# Introduction/Background

Discuss the evolution of physics in games

* The distinctions between the types of simulations (rigid body and soft-body)
* The use of particle systems and how these are used in games
* The implementation of ragdoll physics on characters
* Could also consider the physics of projectiles, much like a football in a Fifa game which requires an understanding of how said object should travel through the air when kicked (especially when trying to emulate the real-life sport as closely as possible)
* Should try to link to the concept of deformable terrain

Look into the industry of physics middleware

* Only investigate the more popular and industry standard physics implementations
* PhysX
  + Now built into popular game engines (Unity & Unreal)
* Havok
* Bullet (Open Source)
* Vortex Studio
  + Used more in military and academic projects

Consider the role that physics plays in modern video games

Aims and Objectives

* **Aim**
  + To experiment with the concept of deformable terrain, using a real-time physics simulation context, as a novel mechanic to solve puzzles in a game. The impact of this mechanic in gameplay, how it affects a player’s perception of puzzles and how they can solve these puzzles using the tools at their disposal.
* **Objectives**
  + To investigate and experiment with the current implementations of physics systems and middleware to find a suitable basis to build a real-time solution for terrain deformation, such as *PhysX* and *Bullet*. Additionally, to explore ways to implement this system into a game, potentially through existing games engines like *Unity* and *Unreal Engine*.
  + The game should go through an extensive design and prototyping process to ensure that it delivers an enjoyable and coherent experience for the players, with focus on conveying the mechanics and how they operate clearly.
  + To successfully develop the game into a functioning prototype, demonstrating the implementation of terrain deformation that responds in an appropriate real-time context to the player’s interactions with it. The game will be designed with this player-controlled terrain deformation in mind as the primary tool for solving puzzles.
  + To evaluate the effect that using dynamic terrain as a game mechanic has on the gameplay experience and how it influences their approach to puzzle-solving. To do this the artefact will need to be presented to a group of play-testers to investigate what their experience with the concept was like, what components they enjoyed, and which features they gravitated towards, along with more quantitative data from logging their interactions with the game.

# Background and Literature Review

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