

Image 1: Gameplay

Space Invaders Documentation

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DESIGN PATTERNS

Singleton

Singleton Design Pattern is used for the Config class.

- The singleton pattern is used as there should only be one instance of a config file reading class.

Builder

Builder Design Pattern is used for building the GameDialog, Base, AlienBuilder and Ship classes.

- The builder pattern is used to make the GameDialog and the Base with all the commands from the Config file.

Composite

The Composite Design Pattern is used for the Alien, AlienBuilder, Hunter and Swarm classes.

- The composite pattern is used to create a tree structure for the aliens and alien bosses. This allows the swarm to be acted upon in one method such as in the move() method that is called and then sub sequentially called each child elements move() method.

State

The State Design Pattern is used for the Ship, ShipState, ShipStateNormal, ShipStateFrozen, ShipStateHyper and ShipStateDead classes.

- This is used so the ship can be in different states depending on different situations. It allows the ship to react differently depending on what it has set to be.

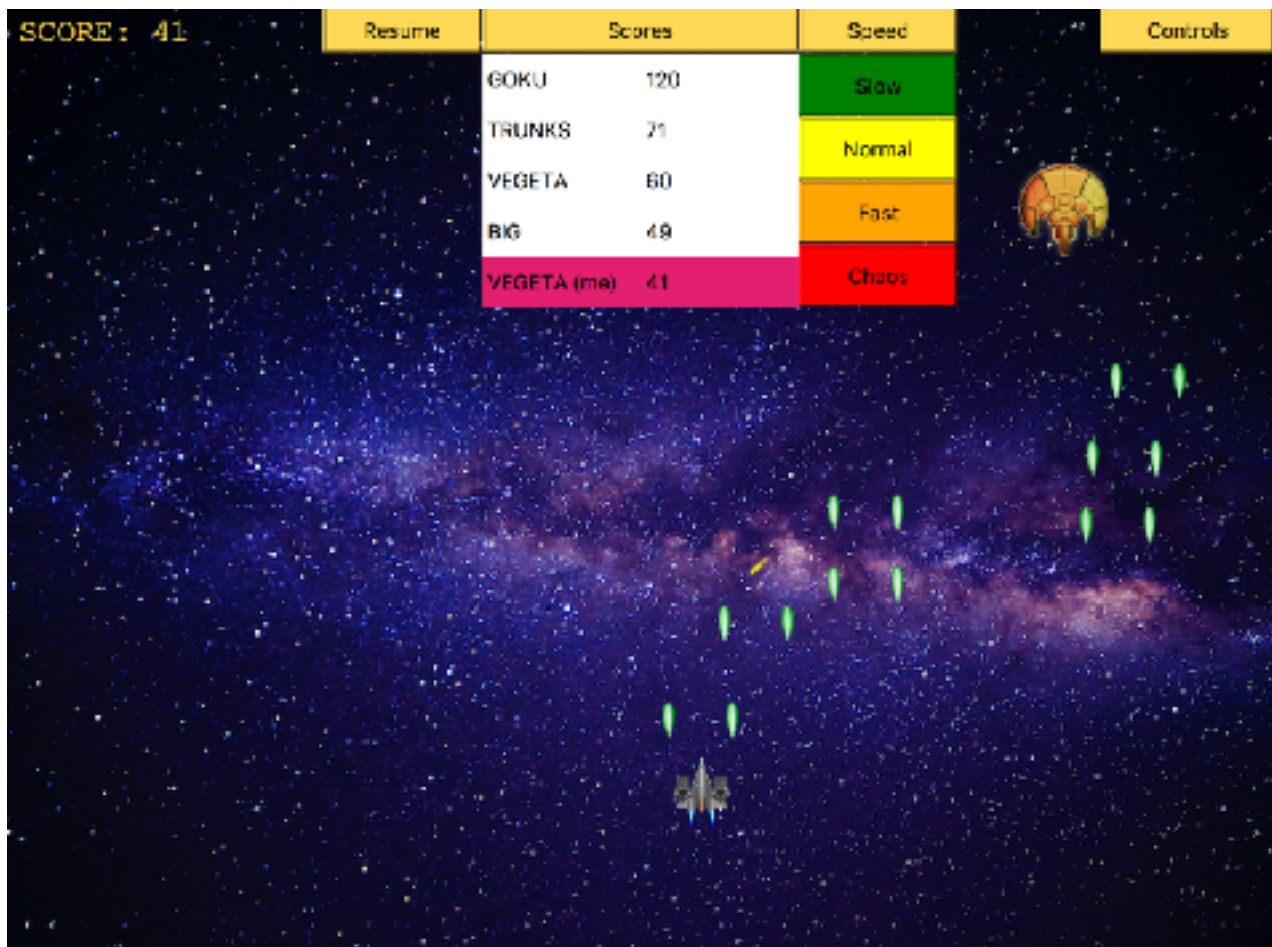


Image 2: Menu Configuration

CLASSES

Alien

The alien class is a concrete class used for the aliens on the screen.

AlienBase

The alien base is an abstract class used to hold alien member variables.

AlienBuilder

The alien builder class is used to build aliens.

Base

The base class is used to hold screen variables such as x and y coordinates.

Bullet

The bullet class is used for creating alien and ship bullets on the screen.

BulletBuilder

The bullet builder class is used to create the bullets that are appended to lists for aliens and ships.

BulletBuilderInterface

The bullet builder interface is used to specify which methods should be implemented for building different bullets.

Config

The config class is used to read in the config file, it also saves to the config file for updating the top scores.

DiagonalBullet

The diagonal bullet class is an alternative to the bullet class that allows bullets to be shot diagonally.

GameDialog

The game dialog is the class that runs the game. It paints the images on the screen and updates the variables related to them by calling their movement, getters and setter functions. It holds the timer that is responsible for loading each nextFrame.

Hunter

The class is a specific alien class that has an ability to move towards the ship, it has access to the ships x and y coordinates.

Menu

The class is responsible for the labels and buttons that are used for the menu displayed on the screen during the game. It calls public SLOT methods from game dialog to amend values in the game and get access to variables that it needs to display values like top scores.

Ship

The class represents the ship the player uses to play, it holds it's own x and y coordinates and also a state variable representing what state it is currently in.

ShipState

The ship state class is an abstract class that defines all the functions that the concrete ship states have to implement.

ShipStateDead

The ship state dead class is a concrete class pertaining to the state the ship would be in when its dead. It implements the methods from the abstract ship state class however most of its methods simply stop the user from doing anything with the ship.

ShipStateFrozen

The ship state frozen class is a concrete class pertaining to the state the ship would be in when it gets shot by one bullet. It implements the methods from the abstract ship state class however most of its methods just like the ship state dead class just hinder the player from doing anything, it however is a temporary state unlike the ship state dead class.

ShipStateHyper

The ship state hyper class is a concrete class pertaining to the state the ship would be in when it loads its hyper mode this is available to a player once the hyper bar has been fully loaded. The class adds the ability to shoot bullets from both sides of the ship.

ShipStateNormal

The ship state normal class is a concrete class pertaining to the state the ship would be in when it loads its normal mode. It is the default mode the ship is in.

Swarm

The swarm class is the class pertaining to the composite creation of the aliens in accordance with the composite design pattern.

SwarmInfo

The swarm info class is used to hold the information of a swarm.

PROMINENT METHODS

GameDialog::NextFrame()

Load the next frame, take into consideration variables and flags so as to load the next frame correctly.

GameDialog::PaintEvent()

Paint the background, swarms, ship and all objects onto the screen.

GameDialog::GameOver()

Open the menu and display the scores once a player loses or wins the game, allowing them to start a new game, continue their game or quit.

GameDialog::ContinueGame()

Continue the game the player was playing, this is not accessible if the player has won the game, finishing all levels.

GameDialog::NewGame()

Start a new game, this resets all flags to default and sets the player back at the first level in their starting position.

GameDialog::UpdateHyperFuel()

This updates the hyper fuel gauge to allow the ship extra bullet-shooting abilities once full.

GameDialog::mousePressEvent()

This detects if the mouse has been pressed and lets the player shoot a bullet from the spaceship.

GameDialog::mouseReleaseEvent()

This detects the mouse has been released and removes the shoot commands.

GameDialog::MouseMoveEvent()

This detects the mouse has been moved and moves the spaceship accordingly.

GameDialog::KeyPressEvent()

This detects a key has been pressed and adds the key to commands list if it is an applicable key.

GameDialog::KeyReleaseEvent()

This removes the key from the commands so as to ensure the command is only processed once.

GameDialog::SetSpeed()

This sets the speed, it is a publicly slotted method available to the Menu class.

GameDialog::PauseStart()

This is another publicly slotted method available to the Menu class and also able to be run if the Qt::Key_Escape is pressed, in other words the esc key.

GameDialog::GenerateAliens()

This function generates the aliens by retrieving the next swarm composite for the level which can hold many swarms.

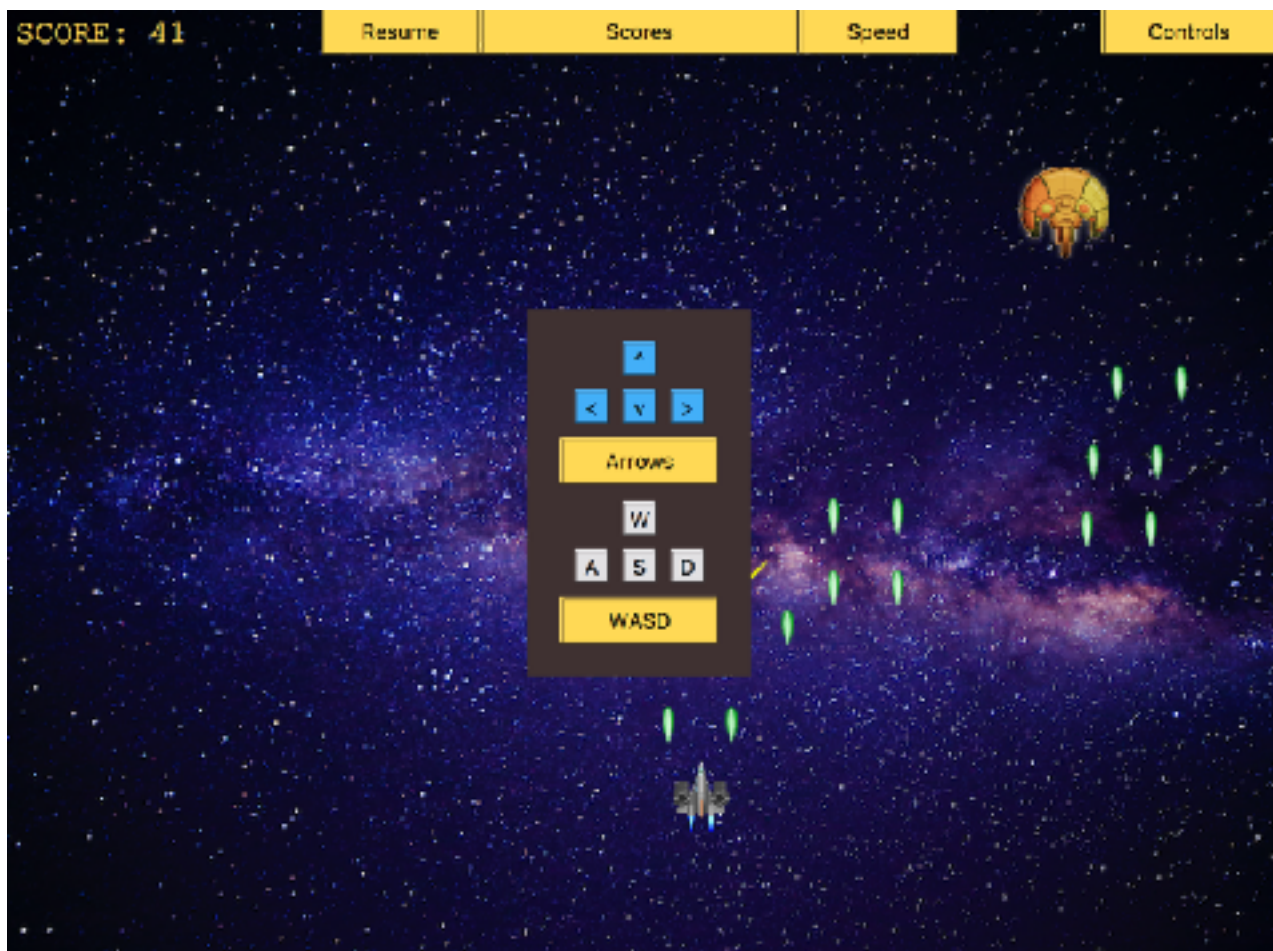


Image 3: Changing Controls