Buzzer Beater

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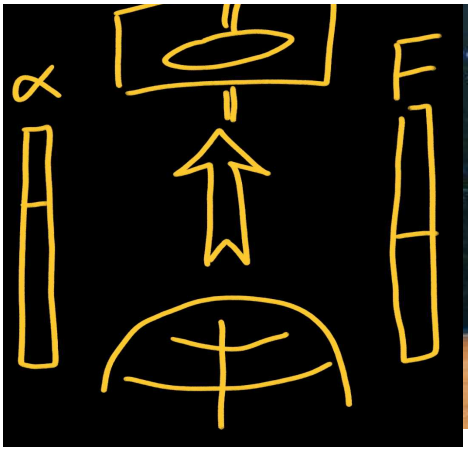
Overview:

BUZZER BEATER! An interactive game of basketball.

Buzzer Beater is a free-roam basketball game where players can move freely around the court and shoot a basketball at the rim. This project demonstrates **Three.js** principles such as scene setup, object rendering, realistic lighting, and texture application. The movement of the ball will be physics based using some of the kinematic equations for projectile motion. Gravity and collision detection will be used on the ball and how it interacts with the rim/back board to enhance realism. **GLTFLoader** integrates detailed models such as the backboard, hoop, and court surroundings, and first-person controls allow for an immersive player experience. These elements combine to create a well rounded interactive 3D basketball game displaying real life mechanics and movements.



This is what our game could look like ^^

Topics used:

- **Rendering objects -** this will be used to render the whole scene, where we need a basketball hoop, the actual platform, and then the ball to show up when we decide to launch it
- **Lighting -** We need to have a source of light that will light up our scene, for our case, the sun will be the main source of light, which will affect the visuals of each object, shadows will have to be implemented accordingly
- **Change of Basis -** We will be using the concepts we learning regarding change of basis when shooting the ball, the ball can be shot, It is like we are carrying the ball and wherever the camera is facing, the ball will be launched according to the new basis

Interactivity

The player will be allowed to move freely in any direction on the court, this will happen with the implementation of WASD as key entries to dictate movement. 'W' being forward, 'A' moving left, 'S' moving back, and 'D' will go right. This free movement will allow the player to shoot from any spot on the court, making the player have full control on where they want to shoot the ball from. The player will also be able to look in any direction with the use of their mouse. This will be how they ultimately aim where they want to shoot the ball. The way the player will shoot the ball will be with the space bar, when the spacebar is pressed, a power bar will show up moving from the lowest power to the highest (similar to nba 2k for those familiar), when the player press space again the ball will be launched with that amount of power.

Advanced Features

- Physics-based animation when launching a ball, we will have to treat the ball launch as a projectile, using kinematic details to determine where the ball goes, using the angle of the shot and the initial velocity
- Collision detection will be used when shooting the ball to the hoop, we will detect when the ball hits the rim or the backboard and it will have to act accordingly
- Detect the ball going through the hoop for the point system

Other features: (if we have time)

- High score feature
- Mini game
    - Time limit for about 2 minutes in which you try to score as many points as you can in the given time frame
- Aiming feature
    - Where we see where the ball would go based on the angle and amount of force that the ball is launched with

Technology: ThreeJS and more