Q: Design a greedy algorithm for the assignment problem (see Section 3.4). Does your greedy algorithm always yield an optimal solution?

A: Greedy technique is applicable either to the entire cost matrix or to each of its rows (or columns):

> If greedy technique is applied to the entire cost matrix, the algorithm is to repeat the operations *n* times, choose the smallest element in the row, then mark the column so no element is chosen from the same column.
>
> If greedy technique is applied to each of its rows (or columns), the algorithm is to choose the smallest element in the row that is in an unmarked column, starting from the first row until the last row. Then, mark the column so no element is chosen from the same column.

Both approaches do not always yield an optimal solution. A counterexample would be:

$$C = \begin{bmatrix} 4 & 8 \\ 3 & 15 \end{bmatrix}$$

Using the greedy technique, the smallest element chosen in the first row is the one in the first column, while the smallest element chosen in the second row, although is supposedly the element in the first column, is instead the element in the second column since the first column has been marked.