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Expt-04 B : Travelling Salesperson Problem

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In [1]: 1 from itertools import permutations
```

```
In [10]: 1 n = 4
2
3 graph = [[0, 30, 4, 6],
4           [30, 0, 10, 5],
5           [4, 10, 0, 20],
6           [6, 5, 20, 0]]
7
8 start_city = 0
9
10 def TSP(graph, start_city):
11     dist = []
12
13     for cur_city in range(n):
14         if cur_city != start_city:
15             dist.append(cur_city)
16
17     min_cost = float('inf')
18
19     next_Perm = permutations(dist)
20
21     for i in next_Perm:
22         cur_cost = 0
23         k = start_city
24
25         for j in i:
26             cur_cost = cur_cost + graph[k][j]
27             k = j
28
29         cur_cost = cur_cost + graph[k][start_city]
30
31         min_cost = min(min_cost, cur_cost)
32
33     return min_cost
34
35 min_TourCost = TSP(graph, start_city)
36
37 print("Minimum Tour Cost of TSP:", min_TourCost)
```

Minimum Tour Cost of TSP: 25

```

In [9]: 1 n = int(input("Enter number of cities: "))
        2
        3 print("Enter the cost matrix (enter each row separated by space):")
        4 graph = []
        5 for i in range(n):
        6     row = input().split()
        7     graph.append([int(x) for x in row])
        8
        9     start_city = 0
10
11 def TSP(graph, start_city):
12     dist = []
13
14     for cur_city in range(n):
15         if cur_city != start_city:
16             dist.append(cur_city)
17
18     min_cost = float('inf')
19
20     next_Perm = permutations(dist)
21
22     for i in next_Perm:
23         cur_cost = 0
24         k = start_city
25
26         for j in i:
27             cur_cost = cur_cost + graph[k][j]
28             k = j
29
30         cur_cost = cur_cost + graph[k][start_city]
31
32         min_cost = min(min_cost, cur_cost)
33
34     return min_cost
35
36 min_TourCost = TSP(graph, start_city)
37
38 print("Minimum Tour Cost of TSP:", min_TourCost)

```

```

Enter number of cities: 4
Enter the cost matrix (enter each row separated by space):
0 30 4 6
30 0 10 5
4 10 0 20
6 5 20 0
Minimum Tour Cost of TSP: 25

```