Agentic AI Take■Home Assignment

Problem Statement: Travel Itinerary Design Agent

You are tasked with designing an **Agentic AI system** that autonomously plans an optimized travel itinerary to a destination (e.g., *Goa*). The AI should reason across multiple variables — weather, cost, transport, and time — and propose the best travel plan.

Goal

Design an **Agentic AI Travel Itinerary Agent** that plans a trip considering: weather conditions, month/time, local holidays, road conditions, transport type, and budget constraints.

Part 1: Simple Use Cases

#	Scenario	Description	Expected Agentic Behavior
1	Weather-based adjustment	User wants to visit Goa in July.	Suggest indoor attractions or alternate months (Dec–Feb).
2	Budget-based selection	Budget ■25,000 for 3 days.	Optimize transport, stay, and activities within budget.
3	Transport choice	User prefers road travel.	Fetch real-time road data and suggest stopovers.
4	Event detection	Trip during New Year week.	Detect peak season and recommend early booking.

Part 2: Advanced / Difficult Use Cases

#	Scenario	Description	Expected Agentic Behavior
5	Dynamic re-planning	Flight delayed by 6 hours.	Re-adjust itinerary and notify stakeholders.
6	Multi-Agent Collaboration	Itinerary Agent collaborates with Weather, Budget, and Event Agents.	Agree on a joint travel plan; design message bus communic
7	Preference Learning	User likes local cuisine & offbeat beaches.	Learn preferences using reinforcement or pattern analysis.
8	Ethical & Responsible Design	Sensitive personal data used.	Ensure privacy, explainability, and fairness.
9	Multi-objective Optimization	Balance cost & comfort.	Use weighted or Pareto-based decisioning.

Part 3: Expected Deliverables

1. System Architecture diagram with data and control flow.
2. Use Case flow for one simple and one advanced case.
3. PEAS Framework (Performance, Environment, Actuators, Sensors).
4. Agent Collaboration Model (inter-agent communication design).
5. AI Approach (rule-based, ML, LLM, or hybrid).
6. Ethical considerations (data privacy, explainability).
7. Future enhancements (weather forecasting, GenAI summarization).

Part 4: Evaluation Criteria

- **System Thinking:** Identification of sub-agents and interactions.
- **Autonomy:** Level of decision-making and adaptation.
- **Technical Depth:** Use of APIs, ML, and message buses.
- **Reasoning:** Handling of dynamic, real-world inputs.
- **Ethics & UX:** Privacy, transparency, and personalization.