**The “Game” for Game Agent 2025**

This is a “talking spit ball” at this stage (April 20,, 2024)…

1. Start by thinking of the old game pacman. It has a maze, pacman agent character, 4 adversary ghost characters each with its own AI, they all run around in a maze arena that the player can see, with energy pills that pacman can gobble up to renew energy (increase score). A player controls pacman’s movements. Simple AI’s control the ghosts’ movements. Each ghost has a different AI. Collisions between pacman and ghosts can harm pacman (hurt score) or the ghost (increase score) depending on timing. Exiting the arena in one area allows the characters to enter at another.
2. Now, move that into a three-D hallway cavern environment “Arena”. There are fewer energy pills to pick up. The pills are now glowing donuts (?). The ghosts project their nearby presence with an aura (this takes the place of the Agent being able to see the entire arena at once). The team can observe the behavior of their Agent and the ghosts in the Arena, in a top-down separate view, but their Agent cannot. The exit/entrances are now shimmering transport screens.
3. In the “easy” level the AI’s for the ghosts are perhaps as “smart” as the old pacman ghosts. The AI’s are available for the teams to practice with.
4. In the “hard” level, the AI’s for the ghosts are more difficult, and are not available to the teams for practice against. The teams meet the “hard” ghosts and their AI’s when they introduce their Agent in the Arena at the competition. Teams are encouraged to develop their own iterations of ghost AI’s to practice against.
5. The goal in the “easy” level is to survive for 60 seconds and to accumulate as many points as possible. The goal in the “hard” level is to survive for 90 seconds and to accumulate as many points as possible.
6. In the “finals”, the top team Agents are introduced into the Arena at the same time, along with the ghost AI’s. Episodes are run until one Agent is the sole survivor of three episodes. No time limits. That Agent’s team is declared the gold medal winner. Other places are determined by total point accumulation in all of the episodes of the finals. A running scorecard should be kept for the audience to view.
7. The demonstration “Basic Agent” has an AI sufficient to survive 60 seconds at about 50% of episodes run. Its code, training time and schedule is provided to the teams in the supporting documentation to the teams.
8. The Basic Agent is a very simple blob of Clay.
9. Each team needs to design its own Agent’s appearance. This is a scored item in the scoring rubric. Artistic quality, articulation, and sound movements are all scored.
10. The “easy” ghosts appearance is close to those in the original pacman game.
11. The “hard” ghosts are characters to be developed by the design team.
12. Each Agent is “weighed and measured” at the start of an episode, where:
    1. The more armor it has, the slower it moves for the same amount of energy burned. This is determined by the Arena mechanics, not by the team.
    2. The more “gobble power” it has increases the “rate of energy burn” (‘Strength”)
    3. The more movement speed it has increases the “rate of energy burn” (Speed”)
    4. The size of the projection “aura” of the Team Agent will inversely affect the “rate of energy burn”.
13. The “rate of energy burn” is a factor in Agent design. Not under team control.
    1. The basic “rate of energy burn” is 10 seconds per donut.
    2. Each Agent starts an episode with 6 donuts.
    3. Each ghost in the “easy” game starts with 9 donuts and burns them at the basic rate of 10 seconds per donut.
    4. For the “hard” game and “final” game, the burn rate of the ghosts and their starting donut amount is not given to the teams.
14. Each Agent has a movement sound and a collision sound.
15. Each Agent must project its current score to a game input for inclusion to the scoreboard
    1. An Agent caught cheating is second-tiered.
16. The size of the projection “aura” projected by the ghosts is a factor in the hardness of the game. The “easy” game will have a projection aura of at least four hallway widths for each ghost. The “easy” Basic Agent example will have about half the size of the projection aura of the ghosts. Projection auras are circular. They project thru walls.
17. The “detector aura” (ie, how far Agents and ghosts see) is an ellipse with the Agent in one vertex and the other is the direction the Agent is looking.
18. When “projection” and “detector” auras touch, AI’s are influenced. Think hit box overlap.

Questions I currently don’t have answers to:

1. What;s to prevent a team from merely hard coding an algorithm rather than designing and training their Agent?
2. The sound input from several Agents will need to be put through the same mixer to make it into the sound system, but will need to be collected separately - how to do this?
3. Ideally, on the big screen for the Finals, there will be an overhead view of the Arena showing all of the Agents and their movements, plus a view from each of the Agents wherever they are in the caverns of the Arena. . Is this doable?
4. The “weigh and measure” system will need to be coded with the Arena - I don’t yet see a way to do this.
5. What happens when two Agents collide in the finals? What happens when three or more collide at the same time, or slightly different times? Are two Agents able to gang up on a third Agent in the finals?

Notes:

1. Future games should try to follow this same pattern, with about the same number of variables for an Agent to deal with. But appear very different.
2. Ideally, we have several such games built and ready to go by spring 2025 (Capstone?)