Artificial Intelligence

A computer would deserve to be called intelligent if it could deceive a human into believing that it was human.
--Alan Turing, 1950

What is the state of AI today?

- Machine Learning
  - statistics + lots and lots of data = intelligence!
- We have pretty darn good spam filters
- Recommendations (Amazon, Netflix, etc.)
- Reading handwriting (USPS)
- Facial recognition (Facebook)
- Self-driving cars! (Google)
- Siri (Apple)

What is human intelligence?

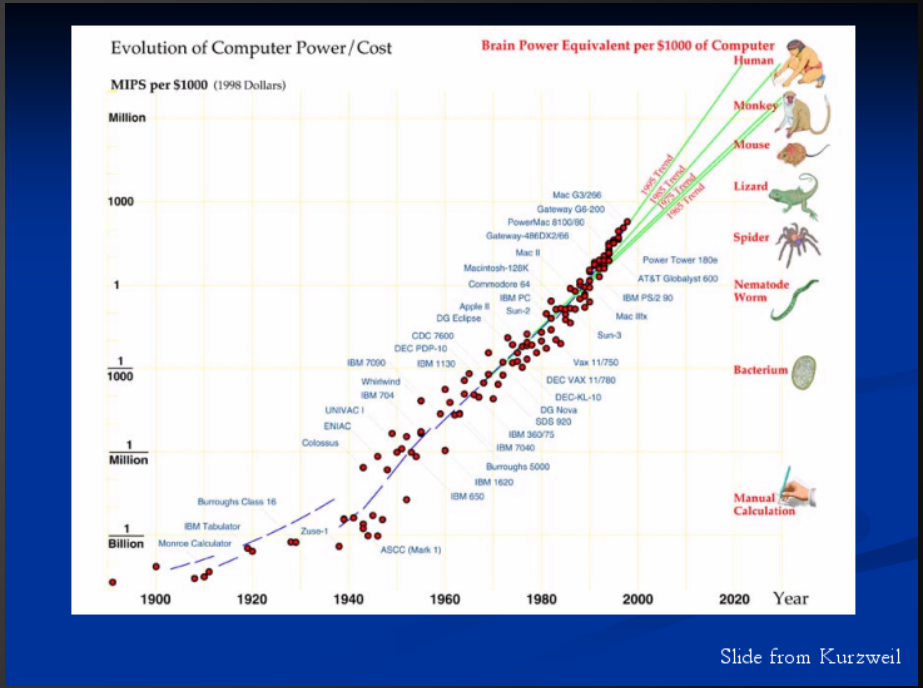
How would you test a computer for it?

The Turing Test

- Tests whether a computer is indistinguishable from a human in text-only conversation
- Not the main focus of most AI research
- Loebner Prize
- When will a computer pass it?

The Singularity is Near

- Moore's Law (since 1965): computing power doubles every 1.5 - 2 years
- Human brains have 100 billion neurons
- We could probably simulate a neuron in 2000
- 100 billion = 2^37, so 2074 at the latest



What are some implications?

- Evolution 2.0: Intelligence continually improves itself
- Humans have to plug in to keep up?
- Immortality?
- Single organism of humanity?

For now, how do we fake human intelligence?

ELIZA

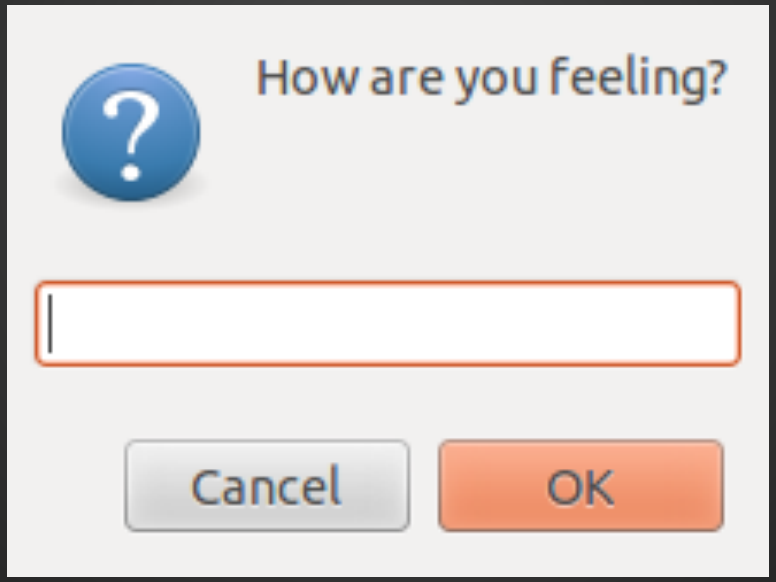
- One of the first “chat bots”
- Born at MIT in 1966!
- Human: My head hurts
  - ELIZA: Why do you say your head hurts?
- Human: My mother hates me
  - ELIZA: Who else in your family hates you?
- Human: Who is your favorite composer?
  - ELIZA: Does that question interest you?
  - ELIZA: J.S. Bach! What about your own favorite composer?

Chat Bot Step By Step

1. Ask a question
2. Store user's response
3. Analyze user's response (the hardest part)
4. Take some action (e.g. print an answer)
5. Ask another question, etc.

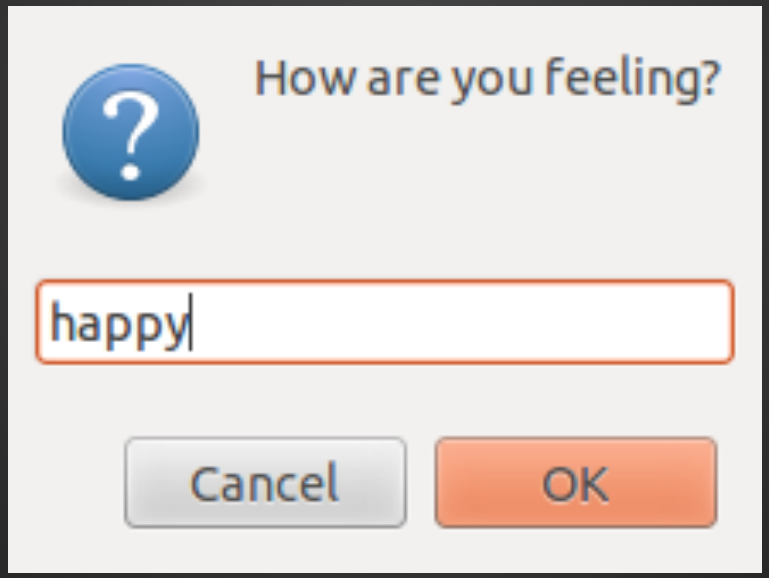
1. Ask a question

raw_input(‘How are you feeling?’)



2. Store user's response

mood = raw_input('How are you feeling?')



3. Analyze user's response

```
mood = raw_input('How are you feeling?')
if mood == "happy":
    <do something for happiness>
elif mood == "sad":
    <do something for sadness>
else:
    <take default action>
```

4. Take some action

```
mood = raw_input(‘How are you feeling?’)
if mood == “happy”:
    print “I’m so glad to hear you’re happy”
elif mood == “sad”:
    <draw a smiley face with Turtle Graphics>
else:
    print “What a coincidence!”
    print “I’m feeling ” + mood + “as well!”
```

5. Ask another question

```
mood = raw_input(‘How are you feeling?’)
if mood == ‘happy’:
    print “I’m so glad to hear you’re happy”
elif mood == ‘sad’:
     <draw a smiley face with Turtle Graphics>
     mood = raw_input(‘How are you feeling now?’)
     if mood == ‘happy’:
         print “I’m glad I could cheer you up!”
     else:
         print “Oh. Okay.”
else:
    print “What a coincidence!”
    print “I’m feeling ” + mood + “as well!”
```

One Last Thing: Datatypes

```
import turtle
winston = turtle.Turtle()
distance = raw_input(‘How far to move?’)
winston.forward(distance)
```

- THIS WILL FAIL NO MATTER WHAT YOU TYPE IN RESPONSE TO THE PROMPT!!!!
  - distance is a String (words), but winston.forward needs an Integer (number) as its argument
  - In order for this to work, we need to convert distance to an Integer

One Last Thing: Datatypes

```
import turtle
winston = turtle.Turtle()
distance = raw_input(‘How far to move?’)
new_distance = int(distance)
winston.forward(new_distance)
```

- Alternatively: winston.forward(int(distance))

Questions?