

## Unity Pooling Test - Notes

For the pooling system, I chose to use game objects as a generic type, since it is the most likely type to be used in a pool system.

The pool class contains a reference for the prefab, a boolean setting to allow automatic expansion at runtime, and two queues: one for active objects, and one for inactive objects.

By default, the pool system has automatic expansion on, making it easy to test the project to its limits.

It uses a tag string to organize different pools, so multiple sources can use the same prefab in different pools without interfering with each other.

The pool can also instantiate multiple objects at once. It instantiates all of them at the same point; this could be changed, but I liked the visual effect it caused.

For future iterations, I would like to refactor it using the generic parameter type `<T>` instead of game objects.

For the Find Nearest Neighbour system, I realized that the KD tree would be the optimal way to calculate the distances in 3D space.

It is recalculated each frame, in each frame all the tracked objects move.

The connection between neighbors is done by a line renderer. It started with a debug line, but it would be invisible outside the editor in the final release.

The Object Mover system is responsible for moving the objects. It randomly chooses a direction for an object, which is kept until it hits the zone limit, and then it chooses a new random direction for that object.

Sometimes the cubes appear to jitter near the movement area limit, which is caused because the new random direction keeps pointing outside the movement zone.

The Object Mover uses the Registry pattern to keep track of all objects in the scene, updating each time an object is created or destroyed/disabled.

For the UI, I used the Observer pattern to only update the text when needed.

The object spawner spawns the cube prefab based on its tag and the initial value set in the editor. This value is updated by the input field in the UI. It has a direct reference to the Object Mover system so it can know the area where to spawn the prefab.