

Final Project: Tower Defense (Part 3)

Out: Monday, November 19th

Due: Saturday, December 2nd at 11:59 PM (12/2/17 at 11:59 PM)

This assignment will build on the work that you did last week. Use your own code as starter code.

Introduction

This part of the final project will be a matter of polishing things off. All that you need to do is add two new types of enemies and two new types of towers. Then, we'll specify a few waves to have at the beginning of your game.

For the enemies and towers, specifically:

- a fast, weak enemy (spawn these in large numbers to give the player a real challenge)
- a strong, slow enemy (give these lots of hitpoints and spawn them far apart from one another... unless you're sadistic :))
- a "freeze" tower that has an area of effect attack that slows nearby enemies and deals a tiny amount of damage over time
- a "shock" tower with a lightning attack that chains between enemies that are near one another

Let's get started.

New Enemies

The new enemies should be a cinch, thanks to prefabs. The fast enemy should:

1. Be noticeably faster than the "normal" enemy

2. Have substantially fewer hitpoints
3. Have a different appearance (e.g., color and size) than either other type of enemy

The strong enemy should:

1. Have substantially *more* hitpoints than the normal enemy
2. Move slower than the normal enemy
3. Have a different appearance (e.g., large in size and a different color) than either other type of enemy
 - a. if you decide to make them large, make sure that they can still navigate your grid!

That's all for the enemies. Make sure that both of them spawn correctly and can traverse the entirety of your grid without trouble.

Two New Towers

This is a little more challenging, but prefabs and components should make your lives much easier. We'll be adding a "freeze" and a "shock" tower, both of which have pretty radically different behavior from our vanilla towers.

The Freeze Tower

The freeze tower slows and lightly damages enemies in the cells adjacent to it (including diagonally adjacent). Specifically, enemies in a cell adjacent to a freeze tower should:

1. Have their movement speed reduced by significant fraction (e.g., $\frac{1}{3}$)
2. Take damage over time (i.e., as long as the enemy is within range of the tower, they should take a certain amount of damage per second)
3. Enemies adjacent to *multiple* freeze towers should take damage *additively*, but be slowed *multiplicatively*
 - a. i.e., an enemy adjacent to three freeze towers will take three times as much damage but will move $\frac{2}{3} * \frac{2}{3} * \frac{2}{3} = \frac{8}{27}$'s its original speed
4. When enemies leave the tower's attack radius, the freeze effect (from that tower) goes away

Hint: you can make the freeze effect (even multiple) into a component. Remember that you can freely add and remove components to GameObjects.

Finally:

1. add a button to your construct tower menu for the “freeze” tower. You should probably make it more expensive than your normal towers, although you don’t have to ;)

The Shock Tower

The shock tower has a lightning attack that can “chain” among multiple enemies that are close to one another. When it fires, the first enemy is hit. If there is a second enemy nearby, the attack chains to that enemy, damaging it as well. If there is a third enemy nearby (i.e., not the first enemy), it, too, is hit by the lightning. All of this happens instantaneously, and is visible by the drawing of lines among all of the enemies involved. Here are the specifics:

1. The shock tower can attack enemies that are within one cell of the tower
2. The first enemy hit by the tower takes damage, and if there is another enemy within a one cell distance: this enemy is also hit by the attack, and if there is a third enemy (i.e., not the first enemy) within one cell distance, this enemy takes damage as well
 - a. don’t chain to more than three enemies
3. Indicate to the player which enemies are being hit. Feel free to use GL.DrawLine to draw lines between the tower and the first enemy, the first and the second enemy, etc.
 - a. you may use any effect that you want, so long as it is clear which enemies are being “shocked”
 - b. the effect needs to persist for a few frames, so that the player has time to see it
4. The shock tower should have a relatively slow rate of fire

Finally:

1. Add a button to the construction menu to build shock towers. You should make them even more expensive than your freeze towers, although you don’t have to ;)

Finishing Finishing Touches

You've add two new kinds of enemies and two new kinds of towers, both of which can be bought and sold. Here are some standardized waves that your game needs to include so that playtesters can see that you've implemented each kind of enemy. Starting with Wave 1:

1. 5 normal (enemies)
2. 10 normal
3. 5 normal, 5 fast, then 5 normal
4. 5 normal, 2 strong, then 5 normal
5. 10 normal, 4 strong, then 10 normal
6. 10 normal, 4 strong, then 10 fast
7. Your choice
8. Your choice
9. Your choice

Your game should end after nine waves. If you're feeling fastidious, you can tune your game (prices, hitpoints, damage, fire rate, etc.) based off of the first six waves.

Submission

As per usual, zip up only your Assets and ProjectSettings and submit **one copy** of the final project *as your Canvas group*.