Solving the unbalanced Assignment Problem

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1520.

The assignment problem is a standard topic discussed in operations research textbooks (see for example, Hillier and Lieberman [1] or Winston [2]). A typical presentation requires that n jobs must be assigned to n machines such that each machine gets exactly one job assigned to it. If the number of jobs is not equal to the number of machines, then the assignment problem is first balanced. This requires that either dummy (fictitious) jobs or machines are added to the problem so that the number of jobs will equal the number of machines. The typical textbook solution to the balanced assignment problem is then found using Kuhn's [3] Hungarian method. Problems in which there are more jobs than machines and more than one job can be assigned to a machine can easily be handled as a balanced assignment problem with a little modeling effort. The idea is to "make copies" or "clone" the machines. This approach is discussed in Hillier and Lieberman [1] on page 336 with an example given in Table 8.29 on page 340. Also, problem 28 on page 411 of Winston [2] illustrates this modeling ap-proac