

Assignment Problem Examples and Solutions

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1 Assignment Problem 1 and the Solution

1.1 The Problem

	Task 1	Task 2	Task 3
Worker 1	10	17	9
Worker 2	11	19	14
Worker 3	12	15	12

Table 1: Times required to perform tasks by workers

1.2 The Mathematical Model

$$\min z = 10x_{11} + 17x_{12} + 9x_{13} + \dots + 15x_{32} + 12x_{33}$$

Subject to:

$$x_{11} + x_{12} + x_{13} = 1$$

$$x_{21} + x_{22} + x_{23} = 1$$

$$x_{31} + x_{32} + x_{33} = 1$$

$$x_{11} + x_{21} + x_{31} = 1$$

$$x_{12} + x_{22} + x_{32} = 1$$

$$x_{13} + x_{23} + x_{33} = 1$$

$$x_{ij} \in \{0, 1\}$$

$$i = 1, 2, 3$$

$$j = 1, 2, 3$$

1.3 The Solution

	Task 1	Task 2	Task 3
Worker 1			✓
Worker 2	✓		
Worker 3		✓	

Table 2: Cost is 35

2 Assignment Problem 2 and the Solution

2.1 The Problem

	Task 1	Task 2	Task 3	Task 4
Worker 1	10	17	9	16
Worker 2	11	19	14	8
Worker 3	12	15	12	7
Worker 4	9	16	19	19

Table 3: Times required to perform tasks by workers

2.2 The Solution

	Task 1	Task 2	Task 3	Task 4
Worker 1			✓	
Worker 2				✓
Worker 3		✓		
Worker 4	✓			

Table 4: Cost is 41

3 Assignment Problem 3 and the Solution

3.1 The Problem

	Task 1	Task 2	Task 3	Task 4	Task 5
Worker 1	17	19	12	16	21
Worker 2	19	11	15	8	10
Worker 3	9	15	12	7	14
Worker 4	16	13	22	19	22
Worker 5	8	14	19	17	10

Table 5: Times required to perform tasks by workers

3.2 The Solution

	Task 1	Task 2	Task 3	Task 4	Task 5
Worker 1			✓		
Worker 2					✓
Worker 3				✓	
Worker 4		✓			
Worker 5	✓				

Table 6: Cost is 50