Project 1: Object Oriented Programming

Title:balls eat balls

1. Description

Balls eat balls is a web-based mini-game where the basic rule is that big balls eat small balls. It consists of two modes: PvE and PvP.

PvE mode, a big ball will initially chase the player, who needs to control their own ball to eat randomly generated small balls to grow larger and ultimately devour the pursuing big ball.

PvP mode involves two players competing to eat each other's balls to win.

2. Business requirements

Nouns   Verbs

1. players can choose between PvE or PvP game modes.
2. In PvE mode, players can control the direction of movement using arrow keys.
3. In PvP mode, players can respectively use WASD and arrow keys to control their respective balls..
4. After winning or losing a game, players can restart a new round
5. Big balls can eat smaller balls, To make decisions about eating balls, it's necessary to record the positions of the balls and to distinguish between different balls, it's necessary to record their colors.
6. Eating randomly generated static balls will cause the player's ball to increase balls size.
7. Player's ball touches non-circular obstacles, the player fails..
8. The larger the ball, the slower its movement speed.
9. In PvE mode, a large ball will be generated to chase the player's ball.

Nouns and Verbs

Nouns

player, PvE or PvP game modes, arrow keys, WASD, balls, winning, losing, game, balls size, new round, big balls, smaller balls, static balls, player's ball, non-circular obstacles, movement speed, positions, colors

Verbs

choose, control, move, use, restart, eat, generated, grow, touch, fails, chase

Classify the nouns and verbs

Nouns

1. Round:
   attribute: game modes, winning, losing, new round

method: startGame, endGame, determineWinner, checkCollision, gameLoop
2. Balls:
   attribute:movement speed, size, position, color
   method: createBall, eat, increase, updatePostion
3. Big balls:
   method: moveMonster
4. Static balls
5. Player's ball:
   method: movePlayer
6. non-circular obstacles
   attribute: shape, postionx, postiony
   method: failure
7. Player:
   attribute: playid, number
   method: chooseMode, controlBalls

Associations

A Round will generate many balls or at least one ball, and a ball can exist in one Round or many Rounds.

A Round will generate many obstacles or at least one obstacle, and an obstacle can exist in one Round or many round s.

Classes PlayerBall, StaticBall, and MonsterBall inherit from the Ball class.

A Round can have one or two players, and a player can play in one Round or many Rounds.

A player can only control one ball.

PlayerBall can collide with an obstacle only once, and an obstacle can be collided with by two players.

StaticBall can be eaten by one player or by a MonsterBall, and a player or MonsterBall can choose not to eat or eat many StaticBalls.

Target audience

Users aged 8 to 70 who enjoy gaming for pleasure. They prefer simple and easy-to-operate games, have ample time to play games, or like to play games during breaks. They enjoy competing with friends.

Rules

1. Players control the ball's movement using arrow keys or WASD..
2. Players can choose the game mode and restart a round.
3. The ball can eat smaller balls to increase size, and collision with non-circular obstacles results in failure.
4. The larger the ball, the slower its movement speed.
5. game can randomly generated static ball.

6. The ball that survives until the end wins.

Challenge Questions

1. How to balance PvE and PvP modes to meet the preferences of different players?
2. How to design the game to be both easy to pick up and have long-term appeal?
3. How to make players want to play another round?

3. User stories

Dimensions

1. People with spare time and people without spare time
2. Young people and old people
3. Introverted people and extroverted people
4. Single people and non-single people

User personas

1. For Young Adults with Leisure Time

Background: **Jack**, 22 years old, a college student majoring in software engineering. Besides studying, he is also a member of the university's eSports club, passionate about gaming and programming.

Scenario: On weekends or holidays, Jack often plays games with his roommates or friends from the club to relax and enjoy the fun of teamwork.

Reason for Use: Jack looks for games that are easy to pick up and offer competitive challenges. For him, "*Balls Eat Balls*" provides a relaxed environment where he can enjoy gaming and socializing amidst his busy academic life.

2. For Senior Citizens with Leisure Time

Background: **Mary**, 65 years old, a retired teacher who enjoys reading and gardening. She has recently started exploring digital devices to stay better connected with her family and find new hobbies.

Scenario: Mary looks for simple games in the evenings or weekends, so she can find some new enjoyment alongside her gardening and reading.

Reason for Use: She is interested in "*Balls Eat Balls*" because its simple controls are very appealing to her. It offers a relaxed and enjoyable way to learn and master new skills, while also providing enough challenge to keep her interest.

3. **For Busy Young Adults**

Background: **Elisa**, 30 years old, a product manager at a startup company, busy with work and often works overtime. She needs a quick way to relax during her hectic schedule.

Scenario: During short lunch breaks, Elisa plays games that she can quickly get into

without requiring a lot of time commitment.

Reason for Use: For Elisa, "*Balls Eat Balls*" is a perfect choice because it not only provides a brief escape from reality but also offers a sense of satisfaction and achievement within her limited free time.

4. For Busy Senior Citizens

Background: **Robert**, 65 years old, a retired engineer currently active as a community volunteer. His schedule is quite busy, participating in various community services and family gatherings.

Scenario: During downtime at the community center, Robert looks for simple games to relax.

Reason for Use: "*Balls Eat Balls*" is an ideal choice for Robert because it's simple to play, provides quick fun, and doesn't require long time commitments, fitting well into his fragmented leisure time.

Use story

As **Jack**, a college student who loves eSports, I want to join and play fun, quick games with my pals, because I'm looking for a game that's fun to play with others and gives me a challenge without taking up too much of my study and social time.

As **Mary**, a retired teacher new to video games, I want to play games that are easy to control and fun, because I'm searching for a new hobby that's simple to pick up and keeps me hooked, helping me get better with technology and enjoy my free time.

As **Elisa**, who works a lot at a startup, I want to play games quickly during my short breaks, because I need a fast way to chill out and feel good without spending too much time.
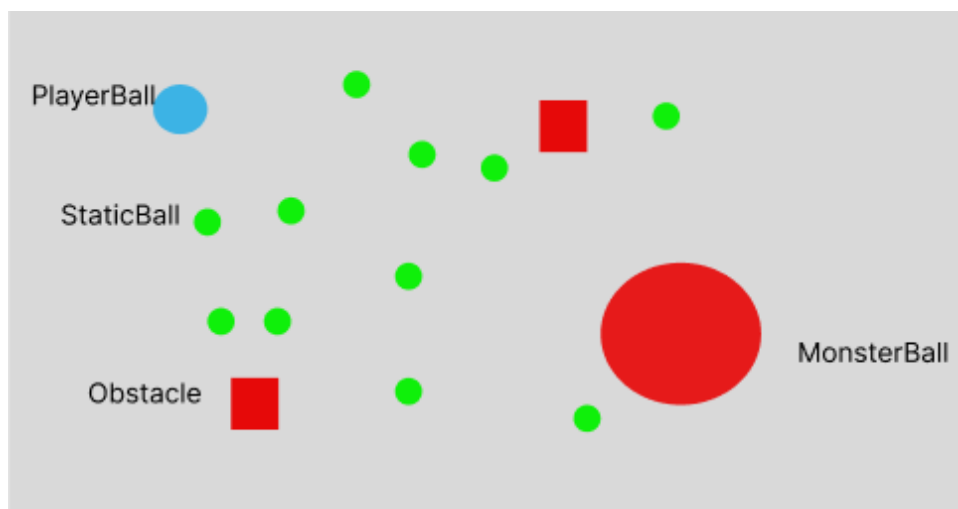
As **Robert**, a retired engineer and busy volunteer, I want to play easy and fun games in my few free moments, because I'm looking for an activity that suits my busy life, helps me relax, and doesn't take too long.
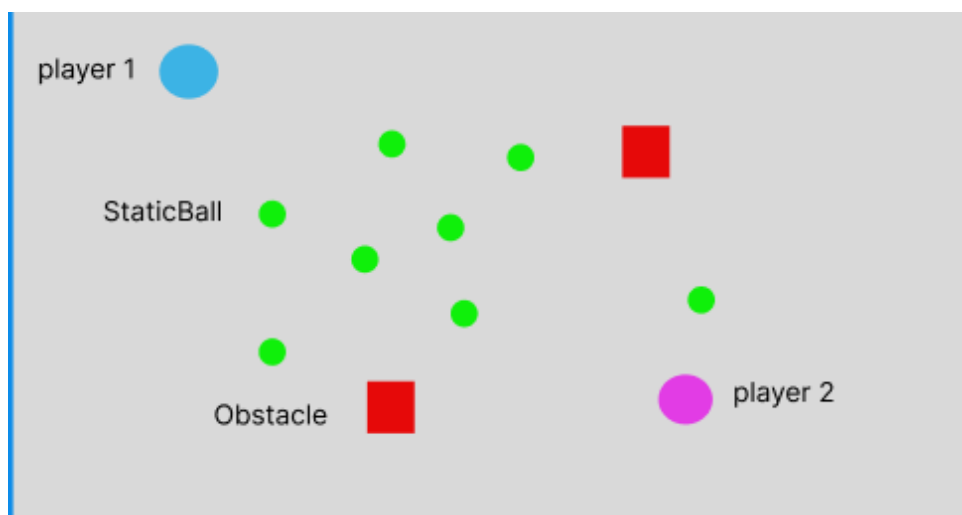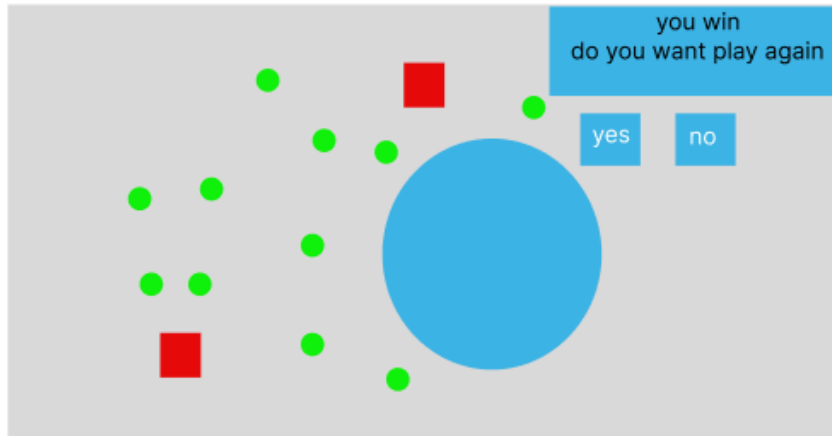
4. Mockup

Start game choose mode
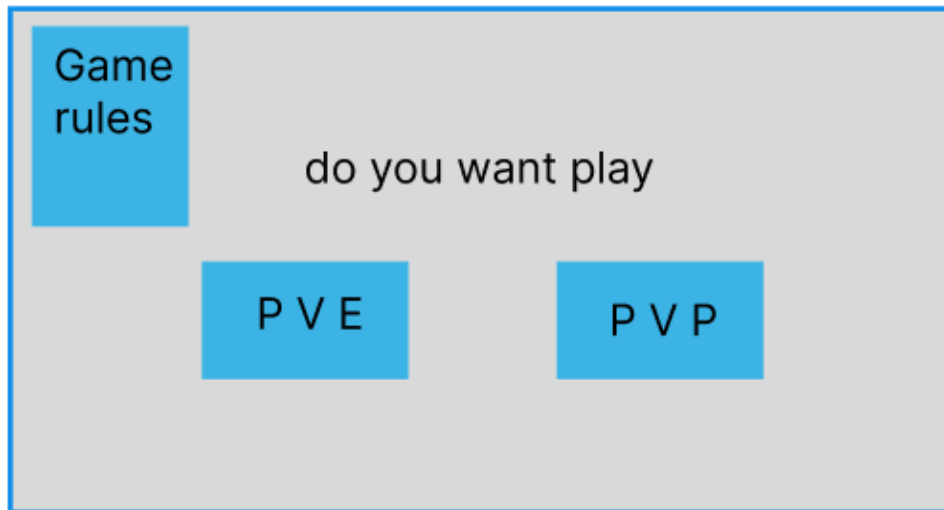
PVE mode

PVP mode

End game

5. UML Class diagram