

COMPUTER ENGINEERING DEPARTMENT**COMPUTER ENGINEERING****ARTIFICIAL INTELLIGENCE****2018/2019 – 2nd semester**

REACTIVE AGENTS

Goals for this worksheet:

- To Implement a reactive agent;
- Understanding the architecture and limitations of reactive agents.

Reactive agents are one of the simplest approaches to agent building. These agents are only able to react according to their most recent perceptions. The algorithm for this type of agents can be summarized as follows:

```
function reactive_agent(environment)
  repeat
    perception ← build_perception(environment)
    action ← decide(perception)
    execute(action)
  while ...
end

function decide(perception) : action
  if perception = state1 then return action1
  elseif perception = state2 then return action2
  ...
End
```

You are expected to develop a reactive agent which is capable of navigating in an environment consisting of a grid of cells containing obstacles (walls). A cell may be: empty, contain an agent; or be occupied by a wall – blocking the movement of the agent. The agent can perceive four positions and move in four directions (the main cardinal points).

In the course's Moodle page you will find a scaffold project (ReactiveAgents.rar) containing the base code to be used in this exercise; this code implements the base architecture of a reactive agent. You will be mostly working in the ReactiveAgent class, keeping the code related to the environment unchanged.

In the ReactiveAgent class, the decision, execute and buildPerception methods are of particular relevance because they correspond to the implementation of the fundamental algorithm of a reactive agent.

Start by carefully reviewing all of the code provided in order to understand the proposed architecture. Then:

- a)** Implement a basic version of the reactive agent, defining the rules of the decision function. This first agent should simply wander around the world and avoid hitting the walls.
- b)** Consider that each cell may contain garbage. When the agent enters a dirty cell, it “vacuums” any garbage it contains. In addition, the agent should be able to perceive garbage in adjacent cells and use that information in its decision-making process.
- c)** Implement a mechanism of memory so that the agent avoids entering, whenever possible, already visited cells.