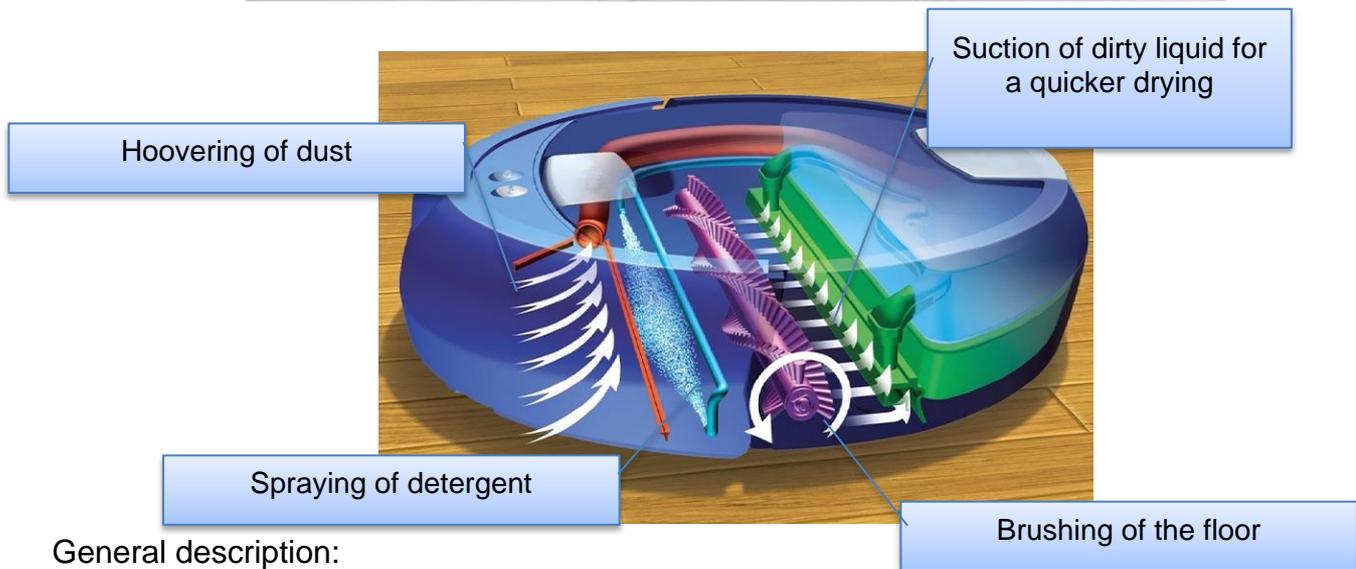


iRobot already developed robots to vacuum clean your home automatically.

They are now presenting a device that can actually wash hard floors such as tiled floors.



General description:

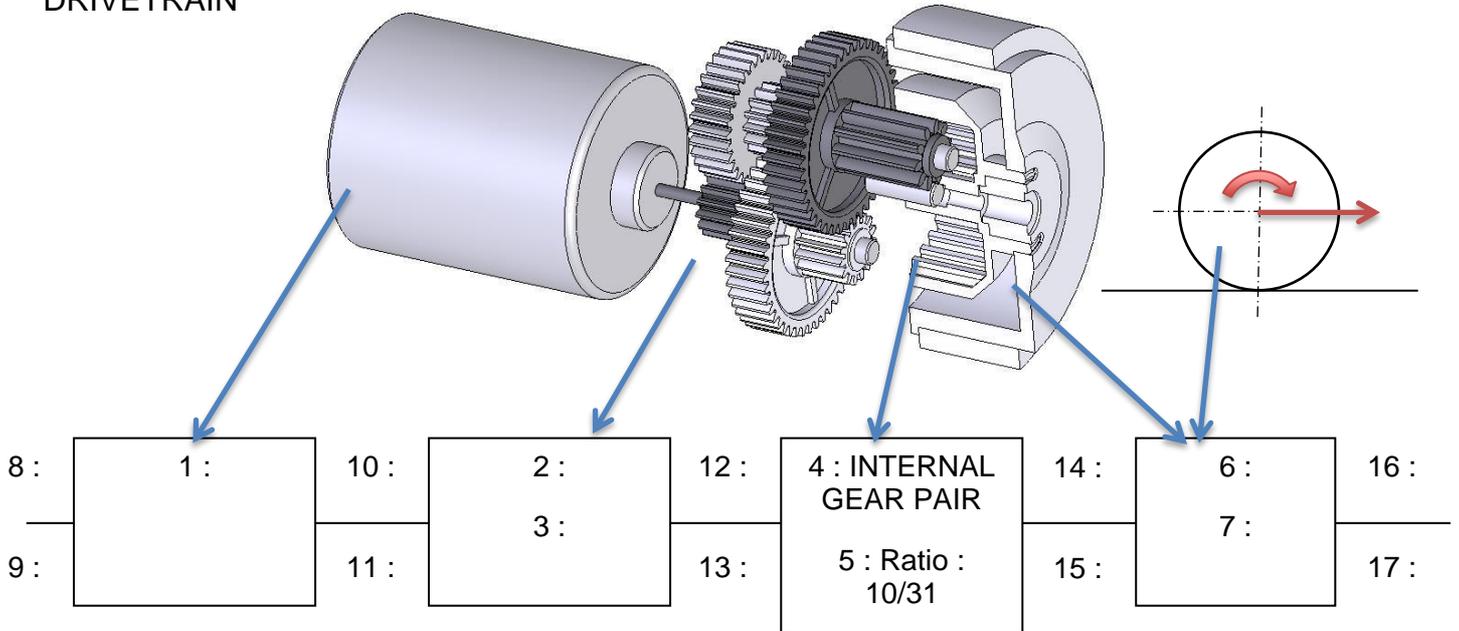
How many water tanks have to be planned by the designer and why?

The device stands on three wheels, one idler wheel at the front and two main wheels.

How many independently driven motors are necessary and why?



DRIVETRAIN



Q1: Give the right number to each element of the drivetrain  
 (follow the example given for 4 and 5, some numbers might not be used)

Elements of drivetrain		Technical data		
Wheel		Radius of the wheel	21,5 mm	
Reducing gears		Drive ratio of the reducing gear	1/18,4	
Internal gear pair	4	Drive ratio of the internal gear	10/31	5
Motor		Output torque of the motor	Q3	
		Tension		
		output torque at the wheel	75 N.mm	
		frequency rotation of the wheel	100 r.p.m	
		Current		
		Linear speed of the robot	Q2	

For the next questions explaining your reasoning is much more important than the actual calculus.

Q2: Calculate the linear speed of the robot

Q3: Calculate the output torque of the motor

## STUDY OF THE STEERING

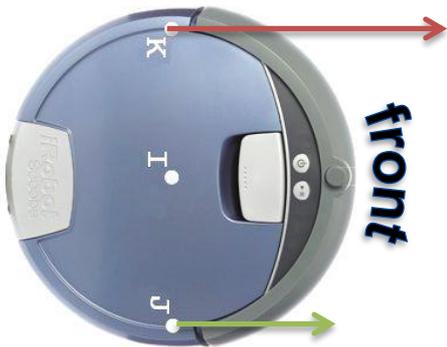
The steering is obtained by having the two main wheels turning at different speeds.

In each of the following cases **explain** how the wheels turn with respect one to the other. Then **describe** the behavior if the robot.

### SITUATION 1



### SITUATION 2



### SITUATION 3

