The following question comes from the book "Operations Research: Applications and Algorithms" by Wayne L. Winston and Jeffrey B. Goldberg. I have edited it to remove some ambiguity about the constraints.

Problem 5 (10 points)**.** Brady Corporation produces cabinets. Each week, it requires 90,000 cu ft of processed lumber. The company may obtain lumber in two ways. First, it may purchase lumber from an outside supplier and then dry it in the supplier's kiln. Second, it may chop down logs on its own land, cut them into lumber at its sawmill, and finally dry the lumber in its own kiln.

Brady can purchase grade 1 or grade 2 lumber from the supplier. Grade 1 lumber costs \$3 per cu ft and, when dried, yields 0.7 cu ft of useful lumber. Grade 2 lumber costs \$7 per cubic foot and, when dried, yields 0.9 cu ft of useful lumber. Each week, up to 40,000 cu ft of grade 1 lumber and up to 60,000 cu ft of grade 2 lumber can be purchased.

It costs the company \$3 to chop down a log. A log is 1 cu ft before being dried; after being cut and dried, a log yields 0.8 cu ft of lumber. Brady incurs costs of \$4 per cu ft of lumber dried (this cost refers to the number of cubic feet before drying). Each cu ft of log (before drying) costs \$2.50 to send through the sawmill. Each week, the sawmill can process up to 35,000 cu ft of lumber (again, measured before drying).

Each week, 40 hours of time are available for drying lumber at each kiln. (So the total amount of lumber purchased from the supplier (both grade 1 and grade 2 together) must be able to be dried in 40 hours—and, the total amount of lumber Brady corporation dries in its own kiln must be able to be dried in 40 hours.) The time it takes to dry 1 cu ft of grade 1 lumber, grade 2 lumber, or logs is as follows: grade 1: 2 seconds; grade 2: 0.8 second; log: 1.3 seconds.

Formulate an LP to help Brady minimize the weekly cost of meeting the demand for processed lumber. You do not need to implement it or prove that it is correct.