**CSC420 Artificial Intelligence**

**Spring 2022, Group Assignment 1**

Due – Wednesday, February 9, 2022, at 11:59pm EST

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| **Group #** | **3** |
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This assignment will be graded out of 20 points. Submit your answer file to the right D2L Dropbox named “Assignment 1 Dropbox” by the due date and time.

**Question 1. (9 points)** For each of the following activities, characterize the properties of the task environment in terms of Fully observable or partially observable, single agent or multiagent, deterministic or stochastic, episodic or sequential, static or dynamic, and discreate or continuous:

1. Solving 8-puzzle
2. Playing football
3. Exercising tennis against a wall

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|  | **8-Puzzle** | **Playing Football** | **Tennis** |
| **Observability** | **Fully Observable** | **Fully Observable** | **Fully Observable** |
| **Agents** | **Single Agent** | **Multi Agent** | **Single Agent** |
| **Determinism** | **Deterministic** | **Stochastic** | **Stochastic** |
| **Episodes/Sequences** | **Sequential** | **Episodic** | **Sequential** |
| **Static/Dynamic** | **Static** | **Dynamic** | **Dynamic** |
| **Discrete/Continuous** | **Discrete** | **Continuous** | **Continuous** |

**Question 2. (8 points)** In the vacuum cleaner world that is described in the textbook, with one vacuum cleaner and some dirty cells, there are 8 different states in the simple two-cell version and *n.2n* different states for the *n*-cell version. How many different states in the following cases where some of the cells may be dirty:

1. One vacuum cleaner in an area with *n* by *m* cells.
   1. (n\*m) \* 2^(m\*n)
2. Two identical vacuum cleaners in an area with *n* by *n* cells such that each cell can have a maximum of one vacuum cleaner at any given time.
   1. (n^2)((n^2)-1) \* 2^(n^2)

**Question 3. (3 points)** What are the differences between simple reflex agents and model-based reflex agents?

Whereas simple reflex agents only act based on the current percepts, the model-based reflex agents keep a memory model of past percepts in order to have more information when deciding actions for the current scenario.