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| Code Review Report |
| Project Summary |
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| Report Date | Project Name | Student Name / Number | Code Reviewer |
| 06/12/2023 | Boid Simulation | Josh Brown / s4204161 | *Billy Foulger* |

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| Project Overview |
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| My Boid Simulation is a surreal artificial life experience that produces realistic scenarios that resemble the flocking behaviour of not just birds but also fish. There are 3 different themes to choose from ranging from Birds to Fish and even Rabbits (flying rabbits I know).  Additionally, Static Obstacles and Dynamic Obstacles can be spawned in, which help demonstrate the boids inherited realistic Obstacle Avoidance mechanism, that utilises Pursuing and Evasion. Alongside this, boids are constrained to a bounding box, in which its size can be changed on all 3 axis (x, y, z).  I have introduced a Truncated Running sum with priority into the Application of Flocking behaviours. This allows me to prioritise particular flocking behaviours such as Separation, Cohesion and Alignment as well as Wandering (this aims to mimic random movement amongst the boids making each simulation different from the last).  Moreover, there is a Free Fly mode in which the Player can openly fly about in the simulation and gain a closer insight into analysing the boids behaviours from different angles, perspectives and distances. [For More detail check my gitHub README.md] |

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| Unit Testing |
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| Test Summary | Test Steps | Expected Result | Actual Result | notes |
| **Tweaked flocking behaviour** | **Changed a range of variables in the UI** | **The boids flocking behavior would be affected** | **Boid behaviour changes relative to the adjusted UI** |  |
| **Boids avoid obstacles** | **Spawn several boids and obstacles** | **The boids should try and avoid the obstacles** | **The boids manage to avoid the obstacles most of the time** | **Sometimes the boids would clip into the obstacle – probably due to the model sizes** |
| **Clicking buttons whilst animation playing** | **Click on one of the sidebar buttons and whilst the animation is playing click another button** | **The first animation should continue playing** | **A new animation would start overriding the previous animation** |  |

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| BUG Tracking LOG |
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| Bug Details | STEPS TO Reproduce | DATE Found | Date Resolved |
| **Boids flocking around in a circle** | **On start up the boids would default to flocking around the centre in a circle.** | **05/12/2023** | **05/12/2023** |
| **Boids freezing** | **When entering free fly the boids movement would stop** | **14/11/2023** | **28/11/2023** |
| **Clicking UI buttons overrides active animation** | **Click on one of the sidebar buttons and whilst the animation is playing click another button** | **06/12/2023** | **7/12/2023** |

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| Conclusions/Areas for further expansion |
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| ***Ultimately, you can make your comments more concise as well as fix any minor bugs that were found related to flocking and freezing – this would make the overall simulation more polished and refined. Also make sure the boids are more alert by adjusting their obstacle detection value.*** |

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| Project Checklist – (For Code Reviewer to fill in) |
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| task | notes |
| *What is the code supposed to do, and does it accomplish it? (Is the code easy to understand?)* | The code is designed to create a flocking algorithm in which a set of boids are able to navigate within a box. The boids are affected based on values that the user is allowed to change during runtime. |
| *Can this solution be simplified? (How?)* | The solution could be simplified by reusing existing functions such as reusing the function for removing the debug box when spawning in a new box rather than rewriting the code. |
| *Can this solution be improved in terms of maintainability, readability, or performance?* | The solution could be improved in terms of maintainability and readability by reducing the number of comments in the code, which can then make it easier to read. Along with this the performance and maintenance of the code could be improved by including the use of more functions. |
| *Is the code modular enough? How reusable is it?* | The code is very modular with a lot of the code being split down into different functions, allowing a lot of the code to be reused. |
| *Are there any best practices or design patterns that could improve this code?* | There is unlikely to be any best practices or design patterns that could be used to improve this code. |
| *Does this code adhere to Object-Oriented Principles, like the Single Responsibility Principle?* | The code does adhere to a range of objected-oriented principles such as the single responsibility principle. |
| *Can you think of any use case in which the code does not behave as intended?* | The only time the code does not behave as intended is when a lot of boids are spawned in the UI becomes a little less responsive but other than that the code works great. |
| *Are debug-logs user friendly?* | Debug logs are informative and display relevant information. |
| *Does the code contain user friendly comments or documentation? (Is it up to date?)* | The code contains a lot of comments and documentation. This makes the code descriptive and readable helping me gain a better understanding of the functionality that is being carried out in each section of code. |
| *Does the code make use of user data in a way that might raise privacy concerns?* | The code does not raise any privacy concerns. |
| *Is the code ethical? Does it exploit behavioral patterns, introduce bias, or have the potential to cause harm?* | The code is ethical and doesn’t exploit any behavioral patterns and instead adheres to ethical coding practices. |
| *Is the code testable? If so, what automated tests have been added?* | The code is testable and is easy to tweak values to test for any bugs or issues. |
| *Are there portions of code that aren’t covered in testing?* | No all portions of code were covered during testing. |
| *Were any parts of the code confusing or difficult to understand?* | No all the code was easy to gain an understanding of |
| *Any final comments or feedback:* | The code is overall very good and efficient with all aspects of the code working with no major issues arising other than the ones discovered in unit-testing. |
| *Signature/Date:* |  |