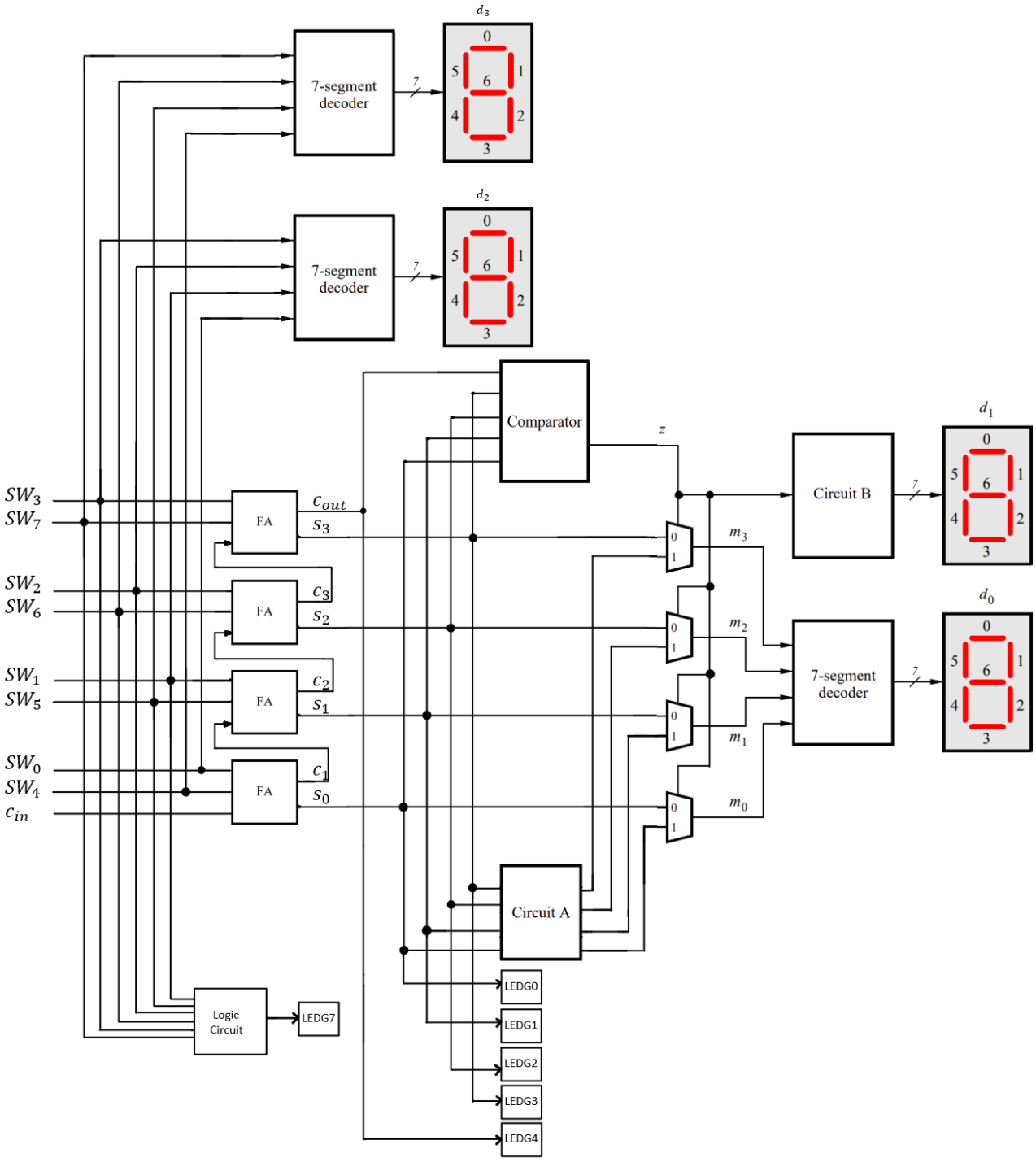
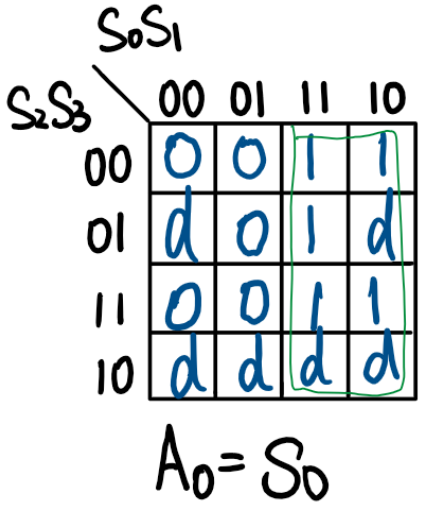
- circuit diagram

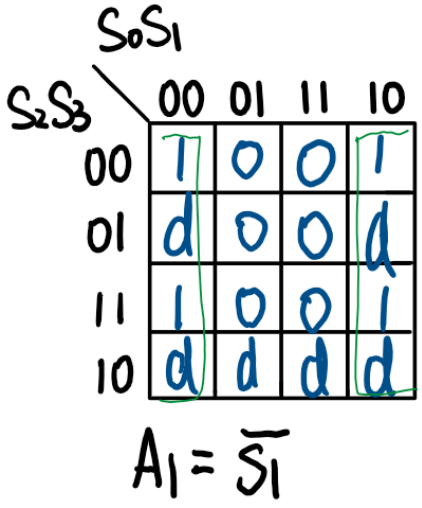


Truth table for circuit A	K-map and logic expressions

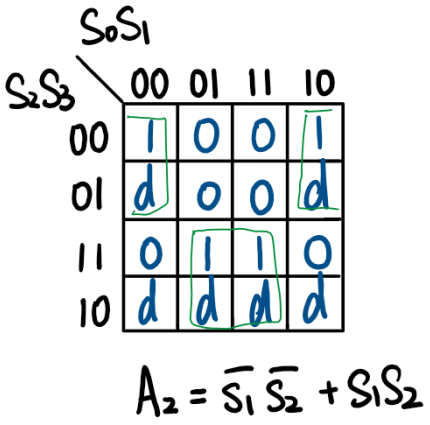
Decimal	S3	S2	S1	S0	A0
	0	1	x	x	d
	1	0	0	x	d
10	1	0	1	0	0
11	1	0	1	1	1
12	1	1	0	0	0
13	1	1	0	1	1
14	1	1	1	0	0
15	1	1	1	1	1
16	0	0	0	0	0
17	0	0	0	1	1
18	0	0	1	0	0
19	0	0	1	1	1



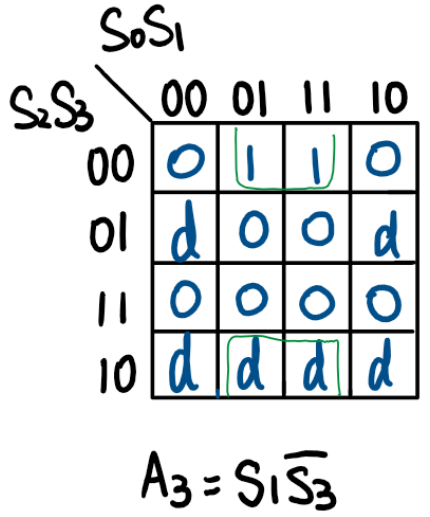
Decimal	S3	S2	S1	S0	A1
	0	1	x	x	d
	1	0	0	x	d
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	1
13	1	1	0	1	1
14	1	1	1	0	0
15	1	1	1	1	0
16	0	0	0	0	1
17	0	0	0	1	1
18	0	0	1	0	0
19	0	0	1	1	0



Decimal	S3	S2	S1	S0	A2
	0	1	x	x	d
	1	0	0	x	d
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	0
14	1	1	1	0	1
15	1	1	1	1	1
16	0	0	0	0	1
17	0	0	0	1	1
18	0	0	1	0	0
19	0	0	1	1	0



Decimal	S3	S2	S1	S0	A3
	0	1	x	x	d
	1	0	0	x	d
10	1	0	1	0	0
11	1	0	1	1	0
12	1	1	0	0	0
13	1	1	0	1	0
14	1	1	1	0	0
15	1	1	1	1	0
16	0	0	0	0	0
17	0	0	0	1	0
18	0	0	1	0	1
19	0	0	1	1	1

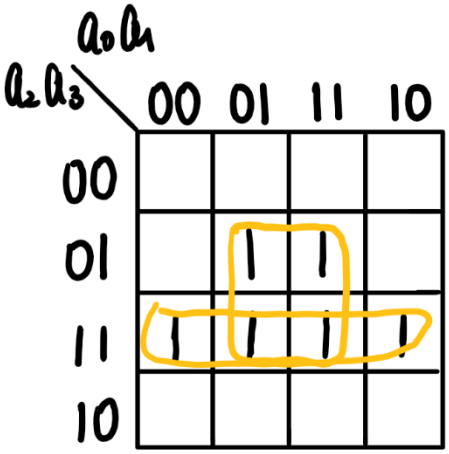


- **logic expression for LEDG7**

let LEG7 <= f(a) + f(b)

truth table and K-map for f(a)

a3	a2	a1	a0	f(a)
0	x	x	x	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1



f(a) = a1*a3 + a2*a3

Similarly, f(b) = b1*b3 + b2*b3

Hence, LEDG7 = a1*a3 + a2*a3 + b1*b3 + b2*b3