Space Invaders Report- HHD

My Space Invaders game is a survival game where the player tries to kill as many invaders as possible from the 5 waves. It is a classic arcade game I have always enjoyed playing and creating it was just as fun.

The user can play through 5 levels of increasing difficulty. When in single player the player uses the left and right arrow keys to move and the space bar to shoot. In multiplayer mode Player 1 uses the left and right arrow keys to move and the up key to shoot while Player 2 uses the a and d keys to move and the w key to shoot.

I created this game using the PyGame module to interpret user commands and create rects.

The game has a multiplayer option so you can play with your friends. This can be toggled in the start screen. This uses PyGame's collidepoint function to only change when the mouse is clicked on the option.

I split the main function into a game loop and a settings loop function each having their own window as these are the vital parts to running the game – the set up and the actual game. This also made the game loop more easily repeatable for different levels and allowed me to incorporate restart functionality.

The game loop function is split into various states which allow the user to pause and for game over and victory messages to be displayed.

I used classes for players, invaders, shields and bullets and created the spawn invaders and shield functions to make it easier to make any additions to the game.

The starting variables which are adjustable allows the game to be easily tweaked. The levels can also easily be adjusted in the code for further tweaking. I did not make these settings changeable in the start screen however to avoid unnecessarily overwhelming the user and due to the difficulty in balancing them.

There were many problems I needed to find solutions for. Using a pressed keys dictionary means the user can hold down a key to move instead of constant clicks for more control of players. I added a reloading feature to prevent the player from winning too easily using the time module to create the delay between shots. Using the module, high scores for both single player and multiplayer are automatically saved.

The biggest hurdle I came across when making the game I used a larger screen resolution as I was using a monitor to view it. When I opened my laptop, I realised it didn't fit the screen. To counter this my measurements are in proportions of the screen size. I used a screen resolution in almost the same ratio as the original space invaders for authenticity.

There are different player images for shooting, death and losing a life which I made in paint to improve the overall user experience and appearance of the game.

I tried to recreate the original space invaders theme tune by exporting 4 notes from GarageBand and looping them to play each time the invaders move so it speeds up as they do. This was somewhat successful but by no means perfect.

Sources:

Lectures

PyGame Website - https://www.PyGame.org/docs/tut/newbieguide.html

Tech with Tim YouTube Channel for PyGame tutorials

Classic Gaming for Image Base and Sounds - https://www.classicgaming.cc/classics/space-invaders/sounds

StackOverflow:

https://stackoverflow.com/questions/40774276/python-display-sprites

https://stackoverflow.com/questions/41917744/PyGame-hold-key-to-move

https://stackoverflow.com/questions/52010337/shooting-bullets-in-PyGame

https://stackoverflow.com/questions/53560589/PyGame-collisions-with-bullets-cannot-find-collisions-and-bullets-disappear

https://stackoverflow.com/questions/23366020/making-PyGame-play-sound-once

https://stackoverflow.com/questions/43758189/how-to-stop-a-sound-that-is-playing-in-python

https://stackoverflow.com/questions/50375708/PyGame-sprite-collision-object-has-no-attribute-sprites

https://stackoverflow.com/questions/19733226/python-PyGame-how-to-make-my-score-text-update-itself-forever

https://stackoverflow.com/questions/17610477/creating-multiple-instances-in-PyGame

https://stackoverflow.com/questions/20842801/how-to-display-text-in-PyGame

https://stackoverflow.com/questions/23982907/python-library-PyGame-centering-text

https://stackoverflow.com/questions/30744237/how-to-create-a-pause-button-in-PyGame

https://stackoverflow.com/questions/23031102/how-load-an-animated-gif-in-PyGame

https://stackoverflow.com/questions/25785243/understanding-time-perf-counter-and-time-process-time

https://stackoverflow.com/questions/42577197/PyGame-how-to-correctly-use-get-rect

https://stackoverflow.com/questions/18807548/trying-to-make-a-toggle-type-button-in-PyGame-having-an-issue

https://stackoverflow.com/questions/16726354/saving-the-highscore-for-a-python-game