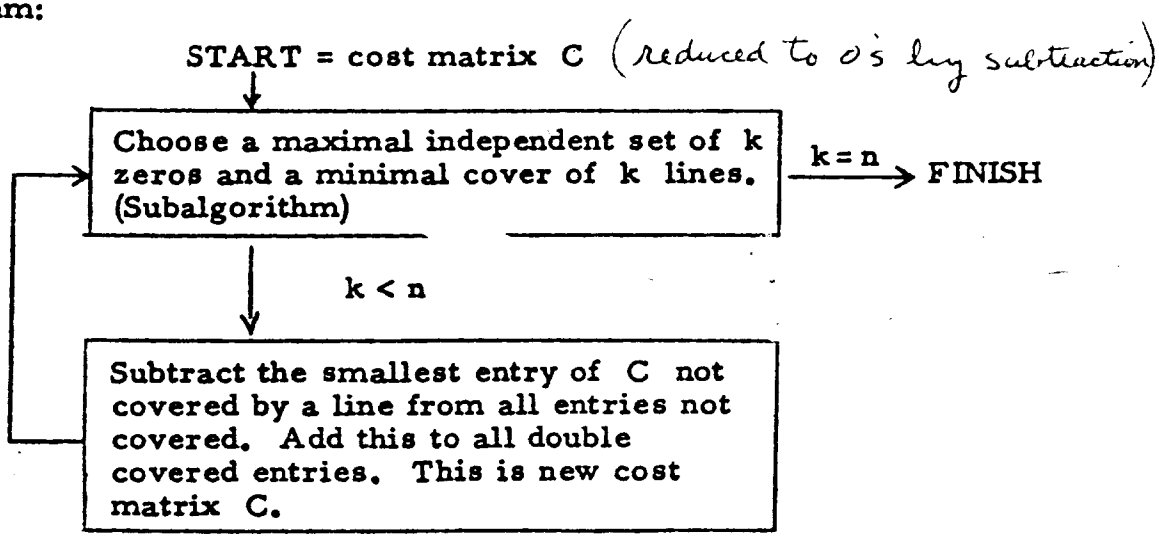
THE HUNGARIAN METHOD

Notation and Terminology: Square matrix of nonnegative real numbers $C = (c_{ij})$ where $i, j = 1, \ldots, n$, called a cost matrix. An assignment is a set of n entries from C, such that no two lie on the same line (= row or column). A set of zeros in C is said to be independent if no two lie in the same line. A set of lines is called a cover if it contains all of the zeros in C.

Assignment Problem: Find an assignment which minimizes the sum of its entries.

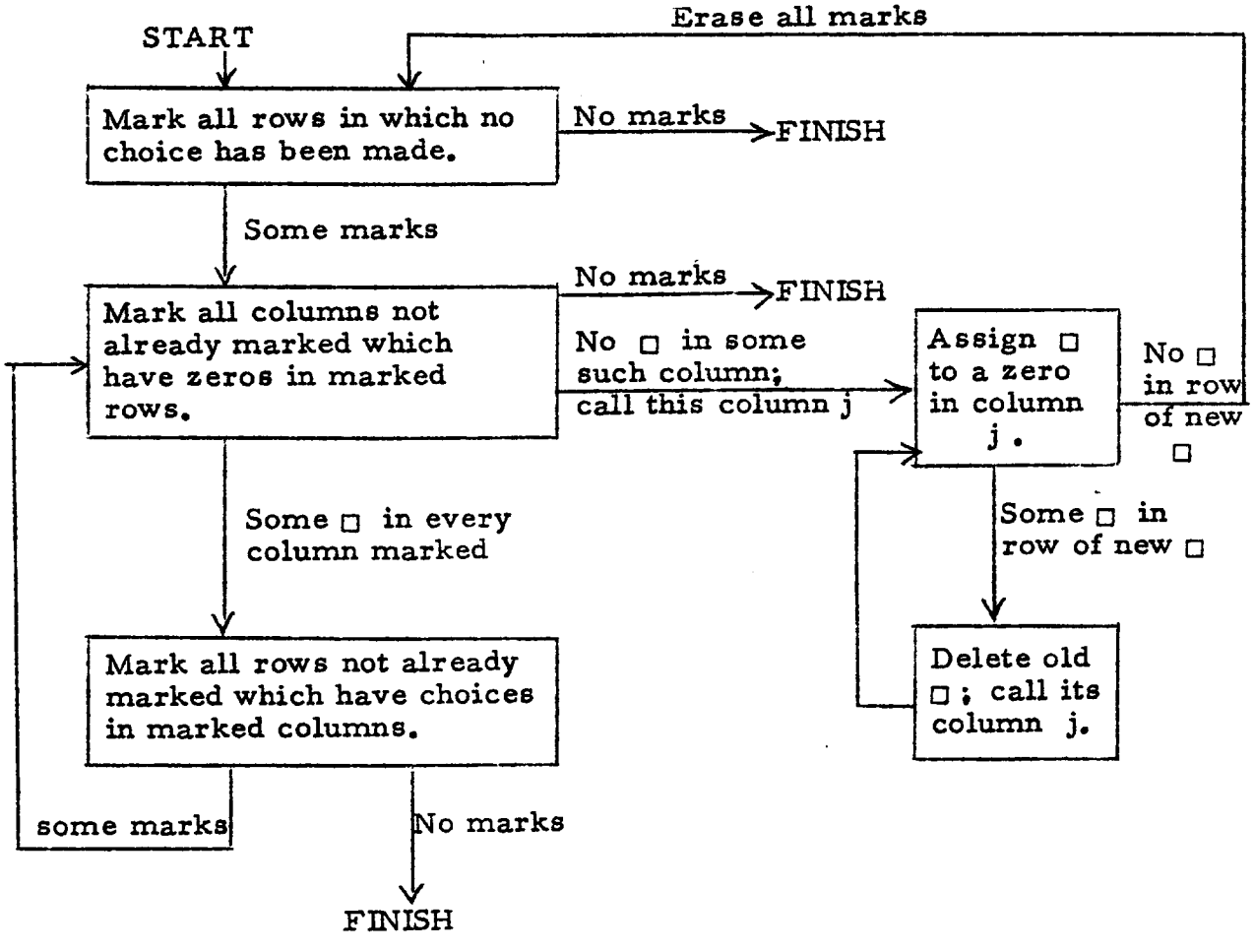
Algorithm:



FINISH = maximal independent set of n zeros determines optimal assignment for cost matrix C.

Subalgorithm:

START = Array C in which an independent set of zeros has been designated (□).
The designated zeros are called choices.



FINISH = Draw lines through all unmarked rows and all marked columns.

THEOREM. This set of lines is a minimal cover and the final set of choices is a maximal independent set.

MAX = MIN .

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