In class, we asked the following question:

Question 1. *Consider the following two Latin squares L, M described below:*

$$L = \begin{array}{|c|c|c|c|} \hline 1 & 2 & 3 & 4 \\ \hline 2 & 1 & 4 & 3 \\ \hline 3 & 4 & 1 & 2 \\ \hline 4 & 3 & 2 & 1 \\ \hline \end{array}, \quad L = \begin{array}{|c|c|c|c|} \hline 1 & 2 & 3 & 4 \\ \hline 2 & 3 & 4 & 1 \\ \hline 3 & 4 & 1 & 2 \\ \hline 4 & 1 & 2 & 3 \\ \hline \end{array}.$$

Show that no matter how you permute the columns or rows of L, you cannot get the Latin square M.

Solve this problem, write up its solution in LATeX, and turn it in on Friday along with the problems from Wednesday!