**ASSIGNMENT -6**

Program:

#include<iostream>

using namespace std;

#include<conio.h>

int main()

{

int graph[50][50];

int i,j,k,t;

int nn;

cout<<"\n Enter Number of Nodes:";

cin>>nn;

for (i=0;i<nn;i++) {

for(j=0;j<nn;j++) {

graph[i][j]=-1;

}

}

char ch[7]={'A','B','C','D','E','F','G'};

for (i=0;i<nn;i++) {

for(j=0;j<nn;j++) {

if(i==j) {

graph[i][j]=0;

}

if(graph[i][j]==-1)

{

cout<<"\n Enter Distance between "<<ch[i]<<" - "<<ch[j]<<" : ";

cin>>t;

graph[i][j]=graph[j][i]=t;

}

}

}

int via[50][50];

for (i=0;i<nn;i++) {

for(j=0;j<nn;j++) {

via[i][j]=-1;

}

}

cout<<"\n After Initialization";

for (i=0;i<nn;i++) {

cout<<"\n"<<ch[i]<<" Table";

cout<<"\nNode\tDist\tVia";

for(j=0;j<nn;j++) {

cout<<"\n"<<ch[j]<<"\t"<<graph[i][j]<<"\t"<<via[i][j];

}

}

int sh[50][50][50];

for(i=0;i<nn;i++) {

for(j=0;j<nn;j++) {

for (k=0;k<nn;k++) {

if((graph[i][j]>-1)&&(graph[j][k]>-1)) {

sh[i][j][k]=graph[j][k]+graph[i][j];

}

else {

sh[i][j][k]=-1;

}

}

}

}

for(i=0;i<nn;i++) {

cout<<"\n\n For "<<ch[i];

for (j=0;j<nn;j++) {

cout<<"\n From "<<ch[j];

for(k=0;k<nn;k++) {

cout<<"\n "<<ch[k]<<" "<<sh[i][j][k];

}

}

}

int final[50][50];

for(i=0;i<nn;i++) {

for(j=0;j<nn;j++) {

final[i][j]=graph[i][j];

via[i][j]=i;

for(k=0;k<nn;k++) {

if((final[i][j]>sh[i][k][j]) || (final[i][j] == -1))

{

if(sh[i][k][j]>-1) {

final[i][j]=sh[i][k][j];

via[i][j]=k;

}

}

}

if(final[i][j]==-1)

{

for(k=0;k<nn;k++) {

if((final[i][k]!=-1)&&(final[k][j]!=-1))

{

if((final[i][j]==-1) || ((final[i][j]!=-1) &&(final[i][j]>final[i][k]+final[k][j])))

{

if(final[i][k]+final[k][j]>-1)

{

final[i][j]=final[i][k]+final[k][j];

via[i][j]=k;

}

}

}

}

}

}

}

cout<<"\n After Update :";

/\* Display table Updation \*/

for (i=0;i<nn;i++) {

cout<<"\n"<<ch[i]<<" Table";

cout<<"\nNode\tDist\tVia";

for(j=0;j<nn;j++) {

cout<<"\n"<<ch[j]<<"\t"<<final[i][j]<<"\t";

if(i==via[i][j])

cout<<"-";

else

cout<<ch[via[i][j]];

}

}

getch();

return 0;

}

Output: