

Requirements for the bouncing ball program

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Functionality Requirements:

1. The bouncing ball program will open in a transparent window, allowing other windows to remain visible. Only the balls themselves will partially obscure the view. This requirement derives from the scenario. Since the program is for amusement during program compiling or to run, transparent window to prevent the program from hiding important outputs from other applications, especially useful when the program runs during code compilation or execution. It ensures users can stay entertained without missing essential information from their work.
2. Add balls: Users shall be able to add balls to the window. While adding balls, users should be able to set the number, texture, color and size of the ball.
3. Bouncing Effect: The program should be able to achieve animations of the ball moving, bouncing, and colliding in the window.
4. Manipulation: Users should be able to control the balls for amusement. According to discussion with the “users”, there are for kinds of manipulation:
 - Individual Ball Manipulation: Users shall have the capability to click on any ball within the window and drag it to a new location of their choosing.
 - Group Ball Manipulation: Users shall be able to select a group of balls by drawing a selection box around them. Once selected, the user shall be able to drag the entire group to a new location simultaneously.
 - Ball aggregation: Users shall have the option to click on an empty space within the window, which will signal all balls to gravitate towards that point and merge into a single, larger ball.
 - Ball Division: Users shall be able to double-click on any ball, causing it to split into two smaller balls.
5. Personalized ball design: Users can right-click the ball to change its texture, color and size.
6. Ball classification: Users can set a key word of texture, color or size. The program can filter the balls that match the key word.
7. Delete balls: Users can right click the ball to delete it. Users should also be able to delete a batch of balls through group manipulation.

Performance Requirements:

1. The program must be optimized for low memory consumption to ensure it does not significantly impact the performance of concurrently running applications such as compilers or other programs.
2. When running alongside mainstream Integrated Development Environments (IDEs), the program must not cause any noticeable slowdown or lag in the operation of these IDEs.