DIGITAL ELECTRONICS

EXPERIMENT-7

PULKIT PANDEY

2K19/EP/076

AIM: To study the operation of 8-bit parity generator/checker; and operation of BCD to 7-segment display

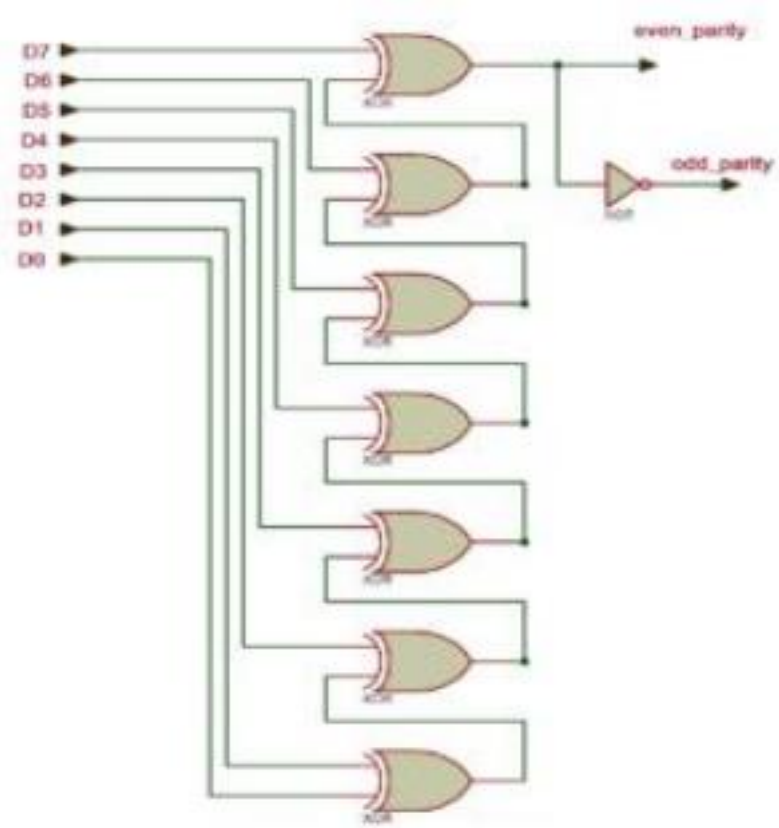
THEORY: A parity generator is a combinational logic circuit that generates the parity bit in the transmitter. On the other hand, a circuit that checks the purity in the receiver is called a parity checker. A combined circuit or devices of parity generators and parity checkers are commonly used indigital systems to detect the single bit errors in the transmitted data word.

The sum of the data bits and parity bits can be even or odd . Even Parity, the added parity bit will make the total number of 1s uneven amounts whereas in odd parity the added parity bit will make the total number of 1s odd amounts.

The basic principle involved in the implementation of parity circuits is that the sum of odd numbers of 1s is always 1 and the sum of even numbers of 1sis always zero. Such error detecting and correction can be implementedby using Ex-OR gates (since Ex-OR gates produce zero output when there are even number of inputs).

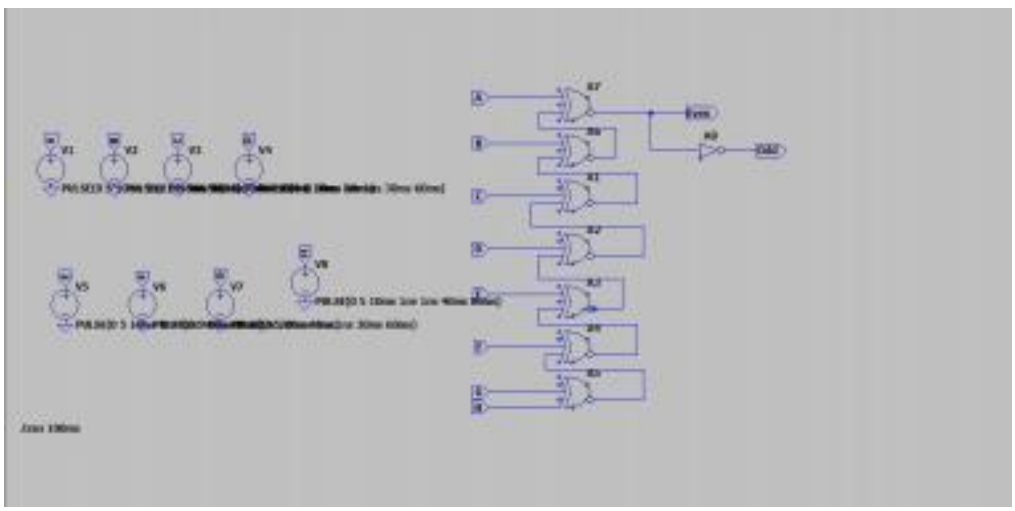
CIRCUIT DIAGRAM AND TRUTH TABLE:

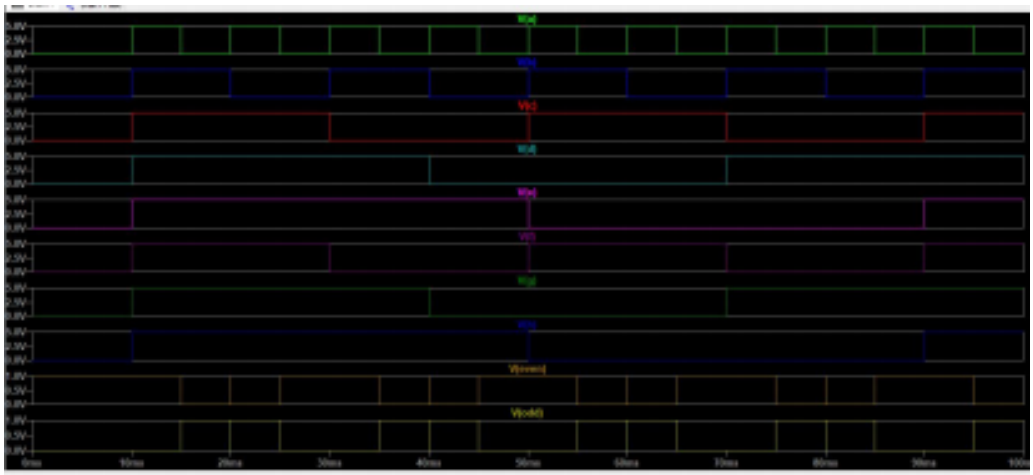
8-bit parity generator/checker



D7	D6	D5	D4	D3	D2	D1	D0	Even_parity	Odd_parity
1	0	1	1	0	0	1	0	0	1
1	1	0	0	1	0	0	0	1	0
1	1	1	1	1	0	1	1	1	0
1	0	1	1	1	1	1	0	0	1
0	0	1	0	1	0	1	0	1	0
0	1	1	1	0	1	0	1	1	0
0	1	0	1	0	0	1	1	0	1

SOFTWARE SIMULATION:





BCD to seven segment display

In Binary Coded Decimal (BCD) encoding scheme each of the decimal numbers(0-9) is represented by its equivalent binary pattern(which is generally of 4-bits).

Whereas, Seven segment display is an electronic device which consists of seven Light Emitting Diodes (LEDs) arranged in a some definite pattern(common cathode or common anode type), which is used todisplayHexadecimal numerals(in this case decimal numbers,as input is BCDi.e., 0-9).

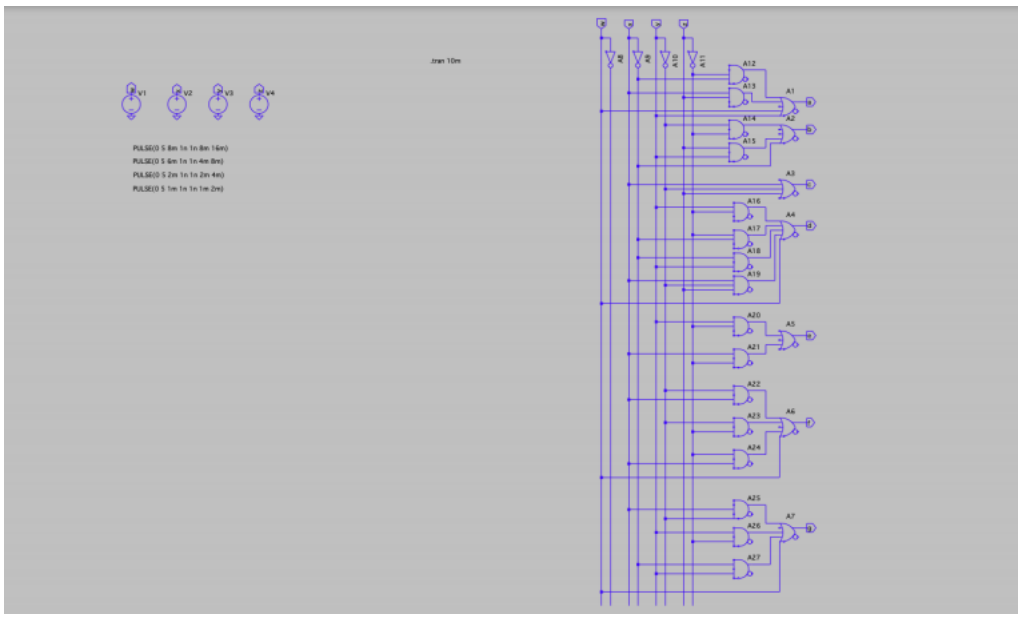
Two types of seven segment LED display:

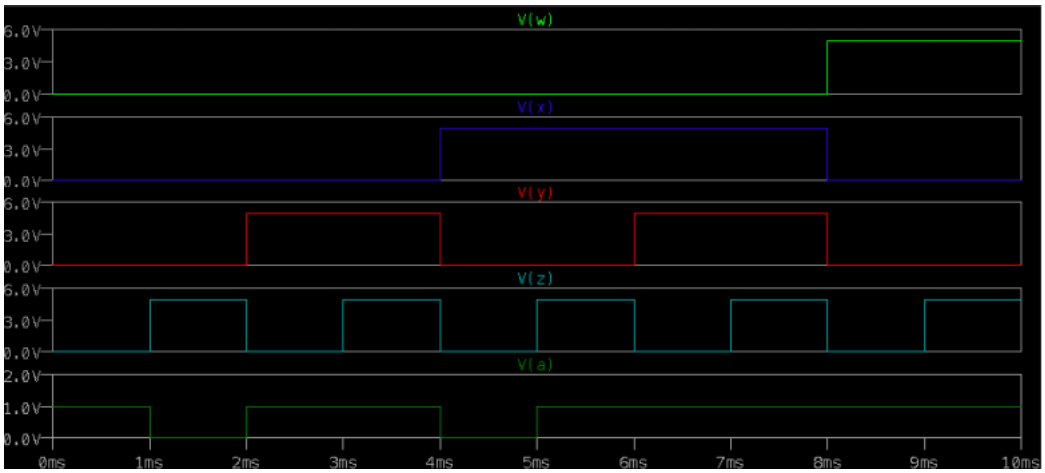
1. Common Cathode Type: In this type of display all cathodes of theseven LEDs are connected together to the groundor-Vcc(hence,common cathode) and LED displays digits whensome‘HIGH’ signal is supplied to the individual anodes.
2. Common Anode Type: In this type of display all the anodes of theseven LEDs are connected to battery or +Vcc and LED displays digitswhen some ‘LOW’ signal is supplied to the individual cathodes.

TRUTH TABLES:

A	B	C	D	a	b	c	d	e	f	g
0	0	0	0	1	1	1	1	1	1	0
0	0	0	1	0	1	1	0	0	0	0
0	0	1	0	1	1	0	1	1	0	1
0	0	1	1	1	1	1	1	0	0	1
0	1	0	0	0	1	1	0	0	1	1
0	1	0	1	1	0	1	1	0	1	1
0	1	1	0	1	0	1	1	1	1	1
0	1	1	1	1	1	1	0	0	0	0
1	0	0	0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1	0	1	1

SOFTWARE SIMULATION




V(w)
6.0V
3.0V
0.0V
V(x)
6.0V
3.0V
0.0V
V(y)
6.0V
3.0V
0.0V
V(z)
6.0V
3.0V
0.0V
V(a)
2.0V
1.0V
0.0V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms