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Assignment: Problem Set 0 (c)

#### Describing the agent & environment:

For this assignment, I chose to describe a traffic light as I've always wondered how they work, but never had motivation to do the requisite research. For simplicity purposes, this traffic light uses microwave radar sensors to detect vehicle movement, as it seems as though the US doesn't have any standard traffic light implementations and this design seemed the most interesting.

With regards to the agent's environment, it would be placed above four-way intersections. In this environment, it would have to be able to handle different types of vehicles, pedestrians (an external sensor such as a push button may suffice), different weather conditions, and breakdowns. In each of the four lanes of traffic, there's either vehicles or not.

#### Analyzing the environment:

This environment could be described as partially observable depending on the range of the microwave radar sensors if they aren't able to detect pedestrian movement, or unable to detect smaller objects in the traffic lane.

This implementation of the agent would be a single-agent design. All four traffic lights would be equipped with a microwave radar and that data, along with the pedestrian button, is fed to the single agent for processing and deciding on the right course of action.

In terms of deterministic or stochastic states, I believe it would be stochastic as traffic happens in random sequences. This agent could be in either episodic or sequential task environments, but a sequential task environment would be more practical and helps reduce the time spent at lights. The environment would also be dynamic, as cars are part of the environment, and it's not guaranteed a traffic pattern is consistent. Also, the environment would be discrete and known; there's either cars in the lane or not.

#### Agent Classification:

The goal of this agent is to reduce the time vehicles spend at traffic lights, while also being efficient. Due to efficiency concerns, the partially observable nature of the environment, and access to the percept history, a model-based reflex agent makes the most sense to me.