Design Report

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Game Name:
Bunny Eight-ball

Game Summary:
Bunny Eight-ball is a virtual reality billiards game based on Unity. The main goal of the game is to provide players with an immersive VR experience that will make them feel like they are in a billiard hall and use virtual cues to accurately hit billiard balls. Players can familiarize themselves with the rules of billiards and grow in billiard skills through this game.

Game Features:

- Immersive VR Experience
- Motion Control
- Precision and Skill
- Real-time Feedback
- Rules
- Kick-Off
- Taking Turns
- Fouls
- Game Over

Immersive VR Experience: The game will provide players with an immersive virtual reality experience that will make them feel like they are actually in a billiards hall.

Motion Control: Players will use VR controllers to simulate the movement of the character through two methods of movement, walking or moving, and adjusting the angle to hit the white balls in order to put the other balls in the pocket.

Precision and Skill: The game requires players to demonstrate precision and skill in hitting the ball. They need to hit the ball with the right amount of strength, angle and spin to successfully put the ball in the pocket.

Real-time Feedback: The game will provide real-time visual and auditory feedback to help players better understand the result of their shots. For example, the ball's trajectory line will appear when the player is hitting the ball. Meanwhile, the sound effect will express the moving status of the ball.

Rule Rules and Play:
Kick-Off: At the beginning of the game, a player is chosen to kick-off by a coin toss. After kicking-off, if any ball other than the white ball and black 8 ball is in the pocket at this time, that

player has the right to choose the team of stripes or solids for this play at this time. Otherwise, the rule continues to cycle.

Taking Turns: The game is played on a turn system where players take turns trying to hit the ball. If a player succeeds in getting the ball into the pocket, they will continuously gain the chance of the next hit. If a player fails to pocket the ball, then the next turn will switch to the rival. If the player commits a foul, then the next turn will switch to the rival and the rival is permitted to palace the white ball anywhere.

Fouls: Fouls include pocketing the white ball, failing to hit any ball, and failing to make a legal stroke (touching the ball during the rival's turn). Fouls will result in a penalty or loss of turn.

Game Over: The game ends when one player has pocketed all the balls that belong to him, including the black 8 ball.

Interaction Techniques:

In Bunny Eight-ball, the player will use motion controllers to interact with virtual objects (cues, balls, table) and the virtual environment. Here's how the interactions work:

- Cue Control
- Aiming Assistance
- Motion Control
- Haptic Feedback
- Menu Interaction
- Visual Cues
- Sound Effects
- Multiplayer Mode

Cue Control: Players will use a main motion controller in their hand to simulate the action of the cue. It is able to simulate the actions of a real shot, such as gripping the cue, aiming and hitting to hit the white ball.

Aiming Assistance: To assist with aiming, players can use the motion controller in their non-dominant hand to make a virtual aiming line. By pointing the controller and pressing a button, they can visualize the predicted moving path of the white ball to help them plan their stroke.

Motion Control: Players will use the VR controller to simulate the movement of the game character by using two methods of movement, walking over or moving over to the place that the player aimed to reach in the scene.

Haptic Feedback: The motion controllers will provide haptic feedback when interaction happens, such as hitting the ball and collision of balls. This feedback can enhance immersion by simulating the feeling of hitting a real ball.

Menu Interaction:
Used for game settings and options, the player can use the motion controller to navigate through the menu and select options by pointing on and clicking.

Visual Hint: The game will use visual hints, such as trajectory lines, to help players aim their shots accurately.

Sound Effects: The game will provide realistic sound effects, including the sound of balls colliding, the sound of falling into pockets, etc., to enhance the player's immersion.

Additional features and challenges:

Multiplayer Mode: The game will support a multiplayer mode that allows players to compete with friends in real-time, increasing the social attributes of the game.

Why it will be fun to play this game in VR:

Immersive Interaction: Using VR controllers to simulate the action of hitting a ball allows players to feel the thrill of hitting a ball in an immersive way, and this interactivity makes the game even more fun and satisfying.

Skill Challenge: The rules of the game are identical to actual billiards, so players can practice and improve their billiards skills in a virtual environment. This provides players with the opportunity to challenge and grow, making the game more engaging.

Real-Time Feedback: The game provides instant visual and auditory feedback, such as trajectory lines and collision sound effects, which help players better master the art of hitting the ball. Players are able to see how they are doing and improve themselves continuously.

Visual and sound enjoyment: The game's realistic visual and sound design will provide players with an immersive experience, allowing them to feel the real atmosphere of a billiard hall to enhance the fun of the game.

Project Plan:

Week 1: Project Preparation and Design Phase
Activities: Project requirements analysis and planning, virtual environment modeling, game mechanics design, technical feasibility study.
Milestone: Project planning and design completed, ready to enter the development phase.
Progress Supervisor: Liu, Yuchen

Week 2: Core Game Development Phase
Activities: Billiard hall, virtual cues and balls modeling, implementation of physical stroke simulation, development of game rules and scoring system.
Milestone: Core game functions are basically realized and game prototype testing can be conducted.
Progress Supervisors: Xu, Weilong; Zhang, Minglun

Week 3: User Interface and Interaction Design
Activities: Develop user interface, movement control for virtual cue, and implement haptic feedback for cue movement, as well as optimize user experience.
Milestone: User interface and interaction development completed, integrated with core game.
Progress Supervisor: Zhu, Jun

Week 4: Optimization and Testing
Activities: Performance optimization, bug fixes, game balance testing.
Milestone: Game stability and performance optimized, ready for internal and user testing.
Progress Supervisor: Ma, Jingran

Week 5: Internal testing and user feedback
Activities: Conduct internal testing, address feedback from internal testing team, provide game to a small group of users for testing, collect user feedback.
Milestone: internal testing and user feedback integrated, ready for submit.
Progress Supervisor: Hua, Zean