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Milestone 3 Report

Title: Gun Range Simulator

Project Concept:

The concept of my project is to create a simulation of the tasks done at a gun range. I would like to simulate the workings of various guns, such as reloading the magazines, reloading the guns, cocking the gun, and pulling the firing trigger.

New Features Implemented:

In this iteration I've fully implemented my second gun, which is a shot gun. The shot gun is fully featured, with all the features that my second iteration had, which includes manual reloading, arming magazines/chambers, cocking the gun, firing, and firing animations. In this iteration I've also added some animation to my previous assault rifle, which includes a muzzle flare and a gun recoil animation for when the gun is fired.

To use the shotgun:

1. Click "Spawn Shot Gun" button
2. Spawn ammo
3. Cock the shot gun back by clicking on the black pump near the front of the gun, and dragging it back
4. Notice the ammo slot has slit back. Drag a spawned shot gun shell and place it into the ammo slot
5. Load the shot gun by dragging the pump back forward. This arms the gun
6. Press the trigger to fire
7. Pull the pump back again to eject the spent casing

Feature List:

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| Interactive ammunition | Done |
| Reloading of Magazine | Done |
| Assault Rifle manual loading | Done |
| Assault Rifle firing animations | Done |
| Shot gun reloading | Done |
| Shot gun interactive cocking | Done |
| Shot gun firing animations | Done |
| Assault Rifle relevant Sound FX | Work in Progress |
| Shot gun relevant sound FX | Work in Progress |
| Ammunition relevant sound FX | Work in Progress |
| Gun range relevant sound FX | Work in Progress |
| Interactive shooting targets | May be dropped |
| Shooting targets animation and logistics | May be dropped |

Challenges and Solutions:

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One challenge I experienced was changing my design philosophy of the shot gun in comparison to the previous assault rifle. When I designed the assault rifle, I wanted everything that's going to be interacted upon to be an object, which then will extend from my parent MovingObjects class for maximum compatibility, and also make use of inherited functions. However, after completing the assault rifle, I realized that doing so was tedious and often made 0 sense. Some objects such as the assault rifle reload pin had so little features that it was created as a separate object simply to inherit the object collision function. While this worked and worked great, it consumed a lot of time and was tedious to debug and implement. Moving on to my 3rd iteration on the shotgun, I didn't want to repeat the same mistake I did in iteration 1, but I couldn't justify recoding a large portion of my previous methods at this point. The solution I implemented instead is to merge small movable components into one object, then creating Rectangle2D.Double hitboxes for all of them for collisions. I found this simplified my code a lot more, and allows me to minimize the amount of refactoring needed to make sure both my implementations worked cohesively.

Deviations:

One major deviation in this iteration is that I've changed my original proposal of assault rifle + pistol to assault rifle + shotgun. I found that pistols are too small, and it was incredibly hard to find matching renderings to match gun, magazine, and ammunition. I found that shotguns have more interesting mechanics such as manually reloading ammunition one by one, and the addition of cocking the shotgun to reload, then ejecting the spent ammunition.