Title: Pac-man 258

Description :

An FPGA version of Pacman! Without a computer, users can plug in their DE2 Altera boards to their monitors and play an amazing,fantastic,spectacular game of Pacman! Users can move Pacman with the four button keys on the FPGA. The user wins when Pacman has collected all of the yellow orbes. But the user needs to be careful; Pacman will die when he gets caught by one of the four ghosts!

First milestone:

The first milestone involves creating the backend of the Pacman project. More specifically, registers will be used to store the map in a 2D grid (which each cell contains a number (like 0 for nothing there, 1 for a yellow orbs, 2 for a wall, 3 for ghost, etc), and Pacman's location will be stored in a register as well, pointing to the address of a cell in the 2D grid. Furthermore, as mentioned previously, the yellow orbs will be stored in the 2D grid as well. In addition, the ghost will each have a unique path - a path which they will travel on. This path will be controlled by an FSM that will modify the location of the ghost directly on the 2D grid. Furthermore, an FSM will be used to control the movements of Pacman, such as moving Pacman up, down, left, or right, which are then dictated by a set of switches on the FPGA board (SW[0] for moving up/down (if it is 0, it will move down; else it will move up); and SW[1] for moving left/right (if it is 0, it will move left; else it will move right) We will also limit the movement of Pacman so that it will only move in one direction (not sideways and not through walls!). The game ends when all of the number of orbs are consumed, or when Pac-man becomes consumed by a Ghost. In that case, the game will end with a black screen, and the user will need to press the dedicated start game button to restart the game. At this point in time, we do not have the VGA graphics built so we will need to demonstrate it to the TAs through ModelSim (i.e, waveforms).

Second milestone:

The second milestone involves creating the frontend(graphical interface) for the project. That includes: creating the sprites,setting up the map, it does not need to be connected to the backend at this point, but it has to show up on the VGA display with no error. We will try to connect it with the backend if time allows.

Third milestone:

This milestone should be the least time consuming one, as we should have a almost finished copy of the game at this point. The last step is to complete any last tasks in connecting the backend with the front end (i.e, milestone one and two). Furthermore, we should also perform some debugging/play tuning and other quality assurance tasks..

How does this project relate to material covered in CSC258?

This project relates to the material covered in CSC258 because it involves FSMs (to control player and Ghost movements), Memory (used to store the 2D grid of game data), and counters. Furthermore, this project is related to Lab 7 where we will be using the VGA ports and a monitor display to display the game onto the screen.

What's cool about this project (to CSC258 students and non-CSC258 students)?
It is a famous, classic game that involves gates and hardware to perform game mechanics, such as displaying sprites to the screen, making objects move, etc. It also grabs the interests to non-CSC258 students because this game has existed for over 50 years and yet it still interests many young gamers in society.

Why does the idea of working on this appeal to you personally?
I like making games and being able to construct a game from hardware is pretty cool. XD