Individual Extension Plan

AI - Pathfinding

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Idea Summary

The idea of this extension is to provide homemade pathfinding tool, in order to move the different agents on the map with the best possible path.

Pre-study Mention

There are a lot of resources about AI in games on the Internet, and also some books like this one: "*Artificial Intelligence for games*", Ian Millington, John Funge. In this book, there is a detailed part about pathfinding, world representations and optimizations.
A brief review of the A* algorithm will also be a good start.

Implementation

This extension will be designed to work on Unity3D Free and will be as modular as possible.
The pathfinding will be first implemented using a Tile-based representation of the map, in 2D, each tile representing a node. A* will use this representation to perform the pathfinding.
Then there are two improvements: automatically generate a NavMesh as a support for the pathfinding, and add a post-process part to the A* algorithm to make the path smoother.
These two improvements are supposed to give a more realistic behaviour of the enemies using the pathfinding for moving.
As soon as a basic pathfinding is ready, we will try to interface it with the Behaviour-AI.

Limitations

The extension will mainly focus on plane surfaces, because our levels (mazes) are supposed to be flat.
This extension will not consider dynamic obstacles (or dynamic modifications of the map), because it requires a runtime scan of the map, and this could dramatically decrease the

performances.
It could be interesting to make it work for different kind of terrains, like hills, mountains … but it is not the main focus.

Purpose

This extension is first of all required to move the enemies on the map.
But it could also be used as an independent module for other projects.