CS 230 FINAL PROJECT

ASTEROIDS GAME USING UNITY

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1. Motivation :

We as a team decided on the topic of implementing a 2-D game, after reading about a lot of other games we decided on Asteroids as it is a very interesting, arcade game played since the 20th century. We also enjoyed making and playing this game.

2. Introduction :

Our game has a spaceship which is the player. The player can move forward, left and right directions. We have asteroids moving around the screen. The asteroids get destroyed when the player shoots them. The goal of the player is to score more points with the given lives.

3. Implementation

The game is implemented using Unity 2020.3.30f1. The following are the characters in the game.

3.1.1. Spaceship

The spaceship is the player in the game. The player can move in the left, right and forward directions. In Unity, RigidBody and RigidBody Collider components are added to the Player sprite(character in the game). This puts the sprite under the control of the physics engine. Thus we have defined the force, torque, etc., for the spaceship.

Moving Forward	**W/up**	

Rotating Right	**D/right**	
Rotating Left	**A/left**	
Shoot	**Spacebar**	

3.1.2. Bullet

The spaceship is given the functionality to shoot. The shooting and the bullet positions are calculated based on the transformations of the spaceship.

3.1.3. Asteroid

The asteroid sprite again has a rigidBody and rigidBody collider components which puts it under the control of the physics engine. We have to generate asteroids continuously and enable their movement around the screen. We have defined the spawn rate, spawn direction randomly, and for the rotation, we have defined the angle axis using quaternions. Rotating the asteroids makes them look different every time they get spawned(generated). With all this information, we set the trajectory of the asteroid.

3.1.4. Boundary

The boundary is defined in all the four directions to not let the spaceship get out of the boundary.

3.1.5. Collisions

Collisions form the major part of the game. The following collisions are allowed - collision between spaceship and asteroid, collision between bullet and asteroid. When the spaceship collides with the asteroid the spaceship is destroyed and the player loses a life. If a bullet collides

with an asteroid then bigger asteroids break into smaller ones and smaller asteroids vanish giving score increases to the player. When the player comes back after losing a life, some invulnerability time is given.

4. **Scoring:**
The objective of the game is to survive the longest while scoring the most points. The points are given based on the mass and size of the asteroid. The amount of points given from each space rock destroyed is shown as they are blown up, and accumulation of points is shown on the top right of the screen. There are three types of asteroids, the bigger, regular and the smaller. When the user hits the bigger one it breaks into 2 smaller parts and gets comparatively lesser points. But the regular and smaller ones just disappear and bring users more points. Also we gave the user 3 lives to regain even if he loses. After losing all the 3 lives the game ends.

6. **Further Improvements :**
   - Give user choices (playing mode, color, shape)
   - Improve and increase levels
   - Create a better UI for the game
   - Store previous scores and maintain a leaderboard
   - Include sound effects