The second of	Shreya Thigale
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	-ASSIGNMENT-10
	11-1KE: Travelling Salesman Problem (DP)
	J
	PROBLEM STATEMENT:
	1) of a program to solve the travelling
	ord to visit the path and
	Orite a program to solve the travelling Salesman problem and to print the path and the cost using dynamic programming
	The cost using agrance prosper
	OBJECTIVE: To understand and implement deposition problem algorithm for solving Travelling salismus problem and study dynamic programming.
	To understand and problem of the Ralisman problem
	algorithm for solving travelley
	and study ayramic programming.
	CIMEORY:
	A travelling sales man is getting grady for big
	Sales tour. Starting at his hometown suitease en
	Sales lour. Starting on his position which
	0 11 1 180 111 11 11 11 11 11 11 11 11 11 11 11 1
	each of hes target cities is visited exactly once
	lefore he returns home. Given pairwise costs/
	distances between cities we have to find but
	ender in which he can will from
	the property of the second of
Š	Let G(V, E) be directed graph argining an
	het li(V,E) be directed graph defining an instance of paulling Salispuson problem
	instance of fracting satisfactory Let Cij be the cost of edge <i,;> Cij = Co if <i,j> closs not belong to & and let IVI=n.</i,j></i,;>
	il (ii) does not belong to & and let (VI=n.
	Without loss of generality, we may assume
Y	Without loss of generality, we may assume that every tour starts and ends at vertex 1.

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	So, solution space &	3 is down by
-	8= 21.T.11T	numertation of (2,3,,n)}
	181 = (n-1)! The Size	of 8 may be reduced by
	restricting 8 30 that	(1, i, i2, in 1) Eg
	iff < 9, ign > EE, C) < j < n+1 lo= in=1.
	The travelling salesn	nan problem is to find
1 (**	a tour of minimus	m cost.
	Dynamic Programming &	Strategy=
	whatever the initial	icy has the property that state and initial descision,
	are the remaining of	lescisions meest constitute an
	optimal policy will	h regard to state resulting
	from first ducision.	
	1/10/11) 11/00 /1/00/00 0	of optimality it follows:
	g (1, V-(13) = min (C1x+g(k, V-(1, k))]
	<i>V</i>	
	Generalising, we obtain	in i
	0	2.1
	<u>g(i,s) = mén {C</u> jes	ij + g (j, 8-2js))
	EXAMPLE:	
	CANTILL	
	(1) (2)	[0 10 15 20]
		5 0 9 10
, :		6 13 0 12
	4 3	8 8 9 9

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	a(9 d) = c = 5; $a(3 d) = c = 6$; $a(4 d) = c = 8$		
	$g(2,\phi) = C_{11} = 5$; $g(3,\phi) = C_{31} = 6$; $g(4,\phi) = C_{41} = 8$		
	$g(2, [3]) = c_{23} + g(3, \emptyset) = 15$		
	$(g(2,(4)) - C_{24} + g(4,0) = 18)$		
	$g(2,\{4\}) = c_{94} + g(4, \emptyset) = 18;$ $g(3,\{2\}) = 18;$ $g(4,\{2\}) = 13;$ $g(4,\{3\}) = 15;$		
	(g (4, (2)) = 13; (4, (31) = 13)		
	0		
	g(2, (3, 43) = min (C23 + g(3, (4)), C24 + g(4, (8))) = 23		
	(g (3, (2,4)) = min [C32+ (9,14)), C34+ 7 (4,19))=23		
	$g(2, [3,4]) = min \{C_{23} + g(3, [4]), C_{34} + g(4, [3])\} = 25$ $(q(3, [2,4]) = min \{C_{32} + q(2, [4]), C_{34} + g(4, [2])\} = 25$ $(q(4, [2,3]) = min \{C_{42} + g(2, [3]), C_{43} + g(3, [2])\} = 23$		
	V		
	Tinally,		
	$finally,$ $g(1,12,3,41) = min \{C_{12} + g(2,13,41), C_{13} + g(3,12,41), C_{14} + g(4,12,31)\}$		
	C14 4 g (4/2,3))		
	= min (35,40(/43)		
	= 35		
	J (1, {2,3,4)=2		
	J (2, {3,43) = 4		
	T(1, 121) = 3		
	Final ontimal tour: 1-2-4-3-1		
	Final optimal tour: 1-2-4-3-1 Cost of tour = 35		
	ALGORITHM FOR TSP using DP:		
	7129014 1111		
	q(1,113) = 0		
	(1, 1)		
	Mor S=2 lando		
	for s=2 to n do for all subsets S of s and containing 1: g(1,8) = 8 for all j & S; j ≠ 1 do		
	$\frac{1}{2}\left(\frac{1}{2}\right) = 8$		
	V for all j ts, j ≠ 1 do		

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g (2,8) = min { Cij + g (j	,s-[j])j
jes	
 return min g (i, 8)	
Analysis :	
The love approach	is to explicate era.
The brute force approach possible four and return	the heat one of
there are Ch-171 parily 12/2/2/2	of soit in
then an (n-1)! possibilité	
n points, which results in	Klintone of U(n)
By dynamic programmic & There are at most 2°, r	
 There are al most 2°, y	subproblins and
each one takes lorear &	ene to solve. The
total surring line is	Therefore O(n2.2")
CONCLUSIONS	
0	
Thus we hour studied and structured that TSP seeming time as companion bruth force and also	the TRP 12/1.
and studied that TSP	121 DR +1 (-200)
running time as compa	1) 1 (2) ()
brutt live al	to (n-1): by
De lend allo	inglemented TSP by