

### Exercise

Solve the following assignment problem using Hungarian method

The matrix entries represent processing time in hours

A-

man \ job	1	2	3	4	5
A	9	11	14	11	7
B	6	15	13	13	10
C	12	13	6	8	8
D	11	9	10	12	9
E	7	12	14	10	14

$P_k$   
**7**  
**6**  
**6**  
**9**  
**7**

We note #Row = # column, we can solve this problem.  $P_k = \min\{c_{kj} : j = 1, 2, \dots, n\}$

	1	2	3	4	5
A	2	4	7	4	0
B	0	9	7	7	4
C	6	7	0	2	2
D	2	0	1	3	0
E	0	5	7	3	7
$q_k$	0	0	0	2	0

	1	2	3	4	5
A	2	4	7	2	0
B	0	9	7	5	4
C	<del>6</del>	<del>7</del>	<del>0</del>	<del>0</del>	<del>2</del>
D	2	0	1	1	0
E	0	5	7	1	7

$$h = \min\{cell(i, j) \text{ is not covered}\} = 1$$

	1	2	3	4	5
A	2	4	6	1	0
B	0	9	6	4	4
C	<del>7</del>	<del>8</del>	<del>0</del>	<del>0</del>	<del>3</del>
D	<del>2</del>	<del>0</del>	<del>0</del>	<del>0</del>	<del>0</del>
E	0	5	6	0	7

$$x_{15} = x_{21} = x_{54} = x_{33} = x_{42} = 1$$

Optimum solution

Man	1	2	3	4	5
Job	B	D	C	E	A
Man hours	6	9	6	10	7

$$Time = Z^* = 38 \text{ hours}$$

B-

	A	B	C	D
1	1	6	4	3
2	0	7	2	1
3	3	7	2	4
4	4	6	5	7
5	3	2	4	6

We note #Row  $\neq$  # column, we can solve this problem.

	A	B	C	D	Dummy
1	1	6	4	3	0
2	0	7	2	1	0
3	3	7	2	4	0
4	4	6	5	7	0
5	3	2	4	6	0
q <sub>k</sub>	0	2	2	1	0

	A	B	C	D	Dummy
1	1	4	2	2	0
2	0	5	0	0	0
3	3	5	0	3	0
4	4	4	3	6	0
5	3	0	2	5	0

	A	B	C	D	Dummy
1	0	4	2	1	0
2	0	6	1	0	1
3	2	5	0	2	0
4	3	4	3	5	0
5	2	0	2	4	0

$$x_{45} = x_{52} = x_{33} = x_{24} = x_{11} = 1$$

Optimum solution

Man	1	2	3	4	5
Job	A	D	C	dummy	B
Man hours	1	1	2	-	2

Time =  $Z^* = 6$  hours

**H.W**

Solve the following assignment problem using Hungarian method.

	A	B	C
1	20	15	31
2	17	16	33
3	18	19	27