Market Research & Use Case Generation Agent Assignment Design Document

High-Level Design (HLD)

1. **Objective**
   The HLD provides an overview of the entire system architecture, including how agents will interact, key functionalities, and the overall workflow of your multi-agent system.
2. **SystemOverview**
   The multi-agent system is designed to generate relevant AI and GenAI use cases for a specific company or industry by performing three main functions:
   - **Market Research**: Researches and gathers insights into the company's industry, segment, and strategic focus areas.
   - **Use Case Generation**: Based on market insights, generates AI/ML use cases aligned with company goals.
   - **Resource Asset Collection**: Finds datasets and resources related to generated use cases and saves resource links in a shareable format.
3. **High-Level Architecture Diagram**
   - Show a diagram with three primary components:
     - **User Interface** (e.g., Streamlit application): Acts as the front end for user input and output display.
     - **Multi-Agent System**: The backend logic with separate agents for each task (research, use case generation, asset collection).
     - **External APIs and Data Sources**: Interfaces with web search APIs (e.g., Serper) and dataset sources (e.g., Kaggle, Hugging Face).
   - Include arrows showing the flow from user inputs to the Multi-Agent System and the feedback loop back to the UI.
4. **Module Descriptions**
   - **Input Module**: Accepts company or industry input from the user.
   - **Market Research Agent**: Conducts web searches, fetches industry information, and segments the company’s focus areas.
   - **Use Case Generation Agent**: Analyzes research results, industry trends, and generates actionable AI/GenAI use cases.
   - **Resource Asset Collection Agent**: Collects links to relevant datasets and resources for the identified use cases.
   - **Output Module**: Displays the results, including clickable resource links and a final proposal.

Low-Level Design (LLD)

1. **Detailed Component Specifications**
    - **Market Research Agent**:
        - **Inputs**: Industry or company name.
        - **Process**:
            - Searches web resources to retrieve industry insights using web search APIs.
            - Extracts company focus areas and key offerings.
        - **Outputs**: JSON data with industry_information and company_focus fields.
    - **Use Case Generation Agent**:
        - **Inputs**: Data from Market Research Agent (e.g., focus areas and industry insights).
        - **Process**:
            - Analyzes trends and standards related to AI, ML, and automation.
            - Generates specific use cases aligned with the company's strategic focus.
        - **Outputs**: List of generated use cases.
    - **Resource Asset Collection Agent**:
        - **Inputs**: List of generated use cases.
        - **Process**:
            - Searches platforms like Kaggle, Hugging Face, and GitHub for relevant datasets.
            - Compiles resource links and formats them for easy sharing.
        - **Outputs**: Markdown file with clickable resource links.
2. **Database and Data Structure Design**
    - **Market Research Data Structure**: JSON format with fields such as industry_information, company_focus, generated_use_cases.
    - **Resource Links**: Markdown file structure with clickable links.
3. **Error Handling and Logging**
    - Implement logging for errors, especially in API calls or dataset searches.
    - Catch missing fields (e.g., KeyError when a field like industry_information is absent).
4. **User Interface Details**
    - Use Streamlit for an interactive UI.
    - Separate sections for entering company details, viewing research findings, generating use cases, and displaying resource links.
5. **Flowchart for LLD**

   Draw a flowchart showing:
    - User input → Market Research Agent → Use Case Generation Agent → Resource Asset Collection Agent → Output.