Topic 1

AI (Artificial Intelligence): is when computers or machines are made to think and learn like humans.

Goal of AI:
1-To create a system that can perform task requiring humain intelligence
2-Able to solve a complex task
3-At like humain

Advantages of AI:
perform task very faster
useful for risky areas(take risk with robot instead of humain)
saving time
reducing errors
No tiredness

Disadvantages of AI
Leading to unemployment
high cost
No feelings and emotion
privacy concerts

Approches of AI
1-**System thinks like huma**n : Tries to copy how humans think.
Example: Problem-solving like a human brain.
2-**System that thinks rationally**
Tries to think logically and follow rules.Example: Solving math or logic puzzles correctly.
3-**System that acts like a human**
Tries to behave like humans (talk, walk, react).
Example: Humanoid robots, chatbots.
4-**System that acts rationally**
Makes the best decision for a goal.
Example: Self-driving cars choosing best route safely.

TYPE OF AI (3)
Mundane Tasks (Everyday human tasks):
Things we do daily, often without thinking.
Example: Talking, seeing, walking, recognizing faces, understanding speech.

Expert Tasks (Professional skills):Tasks that need expert knowledge in a field.
Example: Diagnosing diseases, fixing machines, trading stocks.

Formal Tasks (Math, logic, games):Tasks with clear rules and logic.
Example: Solving puzzles, playing chess, doing math.

TOPIC 2

A Logical Agent is an AI system that Thinks using logic

Types of Knowledge

1. **Declarative – Facts (e.g., AIU is in Alor Setar)**
2. **Procedural – Steps (e.g., how to make eggs)**
3. **Structural – Relationships (e.g., CPU is part of computer)**
4. **Heuristic – Experience (e.g., if fever > 102°F, go to doctor)**
5. **Meta-knowledge – Knowledge about knowledge (e.g., check sources)**

📚 Dimensions of Knowledge

1. **Posteriori – Comes from experience (e.g., ice is cold)**
2. **Priori – Always true (e.g., cloud has no pillar)**
3. **Tacit – In your head, hard to explain (e.g., riding a bike)**
4. **Explicit – Written or recorded (e.g., books, videos)**

🧠 Knowledge-Based Agent

- **Uses internal facts to make smart decisions**

💾 Knowledge Representation

How we store facts in AI.
3 ways:

1. **Logic-based**

2. **Rule-based**
3. **Object-based**

➕ Logic in AI

- **Uses rules and facts to make decisions**
- **Helps AI think clearly and correctly**

🔢 Propositional Logic (Basic Logic)

- **Uses simple statements that are true or false**
- **Example:**
  “If the sky is blue and windy → it’s good for picnic”
  Written as: `P ∧ Q → R`

📊 Truth Table

- **Shows all possible true/false values**
- **Helps check if logic is correct**

❌ Limits of Propositional Logic

- **Can’t say "some", "all", or "none"**
- **Example: Can’t fully say “All humans are mortal”**

✅ First Order Logic (FOL) or Predicate Logic

- **Fixes those limits**
- **Can use quantifiers:**
    - **∀ (For all)**
    - **∃ (There exists)**

Examples:

- **∀x (Bird(x) → HasFeathers(x))**
  → All birds have feathers
- **∃x (Cat(x) ∧ Black(x))**
  → Some cats are black

🕸️ Semantic Network

- **Shows knowledge like a map or graph**
- **Objects = nodes, Relationships = lines (arcs)**
- **Example:**
  Object: "Flashdance" → is a Horse → owned by "Morrison"

Topic 3

WHAT IS AN AGENT?- An agent is something that can sense (see or feel) and act.- It gets info from around it and does something

Examples: - Human: eyes and ears (sensors), hands and legs (actuators) - Robot: cameras (sensors), wheels (actuators) - Software: reads files (sensor), writes files (actuator

WHAT IS AN ENVIRONMENT?- The place around the agent

FEATURES OF ENVIRONMENTS -

Observable: sees everything.

- Partially observable: sees only some.

- Deterministic: clear result.

- Stochastic: random result

. - Strategic: many agents involved. - Episodic: each task is separate. - Sequential: one task affects the next. - Static: doesn't change.

- Dynamic: keeps changing.

- Discrete: has fixed steps.

- Continuous: many steps.

Single-agent: one agent works.

- Multi-agent: many agents work.

PEAS FRAMEWORK (To describe an agent)

- P = Performance (goal: speed, safety, etc.)

- E = Environment (place, people, machines)

- A = Actuators (do things)

- S = Sensors (see or feel things)