



DESIGN AND ANALYSIS OF ALGORITHMS

UE19CS251

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Assignment Problem

Major Slides Content: Anany Levitin

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- There are n people who need to be assigned to n jobs, one person per job. The cost of assigning person i to job j is $C[i, j]$. Find an assignment that minimizes the total cost

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The Assignment Problem

Example

	Job 1	Job 2	Job 3	Job 4
Person 1	9	2	7	8
Person 2	6	4	3	7
Person 3	5	8	1	8
Person 4	7	6	9	4

Algorithmic Plan

1. Generate all legitimate assignments
2. Compute their costs
3. Select the cheapest one

The Assignment Problem by Exhaustive Search

Assignment	Cost
1, 2, 3, 4	$9 + 4 + 1 + 4 = 18$
1, 3, 4, 2	$9 + 8 + 9 + 7 = 33$
1, 4, 3, 2	$9 + 6 + 1 + 7 = 23$
1, 4, 2, 3	$9 + 6 + 3 + 8 = 26$
1, 3, 2, 4	$9 + 8 + 3 + 4 = 24$
1, 2, 4, 3	$9 + 4 + 9 + 8 = 30$

etc.,

Efficiency

- The Assignment Problem is solved by generating all permutations of n
- The number of permutations for a given number n is $n!$
- Therefore, the exhaustive search is impractical for all but very small instances of the problem



THANK YOU

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