TRANSPORTATION

- Verify the nature of data
  - Balanced data → Total demand = supply
  - Unbalanced data → demand ≠ supply → convert into balance by inserting dummy row/coloumn for the Qty (zeros)

- **Initial basic feasible solution** (IBFS)
  - North-west corner → Allocations are made starting from top-left corner Cell i.e (N/west)
  - least cost → Allocations are made starting with least cost element
  - Vogel's Approximation method → Allocations are made starting with the cell which has highest opportunity cost i.e penalty
    - If tie in penalty Select the one with highest Qty
      - Qty also tie, then arbitrage i.e anything can do

→ Allocate Qty = Required / Availed ↓

→ Eliminate the row/coloumn that has been satisfied.

- Degeneracy check:
  - → Non-degenerate
    - no. of allocations = m+n-1
    - m = no. of rows
    - n = no. of coloumns
  - → degenerate
    - no. of allocations ≠ m+n-1
    - Allocate Very small independent (e) value to least cost & from where "loop" is not to possible.
    - Smallest independent unallocated cell

optimality test:

① calculate u+v for allocated cells — put zero @ first row (or) where there are max allocah

② calculate u+v for unallocated cells — Implied cost matrix

③ Opportunity cost matrix for unallocated cells

ΔOC = Actual cost − Implied cost

$$\Delta = c_{ij} - u_i + v_i$$

c = actual cost

Net Evaluation test

① Δ_{ij} matrix (all elements) ≥ 0 → optimal

② Any element in Δ_{ij} is Negative — Not optimal & loop shall be formed to do as optimal

③ Any one of element = 0 (many zero's − many alter)

↓

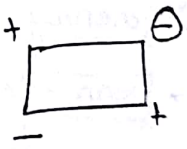
possibility of alternative.

* loop (for assigning 'e' value)

① start from the cell.

② Takes turns at only allocated cells
(If you may come across allocated & unallocated but turns @ unallocated)..

③ Reach back where started.



If **NE ≤ 0 i.e Negative** then loop should be as follows

→ select the cell with least cost (worst Negative No)
→ Trace a closed loop which begins & ends @ choosen cell
→ where loop started put '+' sign & go alternative symbols i.e − @ turns
→ see all the negative symbols & choose least cost (qty should be ↑ +, & −ve)
→ adjust & make new matrix.

Types of models

→ Unbalanced problem → dummy insertion

, prohibited routes → 'M'

, max model → convert to minimi & do as & computing profit - see profit table

→ Unique solution | alternative | multiple — (NE = 0)

→ NE = 0 for allocated cell (Generally)

problem is) degeneracy = ?

- Assignment → No. of lines = order of matrix
- Transportation → No. of allocations = m+n-1

} non degeneracy

Extra points:

→ When problem is given indirectly about profit

profit = SP − production cost − material cost − transportation cost

& do as normal (1) convert into minimize & ... same transportation process

↓

while doing Δ_{ij} matrix (minimised matrix (converted matrix) − implied matrix)

But while computing max. profit (last answer) − profit (max) table (before conversion) only considered.