**Project Title**: A Nature Simulation Sandbox Game

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**Ethics Reference Number:** 26058

# Course-Specific Learning Outcomes

* Use knowledge, abilities and skills for further study and for a range of employment in areas related to scientific and technical computing.
* Interpret legislation appropriate to computer professionals and be aware of relevant ethical issues and the role of professional bodies.
* Analyse, design, and implement algorithms using a range of appropriate languages and/or methodologies.
* Demonstrate effective communication, decision making and creative problem-solving skills, and identify appropriate practices within a professional, legal and ethical framework.
* Critically appraise and apply suitable artificial intelligence techniques for a variety of software systems.

# Project Background

This project is about creating a prototype for a nature simulation sandbox game. These types of games have already been made before, some examples being Equilinox which is based on growing an ecosystem and Spore which is about genetics and survival. Since the main purpose of this project is to create a relaxing sandbox game with emergent gameplay, a fair amount of research will be dedicated to learning how to develop a game and an extensive amount of research will need to be dedicated to life and nature.

Last year there was a presentation at our university by two video game developers, Andrew and Philip Oliver, since I was interested in game development, I attended the presentation. There they talked about all the aspects of game development that they went through all their years and as a person interested in game development it helped me understand more clearly what I wanted to do so when I had the opportunity to make a game as a final year project, I was very excited. My goal before the deadline is to create a relaxing and entertaining game using a 3D real-time creating program like unity or unreal engine. The game should be well optimised so users on different systems can experience it too.

# Aim

The aim of the project is to create a prototype for a nature simulation game which shows that it is functional and can provide basic mechanics in action. A significant amount of research will be needed in both game development and nature in order to complete this project. Hopefully I should have a working prototype a few months before the deadline, so I have enough time to work on some additional features as I am heavily invested in the project and I want to see it more developed. However, the project would realistically just be a prototype with the focus being creating a working model.

# Objectives

To be able to fully comprehend the requirements of the project there will need to be certain research objectives set.

* Adequate research for the important areas in the project needs to be performed. For game development make it extensible so it can be further developer, for specifics it would be to research what aspects of nature I want to implement and how much of a focus it should be to the game
* Learn how to create a video game using books and online tutorials and use suitable game development programs. For Example, Unity or Unreal Engine
* Research into how current existing games like Equilinox were made to help further understand my goal and possibly give inspirations to new ideas I could implement in my own game
* Use design patterns that can be correctly implemented into the project like using factory method and flyweight to create npc’s and store shared features. Using the book provided by my supervisor (Game Programming Patterns) will be very helpful for this objective
* Create a modern and easily comprehensible Graphical User Interface. A good interface is key to a smooth experience
* Ensure that the game is well optimised for suitable use on various machines
* Have a working prototype that can be used by people to provide relevant feedback which will be useful for future development and to help me improve as a game developer for any future games I make

# Problems

Some issues that could arise from doing a project like this are as follows.

* Data loss – A loss of data could occur randomly due to any type of hardware failure, but this can be prevented by regularly uploading to a cloud service or using Git Hub
* Time management – balancing the project with other units might be tough and with the new block system implemented by the university it puts a lot of pressure on me needing to complete the project within a specific time frame which could also affect the testing portion
* Covid-19 – The pandemic that is currently affecting the world could cause several issues such as forcing me to self-isolate or it could force a local lockdown which would mean that the testing would need to be done online
* Third-party testing – sending the game will most likely be difficult due to a large file size so compression and good optimisation will be necessary. Which will also help for testers who don’t have strong hardware

# Required Resources

* Unity or Unreal Engine
* Internet
* Computer
* Microsoft Word
* GitHub/Git
* Game Programming Patterns book

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| Tasks | Weeks | | | | | | | | | | | | | | | | | | | | | | | | |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Research |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Unity/Unreal Engine tutorials |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Creating game |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Brainstorming ideas and concepts |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Interim report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Design and development map |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Development of game |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Creation of assets |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Animations and sound effects |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Testing and evaluation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Final report |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# Schedule

# References

* <https://unity.com/>
* <https://www.unrealengine.com/en-US/?sessionInvalidated=true>
* <https://www.equilinox.com/>
* <http://www.gameprogrammingpatterns.com/>