PROJECT
REPORT

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G2

Project Concept:

This project focuses on creating a dramatic and visually engaging animation of a building explosion. The goal was to simulate the destructive force of an explosion in a 3D environment, starting from modeling a simple building to animating its disintegration.

1. Project Workflow & Technical Process

Phase 1: Modeling & Asset Creation

Software Used: Blender

Process:

Building Construction: The primary building was constructed using cube meshes as the base. These cubes were scaled, extruded, and duplicated to form the main structure, including different floors and sections.

Architectural Details: To add realism and scale, details such as windows and doors were modeled. These were created using a combination of:

Inset faces and extrusions on the main cube surfaces to create recessed window and door panels.

Boolean modifiers or simple scaled cubes placed as separate objects to form individual windows and doors.

The final model aimed for a modular, believable structure that would break apart convincingly.

Phase 2: Animation & Dynamic Effects

Process:

Explosion Animation: The core of the project was animating the building's destruction. This was achieved using Blender's dynamic and simulation tools.

The building pieces (walls, floors, windows) were likely separated into individual objects or fractured using a cell fracture add-on to prepare them for the simulation.

A rigid body simulation was then applied. The building pieces were set as "Active" rigid bodies, and an "Explosion" force field or a "Radial" force field with a very high strength was added to the scene to trigger the collapse.

The animation was tweaked by adjusting parameters like force strength, noise, and rigid body physics to make the explosion look chaotic and powerful

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2. Challenges and Solutions

Challenge #1: Creating a Believable Building from Simple Shapes

Problem: Making a structure composed of basic cubes look like a credible building.
Solution: Strategic use of detailing through repeated inset/extrude operations for windows and doors, creating patterns that break up the monotony of large flat surfaces.

Challenge #2: Controlling the Explosion Simulation

Problem: Managing the chaos of a physics simulation to make the explosion look intentional and dramatic, rather than just random.
Solution: Extensive testing and iteration on the force field's location, strength, and falloff. The building pieces' mass and physics properties were adjusted to control their flight paths. Using a keyframed visibility or time offset for the rigid bodies could also create a more sequential, wave-like explosion effect.

Challenge #3: Performance During Simulation

Problem: Physics simulations, especially with many objects, can be computationally heavy and slow to bake.

Solution: The simulation was likely baked (calculated and cached) after finding the right settings. Working with a lower-resolution model for initial tests before applying the final simulation to the detailed model can also save time.

4. Conclusion & Acquired Skills

This project provided invaluable hands-on experience in two key areas of 3D graphics:

Procedural Modeling: Gained skill in constructing complex-looking structures from primitive shapes using extrusion, inset, and duplication techniques.

Physics Simulation & Dynamics: Developed a practical understanding of Blender's Rigid Body physics and Force Fields to create a complex destruction event. This included learning to bake simulations, control chaos, and iterate on physical parameters to achieve a desired artistic effect.

Completing this project demonstrates a strong ability to not only create 3D models but also to bring them to life through dynamic, simulated animation, resulting in a compelling and high-impact final piece.