FLOW CHART:
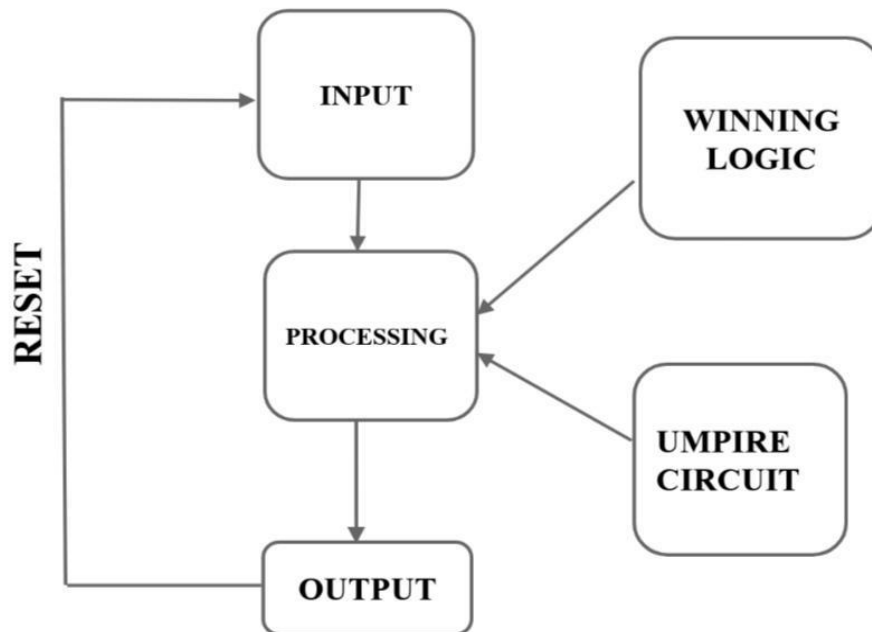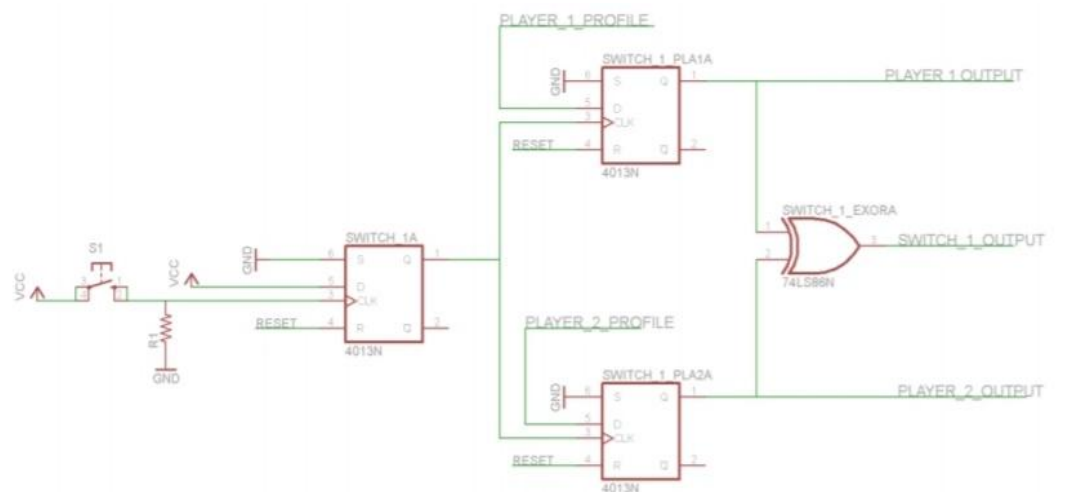

INPUT LOGIC:

1. Switch Design

D flipflops are used to keep track of the input. This circuit is duplicated 9 times for all the 9 switches. Once a switch is pressed, it cant be pressed again.

2. Profile Generato

This circuit helps helps us to find out which players turn is it to play currently. As it consists of XOR gates, if no one has played yet the inputs will remain as zero; hence the output for Player_2_profile will be 'zero' and the Player_1_profile will be 'one' because we have made use of an inverter to invert the output.

PROCESSING LOGIC

### 1. Player 1 and Player 2 winning logic
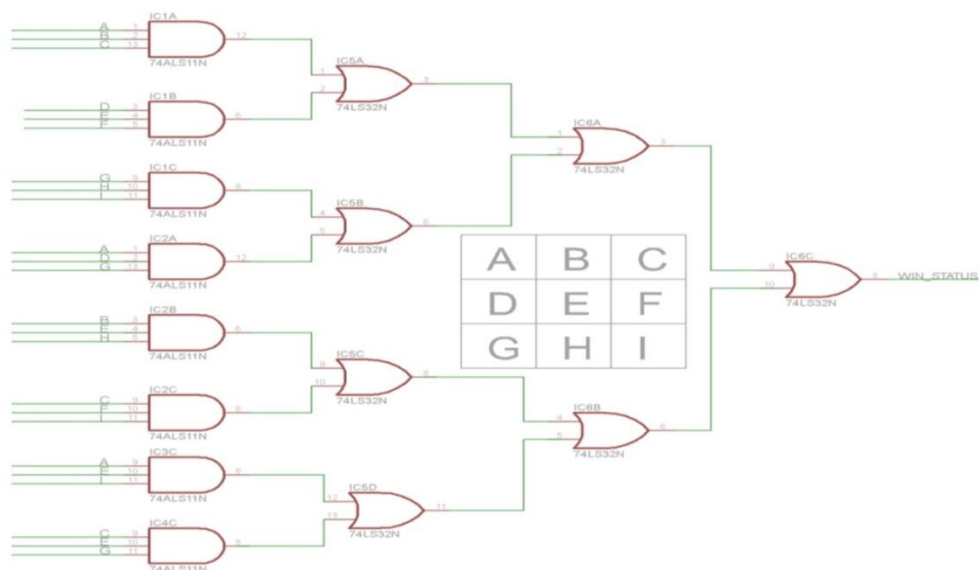
The inputs of the circuit is given from the block one whose main constituent are switches. We employ AND logic in combination with OR logic to achieve this design. If all the three, player switch status required for a win case are high only then will one of the inputs of the OR logic turn high, if any one of the inputs to OR logic are high the output turns high thus declaring the winner.
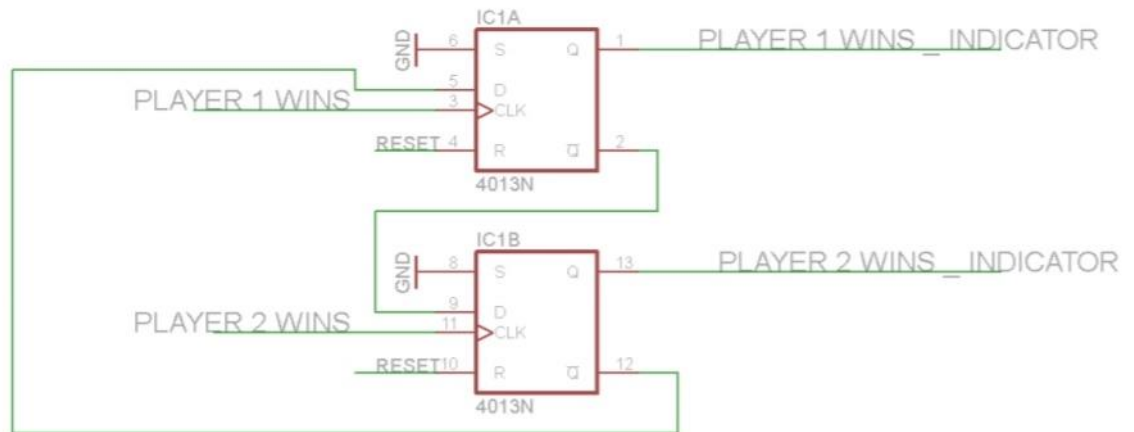
2. All switches pressed (DRAW)
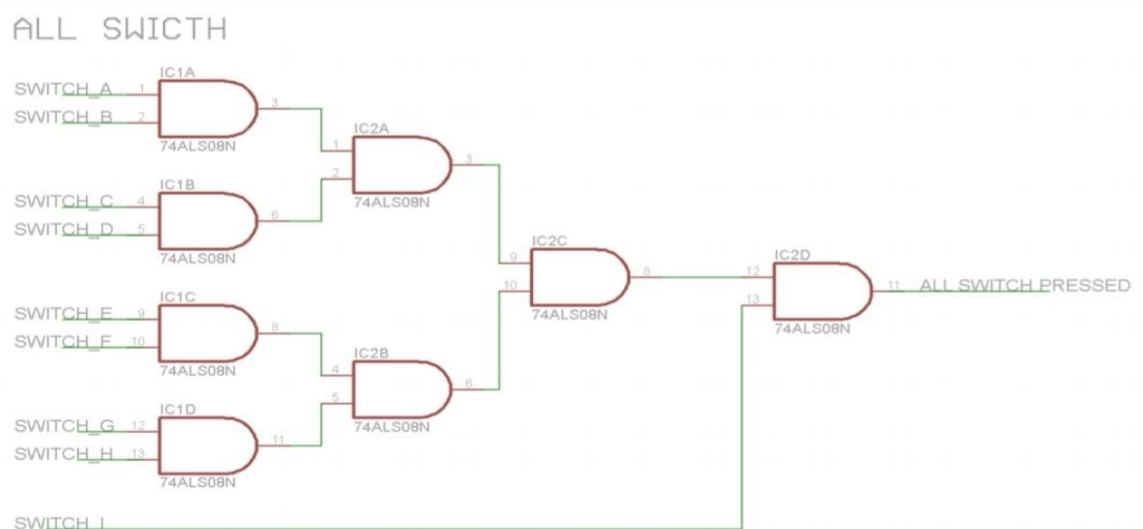
In this circuit we employ AND logic using 7408 IC to achieve this design. If all the switches are pressed at once, we need to bring back the circuit to the original state i.e. "Reset". This is where all switches circuit comes into action. Here we just AND all the outputs from the switches. When all the switches are pressed, the output of the circuit goes high which means it's a draw or that a new game should be started.

3. Umpire circuit

UMPIRE CIRCUIT

PLAYER 1 WINS _ INDICATOR

GND 6 — S — Q 1 — IC1A
5 — D
3 — CLK
PLAYER 1 WINS
RESET 4 — R — Q̄ 2
4013N

GND 8 — S — Q 13 — IC1B — PLAYER 2 WINS _ INDICATOR
9 — D
11 — CLK
PLAYER 2 WINS
RESET 10 — R — Q̄ 12
4013N

We use this circuit to avoid the opponent to get another chance to complete the game while the winner has already been declared. two interconnected D flipflops help in achieving this design.

DISPLAY BLOCK:

We represent the players with two different colours, thus we make use of this hardware component Dual colour LED. The Dual colour LEDs are arranged on a 3-by-3 board in a matrix form. Outputs from the 'switch block' are given to the corresponding LED. One leg of the LED is given to player1 and another leg of the LED to player2.