Artificial intelligence

FACULTY OF AI & MMG
LECTURE – 01

How to reach me?

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Course Guidelines

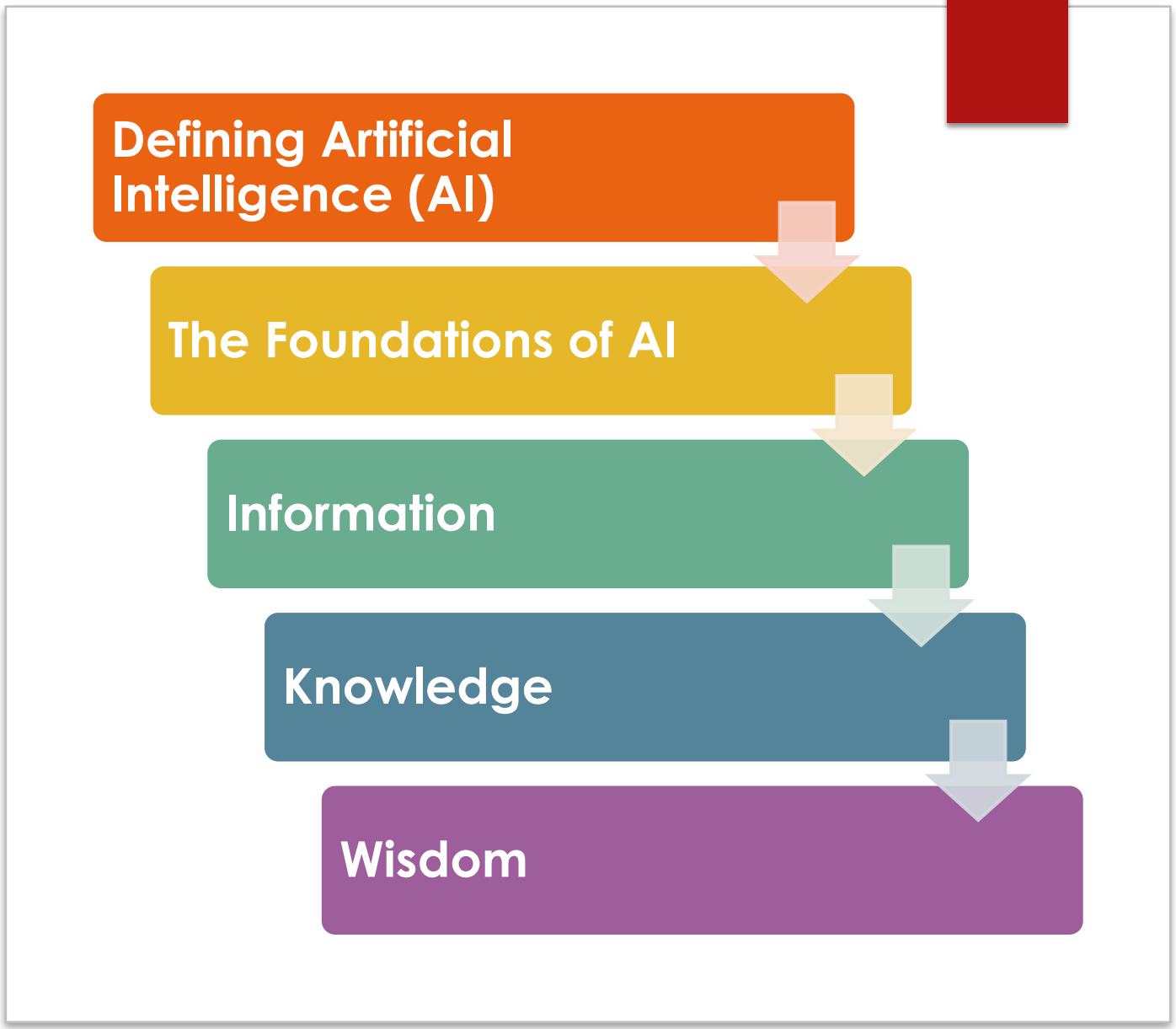
- Attendance must be at least 75%
- Discipline
- MobilePhone is **strictly prohibited** during class.
- There will be quizzes / assignments / presentation in every class
- Course related material will be uploaded in Classroom
- Class Room Code:

Marks Distribution

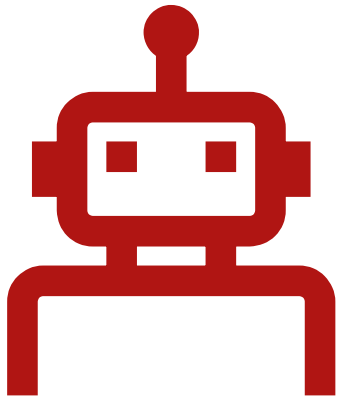
Nature of Examination (Theory)	**Max. marks**
Sessional marks (quiz, assignment, Presentation, Practical)	30
Midterm Examinations	30
Final Examinations	40
Total marks	**100**

Nature of Examination (Practical)	**Max. marks**
Practical Exam	20
Viva, Discussion, Presentation	15
Manuals, Project File etc	15
Total marks	**50**

Content

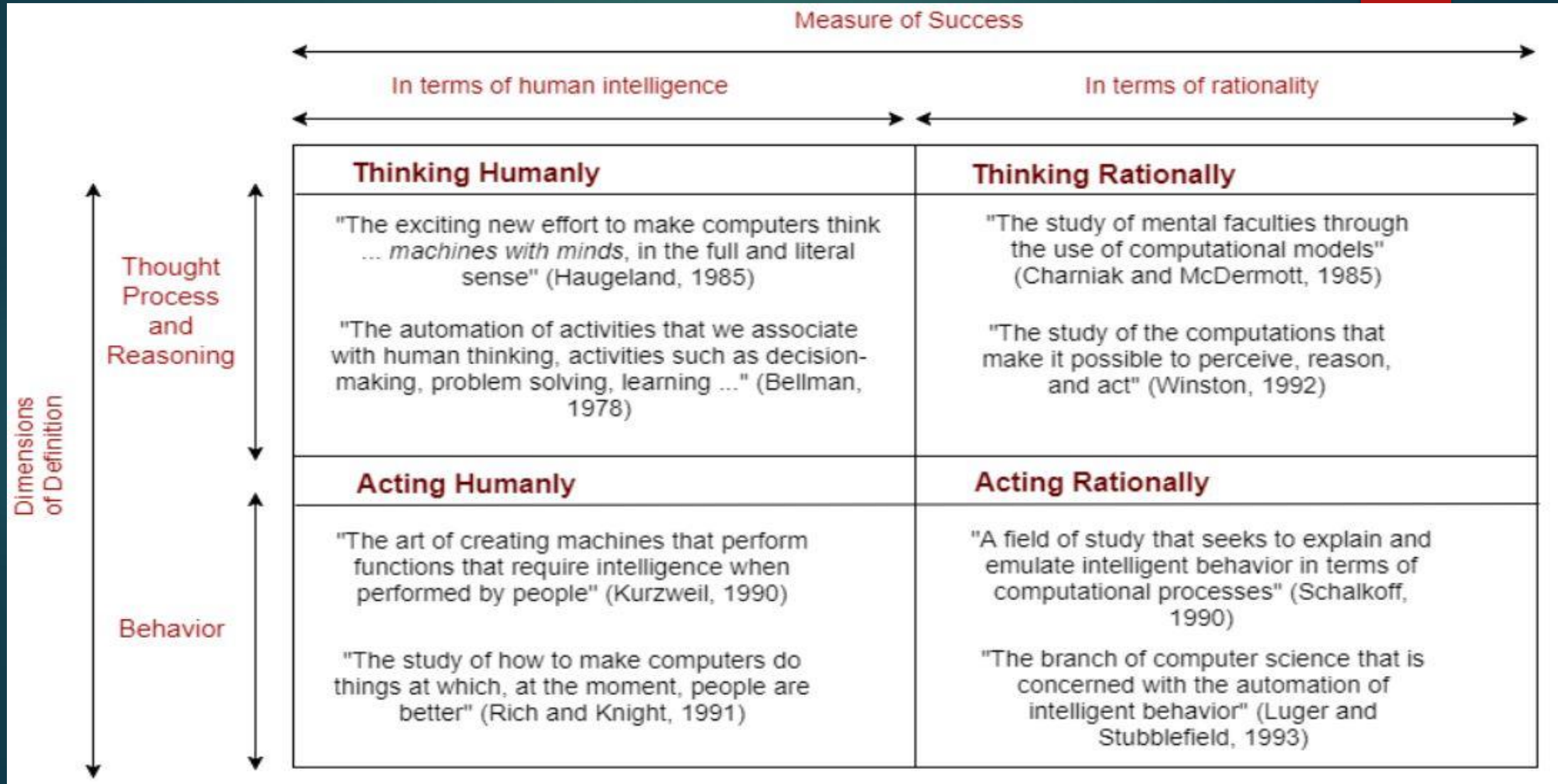

Defining Artificial Intelligence (AI)
The Foundations of AI
Information
Knowledge
Wisdom

Defining artificial intelligence (AI)



- Artificial Intelligence (AI) is a branch of computer science focused on **creating systems and machines** capable of performing tasks that typically **require human intelligence.**
- These tasks include **learning from experience, understanding natural language, recognizing patterns, solving problems, and making decisions.**
- AI aims to develop algorithms and technologies that **enable machines to mimic** or simulate aspects of **human cognition and behavior**.

Defining ai - Four perspectives of ai

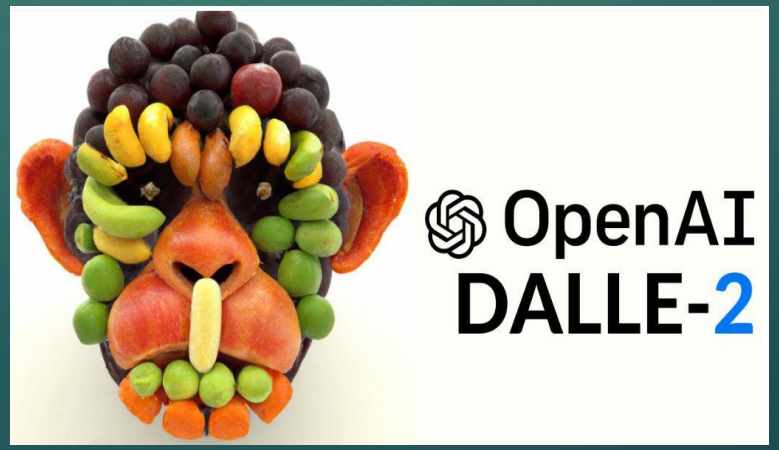


Summary of Quadrants:

Category	Focus	Key Approach	Examples
Thinking Humanly	Mimic human thinking processes.	Replicate human reasoning and decision-making.	Expert Systems, Human-Emulated AI
Thinking Rationally	Study rational thought and its computational model.	Logical, rule-based thinking and computational models.	Mathematical algorithms, Logical Reasoning Systems
Acting Humanly	Mimic human-like behavior in tasks.	Create machines that **act** like humans in behavior.	Chatbots, Robotics, Customer Service AI
Acting Rationally	Achieve optimal, effective task performance based on computations.	Machines that perform optimally based on computations rather than human mimicry.	Autonomous Vehicles, Decision-making Systems, Robotic Process Automation

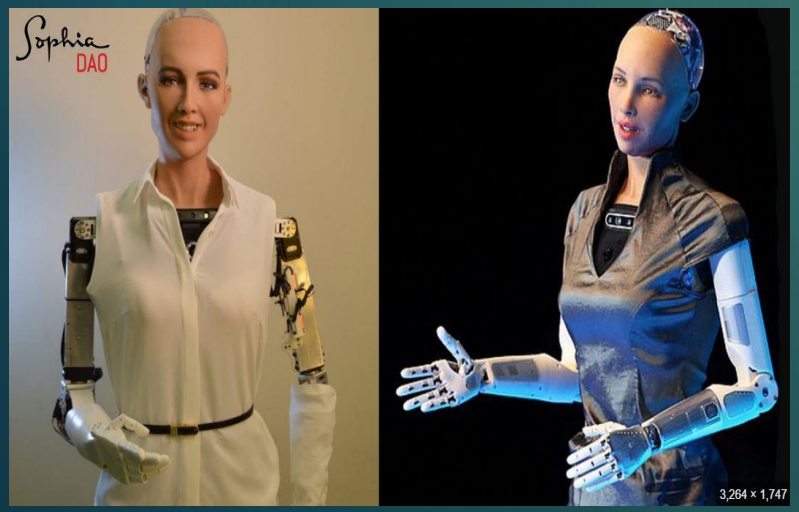
Defining ai – thinking humanly

- Systems that "think like humans" aim to replicate human-like cognitive processes, such as learning, reasoning, problem-solving, and decision-making.
- Cognitive science is used in this model.
- Examples: AphaGO, DALL-E (OpenAI), Aiva, etc



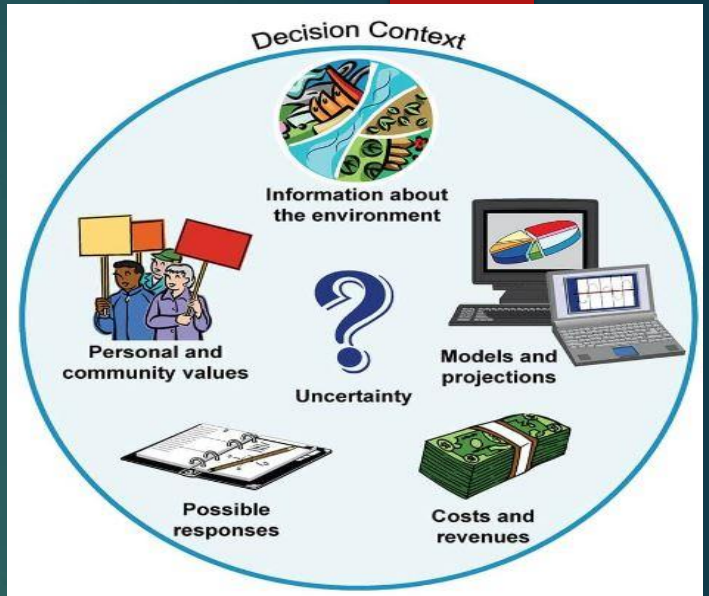
Defining ai – acting humanly

- Systems that "act humanly" are designed to exhibit behaviors and interactions that mimic human actions, emotions, and responses. AI aims to develop algorithms and technologies that enable machines to mimic or simulate aspects of human cognition and behavior.
- These systems focus on creating interactions that feel natural and intuitive to humans.
- Examples: Sophia (Hanson Robotics), Replika, NPCs (Non-Player Characters) in Video Games, etc.



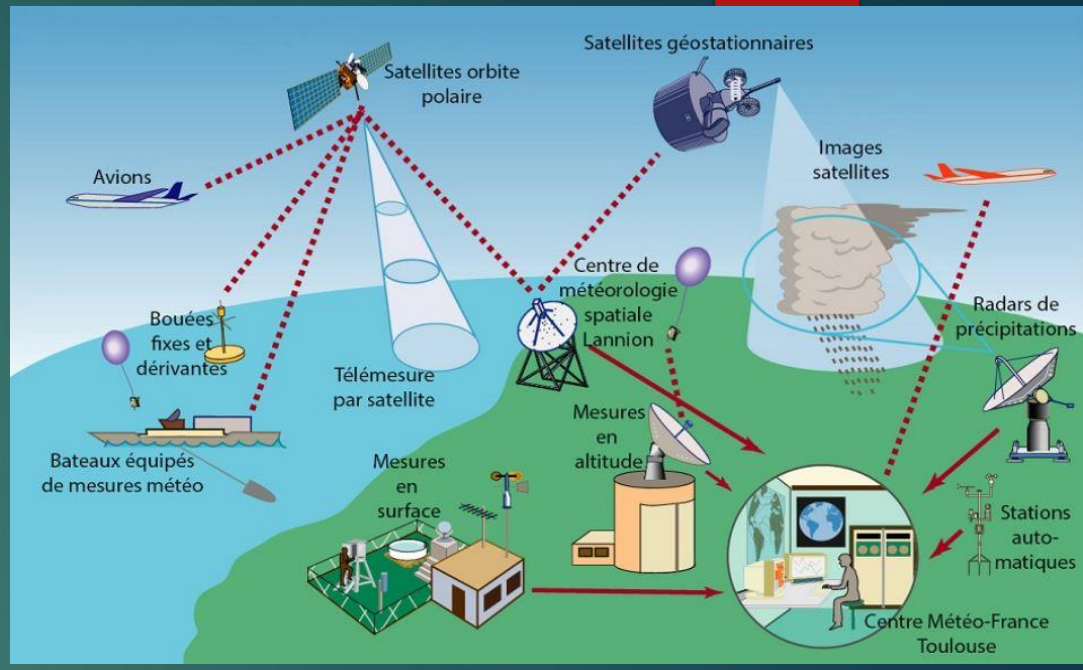
Defining ai – thinking rationally

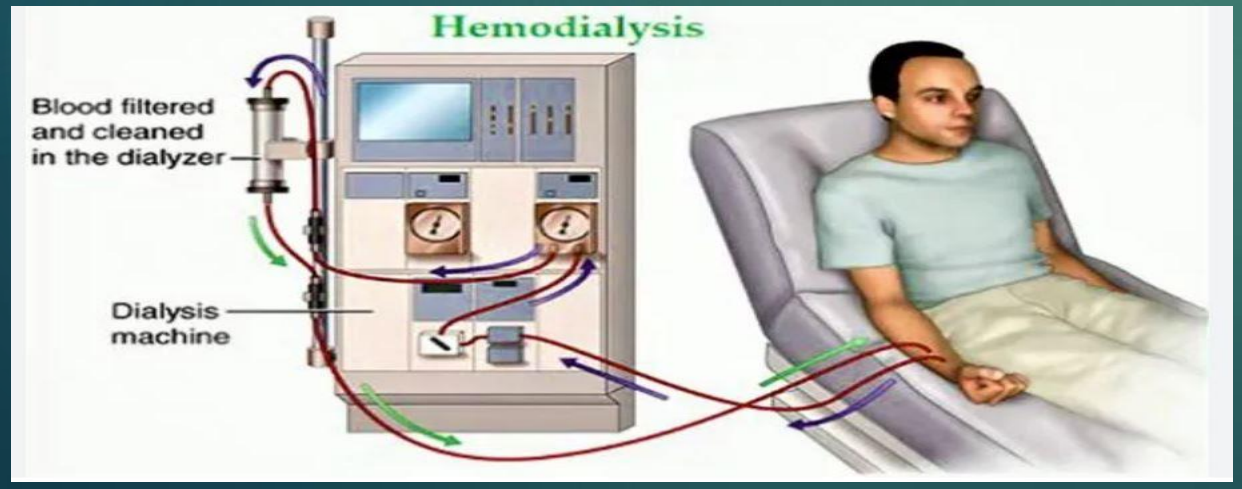
- Systems that are designed to make decisions and solve problems in a logically consistent and optimal way.
- Rational thinking involves making decisions based on reason and logic rather than emotions or subjective biases.
- Rational systems aim to achieve specific goals based on their understanding of the environment.
- Example: Medical Diagnosis System, Personal Finance Management, Business Decision Making, etc.



Defining ai – Acting rationally

- "Acting rationally" refers to making decisions or taking actions that are logically aligned with one's goals, knowledge, and circumstances.
- It involves choosing the best course of action based on reason, evidence, and a clear understanding of the potential outcomes.
- Acting rationally involves gathering and analyzing relevant information before making a decision. This could include data, past experiences, expert opinions, and empirical research.
- Example: Dialysis Machine, Weather Prediction System, Fire Alarm System etc.





Foundations of ai

- Various disciplines that contributed ideas, viewpoints and technique to AI are given below:
  - Philosophy → reasoning, logic, ethics, concept of mind and intelligence.
  - Mathematics & Statistics → probability, optimization, algorithms, learning theory.
  - Economics → decision theory, game theory, rational agents, utility optimization.
  - Neuroscience → inspiration for neural networks and brain-like processing.
  - Psychology → cognition, learning behavior, problem-solving models.
  - Computer Science & Engineering → programming, data structures, efficient algorithms.
  - Control Theory & Cybernetics → feedback systems, robotics, adaptive control.
  - Linguistics → natural language processing, grammar rules, semantics.