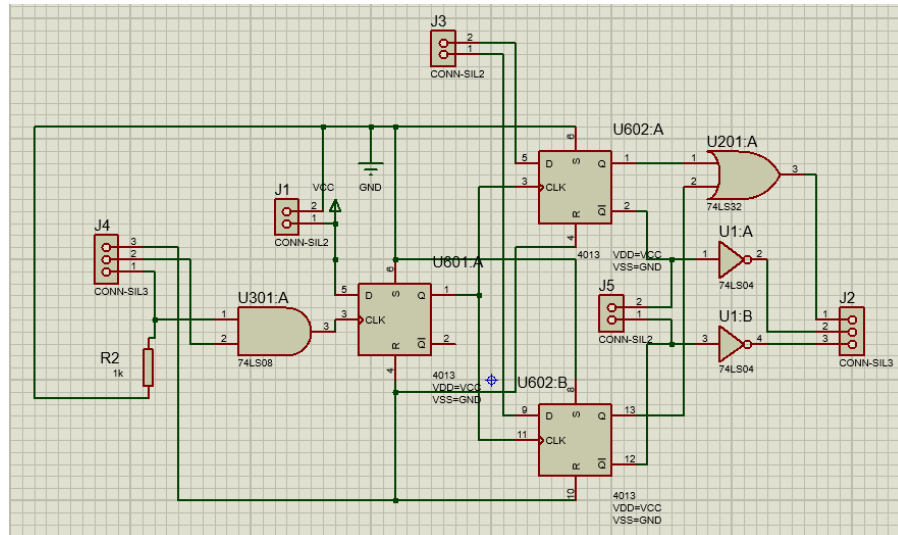


1. Push button's input control circuit: This circuit will ignore the input from the push buttons if the game is over or a player already pushed that button.



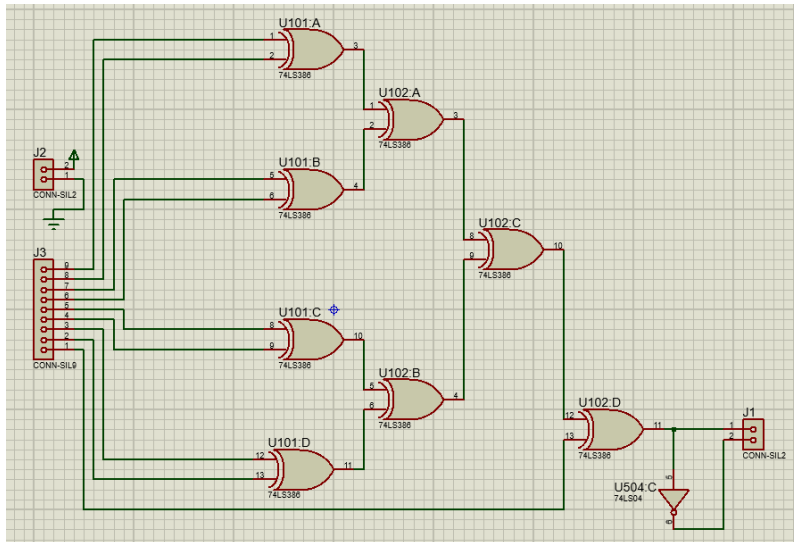
Input	Output
J4(1): Push Button	J2(1): Input for player selector circuit
J4(2): Output from draw circuit	
J4(3): Reset Button	J2(2,3): Input for winner selector circuit
J3(1,2): Output of player selector circuit	

Working Principle:

On the left side we can see an AND gate with input from push button and game winning circuit's output. Output will be high only if both the input is high. That means if a player pushes button after game over then the input will not be counted.

Again, from the flip flop combination we can see that first flip flop gets clock signal when push button is pressed. Initially, all the outputs of flip flop remain low that's why following flip flops don't get their clock signal before pushing buttons. After pushing a button, flip-flops on right side get their clock signal which is mainly output of leftmost flip-flop which remains high until reset button is pushed. This is how we can store the first excitation from push buttons until the reset button is being clicked. Till then if that push button is clicked again no effect will be noticed as the clock of the flip-flops on left side will not change until reset button is not being pressed.

2. Player selector circuit: This circuit will decide either player-1 pushes the button or player-2 pushes the button.

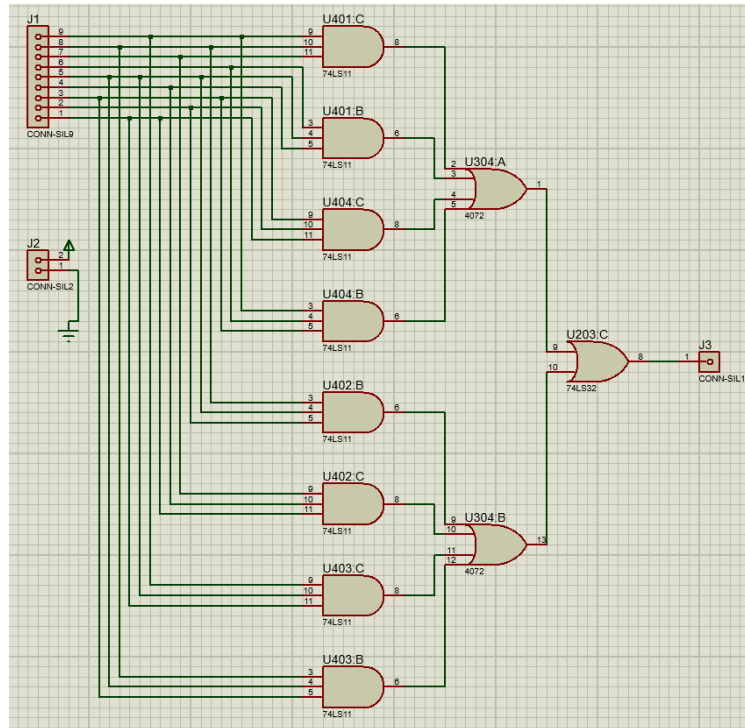


Input	Output
J3(1-9): Output from 9 push button controller circuits.	J1(1,2): Control bits. [Input for push button controller circuit.

Working principle: In this circuit we can see some XOR gate combination which output will be high when odd number of buttons are pressed otherwise will remain low. Thus, the circuit will generate different control signal for two different players.

Player-1	-----	Control bit: 01
Player-2	-----	Control bit: 10

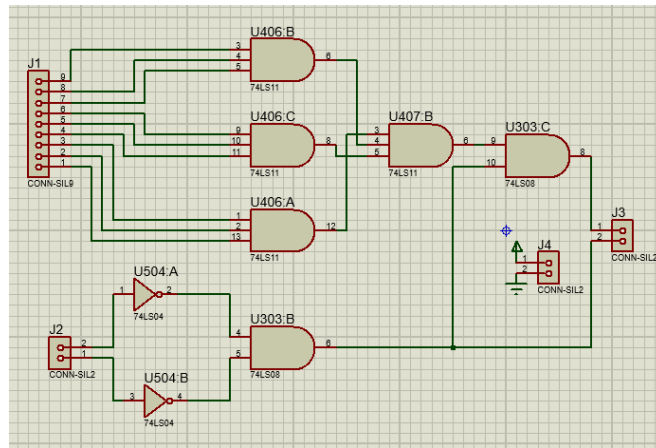
3. Winner selector circuit: This circuit will take inputs of a player and will decide that player wins that match or not.



Input	Output
J1(1-9): Input from push button controller circuit	J3(1): Win signal.

Working Principle: This circuit will check any of 8 winning combinations have attained by a player if a player attains then it will generate a high as output.

4. Draw declaring circuit: This circuit will set output as high if the game is drawn.



Input	Output
J1(9): Output from push button control circuit.	J3(1): Draw Signal
J2(1,2): Output from winner selector circuit.	J3(2): Game On signal

Working principle: If all the push buttons are pressed and the game on signal is high then the circuit will declare the game as draw. AND gate on down-left side takes two input which denote which player have won, if both are low then the game is not over yet the AND gate will set the game on signal high.

Simulation Model of Circuit Diagram

Here we have attached the whole circuit diagram of our project.

