

COS30019 - Introduction to Artificial Intelligence  
Tutorial Problems Week 2

**Task 1:**

Let us examine the rationality of various vacuum-cleaner agent functions.

- A. Show that the simple vacuum-cleaner agent function described in the lecture (under the given assumptions) is indeed rational.
- B. Describe a rational agent function for the modified performance measure that deducts one point for each movement. Does the corresponding agent program require internal state?
- C. Discuss possible agent designs for the cases in which clean squares can become dirty and the geography of the environment is unknown. Does it make sense for the agent to learn from its experience in these cases? If so, what should it learn?

**Task 2:** Develop a PEAS (performance measure, environment, actuators, sensors) description of the task environment for:

- a) Robot soccer player
- b) Internet book-shopping agent

**Task 3:** For each agent type above, characterize the properties of the task environment and select a suitable agent design.

**Task 4:** Referring to the utility-based agents described in the lecture, both the performance measure and the utility function measure how well an agent is doing. Explain the difference between the two.