Assignment #1 - Test Plan

Part I: Description of Overall Test Plan

Our testing strategy follows a two-phase approach to ensure comprehensive validation of "**CleverCollab - Autonomous AI Agents for Project Management Automation**" project.

1. **Component-Level Testing:**
   Each module, such as automated task allocation, real-time tracking, predictive analytics, and chatbot query handling, will be tested independently. Simulated data will be used to validate normal, abnormal, and boundary conditions, ensuring robustness. Testing scripts will be used to automate test scenarios for consistency.

2. **System Integration Testing:**
   The entire system will be deployed and tested in an integrated environment. This phase will validate interactions between modules (e.g., the backend's predictive models and the frontend's visualization). Stress testing will simulate real-world conditions by handling large datasets retrieved via the Jira API and ensuring the AI agents' predictions and task allocations perform efficiently.

Part II: Test Case Descriptions

TC1.1 Task Allocation Test
TC1.2 This test ensures that the AI agents allocate tasks based on team members' skills and availability.
TC1.3 For this test, simulated skill profiles and availability schedules of team members will be used as inputs. The system will match tasks to the most appropriate team members.
TC1.4 Inputs: Skill profiles of team members and task descriptions.
TC1.5 Outputs: Tasks are allocated optimally to team members based on their expertise and availability.
TC1.6 Normal
TC1.7 Blackbox
TC1.8 Functional
TC1.9 Unit Test

TC1.10: PASS – The system successfully allocated tasks to members with the most relevant skills and available time during multiple simulations.

TC2.1 Predictive Analytics Test
TC2.2 This test ensures that the predictive model identifies tasks likely to miss deadlines.
TC2.3 Simulated task progress data with varying completion percentages will be used. The model will analyze this data to predict delays.
TC2.4 Inputs: Task progress data with delays simulated in 20% of tasks.
TC2.5 Outputs: The system accurately identifies delayed tasks.
TC2.6 Normal
TC2.7 Blackbox
TC2.8 Functional
TC2.9 Unit Test

TC2.10: PASS – The predictive model correctly flagged all simulated delayed tasks with over 90% accuracy using test data.

TC3.1 Task Status Update Test
TC3.2 This test ensures that the system reflects real-time updates of task progress.
TC3.3 The backend will send simulated updates via the API, which will be reflected in the frontend dashboard.
TC3.4 Inputs: Task completion updates on Jira (sent via API).
TC3.5 Outputs: Updates are reflected instantly in the dashboard.
TC3.6 Boundary
TC3.7 Blackbox
TC3.8 Functional
TC3.9 Integration Test

TC3.10: PASS – Real-time updates sent from the backend were reflected immediately on the dashboard without delays or inconsistencies.

TC4.1 Chatbot Query Test
TC4.2 This test ensures that the chatbot responds accurately to project manager queries.
TC4.3 Various natural language queries, such as "Who is working on Task X?" and "Which tasks are overdue?" will be tested.
TC4.4 Inputs: Predefined natural language queries.
TC4.5 Outputs: Correct responses with task and team member data.
TC4.6 Normal
TC4.7 Blackbox
TC4.8 Functional
TC4.9 Unit Test

TC4.10: PASS – The chatbot correctly interpreted all test queries and returned precise data for team member assignments, summary, and overdue tasks

TC5.1 System Stress Test
TC5.2 This test validates the system's performance under heavy loads.
TC5.3 A large number of tasks will be retrieved via the Jira API and processed by the system.
TC5.4 Inputs: 100+ tasks retrieved via Jira API.
TC5.5 Outputs: The system processes all tasks without degradation in performance.
TC5.6 Normal
TC5.7 Blackbox
TC5.8 Performance
TC5.9 Integration Test

TC5.10: PASS – The system handled over 100 Jira tasks without noticeable lag, ensuring stable performance under load.

TC6.1 Task Duplication Detection Test
TC6.2 This test ensures that duplicate tasks are identified and flagged.
TC6.3 A dataset containing duplicate tasks will be uploaded to the system.

TC6.4 Inputs: Duplicate tasks with identical descriptions and deadlines.
TC6.5 Outputs: Duplicate tasks are flagged by the system.
TC6.6 Abnormal
TC6.7 Whitebox
TC6.8 Functional
TC6.9 Unit Test

TC6.10: Partial **PASS** – Duplicate tasks with matching fields were accurately identified by the chatbot. No such feature has been added yet to the main UI.

TC7.1 User Authentication Test
TC7.2 This test validates that only authorized users can log in.
TC7.3 Valid and invalid credentials will be tested to ensure proper authentication.
TC7.4 Inputs: A combination of valid and invalid user credentials.
TC7.5 Outputs: Valid credentials allow access to the chatbot interface; invalid credentials are rejected.
TC7.6 Normal/Abnormal
TC7.7 Blackbox
TC7.8 Functional
TC7.9 Unit Test

TC7.10: PASS – Valid users were granted access, while invalid users received proper error messages. Clerk integration worked smoothly.

TC8.1 Real-Time Notifications Test
TC8.2 This test ensures that notifications are sent for overdue tasks.
TC8.3 Tasks will be marked overdue, and the system will verify notification delivery.
TC8.4 Inputs: Tasks with overdue status.
TC8.5 Outputs: Notifications are sent to assigned team members.
TC8.6 Boundary
TC8.7 Blackbox
TC8.8 Functional
TC8.9 Integration Test

TC8.10: Partial **PASS** – Overdue task triggers were flagged in the chatbot. No such feature added to the main UI because same functionality exists in Jira.

TC9.1 API Data Consistency Test
TC9.2 This test ensures that data retrieved via the Jira API matches the database.
TC9.3 Task data retrieved from the API will be compared with database records.
TC9.4 Inputs: Task data from Jira API.
TC9.5 Outputs: Data matches database records exactly.
TC9.6 Normal
TC9.7 Whitebox
TC9.8 Functional
TC9.9 Integration Test

TC9.10: PASS – Data fetched from the Jira API matched exactly with database entries across all validation tests.

TC10.1 Frontend Responsiveness Test
TC10.2 This test ensures the dashboard remains responsive during heavy interactions.
TC10.3 Simulated user interactions will be performed during live updates.
TC10.4 Inputs: Multiple user actions on the dashboard.
TC10.5 Outputs: No UI lag during updates.
TC10.6 Normal
TC10.7 Blackbox
TC10.8 Performance
TC10.9 Integration Test

TC10.10: PASS – UI remained fluid and responsive throughout rapid user interactions and during live task updates.

TC11.1 Task Prioritization Test
TC11.2 This test ensures that tasks are prioritized correctly based on deadlines and dependencies.
TC11.3 Tasks with varying deadlines and dependencies will be inputted.
TC11.4 Inputs: Task data with deadlines and dependencies.
TC11.5 Outputs: Tasks are prioritized correctly.
TC11.6 Normal
TC11.7 Blackbox
TC11.8 Functional
TC11.9 Unit Test

TC11.10: PASS – The system ranked tasks correctly based on inputted deadlines and dependencies during controlled scenarios.

TC12.1 Chatbot Error Handling Test
TC12.2 This test ensures that the chatbot handles invalid or unclear queries gracefully.
TC12.3 Invalid or ambiguous queries will be sent to the chatbot.
TC12.4 Inputs: Queries like "task?" or "???".
TC12.5 Outputs: Error messages or clarification requests from the chatbot.
TC12.6 Abnormal
TC12.7 Blackbox
TC12.8 Functional
TC12.9 Unit Test

TC12.10: PASS – Invalid inputs triggered graceful error handling, including clarification prompts and fallback responses.

TC13.1 Role-Based Access Test
TC13.2 This test ensures different roles (managers, team members) have appropriate access levels.
TC13.3 Simulated logins for different roles will be tested.
TC13.4 Inputs: Role-based credentials.

TC13.5 Outputs: Managers access advanced features; team members access personal tasks.
TC13.6 Normal
TC13.7 Blackbox
TC13.8 Functional
TC13.9 Unit Test

TC13.10: FAIL – No such feature added.

TC14.1 Resource Forecasting Test
TC14.2 This test ensures the system correctly forecasts resource needs.
TC14.3 Task data with varying resource requirements will be analyzed.
TC14.4 Inputs: Task data with estimated hours and resources.
TC14.5 Outputs: Accurate resource forecasts for upcoming tasks.
TC14.6 Normal
TC14.7 Blackbox
TC14.8 Functional
TC14.9 Unit Test

TC14.10: PASS – Forecasts matched estimated resource requirements using simulated workloads, validating the model's accuracy.

TC15.1 Predictive Analytics Accuracy Test
TC15.2 This test ensures the predictive model's accuracy for forecasting task completion times.
TC15.3 Historical task data with known outcomes will be analyzed by the model.
TC15.4 Inputs: Historical task data.
TC15.5 Outputs: Predictions match actual outcomes within an acceptable margin.
TC15.6 Normal
TC15.7 Whitebox
TC15.8 Functional
TC15.9 Unit Test

TC15.10: PASS – Model predictions closely aligned with historical outcomes (within ~5% margin), confirming its forecasting capability.

TC16.1 Skill & Availability Matching Test
TC16.2 This test ensures that tasks are assigned by considering both required skills and the availability of all team members.
TC16.3 A dataset with varying team member skills and availability is used. The task descriptions include required skills and estimated effort.
TC16.4 Inputs: Skill dataset, availability schedules, task descriptions with required skills.
TC16.5 Outputs: Tasks assigned to team members who both possess the required skills and have sufficient availability.
TC16.6 Normal
TC16.7 Blackbox
TC16.8 Functional
TC16.9 Unit Test

TC16.10 PASS – The system consistently matched tasks to qualified team members with available time, using real and simulated profiles from the skills dataset.

TC17.1 Chatbot Context Awareness Test
TC17.2 This test ensures the chatbot only shows the task assignment panel when user queries relate to allocation, otherwise provides regular responses.
TC17.3 A series of task-related and general queries are tested.
TC17.4 Inputs: Queries such as "Assign this task," and unrelated ones like "What are today's deadlines?"
TC17.5 Outputs: Task assignment panel appears only for allocation queries.
TC17.6 Normal
TC17.7 Blackbox
TC17.8 Functional
TC17.9 Unit Test
TC17.10 PASS – The chatbot correctly inferred context and triggered the assignment panel only when relevant, improving interaction quality.

TC18.1 Kanban Board Sync Test
TC18.2 This test ensures that drag-and-drop updates in the Kanban board reflect accurately in Jira.
TC18.3 Tasks are dragged between columns in the Kanban UI, and corresponding status updates in Jira are checked.
TC18.4 Inputs: Manual task repositioning in UI.
TC18.5 Outputs: Task statuses updated in Jira with no mismatch or delay.
TC18.6 Normal
TC18.7 Blackbox
TC18.8 Functional
TC18.9 Integration Test
TC18.10 PASS – All task movements in the Kanban were reflected in Jira in real-time, ensuring full sync between UI and backend.

TC19.1 AI Task Refinement and Auto-Assignment Test
TC19.2 This test verifies that user-submitted tasks are refined using AI, added to Jira, and assigned to the appropriate team member.
TC19.3 A natural language task description is given; the system refines it, creates the task in Jira, and assigns it.
TC19.4 Inputs: Raw user task input.
TC19.5 Outputs: Refined task appears in Jira with correct assignment.
TC19.6 Normal
TC19.7 Blackbox
TC19.8 Functional
TC19.9 Integration Test
TC19.10 PASS – The system successfully transformed informal tasks into structured Jira issues and assigned them using skill-availability logic.

Part III: Test Case Matrix

	Normal/ Abnormal/ Boundary	Blackbox/ Whitebox	Functional/ Performance	Unit/ Integration
TC1	Normal	Blackbox	Functional	Unit
TC2	Normal	Blackbox	Functional	Unit
TC3	Boundary	Blackbox	Functional	Integration
TC4	Normal	Blackbox	Functional	Unit
TC5	Normal	Blackbox	Functional	Integration
TC6	Abnormal	Whitebox	Functional	Unit
TC7	Both	Blackbox	Functional	Unit
TC8	Boundary	Blackbox	Functional	Integration
TC9	Normal	Whitebox	Functional	Integration
TC10	Normal	Blackbox	Performance	Integration
TC11	Normal	Blackbox	Functional	Unit
TC12	Abnormal	Blackbox	Functional	Unit
TC13	Normal	Blackbox	Functional	Unit
TC14	Normal	Blackbox	Functional	Unit
TC15	Normal	Blackbox	Functional	Unit