**What is Multi Agent Coordination Pattern**

### **Multi-Agent Coordination Patterns**

**Definition:**Multi-agent coordination patterns are architectural designs and strategies that define how autonomous agents interact and harmonize their actions to achieve shared or individual goals within a system. Common patterns include Hierarchical, Blackboard, Marketplace, Peer-to-Peer (Swarm), and Orchestrator-Worker models

1. **Centralized Coordination**
   * One main agent (leader) controls and assigns tasks to others.
   * *Example:* Uber’s central system assigns drivers to riders.
2. **Decentralized Coordination**
   * All agents act independently and decide based on local information.
   * *Example:* Autonomous drones coordinate flight paths to avoid collisions.
3. **Market-Based Coordination**
   * Agents negotiate, bid, or trade resources like in a marketplace.
   * *Example:* Smart grids match electricity supply and demand through bidding.
4. **Consensus-Based Coordination**
   * Agents share information and reach a common decision through agreement or voting.
   * *Example:* Robot swarms agree on the next area to explore.
5. **Contract-Net Coordination**
   * A manager agent announces a task, worker agents bid, and the best one is chosen.
   * *Example:* Warehouse robots bid for available delivery tasks.

**What is Azure AI foundry - Agent as a service ?**

**Azure AI Foundry – Agent as a Service** is a Microsoft platform that allows developers to **build, deploy, and manage intelligent agents** in the cloud.  
 These agents can **reason, act, and use tools or data sources** to perform real-world tasks — all managed securely and at scale by Azure.

### **How It Works**

1. **Select a Model:** Choose from powerful Azure-hosted models like GPT-4o or Llama.
2. **Define the Agent:** Set its purpose, rules, and behavior (e.g., a data assistant, report generator, or chatbot).
3. **Add Tools and Data:** Connect your agent to enterprise data (e.g., Azure AI Search, SQL) and tools (like Azure Functions or Logic Apps) for taking actions.
4. **Run, Monitor & Scale:** Azure handles orchestration, memory, conversation history, scaling, and security—so your agent runs efficiently and safely.

### **Use Cases**

* **Enterprise chatbots** that answer company-specific queries.
* **Data analysis assistants** that fetch and summarize reports.
* **Automated workflows** like scheduling, approvals, or system monitoring.
* **Multi-agent collaboration**, where specialized agents coordinate tasks (e.g., one for analysis, one for summarizing).