Practice 3.1: Assignment
Combinatorial optimization

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Hungarian method

START

DRAW A COST MATRIX FOR THE PROBLEM

IS IT A CASE OF MAXIMISATION ? → YES → CONVERT THE MATRIX INTO MINIMIZATION MATRIX BY SUBTRACTING ALL ELEMENTS OUT OF THE HIGHEST ELEMENT OF THE MATRIX

NO

IS IT A BALNCED CASE ? → NO → ADD DUMMY COLUMNS OR ROWS TO BALANCE IT.

YES

FIND THE OPPORTUNITY COST
A.   SUBSTRACT THE SMALLEST ELEMENT IN EACH ROW FROM EVERY ELEMENT IN THAT ROW
B.   IN THE REDUCED MATRIX REPEAT THIS PROCESS COLUMNWISE.

➤ MAKE ASSIGNMENT ROWWISE HAVING ONLY ONE ZERO & ELIMINATE ROW AND COLUMN ONCE THE ASSIGNMENT IS MADE.
➤ REPEAT SAME PROCESS COLUMNWISE.

IS THE NUMBER OF ASSIGNMENTS EQUAL THE NUMBER OF ROWS OR COLUMNS ? → NO → REVISE OPPORTUNITY COST TABLE
a.   DRAW MINIMUM POSSIBLE LINES ON COLUMNS AND/OR ROWS SO AS TO COVER ALL ZEROS.
b.   CHOOSE THE SMALLEST NUMBER NOT COVERED BY THE LINES. SUBTRACT IT FROM ITSELF AND EVERY OTHER UNCOVERED NUMBER.
c.   ADD THIS NUMBER AT THE INTERSECTION OF ANY TWO LINES.

YES

**THIS IS THE OPTIMUM SOLUTION **