# Characteristics of the environment

## Accessible or inaccessible.

## An **accessible** environment is one in which an agent can obtain complete, accurate, up-to-date information about the environment's state. In this project we have different agents, one of which is the system agent; this agent is particularly important since its job is to load the environment itself. So in this case, the system agent communicates the complete, up-to-date information of the environment to the other agents.

## Deterministic or non-deterministic.

## An environment in which an action has one single guaranteed effect is **deterministic**, this means that there is no uncertainty about the resulting state after performing an action. Hence, we can say that there is a clear difference in the state of the environment after any action performed by an agent. For example, the harvester after collecting the garbage, changes the state of the environment to ‘no garbage’; there is no other state it could change to.

## Episodic or non-episodic.

In an environment that can be considered **episodic** each episode accounts for the agent’s actions and reactions of the current episode. This means that every agent’s actions are independent in each episode. This kind of environment has a considerable advantage compared with non-episodic due to agents not having to think further. This attribute is seen in the agents where their actions are delimited by each episode and do not require information of previous steps; for example, a scout does not require any previous information from previous episodes to collect the garbage.

## Static or dynamic.

This environment is **static** considering the definition, a static environment is one that can be assumed to remain unchanged except by the performance of actions by the agent. In this problem, the effect on the environment is always determined by the agents. There is no other process aside from the agents that is affecting the world. For instance, the appearance of the garbage in the environment is performed by the system agent, and no process affects the environment.

## Discrete or continuous.

The environment is **discrete** since it has a fixed grid organization in the environment. This problem has a set of specific rules that govern the environment. There exists a number of finite actions that the agents have to do to finish the task. The time is represented in a discrete quantity of steps.

# KIND OF ARCHITECTURES

## System Agent

* **Reactive**: the system agent reacts to the initial configuration file in order to initialize the environment; it also reacts to the message from the coordinator agent to know when to proceed to the next simulation step. In this way the system agent updates the status environment.

## Coordinator Agent

* **Reactive**: this agent only reacts to two things. The former is when the system agent initializes/updates the environment so that the coordinator agent can centralize the orders to be executed in each turn. The latter is to tell the system agent when the tasks have been completed.

## Scout Coordinator

* **Hybrid**: this coordinator focuses on long-term planning of finding the garbage but also has to react for fast reactions in case there is garbage discovered.

## Harvester Coordinator

* **Hybrid**: this coordinator focuses on long-term planning of recollecting the garbage but also has to react for fast reactions in case there is garbage discovered.

## Scouts

* **Reactive**: they have to react fast to changes detected such as discovering new garbage.

## Harvesters

* **Reactive**: they have to react fast to changes detected such as picking up garbage.

# PROPERTIES:

## System Agent

* Reactivity: once the coordinator agent has informed that the simulation has been completed, system agent reacts to it and initiates another simulation.
* Social: this agent has to communicate with the coordinate agent to know when the simulation has finished.

## Coordinator Agent

* Reactivity: once both scout and harvester coordinator finish their task, the coordinator has to inform the system agent to start a new simulation.
* Social: The agent coordinator has to communicate with both scout and harvester coordinator and also with the system agent.

## Scout Coordinator

* Social: The scout coordinator has to communicate with all the scouts and the coordinator agent.
* Deliberative: coordinator has a representation of the map and city. The scout coordinator calculates the optimal routes.

## Harvester Coordinator

* Social: The harvester coordinator has to communicate with all the harvesters and the coordinator agent.
* Deliberative: coordinator has a representation of the map and city. The harvester coordinator calculates the optimal routes.

## Scouts

* Social: The scouts have to communicate with the scout coordinator and share information.
* Reactive: they react to heir sensors to identify when there’s garbage.

## Harvesters

* Social: The harvesters have to communicate with the harvester coordinator and share information.
* Reactive: they react to heir sensors to identify when to pick up garbage.

Bibliography:

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