# Example - Branch and Bound

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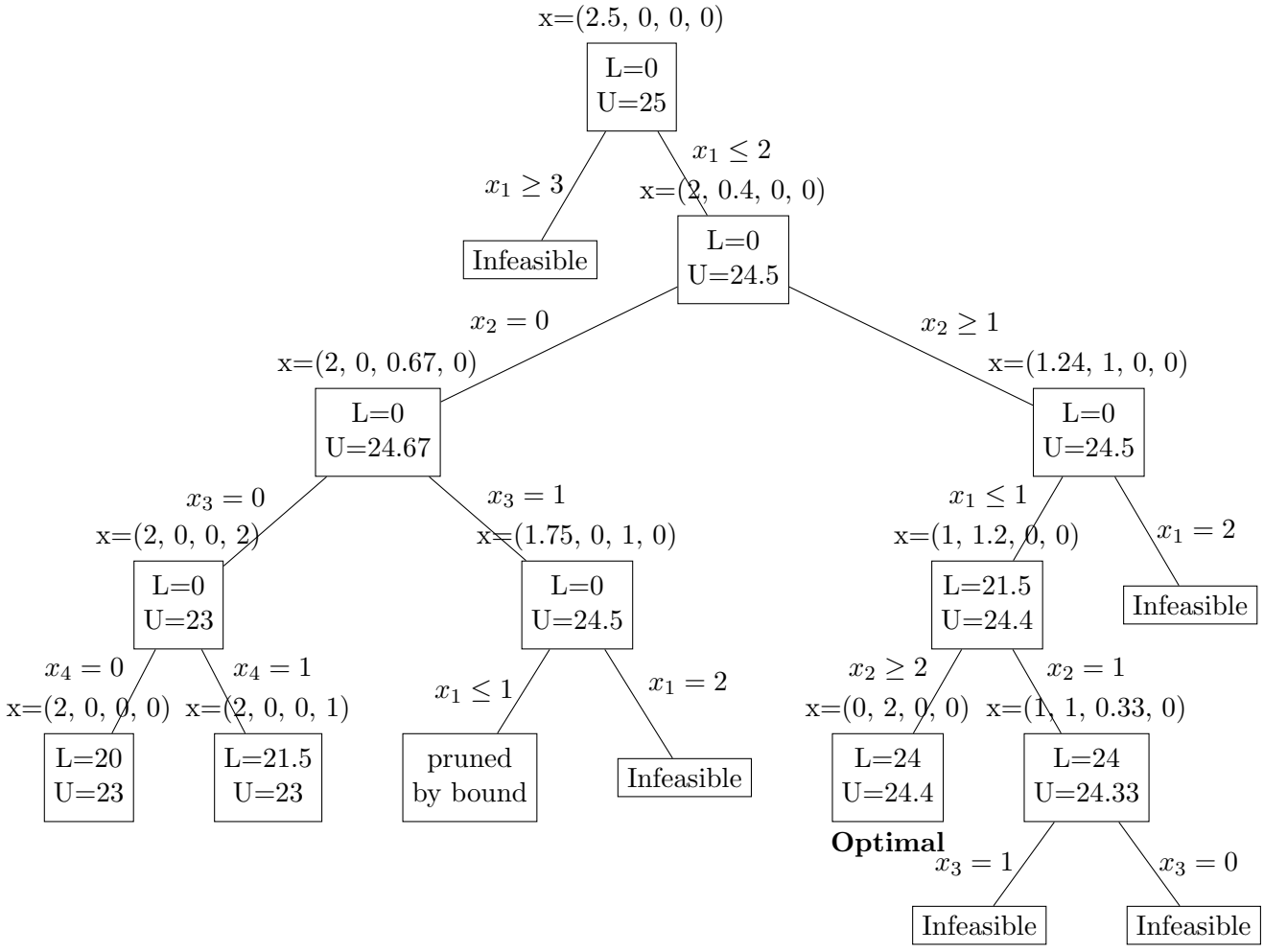
Solve the following knapsack problem via branch-and-bound.

$$\begin{aligned} \max \quad & 10x_1 + 12x_2 + 7x_3 + \frac{3}{2}x_4 \\ \text{s.t.} \quad & 4x_1 + 5x_2 + 3x_3 + x_4 \geq 10 \\ & x_1, x_2 \in \mathbb{Z}_+ \\ & x_3, x_4 \in \{0, 1\} \end{aligned}$$

The branch and bound tree is as following:




By branch and bound, we can get the optimal solution as 24 where $x_1 = 0, x_2 = 2, x_3 = 0, x_4 = 0$.