

Instructional Days: 17-19

Topic Description: The question “What is intelligence?” is addressed through discussion of the differences between humans and computers. Various models of machine learning are investigated along with the concept of natural language understanding.

Objectives:

The student will be able to:

- Explain the idea of intelligence especially as it relates to computers
- Explain what it means for a machine to “learn”
- Discuss whether computers are intelligent or whether they only behave intelligently

Outline of the Lesson:

- Journal Entry (15 minutes)
- Differentiation between humans and computers (95 minutes)
- A simple model of machine learning (55 minutes)

Student Activities:

- Complete journal entry.
- Complete CS Unplugged Activity 20: Conversations with Computers—The Turing Test.
- Interact with web-based chatterbots (Part I of The Computer Intelligence Activity).
- In groups, play several rounds of a guessing game (Part II of The Computer Intelligence Activity).

Teaching/Learning Strategies:

- Journal Entry: What is intelligence? Are computers intelligent? Why or why not?
 - Volunteers share their responses.
- Differentiating between humans and computers
 - CS Unplugged Activity 20: Conversations with Computers—The Turing Test
 - This activity can be downloaded from <http://csunplugged.com> From the menu, click on Activities, click on Turing Test, and then download the pdf for Activity 20. Note there are many additional resources listed that you may wish to explore.
 - It will be helpful for you to read through the entire activity before beginning it with your students. In addition to the explanation of the activity, it provides good background information that you will want to ensure is part of the discussion you have with students.
 - Based on the directions under “What to Do” (p. 214), assign and explain roles to 4 students.
 - Follow the remaining directions under “What to Do” (p.214-215).
 - Have students complete Part I of Computer Intelligence Activity.

- Assign each pair of students (students work with their elbow partner) two of the questions from the Turing Test Activity.
 - Discuss the results.
- A simple model of machine learning.
 - Have students complete Part II of the Computer Intelligence Activity.
 - Assign students to groups of 3 or 4 and assign each group 2 of the games in the activity.
 - Discuss the results.
- As part of the discussion make the distinction between a computer’s ability to perform some operations quickly and what it means to “know”.
 - Speed is not necessarily knowledge.
 - Humans are “smart”; computers are “fast” and follow code explicitly.
 - Intelligence is context dependent—e.g., being able to thrive in mountains versus downtown in a city. If you are familiar with a city, you can find streets easily, etc. whereas if you are a newcomer, you need to have a map and more precise instructions. This ties to the peanut butter and jelly sandwich example.

Resources:

- Computer Science Unplugged Activity 20: Conversations with Computers—The Turing Test (<http://www.csunplugged.com>), pp. 213-226
- Computer Science Unplugged Activity 20: Conversations with Computers—The Turing Test, p. 225—questions (one copy for each pair of students)
- Computer Science Unplugged Activity 20: Conversations with Computers—The Turing Test, p. 226—answers (one copy to post or display)
- Computer Intelligence Activity

Computer Intelligence Activity

Part I

A program passes [The Turing Test](http://en.wikipedia.org/wiki/Turing_Test) (en.wikipedia.org/wiki/Turing_Test) if a person can have a conversation with both it and a person and not be able to tell which one is the computer.

Try each of these chatterbots with the questions you were assigned. (Note: all of these websites were correct at the time of writing. You can also use a Google search to find these and others.)

1. Try to chat with [Eliza](http://nlp-addiction.com/eliza/) (http://nlp-addiction.com/eliza/). How realistic is she? Would she pass the Turing Test?
2. Try to chat with [Athena](http://Athena.blueinfos.com) (Athena.blueinfos.com). How realistic is she? Would she pass the Turing Test?
3. Try to chat with [Friend4U](http://virtualentities.com/friend4u) (virtualentities.com/friend4u). How realistic is she? Would she pass the Turing Test?
4. Try to chat with [InteliAvatar](http://inteliwise.com) (inteliwise.com). How realistic is she? Would she pass the Turing Test?
5. Which of the above chatterbots was the most like a real person?
6. What [Chatterbox Challenge](http://www.chatterboxchallenge.com) (http://www.chatterboxchallenge.com)?

Part II

1. Go to 20q.net. Choose your language (Think in American is recommended). Choose one of the games from the bottom that was assigned to your group. You are supposed to think of something in that category and answer the computer's questions by clicking them. The computer will try to guess what you chose in 20 questions or less. Play the game several times addressing each of the following:
 - Pick an item and see how many questions are required.
 - Choose the same item and see if you can make it require more questions
 - Repeat this with another item.
 - How intelligent is this? Would this pass the Turing Test?
 Play the second game you were assigned and repeat the process above.
2. The Turing test is a person checking to see if it is talking to a computer. Can you think of any occasions that a computer might want to know if it is talking to *another* computer or a real life person?