Polygon Protection

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Introduction:

Polygon Protection is an open-area tower defense game where the player defends their base with polygon towers against waves of enemy circles.

Enemy circles are attacking your area! Defend yourself with your loyal polygon towers and build automatic turrets that shoot incoming enemies. Your reliable polygons, the squares, have never let you down. However, don't let your turrets do all the work for you. Go out to battle with your weapon to defeat the evil circles. The enemies come in waves that increase in difficulty. You gain gold by defeating enemies. Use gold to build more turrets and upgrade them. Can you survive long enough to complete the game?

Instructions:

You will have an indefinite amount of time to place turrets before a wave of enemies comes. You start the game with a set amount of gold. You can use gold to buy turrets in the store side panel. You can select a turret from the side panel by clicking on it. Then, you can move their mouse to the open space and click where you want to place the tower. Placing a tower will also purchase it, meaning that you will spend gold. Click on a tower that you have placed to select it. You will then be able to upgrade or sell the tower by clicking on the corresponding buttons in the store panel. Note that if you sell a tower after upgrading it, you will not receive the gold you spent upgrading that tower, so upgrade your tower only if you are satisfied with where it is placed. You will receive all the gold you spent on a tower if you sell it before upgrading it. You can click a button to start the enemy wave when you are ready. You can move your player character with the WASD keys. Clicking on the screen will make the player character attack. If a tower in the store is selected, the player character will not be able to attack so that you are not confused by placing towers and attacking with your player character at the same time. If a tower from the store is selected, press the spacebar to deselect it so that your player character can attack. You gain gold after defeating each enemy. You keep fighting the enemies for multiple waves of increasing difficulty. Once your base health reaches 0, you can restart the game by pressing enter. If you survive until the end of wave 15, you complete the game.

Features List (THE ONLY SECTION THAT CANNOT CHANGE LATER):

Must-have Features:

- The player can place turrets on the area that automatically fire at enemies. The turrets track the enemies as the enemies move (auto-aim).
- There are enemies that try to cross to the other side of the area (screen) and take damage from turrets.
- The enemies have pathfinding and go around turrets.
- The game prevents the player from placing turrets in a way that completely blocks enemies from going to the other side of the area (screen).

- The player gains money as the game progresses to buy turrets.
- When a certain number of enemies reach the other side of the area (screen), the game ends (the player loses), and the player can restart the game.

Want-to-have Features:
- A menu with a title start button. (This is a want to have because a menu is not strictly necessary for a working game.)
- The turrets have limited ranges.
- The player can sell turrets.
- The enemies come in waves that increase in difficulty.
- The enemies have visible health bars.
- The player can control a character that can move around and attack enemies.
- The player can upgrade their turrets.
- The player has multiple different turrets to choose from that do different things.
- There are turrets that fire moving projectiles.
- There are multiple enemies types that act differently and have different properties.
- The player can choose different weapons for their controllable character that do different things.
- The player can upgrade their controllable character's weapon.

Stretch Features:
- There are sound effects that play during the game, including sound effects for the turrets shooting, the enemies taking damage, and the player attacking enemies.
- There is original music that plays during the game.
- All game elements are original sprites that are pixel art or are hand-drawn
- There is a leaderboard so that you can compare your performance to other players'.

<u>Class List</u>:
Main
DrawingSurface
Screen
MenuScreen
GameScreen
EndScreen
ScreenSwitcher

ScreenElement
Grid
Store

GameElement
Tower

Enemy
RegularEnemy
BigEnemy
Projectile
PlayerCharacter
Weapon

<u>Credits</u>:

Antonio:
- Drafted README
- Helped make UML diagram
- Set up project
- Coded initial code for Main and DrawingSurface classes
- Coded underlying structure for using the grid
- Coded breadth first search pathfinding algorithm for enemies
- Coded grid highlighting when play hovers mouse over the grid
- Coded selecting and placing towers in the grid
- Coded the start next wave button
- Coded upgrading and selling towers
- Coded a different type of enemy
- Coded menu
- Play-tested game and made it not too easy or hard

Justin:
- Helped draft README
- Helped make UML diagram
- Coded initial project classes and structure
- Coded basic graphics
- Coded underlying structure for enemy movement
- Coded attacking for towers (and projectiles)
- Coded gold and base health tracking
- Coded movement controls for player
- Coded attacking code for player
- Coded end screen
- Helped find bugs in program

Outside resources:
- Processing library