Topic: *Mouse Controlled display*

Group: *A*

Group members: *Suyash Singh(2018CS50646), Akash S(2018CS10436)*

Aim:

To create an interesting single player game, using the mouse and basys board, requiring real time thinking to solve a Treasure Hunt before the countdown timer becomes zero, for a maximum score.

Scope:

There is a person looking for treasure on a given map, but he/she does not know where it is. As he/she "looks for it" by moving the cursor, if on one movement the person's final position is closer to the treasure than the initial one then the LEDs brightness decreases, indicating he is closer to the treasure. In this way the player will be able to find the treasure. Also, we will keep a score and timer using the 7-segment display with a maximum achievable score of 99 which you get when you uncover the target. There is also a count-down timer, before whose end you have to find the treasure! Your final score is the score displayed on the seven segment display when the timer runs out.

Note: There will be an overflow if cursor goes out of the treasure map and the score will be reset to 0, and the cursor will be sent back to the initial position.

Challenges:

- Debugging in VHDL is very hard and for our project with long code we might (*hopefully not*) end up giving a lot of time to debug some small errors.

- Pin-pointing the mouse's position and scoring accordingly will be tough.
- Accounting for the lag in transmission of signals, which might affect a player's score.
- Keeping a score based in the real-time coordinates of a player is tough.
- Designing a pseudo random number generator in VHDL.

Design Plan:

Components:

- PWM module for driving the LEDs
- 2 seven segment display for score (max. of 99) and 2 seven segment display for countdown timer (down from 99 to 0)
- Reading the signal (*mouse status*, X *direction data*, Y *direction data*) from the mouse using the PS/2 protocol.
- A data controller which controls the flow of the game and the allocation of resources, and the termination of the program.
- Determining the current coordinates in X and Y using their rate of change visible from the signals.
- Using a random function to determine the coordinates of the treasure.

Real-Life Applications:

- This game can be extended and be used to make games like CS GO etc.
- The underlying logic is similar to the logic used in user friendly applications.

Block diagram showing flow of control, for components refer design plan