

INTELLIGENT AGENTS

CSE 511A: Introduction to Artificial Intelligence
Spring 2018

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COURSE INFO

- Pre-requisites:
 - CSE 131: Computer Science I
 - CSE 240: Logic and Discrete Mathematics
 - CSE 247/347: Data Structures & Algorithms / Analysis of Algorithms
 - Knowledge of Python
 - Knowledge of statistics and probability
 - There will be a lot of math and programming!

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COURSE INFO

- Workload
 - 3.01 Projects: 45% of grade (**Project 0 out today! Due next Tuesday!**)
 - Lots of quizzes: 15% of grade
 - Midterm: 20% of grade
 - Final: 20% of grade
- Grades (not planning to curve):
 - A's: >90%
 - B's: >80%
 - C's: >70%
 - D's: >60%
 - ...

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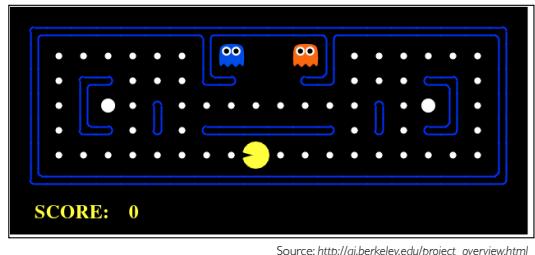
COURSE INFO

- Communication:
 - Course webpage: Announcements, slides, project info
To download slides:
Login: **imastudent**
Password: **letmein**
 - Piazza: ***All*** questions. Use private questions if necessary
 - Blackboard: Your grades will be posted there
- You are responsible for checking the course webpage (including lecture slides posted) for all announcements.

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COURSE INFO

- Projects:
 - Autograded projects (unlimited submissions) + anonymized leaderboards
 - Project 0: Getting you familiar with the project infrastructure (svn, autograder, etc.)
- Projects 1-3:
Programming Pacman!
(courtesy of UC Berkeley's CS188)
- Late submissions:
-25% per day



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ACADEMIC INTEGRITY

- Essentially:

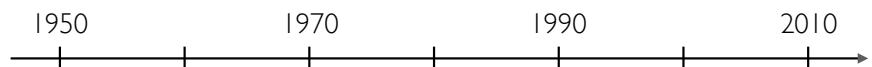
You will get an *F* in the course if you cheat.*

*see WashU's Academic Integrity Policy for what constitutes cheating

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TODO AFTER THIS COURSE

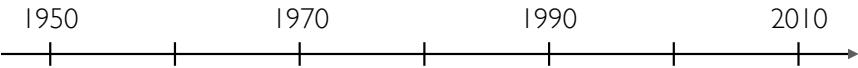
- Register for the class on **Piazza!** Ask all questions here.
- **Project 0:** Unix/Python tutorial is out (due 1/23 at 11:59pm)
- If you are waitlisted, you will most probably not get into the course (69/50 as of yesterday)
 - But if this is your last semester, come see me.



Brief History of AI:
70 decades in 10, maybe 20, minutes :)

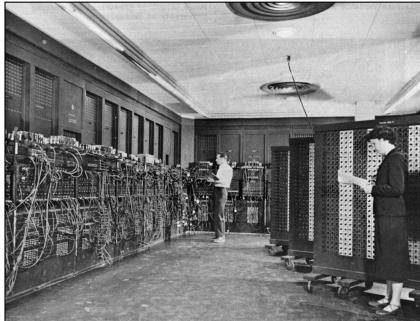
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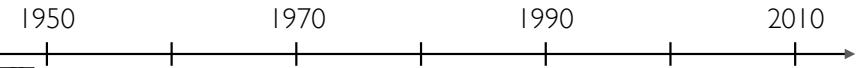


1946:

- ENIAC (Electronic Numerical Integrator and Computer)
- Designed to calculate artillery firing tables
- 2400x faster than humans in performing calculations!

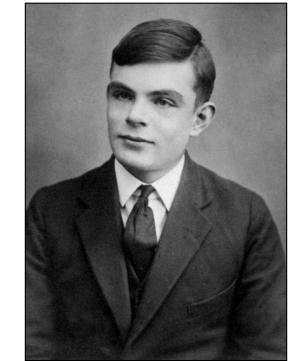
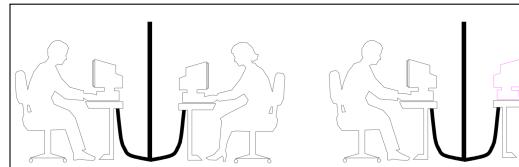


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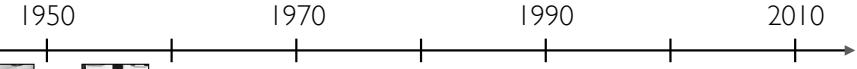


1950:

- Alan Turing asks “Can machines think?” in his seminal paper
- Develops the Turing test



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1950



1956:

- The field is born at Dartmouth
 - Marvin Minsky (Turing Award 1969)
 - John McCarthy (Turing Award 1971)
 - Claude Shannon (father of information theory; National Medal of Science)
 - Allen Newell (Turing Award 1975)
 - Herbert Simon (Turing Award 1975; Nobel Prize 1978)
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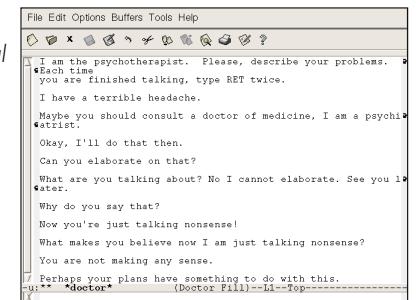
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1950

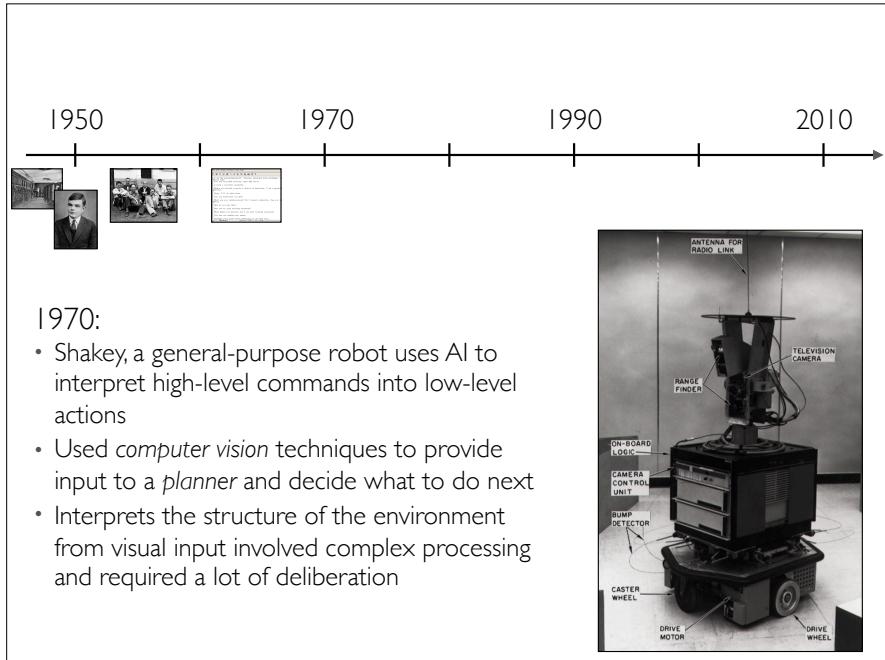


1966:

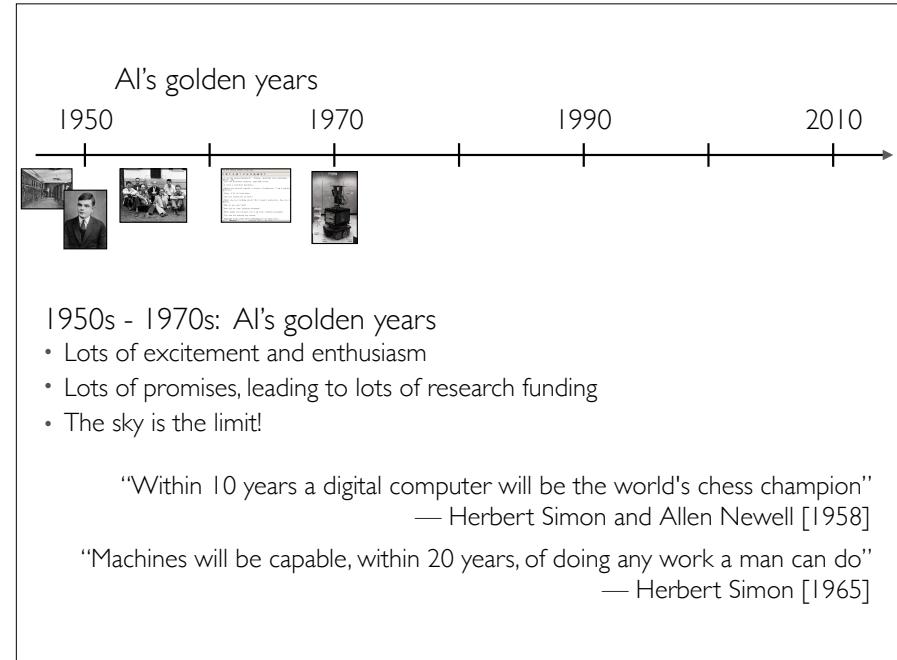
- ELIZA, the first chatbot that uses *natural language processing* techniques
- Capable of passing the Turing test
- Uses pattern matching, but had no idea what it was talking about



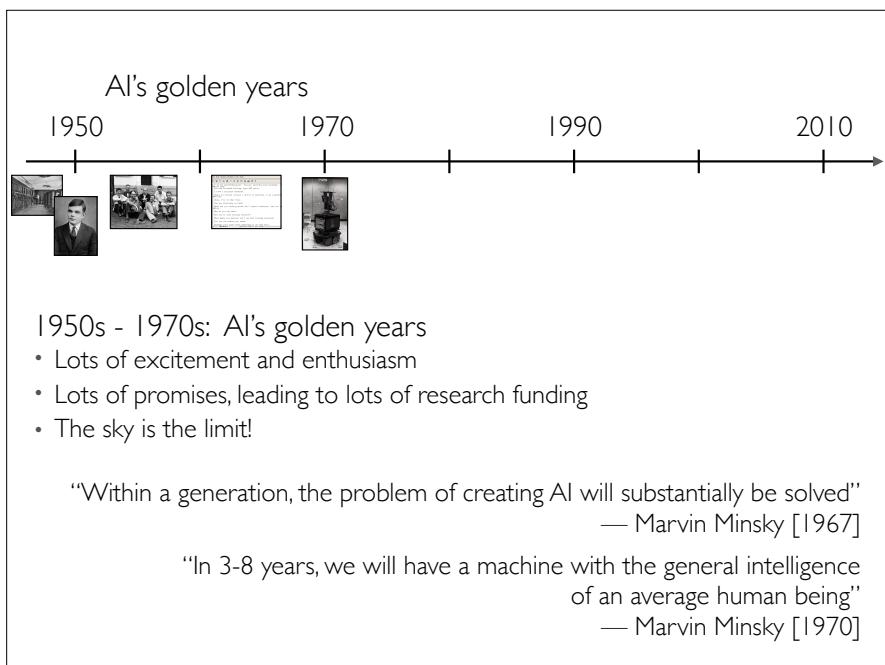
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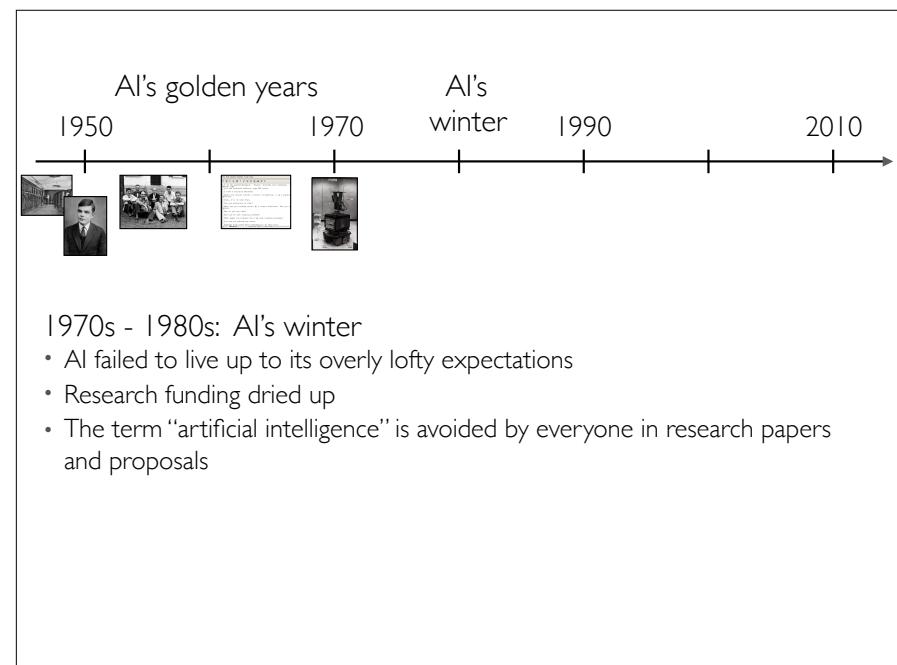
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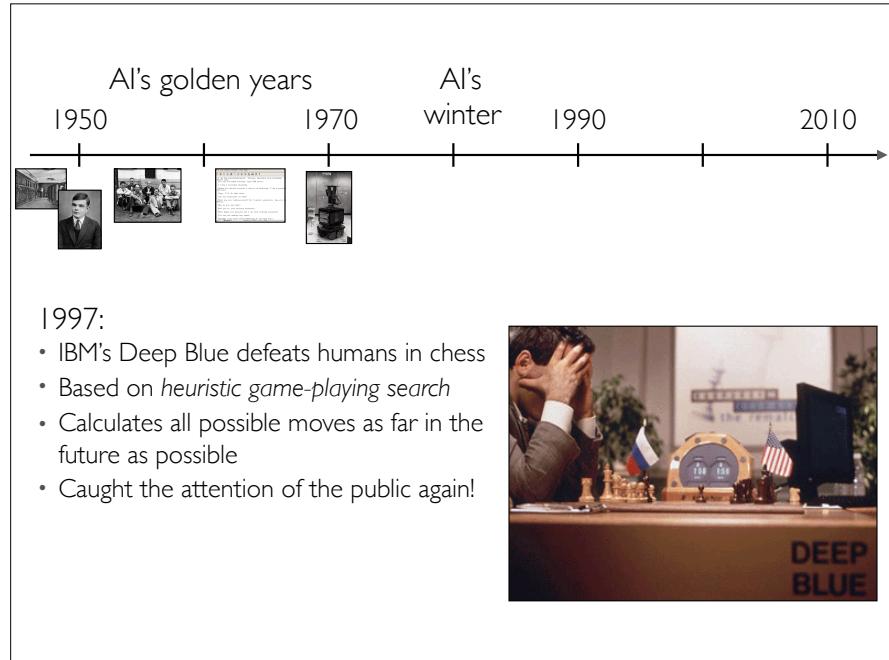
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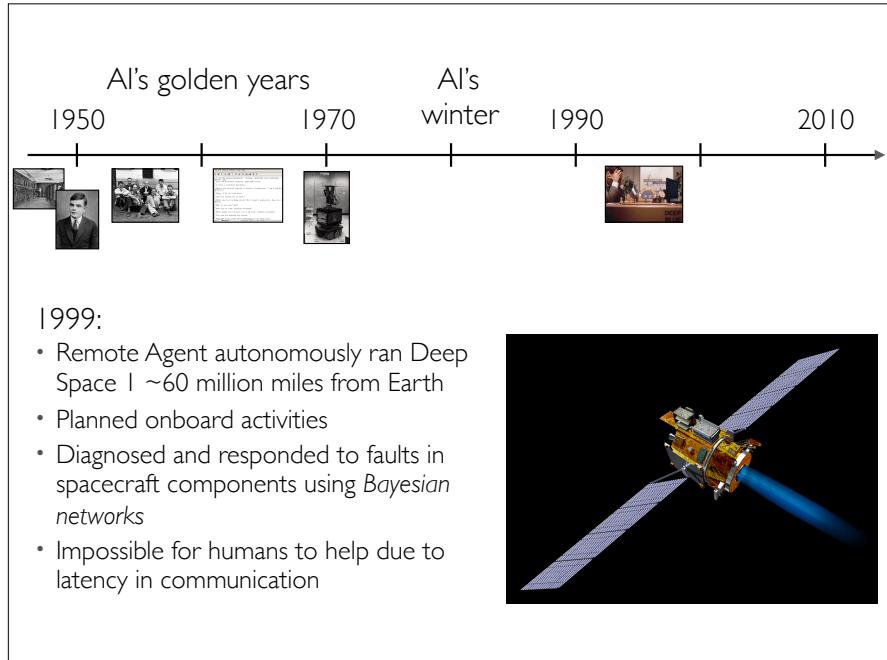
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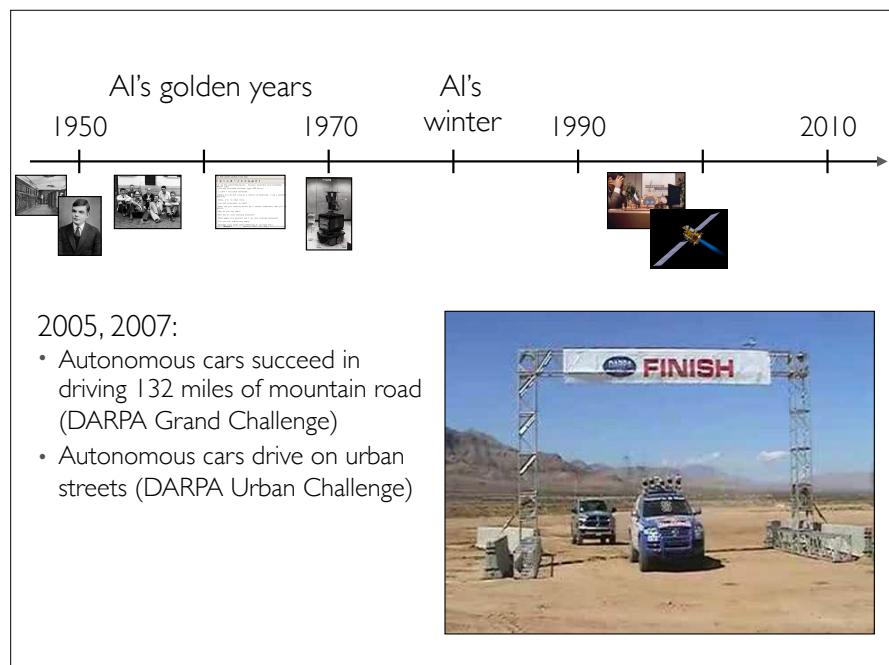
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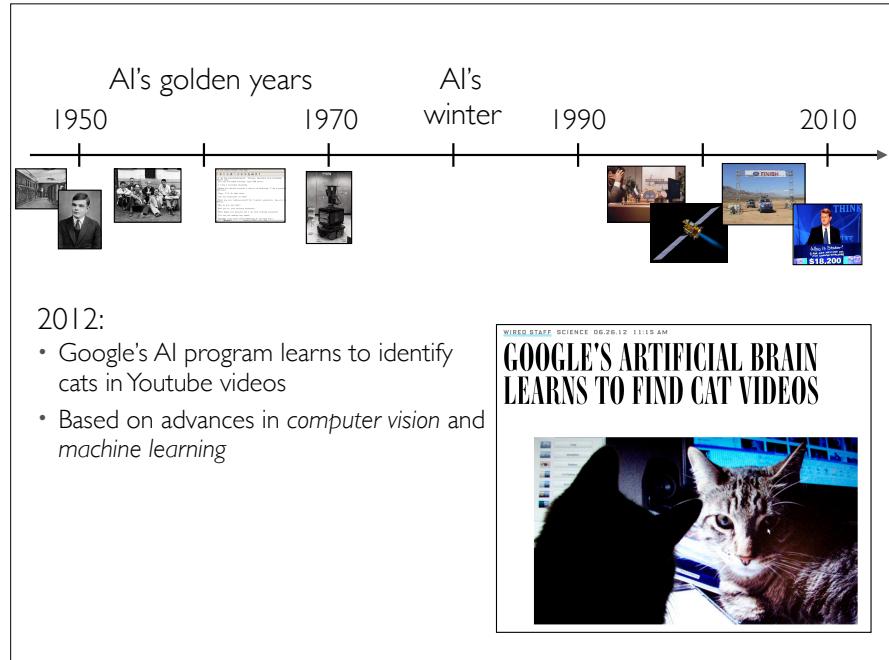
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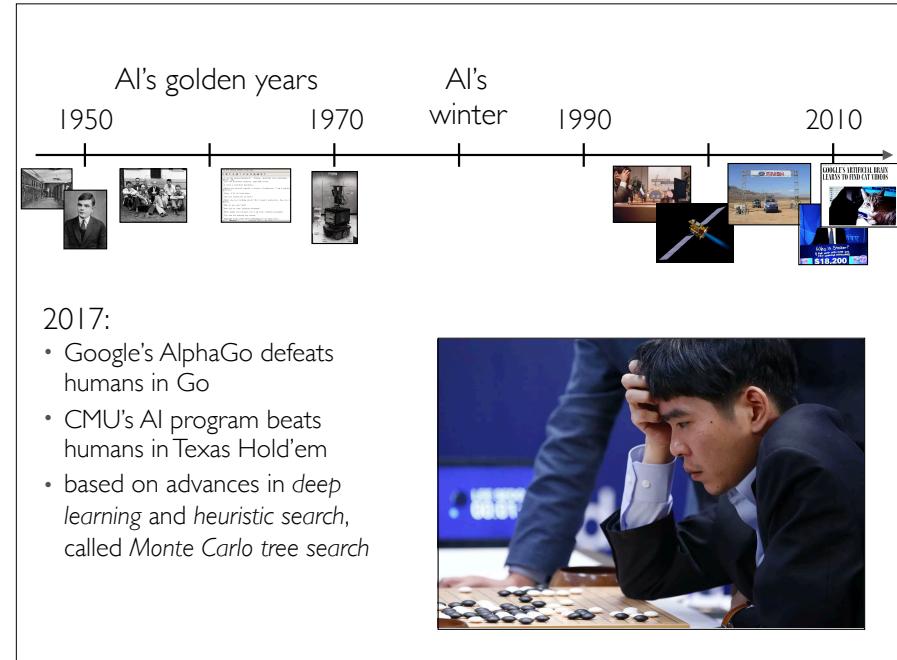
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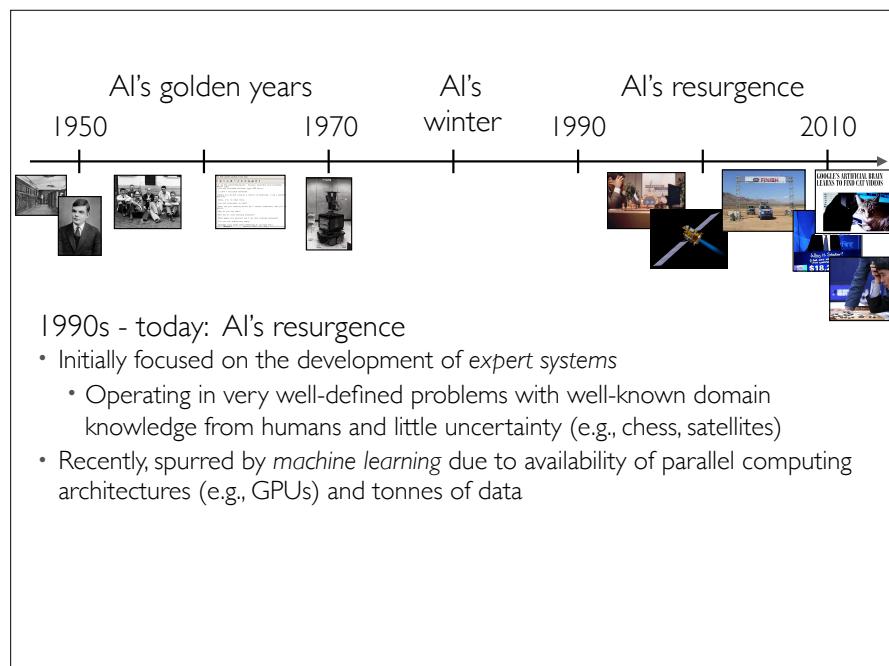
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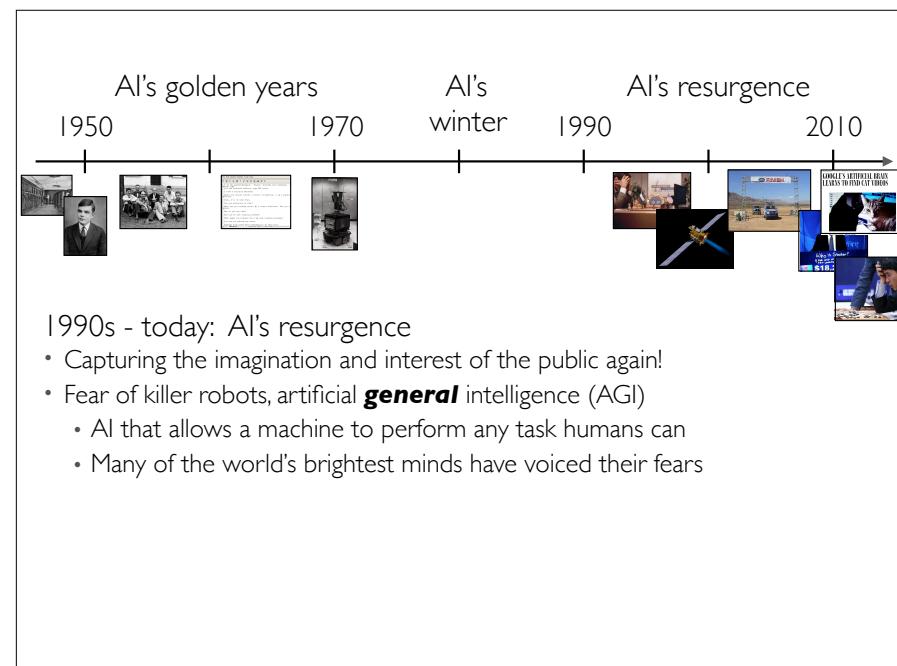
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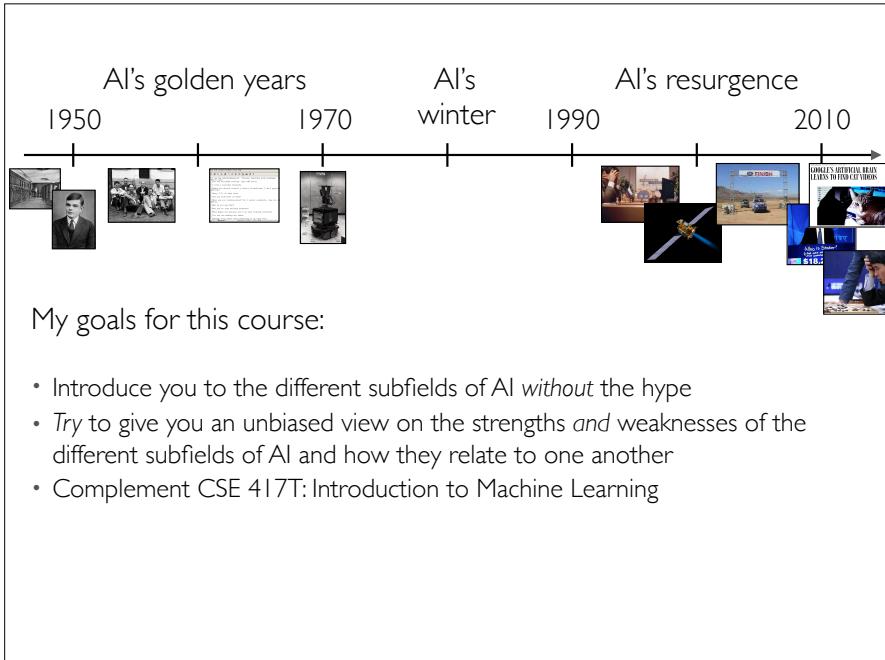
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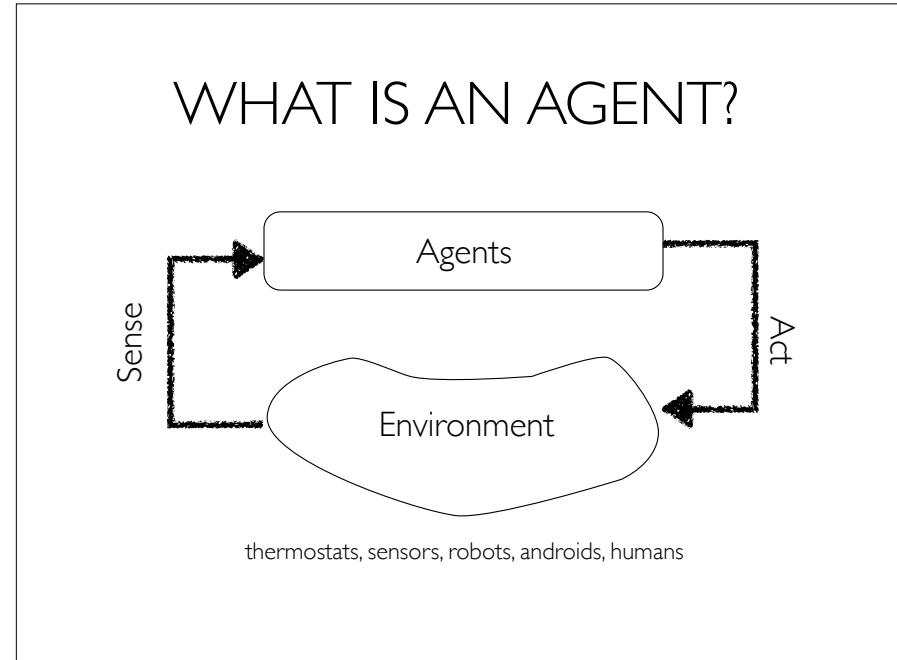
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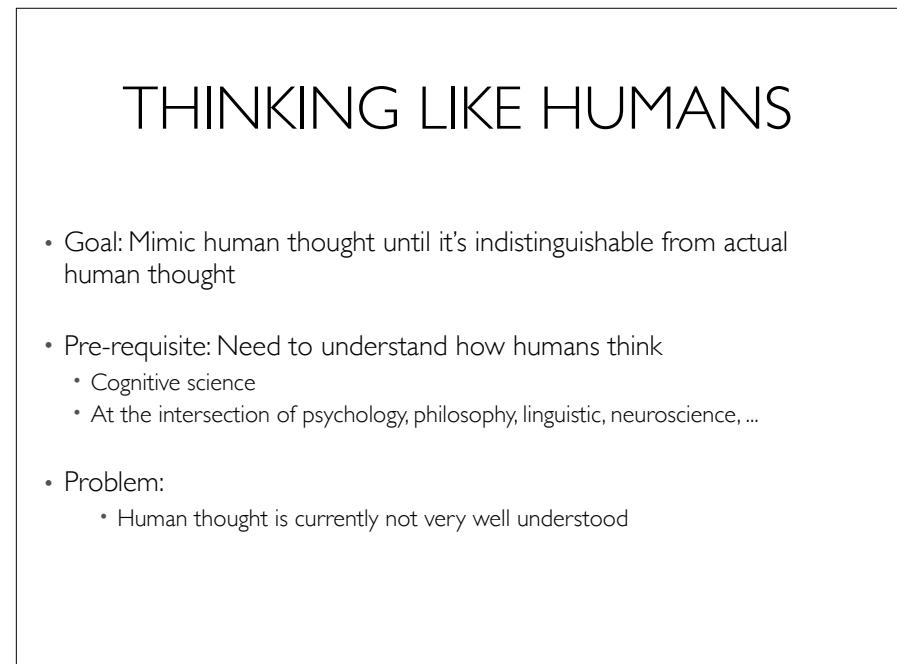
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ACTING LIKE HUMANS

- Goal: Mimic human behavior until it's indistinguishable from actual human behavior
- Pre-requisite: Need to understand how humans act
 - Also a part of cognitive science
- Problem:
 - Human behavior is currently not very well understood

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ACTING RATIONALLY

- Goal: "I don't care how it figures out what to do as long as it does the right thing"
- Pre-requisite: Knowing what is the right thing to do
 - In most cases, it's easy. Designers know what the system is supposed to do (e.g., thermostat)
 - In some cases, it's difficult. The system needs to interpret what users want it to do (e.g., android)
- Problems:
 - There is just so many ways to achieve the same goal, which is the right one?
 - Look at it as an opportunity!

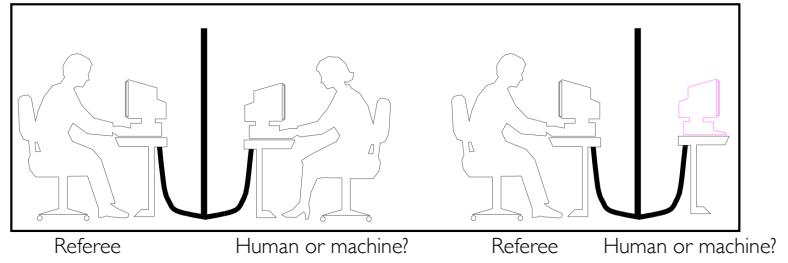
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THINKING RATIONALLY

- "You are an AI student; all AI students love AI; hence you love AI!"
- Goal: Infer knowledge from a knowledge database
 - Like a magic 8 ball or a crystal ball
- Pre-requisite: Model and represent knowledge in a database
 - Major effort started in the 80's: Cyc (www.cyc.com)
- Problems:
 - Difficult to model uncertainty: "I think it's going to rain today"
 - Difficult to always ensure consensus (e.g., is climate change real?)
 - Knowledge is always evolving

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TURING TEST



Is this a good test for intelligence?
What aspects of intelligence is it testing?

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2004 LOEBNER PRIZE WINNER

Alice conversing with Judge 1.
This transcript is in the public domain.

[12:01:25] Alice:
Hello, my name is Alice and I am the human.

[12:04:54] Judge 1:
Hi Alice, if you are indeed human, you should be able to tell me which is bigger, my big toe or a Boeing 747

[12:05:51] Alice:
Hi there Judge 1. Um, I think I sometimes am. I am a real person. As you are sitting in front of your computer screen, you may be wondering if I am a computer or a person talking.

[12:06:10] Judge 1:
Can you answer the question about the toe and the 747?

[12:06:50] Alice:
Please rephrase the question and try asking me again. As you hear the sound of keys typing you may begin to feel more comfortable chatting with me.

[12:07:12] Judge 1:
Which is bigger, a 747 or my big toe. Come on, answer it.

[12:08:01] Alice:
The obvious one. Please rephrase your question, Judge 1. The feel of the keys on the tips of your fingers may remind you of some questions you wanted to ask me about.

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2017 LOEBNER PRIZE WINNER



<http://www.mitsuku.com/>

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TALKING TO MACHINES

Film: Her (2013)

Synopsis: The film centers on a man who develops a relationship with an intelligent computer operating system with a female voice and personality

On Google Play, Amazon Video, and YouTube Movies for \$2.99



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