Assignment #2

Due: Wednesday, September 2, in class

Solve the problems in the puzzle boxes on the following pages of the reader: 26, 27, 28, 31, 32, 47, and 72.

A more interesting challenge

If you like playing with logic gates and want to try a fascinating problem that is one of my all-time favorites, suppose that you have been given a box of logic gates of the following fundamental types:

Although the box contains an unlimited number of AND and OR gates, there are only two NOT gates. Your mission is to design a circuit using only these components that independently negates three input signals, A, B, and C.

If you prefer to work in a modern programming language, you can express the same problem in a software-oriented form. The challenge then becomes to write a sequence of statements in any programming language (C, C++, Java, or whatever you know) that starts with three Boolean variables (a, b, and c) and computes values for three different variables (nota, notb, and notc) that have the values !a, !b, and !c, respectively. Your code must consist entirely of assignment statements in which the only operators permitted on the right hand side are &&, ||, and !. Your function may declare any number of additional Boolean variables and may use any number of the && and || operators, but only two instances of the ! operator.