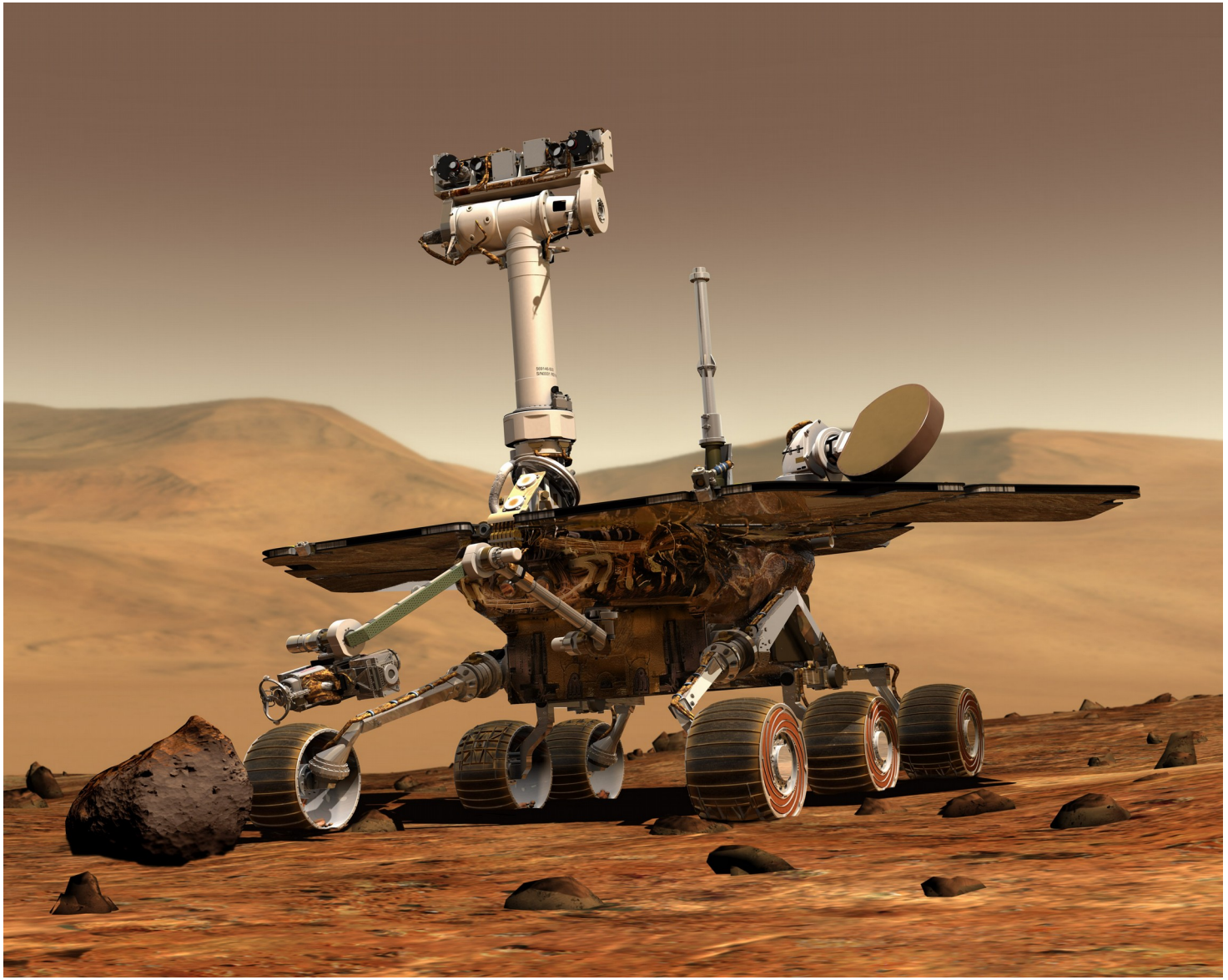
Autonomous mobile robots



How does a robot work?

<u>1) Sensors</u>
Get information from the environment.

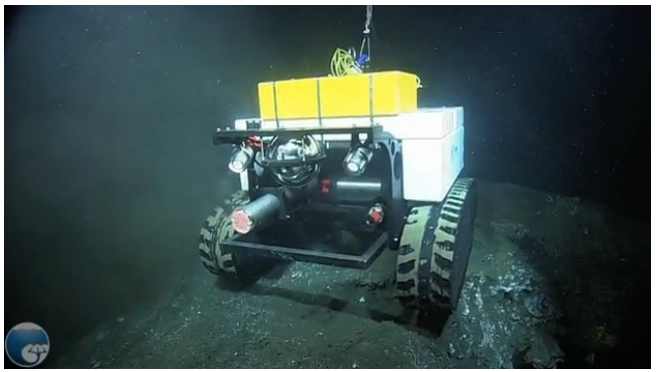
<u>2) Processor</u>
Understand this information and take decisions

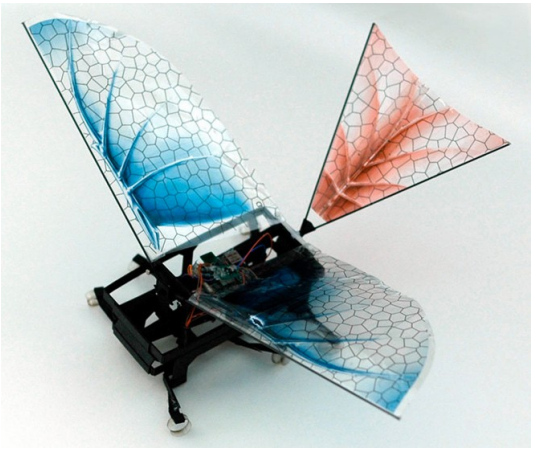
<u>3) Actuators</u>
Act the decisions upon the real world

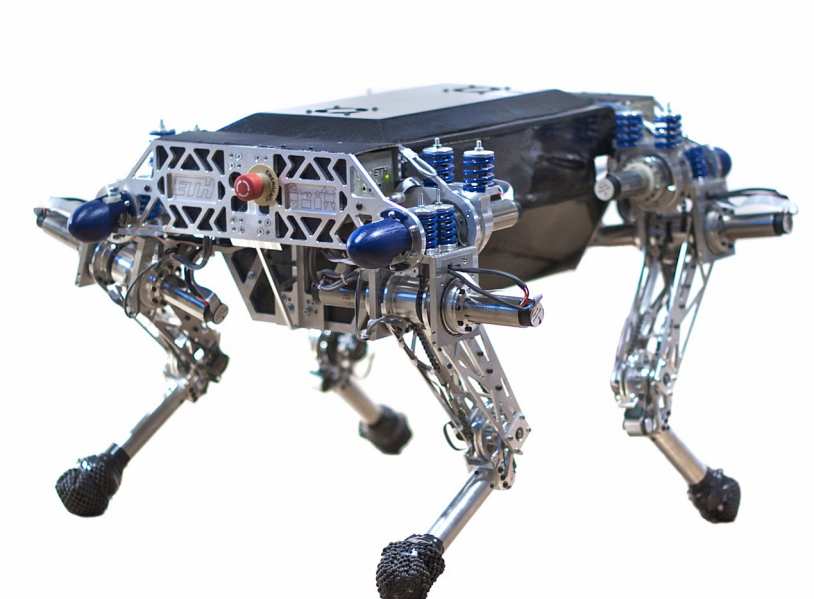
Mobile robot

Some actuators allow it to move:

- Wheels
- Legs
- Propellers
- Wings
- Caterpillar
- ...







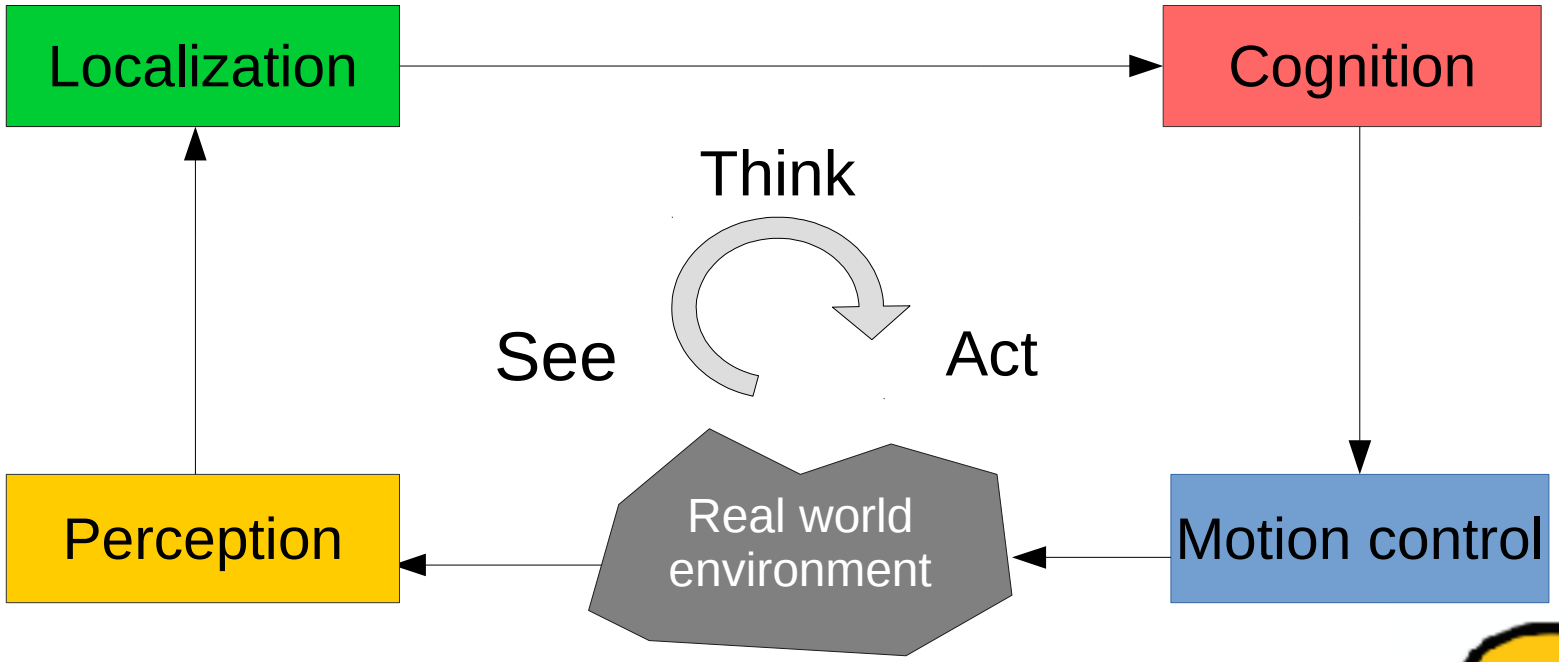
Autonomous mobile robots

3 key questions:

- Where am I?
- Where should I go?
- How do I go there?

Autonomous mobile robot

See – think – act



THIS IS THE MOST IMPORTANT SLIDE OF THE WEEK!

Perception

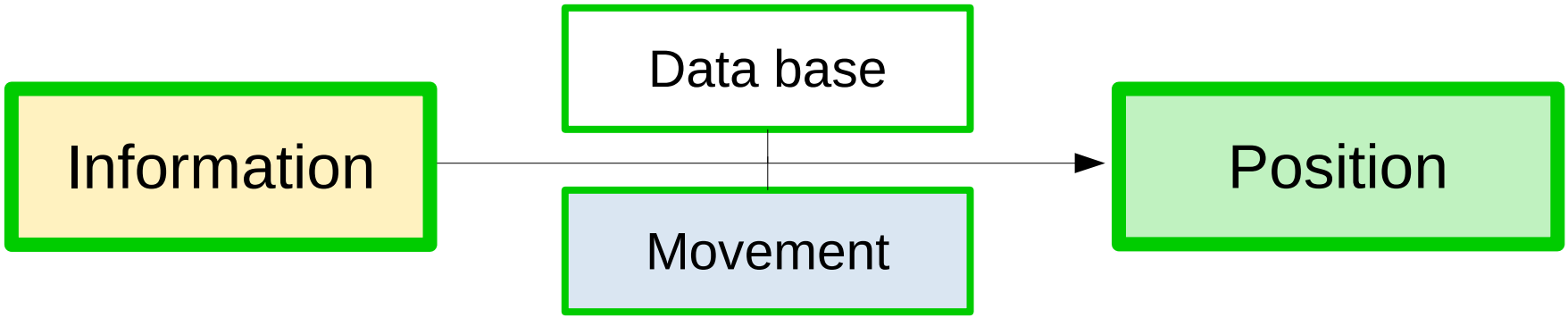
Sensing

Raw data

Information Extraction

It’s a pillar!

Localization



Data base: where are the pillars.

I see a pillar

There are 3 places I can see a pillar from

I moved forward

This is where I can be now

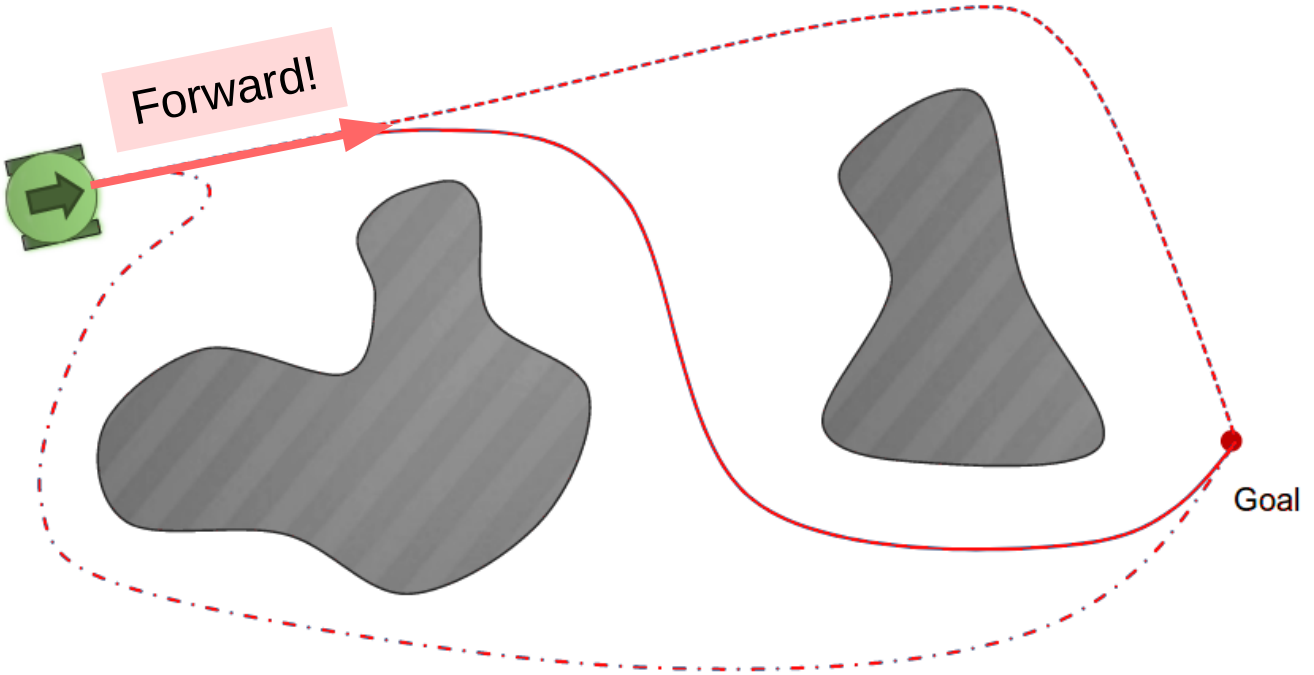
I see a pillar again

There are 3 places I can see a pillar from

Therefore I must be here now

Cognition

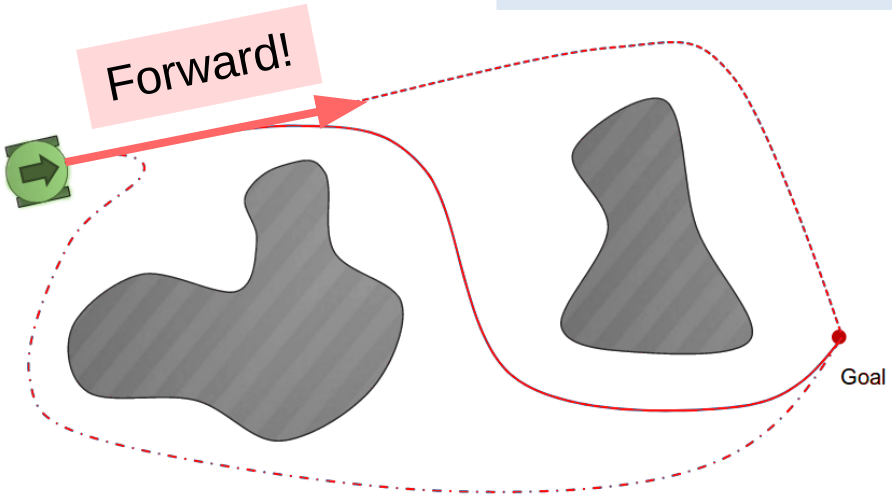

Position
Mission
Global map
Movement command


Forward!
Goal

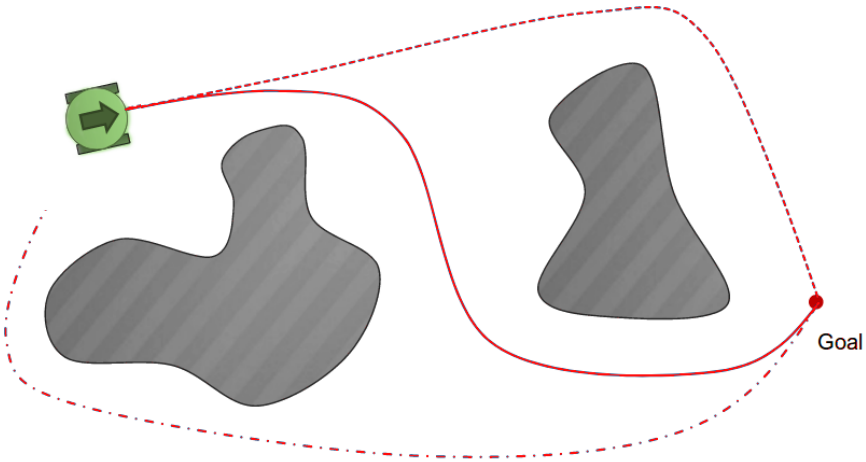
Motion control

Movement command → Movement execution → Actuator commands → Acting

Wheels have to turn:
- Forward
- Same speed for both



Wheels, turn!



Then, we start the loop again

Think

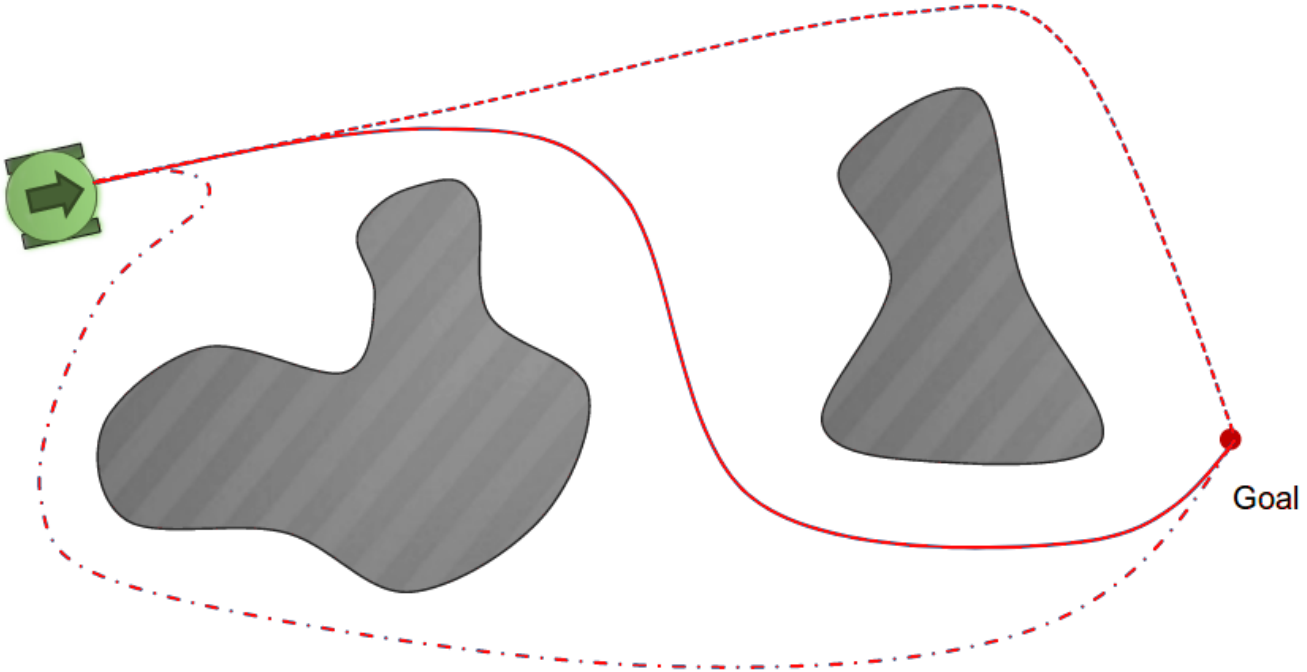
See

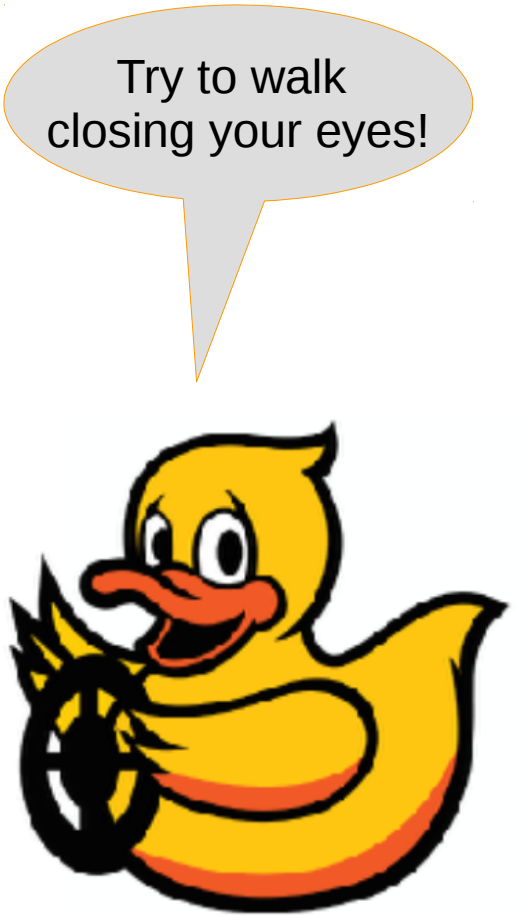
Act

And again, and again, and again...
Unitl we reach our goal!

Discussion

Why do we have to repeat the cycle?
Why could not we just decide once what to do and just do it?





Discussion

You are a robot!

- What are your sensors and actuators?
- How do you do Perception? Localization? Cognition? Motion control?