DIGITAL LOGIC DESIGN

CSE 260

LAB Report - 3

Group - 4

(i) Umme Abira Azmary 20101539

(ii) Naser - Al - Noman 21301249

(iii) Nijaf Md. Ahanaf Rivan 21301339

(iv) MD Ikramul kayes 21301576

Name of the Experiment:

Parity Generator and Checker

Objective:

* To design and implement an even parity Generator and Even parity checker using XOR gates (IC - 7486).

Required components and Equipments:

(i) Bread board

(ii) Trainer board

(iii) Jumper wires

(iv) XOR gate

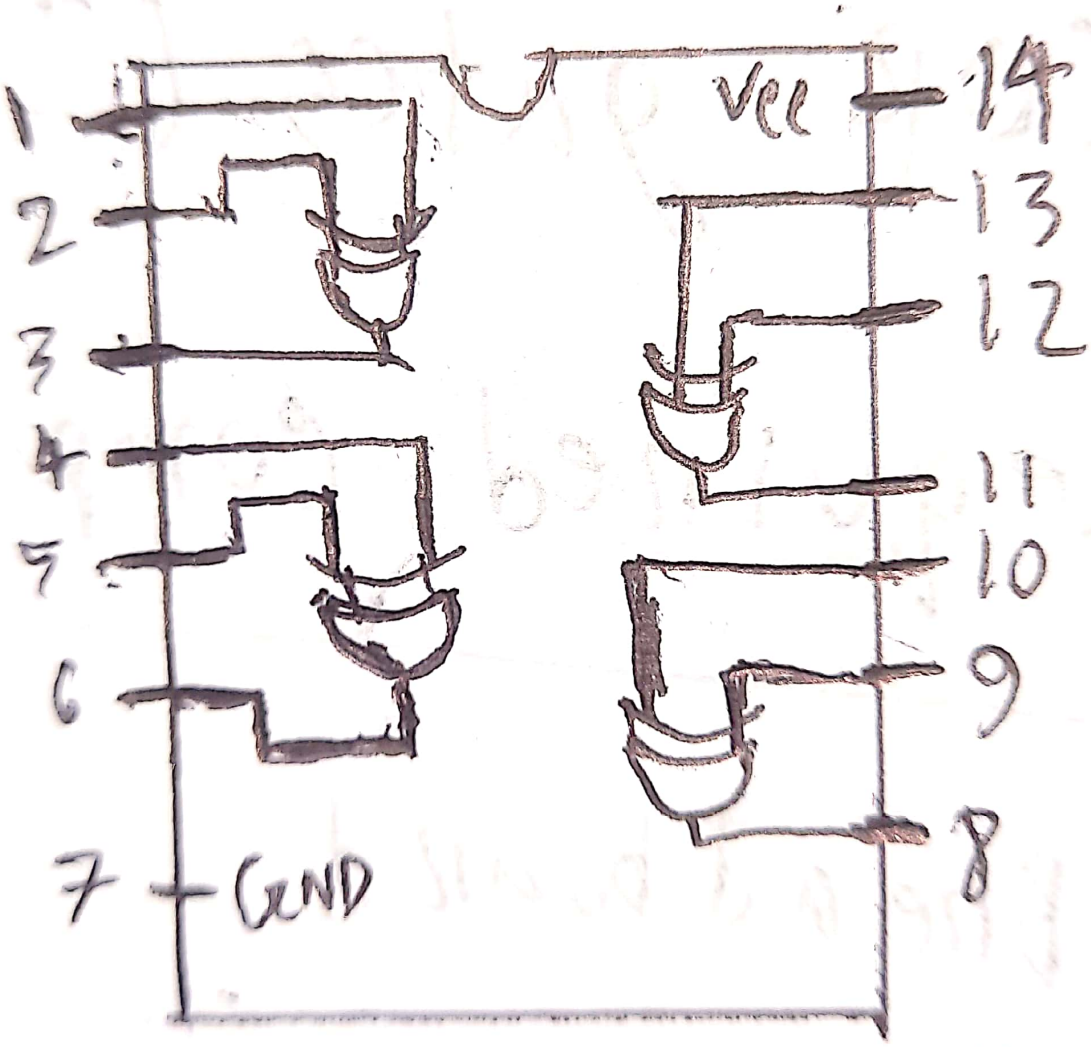
Experimental setup:

Even Parity generator: Firstly, we need to identify XOR (7486) Gate and place it to the bread board properly. Then, we need to connect pin 7 with GND and Pin 14 with Vcc by using Jumper wires. After that, we need to connect input D_0 ~~and~~, D_1 to pin 1, pin 2 of the IC accordingly. We will get the output at IC's pin 3. Moreover, we need to connect input D_2, D_3 to pin 4, 5 accordingly and we will get the output in pin 6. Both outputs of pin 3 ~~and~~ Pin 6, we will take as an input and connect

them to pin 9, ~~to a~~ pin 10 accordingly. we will get the output at pin 8. This output is the parity bit.

Even Parity Checker: For this we need to identify the XOR Gate (7486) IC and place it to the bread board. Then we need to connect pin 7 with GND and pin 14 with Vcc by using Jumper wires. After that, we need to connect input D_0, D_1 to pin 1, 2 pin 2 of the IC accordingly. we will get the output at pin 3. Moreover, we need to connect input D_2, D_3 to pin 4, pin 5 accordingly and we will get the output

in pin 6. Both outputs of pin 3, pin 6, we will take these outputs as inputs and connect them to pin 9, pin 10 accordingly. we will get the output at pin 8. This output is the ~~pari original parit~~ parity bit of those inputs. Then we will take the input parity bit p to pin 13 and the output generated parity bit from pin 8 a, which we will connect to pin 12. we will get the output at pin 11.


1
2
3
4
5
6
7
GND
Vcc
14
13
12
11
10
9
8

5. Results in Tabulated form

Even parity generator:

D_3	D_2	D_1	D_0	Parity bit (output)
0	1	1	1	1
1	0	0	1	0
0	0	0	0	0
0	1	0	0	1

Parity checker:

P	P_3	P_2	P_1	P_0	Error (E)
0	1	0	1	0	0
1	1	1	1	0	0
1	1	1	1	1	1
1	0	0	0	0	1

6. Discussions (Explanation of the results):

Firstly, for even panity generaton, Let us think of an input 0111 where $P_3 = 0$, $P_2 = 1$, $P_1 = 1$, $P_0 = 1$. We know from the theory that for the even number of 1 in a binary number we get panity 0 and for the odd number of 1's, we get panity

bit 1. As 0111 has 3 digit of 1 so, the parity bit of 0111 will be 1 as 3 is an odd number. Furthere-more, let us discuss about the parity bit generator. Here $D_0 = 1, D_1 = 1$ this two will go through a XOR gate. As both are 1 XOR gate will give output ~~of~~ 0. For $D_2 = 1, D_3 = 0$, if these two input go through a XOR gate we will get output 1 for it. Both of these output will then go through last XOR gate by which we will get output 1. This is the output of parity generator.

Parity generators output and according to theory's output is same.

Secondly, for even parity checker, let us think of an input 01010 where $P=0, D_3=1, D_2=0, D_1=1, D_0=0$. When we know from the theory that, if the sum of digit 1 from a binary number's is even than the parity bit of the number is 0. Moreover, if the sum of digit 1 from a binary number is odd than the parity bit of the number is 1. For number 01010, here

we need to count the digit except the first digit, which is the parity bit. As the sum of the binary numbers 1 digits are 2, which is an even number. so, there should a 0 in the first digit of the binary number. As, the first digit of that binary number is 0; so. this number has no error at all. Let. us now dicuss about the even parity checker. The input $D_0 = 0$, $D_1 = 1$ will go through the XOR gate, which will generate output 1. After that input $D_2 = 0$, $D_3 = 1$ will also go through a XOR gate, which

will generate output 1. Both outputs will also go through a XOR Gate which will generate output 0. This is the parity bit the ~~digit~~ binary number supposed to have. So, the parity bit from the binary number P = 0 and the output will go through a XOR Gate as an input. which will generate output 0. 0 in the checker means there is no error in the number, which means the parity bit of the number is alright.