CE241 Final Exam Review

(90 minutes)

(Open-Book, Open-Note)

① Number system conversions

Binary → Decimal → Octoal → HEX → Arbitrary

② Addition, subtraction, Multiplication, Division in Binary

③ Boolean Algebra and the theorems.

$A+BC = (A+B)(A+C)$ $\bar{A}B+A\bar{B} = \bar{A}\bar{B}+AB$

④ K Map, sop, pos, static hazard, timing Diagram (time delay)

⑤ FA, HA, MUX, Decoder (lecture 17)

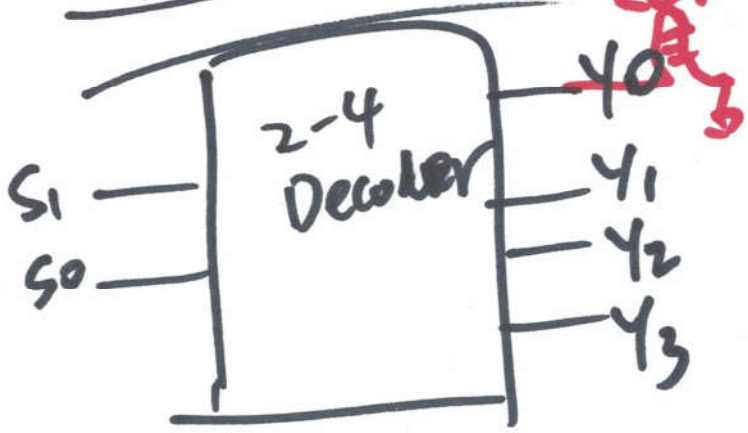
⑥ SR latch, SR FF, JK FF, JK master slave FF, TFF, DFF,

⑦ counter, shift register (lecture 22), switch debouncing (NOR, NAND)

⑧ Mealy / Moore State Machine

State Program ⇄ Sequential Circuit

Decoder



S_1	S_0	Y_0	Y_1	Y_2	Y_3
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	0	0	1

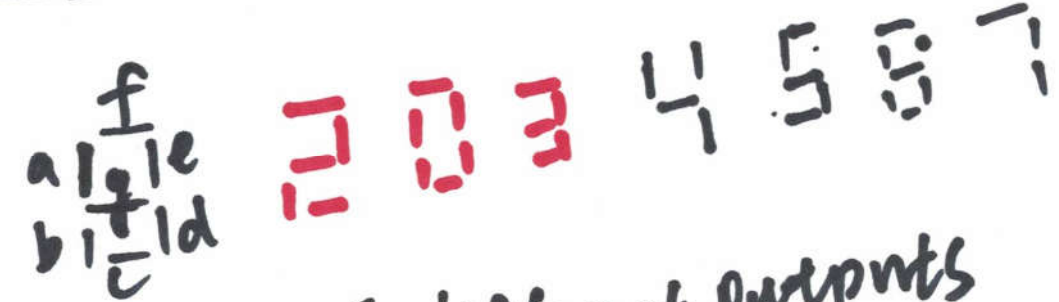
No. of patterns = Possible No. Input Combination

3 patterns = 2 bits

6 patterns = 3 bits

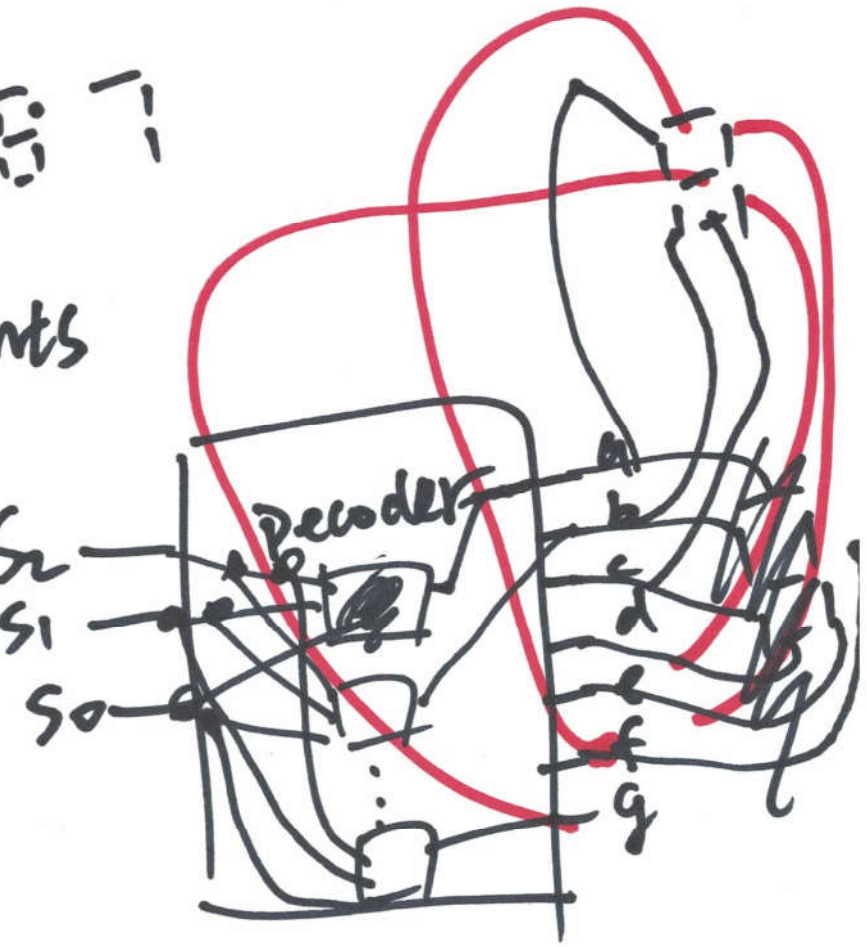
9 patterns = 4 bits

7 Segment Display



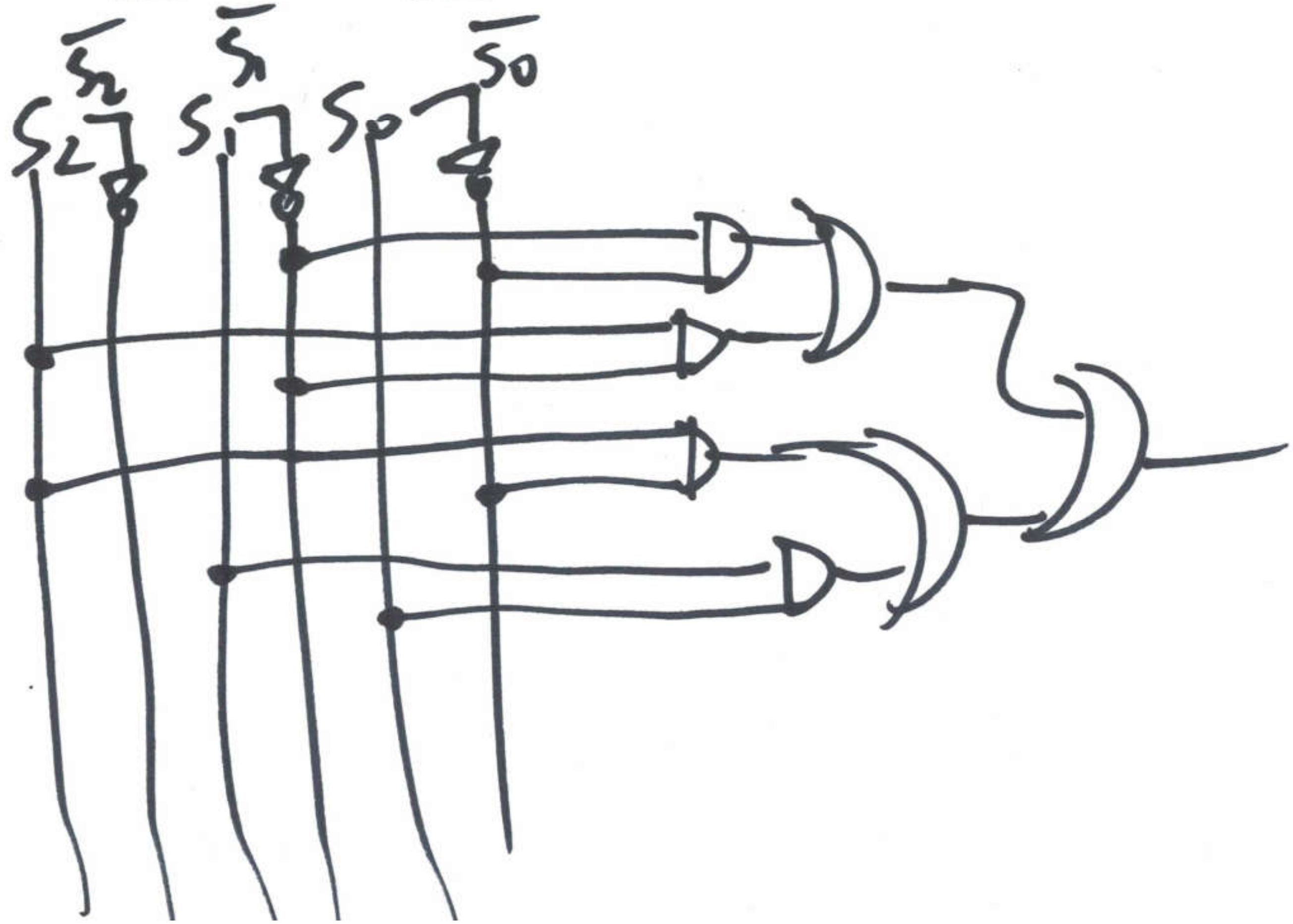
0-7 : 8 different outputs

S_2	S_1	S_0	a	b	c	d	e	f	g
0	0	0	1	1	1	1	1	1	0
0	0	1	0	0	1	1	0	0	0
0	1	0	0	1	1	0	1	1	1
0	1	1	0	0	1	1	1	1	1
1	0	0	1	0	0	1	1	0	1
1	0	1	1	0	1	1	0	1	1
1	1	0	1	1	1	1	0	1	1
1	1	1	1	1	1	1	1	1	1



$S_2 \backslash S_1S_0$	00	01	11	10
0	1	0	1	0
1	1	1	0	1

$$a = \overline{S_1}\,\overline{S_0} + S_2\overline{S_1} + S_2\overline{S_0} + S_1S_0$$



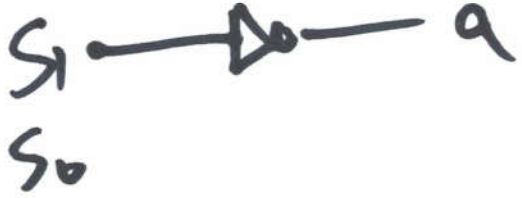
5 - #7

3 numbers

S_1	S_0	a	b	c	d	e	f	g
0	0	1	0	1	1	0	1	1
0	1	1	1	1	1	0	1	1
1	0	0	0	0	1	1	1	0

$$a = \bar{S_1}\bar{S_0} + \bar{S_1}S_0 = \bar{S_1}(\bar{S_0} + S_0)$$

$$= \bar{S_1}$$



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