MACHINES CAN THINK LOGICALLY TOO

# Slide 1

## Level 1 - How do you decide if you need to go to the supermarket and buy ingredients before you make dinner?

### Level 2 -

#### Level 3 -

# Slide 2

## Level 1 - Humans use logic to connect the dots and make decisions.

### Level 2 - You use logical reasoning from simple problem solving, it’s a cognitive skill we benefit from is all kinds of situations.

#### Level 3 - https://www.braingymmer.com/en/blog/logical-reasoning/

# Slide 3

## Level 1 - Machines use logic too, that is how they solve problems.

### Level 2 - Logic is one of the main components used in many common computer algorithms, such as the ones that decide what Netflix film you will want to watch next.

#### Level 3 - https://en.wikipedia.org/wiki/Logic\_in\_computer\_science

# Slide 4

## Level 1 - One way to show how machines use logic is called the Einstein’s riddle

### Level 2 - This riddle focuses on deductive reasoning. With deductive reasoning, facts are used to come to a logical conclusion. If all the facts are true and all the rules of deductive logic are followed to come to a conclusion, then the conclusion will also be true.

#### Level 3 - https://en.wikipedia.org/wiki/Deductive\_reasoning

# Slide 5

## Level 1 - Einstein’s riddle is a logic puzzle in which a sentence relating objects to each other are given.

### Level 2 - Give an example of an Einstein’s Riddle (maybe. We should give a more simple example that can be solve faster by the person looking at the puzzle?)

There are five houses.

The Englishman lives in the red house.

The Spaniard owns the dog.

Coffee is drunk in the green house.

The Ukrainian drinks tea.

The green house is immediately to the right of the ivory house.

The Old Gold smoker owns snails.

Kools are smoked in the yellow house.

Milk is drunk in the middle house.

The Norwegian lives in the first house.

The man who smokes Chesterfields lives in the house next to the man with the fox.

Kools are smoked in the house next to the house where the horse is kept.

The Lucky Strike smoker drinks orange juice.

The Japanese smokes Parliaments.

The Norwegian lives next to the blue house.

#### Level 3 - https://afdsi.com/\_\_\_supplier/story-einstein-riddle/zebra-puzzle.txt

# Slide 6

## Level 1 - At the end, a question is asked on how certain objects related to each other

### Level 2 - Give an example of a question for the previous Einstein's riddle

Now, who drinks water? Who owns the zebra?

#### Level 3 -

# Slide 7

## Level 1 - Can you solve it?

### Level 2 - Include some image of the manual solution with the table

#### Level 3 -

# Slide 8

## Level 1 - Einstein’s riddles have been used to test how effective computer algorithms are at solving problems.

### Level 2 -

### Level 3 -

# Slide 9

## Level 1 - Computers use two main technologies to solve these problems: Ontologies and reasoners

### Level 2 - Figure showing ontology and reasoning

#### Level 3 -

# Slide 10

## Level 1 - Ontologies are detailed descriptions of something. For your purposes, think of an architect blueprint.

### Level 2 - In the puzzle we gave at the beginning, the nationality (English, Spaniard, Ukrainian) is a classified as a property of a person, where as the position (first, middle, etc. ) is associated with the house. Computers are able to create relationships between the different classes to determine which person lives in which house.

#### Level 3 - https://en.wikipedia.org/wiki/Web\_Ontology\_Language

#### https://afdsi.com/ontomatica-home/

# Slide 11

## Level 1 - Reasoners are computer programs that are able to deduce additional information. For example, in our architect blueprint, which rooms should have a heater but do not.

### Level 2 - In our puzzle, if we know that the Englishman lives in the red house, we also know that he does not live in the blue house

#### Level 3 - http://www.hermit-reasoner.com

# Slide 12

## Level 1 - So now, let’s look at how a computer would solve the riddle (include your slide image showing how it does it)

### Level 2 -https://afdsi.com/\_\_\_supplier/story-einstein-riddle/einstein-riddle-part-1.png

#### Level 3 - https://afdsi.com/\_\_\_supplier/story-einstein-riddle/einstein-riddle-description-OWL.html

# Slide 13

## Level 1 - The advantage of having computers solving these problems is that they can be much quicker and have many more variables than what person can do by hand

### Level 2 - is it possible to make a video showing how fast the computer can do this or is it too fast?

#### Level 3 -

# Slide 14

## Level 1 - An open system that uses these tools is Protege, developed by Stanford and free to use

### Level 2 - Protege screenshot

### Level 3 -

# Slide 15

## Level 1 -

### Level 2 -

#### Level 3 -