**48 Hours Challenge: AI-Powered Academic Advisor**

**Title: "AI Curriculum Planner: Adaptive Academic Advising for 100 Simulated Students"**

**Objective:** Simulate a personalized academic advising system for a cohort of 100 students using **graph-based curriculum modeling** and **reinforcement learning (or similar techniques)** for optimized course path recommendations.

**Instructions:** You are tasked with:

**PART 1 – Curriculum and Student Simulation (Graph Modeling)**

1. **Model a university curriculum** using a **graph structure or graph database**.
   * Nodes = courses
   * Edges = prerequisite relations
2. **Simulate 100 students**, each with:
   * A different collection of completed/passed courses
   * GPA and course grades
   * Interests (e.g., AI, Security, Data Science)
3. **Constraints to model:**
   * Course load limit: max 3-5 courses per term
   * Cannot take a course without completing its prerequisites
   * Retake policy for failed courses
4. **Submit:**
   * A script or notebook generating the **student data + curriculum graph**
   * Sample graph schema (or Cypher queries if using Neo4j)
   * Optional: Visualize part of the graph (e.g., with NetworkX or Graphviz)

**PART 2 – AI-Based Personalization Strategy**

1. **Design and implement a high-level personalization algorithm** using RL or heuristic-based planning.
   * Each student is recommended a set of next-term courses
   * Recommendations must:
     + Respect constraints
     + Align with interests
     + Maximize GPA or graduation likelihood
2. **If using RL (preferred):**
   * Define:
     + **State**: current completed courses, GPA, term number, interests
     + **Action**: selecting a set of next-term eligible courses
     + **Reward**: GPA boost, interest alignment, progress toward graduation
3. **Train the model** (or simulate decisions for at least 10 students).

**Deliverables (Within 48 Hours)**

1. **GitHub Repo**:
   * Contains all code, models, and sample data
   * README explaining setup and how to run the task
2. **2-Page Report (PDF):**
   * Explanation of graph schema
   * Student generation logic
   * Personalization strategy and key design choices
   * Example results for 3–5 students
   * Any visualizations or performance metrics (even simple ones)