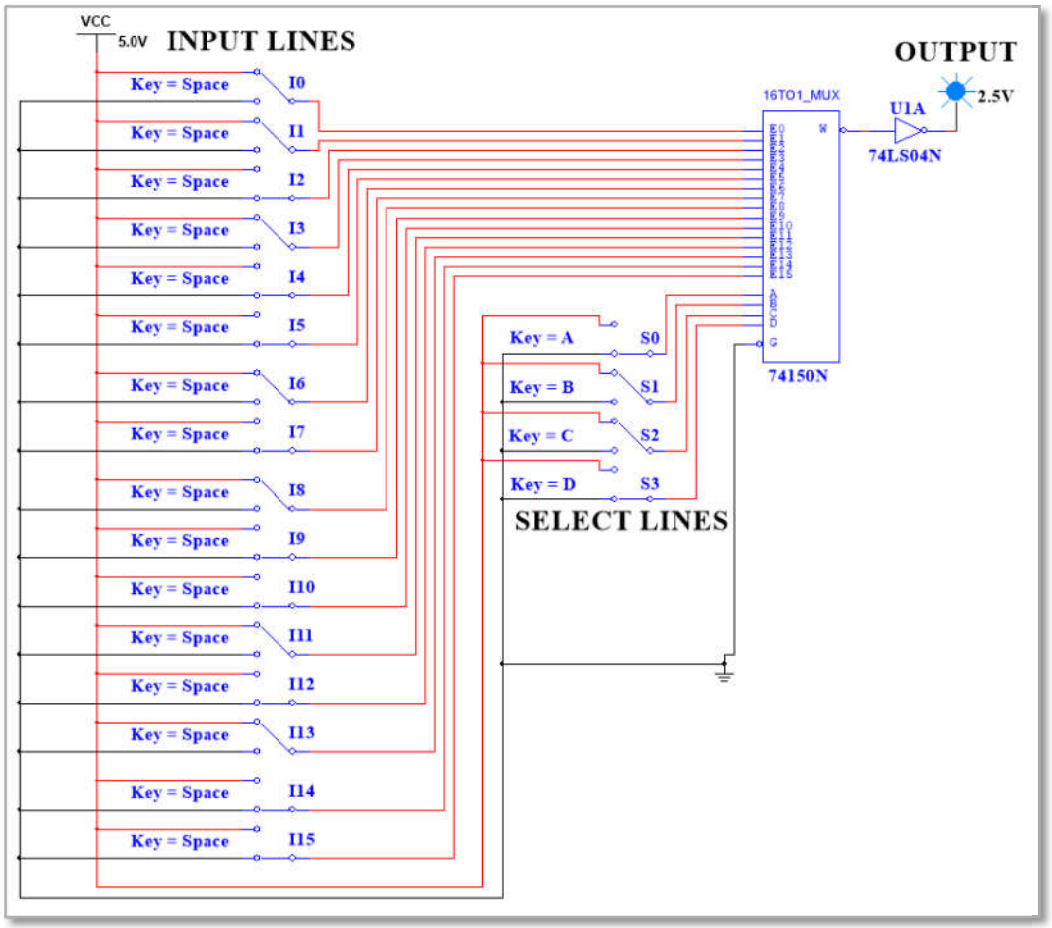
16:1 MULTIPLEXER :

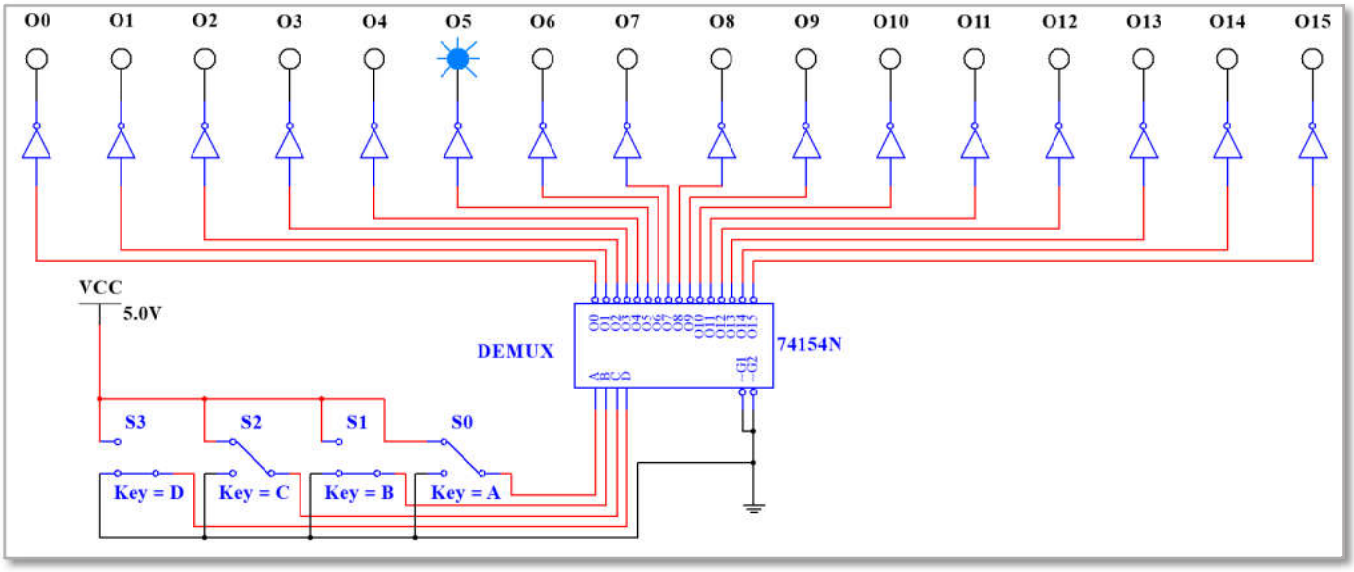
Diagram:



Truth Table				
S3	**S2**	**S1**	**S0**	**OUTPUT**
0	0	0	0	I0
0	0	0	1	I1
0	0	1	0	I2
0	0	1	1	I3
0	1	0	0	I4
0	1	0	1	I5
0	1	1	0	I6
0	1	1	1	I7
1	0	0	0	I8
1	0	0	1	I9
1	0	1	0	I10
1	0	1	1	I11
1	1	0	0	I12
1	1	0	1	I13
1	1	1	0	I14
1	1	1	1	I15

1:16 DEMULTIPLEXER :

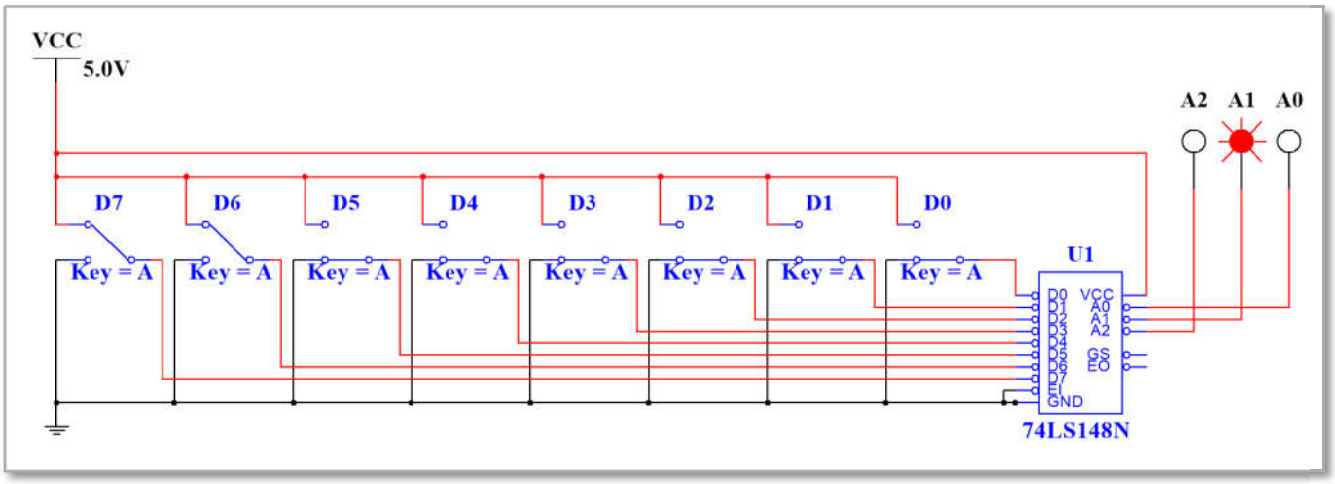
Diagram:



Truth Table																			
INPUTS				OUTPUTS															
S3	**S2**	**S1**	**S0**	**O0**	**O1**	**O2**	**O3**	**O4**	**O5**	**O6**	**O7**	**O8**	**O9**	**O10**	**O11**	**O12**	**O13**	**O14**	**O15**
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
0	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0

8 LINE TO 3 LINE ENCODER :

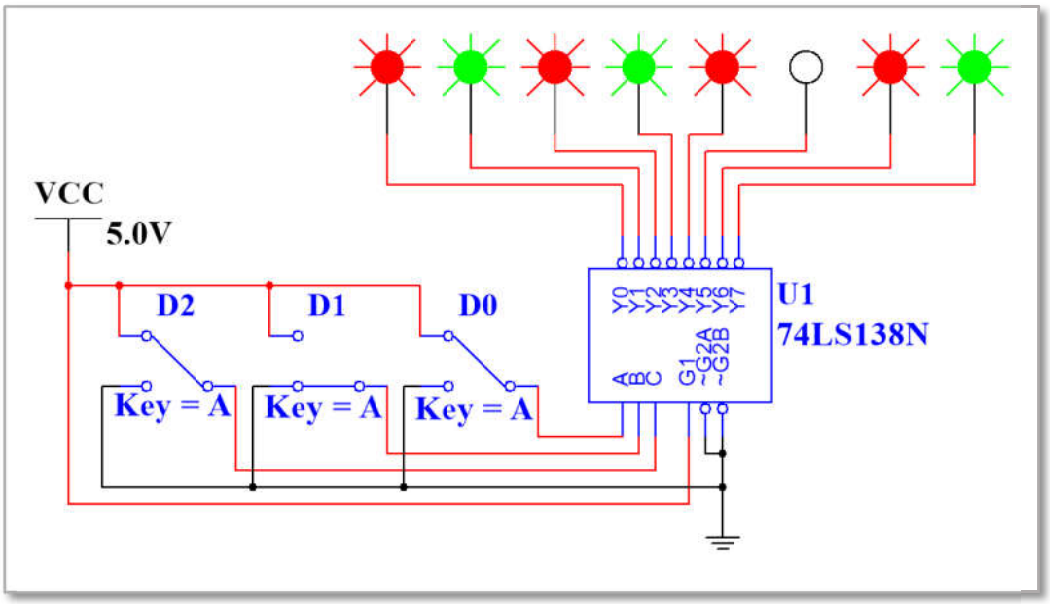
Diagram:



Truth Table										
INPUTS								OUTPUTS		
D7	**D6**	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**	**A2**	**A1**	**A0**
0	X	X	X	X	X	X	X	0	0	0
1	0	X	X	X	X	X	X	0	0	1
1	1	0	X	X	X	X	X	0	1	0
1	1	1	0	X	X	X	X	0	1	1
1	1	1	1	0	X	X	X	1	0	0
1	1	1	1	1	0	X	X	1	0	1
1	1	1	1	1	1	0	X	1	1	0
1	1	1	1	1	1	1	0	1	1	1

3 LINE TO 8 LINE DECODER :

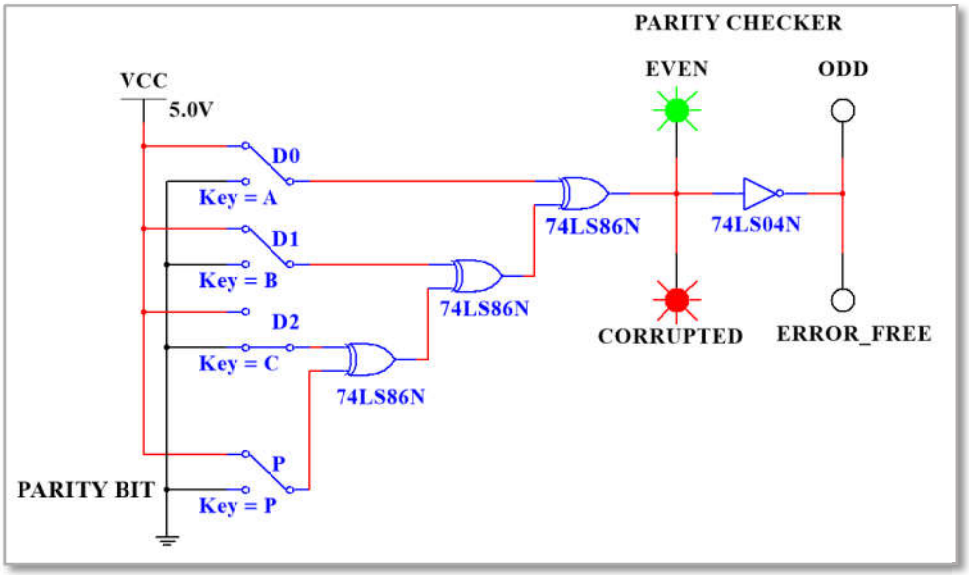
Diagram:



Truth Table										
INPUTS			OUTPUTS							
A2	**A1**	**A0**	**Y7**	**Y6**	**Y5**	**Y4**	**Y3**	**Y2**	**Y1**	**Y0**
0	0	0	1	1	1	1	1	1	1	0
0	0	1	1	1	1	1	1	1	0	1
0	1	0	1	1	1	1	1	0	1	1
0	1	1	1	1	1	1	0	1	1	1
1	0	0	1	1	1	0	1	1	1	1
1	0	1	1	1	0	1	1	1	1	1
1	1	0	1	0	1	1	1	1	1	1
1	1	1	0	1	1	1	1	1	1	1

PARITY CHECKER :

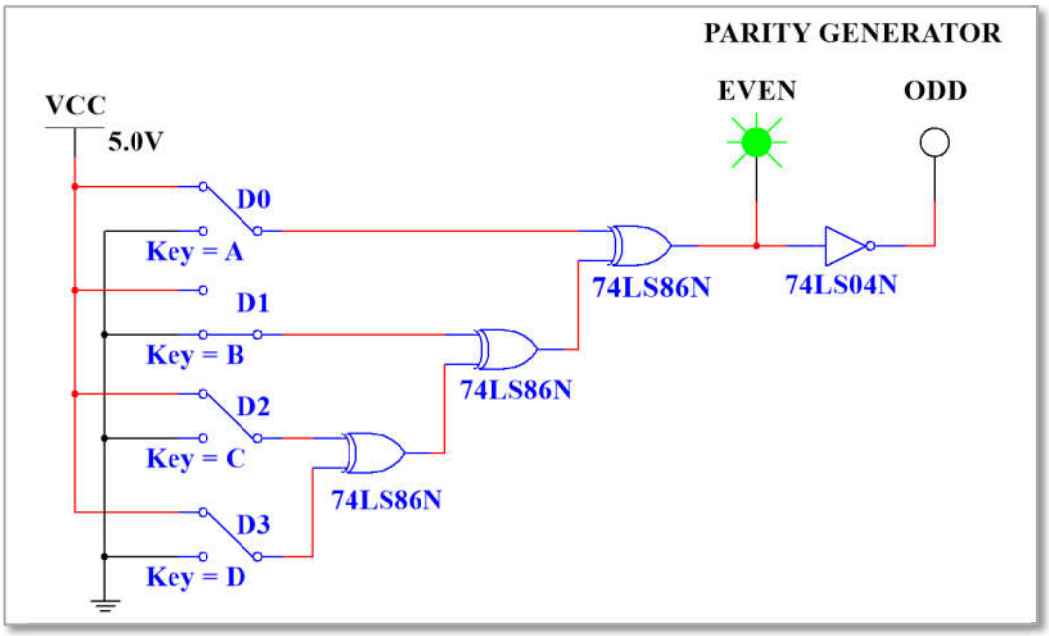
Diagram:



Truth Table					
INPUT				OUTPUT	
D2	D1	D0	P	ODD	EVEN
0	0	0	0	1	0
0	0	0	1	0	1
0	0	1	0	0	1
0	0	1	1	1	0
0	1	0	0	0	1
0	1	0	1	1	0
0	1	1	0	1	0
0	1	1	1	0	1
1	0	0	0	0	1
1	0	0	1	1	0
1	0	1	0	1	0
1	0	1	1	0	1
1	1	0	0	1	0
1	1	0	1	0	1
1	1	1	0	0	1
1	1	1	1	1	0

PARITY GENERATOR :

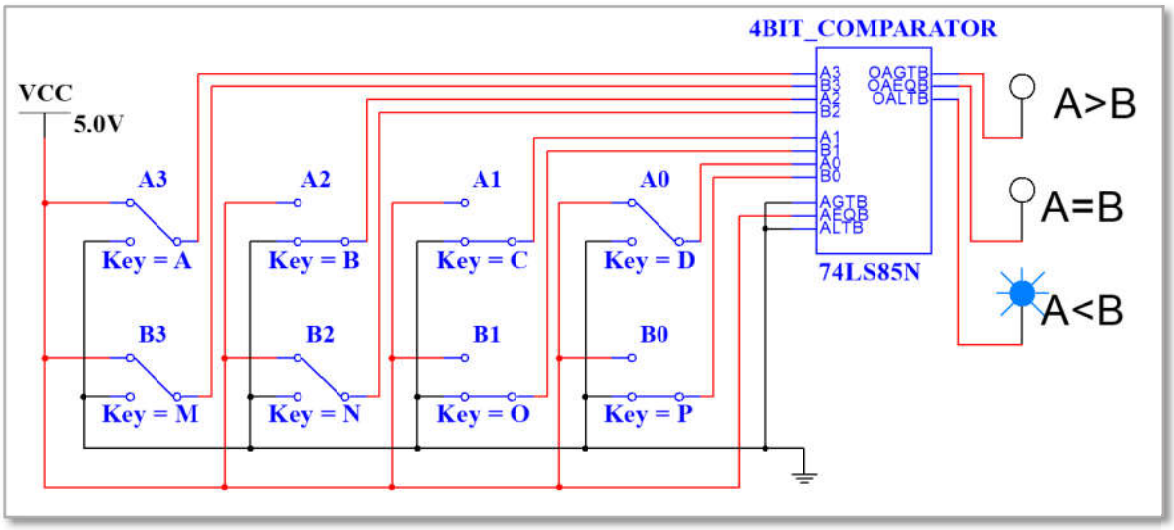
Diagram:



Truth Table					
INPUT				OUTPUT	
D3	D2	D1	D0	ODD	EVEN
0	0	0	0	1	0
0	0	0	1	0	1
0	0	1	0	0	1
0	0	1	1	1	0
0	1	0	0	0	1
0	1	0	1	1	0
0	1	1	0	1	0
0	1	1	1	0	1
1	0	0	0	0	1
1	0	0	1	1	0
1	0	1	0	1	0
1	0	1	1	0	1
1	1	0	0	1	0
1	1	0	1	0	1
1	1	1	0	0	1
1	1	1	1	1	0

4 BIT COMPARATOR :

Diagram:



Truth Table						
INPUT				OUTPUT		
A3,B3	**A2,B2**	**A1,B1**	**A0,B0**	**A>B**	**A=B**	**A<B**
A3>B3	X	X	X	1	0	0
A3<B3	X	X	X	0	0	1
A3=B3	A2>B2	X	X	1	0	0
A3=B3	A2<B2	X	X	0	0	1
A3=B3	A2=B2	A1>B1	X	1	0	0
A3=B3	A2=B2	A1<B1	X	0	0	1
A3=B3	A2=B2	A1=B1	A0>B0	1	0	0
A3=B3	A2=B2	A1=B1	A0<B0	0	0	1
A3=B3	A2=B2	A1=B1	A0=B0	0	1	0