159.261 - Lab 7

Exercise 0 - Getting Started

1. Download Lab7.zip from the course Stream site and extract it.
2. Open and run Lab7.java to make sure that the game runs correctly, the result should be the same as your solution to last week's Lab.

Exercise 1 - Triple Laser

In this exercise you will add a new weapon mode to spaceship. The new weapon mode will shoot three lasers at the same time

1. First create a variable called laserMode to control which weapon mode the spaceship is using. Set this variable to 0 in the initLaser method.
2. Write a new function called void createLaser(double x, double y, double angle) that finds an inactive laser and sets it to the position specified by x, y and moving based on angle. Change the fireLaser() function to call this method with the spaceship position and angle if laserMode is 0.
3. Write a new condition in fireLaser() to represent the second weapon mode (when laserMode is 1). This condition should look through all of the lasers and check if there are at least 3 inactive lasers. If there are then it should fire three lasers at the same time - all starting from the spaceship position and with the spaceship angle plus {-15, 0, 15} degrees.
4. Set laserMode to 1 in the initLaser function and test that your new weapon mode works as expected. You may want to increase maxLasers to 6 or 9 to allow you to fire this triple laser more than once.
5. Add some controls to your game to allow the user to switch between different weapon modes by pressing the number keys. If the user presses 1, change the weapon mode to 0 (normal mode), if they press 2 then the weapon mode should change to 1 (triple laser).

Exercise 2 – Rapid-Fire

This exercise adds another new weapon mode - Rapid-Fire. Currently the normal fire mode and triple laser modes only fire when the space bar is pressed down. Rapid-fire will allow the player to hold down the space bar and repeatedly fire lasers.

1. Create an additional boolean space that keeps track of whether the space bar is held down or not. You will need to add statements to the keyPressed and keyReleased functions to set this to true/false then the space bar is pressed/released.
2. Create two variables rapidFireTimer and rapidFireDelay that will be used to keep track of how much time has passed while the spacebar is held down and the delay between Rapid-Fire shots. Add code to the updateLaser function to increment the rapidFireTimer by dt whenever the laserMode is 2 and the space-bar is being held down. If the rapidFireTimer is greater than the rapidFireDelay then decrease the timer by the delay and fire another laser.
3. Add code to allow the user to switch to rapid-fire mode by pressing the key 3. Test your game to make sure it works as you expect and that you can switch between different weapon modes without problem.

4. This mode is often not much better than the normal firing mode as all of the laser shots follow exactly the same path. Try adding a small random component to the angle of each laser so that not all the laser go in exactly the same direction.

Exercise 3 - Guided Missile - Extra Exercise

How would you go about implementing another weapon such as a guided missile? Some questions to think about:

1. How would you determine the target for this missile?
2. How would the missile correct its course?
3. Would the missile explode only when it hits its target or would it run out of fuel as well?

Exercise 4 - Power-up - Extra Exercise

Another extra feature you could think about is how you manage these different weapon modes.You could allow the user to just swap between them or you could have collectable power-ups that the user would have to collect to switch modes.