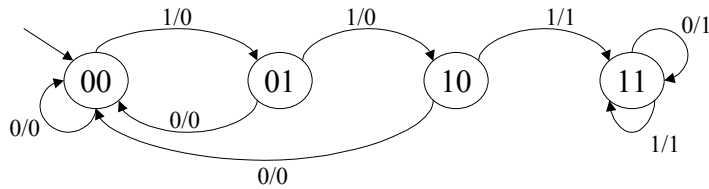# Princeton University
COS 217: Introduction to Programming Systems
A "111" Detector Sequential Circuit

Description

Repeatedly accept one input. Repeatedly produce one output. The output should be 0 until/unless a sequence of three contiguous 1's is detected. Thereafter the output should be 1.

State Machine

Truth Table

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

Boolean Expression

```
next A = (~A & B & x) | (A & ~B & x) | (A & B & ~x) | (A & B & x)
next B = (~A & ~B & x) | (A & ~B & x) | (A & B & ~x) | (A & B & x)
y = (A & ~B & x) | (A & B & ~x) | (A & B & x)
```

Circuit

(See reverse)