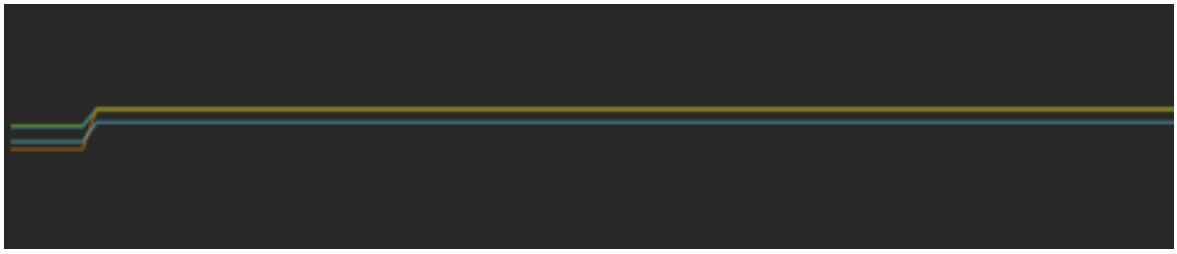
Object Pooling

I implemented object pooling by creating a pool to store data about the ducks such as name, prefab and amount of ducks to spawn. At the start of the scene the object pooler checks how many ducks are in the scene and if there are less than the desired amount it spawns more ducks. Then when a duck is needed to spawn the object pool enables the game object and sets the position to the start of its path. This optimizes the scene by doing all of the spawning at the beginning of the scene to provide smoother runtime during gameplay since ducks won't need to be instantiated ever again.



As seen in this profiler screenshot at the start of the game there is a spike but then it completely smoothes out for the rest of the gameplay since no new objects need to be instantiated. This better performance will improve the game greatly by allowing the best optimization for the player allowing a smoother experience.

Command Design Pattern

Command is a useful design pattern to help improve the optimization of a game. In Duck Hunt it can be used to invert the up and down controls when the player misses two ducks. This adds an element of difficulty to the game and makes it more interesting when the player is down to their last life. The command keeps track of the commands in the command history. There is also a command buffer that gets used to queue the commands called. I created an invert command to invert the controls when the player's health is equal to one.

Management System

For my management system I created a game manager. This game manager keeps track of the players score, health and the difficulty of the level. This manager is used to manage all of these values and to help manage other game objects. For example the score gets increased when a duck is shot and the health gets decreased when it is too far. The game manager also manages the state of the game and is used to declare the win and loss conditions. I used a singleton to create the game manager since I only ever wanted one instance of the manager in the scene and it makes it easier to reference from other scripts. It benefits duck hunting since now there is an easy way to keep track of all the important data and it allows the game's difficulty to increase as the game continues.

Reach the score of 2000 to win, Lose all 3 lives to lose
100 points per duck shot, 1 life lost per duck that you miss