Erasmus+

EURLAB

EUROPEAN

ROBOTIC

LABORATORY

Basic knowledge I.0: About robotics

The Colossi of Memnon

Thebe, 1500 AC

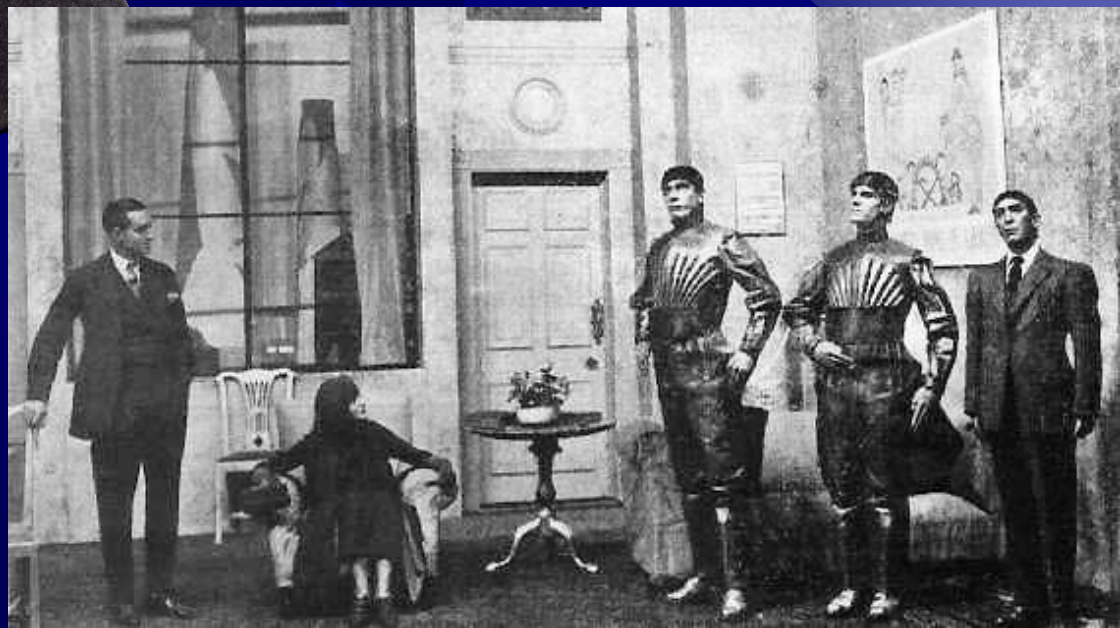
At dawn, mysteriously, on their own emitted a sound.

first robot (??)

->

In the Czech language 'robota' means 'heavy work'

The word 'ròbot' (no 'robòt'!!) was first used to denote a fictional humanoid in a 1920 play R.U.R. (Rossumovi Univerzální Roboti) by the Czech writer, Karel Čapek.



…today!

Robot everywhere

In manufacturing

Robot everywhere

In dangerous works

Robot everywhere

In exploration

Robot everywhere

Home works

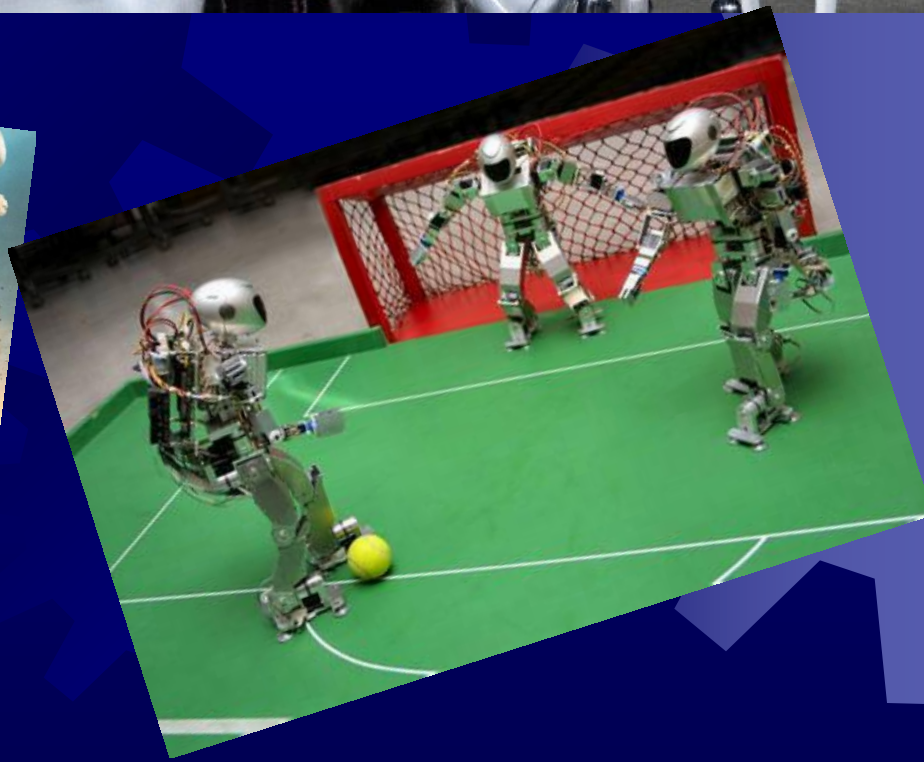
Robot everywhere

In the wars

(unfortunately!)

Robot everywhere

In the entertainment



Robot everywhere

In surgery
and
disability

Robot everywhere

In literature

Isaac Asimov

Isaac Asimov: The Three Laws of Robotics

1) *A robot may not injure a human being or, through inaction, allow a human being to come to harm.*

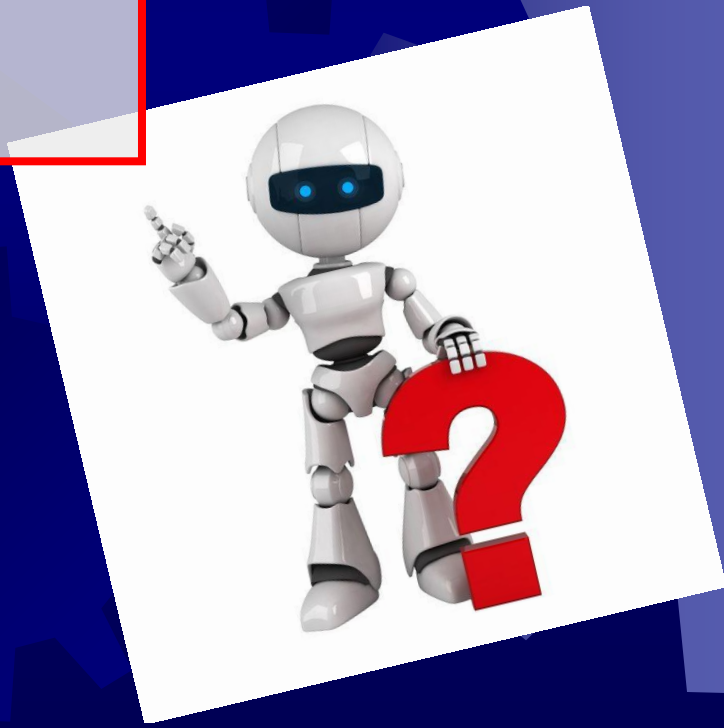
2) *A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.*

3) *A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.*

(These laws concern only the protagonists of his novels!)

ROBOT ?

- What is it?
- What should it do?
- What is it made up?



What a ROBOT is

Differences between

- BYKE
- A POWER DRILL
- A REMOTE CONTROLLED TOY
- A CAR

and

- WATER HEATER
- WASHING MACHINE
- AIRCRAFT WITH AUTOPILOT

They work ALONE!!

They need MAN while are working!!!

ALONE = > AUTOMATIC

AUTOMATIC = AUTOMATON !

What a robot must do

It must

BEHAVE

in some way inside an

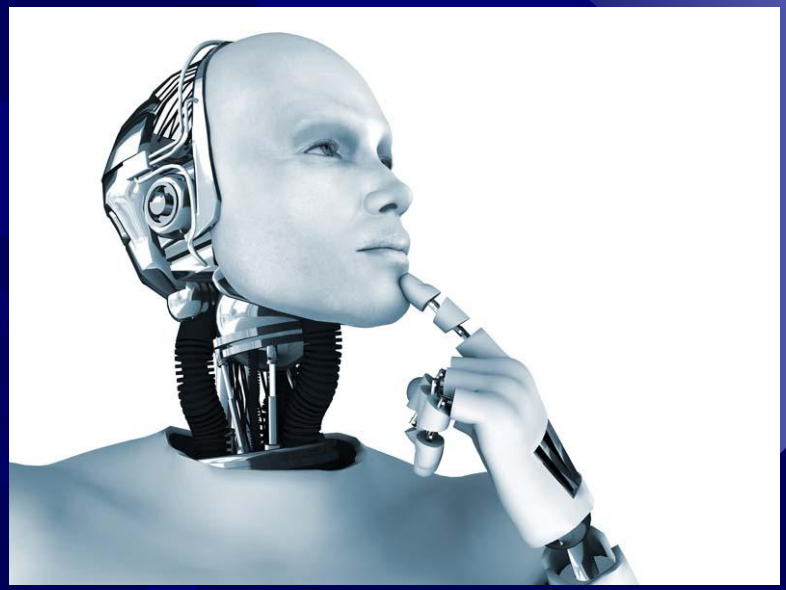
ENVIRONMENT

'To behave' means:

1. ***TO FEEL (sensors)***
2. ***TO DECIDE (programm)***
3. ***TO ACT (actuators)***

Environment means:

- **SOUNDS**
- **COLORS, LIGHT**
- **OBSTACLES**
- **other signals**



Robot's parts.

HARDWARE

SOFTWARE

MECHANICAL PARTS (tongs, gears, engines, wheels ....)

ELECTRICAL PARTS (batteries)

ELECTRONIC PARTS (memories, controllers, boards,…)

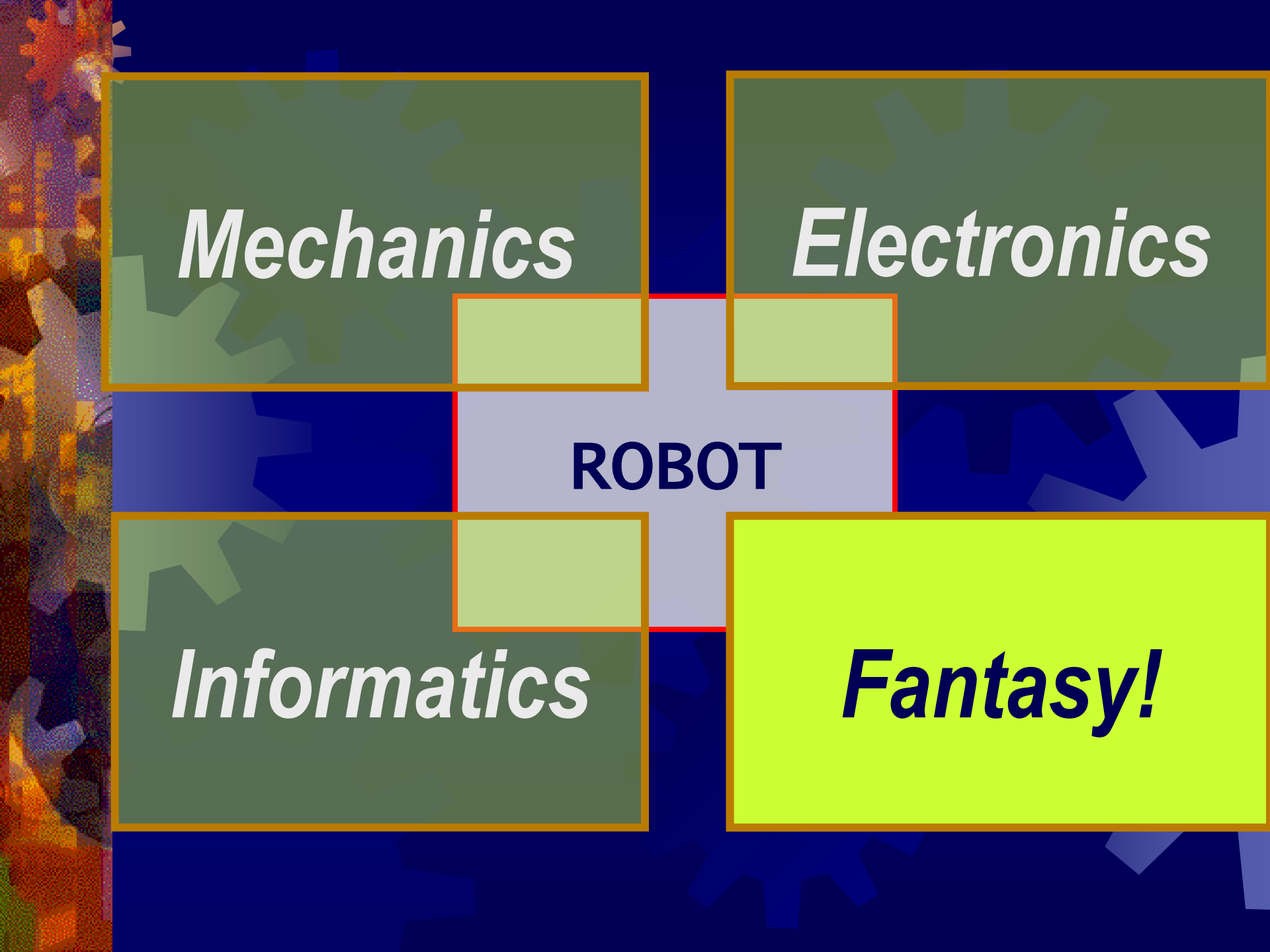
SENSORS, ACTUATORS

The intelligence that leads robot to take decisions.

(CREATED BY MAN!!!!)

ROBOT !

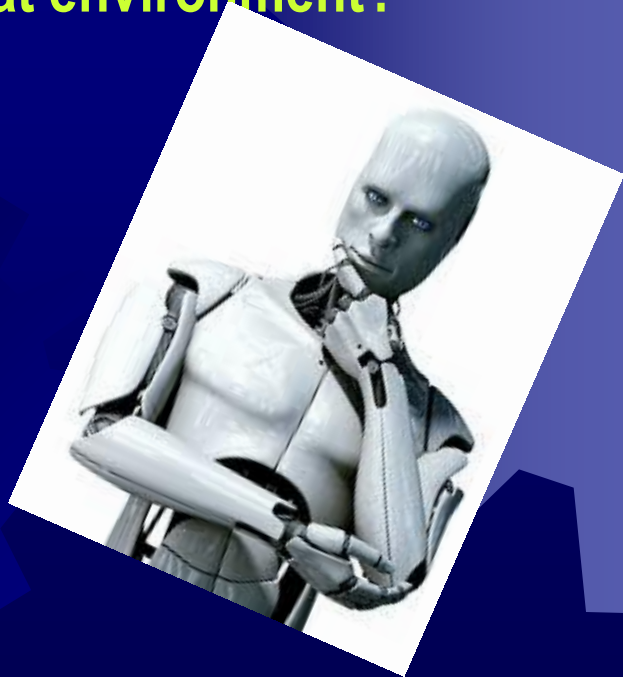
- AN AUTOMATON MADE BY MECHANICAL PARTS, ELECTRONIC PARTS, ELECTRICHAL PARTS
- EQUIPPED WITH INTELLIGENCE (A SOFTWARE CREATED BY MAN!) THAT LEADS IT TO MOVE AND ACT INSIDE AN ENVIRONMENT, WITH WHICH IT INTERACTS THROUGH SENSORS AND ACTUATORS.


Mechanics
Electronics
ROBOT
Informatics
Fantasy!

Let's make a real robotic experience!

First: defining how the robot shall act!

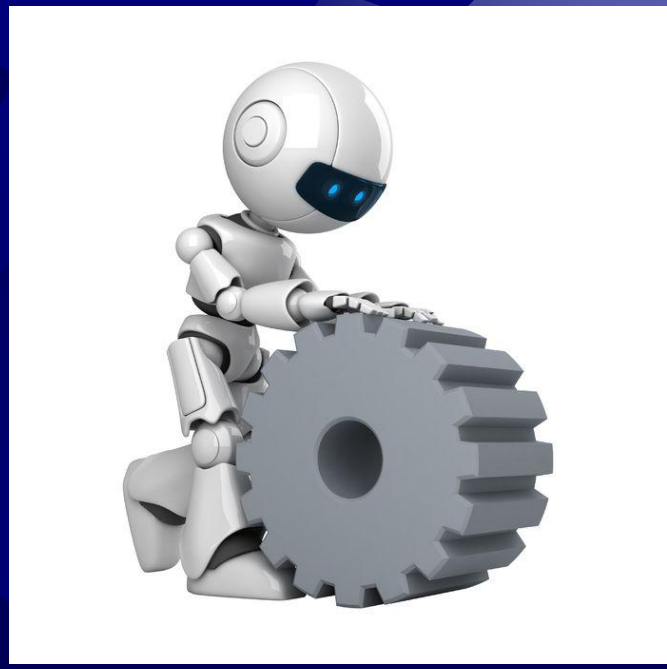
- Have we understood correctly what to do?
- Do we know the environment in which the robot will move?
- Have we decided how it has to act in that environment?
- Do we all agree in our group?



Let's make a real robotic experience!

Now, let's decide the form and the structure

- Do we have sensors we need?
- Do we have actuators we need?
- Do we have all other components ?



Let's make a real robotic experience!

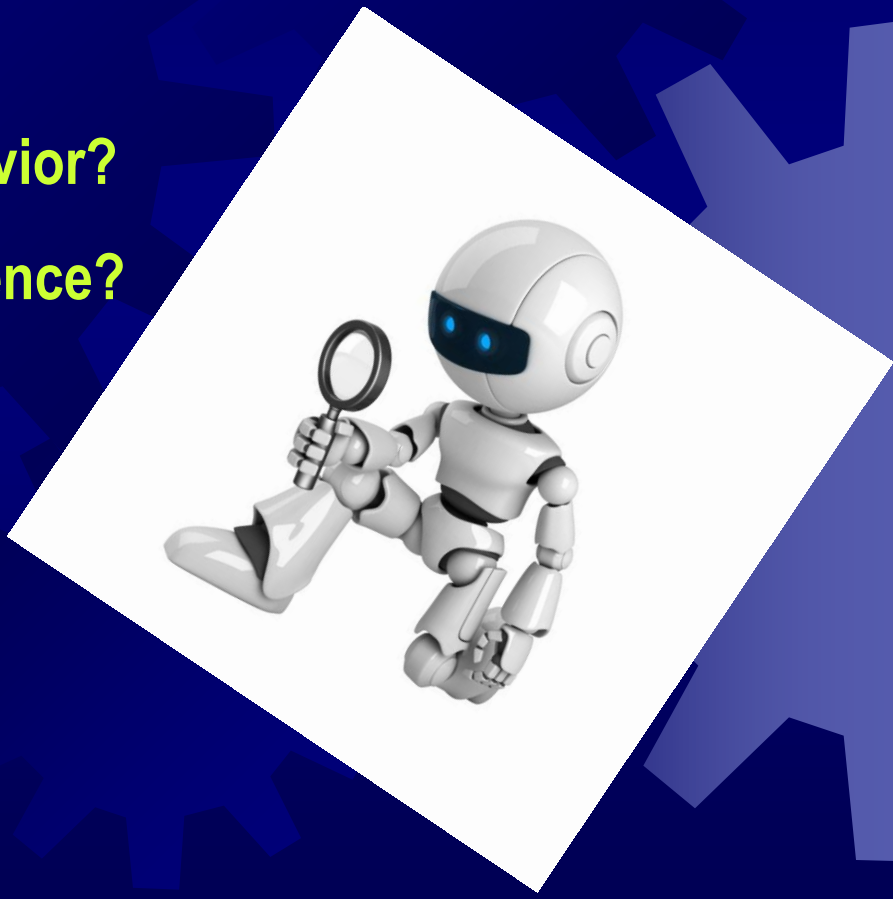
About software

- Do we chosen the software (and IDE) suitable for our hardware?
- Do we know the instructions to read data from the sensors?
- Do we know the instructions to control the actuators?
- Do we know the instructions to manage the hardware of the robot?
- Do we know the instructions to achieve the behavior we wanted to?

Let's make a real robotic experience!

Testing our results!!

- Is the behavior consistent with the initial specifications?
- Are there any critical points?
- Is there any unexpected behavior?
- Could we improve our experience?



Let's make a real robotic experience!

Let's start!

- Connect!
- Collaborate!
- CREATE!

and don' t

"Robotics = INTELLIGENCE + MOVEMENT"

Good work!