Circlez - Pygame Project for Zense

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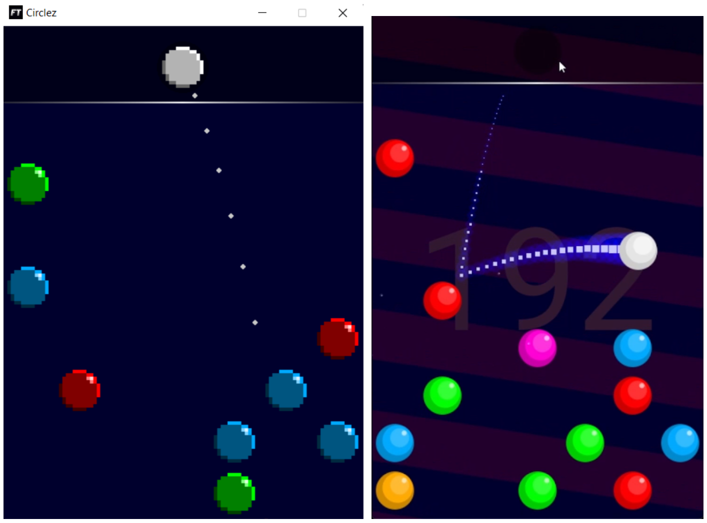
How to Run: Download the github code and run the circlez.py file.

Instructions: Use the mouse to aim the white ball and pop the circles. Some circles might require more hits to pop, depending on its color. Detonate bombs to pop all circles in a row and column. Don't let the circles reach the top of the screen. Try to beat your best score!

Video Demo: https://www.youtube.com/watch?v=HvDfQRd95Ao

Implementation: The goal of this project was to create a game that was very simple to play and learn, yet addictive. So extra effort was put into details and effects in order to make it look appealing and satisfactory to play. The following steps show the progression of the game's development.

Art: At first I planned to make it an 8-bit style game, with pixel graphics. So I drew some pixelated circles. Later I tried drawing the same circles using vector graphics, and this looked much cleaner, so I stuck with the latter.



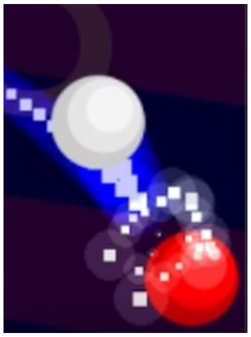
Shown above is a comparison of the two art styles.

Physics: The next step was to simulate realistic physics, in order to make the white ball collide and bounce off other balls. To do this, a vector is calculated pointing from the center of the white ball to every other ball’s center. If the length of this vector is less than 2 * radius, it is colliding. In this case we have to correct the velocity of the white ball, by applying an impulse along this vector.

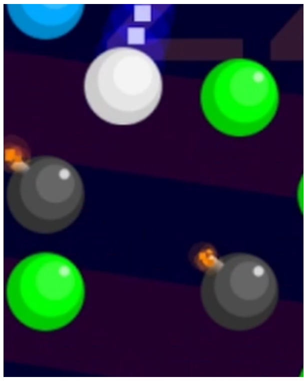
Gravity also acts on the white ball, increasing its downward velocity. Due to approximations while calculating the new velocity, we cannot resolve collisions simply by modifying the velocity. This will cause the white ball to either gain energy, or lose energy and sink into the other balls. Hence, the position is also slightly corrected if a collision exists.

Particle Effects: Subtle effects bring a game to life. So I made a python class to simulate particles. These particles start from a position with an initial velocity and gradually fade away, and decrease in size. Each particle is a small bright colored square with a circular glow around it. Some particles are also affected by gravity. There are five types of particle effects used in this game.

1. The white ball collisions result in the release of white sparks
2. The popping of a red ball results in red explosions
3. A trail of blue particles follows the white ball
4. Once every few seconds a shine appears on every ball
5. Orange sparks are emitted from the bombs



Bombs: To add a bit of variety, there is a chance that a ball can appear as a bomb instead. These bombs when hit detonate, and create an explosion along its vertical and horizontal. Any circles caught in the explosion will instantly pop, irrespective of its color.



Game Balancing: Any good game must contain a proper difficulty curve. It should start easy and gradually increase in difficulty. There are a few conditions set in the game to make it fun to play.

If there are circles near the top of the screen, only one new row of circles is added on to the screen, giving the player more time. Otherwise two new rows will be added to increase the pace of the game.

As new rows are added the probability of different coloured balls appearing increases. Initially only red balls appear which require only one pop. Hence the game gets progressively difficult.

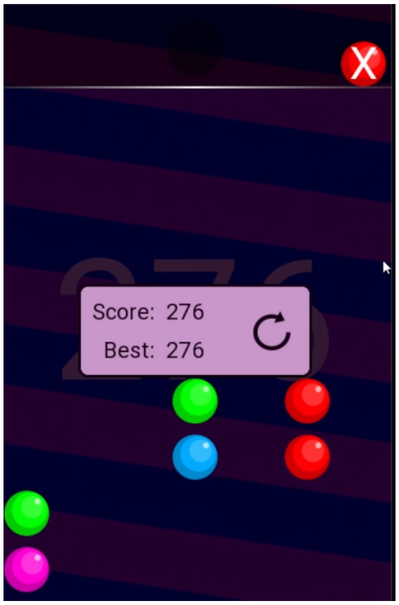
If the number of onscreen balls exceeds a certain limit, there is a high probability of a bomb spawning to help the player to clear the screen faster.

Other Effects: There are some more small effects in the games perhaps worth mentioning, but not too significant.

- Every bounce of the white ball results in a small screen shake, and explosions result in larger screen shake.
- A trail is shown made of 6 white dots, which will indicate the path taken by the white ball before being dropped.

- If a ball has almost reached the top of the screen, it will vibrate to warn the player. Similarly any ball which reaches the top will display a flashing X to indicate the reason for losing.
- A background exists, made of purple stripes which endlessly scrolls upwards.

Highscore: The best score is saved on your computer as a file, and is displayed after losing.



Credits: Music used is Unity by TheFatRat. Sound effects were found on the internet. All programming and artwork by me.