

Vacuum Cleaning Agent

Description

It is a simple vacuum cleaning world example. The idea is that we have a small robotic agent that will clean up a room. The robot is equipped with a sensor, and a vacuum cleaner that can be used to suck up dirt. In addition, the robot always has a definite orientation (one of north, south, east, or west). The robot is capable of sucking up dirt, moving forward and turning right. It is also able to sense if it is over any dirt and it can detect if a wall is directly in front of it.

The robot's task is to make sure the entire room is clean. We assume that the room is entirely surrounded by walls. The robot does not know the location of the dirt ahead of time. The agent moves around a room, which is divided grid-like into a number of equally sized squares (conveniently corresponding to the unit of movement of the agent). We will assume that our agent does nothing but clean- it never leaves the room.

The figure below shows an example initial state for the room. The robot is indicated by the "A", dirt is indicated by "*". The agent starts in the upper left corner of the room in square (1,1) and is facing south.

```

    1  2  3  4
    +---+---+---+
1 | A |   |   |   |
    +---+---+---+
2 |   | * |   |   |
    +---+---+---+
3 |   |   |   |   |
    +---+---+---+
4 |   |   |   | * |
    +---+---+---+
Location: (1,1)   Facing: SOUTH
```

Implementation – a single agent-based system simulation

- Java
- the package **agent** contains abstract classes corresponding to the agent-based simulation.
- based on this generic simulation, a Simple Vacuum World simulation is written in the package **simplevacuumagent**.
- the designed Vacuum agent has no strategy (it uses a random action selection).
- the main class of the Simple Vacuum World simulation is **VacuumSimulation** from the **simplevacuumagent** package.