Xxxx

Write up a detailed design plan describing the design impacts of  
introducing the chosen new feature. No format required, but the plan  
should be technical and informative: for instance, you could discuss  
what changes need to be made to your existing current design of the  
architecture and classes; what patterns might be useful, what patterns  
that used to work that need to be changed, etc.  
⎯ Commit the plan to your repository before your final demo  
⎯ By the final demo (which will happen during dead/finals week), make  
your best attempt to implement the new attack. You don’t have to  
complete it, but if you do that would earn you a bit of extra credits

Xxx

Design Plan For Boss Shockwave-Style Attack

Looking at option B, we can see that the boss creates multiple rings of small bullets that moves outward at a slow pace. This is phase 1 of the attack. The second phase creates a semi-circle of 5 larger bullets that moves outward at a fast pace. In addition, these large bullets all push the slow bullets out of the way and some of the slow bullets are even pushed along by the larger bullets. This second attack targets the player’s position. Lastly, when the large bullets hit the player or the edge of the screen, they explode into a multitude of smaller bullets that fly in random directions backward.

To implement this attack, we will need to first generate the rings of slow moving bullets. For this, we will need two things: the boss’ vector-based position, and a designated bullet object.

Several circles (set to non-visible status) need to be drawn around the position. Each circle should be increased by a small factor to create a target-like structure. There should also be one large circle that is kept separate. Next, the circles need to be divided into many small subsections and each should be given a designated value (section 1, section 2, etc). Then the large circle should be given corresponding values (see figure 1).

For each section, a bullet should be spawned. This bullet will have a boundary (represented by a shape such as a rectangle), an assigned speed, a damage counter, and also a destination; this destination will be determined by the section it was spawned in. For example, if Bullet1 was spawned in section 1 of the first ring, then its destination will be section 1 of the large circle. The bullets may continue once they hit their destination, and will eventually exit the screen. It is a good idea to include an isOnscreen Boolean, and should the bullet leave the screen, then it is deleted to save memory.

A picture containing logo

Description automatically generated

Figure 1.

For the second phase of the attack, an array list of 5 bullets must be created.

The position of the player must be passed, and this will serve as the destination of the 3rd bullet. The other bullets will be assigned corresponding sections in the smallest circle with their destinations determined by the matching sections in the large circle.

Now the bullets will be spawned. Their size/boundary will be much larger and speed faster than the smaller bullets. Once they make contact with the small bullets, advanced collision detection must be employed where the bullets are not destroyed but rather pushed away.

Each large bullet will have an isOnscreen Boolean. Once they hit the edge of the screen, this Boolean will switch to false and the third phase of the attack will commence.

For the third phase, a list array of small bullets will be used to generate a barrage of bullets from the position the large bullet was when its isOnscreen Boolean switched to false. These small bullets will be given a randomized destination of any of the subsections of any of the rings or large circle.