Project Definition

* This document should contain an elucidation of the problem and the objectives of the project.
* The objectives stated here form a ‘contract’ and your final deliverable will be evaluated, in part, against these objectives.
* The deadline for submitting this document is **Friday at noon in the first week of Block 4.**

**1.Student Name: Tony Djikigoue**

**2.P-number: P2611989**

**3. Project Title: AI Pathfinding Showcase: Comparative Analysis of A\* and BFS Algorithms**

**4. Supervisor:**

**5. Introduction (max. 100 words):**

This project aims to provide a straightforward, visual demonstration of basic AI pathfinding in games. Users can examine how an agent navigates a grid using two distinct methods. The design prioritises helping individuals grasp the behaviour of pathfinding algorithms clearly and interactively, avoiding an in-depth exploration of the underlying complex theories.

**6.Aims (max. 100 words):**

This project aims to create a straightforward system that illustrates the functioning of two pathfinding methods:

* Breadth-First Search
* A\*

Within a simple grid layout. The emphasis is on clarity, user engagement, and visual feedback rather than unnecessary complexity. If time permits, additional features or refinements may be incorporated later; however, the primary objective is to develop a functional and educational demonstration.

**7.Objectives (max. 200 words):**

* Set up a functional Unity scene with a basic 2D grid.
* Implement a simple version of Breadth-First Search (BFS) for pathfinding.
* Allow the user to place obstacles and define start and end points.
* Provide visual feedback during the search (e.g., path highlights, searched nodes).
* Create a basic user interface with buttons to control the simulation.
* Write clear notes on how the system operates and the reasoning behind certain choices.
* Test the system in various setups to demonstrate its functionality.

**8. Deliverables (max. 100 words):**

* A Unity project demonstrating a functioning BFS pathfinding example on a 2D grid.
* A user-friendly interface to control the simulation.
* Concise documentation explaining the system and the decisions made.
* A brief video showcasing the system in operation.
* A reflective write-up discussing what was accomplished, what was effective, and what was not.

**9. Schedule of Activities:**

* **Week 1: Project setup, grid implementation, ethics screening, and initial document drafts.**
* **Week 2: Obstacle management system, basic UI implementation.**
* **Week 3: BFS implementation and visualization.**
* **Week 4: A\* implementation, algorithm toggling, and advanced visualization.**
* **Week 5: Agent movement, system testing, and debugging.**
* **Week 6: Performance analysis, documentation finalization, and project polishing.**
* **Week 7: Submission of final deliverables, demo preparation, and viva practice.**

**10. Requirements :**

* Unity (latest LTS version)
* Visual Studio or Rider IDE
* GitHub for version control
* Microsoft Word/Excel for documentation
* Jira

**11.Research Hypothesis : N/A (This project is not research-based.)**

**12.Student Signature: Tony Djikigoue**

**13.Supervisor Signature:**

**14.Date: 03/04/2025**