Final Project Report

Controls:

- Keyboard Commands
    - To fire at enemy ships, press Z
    - To control the hero ship, press the directions arrows
        - Left arrow key to go left
        - Right arrow key to go right
        - Up arrow key to go up
        - Down arrow key to go down
- Mouse commands
    - no effect in main window, its only used to click on menu items
    - To reset game:
        - Go to: Menu -> Reset
    - To quit game:
        - Go to: Menu -> Quit
    - To pause game:
        - Go to: Menu -> Pause
    - To unpause game:
        - Go to: Menu -> Pause

Rules

Enemy ships will be randomly created and fire barrages of bullets at the player. The player must avoid the bullet hail while returning fire. An enemy ship can be destroyed in 1 to 3 hits. Every time the player destroys an enemy ship, their chain count goes up by one, and every few seconds that pass where a player doesn't destroy an enemy, the chain decrements.

After at least 35 enemy ships have been destroyed, and the player's chain count is over 20, a large final enemy will appear that can withstand 200 hits before it is destroyed. The player can withstand exactly 3 hits. The game ends when either the boss has been defeated or the player has been hit too many times.

Dodging the bullets may seem impossible, but the game is tuned in ways that skews in the player's favor until the player starts doing too well, and then it gets gradually more difficult.

1. The player's hit target is very small, and can be seen in the zoomed view. When the player's chain count is greater than 10 it starts gradually increasing with the player's chain score.
2. The hit radius of the bullets is half the size of the visible bullet on-screen. This means you can skim them very closely without it counting as a hit.
3. The enemies have hit targets that are about the size of the visible ship, so hitting them is much easier than them hitting the player.

4. During the boss fight, the player's hit target is returned to its original size, the bullets are slowed to 20% of the regular speed, and the rate of fire on the barrages is reduced. The boss has more dangerous bullet patterns than the regular enemies, but these tweaks make it look a lot harder than it actually is. Use this knowledge to impress your friends, because they will think you are really good.

Evaluation of System:

- Known bugs:
  - There is a timing hiccup during collisions, resulting in a split-second freeze.
  - Certain low-framerate situations can cause the scrolling paper background to have gaps.
  - When the framerate gets low, certain time-based functions like bullet speed increases don't work correctly. This is most noticeable with the purple "laser" barrage.
  - When a lot of the same type of bullet are on the screen at once, all the bullets of that type seem to increase in speed. This looks cool, but it's not intentional so we're going to consider it a bug.
- Limitations:
  - Some combination of our model code and the way the library works causes framerate issues with large numbers of bullets. We need to do an optimization pass both through our own code and also through the library
- Possible features in next version:
  - Give bonuses for skimming close to bullets.
  - Give bonus for fast completion.
  - "Survival Mode" where the player can't shoot, but must survive for as long as possible.
  - More kinds of enemies and more kinds of bullet barrages.
  - Actual designed levels instead of random spawning.

Hero Design:

8

Hero's main primitive body that we put a texture over

Center (0.3, 4)
Radius = 0.5

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This is the hero's hit box (collisions are done using this). It is a child scene node of the hero object.

Origin (0, 0)
and Pivot location

mScene
Type: Scene Node

Base body of ship

bodyOfShip
Type: Scene Node

Hit box of the hero – collisions are based off of this scene node

heroHitBox
Type: Scene Node

Primitive Rectangle

Primitive Circle