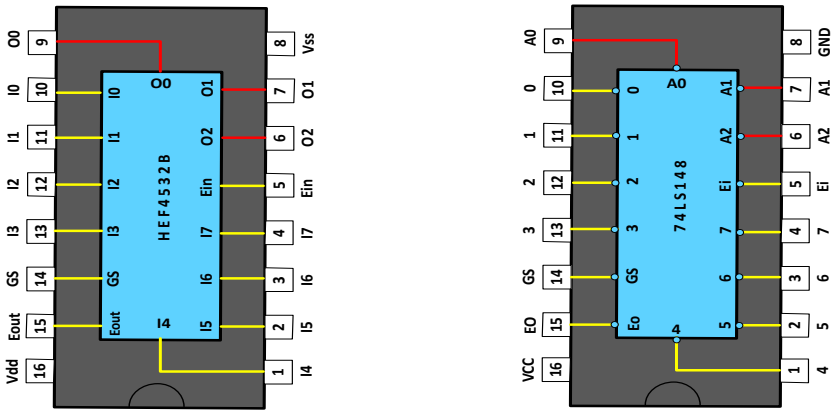
A. Judul : ENCODER

B. Dasar Teori

ENCODER

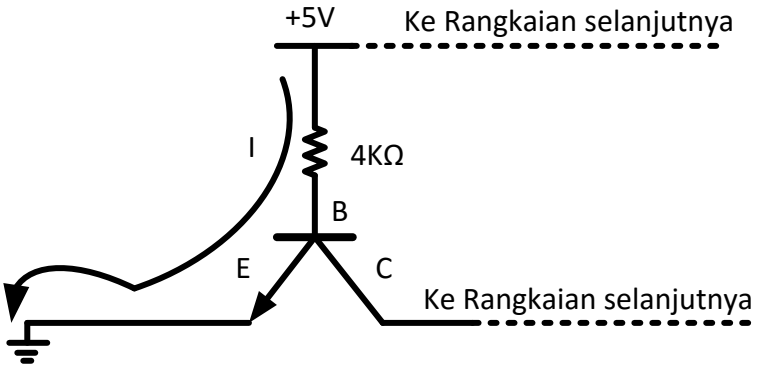
Proses-proses (data dan perintah) baik berupa angka, karakter, dan huruf dalam rangkaian digital hanya dapat diproses dalam bentuk biner. Oleh karena itu perlu dilakukan pengkodean pada data input agar data dapat diproses. Pengkodean ini dapat dilakukan dengan menggunakan rangkaian logika kombinasi. Suatu sandi biner dengan n bit dapat mewakili m ≥2n unsur informasi. Proses pengkodean sata input dilakukan oleh enkoder. Percobaan yang akan dilakukan pada modul ini adalah membuat rangkaian ENCODER menggunakan IC ENCODER *Active low* 74LS148, selain itu ada juga IC encoder *Active high* HEF4532B. Konfigurasi pin dari kedua IC tersebut dapat dilihat di bawah :



(a) (b)

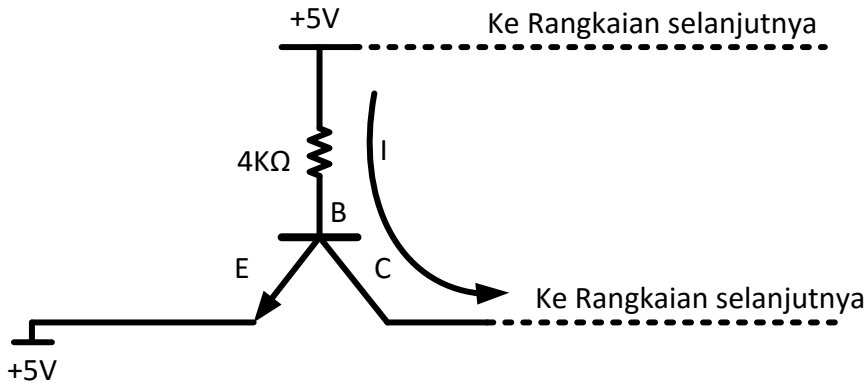
Gambar1.2 (a) Konvigurasi pin IC HEF4532B, (b) konfigurasi pin IC 74LS148

KARAKTERISTIK IC TTL



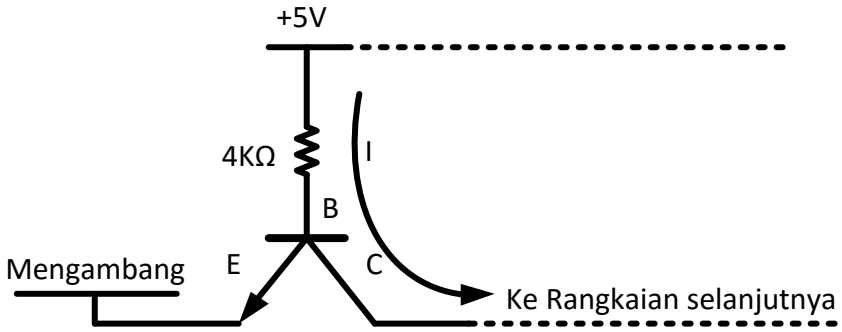
Gambar 1.3 Rangkaian ekivalen input IC TTL (Input = 0)

Bilamasukkan IC TTL dihubungkan ground maka ada beda potensial antara basis dan emitter, sehingga arus mengalir menuju emitter, tidak ada arus yang mengalir menuju colector. Input IC TTL sama dengan nol.



Gambar 1.4 Rangkaian ekivalen input IC TTL (Input = 1)

Bila masukan IC TTL dihubungkan dengan +5V, maka tidak ada beda potensial antara basis dan emiter Tr1. Sehingga arus mengalir menuju colector Tr1 dan menuju basis Tr2, tidak ada arus yang mengalir menuju emiter. Input IC TTL sama dengan 1.



Gambar 1.5 Rangkaian ekivalen input IC TTL (Input = 1)

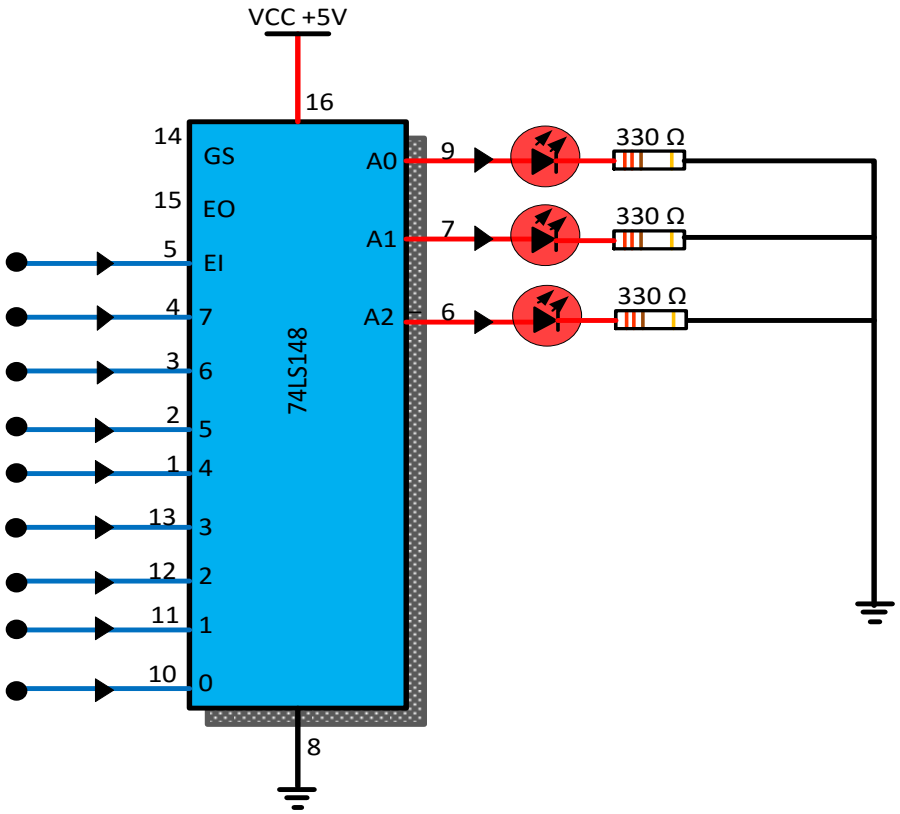
Bila masukan IC TTL tidak dihubungkan dengan +5V atau ground (mengambang), maka tidak ada beda potensial antara basis dan emiter Tr1. Sehingga arus mengalir menuju colector Tr1 dan menuju basis Tr2, tidak ada arus yang mengalir menuju emiter. Input IC TTL sama dengan 1.

C. Alat dan Bahan

Modul trainer ENCODER	1 buah
Catudaya	1 buah
Saklar input logika	1 buah
Kabel jumper kuning	9 buah
Kabel jumper merah	3 buah

D. Langkah Kerja

a) Memperhatikan gambar1.3 lalu cermati konektor yang ada pada modul ENCODER.

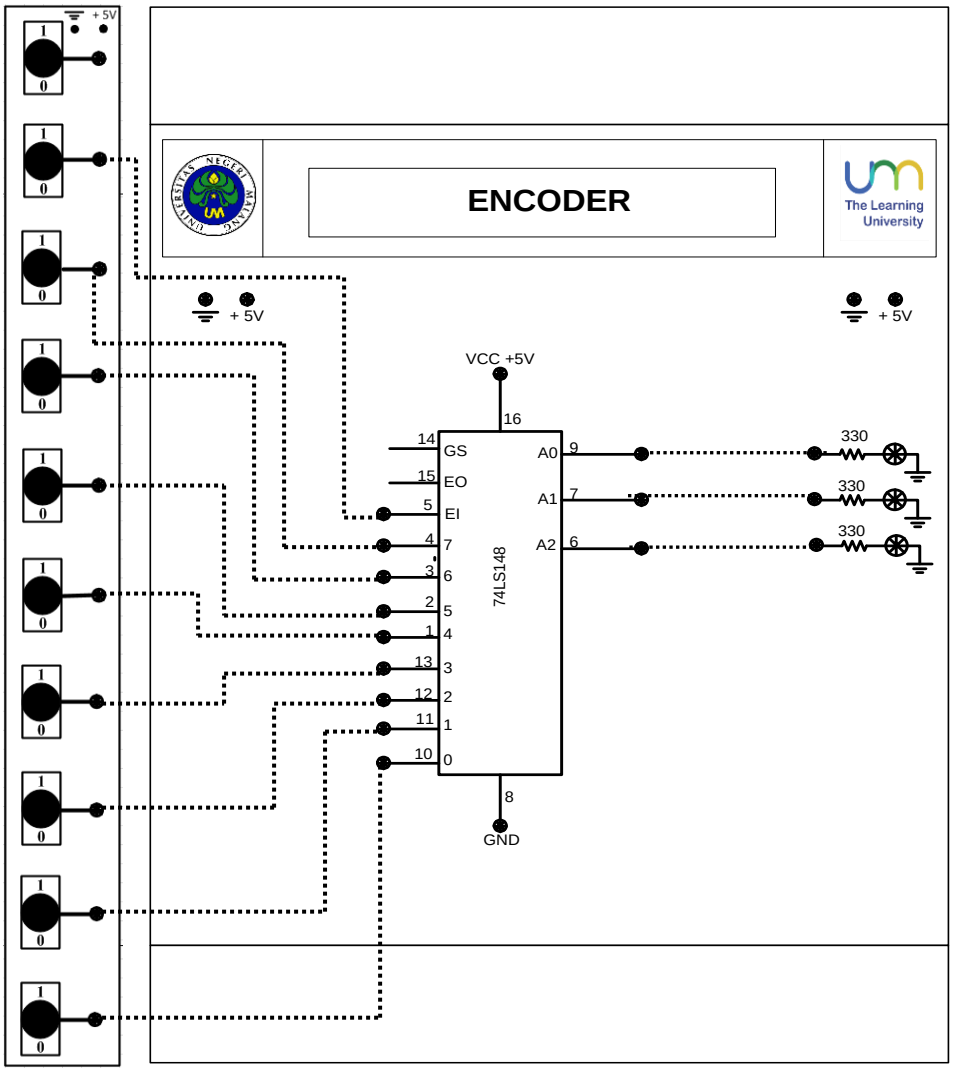


Gambar 1.3 Rangkaian percobaan ENCODER

b) Berilah modul ENCODER tegangan sebesar 5V DC dengan cara menghubungkan vcc dan ground power supply ke vcc dan ground modul ENCODER menggunakan kabel penghubung yang sudah disediakan.

c) Berilah saklar input logika dengan tegangan 5V DC dengan mnghubungkan ground dan vcc power supply pada pin paling atas sesuai gambar.

d) Hubungkan kaki-kaki pada modul ENCODER sesuai dengan nomor – nomor seperti pada gambar 1.3.



Gambar 1.4 modul ENCODER

a) Hubungkan kaki-kaki 1,2,3,4,5,10,11,12,13 dengan VCC atau ground berdasarkan kombinasi pada tabel 1.2.

E. Hasil Praktikum & Simulasi

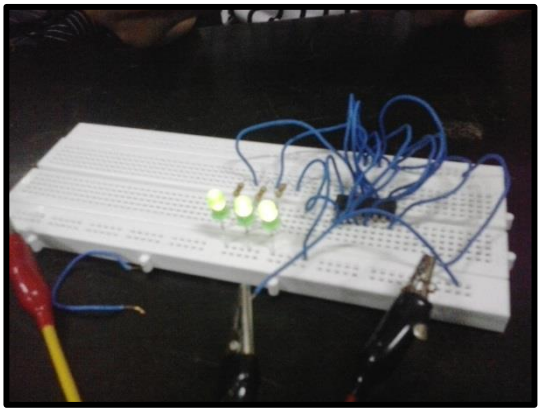
Tabel 1.2 Data Praktikum & Simulasi Encoder Active Low

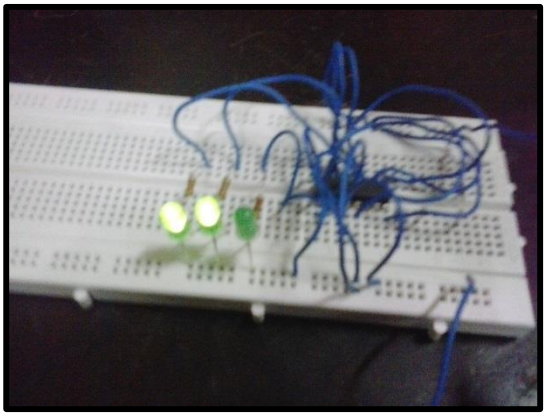
INPUT									**OUTPUT**				
El	0	1	2	3	4	5	6	7	GS	EO	A2	A1	A0
1	1	1	1	1	1	1	1	1	X	X			
0	0	1	1	1	1	1	1	1	X	X			
0	X	0	1	1	1	1	1	1	X	X			
0	X	X	0	1	1	1	1	1	X	X			
0	X	X	X	0	1	1	1	1	X	X			
0	X	X	X	X	0	1	1	1	X	X			
0	X	X	X	X	X	0	1	1	X	X			
0	X	X	X	X	X	X	0	1	X	X			
0	X	X	X	X	X	X	X	0	X	X			

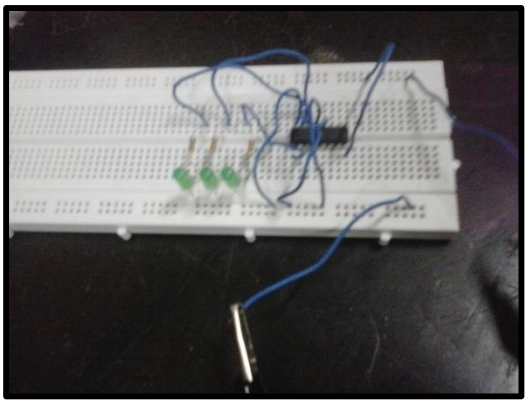
Keterangan :

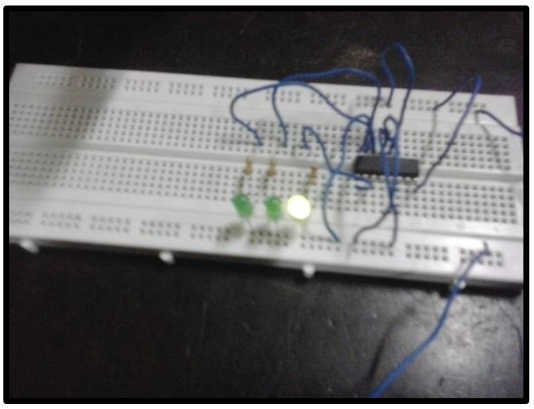
Logika 1 = vcc (5V) Logika 0 = ground X= diabaikan

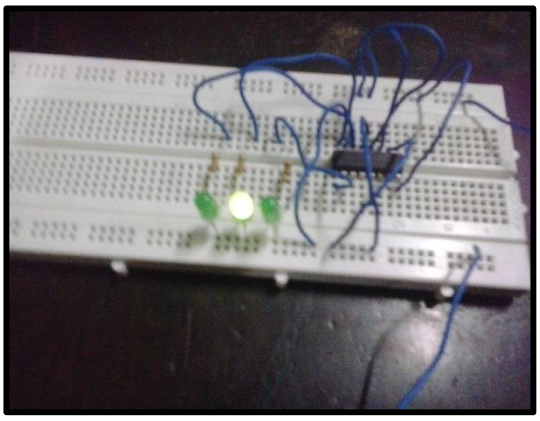
F. Gambar Praktikum

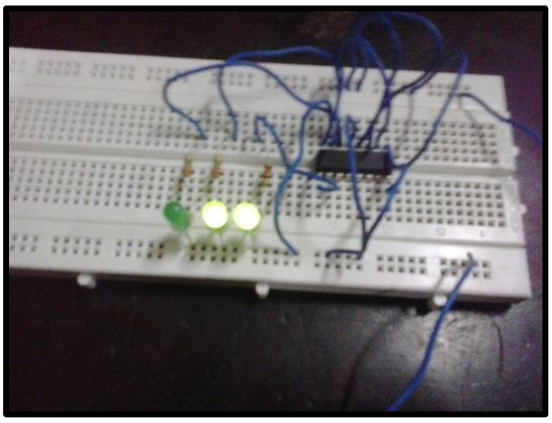


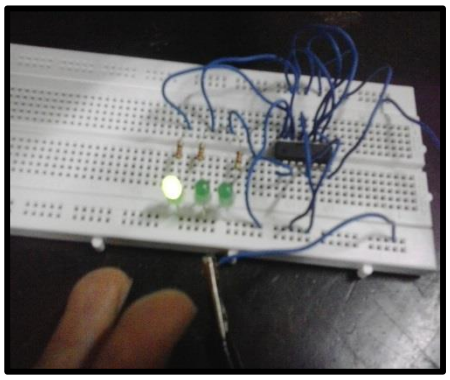


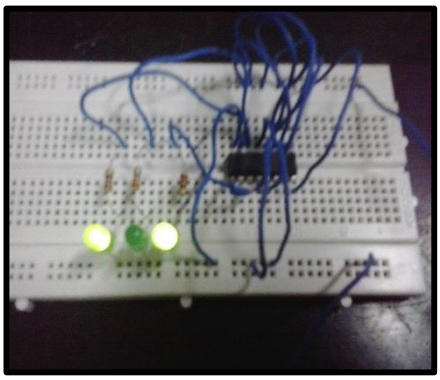


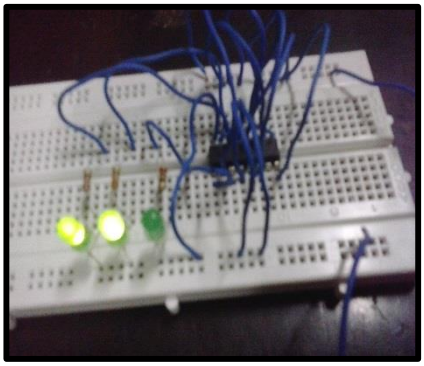






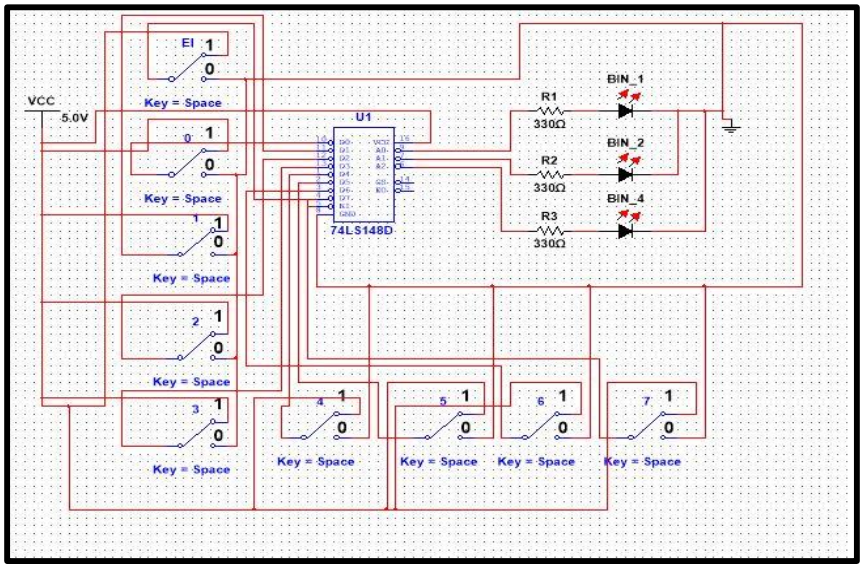


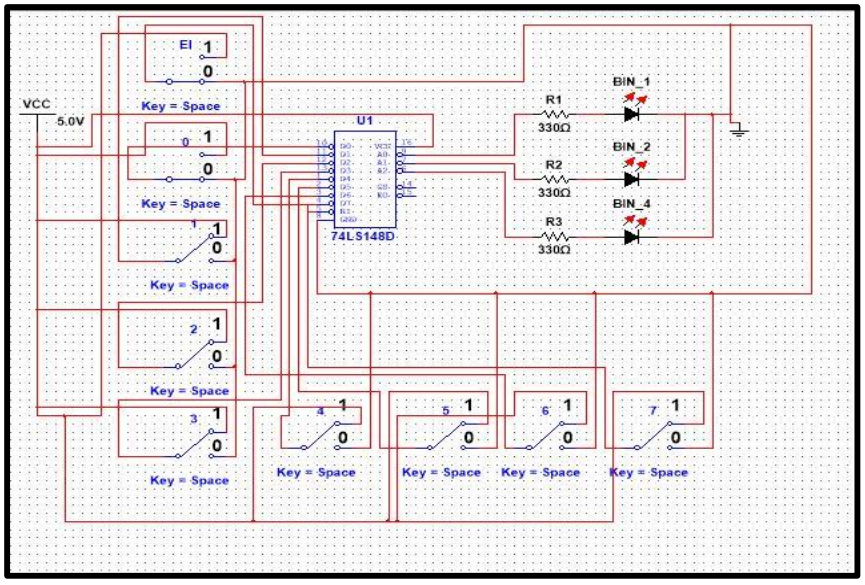


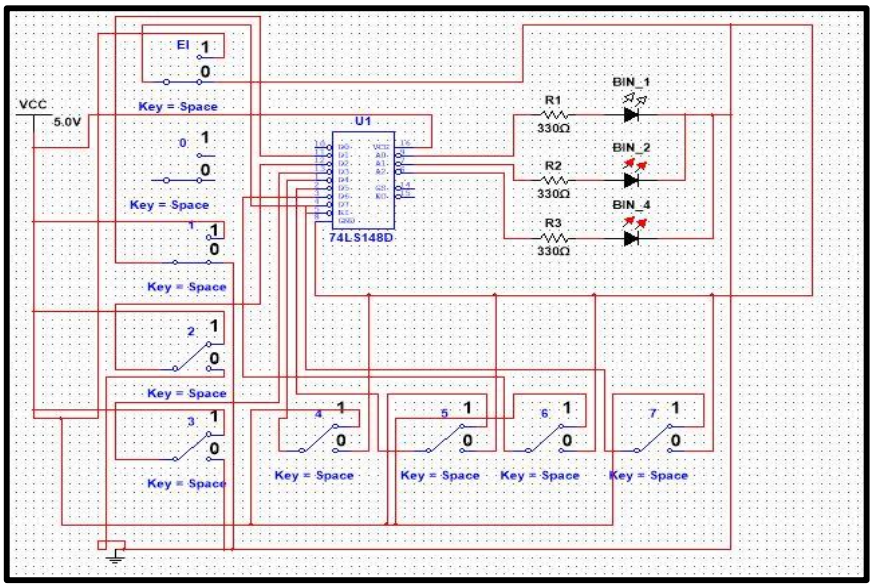


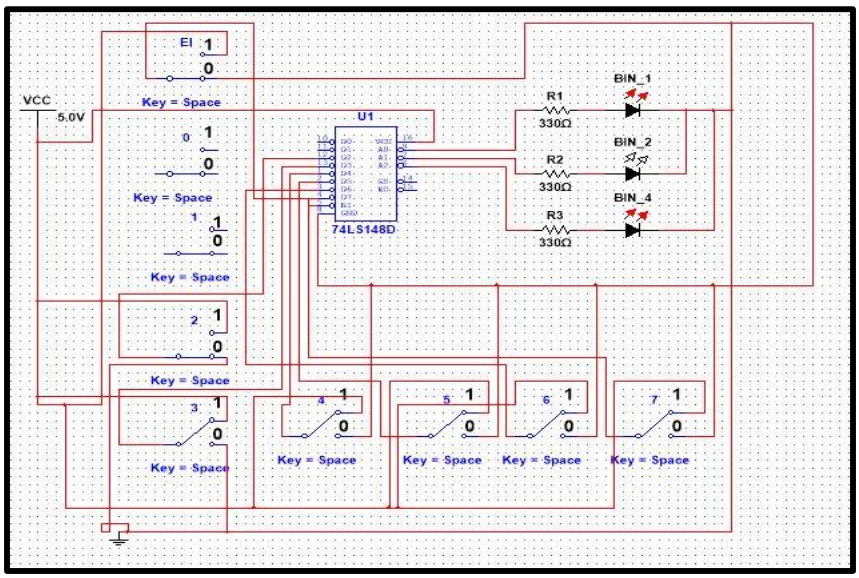
G. Gambar Simulasi Software

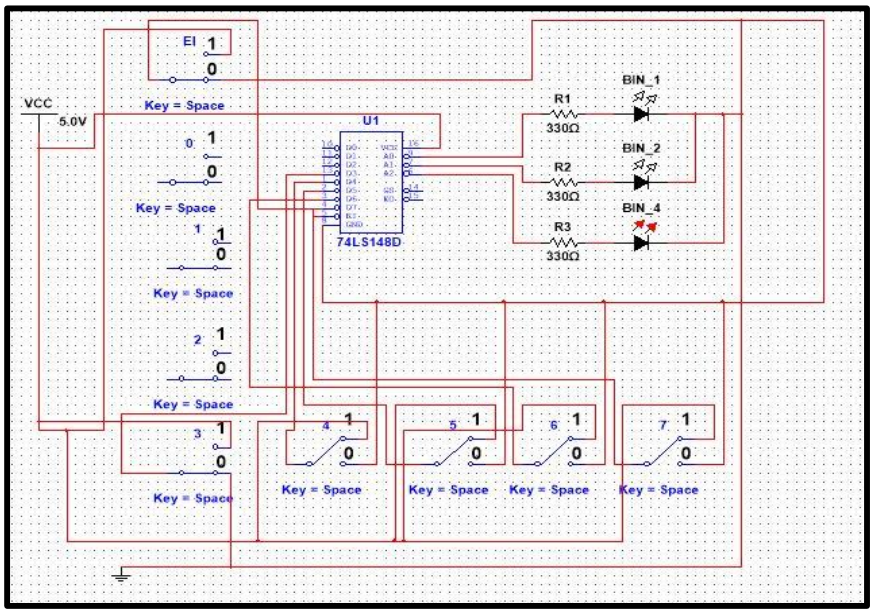
1. Simulasi Encoder Active Low

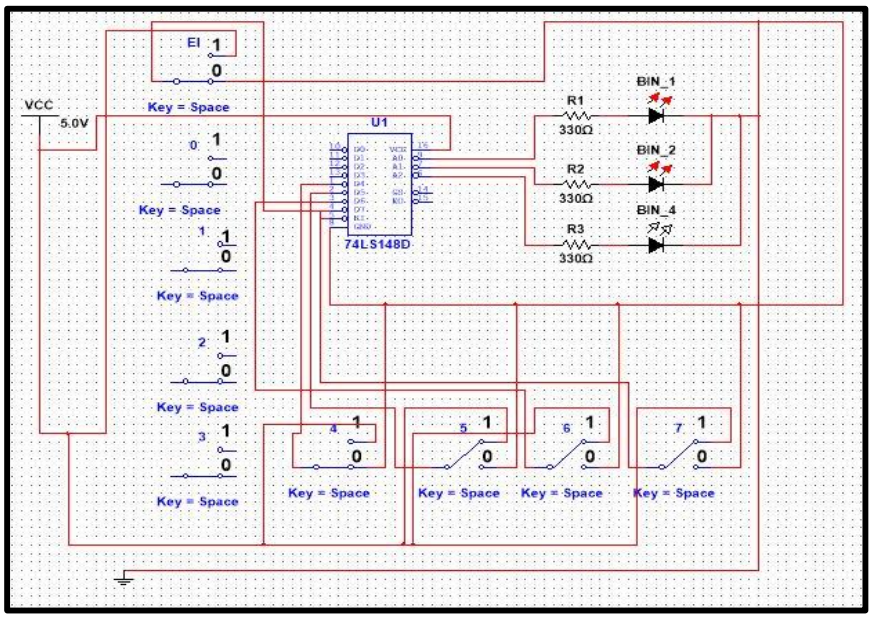


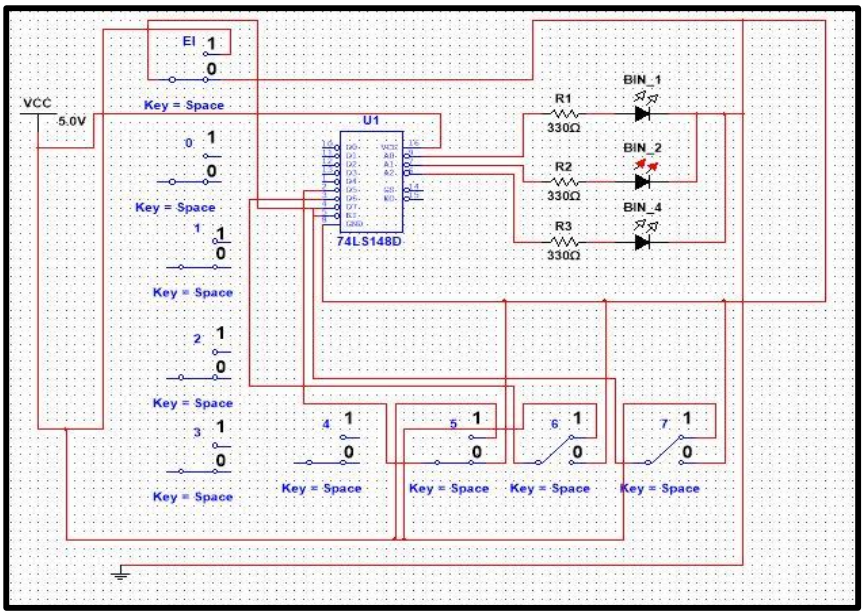


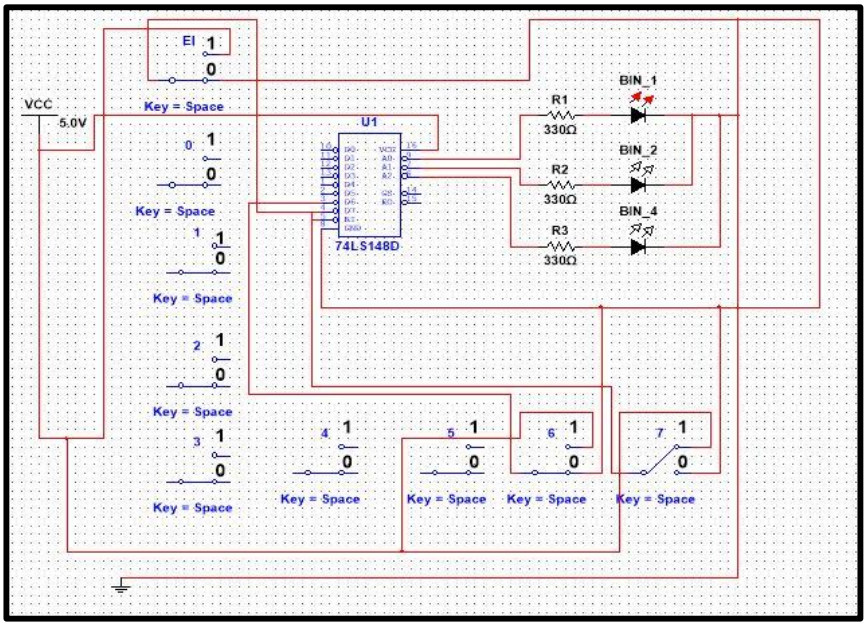


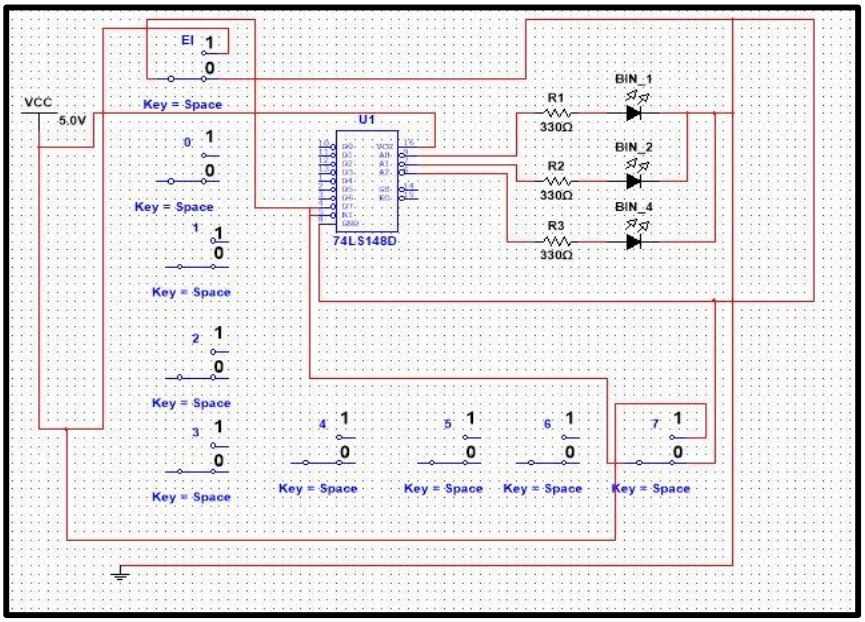

EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4


EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4


EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4


EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4


EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4


EI
VCC
5.0V
Key = Space
U1
74LS148D
R1
330Ω
R2
330Ω
R3
330Ω
BIN_1
BIN_2
BIN_4

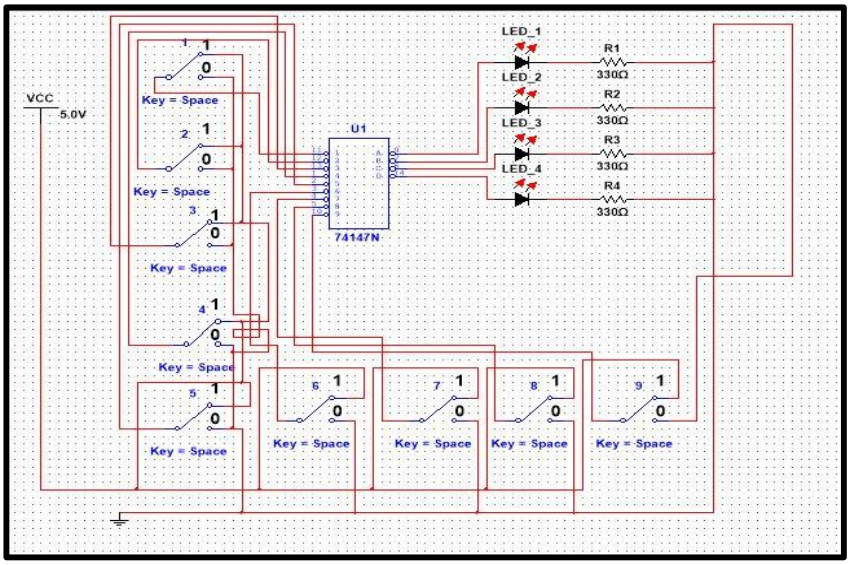
2. Simulasi Encoder Menggunakan IC 74147

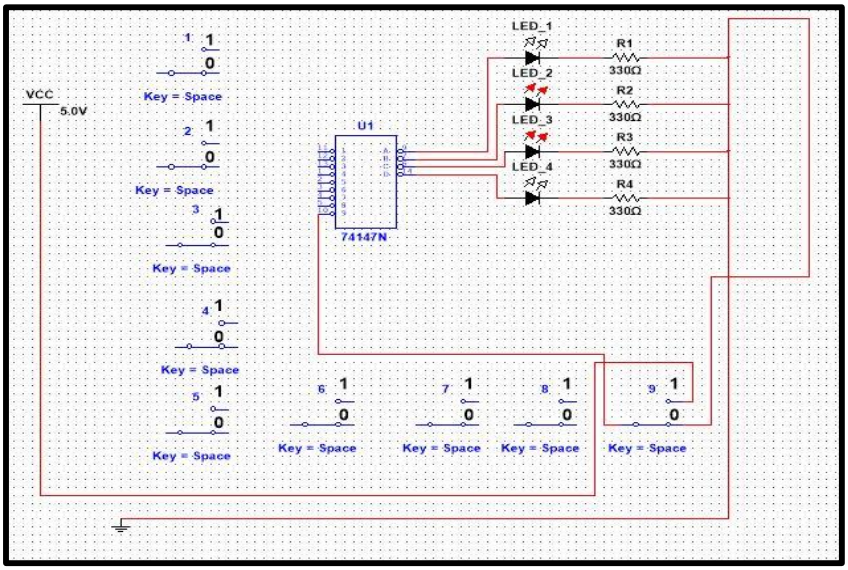
Tabel 1.2 Data Praktikum & Simulasi Encoder BCD IC 74147

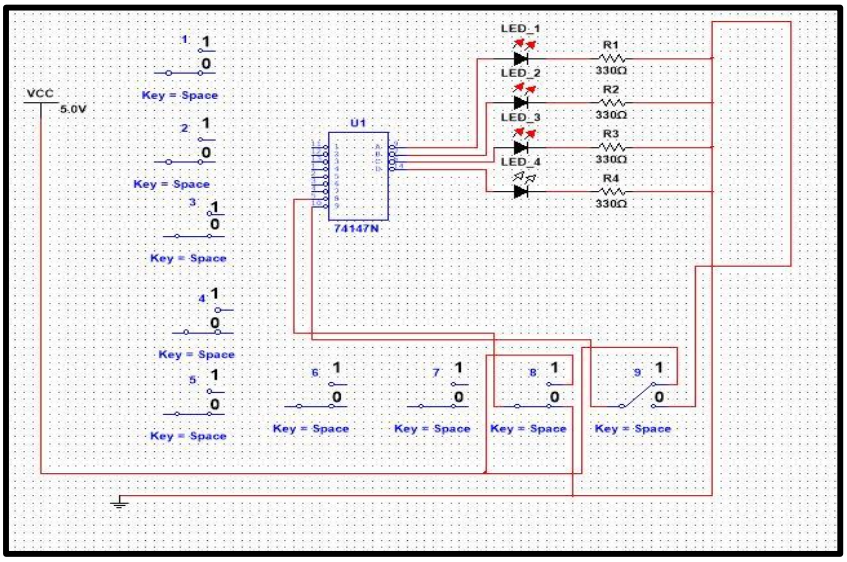
INPUT									**OUTPUT**			
1	2	3	4	5	6	7	8	9	D	C	B	A
1	1	1	1	1	1	1	1	1				
X	X	X	X	X	X	X	X	0				
X	X	X	X	X	X	X	0	1				
X	X	X	X	X	X	0	1	1				
X	X	X	X	X	0	1	1	1				
X	X	X	X	0	1	1	1	1				
X	X	X	0	1	1	1	1	1				
X	X	0	1	1	1	1	1	1				
X	0	1	1	1	1	1	1	1				
0	1	1	1	1	1	1	1	1				

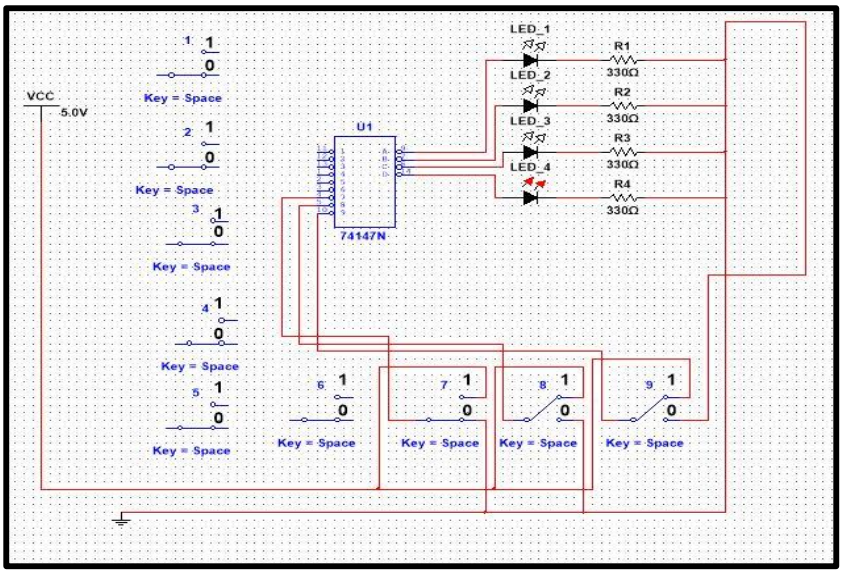
Keterangan :

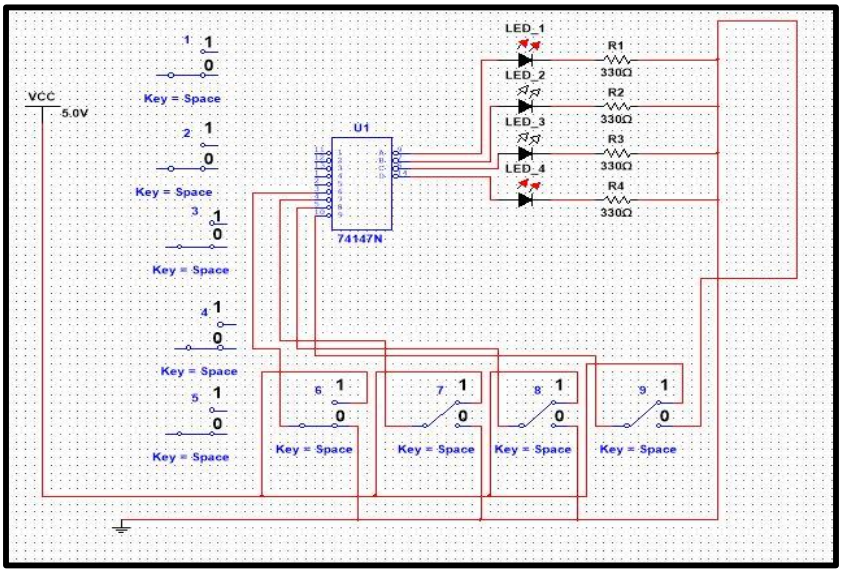
Logika 1 = vcc (5V) Logika 0 = ground X= diabaikan

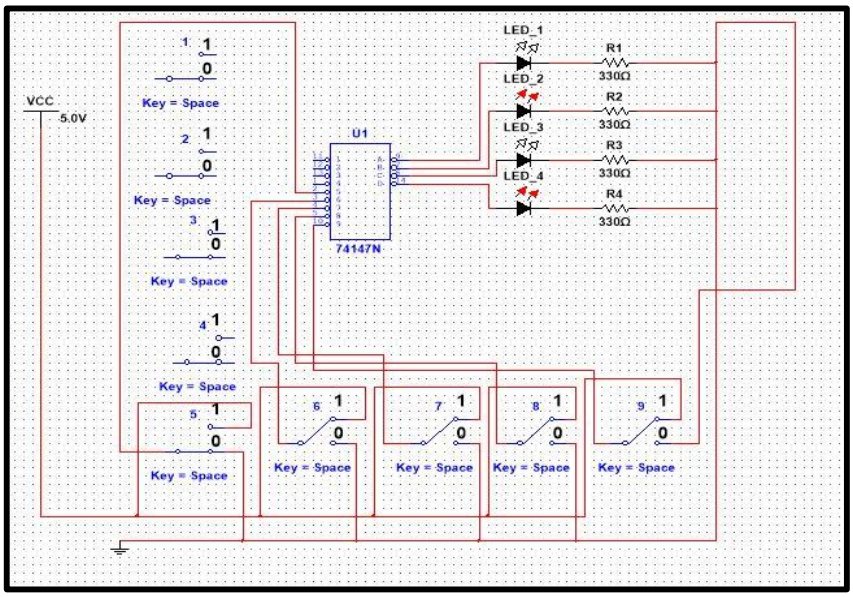

VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space

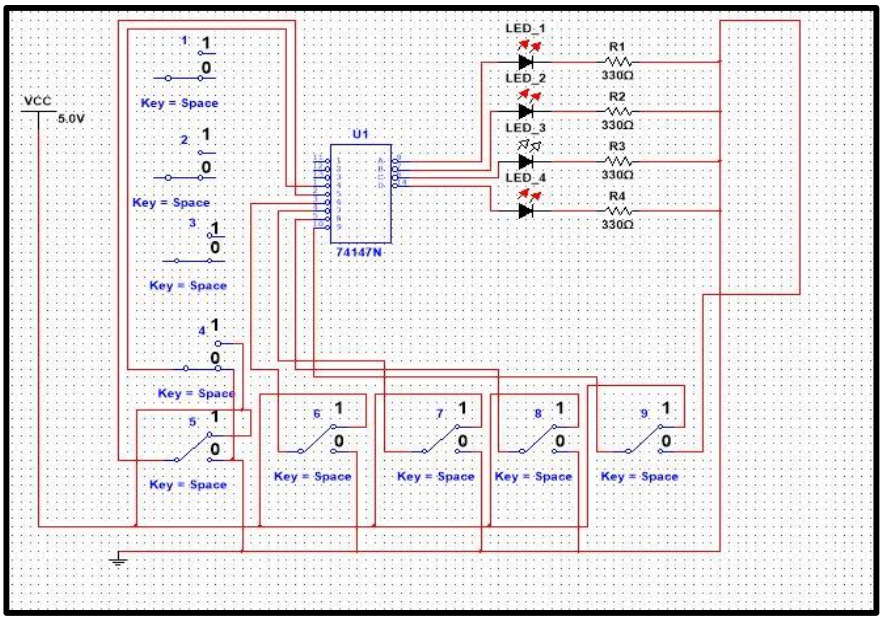

VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space

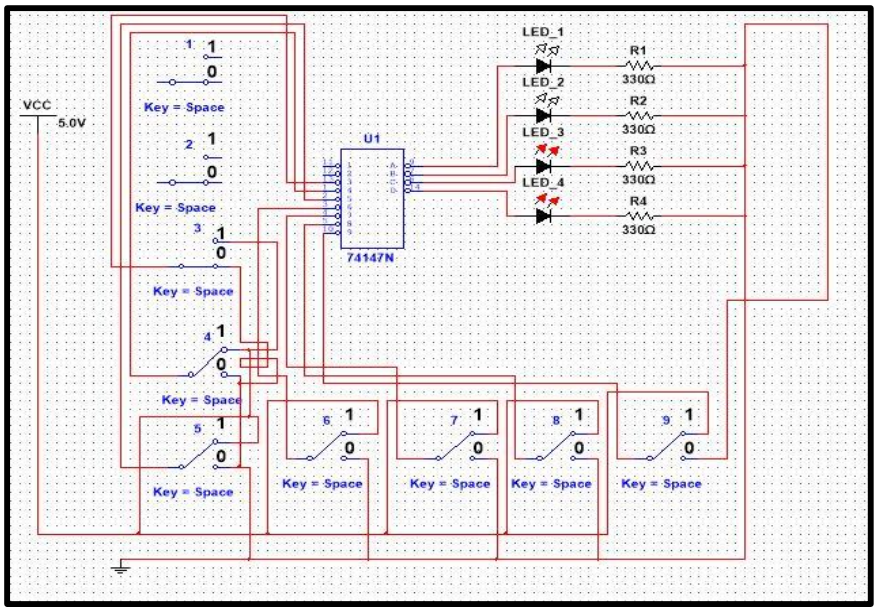

VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space

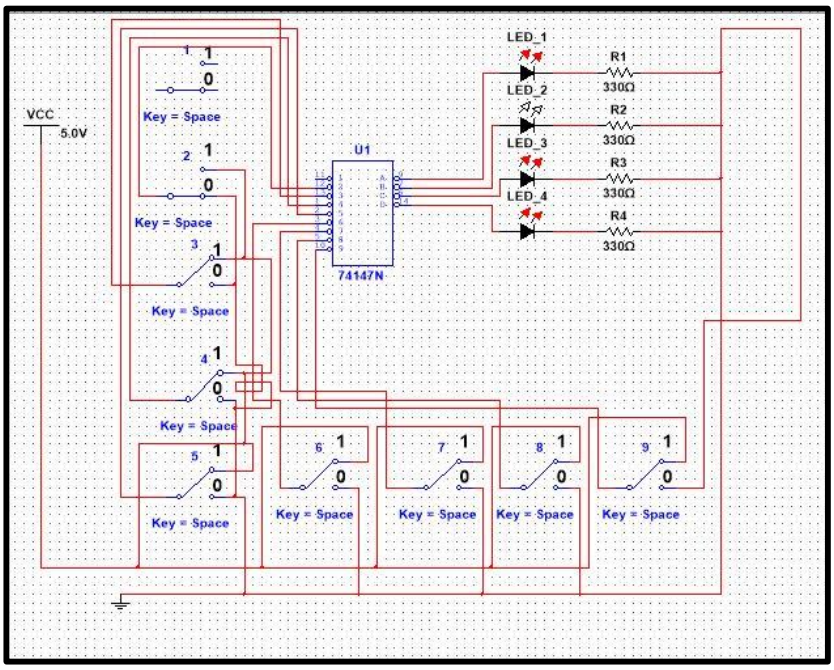

VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space

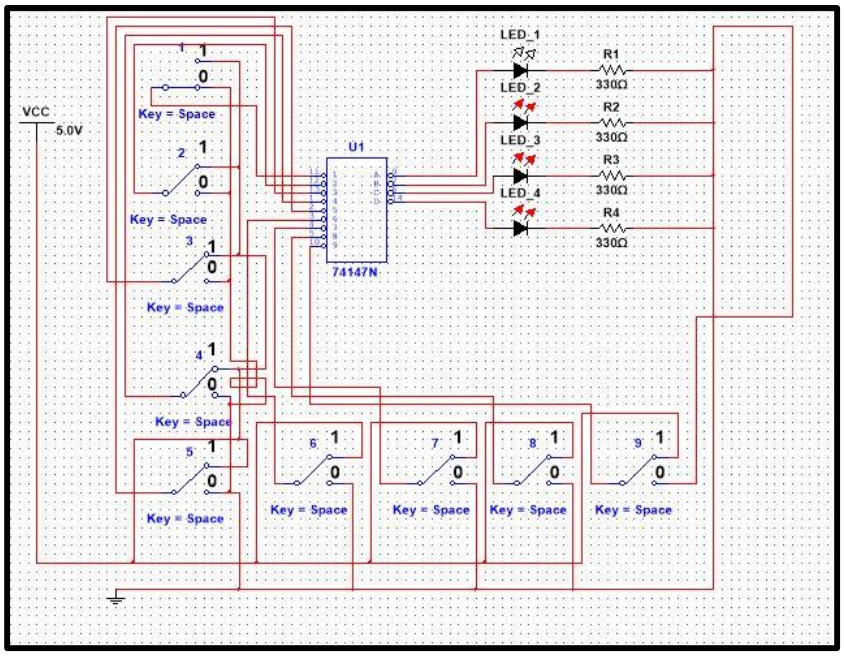

VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space


VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space


VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space


VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space


VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
R2
R3
R4
330Ω
Key = Space


VCC
5.0V
U1
74147N
LED_1
LED_2
LED_3
LED_4
R1
330Ω
R2
330Ω
R3
330Ω
R4
330Ω
Key = Space

H. Tugas Simulasi.

1. **Menggunakan rangkaian pada percobaan ini bagaimana cara agar output yang dihasilkan menjadi sama dengan output encoder *active high*?**

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……
……
……

2. **Berapa nilai output yang di hasilkan tabel di bawah ini**

INPUT									OUTPUT				
El	0	1	2	3	4	5	6	7	GS	EO	A2	A1	A0
0	X	X	X	X	0	1	1	1	X	X			

……
……
……
……

3. **Dengan menggunakan IC 74147 susunlah rangkaian ENCODER desimal ke BCD !**

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I. Analisa

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J. Kesimpulan

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K. Daftar Pustaka

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