

LAB ASSESSMENTS (1&2)

40% Weightage = Programming Solution & Demo (30%) + Viva (10%).

A Single Report needs to be submitted by each student. Report template will be shared later. Submission Deadline: 28th September 2025, 5 pm IST

Check the following two linked assignments.

LAB Assignment-1

Use CrewAI for Building a Multi-Agent Workflow

Problem Statement:

You are required to design and implement a multi-agent system using CrewAI that collaboratively solves a non-trivial **complex task in a domain of your choice** (e.g., education, healthcare, e-commerce, research, finance, law, entertainment, any other).

Your system should simulate how multiple specialists coordinate to produce a high-quality output. Each agent must have a clearly defined role, and the agents must work together to form a coherent workflow.

Minimum Criteria:

1. **At least 6 agents** with role specialization (e.g., Planner, Researcher, Summarizer, Writer, Critic, Validator).
2. **Coordination:** The workflow must involve sequential execution and at least one parallel step.
3. **Prompt Design:** Prompts must be tailored to agent roles.
4. **Context Sharing:** Intermediate outputs from one agent must feed into another.
5. **Tool Integration:** At least two external tools (library or custom) must be used (e.g., web search API, database lookup, file parser, calculator).
6. **Structured Output:** Final output must be generated in a structured form (Markdown, Table, or JSON).

Examples of Use Cases:

- *Education:* Generate a structured study guide with lessons, summaries, and practice questions.
- *Healthcare:* Summarize research articles on a disease into a clinician-ready overview.
- *E-commerce:* Produce a product launch campaign including slogans, descriptions, and ad copy.
- *Research:* Generate a literature survey with sectioned summaries of recent papers.

Deliverables:

- Clearly state the Objectives and Scope of Work (2 paragraphs – total 500 words)
 - Expected Outcome in 3 bullet points
 - A workflow diagram (agents + dependencies).
 - CrewAI implementation code.
 - Sample structured output (e.g., a generated report).
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Generative AI Agents – Task Automation with LLM Reasoning

LAB Assignment-2

Use Google ADK to Extend the Workflow

Problem Statement:

Re-implement the same workflow you designed in the first assignment using Google's Agent Development Kit (ADK).

In this version, extend your system by adding advanced features that improve reliability, coordination, and usability.

The goal is not only to rebuild your system in ADK but also to demonstrate advanced agentic behaviours like memory, tool use, hallucination avoidance, logging and monitoring.

Minimum Criteria:

1. **Memory:** Agents must maintain or reuse context across steps.
2. **Tool Integration:** At least two external existing tools (library) plus one custom tool must be used (e.g., web search API, database lookup, file parser, calculator, etc.).
3. **Parallel Execution:** At least one set of tasks must be executed in parallel.
4. **Hallucination Mitigation:** Include a Validator/Reviewer agent that checks factual correctness, consistency, or alignment with requirements.
5. **Structured Output:** Final results must be delivered in a structured format (JSON, Markdown, or HTML).
6. **Task Monitoring & Logging:** Agents must include a monitoring mechanism that tracks intermediate outputs, execution flow, and errors for transparency and debugging.
7. **Comparative Reflection:** Submit a short write-up (2 pages) comparing CrewAI vs ADK in terms of workflow design, coding effort, and system robustness.

Examples of Extensions:

- *Education:* Add a Quiz Generator agent that creates practice questions using past study guides.
- *Healthcare:* Add a Validator agent that cross-checks claims against PubMed abstracts.
- *E-commerce:* Add a Compliance agent that ensures ad copy doesn't violate given rules.
- *Research:* Add a Reference Manager agent that outputs citations in BibTeX/APA.

Deliverables:

- Updated workflow diagram showing new features.
- ADK implementation code.
- Structured output sample (JSON/Markdown).
- 2-page reflection (CrewAI vs. ADK).