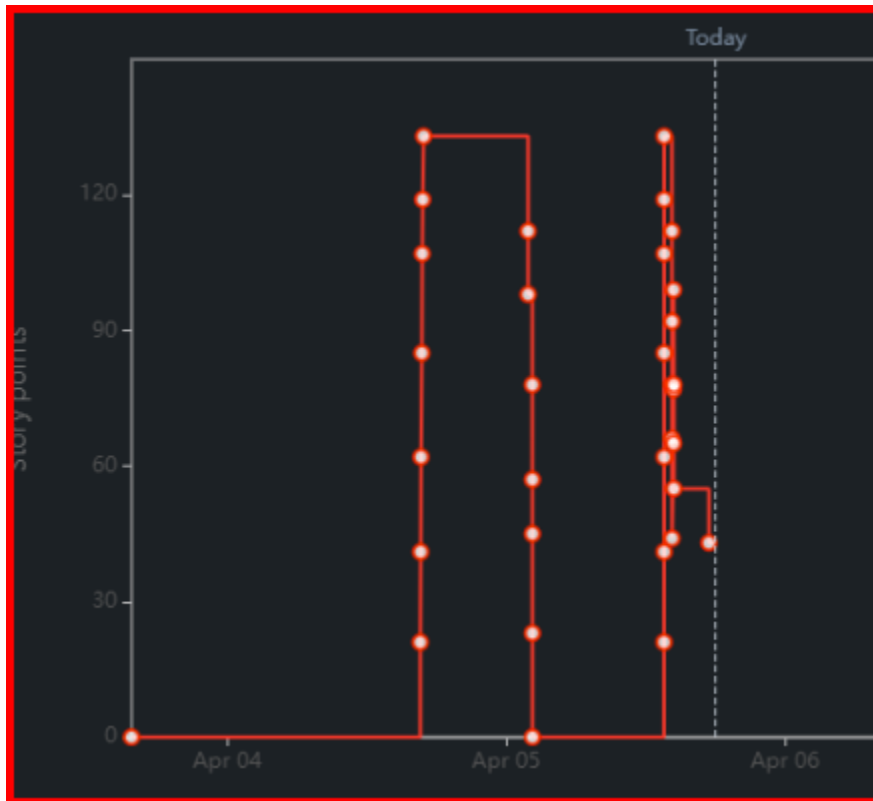
What it shows:

- This chart tracks **remaining story points over time** during the sprint.

- The **Y-axis**: Story points remaining

- The **X-axis**: Dates (April 2nd – April 6th)

Key Observations:

- The work started a little after April 4.

- You can see **steep drops**, which means multiple tasks were completed in batches.

- The total work went down rapidly on **April 5**, indicating most tasks were completed toward the end of the sprint.

- The line touching near **0 before April 6** means the sprint was mostly completed just in time.

Conclusion:

- Team completed the work successfully, but **work was clustered toward the end** of the sprint.

- A more balanced workload across days would be ideal.

Sprint 2: Functional inventory module & Sales Transaction system

1. Sprint Overview

- **Sprint Name:** Sprint 2 – Functional inventory module & Sales Transaction system

- **Sprint Duration:** April 2 – April 16

- **Sprint Goal:** Develop product catalog, sales transaction and inventory tracking.

- **Jira Board Link:** User story task assigned in sprint.

2. Sprint Planning Meeting Summary

- **Key Discussions:**

  - Set up a structured database schema for product categories and stock tracking.

  - Integrated an interface to add, update, and remove products detail so that the latest stock information is accurate.

  - Track inventory to manage stock

  - Generating invoice and inventory tracking challenges.

- **Jira Updates:**

  - Created user stories: **RSMS-10**, **RSMS-12**, **RSMS-15**, **RSMS-18**.
  - Assigned story points and estimated effort for each task.
  - Jira board shows clear progress from backlog to completion.

3. Sprint Review

- **Completed Stories:**

  RSMS-8 – Add detail of product

  RSMS-9 – update product detail

  RSMS-10 – Delete product from catalog

  RSMS-11 – Track inventory in real time

  RSMS-12 – Alerts when stock is low

  RSMS-13 – Process customer purchases

  RSMS-16 – Process product returns.

- **Pending Stories:**

  RSMS-14 – Generating invoice for customer to track purchase.

  RSMS-15 – Discounts to receive promotional offers.

☐ ∨ **RSMS Sprint 2** 2 Apr – 16 Apr (9 issues)		0 36 160	**Complete sprint** ⋯
Functional inventory module Sales transaction system			
🔖 RSMS-8 As an Admin, I want to add products with details, so that the inventory is updated co... 🔀	DONE ∨	22	MA
🔖 RSMS-9 As an Admin, I want to update product details, so that the latest stock information is... 🔀	DONE ∨	25	AZ
🔖 RSMS-10 As an Admin, I want to delete products from the catalog, so that discontinued items... 🔀	DONE ∨	21	👤
🔖 RSMS-11 As an Admin, I want to track inventory levels in real-time, so that I can manage stoc... 🔀	DONE ∨	22	👤
🔖 RSMS-12 As an Admin, I want to receive alerts when stock is running low, so that I can reorde... 🔀	DONE ∨	19	MA
🔖 RSMS-13 As a Cashier, I want to process customer purchases, so that sales are recorded corre... 🔀	DONE ∨	26	👤
🔖 RSMS-14 As a Cashier, I want to generate an invoice, so that customers get a proof of purcha... 🔀	IN PROGRESS ∨	17	AZ
🔖 RSMS-15 As a Cashier, I want to apply discounts to purchases, so that customers receive pro... 🔀	IN PROGRESS ∨	19	MA
🔖 RSMS-16 As a Cashier, I want to process product returns, so that customers can receive refun... 🔀	DONE ∨	25	AZ

4. Meeting records:

- **Meeting 01**

- **Key Discussion:**
  - Analyzing the progress of sprint so far
  - The work which is in progress and not done.

- On track to complete all sprint goals.
- Discussing about the in-progress tasks that are the issue occurring in completing these.
- The tasks that have been on risk are not completed on time.
- Required help from another team member or externally.
- Workflow to be improved.
- **Meeting link: https://meet.google.com/otd-oryt-uho**
- **Meeting Recording link: LINK**

- **Meeting 02**

  - Tasks which are completed and to be completed.
  - Any independencies effecting the progress.
  - Testing status of completed task.
  - Any performance issues on technical debts.
  - Discussing about completion of tasks with in the deadline.
  - The task which requires attention due to some problems.
  - **Meeting link: https://meet.google.com/otd-oryt-uho**
  - **Meeting Recording link: LINK**

- **Meeting 03**

  - Discuss Progress of sprint 2, the task completed .
  - Hurdles faced during the completion of tasks.
  - Completing the sprint.
  - Discussing the burnup report, burndown chart, velocity report to see the completion of the sprint.
  - **Meeting link: https://meet.google.com/kjz-cpje-ckc**
  - **Meeting Recording link: LINK**

5: Burnup report:

What it Shows:
- **Y-axis: Story points completed**

- **X-axis: Time (April 2–16)**

- **Lines:**

  - **Green = Completed Work**

- o   **Red = Work Scope (constant at ~190+ points)**

- o   **Blue Guideline = Ideal pace of completion**

Observations:
- **Completed work ramps up quickly around April 5, hitting the full scope very early.**

- **The guideline (ideal progress rate) is far below the actual progress—shows that the sprint finished ahead of time.**

- **No additional work was added mid-sprint.**

Interpretation:
- **Strong performance—team finished all planned work early.**

- **Great for delivery, but early burnout or quality risks can occur if this pace isn't sustainable or if testing gets rushed.**
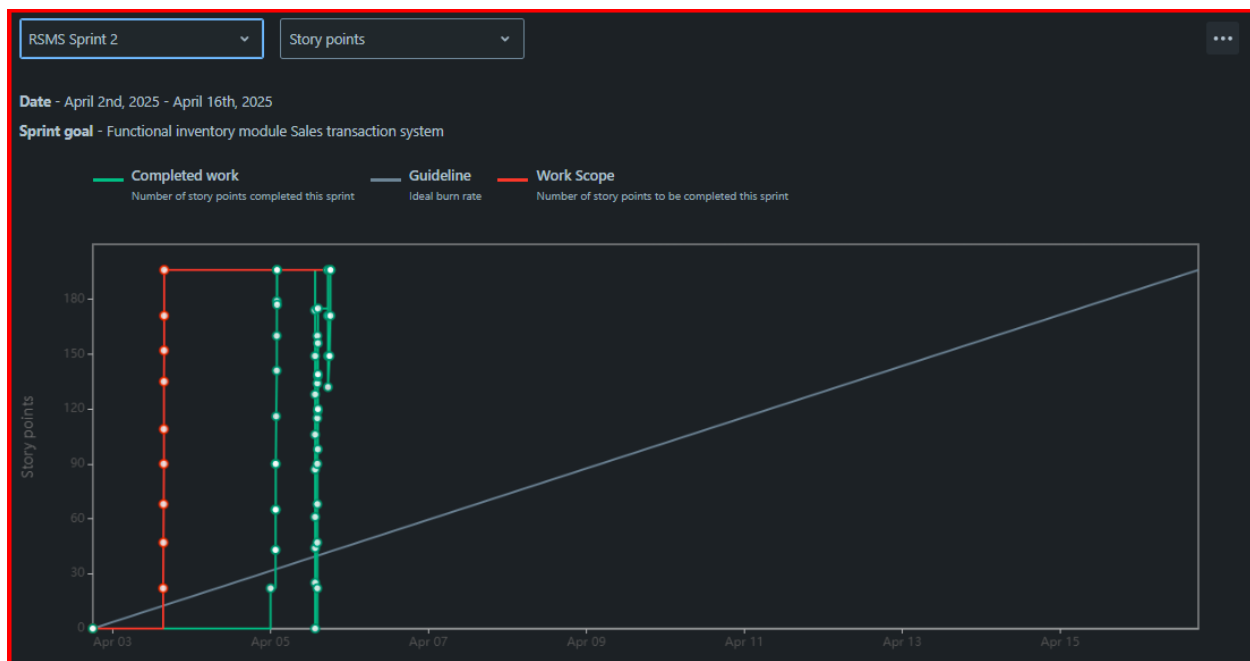
6.Burndown Report:

*What it Shows***:**

- **Y-axis: Story points remaining**

- **X-axis: Timeline (April 2–7)**

Observations:
- **The work scope (story points) was added early and remained constant at around 190+ points.**

- **A sharp drop in remaining work occurs around April 5, meaning a large portion of tasks were completed suddenly.**

- **By April 6, the remaining work reaches zero, indicating all tasks were done before the official sprint end (April 16).**

Interpretation:
- **The team completed all tasks early, but the completion wasn't spread evenly.**

- **Suggests a burst of work rather than consistent progress.**

- **A positive outcome (completed early), but future sprints may benefit from more evenly distributed work for better risk management.**

Date - April 2nd, 2025 - April 16th, 2025
Sprint goal - Functional inventory module Sales transaction system

Sprint 3: Order Processing & Billing System

1. Sprint Overview

- **Sprint Name: Sprint 3 –** Customer Management, Supplier & Inventory, Reporting and System Reliability

- **Sprint Duration:** April 3 – April 10

- **Sprint Goal:** Customer Management, Supplier & Inventory, Reporting and System Reliability

- **Jira Board:** Tasks in this sprint.

2. Sprint Planning Meeting Summary

- **Key Discussions:**

  - Supplier detail to track product.
  - Maintain customer record to track their purchases.
  - Generating sales report.
  - Keep track of inventory and generate report to keep in analyzing the slow products.

- **Jira Updates:**

  - Created user stories: **RSMS-17, RSMS-18, RSMS-19, RSMS-20, RSMS-21, RSMS-22, RSMS-24.**
  - Assigned story points and estimated efforts.
  - Tasks tracked and updated on the Jira board throughout the sprint.

3. Sprint Review & Demo

- **Completed Stories:**
  RSMS-17 – Maintaining customer records.

RSMS-18 – Enrollment in Loyalty program

RSMS-21 – Generating Sales report.

RSMS-22 – Generating inventory reports.

RSMS-24 – Regular system backup.

- **Pending Stories:**
  RSMS-28 – Receipt printing feature delayed.

4. Meeting records:

- **Meeting 01**

- **Key Discussion:**
  - Analyzing the progress of sprint so far
  - On track to complete all sprint goals.
  - Discussing about the in-progress tasks that what is the issue occurring in completing these.
  - The tasks that have been at risk.
  - Any blocker on the task.
  - Improvement made to complete the tasks on the time.
  - **Meeting link: https://meet.google.com/kjz-cpje-ckc**
  - **Meeting Recording Link: Link**

- **Meeting 02**

  - Progress of the sprint.
  - Any issue is faced during the completion.

- Discussing completion of tasks within the deadline.
- Anything that takes longer than expected.
- Does all tasks are tested, face any issue in these.
- **Meeting link: https: https://meet.google.com/otd-oryt-uho**
- **Meeting Recording Link: Link**

5: Burnup report:

Purpose: **Tracks the completed work and overall work scope.**

Green Line (Completed Work):
- **Shows how many story points have been completed during the sprint.**

- **A steep climb on April 5th–6th shows rapid progress or completion of multiple stories.**

Red Line (Work Scope):
- **Represents the total amount of work planned for the sprint (i.e., total story points).**

- **It's flat, which means the scope hasn't changed during the sprint (a good sign of scope stability).**

Light Blue Line (Guideline):
- **Again, the ideal burn rate. Your team completed work faster than planned**
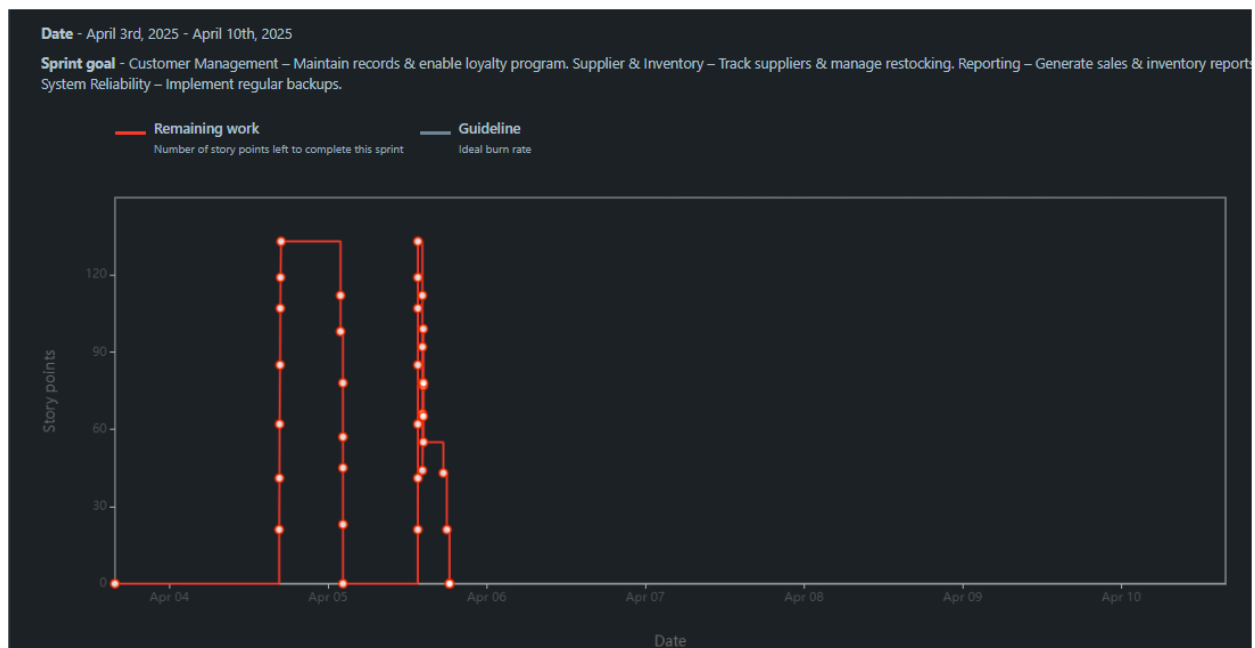
6.BurnDown report:

Purpose: **Tracks the remaining work over time.**

Red Line (Remaining Work):

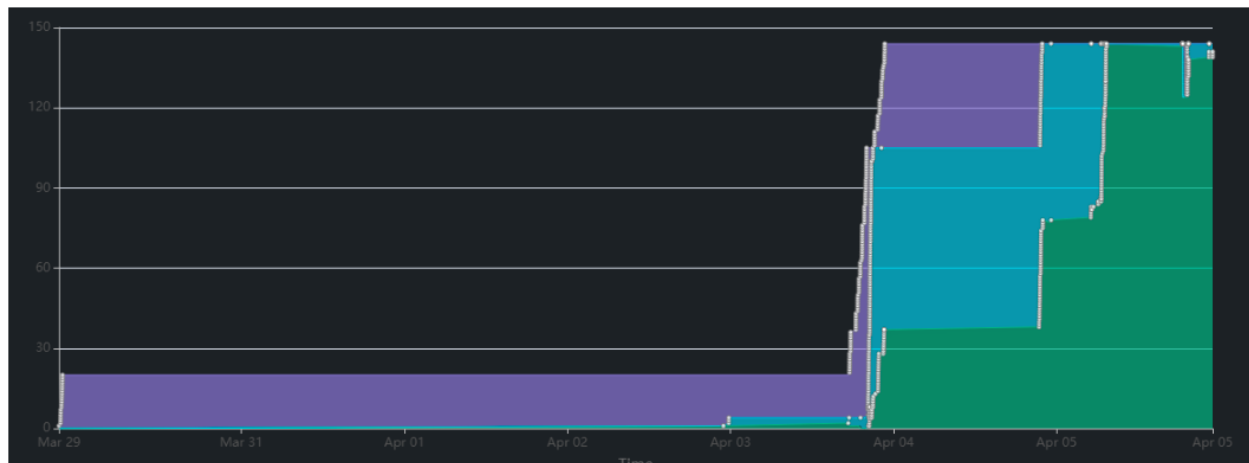- **This line represents the number of story points left to complete the sprint.**

- **As work is completed, the line should trend downward toward zero.**

- **You can see a sharp drop on April 5th and 6th, which means a significant amount of work was completed on those days.**

Light Blue Line (Guideline):
- **This is the ideal burn rate—a guide showing how work should ideally progress if tasks were completed evenly over time.**

- **Your actual progress is ahead of the guideline, meaning work is getting done faster than expected.**

Date - April 3rd, 2025 - April 10th, 2025

Sprint goal - Customer Management – Maintain records & enable loyalty program. Supplier & Inventory – Track suppliers & manage restocking. Reporting – Generate sales & inventory reports. System Reliability – Implement regular backups.

Cumulative flow diagram

Purple → To-do

Blue→ In-progress

Green → Done

Interpretation

- March 29 – April 3: Mostly planning phase. Tasks stayed in "To Do".

- April 4: Sudden burst of activity. A large number of tasks were moved to "In Progress" and quickly to "Done", indicating a high productivity day or a bunch of small tasks completed at once.

- April 5: Continued progress—most work transitions from blue to green (done), and the blue area shrinks, meaning in-progress work is being finished.

Key Takeaways

- **Work moved quickly** from To Do → In Progress → Done over a short period.

- **WIP (Work In Progress) was well managed**—there's not a prolonged flat blue area, which would suggest tasks getting stuck.

- **Team performance is efficient** and focused, possibly due to good sprint planning or relatively easy story points.

Important Note:

- ALL the diagrams(context,pattern,etc) are in this folder
- Meetings recording uploaded on google drive link:
  https://drive.google.com/drive/folders/1UmQh8UZFO9aHWl_ZNjGPTEV456WX4mHF
  ?usp=sharing
- All necessary screenshots are separated in folder named screenshots
- There is a separate folder for sprint cycle time which contains all the logs of the sprint cycle (folder name: cycle time)