

Assignment

Wed 24 Oct 2018

Write a program that takes as input x & y
and outputs $z = x \text{ NAND } y$

Sol

var $x = 1$

var $y = 0$

var $z = \neg(x \& y)$

print($z * 1$)

Exercises

1) Write the following expressions in terms of NOT & NAND

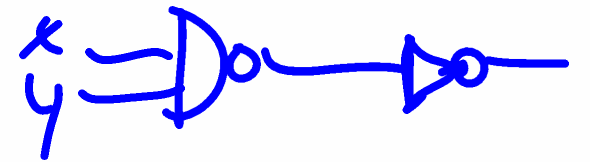
a) $x \text{ AND } y$ b) $x \text{ OR } y$ c) $x \text{ OR } (y \text{ AND } z)$

d) $x \text{ AND } (y \text{ OR } z)$

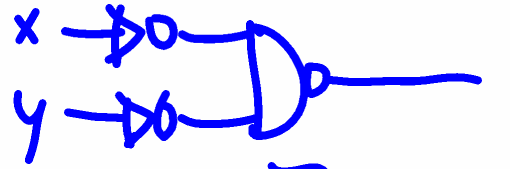
Solutions

$$a) x \text{ AND } y = \text{NOT}(x \text{ NAND } y)$$

Diagram



b) $x \text{ OR } y = (\text{NOT } x) \text{ NAND } (\text{NOT } y)$ Diagram



c) $x \text{ OR } (y \text{ AND } z) = (\text{NOT } x) \text{ NAND } [\text{NOT } (y \text{ AND } z)] =$

$$= (\text{NOT } x) \text{ NAND } [\cancel{\text{NOT}} (\cancel{\text{NOT}} (y \text{ NAND } z))] =$$

$$= (\text{NOT } x) \text{ NAND } (y \text{ NAND } z)$$

$$\begin{aligned} d) x \text{ AND } (y \text{ OR } z) &= \text{NOT} [x \text{ NAND } (y \text{ OR } z)] = \\ &= \text{NOT} [x \text{ NAND } ((\text{NOT } x) \text{ NAND } (\text{NOT } z))] \end{aligned}$$

HOMEWORK

write a program that outputs

d) using NOTs & NAND's