

Problem Statement and Goals

Physics Game - Collisions and Gravity

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Table 1: Goal statement

Date	Developer(s)
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1. Problem Statement

Develop a physics-based gaming application using C++/C# or JavaScript that focuses on realistic collision dynamics and gravitational interactions. The goal is to create an engaging gameplay experience where players can manipulate objects, analyze trajectories, and master the application of physics principles in a challenging gaming environment.

Showcasing:

realistic collision dynamics, gravitational forces, and the innovative incorporation of momentum.

1.1 Problem

Develop a physics-based gaming application focusing on realistic collision dynamics, gravitational interactions, and innovative momentum disruptions. The goal is to create an engaging gameplay experience allowing players to manipulate objects, analyze trajectories, and master physics principles in a challenging gaming environment.

1.2 Inputs and Outputs

Inputs:

- Initial Conditions: User-specified parameters for rigid bodies (Projectile, Targets/Obstacles).
- Launch Parameters: User-defined launch angle, force, and time step size for simulation accuracy.

Outputs:

- **Updated Positions and Velocities:** Information on the new configuration of rigid bodies post each simulation step.
- **Visual Representation:** Graphics illustrating the scene's new configuration, considering collisions, gravitational effects, and other forces.

Project Goal

1. Realistic Interaction Mastery:

Enable players to master realistic collision dynamics, gravitational forces, and momentum disruptions, providing an immersive experience in manipulating fundamental physics principles within the gaming environment.

2. Engaging Gameplay Experience:

Create an engaging and challenging gaming experience where players can analyze trajectories, strategically manipulate objects, and actively apply physics knowledge to overcome obstacles.

3. Quantum Leap in Computational Realism:

Simulate a breakthrough in computational realism by authentically representing the impact of collisions, gravitational effects, and dynamic momentum disruptions, especially when a bird collides, delivering a quantum leap in gaming physics.

4. Advancement in Gaming Physics Understanding:

Contribute to the advancement of gaming physics understanding within the community, pushing the boundaries of what is achievable in virtual worlds through the application of cutting-edge computational physics.

5. Elevated User Engagement:

Elevate user engagement by providing a gaming experience that not only entertains but also educates, encouraging players to actively engage with and deepen their understanding of physics principles through interactive gameplay.

3. Stretch Goals

1. **Advanced Physics Interactions:** Explore implementing more complex physics phenomena, such as fluid dynamics or advanced particle interactions.
2. **Multiplayer Functionality:** Extend the application to support multiplayer interactions, enabling collaborative or competitive gameplay.

3. **Integration of AI Elements:** Investigate the incorporation of AI-driven entities to enhance the gaming environment's realism and challenge level.