***ESD PROJECT REPORT***

**\*\*\*\*TITLE\*\*\*\***

**Fourth Semester Electronics and Communication Engineering**

*Submitted by*

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**ABSTRACT**

**Times new roman- Font size 12, Italic --- 100 to 150 words,**

**PROJECT DETAILS**

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**Include-**

**Introduction;**

**Block diagram;**

**Theory**

**Methodology used:**

**components used;**

**circuit diagram;**

**code ;**

**Results**

**REFERENCES**

**Times new roman- Font size 12, Normal, justified**

* 1. Tsuhan Chen, "*Audiovisual Speech Processing, Lip Reading and Lip synchronization*", IEEE Signal Processing Magazine, January 2001.
  2. R.Chellapa, C.L. Wilson and S. Sirohoey, ‘*Human and Machine Recognition of Faces : A survey*’, Proceedings of the IEEE, vol 83, no.5 May 1995

**Note: For the final report attach the Plagiarism report at the end**

**Introduction:**

This project implements a hardware-based **Snake Game** using **shift registers**, **counters**, and other basic ICs, eliminating the need for a microcontroller. The game runs on a matrix of LEDs that visually represents the snake's movement. The snake moves automatically, with the user controlling its direction (up, down, left, right) via push buttons. The system incorporates logic circuits for position tracking, collision detection, and game state updates.

**Components Required:**

* Logic ICs:
  + Flip-flops (74HC74).
  + Counters (74HC193)/
  + Multiplexers/Demultiplexers (74HC157/74HC138)
  + Logic gates (AND, OR, NOT) for decision-making.
* Shift Registers: (74HC595)
* Toggle button(UP,Down,Left,Right)
* 555 Timer or Oscillator: For clock pulses.
* Decoders/Encoders:
* Resistors, Capacitors, Transistors:(pull up and pull down and for noise filtering)
* Power Supply: 5V regulated supply for ICs and LEDs.

**Game Logic Design(theory):**

1. **Snake Movement**

1.Use counters to track the snake’s head and tail positions.

2.Shift registers can update the snake's body positions.

**1. Shift Registers for Snake Body Position**

Shift registers are used to store and shift the positions of the snake's body on the LED matrix. Each bit in the shift register represents whether a particular LED (or cell) is part of the snake.

Series of shift registers are used to represent the LED matrix.. A 1 indicates the snake's presence, and a 0 indicates an empty cell. When the snake moves it shifts the bits in the registers to represent the movement. ‘1’is inserted for the new head position. ‘1’ is removed or set to 0 for the old tail position.Four toggle buttons can be used to select the direction of movement (up, down, left, right). The "snake body" shifts automatically as new head and tail positions are updated.

When the snake moves, a **direction signal** (e.g., from buttons or a joystick) is fed into a control circuit.The direction determines whether the **row or column counter** for the head is incremented or decremented:

* **Up**: Decrement the row counter.
* **Down**: Increment the row counter.
* **Left**: Decrement the column counter.
* **Right**: Increment the column counter.

Tail movement logic mirrors the head logic but is triggered after a predefined delay controlled by a frequency divider or based on the snake's length.The clock drives the **serial input** of the shift registers. On each clock pulse, the shift registers update2 normal 8 bit counter will be used controlling the (row,column) of the 8x8 matrix.for row there will be increment or decrement depending on upward or downward button pressed and it will be max upto 8.same goes with the column counter.the data from the row and column will be pushed to the data line of shift register through a decoder .4 bit data from the counter is coneverted to serial data using a decoder

Four push buttons control the snake's movement direction (up, down, left, right).A logic circuit converts button presses into signals for the row and column counters.A movement clock periodically drives the counters to update the snake's head position based on the current direction.The counters increment or decrement the row/column values accordingly.The snake’s body is managed using a FIFO mechanism implemented with shift registers (74HC595).

* At each clock pulse:
  + The new head position is added to the FIFO.
* The tail position is removed, maintaining the snake’s length.

The positions of the snake (head, body, and tail) are translated into LED states on the matrix.

Multiplexing ensures the display updates smoothly and efficiently.Logic circuits compare the head’s position with the boundaries and the body to detect collisions. If a collision is detected, the game stops or resets. A random number generated Ic RPF100F will also be used for this to generate the egg at random positions of the matrix.magnitute comparator will be used to match the egg position with the head position of the snake.if they match then snake length will be incremented by 1.

Block Diagram: