

Example (Assignment Problem):

Each day an airline operates the following flights between two cities X and Y.

Flight No.	Departure X	Arrival Y
1	9.00	11.00
2	10.00	12.00
3	15.00	17.00
4	19.00	21.00
5	20.00	22.00

Flight No.	Departure Y	Arrival X
11	8.00	10.00
12	9.00	11.00
13	14.00	16.00
14	20.00	22.00
15	21.00	23.00

The company wishes to pair the arriving flights with the departing flights at both X and Y so as to minimize time on the ground (subject to this being at least one hour to allow for refueling). Use the assignment technique to carry out this pairing.

The arrays below show the time on the ground for each possible pairing.

At X In/Out	1	2	3	4	5
11	23	24	5	9	10
12	22	23	4	8	9
13	17	18	23	3	4
14	11	12	17	21	22
15	10	11	16	20	21

At Y In/Out	11	12	13	14	15
1	21	22	3	9	10
2	20	21	2	8	9
3	15	16	21	3	4
4	11	12	17	23	24
5	10	11	16	22	23

Solution:

At X In/Out	1	2	3	4	5
11	23	24	5	9	<u>10</u>
12	22	23	<u>4</u>	8	9
13	17	18	23	<u>3</u>	4
14	<u>11</u>	12	17	21	22
15	10	<u>11</u>	16	20	21

At Y In/Out	11	12	13	14	15
1	21	22	3	9	<u>10</u>
2	20	21	<u>2</u>	8	9
3	15	16	21	<u>3</u>	4
4	<u>11</u>	12	17	23	24
5	10	<u>11</u>	16	22	23

Thus at X, pairing are

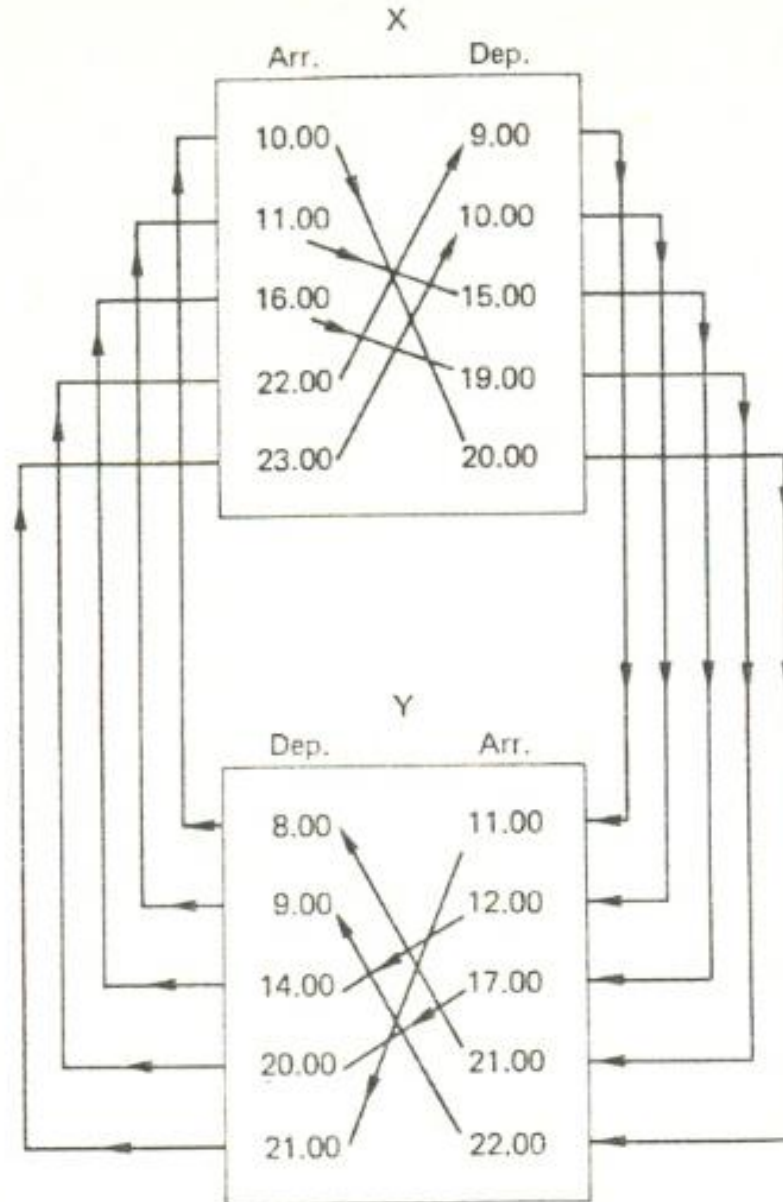
11→5, 12→3, 13→4, 14→1, 15→2; and

at Y, pairings are

1→15, 2→13, 3→14, 4→11, 5→12;

so sequence is

1→15→2→13→4→11→5→12→3→14→1 etc.



Thus the airplane that leaves X at 9.00 on Monday completes all flights in the schedule by 22.00 on Thursday and is ready to start the sequence again at 9.00 on Friday. Thus 4 airplanes are needed to operate the schedule.