

**Technical Design Document**

**Tyler Kirk, Nick Krisa, Thomas Tzrcinski, Joseph Shapiro**

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**1 - Game Overview**

Networked Boids is a networked game based on a simulation of AI flocking behavior. The game starts with a Lobby screen where there are options to Create a Game, List Servers, Play and Host, or Join a Game. Once a player hosts a game, other players can connect to it. Once two or more players are in the game lobby and are ready, the game will begin. The players each have simple guns which they can shoot bullets out of with the space bar. The players enjoy moving the flock around with WASD or the arrow keys.

**2 - Technical Summary**

Networked Boids was developed in 3 weeks by one individual using Unity Pro for Students. The game’s foundation is a fork from Prof. Price’s Rijeka repository. For 3D assets, Unity’s built in assets will be utilized. Total production cost of this game was 3-4 dozen hours of my time and a few headaches. A satisfactory grade mark will offset the investment.

The game will be deployed for PC, Mac and Linux Standalone. Minimum requirements include:

OS: Windows XP SP2+, Mac OS X 10.8+, Ubuntu 12.04+

Graphics card: Generally anything made since 2004 should work.

**3 - Hardware Equipment**

To create this software, I utilized one MacBook Pro 15’ computer for game development. Luckily I already owned this machine, so it is not a cost directly associated with producing this software.

**4 - Software Equipment**

The only software that I utilized for this project is the game editor/engine Unity Pro for Students which I acquired for free. No software necessary for graphics as I used Unity’s built in assets.

**5 - Game Engine**

The game engine that I used to create Networked Boids was Unity because I was able to create this simulation in a streamlined way. Additionally I was able to utilize the built in assets, physics, libraries, and other useful resources available in Unity.

**6 - Target Platform**

Networked Boids will be deployed to PC, Mac, and Linux Standalone. The simulation runs beautiful on these standard personal machines. All controls are via keyboard, so this game works properly with full controls for Linux.

**7 - Scenes**

**Lobby\_New**

The Lobby menu has many useful features. At the top of the screen, one sees the title of the game: “Networked Boids”. Options in the lobby include: Create a Game, List Servers, Play and Host, and Join a Game. If one would like to go back to the original lobby screen, there is a back button at the top right of the screen. There is also some UI to indicate your Status, your current Host, and if you are currently connecting or about to start a game.

Once in a game lobby, players can wait to see if more players will join or the players can indicate that they are ready. Once two or more players are in the game lobby and they are ready, the game will begin.

Asset List: LobbyManager, TopPanel, MainPanel, ServerListPanel, LobbyPanel, InfoPanel, CountdownPanel

**Main**

This scene is a multiplayer networked scene. It includes sending a Goal/Target sphere to a random location and then having the Flock, flock to that location. Once the average distance between the Flock and the Goal/Target is small enough, the Goal/Target is sent to a new random location and again the Flock, flocks to that location. This behavior loops.

The players each have the ability to move the flock’s central location with the WASD keys for forward, left, backwards, right, respectively.

The players can also shoot bullets from their guns by hitting the space key. If the players kill each other, they might respawn on top of each other.

Asset List: Network Manager, Enemy Spawner (Flock Spawner), Player1/2 (Player Prefab), Spawn Position 1/2

**8 - Code Analysis**

All of my scripts are relatively simple (short and of low complexity). However, I utilized Unity’s networking library which has more complex algorithms. For more specific information about the complexity of Unity’s networking algorithms please visit <https://docs.unity3d.com/ScriptReference/Network.html> .