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DIV:	CSE(DS)D1
EXP:	08
AIM:	Approximation algorithms (Travelling Salesman Problem)
CODE:	

```
#include <bits/stdc++.h>
using namespace std;
#define V 4

// implementation of traveling Salesman Problem
int travllingSalesmanProblem(int graph[][V], int s)
{

   // store all vertex apart from source vertex
   vector<int> vertex;
   for (int i = 0; i < V; i++)
   if (i != s)
   vertex.push_back(i);

   // store minimum weight Hamiltonian Cycle.
   int min_path = INT_MAX;
   do {

   // store current Path weight(cost)
```

```
   int current_pathweight = 0;

   // compute current path weight
   int k = s;
   for (int i = 0; i < vertex.size(); i++) {
      current_pathweight += graph[k][vertex[i]];
      k = vertex[i];
}

current_pathweight += graph[k][s];

 // update minimum
 min_path = min (min_path, current_pathweight);

}

while (
next_permutation (vertex.begin (), vertex.end ()));

return min_path;

}
```

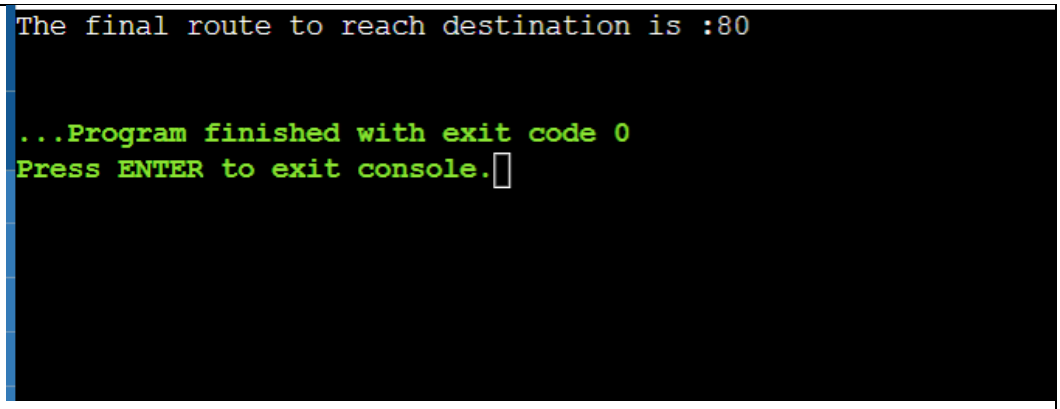
```
// Driver Code
int main()
{

   // matrix representation of graph
   int graph[][V] = { { 0, 10, 15, 20 },
   { 10, 0, 35, 25 },
  {15, 35, 0, 30}
  ,
  {20, 25, 30, 0}
};

int s = 0;
printf("The final route to reach destination is :");

cout << travllingSalesmanProblem (graph, s) << endl;
return 0;

}
```

OUTPUT:	

CONCLUSION: In this experiment I have understood how to implement travelling salesman algorithm using approximation algorithm .