**Fully Observable, Partially Observable and Unobservable**

If an agent's *sensors* give it access to the complete state of what is *relevant* in the environment at each point in time, the task environment is considered **fully observable**. In essence, a task environment is fully-observable if the sensors can detect all aspects of the environment which are *relevant* to the choice of action. Consequently, the relevance of an aspect is dependent upon the performance measure. Fully observable environments are convenient as the agent need not maintain any internal state to keep track of the environment.

An environment might only be **partially observable** because of noisy and inaccurate sensors or because parts of the environment cannot be captured by the agent's sensors.

If an agent has no sensors at all, the environment is said to be **unobservable**.

**Single Agent and Multiagent**

Given two agents, A and B, the key distinction between whether the environment is single agent or multiagent is whether B's behaviour can be described as being able to *maximise* Agent A’s performance measure. If not, the only agent acting in the environment is A and B is therefore *just* part of the environment.

**Competitive and Cooperative**

Consider a game of chess wherein agent B (e.g. a person) is trying to maximise its performance measure, which, by the rules of chess, minimises agent A's (e.g. a chess-playing agent) performance measure. Therefore, chess is a **competitive** multiagent environment.

On the other hand, in a taxi-driving environment, avoiding collisions maximises the performance measure of all agents, so it is a partially **cooperative** multiagent environment.

*Note: the distinction between competitive/cooperative only applies to multiagent environments*

**Deterministic and Stochastic**

The environment is **deterministic** if the next state of the environment is completely determined by the current state and action executed by the agent.

If an environment cannot be considered as being deterministic, it is, therefore, **stochastic**. The term "stochastic" implies that certainties of outcomes is quantified in terms of probabilities.

An environment which is neither fully observable nor deterministic is said to be **uncertain**.

A **non-deterministic** environment is one in which actions are characterised by their *possible* outcomes, but with no probabilities attached to their certainty. Non-deterministic environment descriptions are usually associated with performance measures which require the agent to succeed for *all possible* outcomes of its actions.

**Episodic and Sequential**

In an **episodic** task environment, the agent's experience can be thought of as consisting of atomic episodes. In each episode, the agent senses something from the environment and performs an action. Crucially, *the next episode does not depend on the actions taken in previous episodes*.

In **sequential** environments, the current decision could affect all future decisions.

**Static and Dynamic**

If the environment can change while an agent is deliberating, then we say the environment is **dynamic** for that agent. Otherwise, it is **static**.

If the environment itself does not change with the passage of time but the agent's performance score does, then we say the environment is **semidynamic**.

**Discrete and Continuous**

The discrete/continuous distinction applies to the *state* of the environment, the way *time* is handled and what an agent *senses* as well as the *actions* it executes. Input from digital cameras is discrete, but is typically treated as representing continuously varying percepts.

**Known and Unknown**

In a **known** environment, the outcomes (or outcome probabilities if the environment is stochastic) for all actions are known (either by the agent or its designer).

Conversely, if the environment is **unknown**, the agent will have to gain an understanding of the environment to make good decisions.