Spike: 9
Title: Agent Marksmanship

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Goals / deliverables:

Create an agent target simulation which can:

- Attacking agent (Stationary is good) which has:
  - Fast / Slow moving accurate projectiles
  - Fast / Slow moving inaccurate projectiles
- Target Agent must:
  - Be moving (traveling between two points is a good start)
  - When hit have visual effect to show

Technologies, Tools, and Resources used:

- Knowledge of python
  - https://docs.python.org/3/tutorial/
- Python Interpreter
  - Visual Studio
    - https://www.visualstudio.com/downloads/
- Knowledge of how an agent should work out how to find the best hiding spot
  - https://ilearn.swin.edu.au/bbcswebdav/pid-6302928-dt-content-rid-34403398_2/courses/2017-HS1-COS30002-220387/Autonomously%20Moving%20Agents.ppt.pdf

Tasks undertaken:

- Add an attacking agent
  - X axis has a locked position
  - Y is a random value between the height of the window.
    - This is to variance between how the agent can different predict the targets location from different locations
- The target agent:
  - Can be still
  - Travel between two point
- Added a bullet
  - Took code from pursuit
  - Check accuracy for stationary target
  - Added bullet types
  - Randomly generates numbers between 0-10 and if the value was lower than the value of the bullet type it was an accurate shot
  - Randomly generates numbers between 0-10 and if the value was higher than the value of the bullet type it was an inaccurate shot
    - If the value was higher then added an extra 100 to each the x and y axis
- When the target is moving:
  - Edited the pursuit code. Instead of a LookAhead variable I used the targets pos + vel and then minus the bullets vel
  - Checked accuracy
  - Added bullet types
  - Randomly generates numbers between 0-10 and if the value was lower than the value of the bullet type it was an accurate shot
  - Randomly generates numbers between 0-10 and if the value was higher than the value of the bullet type it was an inaccurate shot
    - If the value was higher then added an extra 50 to each the x and y axis
- When the target is hit:
  - Targets colour changes to red
  - Target slows down
  - Unable to fire for 100 ticks

What we found out:

- The agent has good accuracy when the target is traveling in a straight line
- The different bullets types are working as expected
- A visual affect when the target is hit. You see it changes colour and slows down

Open issues/ Risks:

- When the target changes direction the agent has, trouble predicting the change
- Some bullets that clip the agent don't disappear straight away. Change the radius to a slightly bigger one on the target so when you look at the screen it is removed before it passes through your target

Notes:

World Keys:
Q – Hanzo Main (Slow, Inaccurate)
W – Tracer Main (Fast, Inaccurate)
E – Ana Main (Fast, Accurate)
R – Symmetra Main (Slow, Accurate)

T – Make the target move
Y – Freeze Agent
S – Shot
D – Move Shooting Agent
G – Auto Fire (For the lazy person or for using Symmetra as seen in Overwatch)
H – Remove Bullets

Appendix

Figure 1.1 Agent hitting the target