# INTRODUCTION TO OPERATIONS RESEARCH

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possibly
ways by branching
section, it is useful to permi
details from the statement of the algo
in Section 8.2 follow the algorithm given above.
puter program to implement the branch-and-bound algorithm
of problems, it would be necessary to specify in advance exactly what rules to use at each point in the algorithm where a choice is necessary. We shall see in Section 8.4 that special variations in the implementation of the branch-and-bound method can be used to increase its efficiency when the integer program has a special structure, and then also it will be important to use a more precise algorithm statement.

## A Branch-and-Bound Example in Detail

To illustrate the branch-and-bound algorithm stated above, we will use it to solve the following example problem:

$$\text{IP: min} \quad z(\mathbf{x}) = 3x_1 - 7x_2 - 12x_3$$

subject to

$$\begin{aligned} -3x_1 + 6x_2 + 8x_3 &\leq 12 \\ 6x_1 - 3x_2 + 7x_3 &\leq 8 \\ -6x_1 + 3x_2 + 3x_3 &\leq 5 \end{aligned}$$

$x_1, x_2, x_3$ nonnegative integers

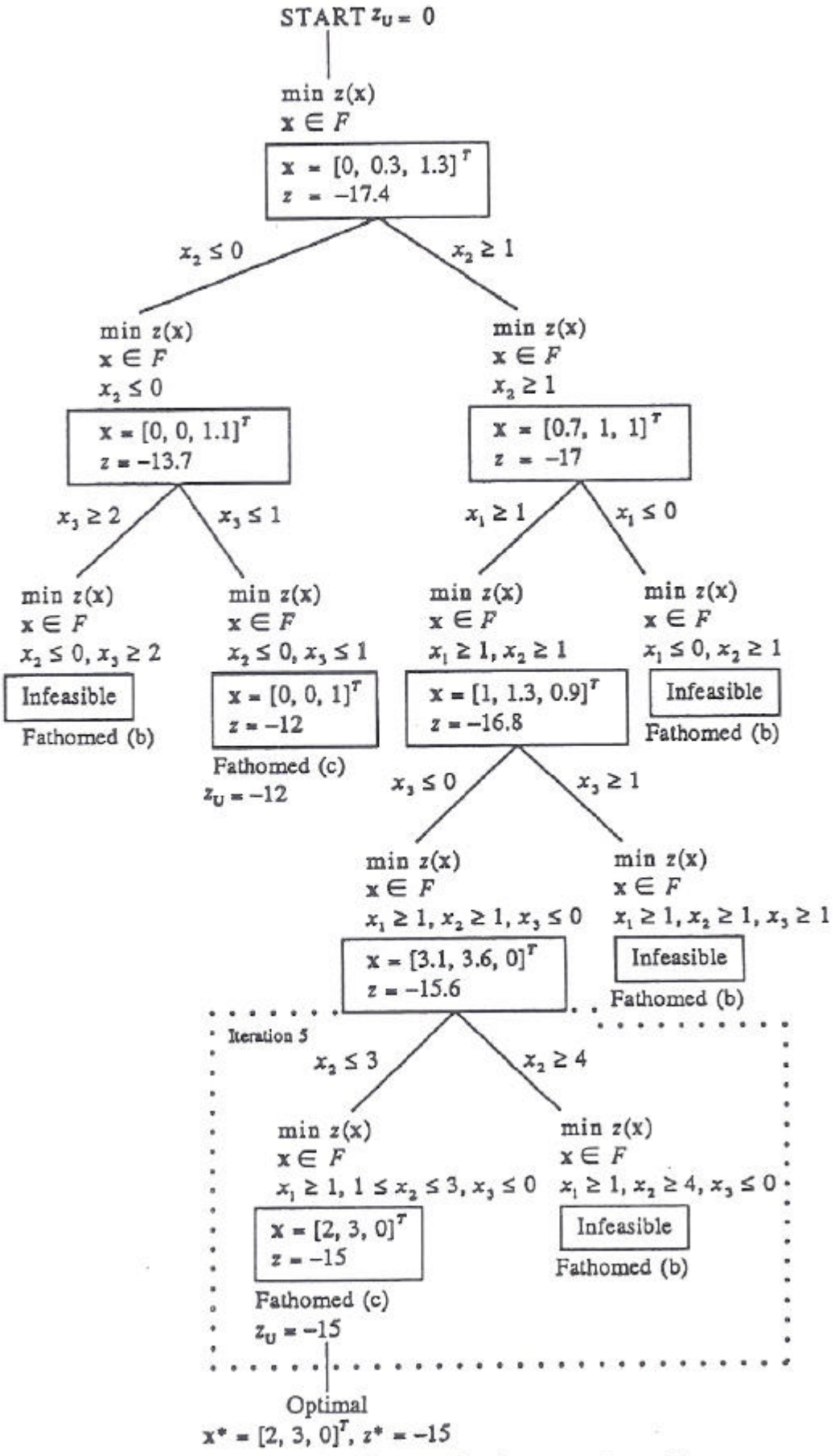


**FIGURE 8.4*e*** **Complete branching diagram for the example problem.**