

11/6/25

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### Group 3 Project Requirements

1. The player is presented with a wave of enemies that take on various shapes.
  - 1.1. Enemies can spawn from random positions above the player.
  - 1.2. The enemies wait a few seconds before descending upon the player to attack.
  - 1.3. Some enemies will go in straight lines, other enemies will bounce from wall to wall.
  - 1.4. The player starts with one life at the beginning of the game
    - 1.4.1. If an uninterrupted enemy reaches the bottom of your screen, a sound will play and the player will lose a life.
    - 1.4.2. If all lives are lost, the game is over.
      - 1.4.2.1. Transitions to a “Game Over” screen
- 1.5. The player can pause the game by pressing a designated key. The player can unpause the game the same way.
2. To combat the enemies, the player must solve the required formula for the given shapes with their respective side lengths given.
  - 2.1. The shapes that will be encountered will be squares, rectangles, triangles and circles.
  - 2.2. The formulas that the player must solve will either be area or perimeter.
  - 2.3. The sprites of the enemies will distinctly represent the formula they need.
    - 2.3.1. Filled in shapes with black lines will ask for area.
    - 2.3.2. Empty shapes with colored lines will ask for perimeter.
3. The enemies will also have their information displayed in a sidebar.
  - 3.1. Enemies will be sorted by the order they appear.
  - 3.2. One enemy will always have their information highlighted.

- 3.3. The highlight will provide more information regarding that particular enemy.
  - 3.4. The player can change which enemy is highlighted by clicking on another enemy in the game, clicking on another segment in the sidebar, or pressing the up or down keys.
4. The player can input a number representing their guess for the answer to a formula.
  - 4.1. The player's input can be seen underneath the sidebar containing the enemies.
  - 4.2. If the player's input is correct, the target enemy will explode, taking down any other enemies within the blast radius.
  - 4.3. If any other enemies share the same answer, they will automatically explode as well.
  - 4.4. The defeat of an enemy will increase the player's score and give the player gold.
  - 4.5. If the player's answer does not match with the highlighted enemy's formula, the player will receive a penalty that disables their inputs for a few seconds.
5. After all enemies are defeated, a shop will be displayed.
  - 5.1. The player can use the gold they have accrued from defeating enemies to buy powerups or upgrades.
  - 5.2. Powerups are one-time use boosts to give the player extra power for a short duration.
  - 5.3. The player can only have up to three of each powerup at a time.
    - 5.3.1. Powerups include a time freeze, score multiplier, and extra blast radius on explosions.
      - 5.3.1.1. The time freeze power up halts the movement of the enemies. Their positions will stay for a short period.
      - 5.3.1.2. Score multiplier will multiply the current score at the end of the wave.
      - 5.3.1.3. The extra blast radius power up would increase the size of the explosion for a single wave
  - 5.4. Upgrades are semi-permanent buffs that the player will have until they lose.
    - 5.4.1. Upgrades include more lives, different explosions, among others

- 5.4.2. Each upgrade has levels. The higher the level number, the more effective the upgrade is. It caps at level 3.
- 5.4.2.1. More lives upgrade gives you one extra life at level 1 and increases by 1 with each level increase
6. Once the shop is closed, a new wave will start.
    - 6.1. Waves toward the start of the game will only have rectangles and squares.
    - 6.2. Waves toward the middle will have mostly triangles with rectangles sprinkled in.
    - 6.3. Waves later on will have an emphasis on circles, that slowly become an even mix of all of the shapes.
    - 6.4. After a set amount of waves, a boss wave will start, featuring a large version of the most common shape of that assortment of waves, covered in armor.
      - 6.4.1. The boss will have a list of problems that represent the many pieces of armor.
      - 6.4.2. After the armor is removed, the boss will require the sum of all of the armor pieces' answers.
      - 6.4.3. If the player succeeds, the game will transition to a "Win" screen
      - 6.4.4. If the player fails to do this in time, the boss will take all of the player's lives.
  7. A tutorial will pop up at the start of the game.
    - 7.1. This tutorial will explain the controls and the objective of the game.
  8. A tutorial will also appear every time a new type of enemy is introduced.
    - 8.1. Each tutorial will explain the data required for the shape (ie. length and width).
    - 8.2. They will explain how to solve for the area and perimeter.
    - 8.3. They will show the differences between the enemies that require area to be solved and the enemies that require the perimeter to be solved.
  9. All tutorials can be accessed whenever the player wants.
    - 9.1. The player must hit a designated button in the pause menu to do so.
  10. Will contain a highscore/leaderboard system.

- 10.1. Every time the player loses or clears every wave the game has to offer, their final score is recorded and displayed in a separate screen on the main menu.
  - 10.2. The player can put in their name when they start a game, and their name will show next to the score. If no name was inputted, they would be named ‘Anonymous’ in game
  - 10.3. The leaderboard can be viewed in the main menu screen and at the end of a run.
11. Music plays in the background
  - 11.1. Different music plays for different parts of the game: Main menu versus Wave Start.
  - 11.2. Music is paused when you pause the game.
  - 11.3. Music fanfare when the player wins a wave and a longer fanfare when they win the game.
  - 11.4. Sad music for when the player loses.