

MATH 354: Homework 12

Due: April 21, 2022 at 11:00 am

1. Upcoming office hours are Monday April 18 3-4 pm and Thursday April 21 9-10 am.
2. Reading is Sections 5.1-2 in Kolman and Beck.
3. Solve the assignment problem for the cost matrix shown.

$$C = \begin{bmatrix} 3 & 2 & 5 & 8 & 9 \\ 6 & 7 & 4 & 2 & 3 \\ 7 & 5 & 7 & 6 & 4 \\ 4 & 7 & 3 & 2 & 4 \\ 3 & 7 & 6 & 6 & 4 \end{bmatrix}$$

4. Solve the assignment problem for the cost matrix shown.

$$C = \begin{bmatrix} 1 & 6 & 3 & 4 & 4 \\ 1 & 2 & 4 & 2 & 1 \\ 4 & 2 & 2 & 8 & 2 \\ 3 & 7 & 6 & 6 & 5 \\ 1 & 2 & 4 & 2 & 5 \end{bmatrix}$$

5. A company leases offices fifteen identical offices along one side of a hall in a large office building, numbered 701 through 715. Because of a recent series of job reassignments some desks in some of the offices must be moved: specifically, the desks in 702, 705, 708, 709, and 713 must be moved to 706, 707, 710, 714, and 715. It does not matter which desk goes to which office. What assignment of desks to new offices minimizes the effort that will be needed to move them?
6. A manager has five employees and five possible projects she could assign them to. Because the employees have different training and skillsets, there is some variable amount of value c_{ij} that will result from the i th employee doing the j th job, given by the matrix below.

$$C = \begin{bmatrix} 3 & 2 & 1 & 4 & 5 \\ 1 & 5 & 9 & 2 & 6 \\ 6 & 3 & 7 & 5 & 5 \\ 2 & 8 & 5 & 3 & 5 \\ 1 & 5 & 7 & 6 & 5 \end{bmatrix}$$

Determine how the manager can assign the employees to projects such that the amount of value produced will be maximized. (Note that this requires you to first decide how to change this problem into one that can be solved by the Hungarian method, which is meant to require minor thinking.)