FUNCKIT PS 1

Team Name – Binary Beasts

1)Name - Mehul Kumar Sahoo

Branch - Electronics Engineering

Email - mehul.kumarsahoo.ece21@itbhu.ac.in

2)Name - Vaibhav Bansal

Branch - Electronics Engineering

Email - vaibhav.bansal.ece21@itbhu.ac.in

Components used –

1) 2 Input NAND gates – 1
2) 4 Input Nand gates – 1
3) 2 Input OR gates – 1
4) NOT gates – 1
5) D Flip Flop – 2
6) Counters – 2
7) Comparator – 1
8) MUX – 2 (IC74150 and IC74LS157)

DESCRIPTION – The Final circuit has three major parts

1)The input part

- The input part consists of a 16X1 MUX(IC74150) whose select lines are connected to a counter so that in every clock cycle, a single bit is entered into the circuit.
- There is a four-input NAND gate, which, once the counter reaches its last state, stops the circuit there.

2)Starting the circuit from the first 1

- The next major challenge was to start the circuit when the first one was entered, or else the circuit would consider the initial zeroes also.
- So, to fix that, we had a picture to add 1 to 0 when the first one was encountered, and then the rest of the time, it would remain in 1 position.
- To carry out this process, we used a D-flip flop and an or gate. We set it as after 1st one, the flip flop's output will be 1.
- The output of the D-flip flop(IC74LS74) is passed into a NAND gate with the clock cycle so that counter 2(IC74LS161) should start working only after 1st one is encountered.

3)Calculating the answer

- This was the final yet easiest step of the process.
- When a zero is encountered, the counter starts counting the number of consecutive zeroes, and as soon as one is encountered, the counter is reset to zero.
- We also took input from the four input NAND and connected with the ENP and ENT of the counter with one delayed cycle using the D-flip flop so that all the bits are covered.

- Then, we have used a comparator (IC74HC85) to compare the previous number of consecutive zeroes and the new number of consecutive zeroes.
- Now, the input of pin two and pin four should be low, and pin three should be high. So, for pin 3, we connected a d-flip flop and took the clock pulse from AND gate two because if we kept pin three high from the start, the output was stuck at 15.
- Next, we added a Quadruple 2 to 1 MUX(IC74LS161) to choose the switch to a larger number out of the previous largest number of consecutive zeros and the new ones.