Spike: Task 16

Title: Goal-Oriented Action Planning

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# Goals / Deliverables

* Basic deliverable: a simulation for agent control demonstrating the effectiveness of goal-oriented action planning in considering long-term outcomes (e.g. side-effects, time delays) of actions, and can plan and act intelligently.

# Technologies, Tools, and Resources Used

* SublimeText (for editing, executing and testing the code)
* Learning materials on Canvas (for instructions and sample code)

# Tasks Undertaken

* I started by copying the project from Task 15: Soldier on Patrol into the Task 16: Goal-Oriented Action Planning folder, stripping the spike report down to what was needed for this task.
* Next, I consulted my lecture notes and the task instructions document to plan out what I wanted to do for this task, as how students implemented goal-oriented action planning was left up to us. The planned goals I put together for this task were:
  + The agent has two weapons at a time, with a limited number of magazines. While patrolling, they must consider if their ammo remaining, between the two weapons, will theoretically be sufficient to reduce the target’s HP to 0. If it is not, the agent must return to an ammunition station to exchange weapons for others. The choice of weapons should be random, weighted based on how effective that weapon has been in damaging the target.
  + When aiming its shot, the agent will consider whether staying with its current weapon or its secondary weapon will be more conducive or sufficient in reducing the target’s HP to 0, in terms of shot impact, speed, rounds per minute. For example, if the target has less than full health, the soldier shouldn’t use two rifle rounds to take out the target.
  + The agent will have to contend with hunger, which will be increased with each step it takes, and each shot it fires. When its hunger reaches a threshold, it must consider whether to continue its current actions, or return to the food station and eat if it would not compromise its current attack against the target. When its hunger reaches a high enough level that if it continued its current actions it would not have the stamina to return to a food station to reduce its hunger (based on the maximum possible distance between itself and the food station), it must return to the food station and eat.
* …

# Instructions for Operating the Code

* A: toggle the display of agents’ collision avoidance range.
* I: toggle the display of agents’ force, velocity and net desired change in position.
* P: pause or un-pause the game.
* S: re-spawn a dead soldier.
* T: re-spawn a dead target.
* W: scroll through soldier weapons.
* Escape: exit the simulation.

# Code Snippets

# In-Simulation Screenshots

# What I Found Out