**📐 Design Document**

**1. System Architecture**

**Inputs**: Stock symbol →  
**Agents Orchestrated in CrewAI** (sequential workflow):

1. **News & Info Researcher** → gathers company news (DuckDuckGo).
2. **Data Researcher** → fetches company profile & income statements (Yahoo Finance).
3. **Analyst** → consolidates news + financials → structured analysis.
4. **Financial Expert** → generates recommendation → writes output.

**Outputs**:

* Analysis.md – Detailed financial and contextual analysis.
* Recommendation.md – Buy/Hold/Sell recommendation with reasoning.

**2. Components**

**Agents**

* News & Info Researcher
* Data Researcher
* Analyst
* Financial Expert

**Custom Tools**

* get\_current\_stock\_price(symbol)
* get\_company\_info(symbol)
* get\_income\_statements(symbol)
* search\_tool(query)

**Tasks**

* get\_company\_news (agent: News & Info Researcher)
* get\_company\_financials (agent: Data Researcher)
* analyse (agent: Analyst)
* advise (agent: Financial Expert)

**Crew Orchestration**

* Framework: CrewAI (LangGraph)
* Process: Sequential execution (Process.sequential)
* Callback: Logs timestamps for observability

**Note: We will be using LangGraph in place of Crew**

**3. Data Flow**

1. User inputs stock symbol.
2. News Agent → retrieves news articles.
3. Data Agent → fetches financials.
4. Analyst Agent → synthesizes data + news into analysis.
5. Financial Expert Agent → issues final recommendation.
6. CrewAI (LangGraph)→ orchestrates tasks → saves outputs to Markdown files.

**4. Scalability & Extensibility**

* **Add new agents**: e.g., Risk Manager, Compliance Checker, Sentiment Analyzer.
* **Add new tools**: e.g., Bloomberg/Reuters API, Twitter sentiment feed.
* **UI options**:
  + Phase 1: CLI
  + Phase 2: Streamlit / Web dashboard.

**5. Future Enhancements**

* Multi-stock batch processing.
* Portfolio-level recommendations.
* Real-time alerting for stock events.
* Integration with broker APIs (Robinhood, Zerodha).
* Reinforcement learning for improving recommendation quality.