## ASSIGNMENT-10

TLILE: TSP USING DP

PROBLEM STATEMENT: Junplement TSP veing DP.

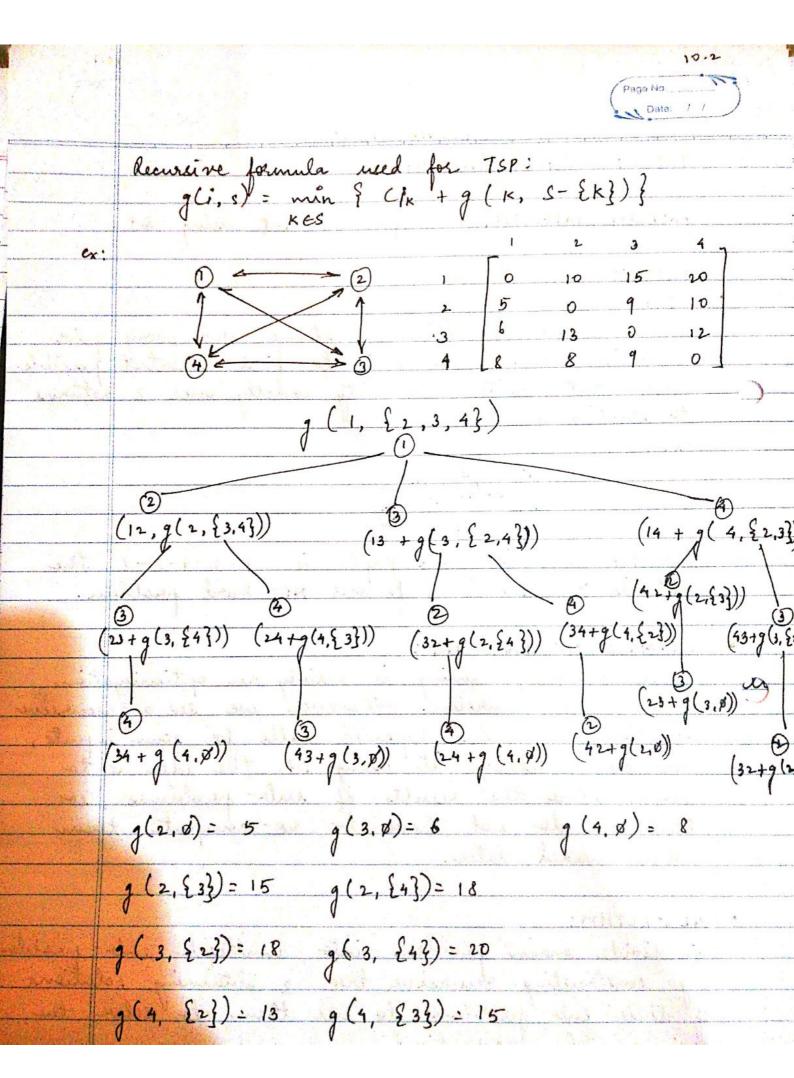
given a set of rities & distance b/w every pair of cities, the problem is to find shortest possible route that visits every city exactly once & returns to starting point.

The TSP tour in alrove graph is 1-2-4-3-1. The cost is 80. TSP is a famous NP-hard problem.

DYNAMIC PROGRAMMING: Dynamic programming is mainly an optimization over plain recursion. Wherever we see a recursive solution that has repeated ralls for some inputs, we can optimize it veing DP. The idea is to simply store the results of sub-problems, so that we do not have to re-compute them when needed later. when needed later.

· ALGOLITHM:

by constructing recursive tree & obtaining solutions of these sub-problems to use them to solve the diain problem collectively.





 $g(2, \{3,4\}) = 25$   $g(3, \{2,4\}) = 25$   $g(4, \{2,3\}) = 23$ g(1, {2,3,43): 35 is the min. cost. Data - structure need for TSP neing &P is graph. • TIME COMPLEXITY:
0(n.2") \* 0(n) total us. of line taken to unique solve each out -problems poslelem. total time complexity = 0 (n2,2") · SPACE COMPLEXITY: Noing D!, we need to construct a table of eine (n-1) 2? To solve. We get better results using DP as compared to Brute Force without to solve TSP. Thus we have implemented & understood the concept of TSP & solved it using DP.