Group Project 2018/19 – “Artificially Intelligent Football Playing Dogs/Spiders”

# Project Goal:

To design an Artificially Intelligent subject (In this instance a dog/spider sprite depending on team) that recognizes an object (ball) and moves it *with intent* towards a target (goal), while avoiding opposing AI subjects.

# Roadmap:

* Integrate IronPython into the Unity engine
  + Unity will be used to create the physics, environment and subjects in c#, while IronPython will be used to run Python scripts for AI.
  + https://github.com/IronLanguages/ironpython2/releases/tag/ipy-2.7.9
  + <https://answers.unity.com/questions/1285601/how-to-use-ironpython.html>

<https://techartsurvival.blogspot.com/2013/12/embedding-ironpython-in-unity-tech-art.html>

* Create testing environment and subject
  + 3D Scaled down pitch, with placeholder object for subject (Rectangle)
* Subject can recognize an object (Ball)
  + Image recognition, specifically shapes will be paramount
* Subject can recognize a target (Goal)
  + Recognized by shape, with differentiating team colours
* Subject can move in an efficient manner
  + As well as change their velocity depending on opposition positions (0-100 linear scale, with top speed set for everyone)
* Subject can handle the physical characteristics of the object while moving
  + If the ball was a 3D object it could have the physical properties present in real life, such as mass, inertia, etc.
* Subject can kick the ball
  + If certain parameters are met (distance to goal/teammate) a Python script is ran to call a “kick” method in Unity c#
* Subject can “tackle” the ball from an opponent
  + Necessary to keep “flow” of game
* Subjects can work as a team to achieve their goals (literally, aay)
  + Subjects understand their given positions on the pitch (back, forward, centre), as well their positions in relation to each other. With this data the subjects can pass the ball to other players on their team.
* Subjects can kick the ball towards the goal, avoiding the goalkeeper
  + In the unlikely event a goal is scored the players reset to their positions for kickout
* More granular rules of football are implemented
  + Such as offside, throw ins, corners, etc
* Future(?):
  + Track and log the movement of the subjects, and display it graphically (Real time overhead chart? HTML5 Canvas?)
  + Give the subjects a framework, a ruleset for this framework, and an objective to achieve. How could the subjects collaborate to achieve their objective? What additional behavioral