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User manual for fpga-based mental binary math game

ECE 6370

# System Description

This iteration of the mental-binary game now includes a login feature that will only allow the game to be played once the correct sequence of digits has been uploaded using player 2’s switches. The password is arbitrary however it is coded in hardware so there is no easy way to change it. The password is 3-2-3-3. Afterwards, the game will be played as normal, where players try to match their opponents numbers in a way that the resultant sum is 15 with a new feature: now each player can load in their numbers with a push button to prevent peaking at their settings.

For reference, Figure 1 below depicts the play space of the board, and all future mentions of features or inputs will use these names for reference.

Diagram, schematic

Description automatically generated

Figure : Play Space of Board

To correctly enter the password, Player 2’s switches will need to be set in the correct configuration, followed by a press of the Password Entering button. For example, entering the first correct digit would consist of flipping the 2 rightmost switches (0011) forming the binary representation for the decimal 3, followed by a depression of the Password Entering button. Currently, there is no way to keep track of which digit is being input so players will have to mentally keep track. Once all digits have been entered correctly, the Logged Out light will turn off and the Logged In light will turn on, indicating that play may now begin normally.

# Example Play-by-Play

Initially, all displays show 0 and the Logged Out light is turned on.

P2: After powering on, hit the RESET button to ensure that all operations begin correctly.

P2: Enters 0011, followed by Password Entering button.

P2: Enters 0010, followed by Password Entering button.

P2: Enters 0011, followed by Password Entering button.

P2: Enters 0011, followed by Password Entering button.

Logged Out light should now turn off, while Logged In light turns on. Play begins.

P1: Enters 0110, followed by Player 1’s LOAD button. Player 1’s number should now display 6.

P2: Enters 1001, followed by Player 2’s LOAD button. Player 2’s number should now display 9.

Sum should display A, and Matching LED should turn on followed by Non-Matching LED turning off.

At any point after logging in, Password Entering button can be pressed to log out of the system. Player 1 and 2’s LOAD button should now not function, and the Logged Out light should turn back on.