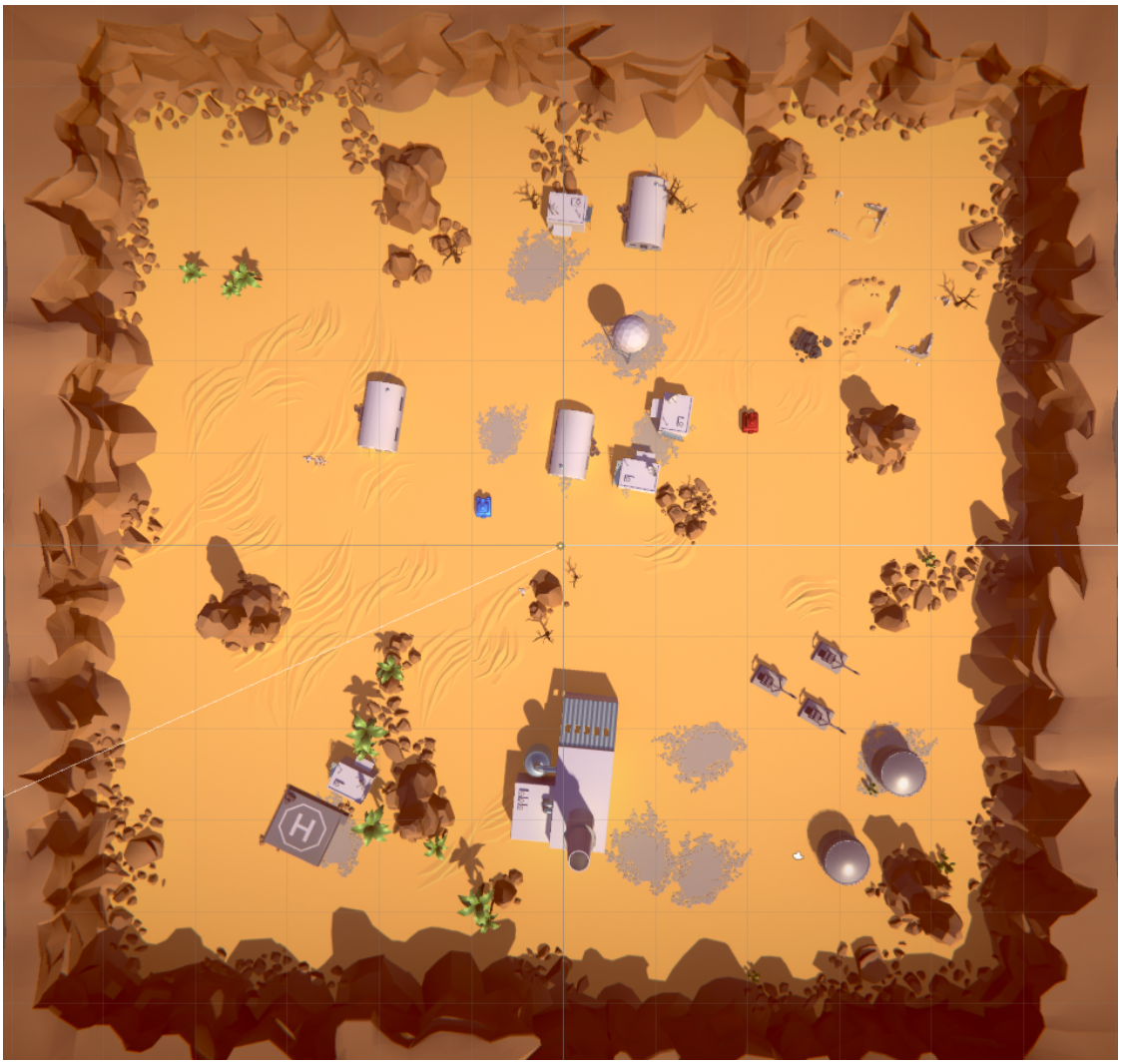
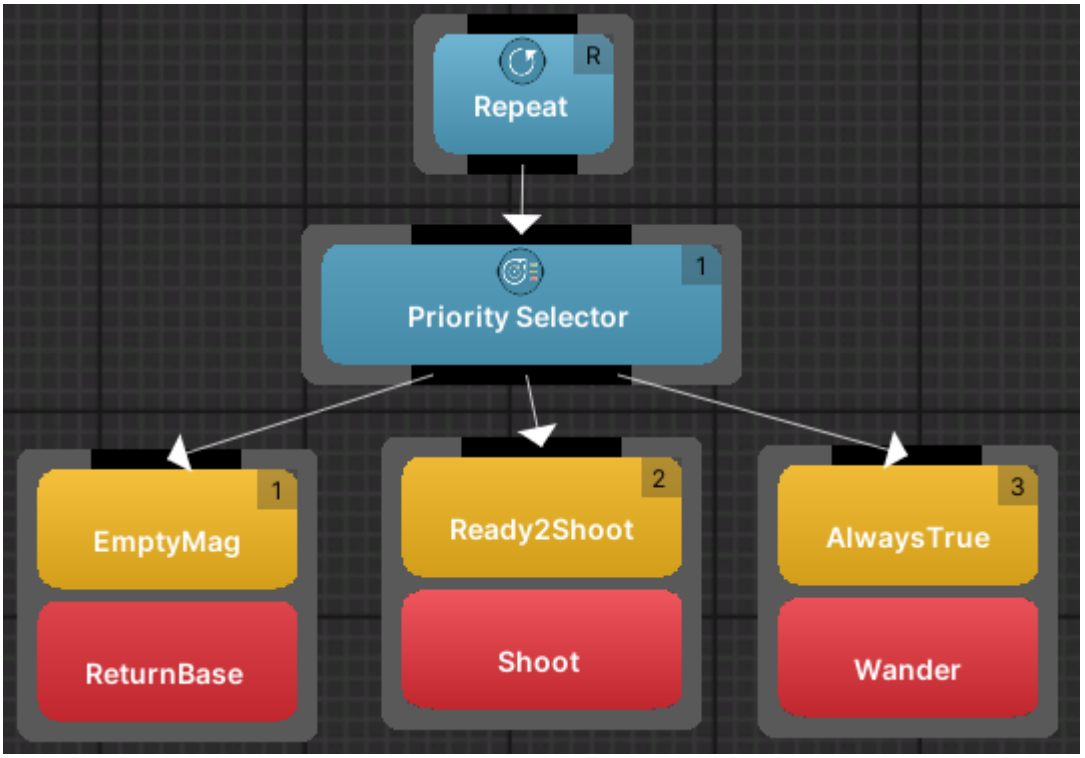
Artificial Intelligence - Assignment 1

The main goal is the movement (steering behaviors, pathfinding & projectile motion) and agent behaviors (using Behaviour Trees) starting with the asset associated with the Tank tutorial in Unity Learn.

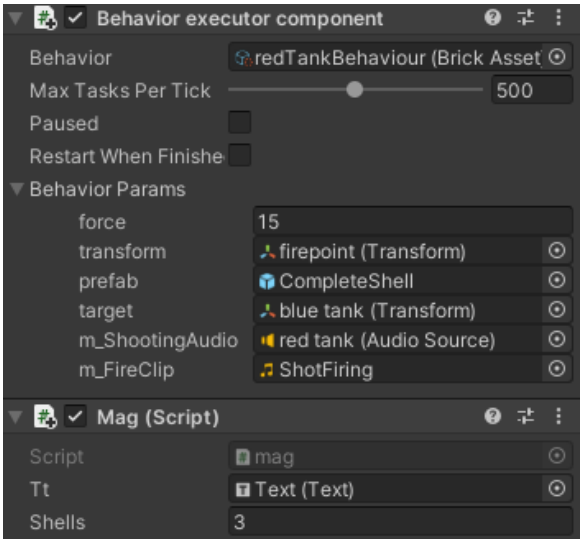
The demonstration represents the battle between 2 tanks, red and blue, trying to shoot each other down. The environment has a variety of obstacles, and 2 spots have been set as bases for which to return in case of needing a reload. According to the statement of the assignment, red tank follows a general movement pattern of wander, that is, randomizing direction every so often; while blue tank follows the path in between 5 patrol locations which have been set constant.



The general behavior of the tank is implemented with Behavior Bricks. Both red and blue tanks have their own tree, though they are very similar. The behavior follows this pattern by priorities: check magazine for shells, check range and viability of shot, then the movement action.
In case any condition of the above appears, the tree executes the appropriate action.



Each action has its own variables set with the Blackboard, then used in the inspector to properly do what they are supposed to. Although some constant variables have been set manually and so do not appear there.
To shoot, the tanks calculate the suitable angle to hit the target, once they know that distance is suitable too. All operations are done in a few scripts which are organized depending on the main action they do. Most are using inheritance of Behavior Bricks classes, but some are mono behavior since editing its values results much easier this way.



The game is fully autonomous, controlled by the IA. The final camera view displays two text boxes to show the amount of shells each tank has left. They start with 3, and after the condition in EmptyMag is checked, the tanks return to their respective bases, executing then the command to reload the magazines, then returning to the usual movement pattern.

The shot follows some physics rules, that is of its rigidbody component, and its velocity and direction are calculated using the formula given in the statement and a set initial force or velocity which we decided based on the final result. Even if the tanks comply with the required conditions for shooting, they must wait a certain amount of seconds to shoot again (we decided how much time that should be).

Most game objects are extracted from the root asset for this project; those are the tank and shell prefabs, with some sound and script.

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