

Core Components of the Multi-Agent Pattern Architecture

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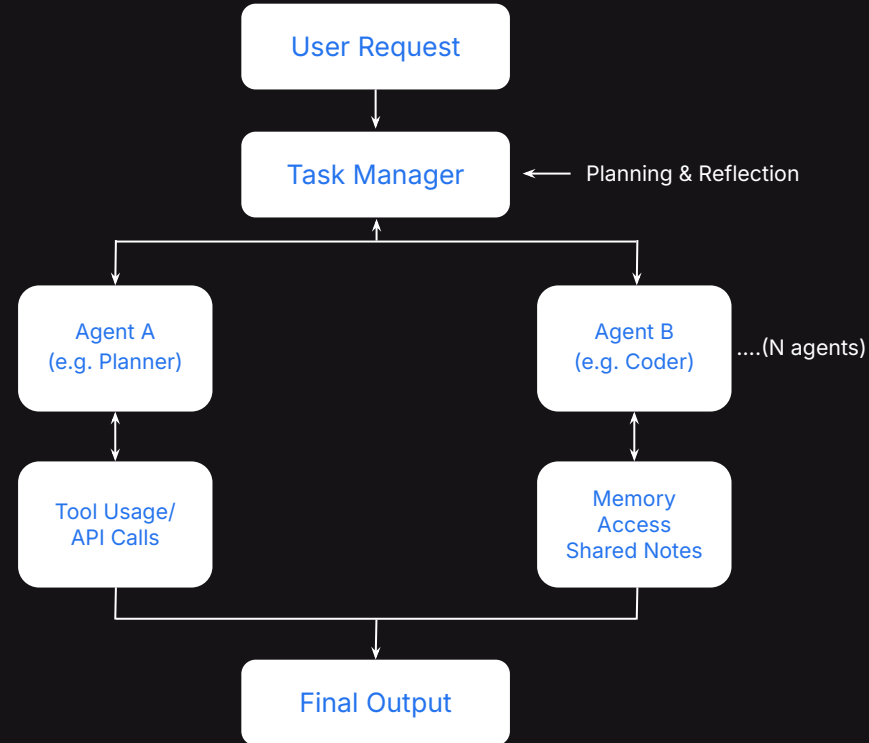
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Core Components

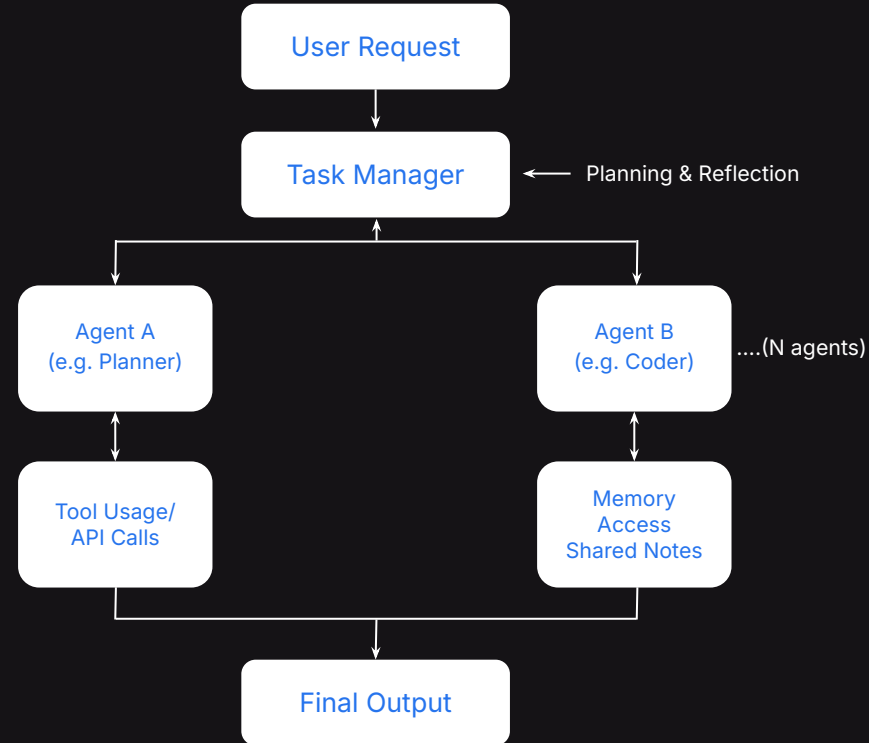
1. Environment
2. Agents
3. Task Manager / Orchestrator
4. Communication Protocol
5. Shared Memory / Knowledge Base
6. Planning & Reflection Loop
7. Execution Layer



Core Components

1. Environment

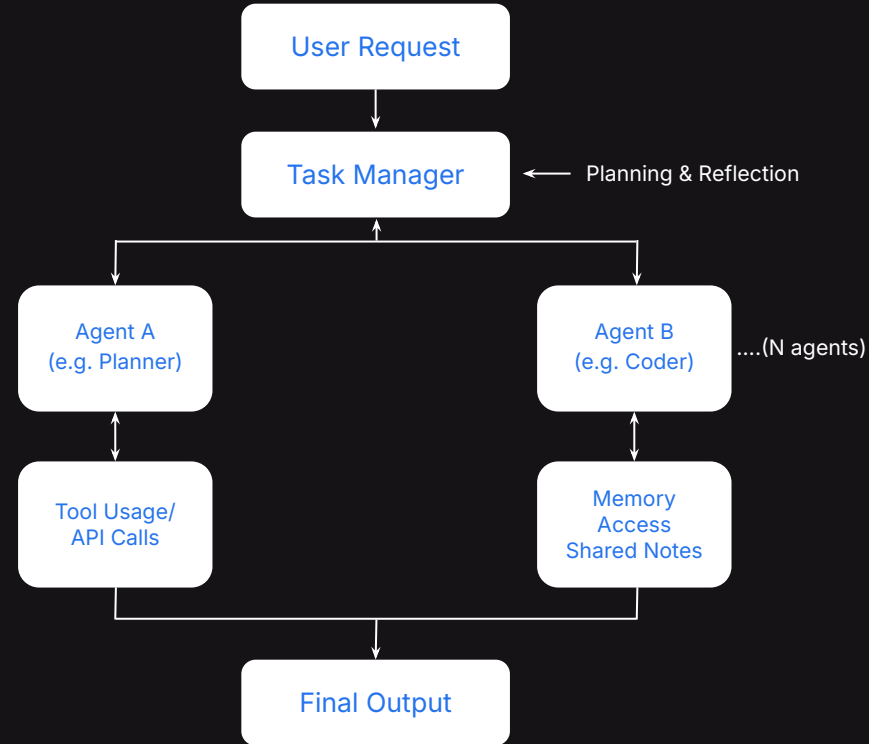
- The shared space or system where agents operate and interact (e.g., memory store, user inputs, APIs).
- Could be real-world (IoT/robotics) or digital (LLM context, RAG memory).



Core Components

2. Agents

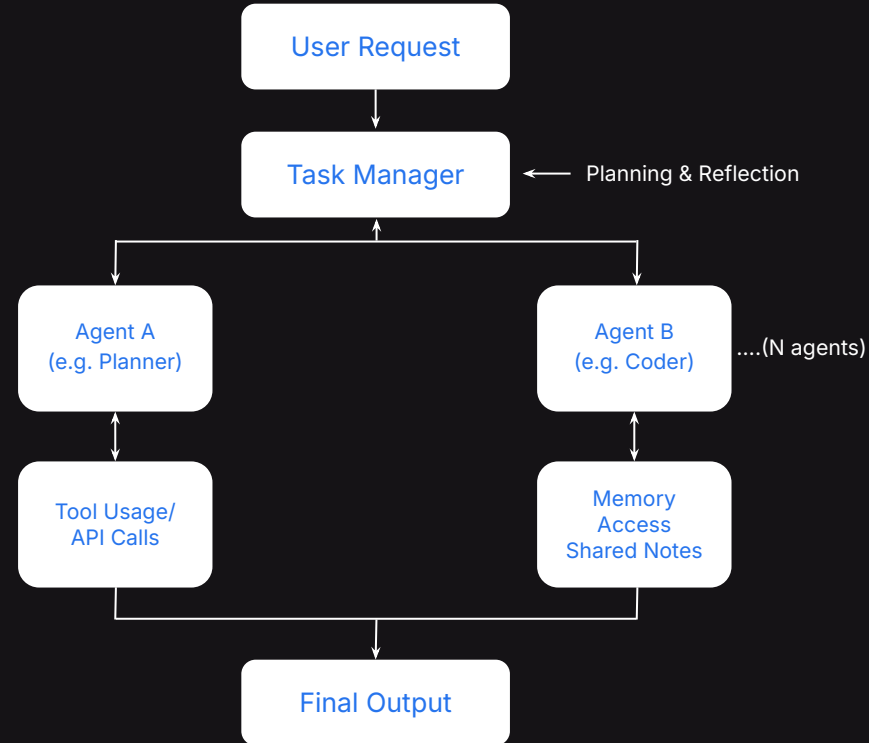
- Independent actors with specific roles, capabilities, or goals.
- Each agent has:
 - A goal or role (e.g., researcher, coder, planner)
 - A policy or reasoning engine (often an LLM)
 - Memory (local or shared)
 - Tools (APIs, search, calculators, etc.)



Core Components

3. Task Manager / Orchestrator

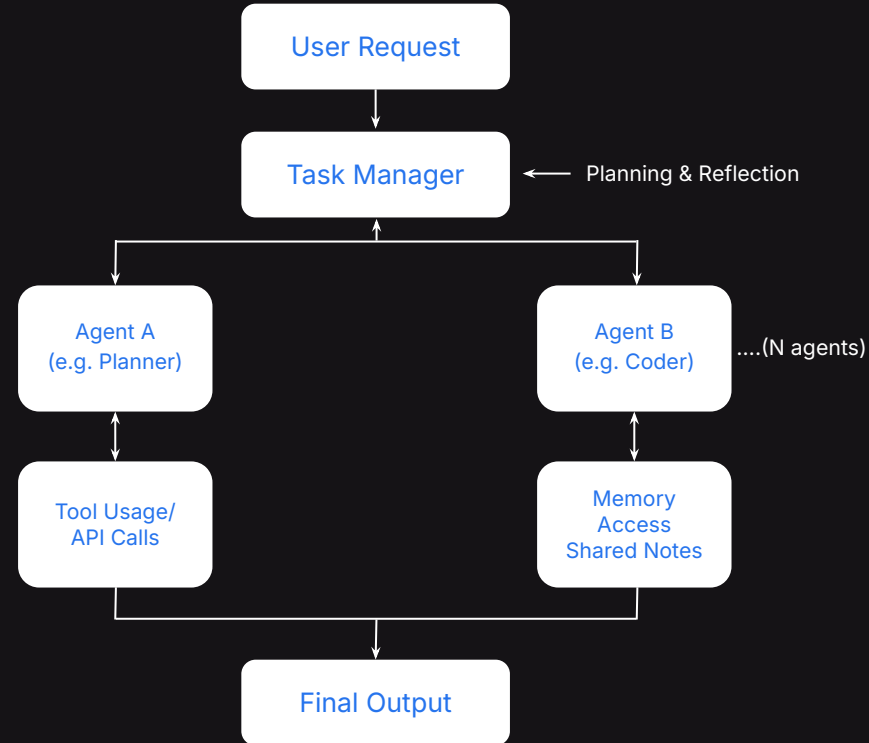
- Coordinates the workflow between agents.
- Breaks the main objective into subtasks and assigns them.
- Monitors progress and resolves conflicts.



Core Components

4. Communication Protocol

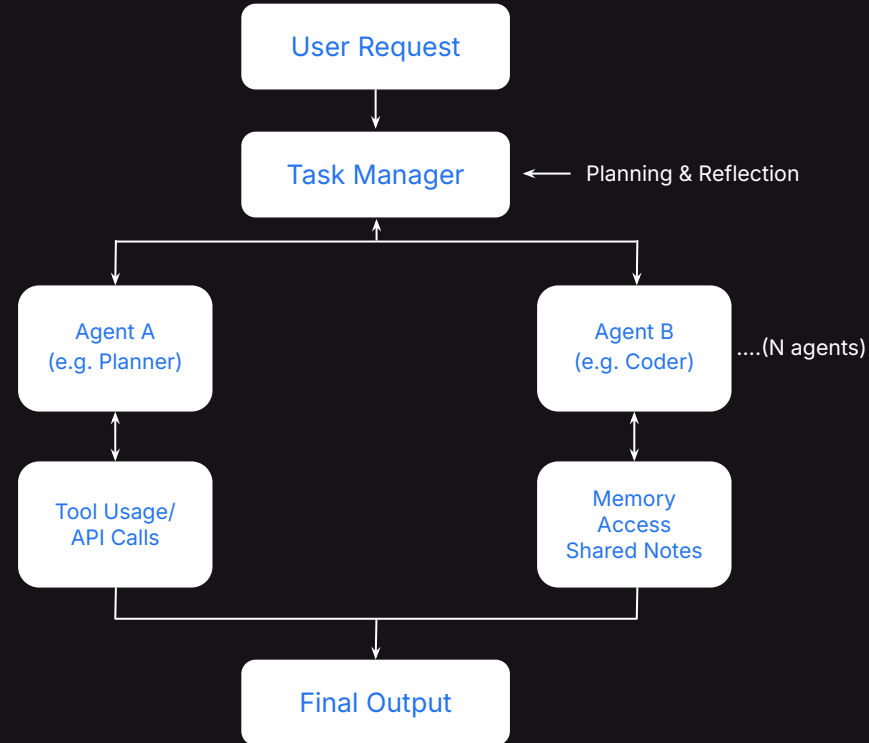
- Defines how agents talk to each other (direct messaging, shared memory, broadcasting).
- Can be synchronous or asynchronous.



Core Components

5. Shared Memory / Knowledge Base

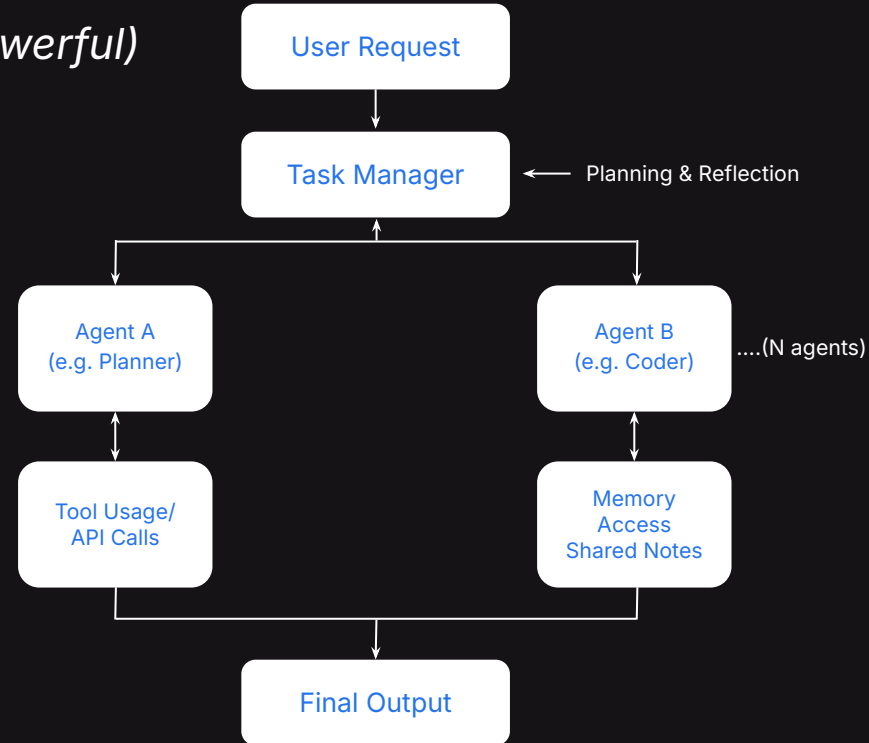
- A persistent space where agents can read/write information (e.g., vector DB, LangGraph memory).
- Ensures context continuity and collaboration.



Core Components

6. Planning & Reflection Loop (optional but powerful)

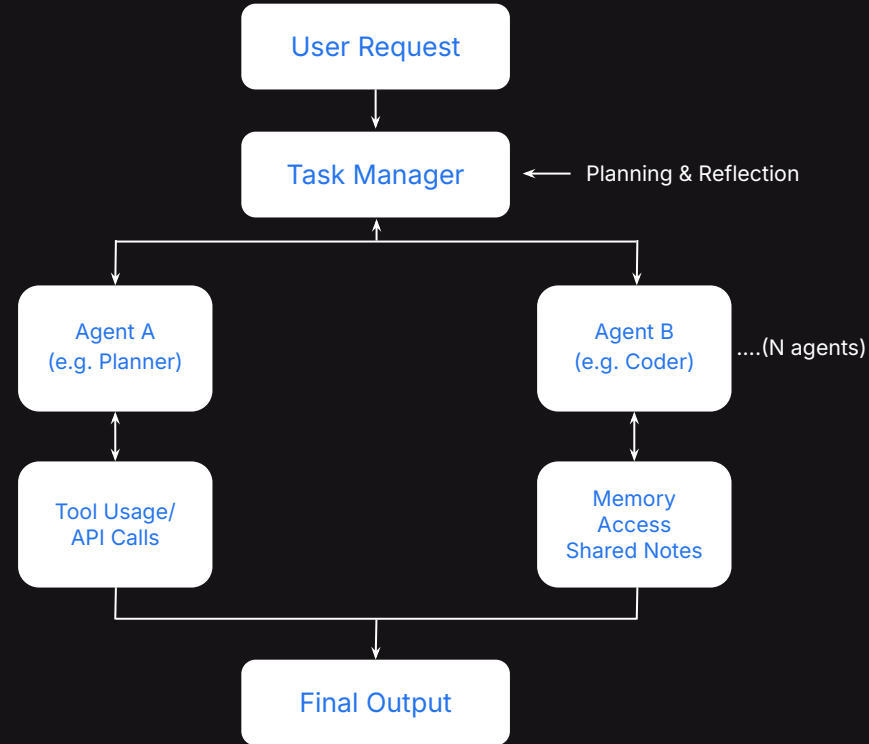
- Agents reflect on outputs, evaluate next steps, and refine their approach.
- Common in tools like LangGraph, CrewAI, AutoGen.



Core Components

7. Execution Layer (optional but powerful)

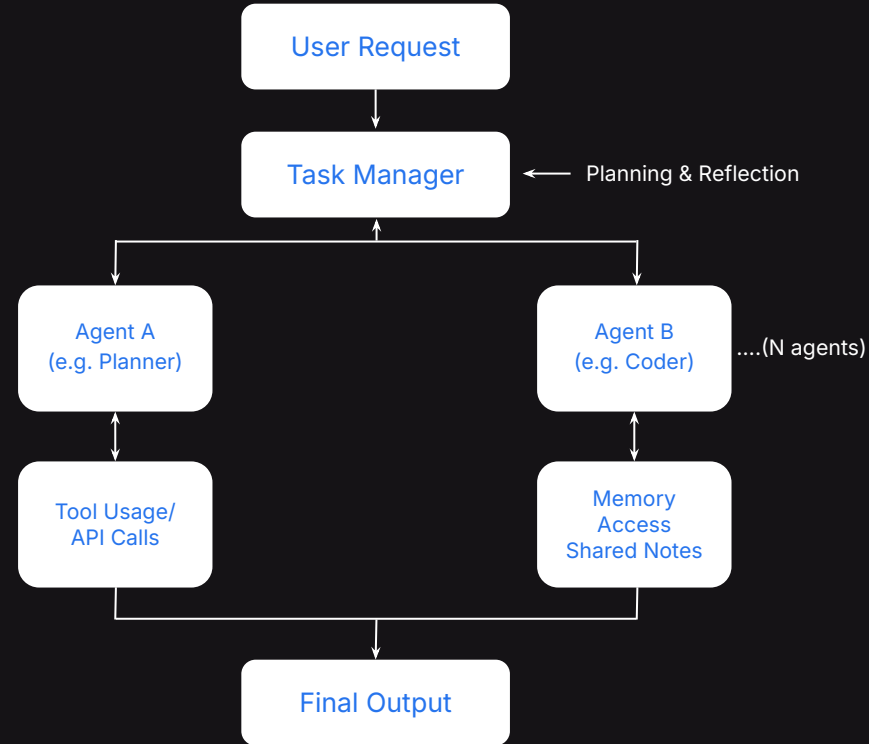
Where agents perform actions via tools, code execution, database queries, or web access.



Core Components

8. User Interface or External API

The interaction point for human users or other systems.



Thanks!