SET09101 Software Development 3

Sky Wars

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Contents

Introduction

Sky Wars is a game where the user takes control of a master ship. The master ship spawns in a random place on the grid and can only move to a neighbouring place afterwards. Every time the master ship moves, there is a 1 in 3 chance of an enemy ship spawning through the intergalactic black hole (the top left square in the grid), enemy ships can also only move to neighbouring squares when they move. If the master ship moves into the same square as an enemy ship, the enemy ship is destroyed and removed from the sky. If the master ship (while in defensive mode) moves into the same square as 2 or more enemy ships, the master ship is destroyed and the game is over, however if the master ship is in offensive mode, it will take 3 or more enemy ships to destroy it.

Use of Patterns and Threads

The Command Pattern

The command pattern is used to generate a list of move commands for the Master Ship and any enemy ships too, and executing them all at the same time. The command pattern can provide a smaller runtime for bigger projects with more actors or a more complex method to move said actors. This is what makes the command pattern so useful.

The Factory Pattern

As there is a 1 in 3 chance of an enemy ship spawning when a move is made, the factory pattern can be used. If a new enemy ship is to be created, the type is passed as a string as a function which creates the new enemy ship before returning it.

The Strategy Pattern

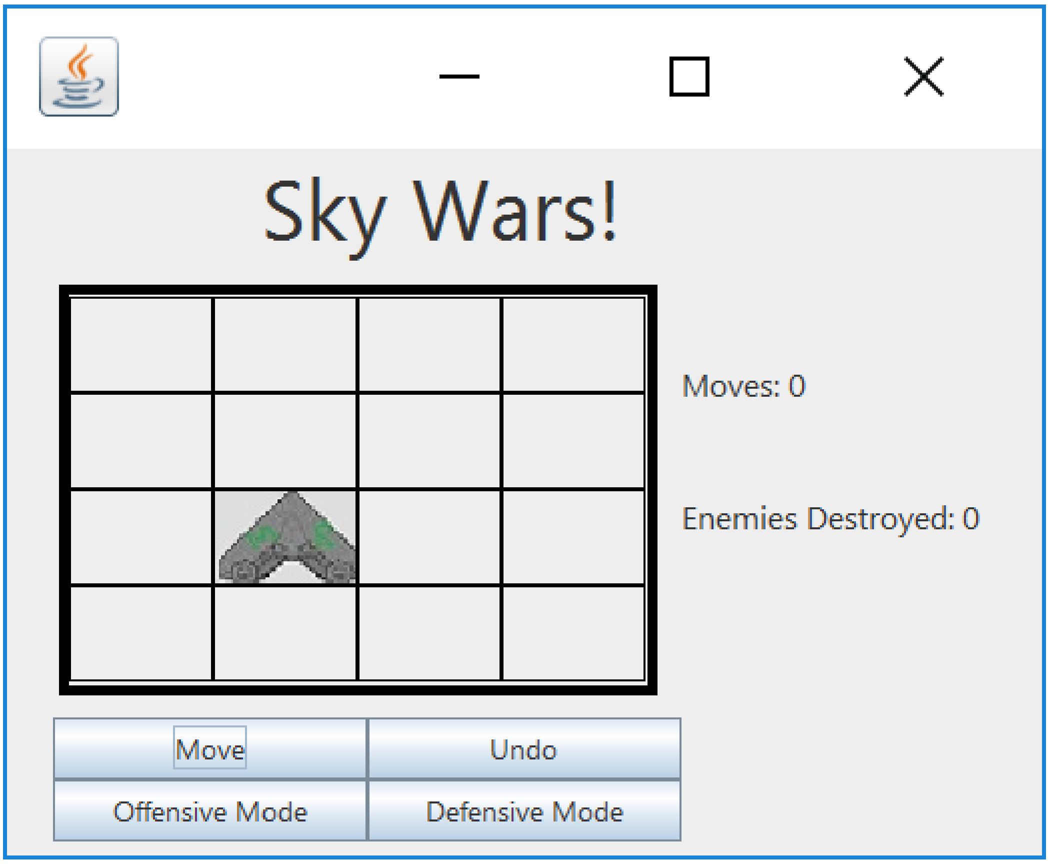
The strategy pattern is used for the combat mode of the Master Ship. There is a method that allows the ship to swap the mode being used, the method being used dictates the number of enemies the Master Ship can defeat at one time. For example, if in defensive mode the Master Ship can only destroy one enemy ship, any more than one would destroy the master ship. If the player decides to change this they can press a button that changes the combat mode, which is where the strategy pattern comes in.

Threads

The use of multiple threads means it is possible to run more than one operation side by side at the same time. In this project the threading was used to generate a move command, because of this, the actors (Master Ship and any enemy ships) on the board can move at the same time, meaning the time it takes for the program to execute this and the time taken for the moves to be completed is lowered, as many ships are moving at one time rather than the moves all happening separately, i.e. Master Ship moves, then Battle Star moves, then Battle Shooter moves.

GUI

Once the program is started, the user sees the game screen. Shown in Figure 1, the game screen displays the name of the game, the grid for the game to be played on, labels showing the number of moves made and the number of enemy ships destroyed, and the move, undo, offensive mode and defensive mode buttons.



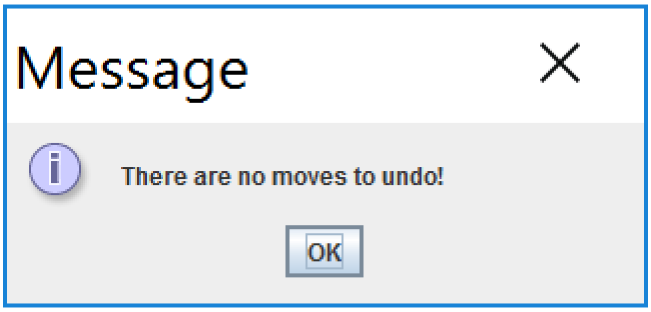
Sky Wars!

Moves: 0

Enemies Destroyed: 0

Figure 1: The game screen before any moves have been made

From here, the user can make their first move. The button to undo a move is enabled, however if this clicked when no moves have been made, or when the user has undone all of their moves, a message is displayed as shown in Figure 2 to let the user know this cannot be done.

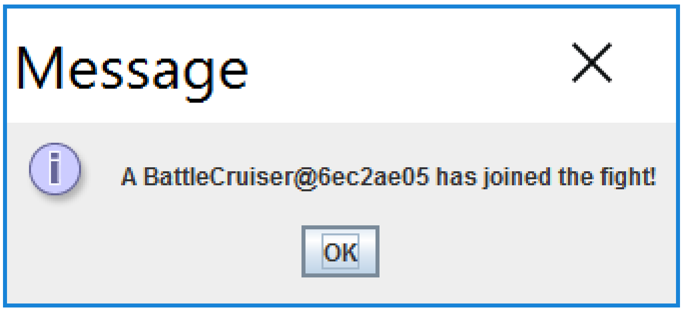


Message

There are no moves to undo!

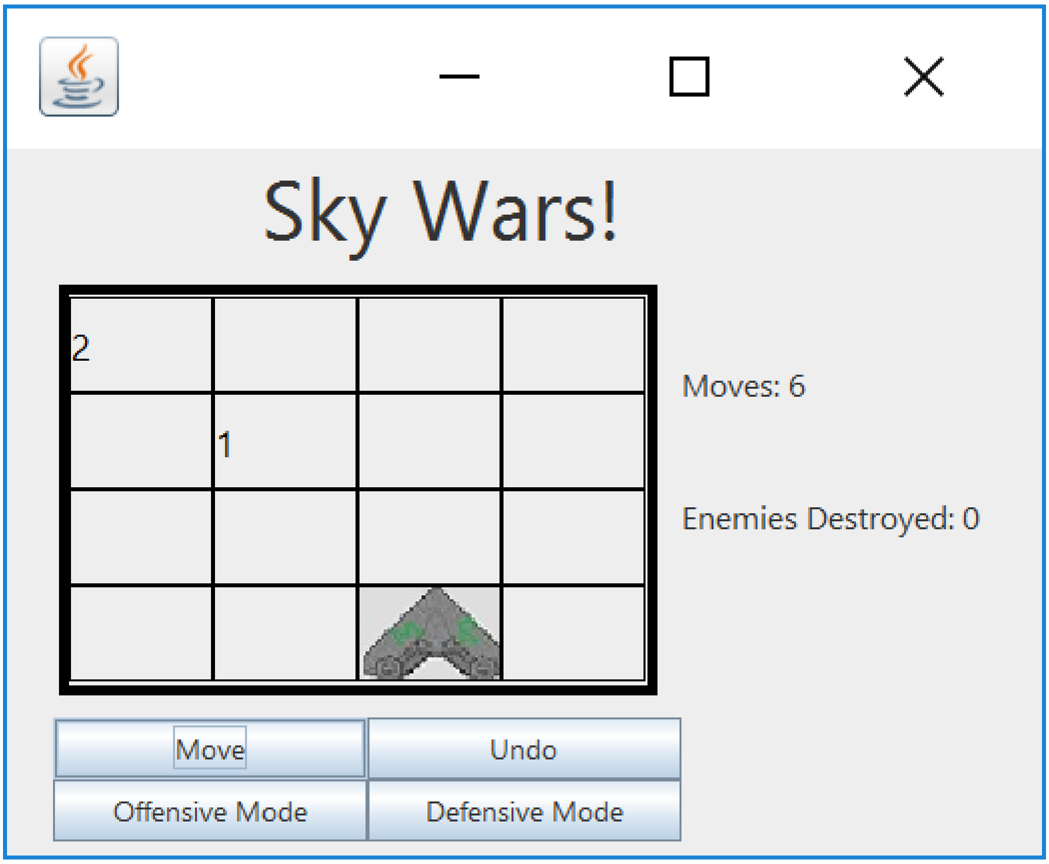
Figure 2: Trying to undo when no moves have been made

Once the user starts to play the game, there is a 1 in 3 chance an enemy ship could be spawned. If an enemy ship is spawned, a message appears like the one in Figure 3 to let the user know an enemy ship is now in the game. The enemy then appears in the top left hand corner of the grid. Enemies are displayed as numbers rather than pictures so the user knows how many enemies occupy one space, this is shown in Figure 4.



A BattleCruiser@6ec2ae05 has joined the fight!

Figure 3: An enemy ship is spawned



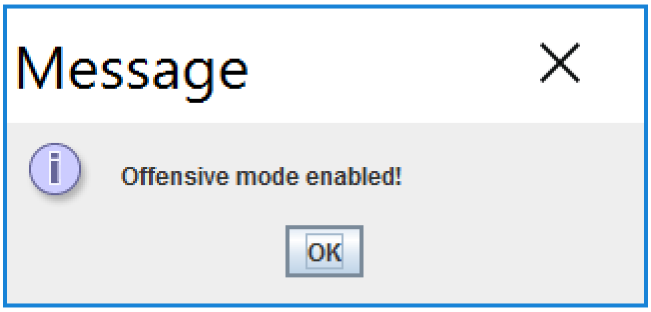
Sky Wars!

Moves: 6

Enemies Destroyed: 0

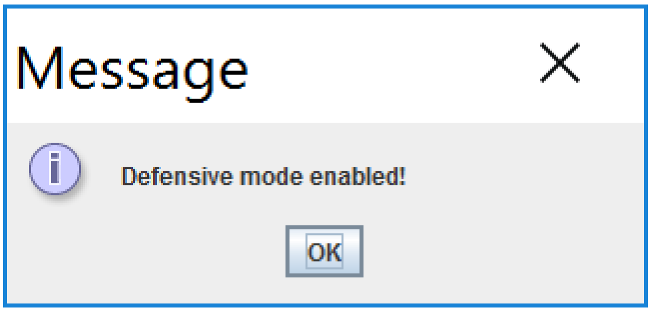
Figure 4: The game screen after some moves have been made

Once enemy ships start to spawn, the player may decide to play the game in offensive mode, to do this they simply click the “Offensive Mode” button. This then changes the combat mode of the Master Ship and displays the message shown in Figure 5 to inform the user the mode was changed successfully. The same can be done if the user wishes to revert to defensive mode.


Message

Offensive mode enabled!

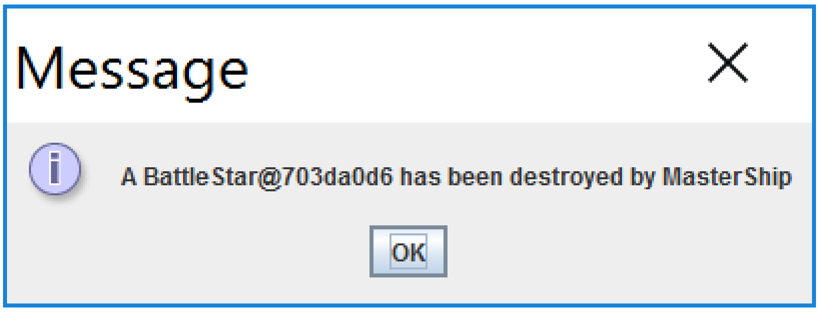
Figure 5: The player changes to Offensive Mode


Message

Defensive mode enabled!

Figure 6: The player changes to Defensive Mode

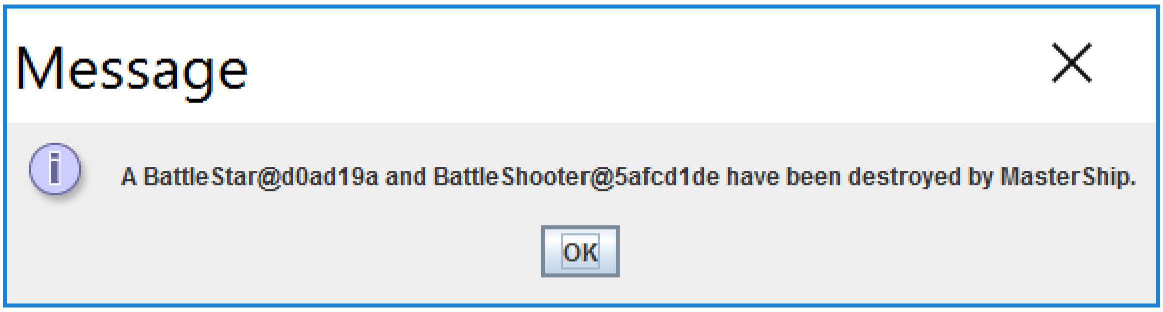
When a move is made, there is a chance of a conflict in the game. If the Master Ship lands on the same square as one enemy ship, the Master Ship destroys the enemy ship and a message like the one in Figure 7 is shown.


Message

A BattleStar@703da0d6 has been destroyed by MasterShip

Figure 7: Master Ship has destroyed an enemy

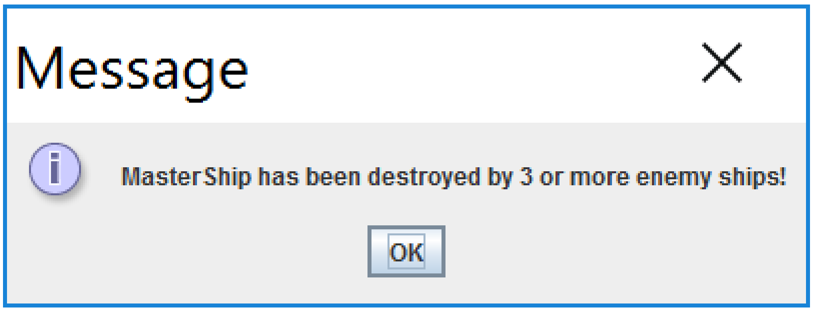
If the player is in offensive mode, they can destroy two enemy ships at a time, and it takes three or more ships to destroy the Master Ship. Examples of the messages the user sees in this case are shown in Figures 8 and 9.



Message

A BattleStar@d0ad19a and BattleShooter@5afcd1de have been destroyed by MasterShip.

Figure 8: Master Ship destroys two enemies

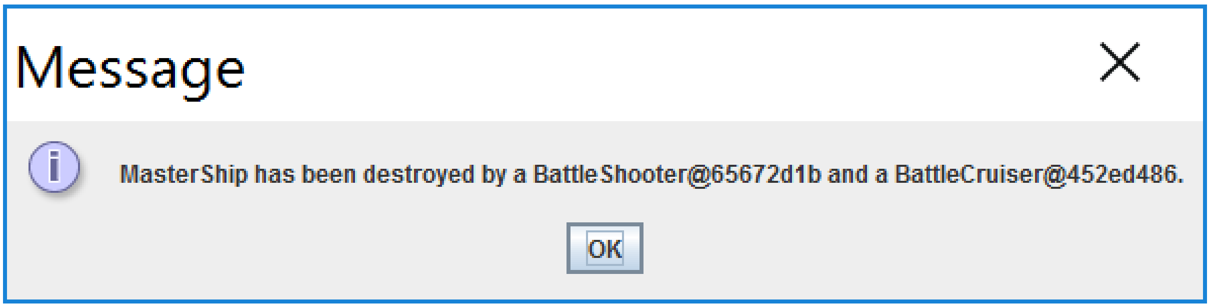


Message

MasterShip has been destroyed by 3 or more enemy ships!

Figure 9: Master Ship is destroyed by three or more enemies

When in defensive mode, it will only take two or more enemy ships to destroy Master Ship and end the game. An example of this is shown in Figure 10.

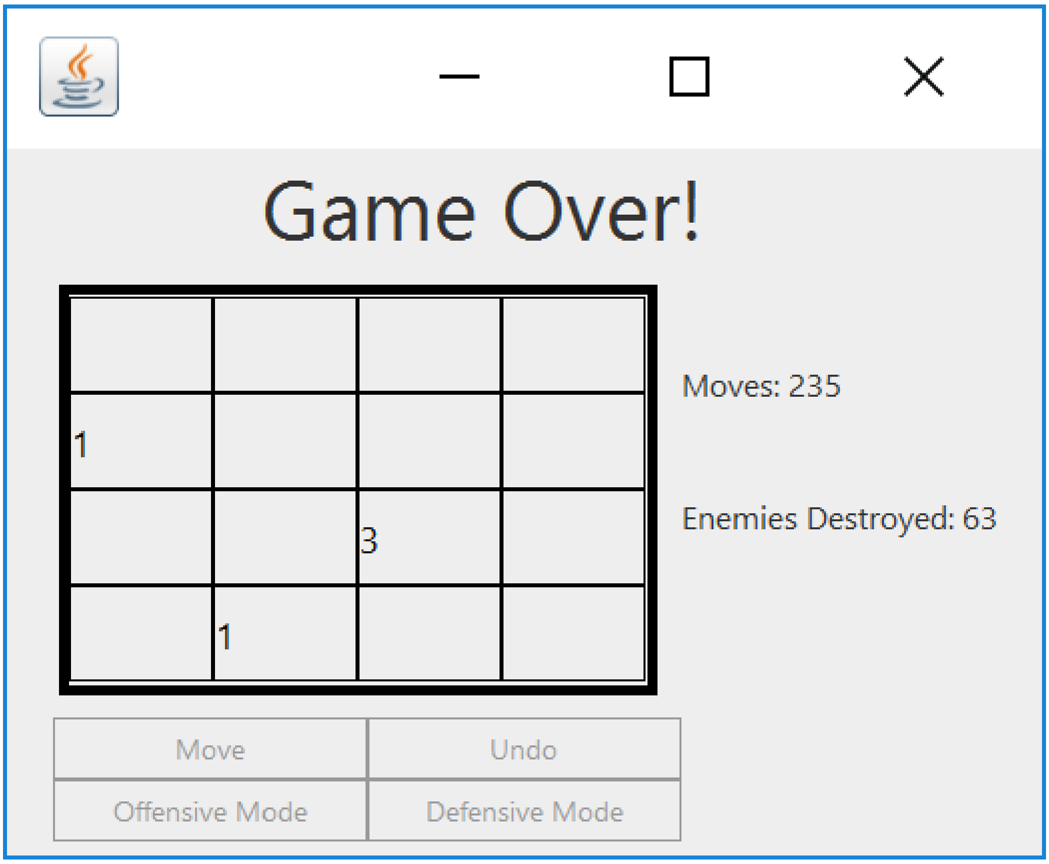


Message

MasterShip has been destroyed by a BattleShooter@65672d1b and a BattleCruiser@452ed486.

Figure 10: Master Ship is destroyed by two enemies

When the Master Ship is destroyed, the game ends. Once the user has read the message confirming that Master Ship has been destroyed, the game screen turns into one similar to the one shown in Figure 11. Differences will be where the enemies are, and the numbers displayed in the ‘Moves’ and ‘Enemies Destroyed’ counters.



Game Over!

1			
		3	
	1		

Moves: 235

Enemies Destroyed: 63

Figure 11: The player loses the game