Experiment 15

Write a program to implement the dynamic algorithm to solve the Travelling Salesman Problem.

Program:-

```
#include <stdio.h>
#include <conio.h>
#include <time.h>
#include <stdlib.h>
void mincost(int city);
int least(int c);
int ary[10][10], completed[10],n,cost=0;
void takeInput()
{
   int i,j;
   printf("Enter the number of villages: ");
   scanf("%d",&n);
   printf("\nEnter the Cost Matrix\n");
   for(i=0;i<n;i++)
   {
      printf("\nEnter Elements of Row: %d\n",i+1);
      for(j=0;j<n;j++)
         {scanf("%d",&ary[i][j]);}
      completed[i]=0;
   }
      printf("\n\nThe cost list is:\n\n");
      for( i=0;i < n;i++)
      {
         printf("\n\n");
         for(j=0;j < n;j++)
            printf("\t%d",ary[i][j]);
      }
```

```
}
void mincost(int city)
{
   int i,ncity;
   completed[city]=1;
   printf("%d--->", city+1);
   ncity=least(city);
   if(ncity==999)
   {
      ncity=0;
      printf("%d",ncity+1);
      cost+=ary[city][ncity];
      return;
   }
   mincost(ncity);
}
int least(int c)
{
   int i,nc=999;
   int min=999, kmin;
   for(i=0;i<n;i++)
   {
      if((ary[c][i]!=0)&&(completed[i]==0))
         if(ary[c][i]+ary[i][c] < min)
         {
            min=ary[i][0]+ary[c][i];
            kmin=ary[c][i];
            nc=i;
         }
```

```
    }
    if(min!=999)
        cost+=kmin;
    return nc;
}
int main()
{
    double t;
    clock_t start, end;
    start=clock();
    takeInput();
    printf("\n\nThe Path is: \n");
    mincost(0); //passing e because starting vertex
    printf("\n\nMinimum cost is %d\n",cost);
    end=clock();
    t=((double) (end-start)*1000)/CLOCKS_PER_SEC;
    printf("\n time=%lf millseconds", t);
    return 0;
}
```

Output:

```
PS C:\Users\user\OneDrive - College of Applied Business\Desktop\CAI
esktop\CAB\Lab\5th_sem_lab\Design_Analysis_and_Algorithm\Lab\" ; i
Enter the number of villages: 4

Enter the Cost Matrix

Enter Elements of Row: 1
4 3 2 1

Enter Elements of Row: 2
6 2 1 0

Enter Elements of Row: 3
5 2 9 6

Enter Elements of Row: 4
9 2 0 1


The cost list is:


        4       3       2       1

        6       2       1       0

        5       2       9       6

        9       2       0       1

The Path is:
1--->3--->4--->2--->1

Minimum cost is 16

 time=43052.000000 millseconds
```

Conclusion:

Travelling Salesman Problem using dynamic algorithm was implemented in C programming language.