OR LAB

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Problem1:

Checking for Optimality Manually

| Depot / Unit | $B_1$ | $B_2$ | $B_3$ | $B_4$ | Stock |
|---|---|---|---|---|---|
| $A_1$ | $c_{11}$=2 | $c_{12}$=3 | $c_{13}$=5 | $c_{14}$=1 | $a_1$=8 |
| $A_2$ | $c_{21}$=7 | $c_{22}$=3 | $c_{23}$=4 | $c_{24}$=6 | $a_2$=10 |
| $A_3$ | $c_{31}$=4 | $c_{32}$=1 | $c_{33}$=7 | $c_{34}$=2 | $a_3$=20 |
| Requirement | $b_1$=6 | $b_2$=8 | $b_3$=9 | $b_4$=15 | = =38 |

| Depot / Unit | $B_1$ | $B_2$ | $B_3$ | $B_4$ | Stock |
|---|---|---|---|---|---|
| $A_1$ | 6(2) | 2(3) | × | × | 8 |
| $A_2$ | × | 6(3) | 4(4) | × | 10 |
| $A_3$ | × | × | 5(7) | 15(2) | 20 |
| Requirement | 6 | 8 | 9 | 15 | 38 |

Vector U:{0, 0, 3}

Vector V:{2, 3, 4, -1}

Penalties for(cij-ui-vj):

cell(1,3): 5-0-4 = 1;

cell(1,4): 1-0+1 = 2;

cell(2,1): 7-0-2 = 5;

cell(2,4): 6-0+1 = 7;

cell(3,1): 4-3-2 =-1;

cell(3,2): 1-3-3 = -5;

Optimality not reached yet, as all penalties are not positive.

```
The initial problem:
    2     3     5     1     8
    7     3     4     6    10
    4     1     7     2    20
    6     8     9    15    38

Finding Initial BFS using NorthWest Corner Method...

Initial table(-1 represent unallocated cells) ->
    6     2    -1    -1
   -1     6     4    -1
   -1    -1     5    15


Current Cost:117

Finding Initial BFS using Matrix Minima Method...

Initial table(-1 represent unallocated cells) ->
   -1    -1    -1     8
    1    -1     9    -1
    5     8    -1     7


Current Cost:93
```

```
Iteration: 1
Current cost: 117
Ui_vec: 0 0 3
Vj_vec: 2 3 4 -1
Optimality NOT yet reached!
Loop Found
Table 1 ->
    6     2    -1    -1
   -1     1     9    -1
   -1     5    -1    15


Iteration: 2
Current cost: 92
Ui_vec: 0 0 -2
Vj_vec: 2 3 4 4
Optimality NOT yet reached!
Loop Found
Table 2 ->
    6    -1    -1     2
   -1     1     9    -1
   -1     7    -1    13


Iteration: 3
Current cost: 86
Ui_vec: 0 3 1
Vj_vec: 2 0 1 1
Optimality reached!


Final cost: 86
```

Problem 2:

```
The initial problem:
   19    30    50    10     7
   70    30    40    60     9
   40     8    70    20    18
    5     8     7    14    34

Finding Initial BFS using NorthWest Corner Method...

Initial table(-1 represent unallocated cells) ->
    5     2    -1    -1
   -1     6     3    -1
   -1    -1     4    14


Current Cost:1015

Finding Initial BFS using Matrix Minima Method...

Initial table(-1 represent unallocated cells) ->
   -1    -1    -1     7
    2    -1     7    -1
    3     8    -1     7


Current Cost:814


Iteration: 1
Current cost: 1015
Ui_vec: 0 0 30
Vj_vec: 19 30 40 -10
Optimality NOT yet reached!
Loop Found
Table 1 ->
    5     2    -1    -1
   -1     2     7    -1
   -1     4    -1    14
```

```
Iteration: 2
Current cost: 807
Ui_vec: 0 0 -22
Vj_vec: 19 30 40 42
Optimality NOT yet reached!
Loop Found
Table 2 ->
    5    -1    -1     2
   -1     2     7    -1
   -1     6    -1    12


Iteration: 3
Current cost: 743
Ui_vec: 0 32 10
Vj_vec: 19 -2 8 10
Optimality reached!


Final cost: 743
```