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EE/CSE 371 Lab 6 Proposal: Memory Game

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Project Description

Our project is a number sequence memory game that challenges the player's ability to memorize a random sequence of 7 numbers ranging from 0 to 3. The VGA flashes the sequence one number at a time, and when the screen turns all black the player must input the sequence they saw using KEY[0] to KEY[3] for numbers 0 to 3, respectfully. The player only has 3 chances ("lives") for the whole game to correctly input the sequence, and only 1 chance per sequence to repeat the numbers on the VGA. When the player enters the correct sequence, they advance to the next level and the next 7-number sequence is displayed at a faster rate on the VGA. When a player enters the wrong sequence and loses all their lives, the game ends.

To implement this game, we will modify the 10-bit LFSR from our 271 lab 7 to generate a random sequence of numbers. We will modify the module so that we take the original 10-bit output Q and perform modulo division with 4 ($Q \bmod 4$) so that the module can instead output a 2-bit number "mod" that will represent either a 0, 1, 2, or 3. We will also be using the clock divider module to display the number sequence at increasing speeds as the levels get higher. We will use the Python script to generate black-and-white image data for each of the 4 numbers and store them in a .mif file to be read and displayed on the VGA in the order that is generated from the LFSR. The 7-segment HEX displays will be used to tell the player what level they are on and how many lives they have left. KEY[0] to KEY[3] will be used for the user to input the number sequence, SW[0] will be used as the "start" button, SW[9] will be used to reset the game, and SW[1] will be used to repeat the current sequence once.

System Block Diagram

