

1. [25 points] The objective of this HW is to get you acquainted with the basic skills required to work with the Nios II processor systems. Before you attempt this HW, please make sure to follow the tutorial that is available on the class webpage.

This game is used to tune brain recognition skills. In the game, The DE2 board is possessed by an alien. It flashes some alien symbol (see example below) once on the 7-segment display that is on the extreme left, and then it displays four symbols on the four 7 segment displays at the extreme right. Your objective is to choose (via the push buttons) the number (or location) of the symbol that matches the alien symbol. You have to be quick because the board will only give you 3 seconds to make your choice (display the timer on one of the remaining 7 segments). A green LED should turn on if you match successfully; otherwise, a red LED should turn on. For this exercise, you should be designing your circuit using the SOPC builder system, which allows the Nios II processor to interface directly with the push buttons and the LEDs. The functionality of the lab should be entirely based on the C code (no Verilog) that you will write and compile for the game. The game should terminate after 10 iterations, and then display a count of the number of successful recognitions.

Example of an alien 7-segment symbol:

—
|
| |

You can make an align symbol by turning on randomly some of the bars in the 7-segment.

Deliverables include:

- Email: project file
- Written documentation includes:
 - Report the amount of logic and routing area utilized in the FPGA
 - Snapshot of the final layout of the FPGA as produced by the synthesis tool
 - C code and memory size it takes after compilation
- 5 points will be allocated to games that work smoothly in an entertaining manner.
- The team that produces the code that uses the smallest amount of memory gets 5 extra bonus points that can be used towards any lab/hw.