Spike: Spike Week 16
Title: Soldier On Patrol
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Goals / deliverables:
Create a "soldier on patrol" simulation where an agent has two or more high-level FSM modes of behaviour and lowlevel FSM behaviour. The model must show (minimum)

     (a) High level "patrol" and "attack" modes
     (b) The "patrol" mode must use a FSM to control low-level states so that the agent will visit (seek/arrive?) a
     number of patrol-path way points.
     (c) The "attack" mode must use a FSM to control low-level fighting states. (Think "shooting", "reloading" - the
     actual states and transition rules are up to you.)

Technologies, Tools, and Resources used:
- Visual Studio Code
- Python 3.12

Tasks undertaken:
- Install Python 3+
- Install and setup compatible IDE for the language, e.g.: Visual Studio Code
- Pay attention to the comment of how the code work and functionality. Can use debug tool to observe the program more clearly.
- Run the code and observing the output.

Planning Notes:
The attacking agent can be static, and the target can be a simple.
• Create a simple weapon for the agent that can shoot projectiles of different types. The projectile (bullet) will
need to be moved each update step and tested for collisions with a target.
• Start by shooting accurate projectiles at a fixed target. Change the state of the target so that a "hit" can be
clearly seen.
• Create "inaccurate" projectiles that don't always go where they are aimed.
• Move the target. The shooting agent will need to use the targets position and velocity, together with the
projectile speed, to work out an interception point to shoot at.centre position etc as needed

What we found out:
Design of the program:

- The World class defines the object of agents, hunters, projectiles,… within world's environment. It also manages to update all the information that belong to the world.
- The Hunter class defines autonomous agent in world class. It manages to have its own movement, shape, behavior to the world as well as rendering its shape and update its position, behavior,… Furthermore, it can be able to include patrol, attack mode
- The Enemy class, which also can be known as hunter, is a class that inherited almost everything from Agent class, the different of it is the shapes, cannot be interact by user as well as different goal and behaviors.
- FSM class, control FSM behavior of the Hunter.

Behavior:
- Hunter:
    - Patrol: In this mode, the agent will prioritize patrol and follow a path that pre-designed in the game using follow_path() function.
    - Attack: This mode will make agent greedy to attack enemy, however, it have to follow FSM behavior, such as: have enemy – seek enemy – attack shoot – Enemy down.