Mohammad Ali Jinnah University
Department of Computer Science
CS2420: Operations Research
Semester Spring 2022

Dated: 24th May 2022
Due Date: 31st May 2022 **(In class)**
Home Work # 8
Total Points 50

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Teacher: Dr. Abdul Qadar Kara

Section: BM

ASSIGNMENT PROBLEM (20 points, 10 points each)

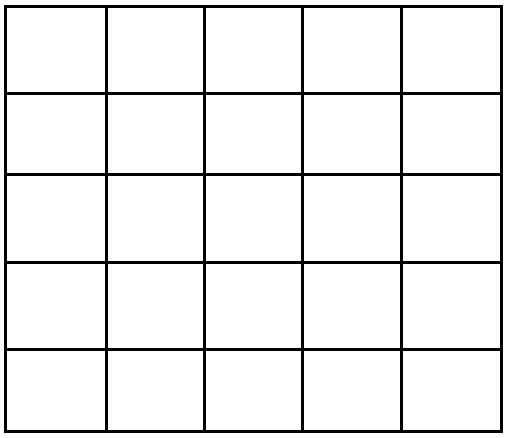
Solve the following assignment problem using the Hungarian method. Show all the steps. Compute z for the solution.

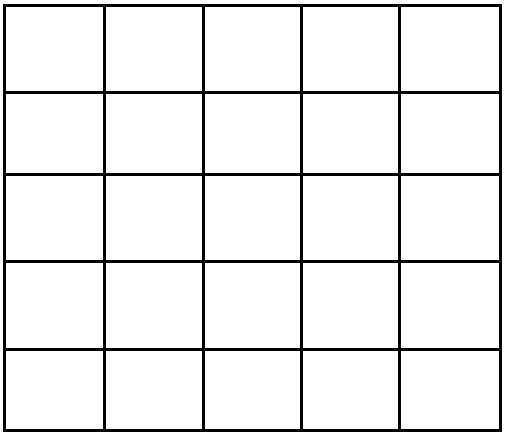
7	8	6	7	7
6	5	2	7	5
6	3	2	7	5
9	8	2	10	3
8	4	12	3	5

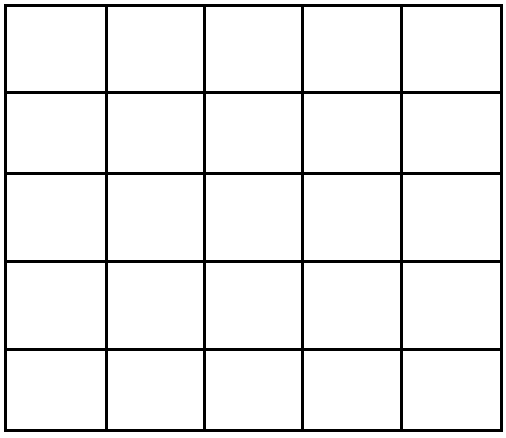
11	10	18	5	9
14	13	12	19	6
5	3	4	2	4
15	18	17	9	12
10	11	19	6	14

1)

2)







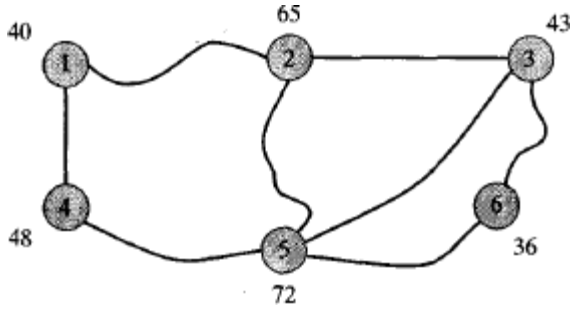
INTEGER LINEAR PROBLEM FORMULATION (10 points each)

1. The River City redevelopment authority wants to add a minimum of one thousand new parking spacesin downtown area. The following table shows the estimated cost (in millions of dollars) of the four proposed projects and a number of spaces each would yield (in hundreds). The goal is to minimize cost.

	Project			
	1	2	3	4
Cost	16	9	11	13
Spaces	8	3	6	6

Formulate it as an ILP problem.

2. The following map shows the 8 intersections at which automatic traffic monitoring devices might beinstalled. A station at any particular node can monitor all the road links meeting that intersection. Numbers next to node reflect the monthly cost (in thousands of dollars) of operating a station at that location.



Formulate the problem as an ILP that minimizes monthly cost.

3. For the above problem, add the following constraints.
   (i) If there is a device installed at node 1, then there should be a device installed at node 5.
   (ii) Either there is a device installed at node 5 or at node 3 but not both.
   (iii) If there is a device installed at node 4, then there should be a device installed at node 6 and vice versa.