AI Agent Challenge: Multi-Agent Travel Planning System

Problem Statement

The user:
Casual and business travellers planning short trips (1–7 days) who want quick, reliable and weather based itineraries without jumping between multiple websites.

Needs:

- A short, day by day travel plan for a particular city and date range.
- Suggestions for must-visit places that are well balanced between culture, history, food and popular neighbourhoods.
- Plans that consider the weather for example, outdoor places on sunny days and indoor options when it rains.
- A clear and easy to read plan that can be used directly or with small changes.

Agent Design

Design principles:

- The system decides automatically when to collect information like weather details or nearby attractions.
  Each part of the system handles one job input checking, weather lookup, finding places or making the itinerary.
  Even if something fails, the system gives partial results with notes instead of stopping completely.

Nodes and responsibilities:

- **Input Handler:** Reads the city and travel dates, checks for errors and calculates trip duration.
- **Weather Module:** Gets or simulates daily weather updates such as temperature and conditions.
- **POI Module:** Finds or simulates a mix of places to visit, tagging them by type, duration and whether they are indoor or outdoor.

- **Itinerary Creator:** Arranges the places into morning, afternoon and evening slots each day, matching the plan with the weather and maintaining variety.
- **(Optional) Replan Module:** Adjusts the plan if the weather is poor or if the list of places is too short.

High-level flow:

User Input
City, dates, preferences
|
Input Handler
Creates trip details
|
Decision Layer
Decides what information to collect
|
Tools Used:
• Weather Module
• POI Module
|
Itinerary Creator
Combines all data into a proper travel plan
|
Final Output
Weather summary, list of places and full itinerary table

Key behaviours:

- **Weather aware scheduling:** Outdoor activities are placed on days with good weather; indoor ones are kept for days with bad weather.
- **Balanced variety:** Each day includes a mix of landmarks, culture and food places, usually 3–4 locations.
- **Reliable fallbacks:** Even if a step fails, the system makes reasonable assumptions and still gives a usable plan.

Metrics of Success

Coverage and composition:

- 3–4 good places per day for standard trips or 2–3 for relaxed ones.
- At least one indoor option on days with rain or extreme heat.
- Each day includes more than one type of activity (e.g one historical, one cultural).

Weather alignment:

- At least 70% of outdoor places are planned for good weather conditions.
- Notes are added when perfect alignment isn't possible.

Readability and structure:

- Every output includes a weather summary, a list of places with tags, and a proper itinerary table (Day | Morning | Afternoon | Evening | Notes).
- Layout and formatting are kept clean and simple.

Resilience and behaviour:

- The plan is still created even if one part of the process fails.
- The system runs smoothly within around 10–12 seconds.

User outcomes:

- People can follow the plan directly without searching elsewhere.
- Travellers can easily understand why certain places were chosen or rearranged (for example, because of the weather or to balance variety).

Future Ideas

Preference driven planning:

- Add simple options to let users pick their preferred trip style more food, more culture, less walking, etc.
- Include family mode, kids mode or nightlife mode.

Budget and time optimization:

- Add estimated daily costs and plan within a user's budget.
- Include travel time between places, group nearby attractions together and consider opening hours.

Multi-city and corporate travel:

- Allow trips to cover multiple cities.
- Add business features like meeting slots, airport transfers and company expense limits.

Dynamic replanning:

- Update the itinerary automatically if weather forecasts change.
- Let users quickly edit plans (for example, “swap this place” or “add more food stops”).

Ecosystem integrations:

- Export plans to calendar or maps.
- Create offline PDF versions.
- Add helpful booking links for tickets or time-based entries.

Your Unique Edge

Smart and adaptable planning:
The system isn’t stuck to fixed rules. It decides when to collect weather information, search for more places, or make adjustments so that every plan feels practical and well balanced.

Plans built around real conditions, not static lists:
Each place includes simple details such as whether it’s indoor or outdoor and how long it usually takes to visit. The system arranges the plan around the weather and comfort level outdoor spots on sunny days and indoor ones when it’s hot or rainy.

Simple and dependable:
The design keeps only the necessary parts so it works quickly and gives consistent results. When some data is missing, it uses sensible defaults and adds clear notes for transparency.

Easy to expand and improve:
Each part is designed separately, making it simple to add features like budget planning, travel timing or place timings later without starting over.

Complete travel experience:
Instead of scattered suggestions, the system gives a proper day by day plan that balances sightseeing, culture and relaxation well structured and ready to use right away.