

1. If we change the definition of the state transformer function from (bottom of p. 31 in Wooldridge)

$$\tau : R^{Ac} \rightarrow \wp(E)$$

to

$$\tau : R^{Ac} \rightarrow E$$

how does this change our characterization of the environment? (There are two aspects worth noting. **Hint:** Regarding one of these aspects, note that $\emptyset \in \wp(E)$.)

Answer

Since the new state transformer function returns a single state instead of a set of states, the environment is now deterministic (there are no alternatives for the next state). In particular, since it can no longer return \emptyset , a run cannot terminate (there is always a next state).

2. We have two agents, `agent1` and `agent2`. Sometime at or after creation, `agent1` makes the proposition `a1` true. Sometime after `a1` becomes true, `agent2` makes the proposition `a2` true. (That's it. Each does one thing and is done.) Write a Concurrent MetateM specification for these agents.

Answer

```
agent1()[a1]:
  start  $\Rightarrow$   $\diamond$  a1;

agent2(a1)[]:
   $\diamond$  a1  $\Rightarrow$  a2;
```