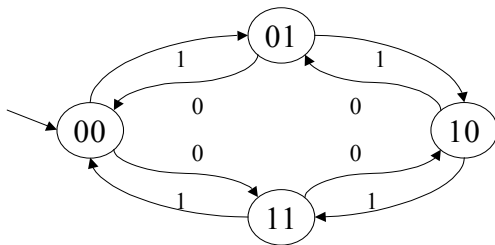


Princeton University

COS 217: Introduction to Programming Systems

A Two-Bit Counter Circuit Description

State Machine:



Truth Table:

A	B	x	next A	next B
0	0	0	1	1
0	1	0	0	0
1	0	0	0	1
1	1	0	1	0
0	0	1	0	1
0	1	1	1	0
1	0	1	1	1
1	1	1	0	0

Boolean Expressions:

$\text{next A} = (\sim A \ \& \ \sim B \ \& \ \sim x) \mid (\sim A \ \& \ B \ \& \ x) \mid (A \ \& \ \sim B \ \& \ x) \mid (A \ \& \ B \ \& \ \sim x)$

$\text{next B} = (\sim A \ \& \ \sim B \ \& \ \sim x) \mid (\sim A \ \& \ \sim B \ \& \ x) \mid (A \ \& \ \sim B \ \& \ \sim x) \mid (A \ \& \ \sim B \ \& \ x)$

Circuit Description:

```

INPUT x ;
FLIPFLOP A B ;
NEXT A  $(\sim A \ \& \ \sim B \ \& \ \sim x) \mid (\sim A \ \& \ B \ \& \ x) \mid (A \ \& \ \sim B \ \& \ x) \mid (A \ \& \ B \ \& \ \sim x)$  ;
NEXT B  $(\sim A \ \& \ \sim B \ \& \ \sim x) \mid (\sim A \ \& \ \sim B \ \& \ x) \mid (A \ \& \ \sim B \ \& \ \sim x) \mid (A \ \& \ \sim B \ \& \ x)$  ;

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