Project 2: Guessing Game (CSE 590)

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Abstract:

The objective of this project is to implement a Guessing game on the hardware board(BASYS2) directly using an hardware description language, where the game purely runs on the logic gates created inside the FPGA, there is no application or operating system with the game, it is purely based on switching of the transistors. This gives an unique opportunity to protect your game from being hacked or improve your security conditions.

The project design had many important aspects like

1.) Importing the logic state of the switches and push buttons onto the fpga.
2.) Exporting the output through the 7 segment display and leds.
3.) Making a State Machine to control the state of the game.
4.) Providing various conditions for the states and establishing clean resolution to the state of the state machine.
5.) Providing various clock sources to give various time frames.

Design Aspects:

1.The whole game comes down to the proper design of the state machine. The state machines have to be clearly defined and the states have to resolved properly.

2.The inputs and outputs need to go through the registers before they get accessed through the state machine to protect the response signal at all times, without missing any event.

3.The state machine designed here consists of 7 states which occur at various input conditions and depends upon the previous state as well.

4.Two clocks slow clock and dead lock clocks have been used to bring down the high clock frequency into required frequency for the design.

5. The cathodes and anodes for various words like : “PL 1”,”PL 2”, “2 HI”, “2 LO” have to be resolved to do the strobing at various events.

Instructions for the guessing game:

1) Start FPGA Board

2) Install the program and power up the device

3) The game will be ready right after you power up.

4) It displays "PL 1", the player 1 can now start entering his/her secret number by positioning the slider switches sw0-sw3 and then if a push button is pressed, the number gets latched on to that digit.

5) Once all the 4 digits have been entered, put the slider switch "sw4" on, you will see that "PL 2" is displayed.

6) Now player 2 is supposed to enter, the player 2 can go on and start sliding the switches and push the push buttons, your numbers will be latched on the display readily.

7) Now to supply the latched number on the display as the guess from player 2, you need to slide the switch SW5 up and then down again.

8) If your number is correct as guessed the leds blink in celebration. And you will see the total number of guesses you have made all this time.

9) If your number is wrong, you will see that the leds wont celebrate(sorry!) instead, the display will hint you if your guessed number is too high or too low. And then you are good to make another guess again.

End: to play again turn of the power and on it again.

Thanks!