Lecture 01: Introduction to Agentic AI

🎯 Learning Objectives

By the end of this lecture, you should be able to:

- Define what agentic AI is and how it differs from traditional AI systems.
- Understand the core components of an agent (e.g., perception, reasoning, action).
- Recognize real-world examples of agentic behavior.
- Grasp the motivation for integrating agency into large language models (LLMs).

🧩 Key Concepts

- **Agent**: An entity that perceives its environment and acts upon it to achieve goals.
- **Agentic AI**: AI systems that exhibit autonomy, decision-making, and goal pursuit over time.
- **Traditional AI vs. Agentic AI**:
    - *Traditional AI*: Often task-specific (e.g., classification, translation).
    - *Agentic AI*: Embeds reasoning, planning, memory, tool use, and goal adaptation.

Components of Agentic AI

- **Perception**: Ingests input from the environment (e.g., user input, documents).
- **Memory**: Stores relevant past information for long-term use.
- **Planning**: Breaks goals into subtasks and organizes actions.
- **Action**: Executes commands, queries APIs, or invokes tools to accomplish tasks.

Why LLMs are Well-Suited for Agentic AI

- Natural language understanding and reasoning
- Broad general-purpose capabilities
- Flexible prompting and tool integration

🛠️ Required Tools/Libraries

- None required (conceptual introduction)
- *Optional*: Diagramming tools (e.g., draw.io, Excalidraw)

🧑‍⚖️ Hands-on Exercise: "Agent or Not?"

Create a table of at least 8 real-world systems (human, software, or robotic) and classify each as:

- ☑ Agentic
- ✖ Non-agentic

Justify your classification based on whether the system can perceive, plan, and act autonomously.

System	Agentic?	Why / Why Not?
Siri	☑	Perceives voice, makes decisions, takes actions
Excel spreadsheet	✘	Passive tool, requires user to act
Roomba	☑	Perceives environment, navigates, avoids objects
Traditional ML model	✘	Static prediction, no ongoing action or planning
GPS Navigation System	☑	Updates route based on traffic, gives directions
Static Webpage	✘	Displays content but takes no autonomous action
Customer Support Bot	☑	Responds to queries, may escalate, routes tasks
Video Game AI Opponent	☑	Makes decisions based on user actions in-game

Bonus: Sketch or diagram the **Perception** → **Memory** → **Planning** → **Action** loop of an agentic system.