COL215 MINI–PROJECT

MOUSE CONTROL DISPLAY

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INTRODUCTION

The problem statement was to write code in VHDL which provides an interface for the interaction between the mouse and the Basys3 Board through the Ps/2 protocol.

We aim to achieve this by reading the data sent by the mouse to the board in the format known to us.

AIM

As said in the project proposal, we aim to implement a game "Treasue Hunt" through the data that we receive from the mouse.
We maintain a score and a timer which are the basic essentials of any game.

PROCEDURE

- Initially the mouse is in "idle" state i.e. it is sending a signal of 1.

- When we move the mouse, we get the start bit hence we start reading the data. The mouse goes into "active" state in the next clock cycle.

- We know that for each data bit that the mouse sends the board comprises of a rising edge and a falling edge. At each, rising edge we increment the number of data bits read and at each falling edge we check the value of the corresponding data bit and store data accordingly.

- We also check the constant and parity bits after e ach set of 8 bits to check for the correctness of data, which if not found correct the system goes back to state "idle" from "active".

- When we read all the 32 bits of the data that is sent by the mouse, we go into the state "idol" which is for the purpose of the calculation of the cartesian coordinates of the mouse.

  Note: The mouse sends us data as its velocity, we need to find its X and Y coordinates from the given data.

- We then go to the state "score_gen" from the state "idol" to calculate the corresponding score based on the euclidean distance of the cursor from the Treasure.

  Note: the coordinates of the treasure are random numbers that we generate.

- When we do reach the target, the score counter stops at 99. To find the treasure on the map, we implement the LEDs which glow with greater intensity as you near the location of the treasure.

TESTING

We simulated our code on Vivado to check if the signals when incorrect, are ignored and when correct, are stored. We also checked the corresponding changes in helper variables were correct in corresponding clock cycles.

RESULT

We were able to establish a link between the mouse and the BASYS board, and simultaneously implement an interesting treasure finding game through this interaction.

REFERENCE

https://www.youtube.com/watch?v=A1YSbLnm4_o

SIMULATION PICTURES