Tower Defense

Gameplay

Basics

The gameplay is that of a very basic Tower Defense game between two players. Each player can build towers on his own lane and send soldiers to the enemy's lane. Every time step a unit can move(if they are soldiers) or attack something in their range. Soldiers will try to run down the enemy lane and if they reach the last row the enemy will lose one HP for every soldier that comes through. When one player has 0 HP left, he loses he game.

Board

The game is played on 2 lanes, each 7 cells wide and 20 cells long. Each player has one lane on which he can place his turrets. They can also hire soldiers that will be deployed on the enemy lane.

Turns and Timestep

One game is divided into Turns, which are themselves separated into Timesteps. Before every Turn, each player can use their Money to build new towers or hire new Soldiers, as well as determine how the available soldiers will be deployed in the enemy lane.

The Turn is then played Timestep by Timestep. Every Timestep Soldiers for that timestep get deployed. Then each tower followed by each soldier on the field get to take 1 action, which can be an attack or a move(if its a soldier). A Turn ends after the 100th timestep. After that, players can again use the money they earned to build new towers and recruit new soldiers before the next Turn begins.

Winning and Loosing

The game is played until one players HP drops to 0. When this happens the turn is still continuing until the last step. In this time the enemy has a chance to reduce the opponents health to 0 as well. If at the end of a turn one players HP is ≤ 0 and the other has more then 0 HP left, the player with HP left, wins. If at the end of the turn both players have dropped to 0 or below, its a draw.

Money

Each player has an amount of Money. They get 1 gold every turn, plus 1 gold for every Unit that they manage to destroy. When an enemy tower is destroyed it will also grand its price to the enemy player.

Deployment

Every Turn each player arranges his soldiers in a "deployment", that determines what soldiers get deployed on what timestep in what field during the next turn. Please remember, that at the 100th timestep the turn ends and all soldiers still on the lane get removed. So a soldier that takes 20 timesteps to reach the last lane, will not be able to score if it is dispatched in turn 90.

Information

The players are allowed to make use of all knowledge in both lanes. But the opponents lane is only observable over the units. You are not allowed to extract information from the opponent commander or any of his AI.

Units

Basics

Units are the acting agents of this game. Every Unit has a to have an AI that controls its actions. There are two types of units, Towers and Soldiers. Towers are deployed in your own lane to prevent enemy soldiers from reaching the end of the lane and damaging your health. Your Soldiers are deployed on the enemy lane trying to reach the end and reducing the enemy players HP. Every soldier that scores, reduces the enemy HP by 1 and is removed from the lane.

Every unit has a number of Health that can be reduced by attacks from enemy units. A unit with ≤ 0 health is removed from the lane at the end of the timestep. Units with 0 HP can not act during the rest of their timestep even if they have not used their action. It is however still possible to target a unit which has 0 health, so be sure not to waste any damage.

Towers

Towers can be build on every cell in the players respected lane, except the lane at the end, where the enemy soldiers are deployed. There also must always be at least one free tile in every lane, even though its not dictated if those tiles have to be next to each other.

Towers can not move but can attack enemies in range with their respective attack.

A cell can only hold one Tower, and a cell with a tower is blocked for soldiers to move to.

Towers can be destroyed by soldiers which makes it possible to build a new tower on the cell they previously occupied. A destroyed tower will give its building cost as gold to the opposing player.

Towers always act before the soldiers.

Missile Tower

Missile Towers are towers with long range and high damage to a single target.

Rocket Tower

Rocket Towers have good range and low damage, but are able to attack all soldiers that occupy the same cell.

Frost Tower

Frost Towers disable their targets for the turn, but have low range and low damage.

Blockade

Blockades can not attack but have very high health and low cost.

Soldiers

Soldiers can be recruited between Turns. They will then be deployed every Turn until the game ends, independent of their survival in individual Turns. They will be redeployed every Turn. After the last timestep each turn, all soldiers are removed from the lanes.

Soldiers can move or attack something in their attack range.

When a soldier reaches the end of the lane he can score a point and be removed from this turn.

When a soldier is killed by a tower it will give 1 gold to the enemy .

Shield Soldiers

Shield Soldiers have little damage and range, but they have more health then any other soldier.

Rifle Soldier

Rifle soldiers have a long range and high single target damage.

Bomb Soldier

Bomb Soldiers are slow and have short range, but extremely high damage against a singe target right in front of them. They do **not** die when attacking.

Horse Soldier

Horse Soldiers have low attack range and medium damage, but the ability to jump over one field even if that field is occupied by a tower. Despite this, they can still only score when they are positioned on a cell in the last row.

AI and Grading

You are allowed to change the AI of your Commander and every Unit type.

To do this you can simply use the *CommanderA* and *UnitA* classes and make a copy with an appropriate name such as *CommanderDennis* or *CommanderFlunky* just make sure none of the other students uses the same name.

Remember that we will test your code by copy pasting all functions form source and header file that have your respective name on them. Make a list of all these functions at the end of your 3-5 page refection on your work, so we can make sure we have all the files. You are free to change what you like at the rest of the code for testing but those changes will not be in our tests so make sure your code runs in our vanilla version.

Even if you find a way to get around any of the rules mentioned here, your code will be disqualified from the tournament, so please play by the rules.

You are allowed to talk with the other students about your work, but not to share code in any way.