COMP 3200
Intro to Artificial Intelligence

Lecture 1

What is Artificial Intelligence?

AI Categories + Examples

Applications of AI

Intro to Artificial Intelligence

- “Classical” AI algorithms
  - Single Agent Search
  - Adversarial Search
  - Optimizations / Data Structures
  - Constraint Satisfaction
  - Evolutionary Algorithms
  - Reinforcement Learning
  - Intro to Neural Networks

Course Goal is to:

- Learn about Artificial Intelligence
- Implement algorithms from scratch
- Learn how to identify problems, choose representations, and find solutions
- Understand which algorithms to use in specific scenarios, benefits and drawbacks

Course Structure

- Lectures:
  - Tuesday / Thursday
  - No mandatory text, lectures are important
- Online Sessions / Help:
  - I’m always available via email
  - Office Hours: Thursday 3:30pm to 5:00pm
  - I’m available on Discord (Dave’s Courses) (please do not share discord info with public)

Lecture Notes / Textbook

- Textbook is not required, but is useful for study
- As such, the slides are designed to be study material, so there is more text than usual
- You should be able to do all assignments and study for exams from these slides
- Class lectures are a mix of reading from slides as well as other demos, with many visuals
- Slides will be given as PDF (no animations)

Assignments / Exams

- Assignments
  - 5 total assignments
  - Assignments worth 35% of course mark
  - Groups of up to 2, no contact with other groups
  - Each assignment will be to apply a learned algorithm to a simple game-like environment
- Midterm + Final Exams (65% of course mark)
  - Group work + generative AI = hard to trust assignments only
  - Written exams only real way to test learned knowledge
  - Exams are comprehensive but very fair

Assignment Notes

- Each groups gets one "no questions asked" 48-hour extension (assignments only, use it wisely)
  - TA will notice late assignment and ask if you want to use it
  - No need to contact me beforehand
- Every assignment is due at 11:59pm on the due date
- Unlimited submissions allowed, submit early
- Only last submission is kept
- You lose 5% per hour that the assignment is late, rounded up (1 min = 5%, 62 min = 10%, etc)
- If special circumstance (sick, etc) contact me

JS Programming

- Many students have completed the course with no JS knowledge beforehand
- I give you a GUI, you write backend algo
- We will be using very basic JS
  - Loops, Functions, Classes, Objects, Arrays
- Will not need to use a specific IDE
  - Recommend Visual Studio Code (vscode)

Cheating / Plagiarism

- All work is going to be group work
- Keep discussion of assignments and the project entirely within your own group
- We will be checking VERY CLOSELY for cheating, and punishing it strictly
- There are valid excuses to be late, miss work, miss class, etc: but never to cheat

Academic Misconduct:

I take academic misconduct very seriously. Anyone found cheating in this course will receive the harshest possible academic penalties. Academic misconduct for this course includes (but is not limited to) the following:

- Handing in any material for evaluation that was done outside you /your group
- Obtaining solutions from ANY non-class source, such anyone outside of your group, previous course offerings, stack overflow, ChatGPT, etc
- Sharing assignment or exam questions outside of the course for any reason, including assignment sharing websites or online repos such as GitHub
- Reverse engineering any obfuscated solution code that may be given to you

No use of any automatic code generation software or services is allowed in this course for any reason. This includes, but is not limited to: generative AI, LLMs, co-pilots, etc.

Anti Cheating Measures

- All assignment files will be personalized and sent directly to your email
  - Name, Student Number, email, etc
  - Other steganographic information inserted
- Any files leaked to other groups or online will be traceable back to original students
- Large repository of past assignments to do code difference checking with

Anti Cheating Measures

- We periodically search online / GitHub for code related to the course
  - Have had code removed under DMCA request
- Ensure any repository is made private
- You may not release any source code written for this course at any time for any reason (now or in the future)


OLD MAN YELLS AT CLOUD

AI Generated Code

- It is impossible to give an assignment that students can solve but AI can’t
- This presents a very difficult situation for education as these tools improve
- The temptation to press 3 buttons and have your assignment completed for you is very strong, but a dangerous one

AI Generated Code

- The point of university is misunderstood
- The point of this class is not to just collect working assignments; I have lots of those
- The point of this class is to give students the knowledge and skills to solve those assignments on their own
- This is a very important distinction

AI Generated Code

- There are two ‘solutions’ to this problem

1. Catch students who hand in AI generated code and punish them academically
2. Convince students that it is extremely beneficial to them to not use AI tools to automatically solve their problems

Using AI Tools Effectively

- There are two ways to use AI tools

1. Prompt the tools with the assignment problem and get it to solve it for you
2. Solve the problem(s) yourself and use the AI tool to help with small coding issues such as syntax or API calls

Using AI Tools Effectively

- If you use AI tools as an API reference to help you learn how to solve the problems on your own, this is incredibly powerful
  - "How do I sort a vector" etc
- If you use AI tools to implement the code for you and then just copy/paste to your assignments, this is cheating, and harmful for learning
- Never under any circumstances submit or push a single line of code from AI you don't understand

AI Tools in Industry

- You will be using AI tools to implement code for you in a future industry job
- This is to save time by having AI write code that you already understand and could have written on your own
- Even at your jobs, you shouldn’t use AI to implement things you don’t understand

AI tools should type for you

They should not think for you

AI Tools in Industry

- Getting a job requires passing an interview
- You will not have AI in an interview
- If you take shortcuts now while you have this chance to learn, you will regret it
- I speak to many people who comment on how interview skills have gone way down in the past 2-3 years due to AI usage

Final Thoughts on AI

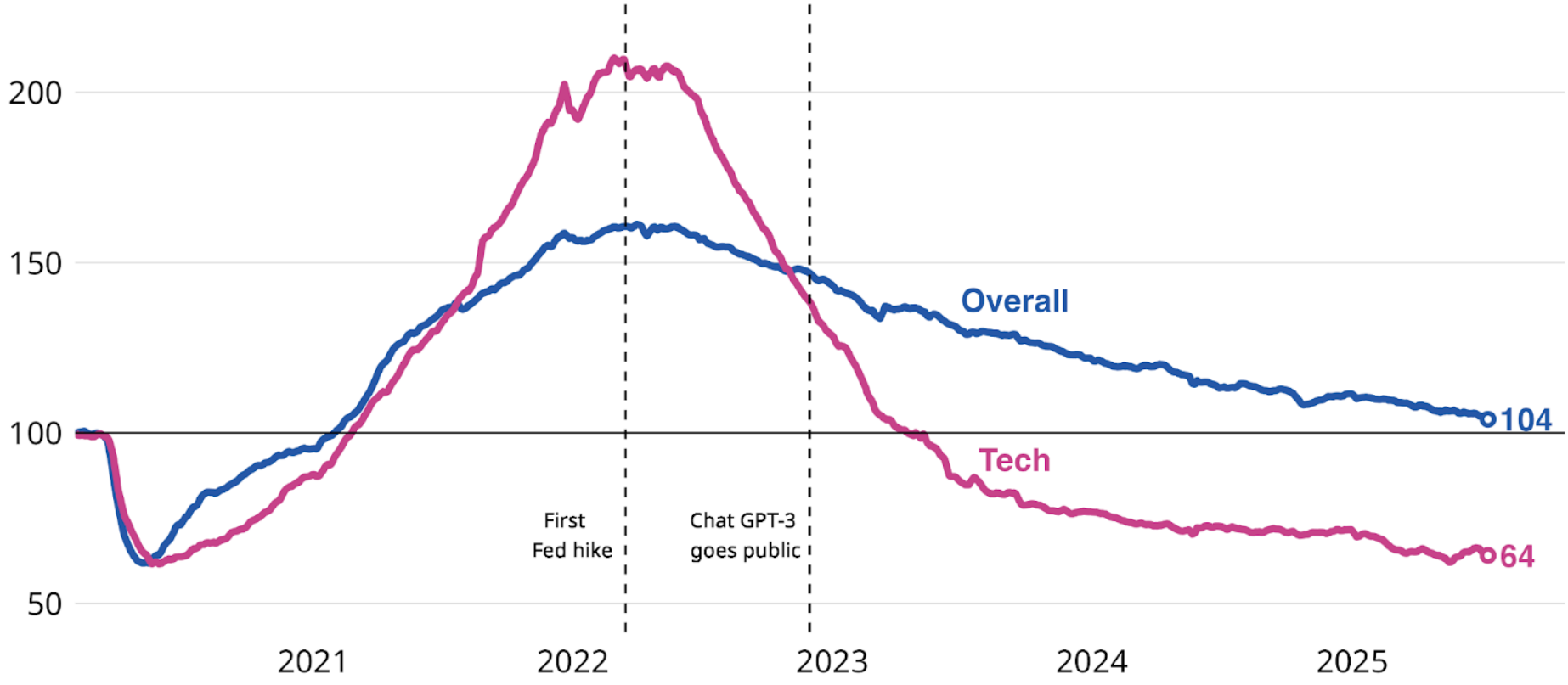
- AI is a useful tool to enhance productivity
- AI can be used to help learn topics
- You will need the knowledge on your own to pass an interview to get a job
- Use school to actually acquire knowledge, practice, and get better at the skills
- Use AI as much as you want at the job

Real-World Consequences

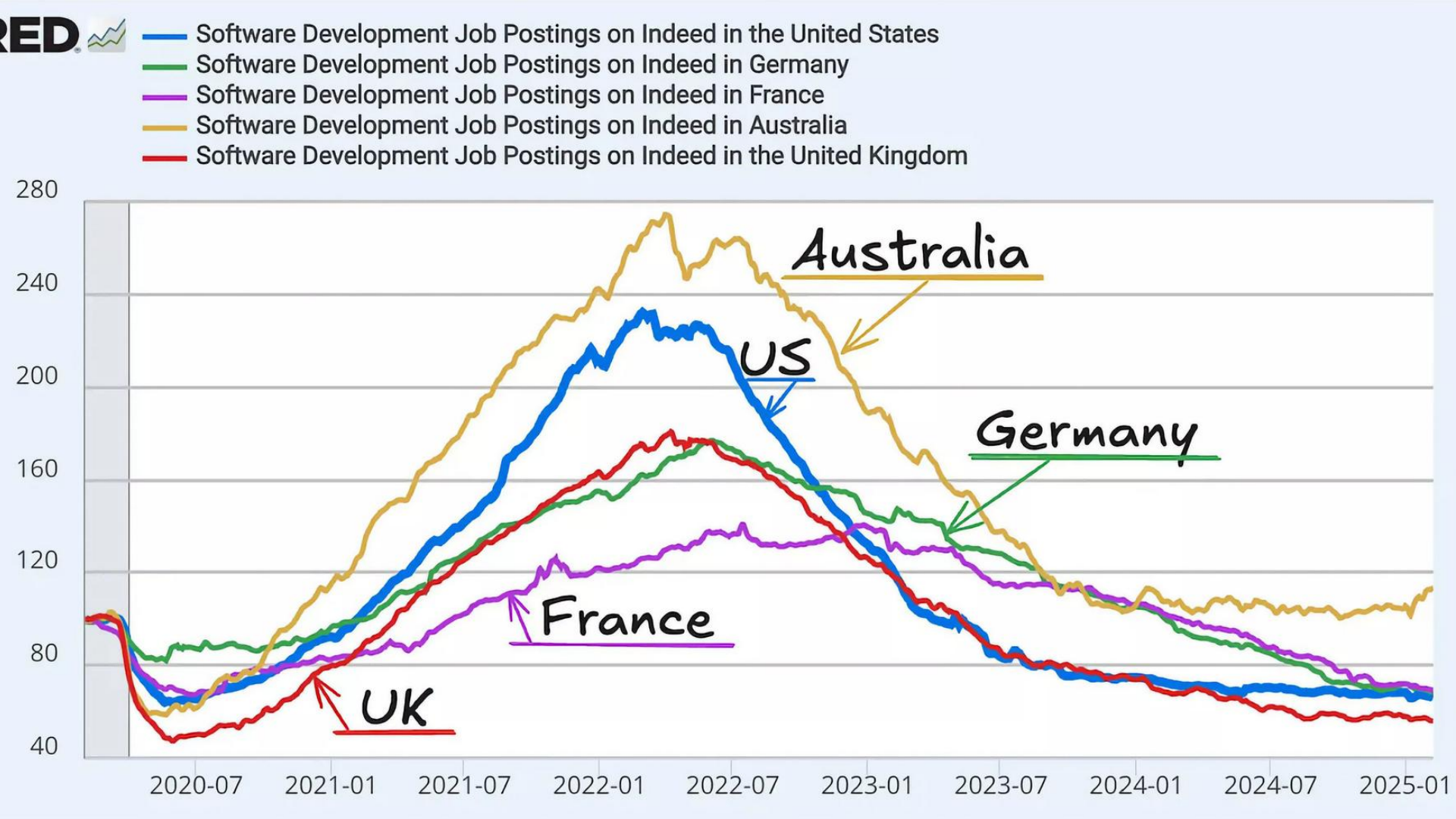
- 2 years ago, I had companies calling me asking for recommendations of good students to hire
- In 2025, my best students are struggling to get internships, co-ops, interviews, etc
- Tech job market in St. John's has gone down significantly in past 1-2 years
- Use this course as a way to practice the skills that you will need to get a job. A piece of paper saying you graduated is no longer sufficient

U.S. tech job postings have gone from boom to bust

U.S. job posting index (Feb-2020 = 100)

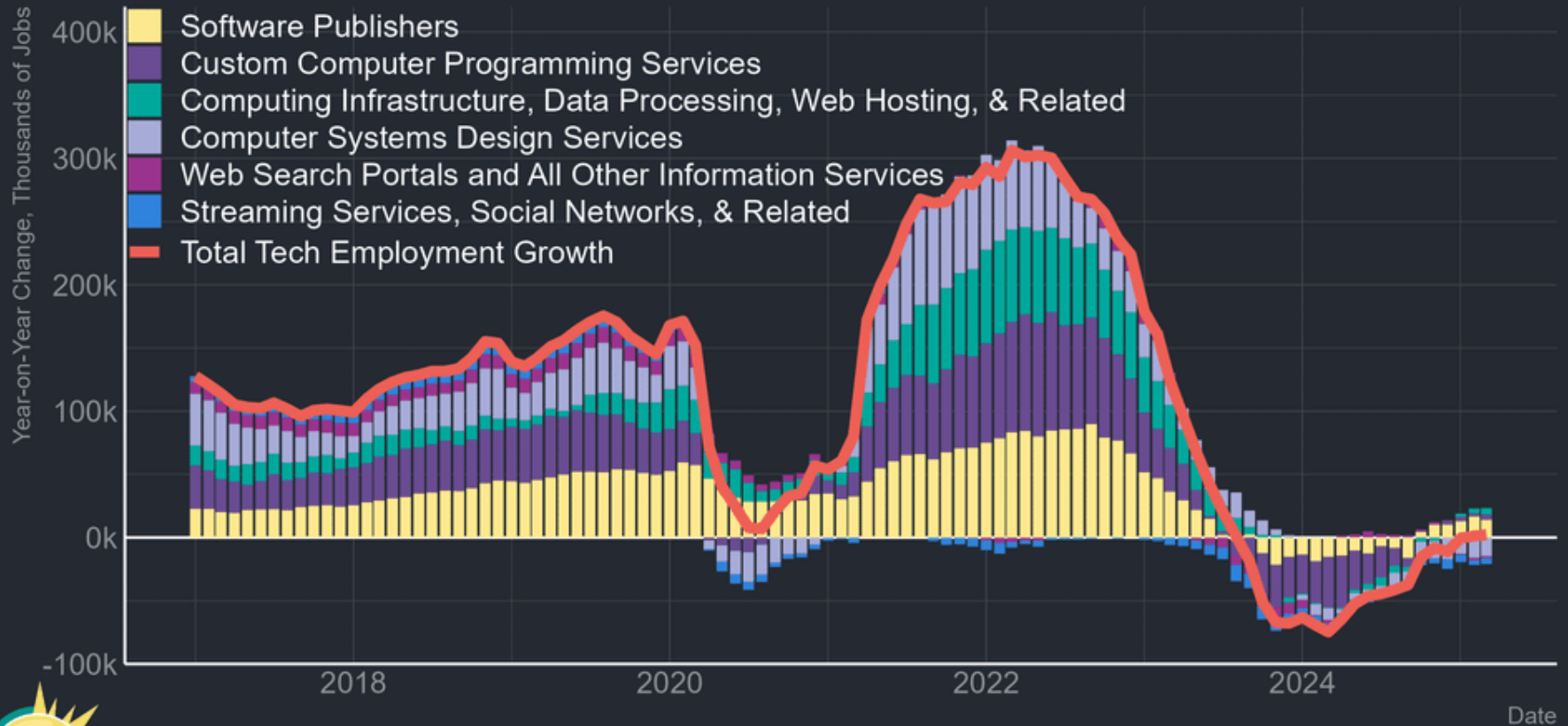


Source: Indeed, last data point: July 11, 2025, seasonally adjusted


Software Development Job Postings on Indeed in the United States
Software Development Job Postings on Indeed in Germany
Software Development Job Postings on Indeed in France
Software Development Job Postings on Indeed in Australia
Software Development Job Postings on Indeed in the United Kingdom
280
240
200
160
120
80
40
Australia
US
Germany
France
UK
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
2024-01
2024-07
2025-01

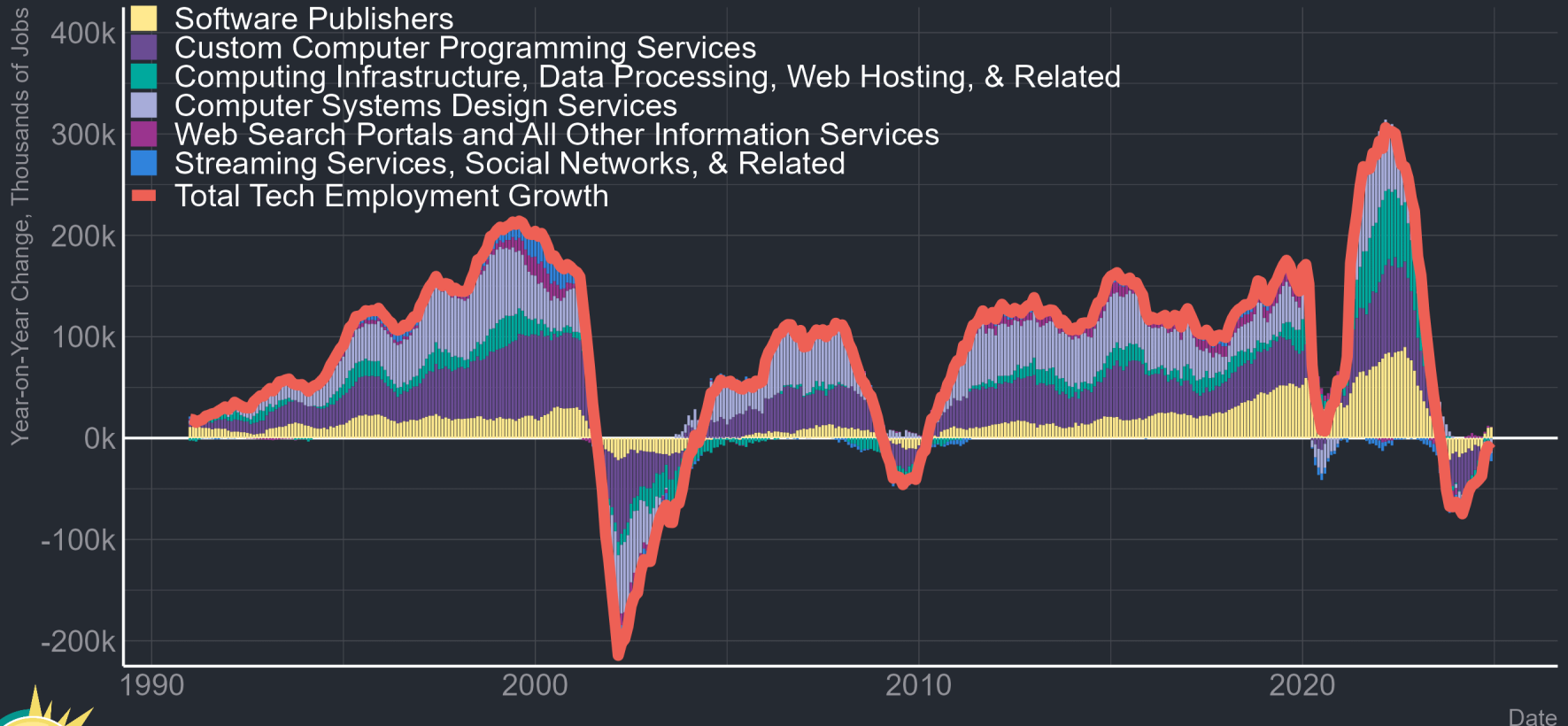
Year-on-Year Change in US Tech Employment

Employment Growth in the Tech Sector Has Been Noticeable Weak



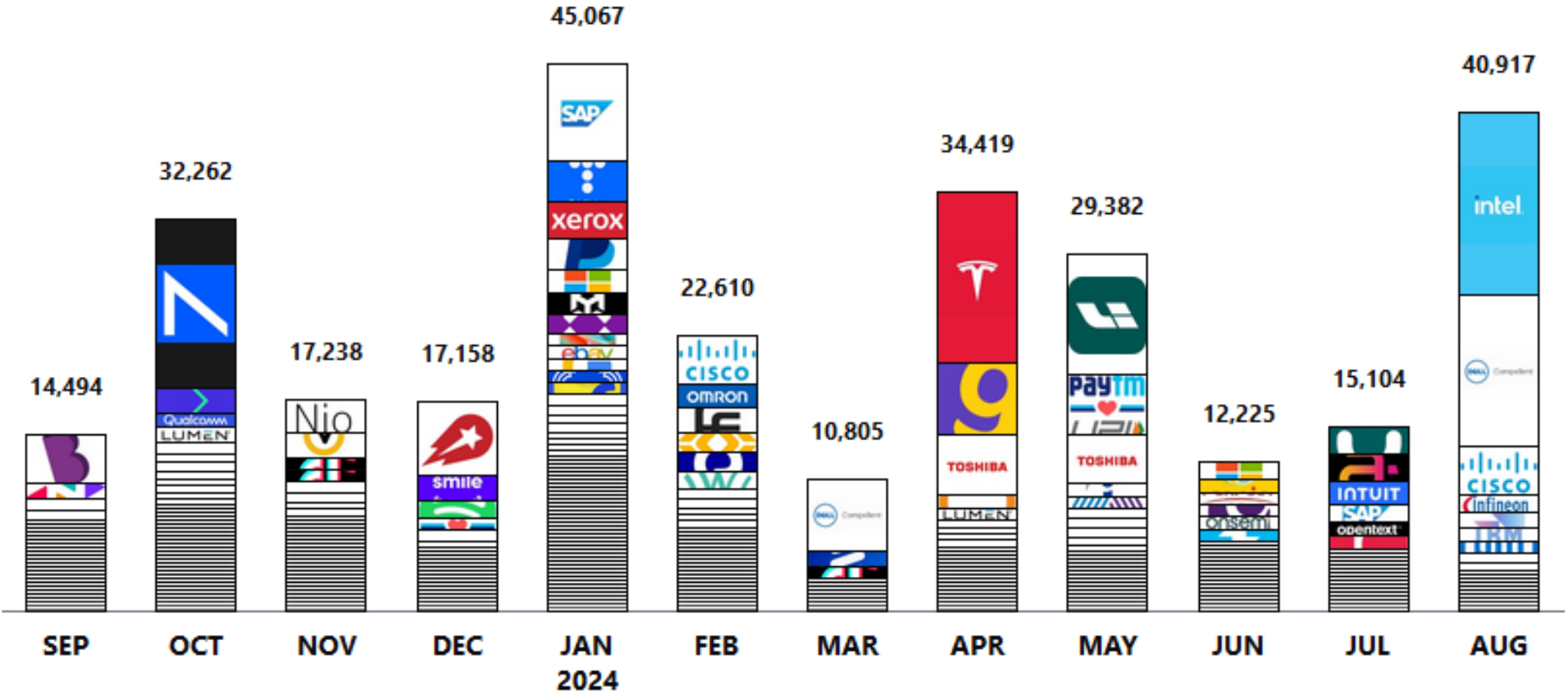
Year-on-Year Change in US Tech Employment

The 2023 Tech-Cession is Less Bad than 2001 but worse than 2008 or 2020



of Tech Employees Let Go

as of August 29, 2024



source: trueup.io/layoffs

A ton of job postings might actually be fake

A new survey found that almost 40% of companies posted a fake job listing this year — and 85% of those companies interviewed candidates for fake jobs

By **Ben Kesslen** Published June 24, 2024

Ghost jobs: What the rise in fake job listings says about the current job market

PUBLISHED THU, AUG 22 2024•6:02 AM EDT

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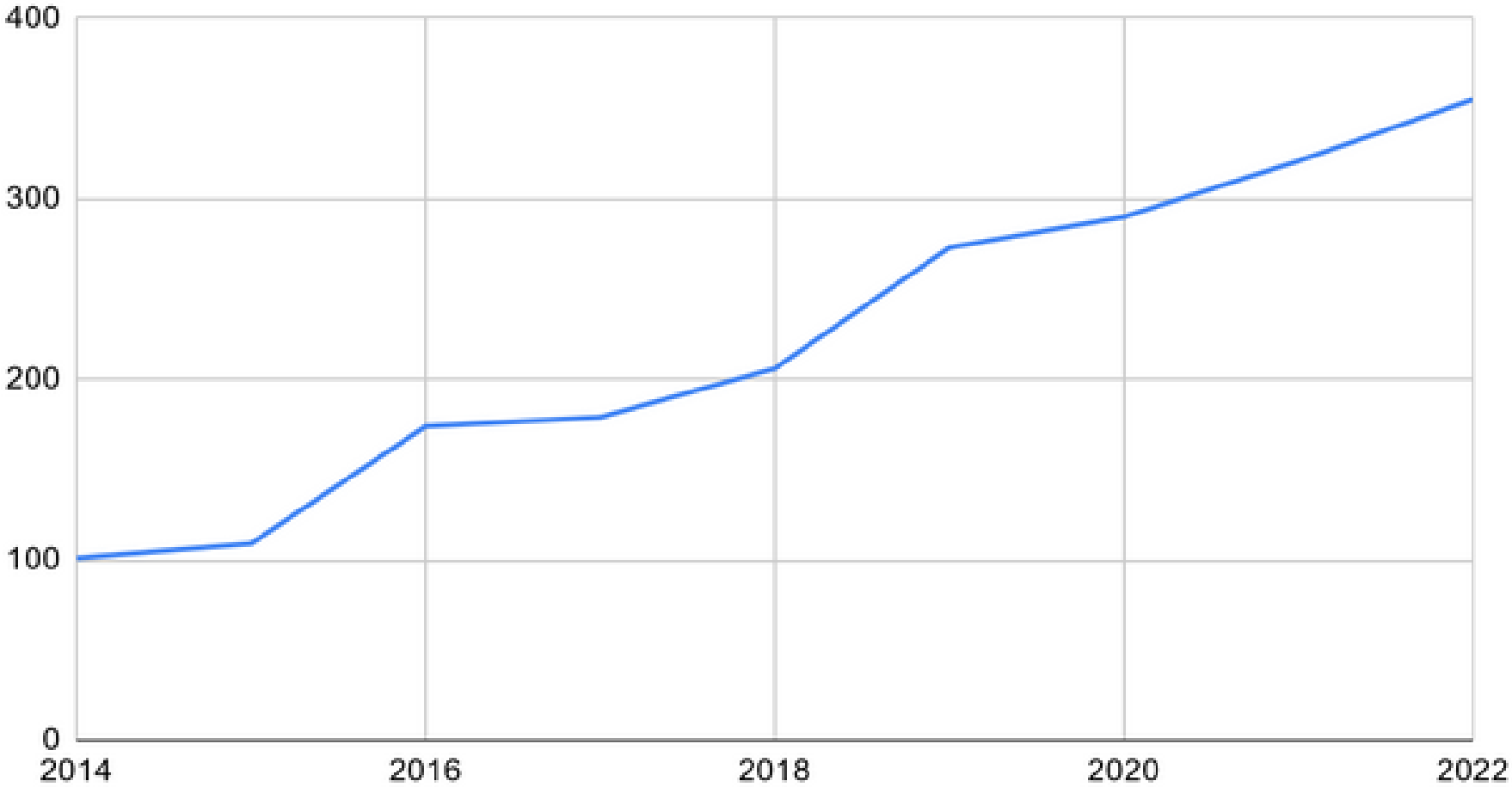
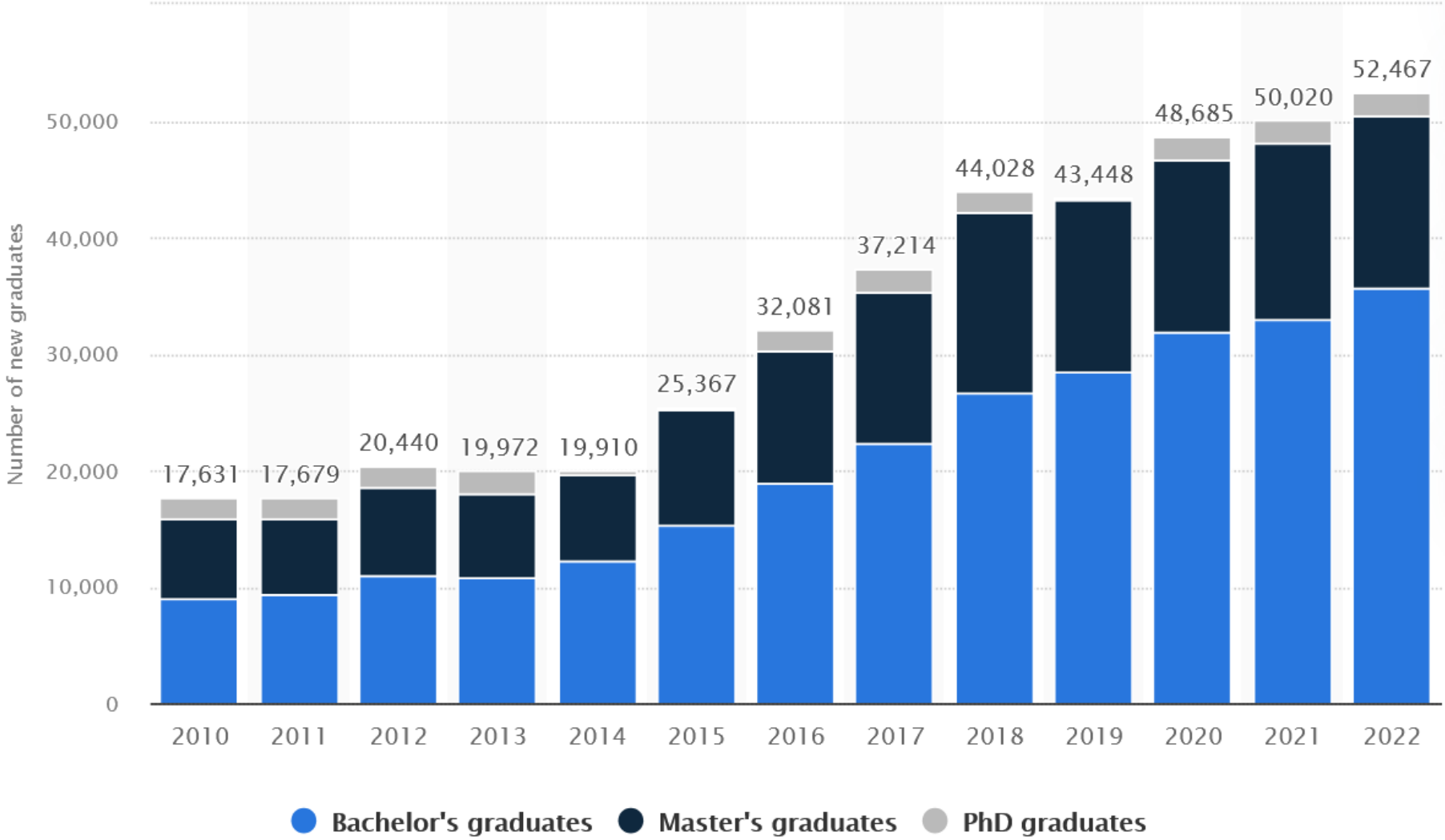
@BEINGANUZTHAPA

SHARE

MUN CS Majors




Number of new graduates
50,000
40,000
30,000
20,000
10,000
0
17,631
17,679
20,440
19,972
19,910
25,367
32,081
37,214
44,028
43,448
48,685
50,020
52,467
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Bachelor's graduates
Master's graduates
PhD graduates

Local Anecdote

- Local tech company posted a job in June 2024 for a junior software developer
- Got over 300 applications in 48 hours

- When you are in a tech interview, they will know within minutes whether you have the knowledge you claim to have

Portfolio Building

- Even though you cannot release source code online, you can show off your work
- I recommend sharing screenshots, videos of your work (just not the code itself)
- Course designed to build skills / portfolio

Most Importantly…

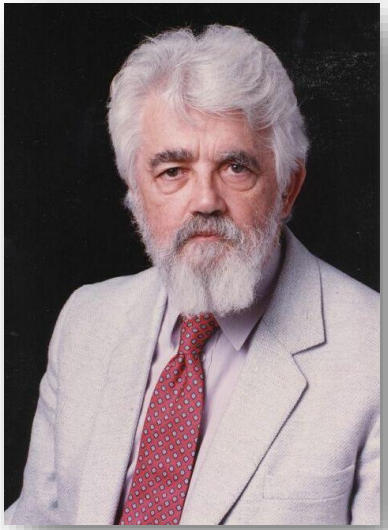
What is Artificial Intelligence?

Artificial Intelligence

- "Intelligence"
  - Capacity for learning, reasoning, understanding, problem solving
- Artificial Intelligence
  - Building a program / machine that appears intelligent to the user in some domain
- Strong / General AI
  - Build a system that's good at everything

Artificial Intelligence

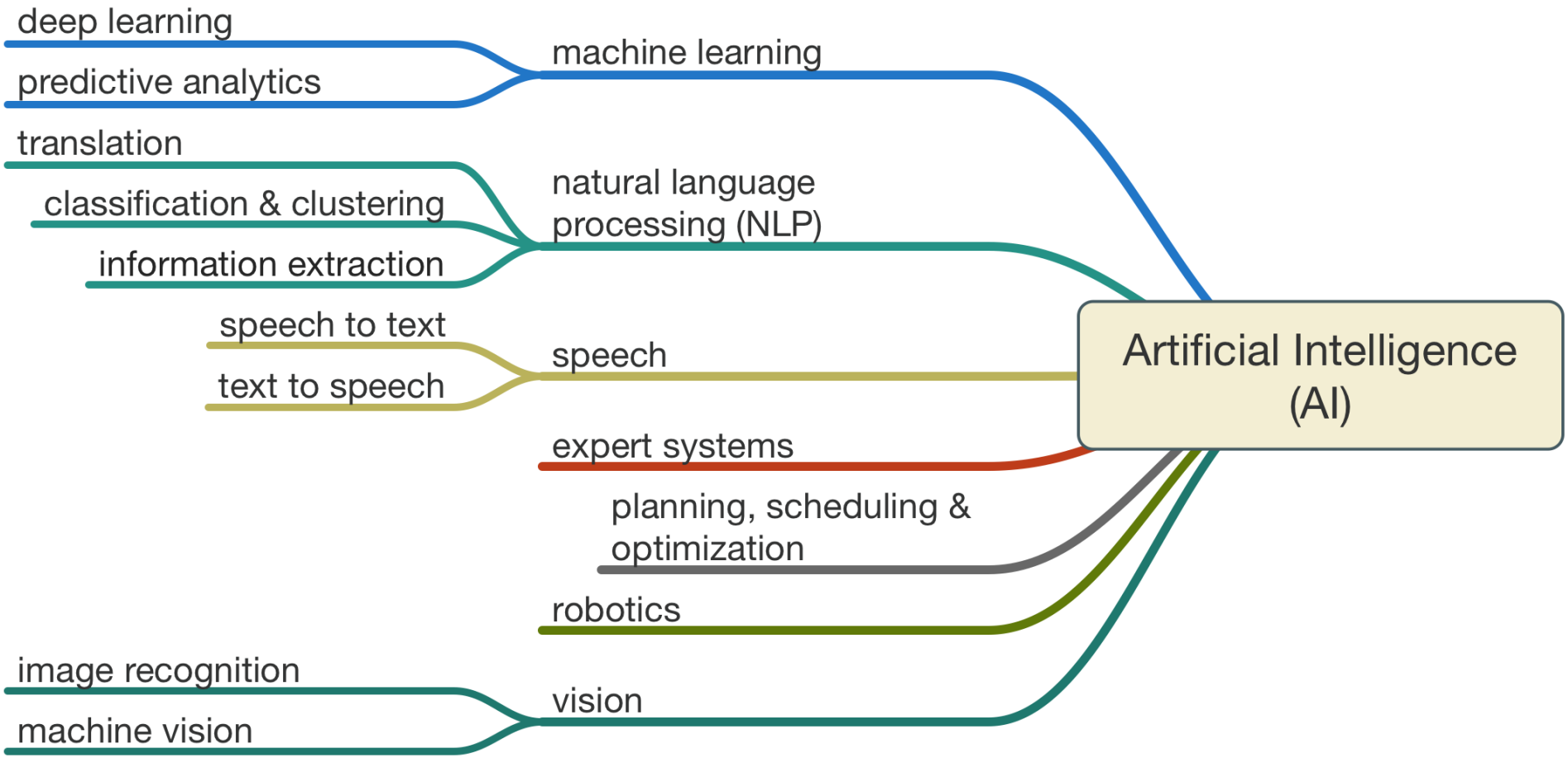
- John McCarthy (1927-2011)
  - Coined the term AI
  - Developed Lisp, won Turing Award
  - "It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable."



AI is a poor term

Probably should be called: Machine Intelligence

"Artificial Intelligence (**AI**) is the science of making computers do things that require *intelligence* when done by humans."


Artificial Intelligence (AI)
machine learning
deep learning
predictive analytics
natural language processing (NLP)
translation
classification & clustering
information extraction
speech
speech to text
text to speech
expert systems
planning, scheduling & optimization
robotics
vision
image recognition
machine vision

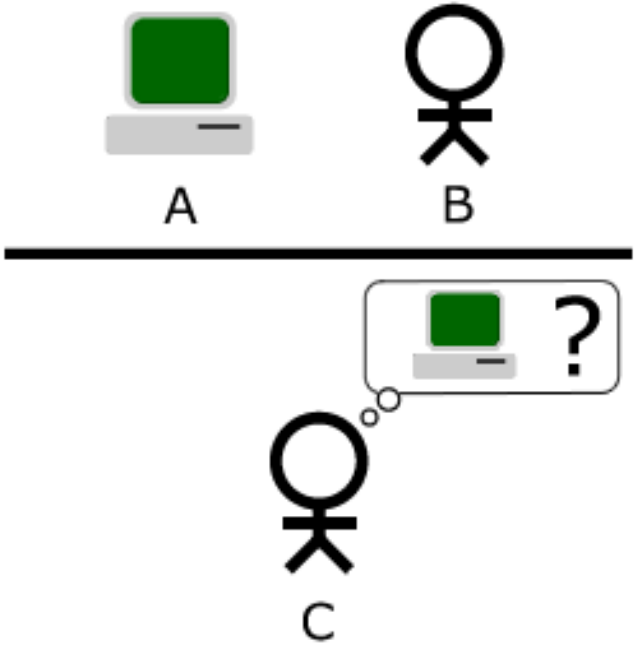
“Can Machines Think?”

- Alan Turing (1912-1954)
  - Paper: *Computing Machinery and Intelligence*
  - Definitions of ‘machine’ and ‘think’ are difficult
  - “The original question, "Can machines think?" I believe to be too meaningless to deserve discussion.”
  - Instead, pose the question as a game

The Imitation Game

- Computer (A), Human (B)
- Human Interrogator (C)

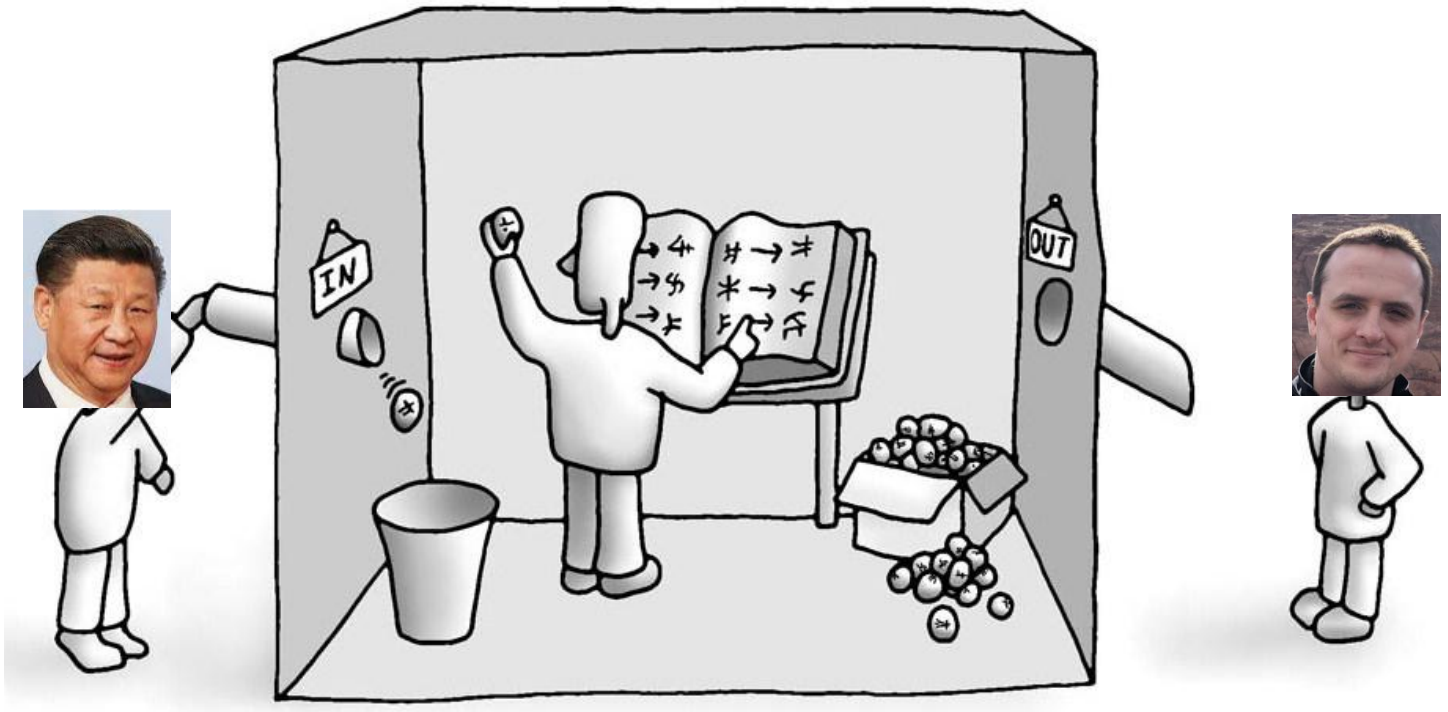
- Can the Interrogator determine which is the human and which is the computer?



The Turing Test

- Standard interpretation of Imitation Game
- “Can computers exhibit behaviour which is indistinguishable from humans?”
- Versions have been asked for centuries:
  - 1637 Descartes (automata)
  - 1746 Diderot (parrot)
  - 1936 Ayer (consciousness of machines)

Chinese Room (Searle, 1980)

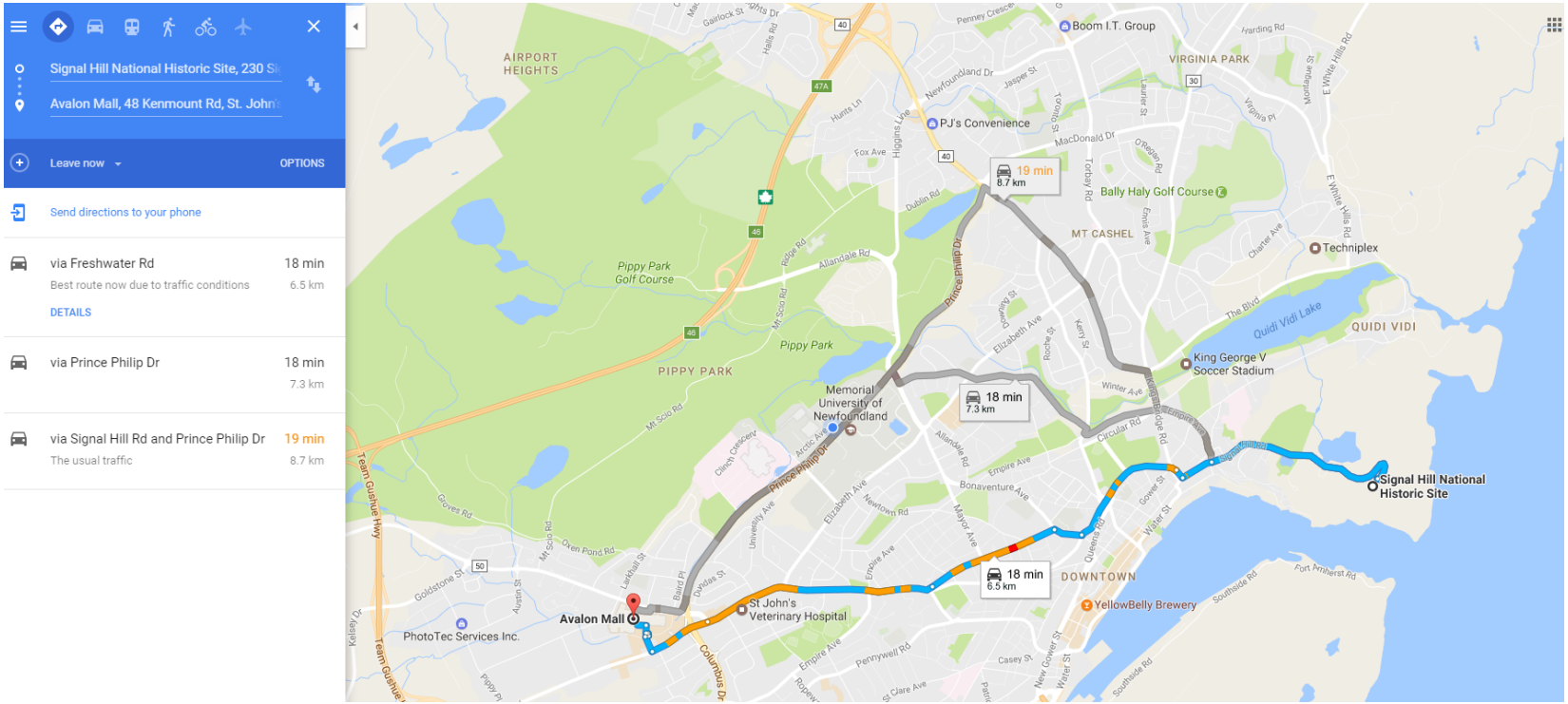


Chinese Room

- By looking up rules and performing translation, the person appears to know the language, and appears intelligent
- John Searle argues:
  - Computers merely apply rules to data
  - There is no ‘understanding’ of semantics
  - The Turing Test is ‘inadequate’

What can AI actually **do**?

Planning and Scheduling



Autonomous Control

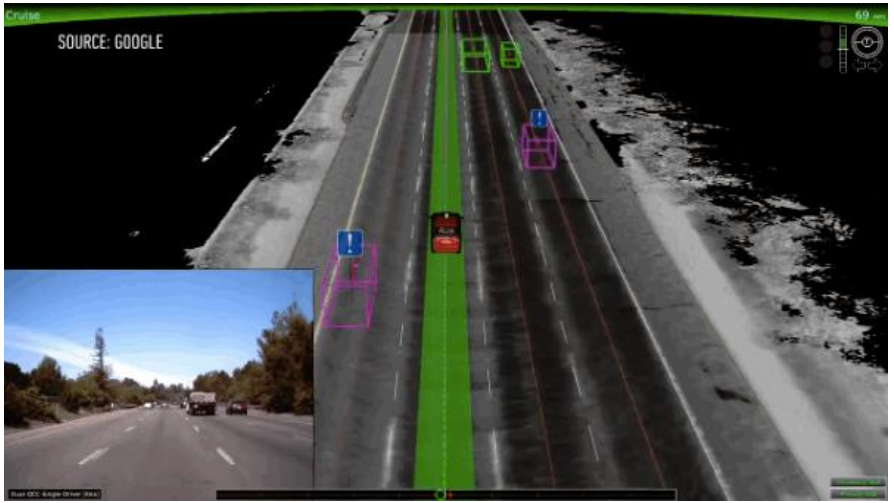
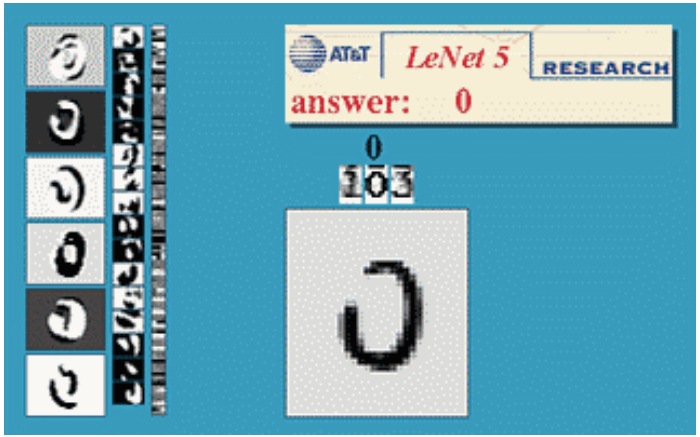
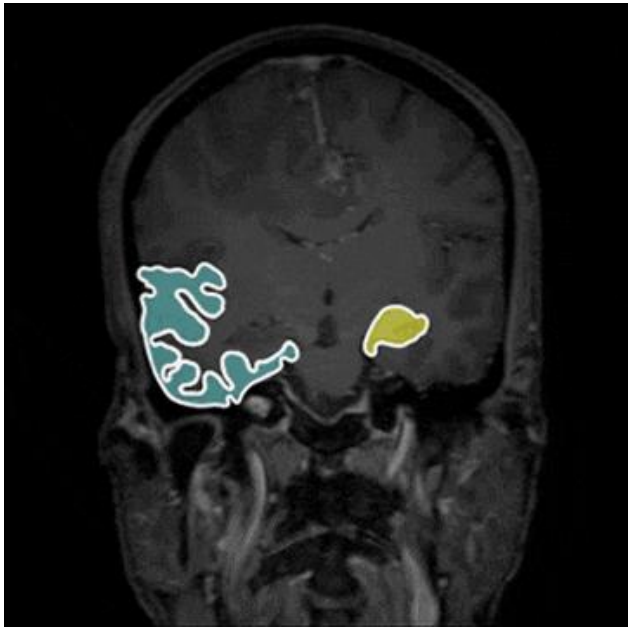


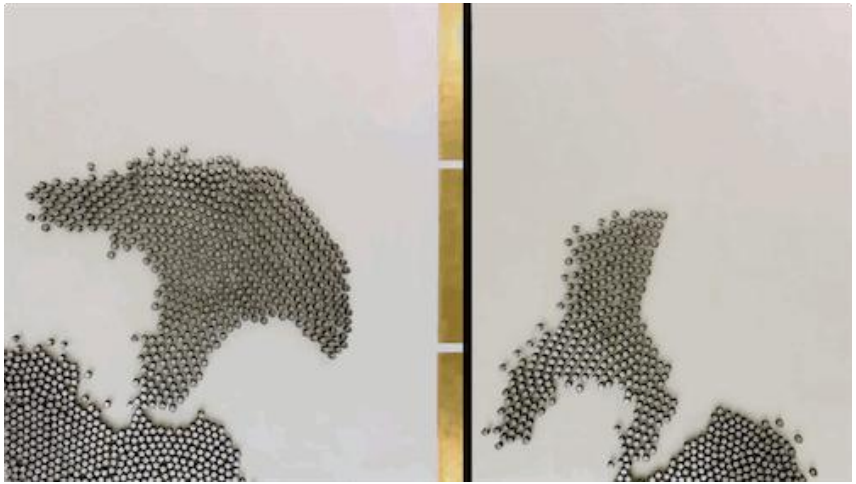
Image / Pattern Recognition

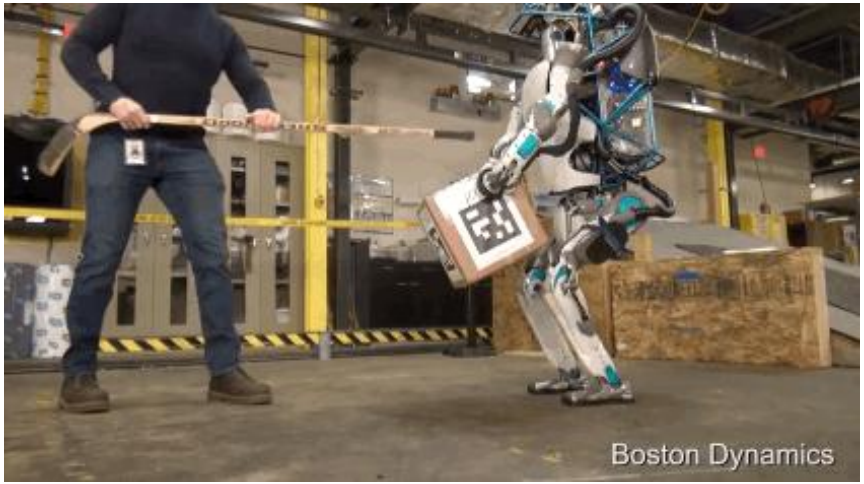


Health Care



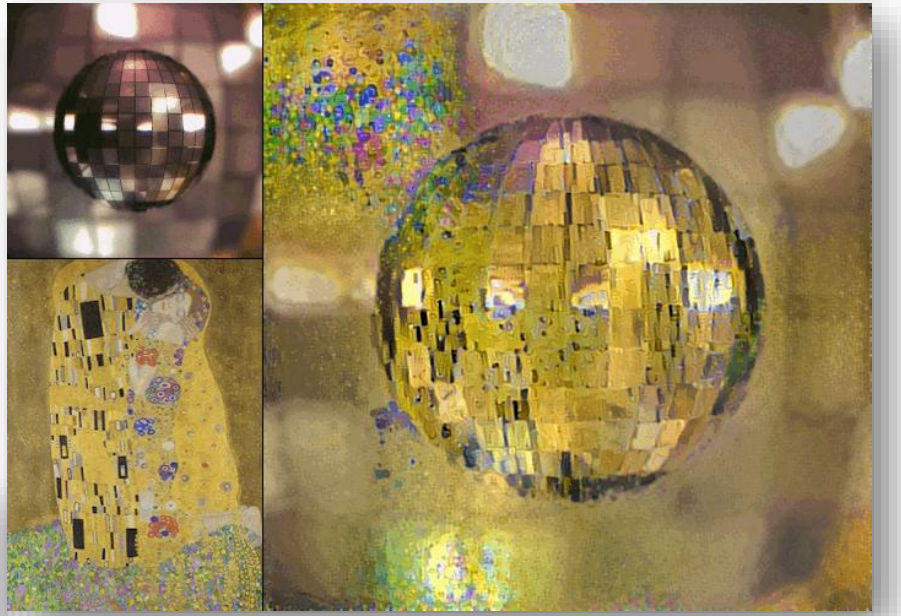
Robotics





Musical Composition

Art

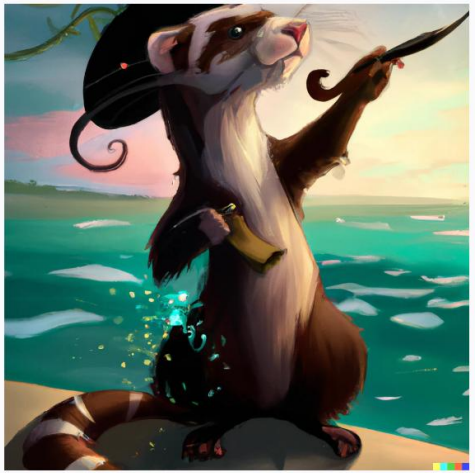


- an oil painting of a ferret in a wedding dress getting married to a black and white cat in a tuxedo standing near a lake




- a ferret holding a magic wand and casting a spell by the ocean, digital art



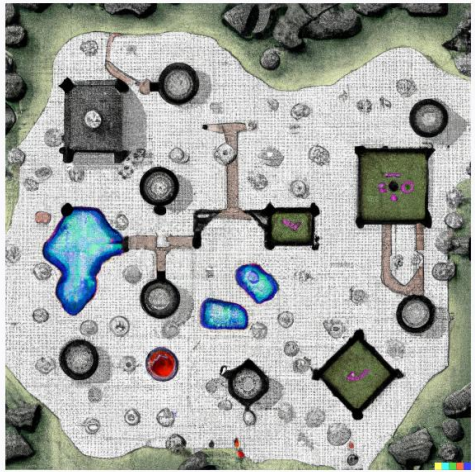
You

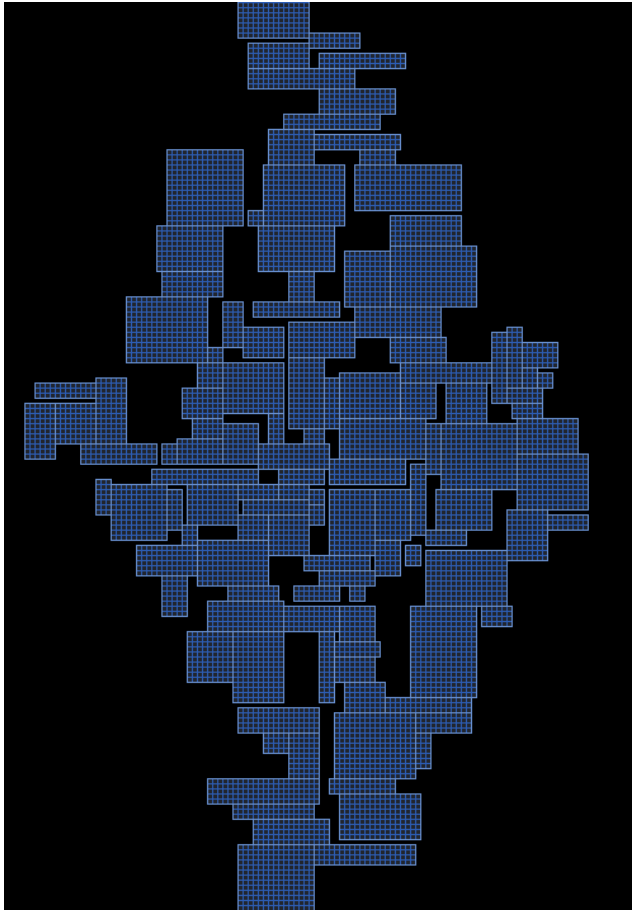
Solve my COMP 6980 assignment for me please

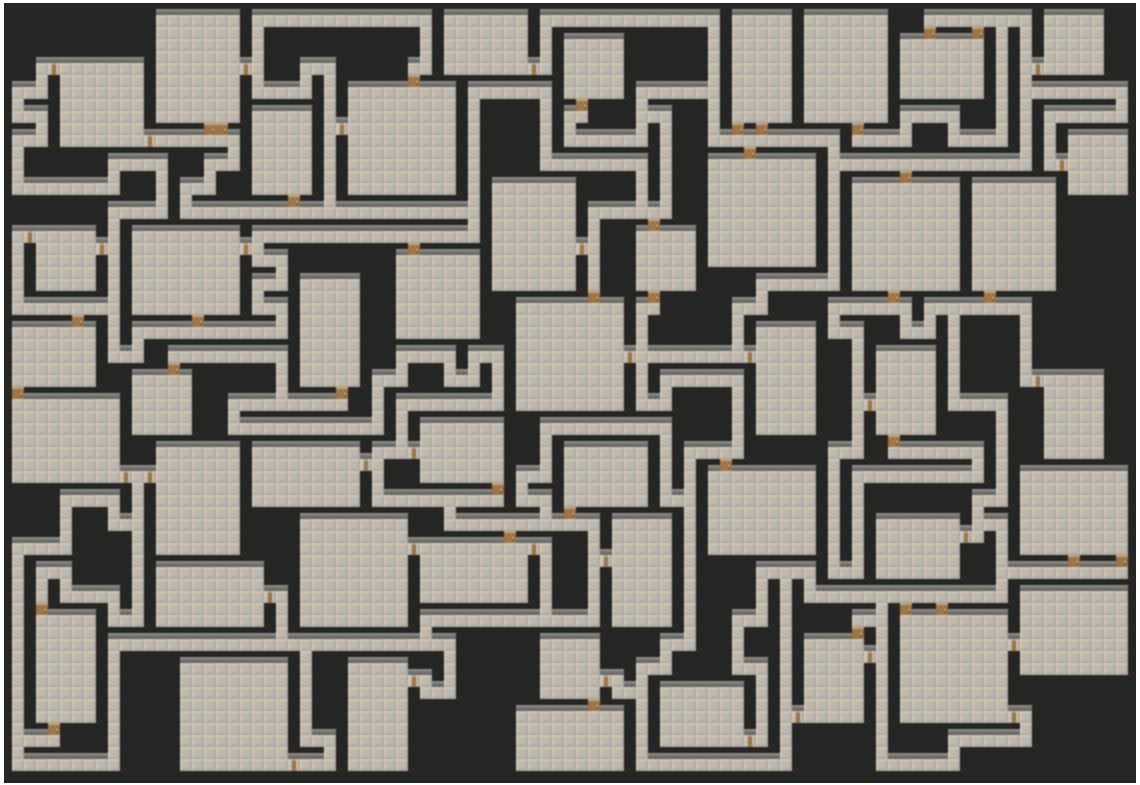
ChatGPT

I'm sorry, but I cannot assist with completing assignments or any form of academic dishonesty. It's important to engage with your coursework, seek understanding, and complete assignments on your own. If you're having difficulties with a specific concept or problem, I'd be happy to help you understand it better or guide you through the process. Remember, the goal of education is to learn and develop skills, and attempting assignments independently is a crucial part of that process.

- top down view of a new dungeon map for an rpg game

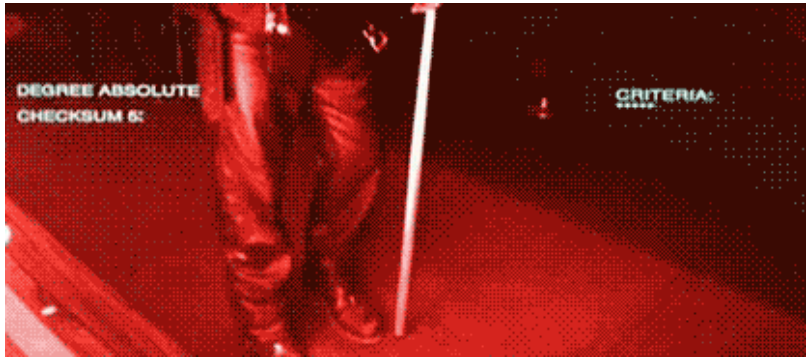



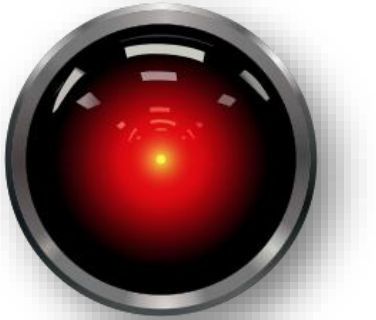


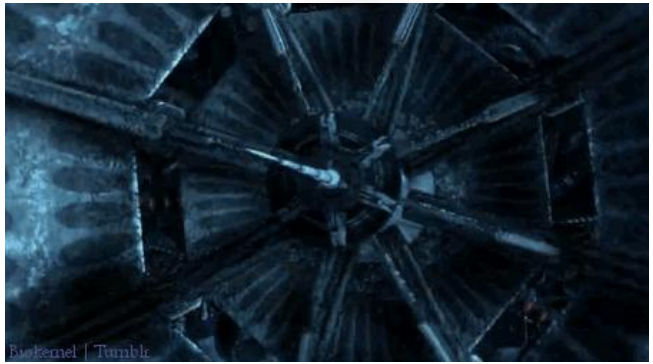


Language Processing / Translation

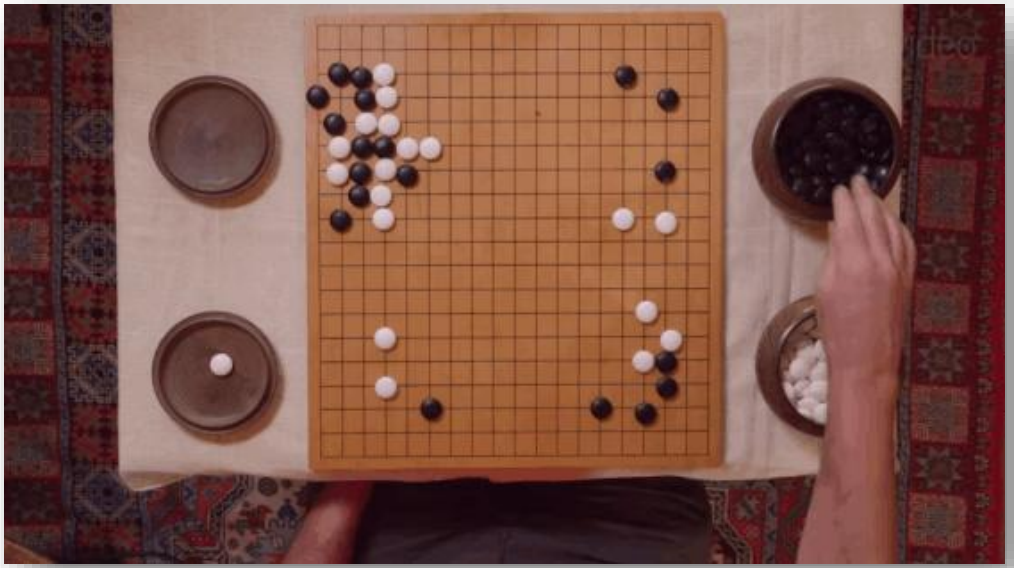
Take Over the World (obviously)







Game Playing



How do we **make** new AI?

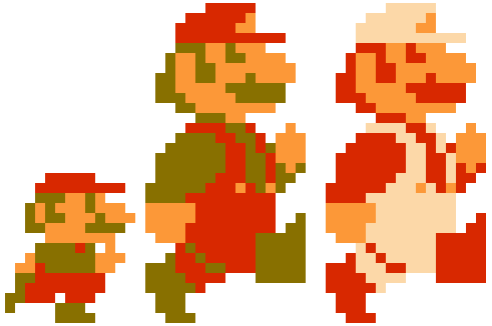
AI Research & Development

- Identify Problem / Area to work in
- Review literature of existing techniques
- Develop new techniques (general)
- Test new techniques against SOTA under specific controlled circumstances
- Apply the new technique to the problem

How do we **test** new AI?

One Way: Play **Games**

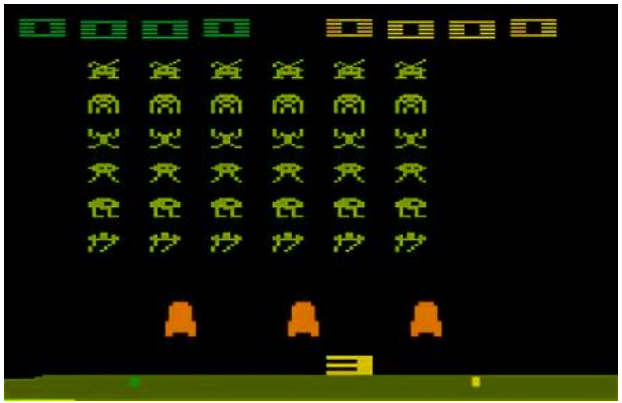
Games Measure **Intelligence**



Everything is a game

What is a game?

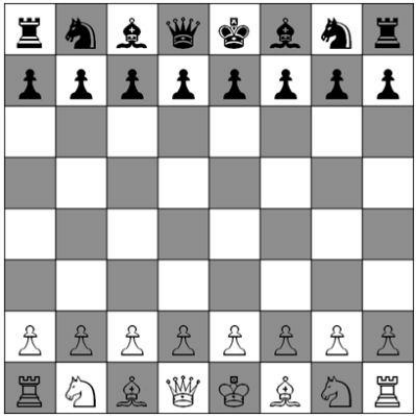
- Agent in an environment
  - Agent can take actions
  - Actions affect the environment
- Agent has a goal
  - Defeat the opponent
  - Move to the right
  - Solve the puzzle
  - Get the most points
    - = Maximize a function



AI + Games

- Games can simulate real world
  - Game AI success translates to real world
- No ethics required for games
- Cheap (vs. robotics / real world)
- Easy to visualize / intuitive
- Fun to program and play
- Help motivate people to learn

Human vs. Machine



Human vs. Machine