Practice Problem:

Travelling sales man problem:

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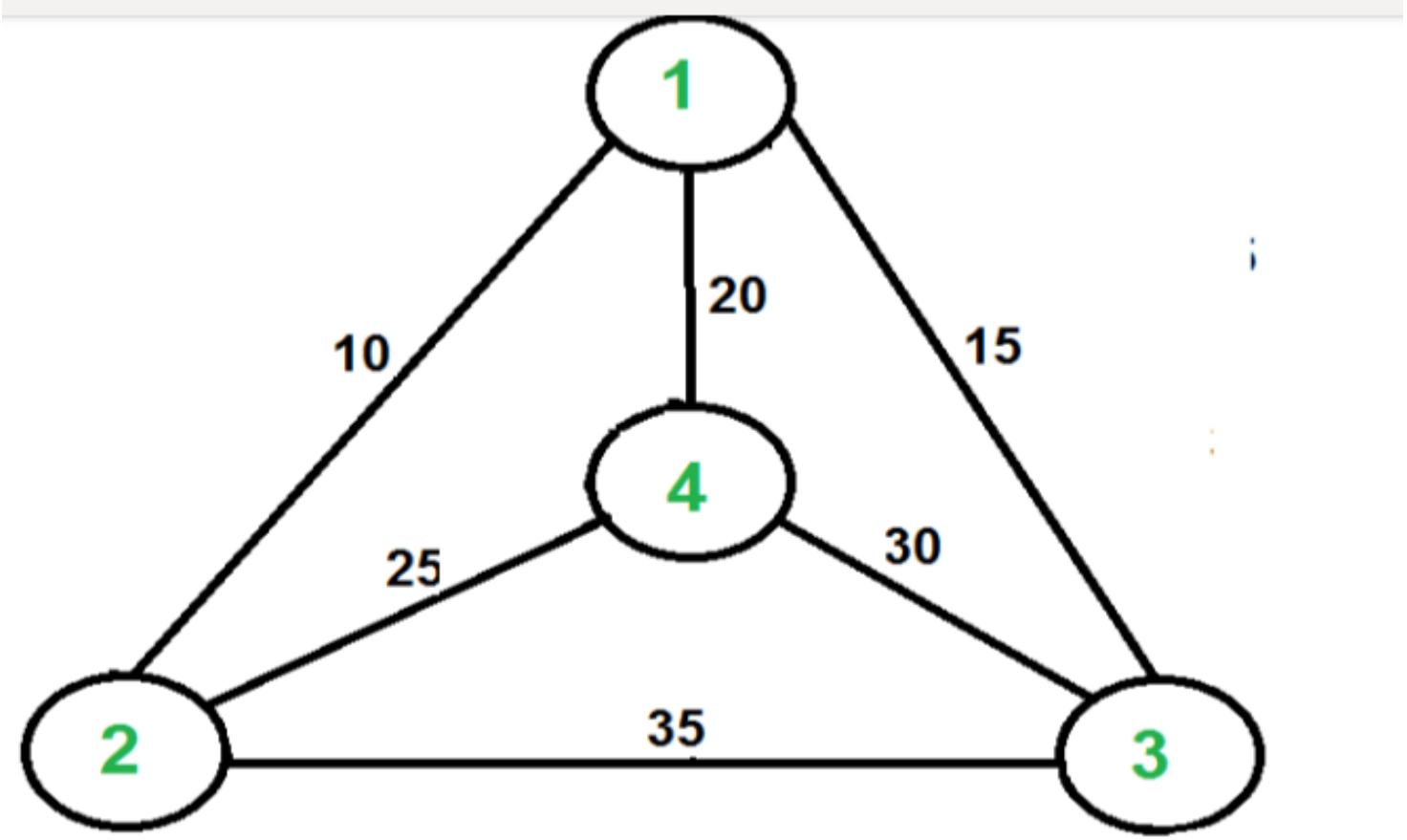

Solve the TSP problem using above graph. Source code links are given above.

Code in c++:

```
#include <bits/stdc++.h>
using namespace std;
#define V 4
#define MAX 1000000
int tsp(int graph[][V], int s)
{
    vector<int> vertex;
```

```
    for (int i = 0; i < V; i++)
        if (i != s)
            vertex.push_back(i);
    int min_cost = MAX;
    while(next_permutation(vertex.begin(), vertex.end()))
     {
        int current_cost = 0;
        int j = s;
        for (int i = 0; i < vertex.size(); i++) {
            current_cost += graph[j][vertex[i]];
            j = vertex[i];
        }
        current_cost += graph[j][s];
        min_cost = min(min_cost, current_cost);
        return min_cost;
       }
}
int main()
{
    int graph[][V] = { { 0, 10, 15, 20 },{ 10, 0, 35, 25 },{ 15, 35, 0, 30 },{
20, 25, 30, 0 } };
    int s = 0;
    cout << tsp(graph, s) << endl;
    return 0;
}
```

main.cpp

Run

Output

```
    for (int i = 0; i < V; i++)
        if (i != s)
            vertex.push_back(i);
    int min_cost = MAX;
    while(next_permutation(vertex.begin(), vertex.end()))
     {
        int current_cost = 0;
        int j = s;
        for (int i = 0; i < vertex.size(); i++) {
            current_cost += graph[j][vertex[i]];
            j = vertex[i];
        }
        current_cost += graph[j][s];
        min_cost = min(min_cost, current_cost);
        return min_cost;
    }
}
int main()
{
    int graph[][V] = { { 0, 10, 15, 20 },{ 10, 0, 35, 25 },{ 15, 35,
        0, 30 },{ 20, 25, 30, 0 } };
```

```
/tmp/JjBD9YR2K3.o
80
```

Type here to search

DA

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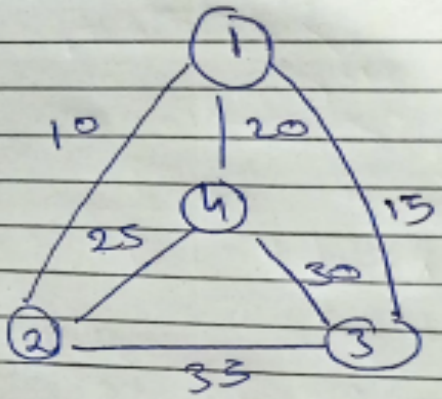
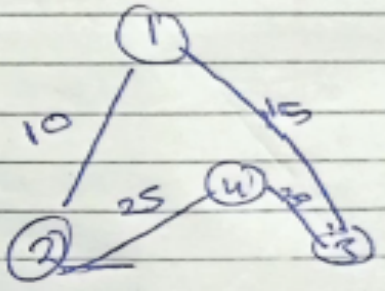
⇒

	1	2	3	4
1	0	10	15	20
2	10	0	35	25
3	15	35	0	30
4	20	25	30	0





10 + 25 + 15 + 30

⇒ 80

⇒ By C++ implemented the code with shortest distance go with Travelling salesman problem