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Artificial Intelligence
Lab - 2

Aim : To develop agent programs for Real World Problems, i.e., Travelling Salesman Problem (TSP)

Algorithm :

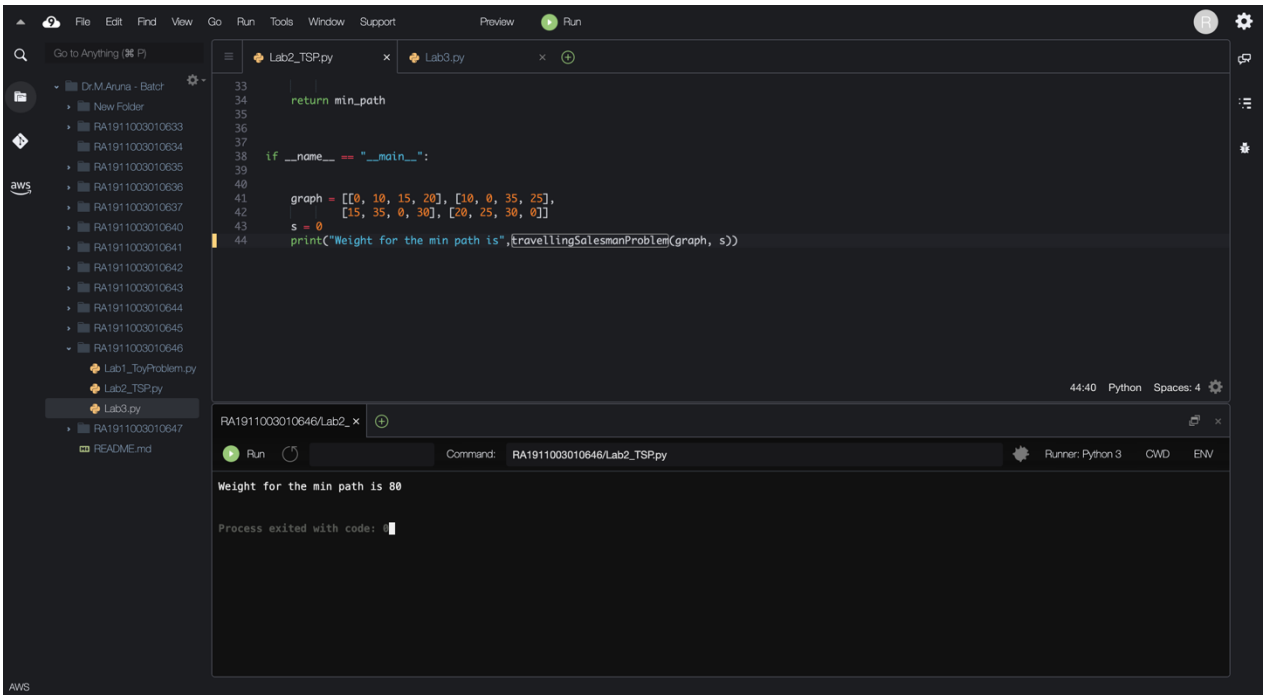
1. Consider city 1 as the starting and ending point.
2. Generate all (n-1)! Permutations of cities.
3. Calculate cost of every permutation and keep track of minimum cost permutation.
4. Return the permutation with minimum cost.

Code :

```
#TSP

from sys import maxsize
from itertools import permutations
V = 4


def travellingSalesmanProblem(graph, s):


    vertex = []
    for i in range(V):
        if i != s:
            vertex.append(i)
```

```
        min_path = maxsize
        next_permutation=permutations(vertex)
        for i in next_permutation:


            current_pathweight = 0


            k = s
            for j in i:
                current_pathweight += graph[k][j]
                k = j
            current_pathweight += graph[k][s]


            min_path = min(min_path, current_pathweight)

        return min_path



    if __name__ == "__main__":


        graph = [[0, 10, 15, 20], [10, 0, 35, 25],
                 [15, 35, 0, 30], [20, 25, 30, 0]]
        s = 0
        print("Weight for the min path is",travellingSalesmanProblem(graph,
    s))
```

Output :



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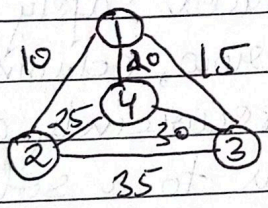
STUDY BUDDIES

AI Lab-2

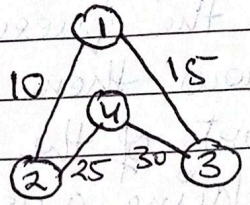
Aim - To develop agent programs for real world problem, i.e, Travelling Salesman Problem

Problem Formulation

For a given complete graph with n vertices & weight function defined on the edges, the objective is to construct a tour, i.e, a circuit that passes through each vertex only once and returns back to the starting point with minimum total weight.



Initial State

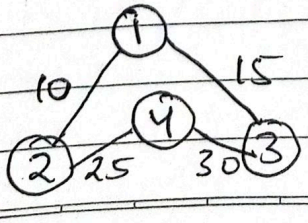


Final State

Problem Solving

We start at vertex 1 and find the minimum cost path with 1 as starting point, i as ending point & all vertices appearing exactly once

Now first we find a path for the same condition and try various permutations to find the min path out of various path. For this example it is 1-2-4-3|



Min. weight = 80