

Last Time:

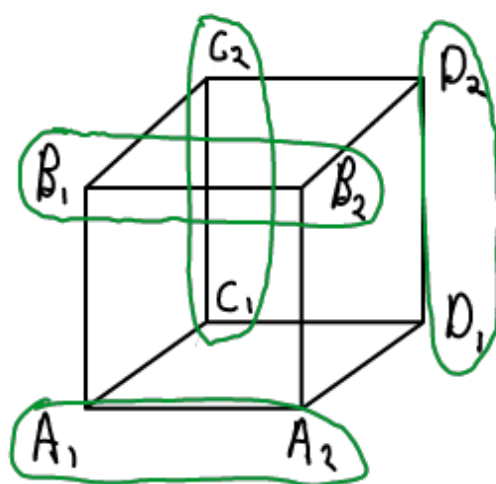
Race-free State Assignment

*Already considered using 1-hot-encoding
-easy, but lots of new states.

Another Method (which only works with ≤ 4 states)

	00	01	10	11
A {	A ₁	A ₁	C ₁	B ₁
A ₂	A ₁	A ₂	A ₁	B ₂
B {	B ₁	B ₁	B ₂	B ₁
B ₂	A ₂	B ₂	D ₂	B ₂
C {	C ₁	C ₂	C ₁	D ₁
C ₂	C ₂	B ₁	C ₂	D ₂
D {	D ₁	C ₁	D ₁	D ₁
D ₂	C ₂	D ₁	D ₂	D ₂

etc.

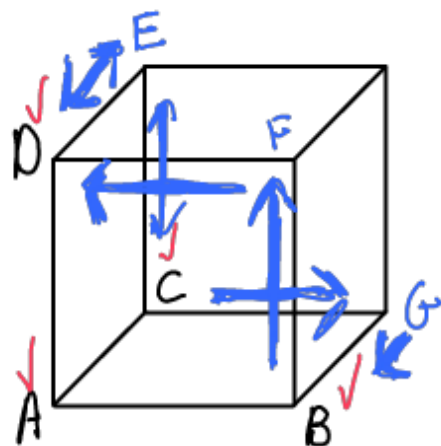


from example on last note

	00	01	10	11
A	A	A	C	B
B	A	B	D	B
C	C	B	C	D
D	C	A	D	D

Another Method

*Just draw a cube + start assigning states,
Add new states required.*

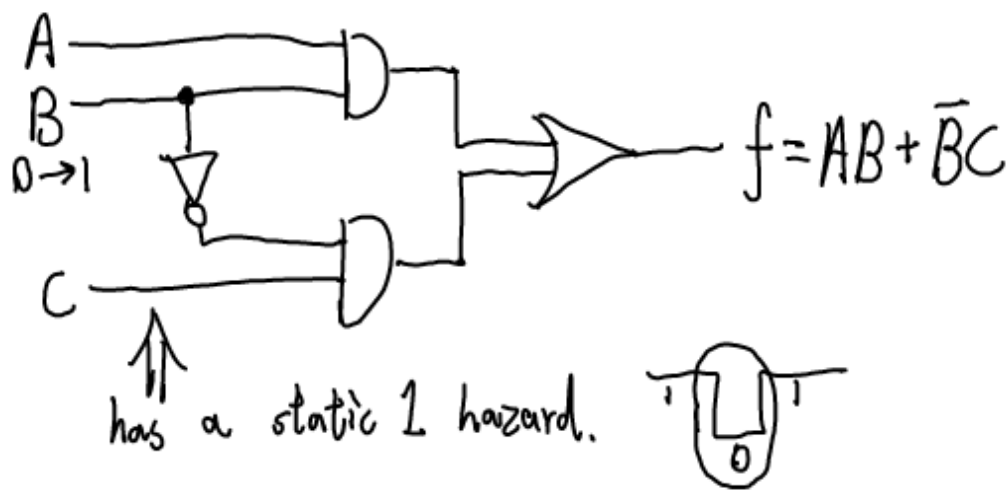


(Trial and error)

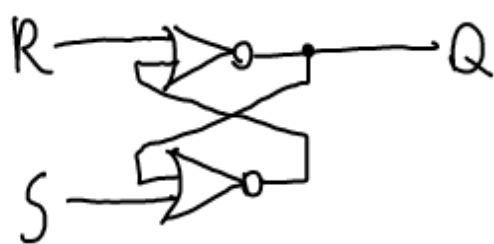
	00	01	10	11
A	A	A	C	B
B	A	B	D	B
C	C	B	C	b
D	C	A	D	D

B → D F
C → B G
C → D
D → C E

Fixing hazards with latches



SR Latch



Clearly, an SR Latch can support temporary cases where S and/or R flips to 0 w/o the output changing.

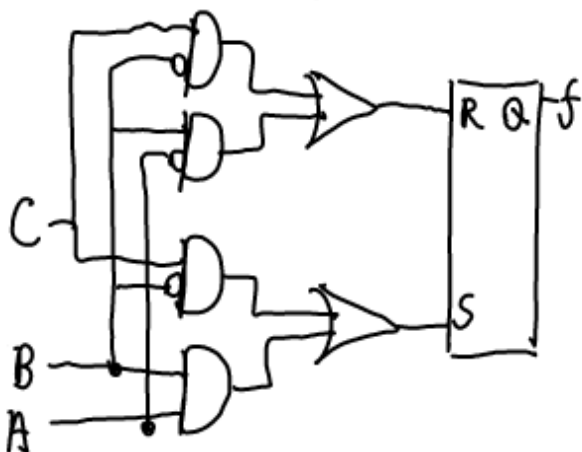
S	R	Q	
1	0	1	set
0	1	0	reset
0	0	hold	
1	1	bad	

AB	00	01	11	10
C	0	0	1	1
1	1	1	1	1

Think in terms of both

AB	00	01	10	11
C	0	0	1	0
1	1	0	1	1

$$S = \bar{A}B + \bar{B}C$$



AB	00	01	11	10
C	0	1	0	1
1	0	1	0	0

$$R = \bar{A}B + \bar{B}C$$