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CSE 3521 Artificial Intelligence SU'19

Homework Assignment #1 (12 pts)
Due: Friday, May 17

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1. Choose an interesting task/domain that you are familiar with (not listed in the book or discussed in class!) and write a PEAS description of an agent for that task. Next, characterize the environment (e.g., fully observable, deterministic, episodic, static, continuous, single agent) and justify your individual characterizations. (8 pts)

Agent: Battle robot

- P(Performance): High mobility, Correct identify enemy, Lost power consumption, Low damage cost, High robustness
- E(Environment): Road, light, enemy robots, obstacles, other robots.
- A(actuators): Mechanum Wheel, Display, gimbal system, aiming system, Projectile system
- S(Sensor): Lidar, IMU, camera, sensors.

Characterization:

- Stochastic: No way to precisely predict the next states, such as the position of enemy robot can be changed freely.
- Dynamic: The environment does change while agent is thinking. For example, the enemy robot can move freely.
- Partial Observability: It's impossible to know all the information of surrounding environment.
- Sequential: We do need to store the previous state. For example, if we want to use SLAM to do the locomotion, or we want predict the enemy movement, we need the information of previous state.
- Continuous: The robot lives in an real world, so the time and position cannot be fixed.
- Multiple agent: there can other agents in the battle, such as opponents, allies.

2. Give the initial state, goal test, actions/operators, and path cost for the following description. There are several possible formulations for the problem, with varying levels of detail. Pay special attention to different path costs for various actions, and conditions for when those actions are valid. The main thing is that your formulation should be precise and "hang together" so that it could actually be implemented. (4 pts)

   A monkey is in a room with a crate, with bananas suspended just out of reach on the ceiling. He would like to get the bananas.

- Initial state: monkey in any position in the room; might stand in the top of crate; has certain amount of energy.
- Goal Test: in an position that could reach to the bananas
- Actions/Operators: walk and move crate (up, down, left, right), jump on/off the crate, grab the banana
- Path cost:Additive, move each step and grab banana will cost 1 energy, move crate and jump cost 2 energy.