AI in Games 6:

Dynamic Difficulty

Laboratory Pack

# Overview

In this laboratory session, you will explore a basic 2D platformer in Unity within which you will implement some dynamic difficulty adjustment based on player behaviour.

# Objective

Implement a basic dynamic difficulty adjustment process to NPCs in a 2D platformer, which adapts according to player behaviour.

# Resources

1. Unity Project | Games AI 6 - DDA

Note - you may build upon your project(s) from laboratory sessions 2 and 3, where we built NPC controllers using Finite State Machines and Behaviour Trees.

If you choose to do this, you may need to tweak your code accordingly to function cleanly with your existing code base.

# Instructions

*Follow the steps below in order to complete the laboratory session. Once you have completed each step in your project, get it checked and signed off by a member of staff.*

*All task items marked with a* ***\**** *symbol are optional.*

## Set Up

1. Obtain the Unity Project and open it up in Unity Editor
2. Navigate to **Assets > CorgiEngine > Demos > Minimal > MinimalSpawner**
3. Use this scene as the basis for your project implementing dynamic difficulty.

## Determine Your Feedback Loop

1. Evaluate what it is that makes the experience for the player ‘easier’ or ‘harder’
2. Expose and track these variables in a clear and organised manner to calculate a ‘difficulty’ value
3. Evaluate what variables can be changed to adjust the difficulty for the player.
4. Using your calculated difficulty value, adjust the player’s variables to make it easier for them when they are struggling, and harder when they are doing well.

## Write the Script

1. Implement a script to adjust the player variables based on your evaluation of the game’s difficulty.

## Key Questions

* How can you tell if the player is struggling or succeeding?
* How do you track this?
* What can you change to make it easier?
* What can you change to make it harder?
* How do you change these things based on your evaluation of difficulty?
* How often might you want to change it?
* How extreme should the change be?