Mavericks Coding Platform

Problem Statement

Developers and companies face significant challenges in skill certification, interview preparation, and continuous learning. Traditional methods of skill assessment and learning are:

- **Inefficient**: Manual review of coding skills is time-consuming and resource-intensive.
- **Inconsistent**: Subjective evaluations can lead to biased skill assessments.
- **Unscalable**: Growing demand for skilled developers overwhelms traditional learning workflows.
- **Lack of Engagement**: Developers need motivation and recognition for their learning efforts.

Goal: Build a comprehensive coding platform that automates the assessment of coding skills, provides personalized learning paths, facilitates engaging hackathons, and offers full visibility into user progress and performance. The platform should be gamified with leaderboards and reports to enhance user engagement and provide actionable insights.

Solution Overview

We decompose the platform into several collaborating agents within an open-source agentic framework. Each agent processes its inputs, leverages AI and machine learning for complex tasks, and emits structured events. A central message bus connects these agents, and stateful agents track the progress of each user. Below are examples of agents and their reasoning:

Agent	Inputs	Outputs	Reasoning / Generative AI Use
Profile Agent	User registration data, past performance, resume uploads	User profile + skill vectors (user.profile)	• Reasoning: Assess user skills based on past performance and uploaded resumes. • AI-Optional: Use NLP to extract and summarize key skills and experiences from resumes.
Assessment Agent	User profile, quiz/exercise triggers	Proficiency scores across competencies (user.scores)	• AI/ML: Dynamically select quiz difficulty based on real-time performance. • Reasoning: Adjust

			assessment difficulty based on user responses.
Recommender Agent	User profile + assessment scores + content metadata	Personalized learning path (user.learning_path)	• Model Inference: Recommend learning modules based on skill gaps. • Reasoning: Provide narrative explanations for recommended modules.
Tracker Agent	Learning Management System (LMS) API events, quiz re-scores	Progress updates and alerts (user.progress)	• Reasoning: Analyze completion patterns to detect user progress or stagnation. • AI-Optional: Trigger additional assessments or refreshers if stagnation is detected.
Hackathon Agent	Hackathon setup requests, challenge definitions	Hackathon events and challenges (hackathon.setup)	• Reasoning: Facilitate the setup and management of hackathons. • AI-Optional: Use AI to generate real-world challenges and evaluate submissions.

Web UI Design

A web UI provides both users and administrators with live visibility into every step of the assessment, learning, and hackathon process:

User Dashboard

1. **Assessment Panel**
    - Upload or connect coding exercises.
    - View upcoming and past assessments.
2. **Progress Bar**
    - Nodes:
        1. Profile Created
        2. Assessment Completed
        3. Skills Evaluated

4. Learning Path Generated

- Each node lights up with a timestamp as agents complete their steps.
- Hover reveals details (e.g., “Assessment took 15 minutes,” “Score=85%”).

3. **Learning Path & Status**
    - Table of recommended learning modules with columns: Module Name, Estimated Time, Completion Status.
    - Click row to expand details and start learning.
4. **Manual Overrides**
    - Buttons to “Re-assess,” “Update Profile,” or “Request Review” if manual intervention is needed.
5. **Hackathon Panel**
    - Join or create hackathons.
    - View hackathon challenges and submissions.
6. **Leaderboard & Achievements**
    - View leaderboards and earned badges.
    - Track progress and achievements.

Admin Dashboard

1. **User Search & Filters**
    - Search and filter users by skill, score, or learning path.
2. **Workflow Progress Bar**
    - Nodes:
        1. Profile Loaded
        2. Assessment Completed
        3. Skills Evaluated
        4. Learning Path Generated
    - Each node lights up with a timestamp as agents complete their steps.
    - Hover reveals details (e.g., “Assessment took 15 minutes,” “Score=85%”).
3. **User List & Status**
    - Table of users with columns: Name, Skills, Assessment Score, Last Updated.
    - Click row to expand live progress bar and metadata panel.

4. **Manual Overrides**
    - Buttons to “Re-assess,” “Update Profile,” or “Generate Report” if manual intervention is needed.
    - **Hackathon Management**
    - Create and manage hackathons.
    - View hackathon submissions and results.
7. **Reports & Analytics**
    - Generate reports on user progress and platform usage.
    - View analytics on skill development and engagement.