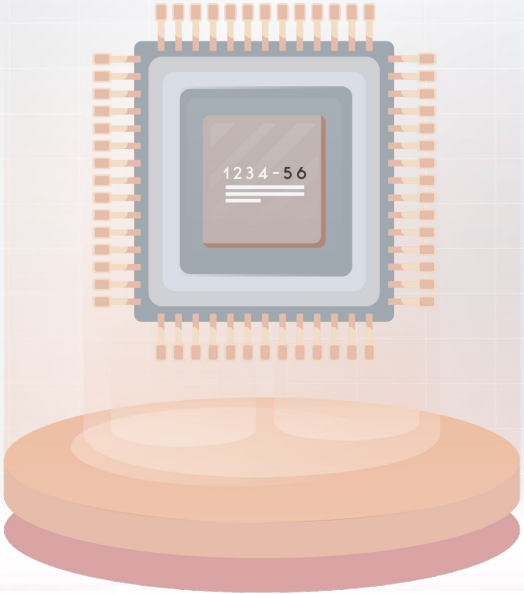
ARTIFICIAL INTELLIGENCE

RATNA MUFIDAH, S.Kom., M.Kom.



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INTRODUCTION

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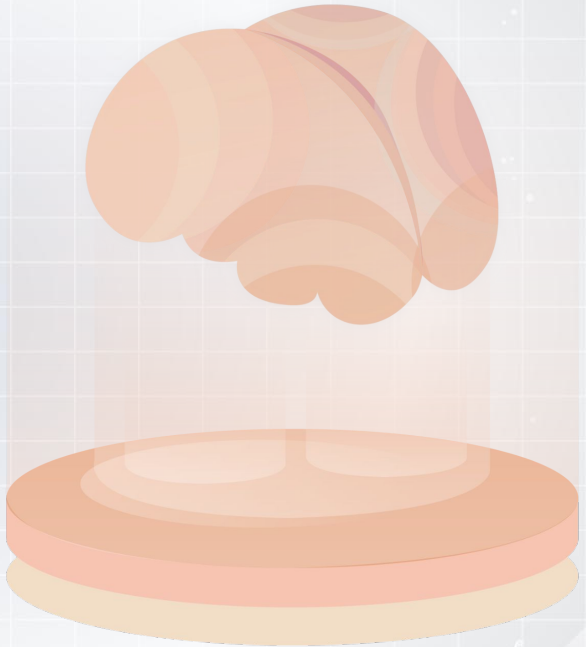
Ratna Mufidah, S.Kom., M.Kom.

Email : ratna.mufidah@cs.unsika.ac.id
WA : 08179643172



GOALS

- **Understand** concept and techniques of artificial intelligence
- Able to **implement** artificial intelligence techniques **to solve a problem**

SYLLABUS

1	Artificial Intelligence Concept (Class Discussion)
2	Intelligent Agent (Class Discussion/ Quiz)
3	Knowledge Representation (Practicum)
4	Searching Algorithm (Assignment, Practicum)
5	Uncertainty (Practicum)
6	Fuzzy Logic (Practicum)
7	Case Study (Class Discussion, Practicum)
8	Midterm Exam
9	Artificial Neural Network (Practicum)
10	Genetic Algorithm (Class Discussion, Practicum)
11	Expert System (Practicum)
12	Natural Language Processing (Assignment, Practicum)
13	Machine Learning (Class Discussion, Practicum)
14	Paper Review/ Project progress report
15	Paper Review/ Project progress report
16	Final Exam

IMPORTANT INFORMATION

Programming Language

Python (Google Colab)

Final Project

- Group project (3-4 member)
- Applying one of the techniques and methods of the Artificial Intelligence in Project Development

Output

- ANALYSIS REPORT
- SCIENTIFIC PAPER (publication draft)

REFERENCES

Taulli, Tom. 2019. ***Artificial Intelligence Basics: A Non-Technical Introduction 1st ed. Edition***. New York: Apress.

Russell, Stuart; dan Norvig, Peter. 2010. ***Artificial Intelligence A Modern Approach. International Edition***, ***3rd Edition.***. New Jersey: Pearson PrenticeHall Education International.

Rich,E. dan Knight, K. 2009. ***Artificial Intelligence. 3rd Edition***. New York: McGrawHill Inc.

Journals and proceedings of IEEE, ScienceDirect, ACM

https://www.python.org/

ASSESSMENT PERCENTAGES

10%

Assignments
(except for final project)

50%

Process
(Practicum 45%, Final Project 40%,
Class Discussion/ Quiz 15%)

15%

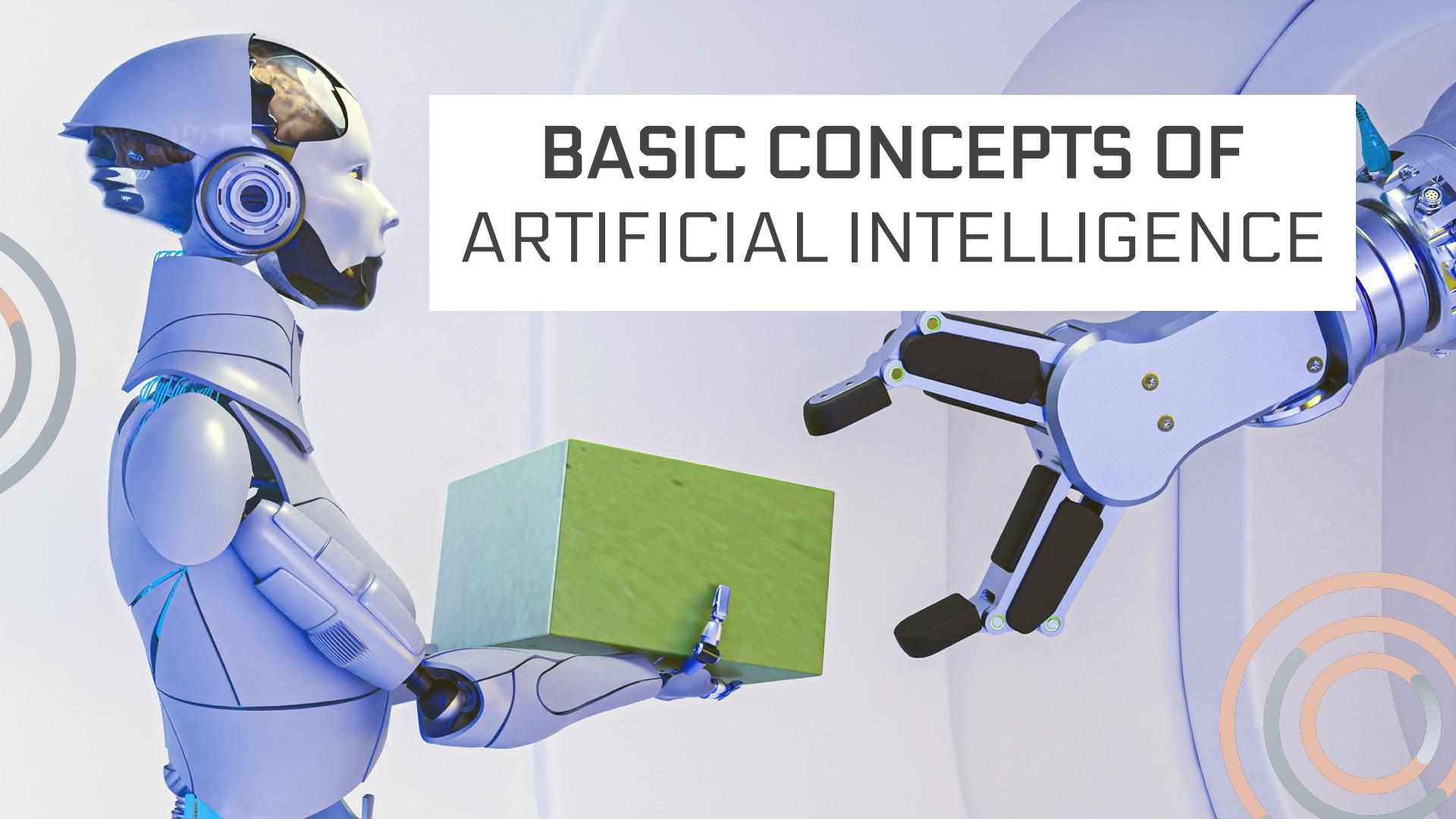
Midterm Exam

25%

Final Exam

RULES of THE CLASS

1. **Arrive on Time** (**15 minutes** tolerance of lateness).
2. **Raise your hand** to speak or volunteer.
3. **Raise your hand** if you have a question and wait to be called on.
4. **Respect everyone** in the class.
5. **Do not cheat or copy** other people's work.
6. **Take pride in your work** and **hand it in on time**.
7. Always **try your best**. **Never give up**!



BASIC CONCEPTS OF ARTIFICIAL INTELLIGENCE

Picture source: https://www.halodoc.com/

HUMAN INTELLIGENCE ???

Picture source: https://www.merdeka.com/

HUMAN INTELLIGENCE

1. Ability to learn from experience
2. Adaptability to new environment/ new situation
3. Ability to come up with creative ideas
4. Ability to change environment according to the knowledge acquired

ARTIFICIAL INTELLIGENCE ???

ARTIFICIAL INTELLIGENCE

AI is a **branch of computer science** that learn how to **build machines (computer) capable of performing tasks as well as done by humans** or even be **better than what humans do**.

ARTIFICIAL INTELLIGENCE **APPROACHES**

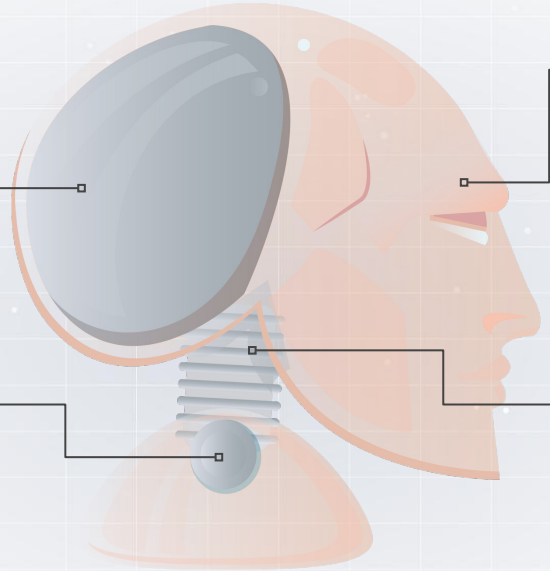
(Russel and Norvig)

THINKING HUMANLY

System think like human

THINKING RATIONALLY

System think rational



ACTING HUMANLY

System act like human

ACTING RATIONALLY

System act rational

1st APPROACH (Thinking Humanly)

- Learn how the human brain works
- Learn how human think

2nd APPROACH (Thinking Rationally)

- This approach is primarily based on logic
- Logic-based AI system uses a set of rules, called a **syllogism**, that is used to draw a conclusions

Lack:

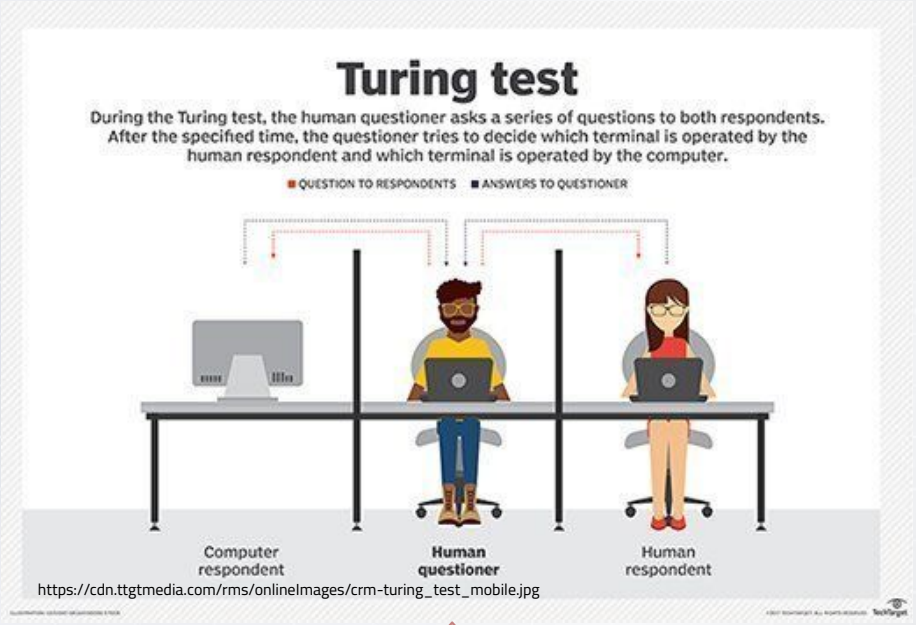
1. It is difficult to know all the rules in a complex world to draw logical conclusions

2. It is difficult to translate informal knowledge into logical rules

3. It is difficult to ascertain whether the knowledge it's right or wrong

3rd APPROACH (Acting Humanly)

The most popular approach is the Turing Test, proposed by Alan Turing (1950).



https://cdn.ttgtmedia.com/rms/onlineImages/crm-turing_test_mobile.jpg

https://otto-lang.medium.com/what-is-ai-an-explanation-by-the-4-different-schools-of-thought-74a85ebecda2

4th APPROACH (Acting Rationally) –

The rational agent approach

A rational agent is an **agent that acts to achieve** its **best performance** for a **given task.**

The "Logical Approach" to AI emphasizes correct inferences and achieving a correct inference is a part of the rational agent.

But all correct inferences cannot be called rationality, because there are situations that don't always have a correct thing to do. It is also possible to act rationally without involving inferences. Our reflex actions are considered as the best examples of acting rationally without inference.

https://www.gopichandrakesan.com/day-20-acting-rationally-the-rational-agent-approach-artificial-intelligence/

4th APPROACH (Acting Rationally) –
The rational agent approach

The rational agent approach to AI has a couple of advantages over other approaches:

- A correct inference is considered a possible way to achieve rationality but is not always required to achieve rationality.
- It is a more manageable scientific approach to define rationality than others that are based on human behavior or human thought.

https://www.gopichandrakesan.com/day-20-acting-rationally-the-rational-agent-approach-artificial-intelligence/

Artificial Intelligence vs Natural Intelligence

More permanent	Change fast
Easier to duplicate and distribute	It takes a long process and time
Cheaper	More expensive (experts)
Be consistent	It can change (change for the better or change for the worse)
Can be documented	Difficult to document
Can do tasks faster and better than natural intelligence	Limited
Using symbolic input	Based on direct experience

Artificial Intelligence vs Convetional Computing

Artificial Intelligence

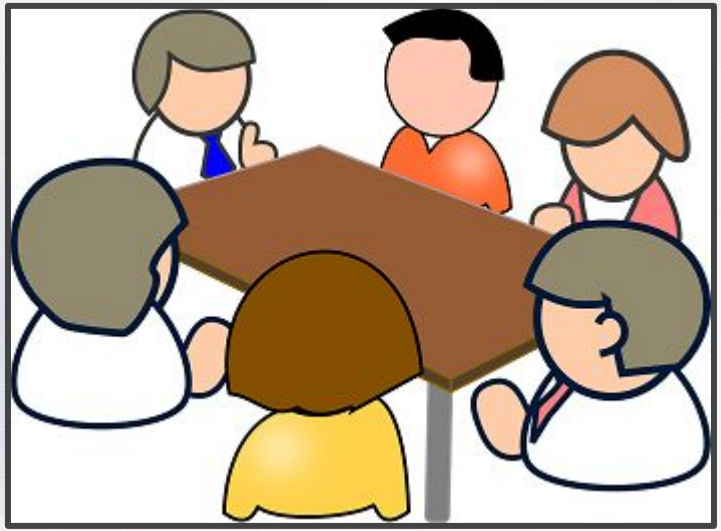
- AI software uses the techniques of search and pattern matching
- Programmers design AI software to give the computer only the problem, not the steps necessary to solve it

Conventional Computing

- Conventional computer software follow a logical series of steps to reach a conclusion
- Computer programmers originally designed software that accomplished tasks by completing algorithms

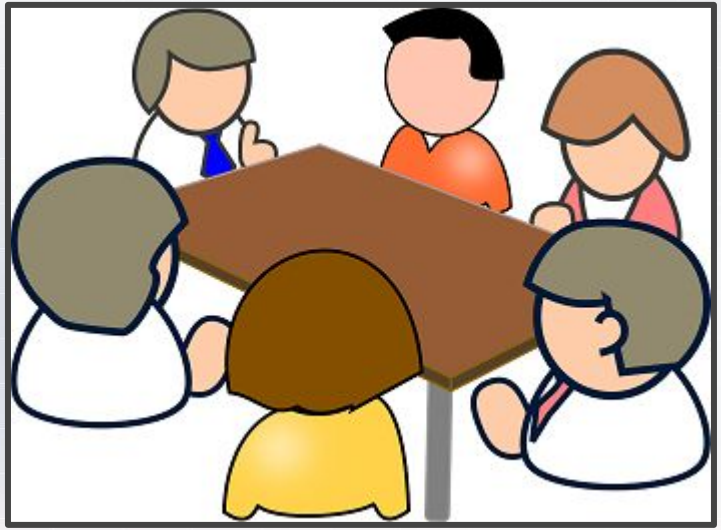
Class Discussion (30 minutes)

1. The class will be divided into several groups
2. One group consists of 4 to 5 members
3. Group discussions are held for 30 minutes
4. The results of the group discussion will be presented in front of the class for 10 to 15 minutes
5. Each group will get 1 to 2 questions from other groups



Discussion Materials

1. Is AI needed? Why?
2. Give two examples of AI implementation in the real world. Please explain it!
3. How do you think about the current trends of AI?
4. What are the positive and negative impacts of AI? Please explain it!



THANKS!

See You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