Initial meeting

Szymon Bobek

Institute of Applied Computer science
AGH University of Science and Technology

ISK Robotics club
email: szymon.bobek@agh.edu.pl
http://home.agh.edu.pl/sbobek

Outline I

1. **What is Robotics**
   - I'm interested in robotics.
   - How to tell if something is intelligent?
   - Can submarine swim?
2. **Questions**
3. **So what are we gonna do here?**
4. **Homework**

Presentation Outline

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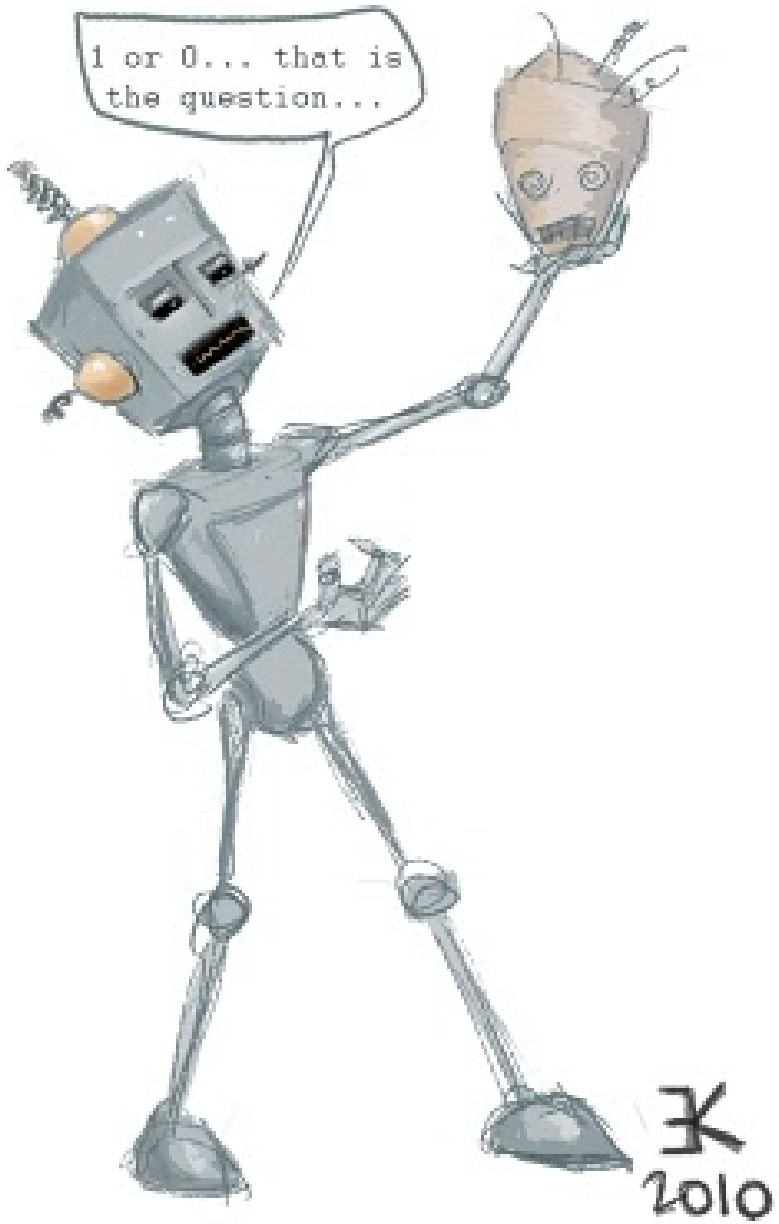
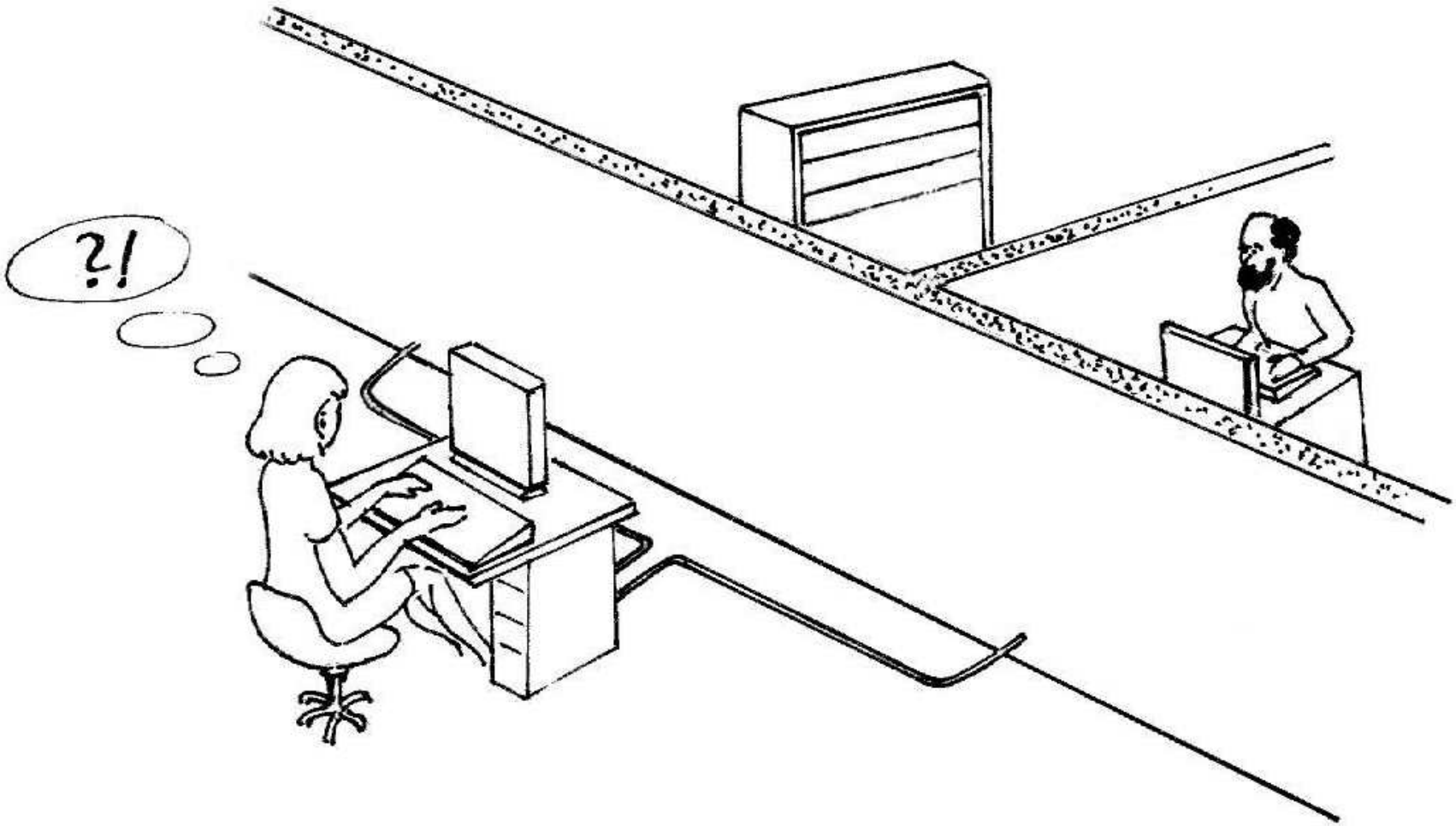
What is Robotics

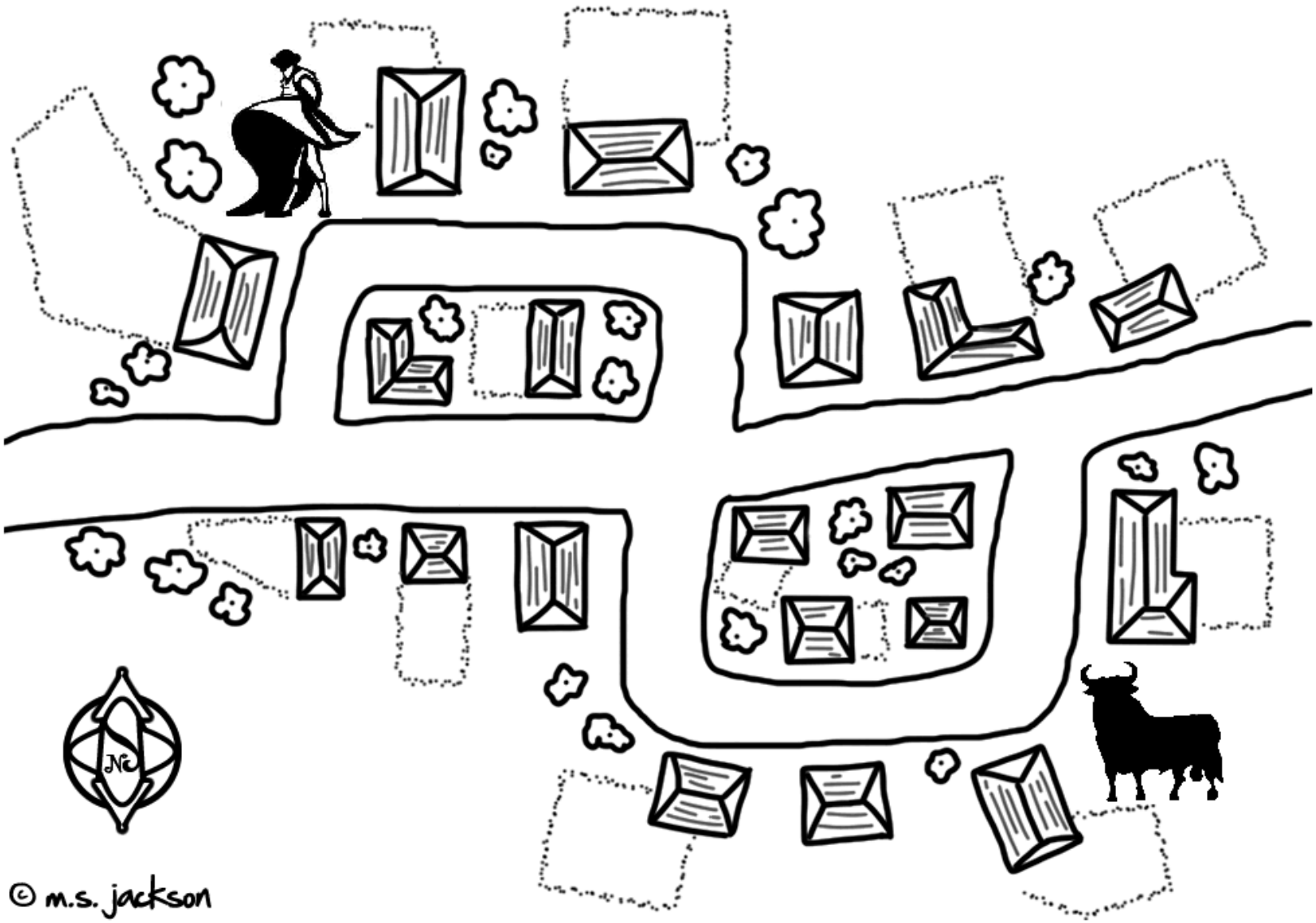


Turing test (Alan Turing, 1950)

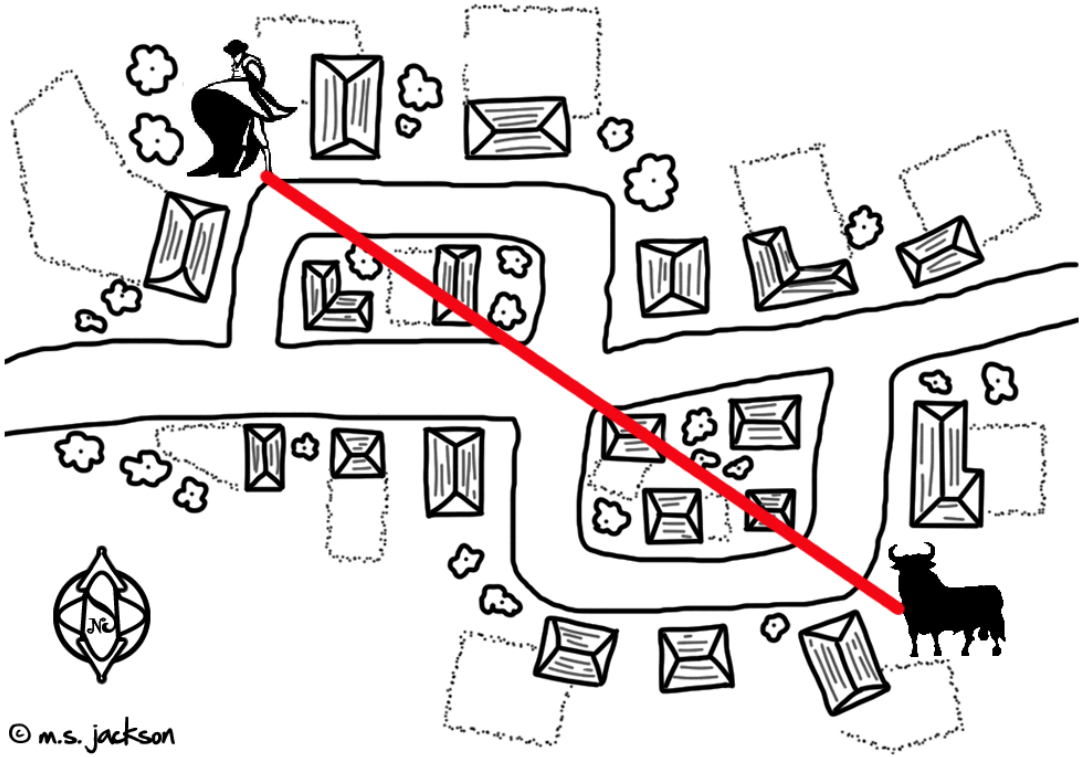


Chinese room experiment (John Searle)

Matador and Torro



Straight line distance

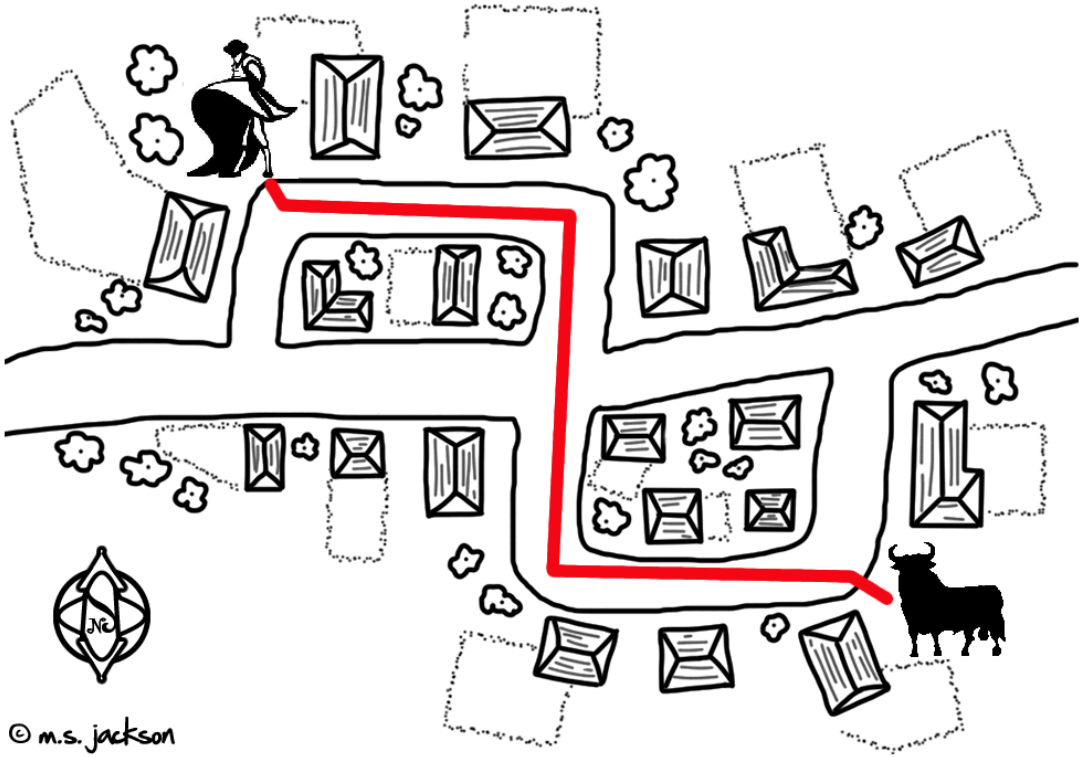


Geometric Distance

Distance can be calculated according to the equation:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Road distance



Real-life Distance

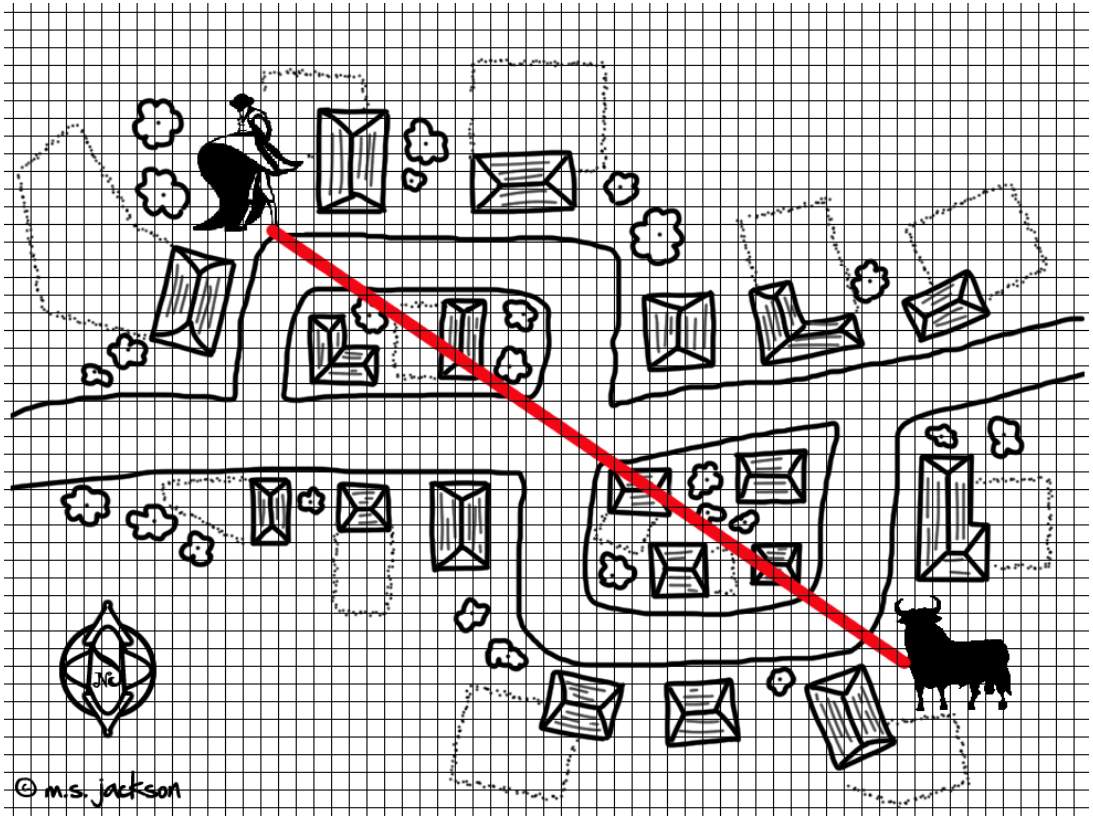
Distance is a length of a path that leads to the destination.

Orthodrome

Perfect Distance

Earth is round. We have to take this into consideration while calculation distance.

Pixel distance

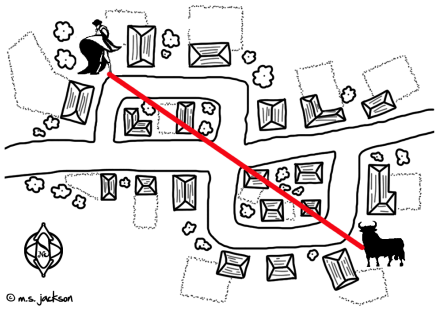


Artificial Distance

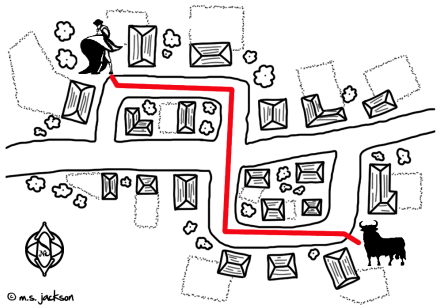
This example is not real at all - it is a picture, so distance can be given as a pixel difference.

Which definition is correct?

Straight line

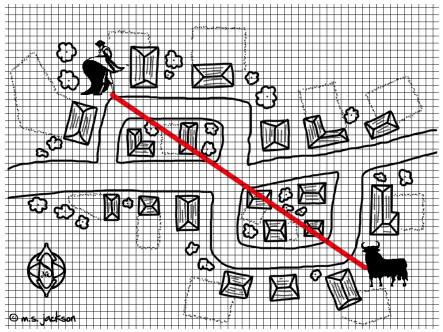


Road line



Curved

Pixel



It depends..

All of the above definitions of distance are correct.
It all depends on the world model, goals and constraints.
Which model is the best?

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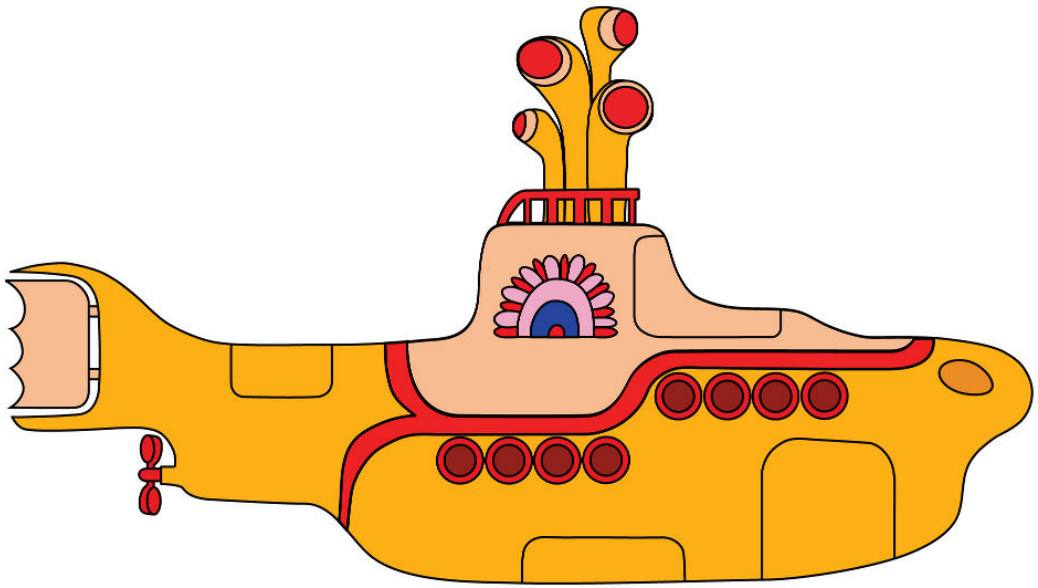
Can submarine swim?

- A question *"Can machine think?"* is similar to a question *"Can submarine swim?"*.
- Artificial intelligence is just a simulation of real intelligence, hence it requires appropriate model.
- Every model requires constraints. The looser constraints, the more difficult the "simulation".



Artificail Intelligence

Strong AI

Machine-based artificial intelligence that can truly reason and becomes self-aware (sentient), either human-like (thinks and reasons like a human mind) or non-human-like (different form of sentience and reasoning) - coined by John Searle: "an appropriately programmed computer IS a mind" (see Chinese Room Experiment).

Weak AI

Machine-based artificial intelligence that can reason and solve problems in a limited domain. Hence it acts as if it were intelligent in that domain, but would not be truly intelligent or sentient.

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Warm up exercise

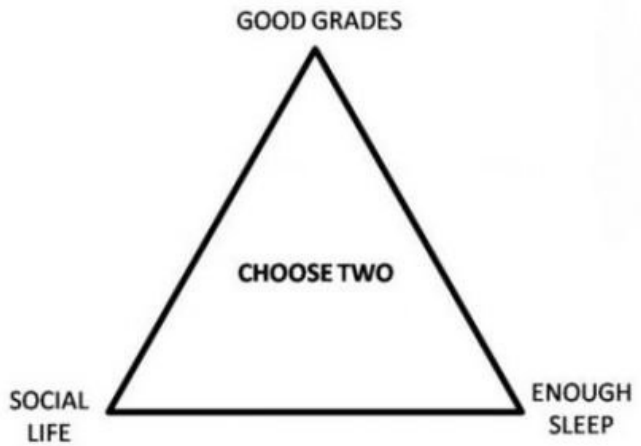
It's only logical

You are given three jars. The jars are labeled as follows: jar 1 has the label 'red'; jar 2 has the label 'blue'; and jar 3 has the label 'mixed'. You know that one of the jars contains balls of red color only; another jar contains balls of blue color only; and another jar contains balls of both colors, red and blue. You also know that every jar is labeled incorrectly. Your task is to label the jars in a correct way. Say what is the minimum number of balls that need to be checked to complete your task.

Write a program that...

...is simple

Write a program (or design one in pseudocode), consisting of a function that takes three parameters (floating point numbers) representing lengths of three sections in 2D space. This function returns true if it is possible to build a triangle out of the three sections, and false otherwise.



What does this program do

```
def function(parameter):
  if(parameter < 0):
    print("I have no idea...")
    return 0;
  if(parameter == 0): return 1;
  if(parameter == 1): return 1;
  return function(parameter-1)*parameter;
```

What is wrong with this program?

```
import java.io.*;
public class MyClass{
   public static void main(String [] argv){
      int a = 10;
      int b = 4;
      double c = 10/4;
      System.out.println(c);
   }
}
```

Localization problem

Why math, physics and creative thinking is also robotics?

Imagine you have a robot in a room. You have a perfect map of that room. There are three anchors that sends signals every second that the robot can receive. You know the location of these anchors on the map. Robot and anchors has their clocks synchronized, and the robot knows times when the signal was send and the time when it arrived to it. How the robot can localize itself on the map.

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We could...

In general

- Program mobile device to communicate with robot, being its eyes, ears and brain (**programming section**)
- Design robots (**engineering section**)
- Design algorithms to solve problems (**all**)
- Formulate problems (remember von Neuman?) (**all**)

We also could...

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No homework :)

But you're gonna build robots, right?

- Buy yourself a notebook (the paper one)
- Design a robot that you would like to build during this club – on the paper... with pencil... think on the paper, make it messy if needed.
- Read (or watch, but rather don't – Will Smith is starring) *I, Robot* by Issac Asimov and think of there any ethical issues regarding building robots (we will talk next time about it).

The riddle

Two robotics enthusiasts meet:

- I am a happy man, I have built three wonderful robots!
- How many processors each of these robots has?
- The product of the number of their processors is my age, which is 36.
- Well, this tells me nothing...
- OK. Can you see the building at the other side of the street? The sum of their processors is equal to the number of windows in that building.
- I still says only a little.
- The most powerful robot looks like a cat.
- Aaaaa...! Now everything is clear. Nice work.

Thank you for your attention!

Any questions?

email: szymon.bobek@agh.edu.pl
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