

# Programming a robotic system to deal with water problems

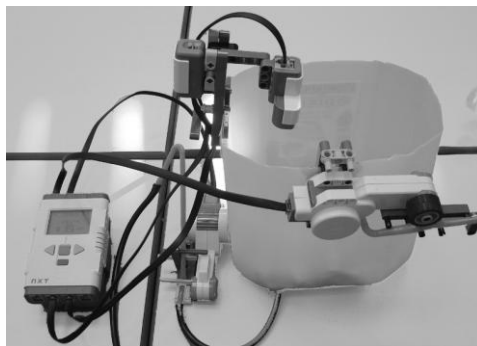
**Marios Xenos**, [mariosxenos@ppp.uoa.gr](mailto:mariosxenos@ppp.uoa.gr)

Educational Technology Lab, School of Philosophy, University of Athens

## Short presentation

The following proposal exploits the graphical programming environment that comes with Lego Mindstorms NXT kit, in order to introduce students with essential programming structures. Specifically, in order to motivate students to build a program, it presents the authentic problem of water management and asks them to formulate their suggestions - solutions through programming the behaviour of a well prepared system.

A water tank with sensors and valves comprises a watering system and needs an appropriate “behaviour” (figure 1). Students are facing the authentic problem of the water management: “How must the system be programmed in order not to waste water in a farm?”



*Figure 1. The watering system*

The above main question breaks down into programming problems that have been addressed by the students-programmers:

- How can the sensor values be inspected continuously?
- In which way the sensor values have to affect the motor/valve movement?
- Is there a necessity to have somehow a “save” functionality for some values?

To solve the above problems, students reconstruct a predefined program by adjusting correctly the available “blocks” that appear on the programming environment, in order to give the system the appropriate behaviour.

Behind the well-designed blocks, programming structures and concepts are hidden. Teacher does not present any of these structures or teaches programming concepts. He acts as a “facilitator” and just helps the learners to find a solution to the watering problem. However, some important and interesting issues that refer to the use of variables, repetition structure and selection structure come to surface.

## Keywords

Educational Robotics, problem-solving, programming