CSE 232 HW3
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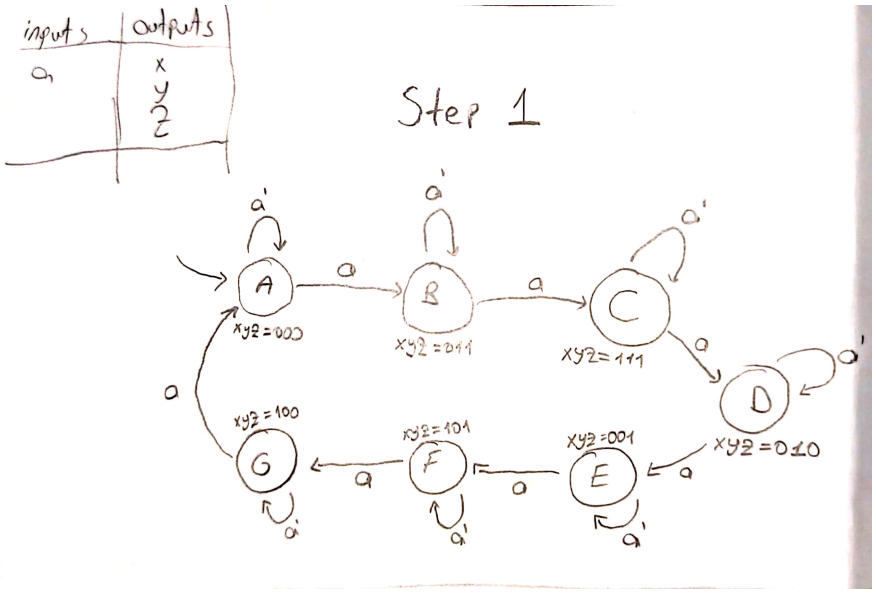

Step 2

→ 7 states (3 bits resister)

→ 3 bits for coming states

→ x, y and z are outputs.

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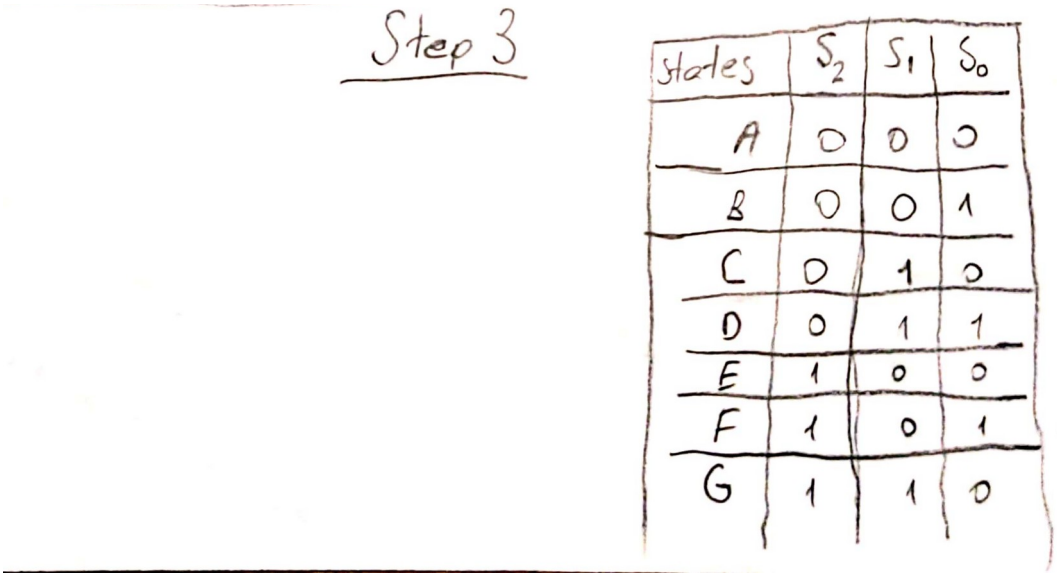
Step 3



states	S_2	S_1	S_0
A	0	0	0
B	0	0	1
C	0	1	0
D	0	1	1
E	1	0	0
F	1	0	1
G	1	1	0

Step 4

state	s_2	s_1	s_0	a	x	y	z	n_2	n_1	n_0
A	0	0	0	0	0	0	0	0	0	0
A	0	0	0	1	0	0	0	0	0	1
B	0	0	1	0	0	1	1	0	0	1
B	0	0	1	1	0	1	1	0	1	0
C	0	1	0	0	1	1	1	0	1	0
C	0	1	0	1	1	1	1	0	1	1
D	0	1	1	0	0	1	0	0	1	1
D	0	1	1	1	0	1	0	1	0	0
E	1	0	0	0	0	0	1	1	0	0
E	1	0	0	1	0	0	1	1	0	1
F	1	0	1	0	1	0	1	1	0	1
F	1	0	1	1	1	0	1	1	1	0
G	1	1	0	0	1	0	0	1	1	0
G	1	1	0	1	1	0	0	0	0	0
No	1	1	1	0						
No	1	1	1	1						

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Step 5.1

Step 5

$$x = \overline{S_0' S_1 S_2'} + S_0 S_1' S_2 + \overline{S_0' S_1 S_2} = S_0' S_1 \underbrace{(S_2 + S_2')}_{1} + S_0 S_1' S_2$$

$$x = \boxed{S_0' S_1 + S_0 S_1' S_2}$$

$$y = S_2' S_1 S_0 + S_2' S_1 S_0' + S_2' S_1 S_0 = S_2' S_1 \underbrace{(S_0' + S_0)}_{1} + S_2' S_1' S_0$$

$$y = \boxed{S_2' (S_1' S_0 + S_1)}$$

$$z = S_1' S_0 \underbrace{(S_2 + S_2')}_{1} + S_0' \underbrace{(S_2' S_1 + S_2 S_1')}_{S_2 \oplus S_1}$$

$$\boxed{z = S_1' S_0 + S_0' (S_2 \oplus S_1)}$$

$+ S_1'$
S_1'

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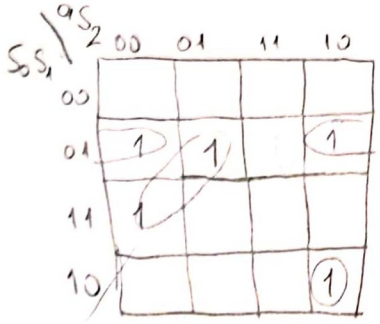
$$n_2 = a S_2' S_1' S_0 + S_2 S_1' S_0' + S_2 S_1' S_0 + a' S_2 S_1' S_0'$$

$$n_2 = \boxed{S_1 (a S_2' S_0 + a' S_2 S_0') + S_2 S_1' (S_0 + S_0')}$$

$(S_0 + S_0') = 1$

$$n_1 = a S_2' S_1' S_0 + S_2' S_1 S_0' + a' S_2' S_1 S_0 + a S_2 S_1' S_0 + a' S_2 S_1 S_0'$$



$$n_1 = \boxed{S_0' S_1 S_2' + a S_2' S_0 S_1' + a' S_1 (S_0 \oplus S_2)}$$

$$a' S_2 S_0' S_1 + a' S_2' S_0 S_1$$

$$= a' S_1 (S_2 S_0' + S_2' S_0)$$

$$= a' S_1 (S_0 \oplus S_2)$$

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Step 5.2