

Project Description for ECE 443

Assigned: Wed., Nov 12th, 2008

Due: Wed, Part I: Nov 21/22, Part II: Nov 26, Part III: Dec 3, Final: Final Exam Period

Description: SPACE INVADERS

You will work in groups of 2 to implement a space invader game on your FPGA boards. The project leverages the work you have done in the labs, namely the UART and VGA. The project is broken into 4 parts as described below.

Part I: (Nov 21/22) Change the symbols (wall, bar and ball) of the pong game to implement the symbols you'll use in space invaders (alien, bullets/shells and tank). Prepare to demonstrate your code that displays these symbols and their movement. For this demo, the movement of the symbols can be random or you can begin to implement the movement you'll need for the game, e.g., aliens start at the top of the screen, move left, right and down in a random fashion, bullets start at the bottom and travel up and tanks move left and right under user control.

Part II: (Nov 26) Add a scoring mechanism to your code and display the score at the bottom of the screen. The bare minimum is "Aliens Destroyed: x Tanks Destroyed: y" where x and y are updated as the game progresses. For example, if a bullet fired from the tank hits an alien, the 'alien destroyed' number should be incremented. If an alien reaches the bottom of the screen without being destroyed, the 'tanks destroyed' number should be incremented. Note that you don't have to implement all of the functionality at this point -- just add the scoring text to the display even if it is not being updated according to these rules.

Part III: (Dec 3) IN CLASS DEMO! Implement the above functionality for the alien, bullets and tank. The minimum requirement is to implement one tank, one bullet and one alien. Adding multiple aliens and bullets will be extra credit. Adding functionality for more than one player (two tanks) is extra credit (Note in this case if an alien makes it to the bottom of the screen both players loose a tank). Any variants such as increasing the speed of the aliens and/or bullets as the game progresses is extra credit.

Part IV: (Dec 12/13) Add a feature that sends text back to the hyperterminal as the game progresses. For example, if an alien is destroyed, send "Alien destroyed! Total number of aliens destroyed so far is x". And if an alien destroys a tank, send "Tank destroyed!" Total number of tanks destroyed so far is y". Any additional features beyond these are extra credit. Be prepared to demonstrate your entire project and describe its features during the project demonstration. Craig and I will grade and judge the projects. The group with the most interesting and challenging game will receive a prize (to be discussed with Craig).

Please pick a partner for the project and email me your choice by Wednesday (Nov 12).

Project Report Requirements

A report is due each week at the DEMO. You can add to the same report as you progress through each Part. The requirements are the same as those described for Lab #5.