# Princeton University
## COS 217:  Introduction to Programming Systems
## A Two-Bit Decoder Circuit

**Description**

Accept two inputs, and produce four outputs.  Interpret the inputs as forming a binary number.  Decode that binary number by setting exactly one of the outputs to 1.

**Truth Table**

| s1 | s0 | x0 | x1 | x2 | x3 |
|----|----|----|----|----|----|
| 0  | 0  | 1  | 0  | 0  | 0  |
| 0  | 1  | 0  | 1  | 0  | 0  |
| 1  | 0  | 0  | 0  | 1  | 0  |
| 1  | 1  | 0  | 0  | 0  | 1  |

**Boolean Expressions**

```
x0 = ~s1 & ~s0
x1 = ~s1 & s0
x2 = s1 & ~s0
x3 = s1 & s0
```

**Circuit**

(See reverse)