GenAI Assignment: Multi-Agent Framework using LangGraph

Objective:

Create a multi-agent system using LangGraph where agents collaborate to complete a complex workflow — from data retrieval, analysis, summarization, and report generation.

Scenario / Use Case:

Design a 'Smart Research Assistant' that automates literature review and report generation for a given topic query.

Agents (minimum 3 required):

Search Agent	Retrieves or simulates data from web sources using LangChain tools.
Analysis Agent	Processes the collected data to identify trends, sentiment, and themes.
Summarizer Agent	Converts analysis into structured narrative sections like Introduction, Key Insights, and Fu
Optional Agents	Validator Agent for consistency checks; Formatter Agent for Markdown/PDF formatting.

Technical Requirements:

- Use LangGraph for building the multi-agent workflow.
- Each agent must have a defined role, state management, and input/output schema.
- Integrate memory or context passing between agents using LangGraph's stateful nodes.
- Expose the workflow through FastAPI or Streamlit UI.

Evaluation Criteria:

Criteria	Description	Weight
Architecture	Proper use of LangGraph nodes, edges, and state passing	25%
Agent Collaboration	Clarity of agent responsibilities and communication	20%
Prompt Design	Effective prompting for each agent's LLM call	15%
Functionality	End-to-end workflow completion	20%
Innovation	Creative use of additional agents/tools	10%
UI/Integration	Clean interface via Streamlit/FastAPI	10%

Stretch Goals (Bonus Points):

- Add a Feedback Agent that improves prompts dynamically.
- Implement asynchronous agent execution in LangGraph.

- Add memory persistence for user queries across sessions.
- Visualize the LangGraph workflow using Graphviz or Mermaid.js.

Submission Requirements:

- `main.py` or `app.py` — the LangGraph setup and orchestration
- `agents/` — folder containing each agent’s logic
- `requirements.txt` — dependencies
- `README.md` — overview, architecture diagram, and run instructions
- Optional: Deployed app link or short demo video