COSC 480/MATH 482
Hungarian Method Summary
Fall 2012

To solve an assignment problem, you could follow the previous examples and rely on simplex. However, there is another way - The Hungarian Method.

1. Subtract the smallest number in each row from every number in the row. Enter the results in a new table.
2. Subtract the smallest number in each column of this new table from every number in that row. Enter the results in another table.
3. Test whether an optimal set of assignments that can be made. You do this by determining the minimum number of lines needed to cover (cross out) all zeros (see step 6). If the minimum number equals the number of rows, an optimal set of assignments is possible. If so, move to step 6, otherwise go to step 4.
4. If the number of lines is less than the number of rows, modify the table in the following way:
   (a) Subtract the smallest uncovered number from every uncovered number in the table.
   (b) Add the smallest uncovered number to the numbers at intersections of covering lines.
   (c) Numbers crossed out but not at the intersections of cross-out lines carry over unchanged to the next table.
5. Repeat steps 3 and 4 until an optimal set of assignments is possible.
6. Make the assignments one at a time in positions that have zero elements. Begin with rows or columns that have only one zero. Since each row and each column needs to receive exactly one assignment, cross out both the row and the column involved after each assignment is made. Then move on to the rows and columns that are not yet crossed out to select the next assignment, with preference again given to any such row or column that has only one zero that is not crossed out. Continue until every row and every column has exactly one assignment and so has been crossed out. The 0 locations chosen in this process represents the assignment. The assignment made this way is optimal.