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 five lives at the beginning of the game.

    1.5. If an uninterrupted enemy reaches the bottom of your screen, a sound will play, and the player will lose a life.

        1.5.1. If all lives are lost, the game is over.

        1.5.2. Upon a game over, the game transitions to a "Game Over" screen.

    1.6. The player can pause the game by pressing a designated key or by selecting a specific button.

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, circles, half circles and quarter 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.

    2.4. Enemies that require an area to be solved will be displayed as filled in shapes with black lines.

    2.5. Enemies that require a perimeter to be solved will be displayed as empty shapes with colored lines.

3. The enemies will also have their information displayed in a sidebar.

    3.1. Enemies listed in the sidebar will be sorted by the order they appear.

    3.2. One enemy in the sidebar will always have their information highlighted.

    3.3. The enemy that is highlighted in the sidebar will have a target displayed over the enemy's sprite.

    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 the highlighted enemy's 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 highlighted enemy will explode.

        4.2.1. The explosion will take down any other enemies within the blast radius.

        4.2.2. The defeat of any enemy will increase the player's score and give the player money.

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.

        5.2.1. The player can only have up to ten of each powerup at a time.

        5.2.2. Powerups include a time freeze, score multiplier, and a fireball.

            5.2.2.1. The time freeze power up halts the movement of the enemies and prevents any additional enemies from spawning temporarily. This effect will stay for five seconds.

            5.2.2.2. The score multiplier will double the score gained from defeating any enemy for ten seconds.

            5.2.2.3. The fireball automatically defeats the selected enemy.

5.3. Upgrades are semi-permanent buffs that the player will have until they lose.

    5.3.1. Upgrades include more lives, larger explosions, and one that slows all enemies by set percentage.

    5.3.2. Each upgrade has levels. The higher the level number, the more effective the upgrade is. All upgrades start at level one and cap at level five.

    5.3.3. The more lives upgrade gives you five extra lives per level, capping at 25 max lives.

    5.3.4. The larger explosions upgrade increases the size of explosions triggered upon defeating an enemy to potentially hit more enemies.

    5.3.5. The slow upgrade causes all enemies to move slower by an increasing percentage per level.

6. Once the shop is closed, a new wave will start.

    6.1. The first set of waves will only have rectangles and squares.

    6.2. The second set of waves will only have triangles.

    6.3. The third set of waves will only have circles, half circles and quarter circles.

    6.4. The final set of waves will have a random mix of all of the enemies.

7. After two normal waves, a boss wave will start, featuring a large version of the designated shape of that assortment of waves.

    7.1. The boss will have a list of fifteen problems that the user must solve.

        7.1.1. The final boss on wave twelve will have twenty problems for the user to solve.

    7.2. If the player fails to do this in time, the boss will take all the player's lives.

8. A tutorial will pop up at the start of the game.

    8.1. The tutorial will explain the controls and the objective of the game.

9. All formulas for enemies can be accessed whenever the player wants.

    9.1. The player must hit the button labelled 'Formulas' in the pause menu to do so.

10. The game will contain a high score/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 if it is higher than the lowest score for that difficulty.

10.2.   The player can put in their name when they start a game, and their name will show next to the score.

10.2.1.   If no name was inputted, they will be listed as 'Anonymous' in the game.

11.   Music and sound effects will play in the background.

11.1.   Music is paused when you pause the game.

11.2.   There is music fanfare when the player wins a wave and a longer fanfare when they win the game.

11.3.   There is ominous music for when the player loses.

11.4.   There are sound effects when the player uses a power up.

11.5.   There are sound effects when the player purchases an item or upgrade.

12.   There will be an options menu for adjusting settings.

12.1.   The menu will contain a slider to adjust volume settings.

12.2.   The menu will contain an option to disable the tutorial.

12.3.   The menu will contain options to disable music and/or sound effects.

13.   There will be a main menu upon the game opening.

13.1.   The main menu has a button labelled 'Start' which will show the difficulty options.

13.2.   The menu displays four different options for difficulty and will start the game on that difficulty when any are selected.

13.2.1.   The four difficulties in order of easiest to hardest are 'Easy', 'Medium', 'Hard' and 'Nightmare'.

13.2.2.   The 'Nightmare' difficulty is locked upon the player starting the game for the first time.

13.2.3.   The 'Nightmare' difficulty can be unlocked by winning on 'Hard' difficulty.

13.3. The menu has an input field for the player's name.

13.4. The menu has a button labelled 'Formulas' to view all formulas relevant to the game.

13.5. The menu has a button labelled 'High Scores' to view the high scores list and leaderboards.

13.6. The menu has a button labelled 'Options' to view the options menu.

13.7. The menu has a button labelled 'Quit' to quit the game.

14. The game contains a pause menu to be used during gameplay

14.1. The pause menu has an option to resume the game.

14.2. The pause menu has an option to view all formulas.

14.3. The pause menu has an option to open the options menu.

14.4. The pause menu has an option to return to the main menu.