

Princeton University
COS 217: Introduction to Programming Systems
A 4 to 1 Multiplexer Circuit

Description

Accept four “x” inputs and two “s” inputs. Produce one output.

Interpret the s inputs as forming a binary number. Pass the value of exactly one of the x inputs to the output, depending upon the value of that binary number.

Truth Table

s1	s0	x0	x1	x2	x3	y
0	0	0	NA	NA	NA	0
0	0	1	NA	NA	NA	1
0	1	NA	0	NA	NA	0
0	1	NA	1	NA	NA	1
1	0	NA	NA	0	NA	0
1	0	NA	NA	1	NA	1
1	1	NA	NA	NA	0	0
1	1	NA	NA	NA	1	1

Truth Table (Alternate Form)

s1	s0	y
0	0	x0
0	1	x1
1	0	x2
1	1	x3

Boolean Expression

$$y = (\sim s1 \ \& \ \sim s0 \ \& \ x0) \ | \ (\sim s1 \ \& \ s0 \ \& \ x1) \\ \ | \ (s1 \ \& \ \sim s0 \ \& \ x2) \ \ | \ (s1 \ \& \ s0 \ \& \ x3)$$

Circuit

(See reverse)