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| Assignment No: 06     1. A program of “Floyd Warshall’s Algorithm” | |
| Date of Performance: 25/09/2019  Date of Submission: 01/09/2019 | Student ID: 17-02-04-058  Group: B1 |

**No.1:**

**#include<bits/stdc++.h>**

**typedef struct{**

**int sourceVertex, destVertex;**

**int edgeWeight;**

**}edge;**

**typedef struct{**

**int vertices, edges;**

**edge\* edgeMatrix;**

**}graph;**

**graph loadGraph(char\* fileName){**

**FILE\* fp = fopen(fileName,"r");**

**graph G;**

**int i;**

**fscanf(fp,"%d%d",&G.vertices,&G.edges);**

**G.edgeMatrix = (edge\*)malloc(G.edges\*sizeof(edge));**

**for(i=0;i<G.edges;i++)**

**fscanf(fp,"%d%d%d",&G.edgeMatrix[i].sourceVertex,&G.edgeMatrix[i].destVertex,&G.edgeMatrix[i].edgeWeight);**

**fclose(fp);**

**return G;**

**}**

**void floydWarshall(graph g){**

**int processWeights[g.vertices][g.vertices], processedVertices[g.vertices][g.vertices];**

**int i,j,k;**

**for(i=0;i<g.vertices;i++)**

**for(j=0;j<g.vertices;j++){**

**processWeights[i][j] = SHRT\_MAX;**

**processedVertices[i][j] = (i!=j)?j+1:0;**

**}**

**for(i=0;i<g.edges;i++)**

**processWeights[g.edgeMatrix[i].sourceVertex-1][g.edgeMatrix[i].destVertex-1] = g.edgeMatrix[i].edgeWeight;**

**for(i=0;i<g.vertices;i++)**

**for(j=0;j<g.vertices;j++)**

**for(k=0;k<g.vertices;k++){**

**if(processWeights[j][i] + processWeights[i][k] < processWeights[j][k]){**

**processWeights[j][k] = processWeights[j][i] + processWeights[i][k];**

**processedVertices[j][k] = processedVertices[j][i];**

**}**

**}**

**printf("pair dist path");**

**for(i=0;i<g.vertices;i++)**

**for(j=0;j<g.vertices;j++){**

**if(i!=j){**

**printf("\n%d -> %d %3d %5d",i+1,j+1,processWeights[i][j],i+1);**

**k = i+1;**

**do{**

**k = processedVertices[k-1][j];**

**printf("->%d",k);**

**}while(k!=j+1);**

**}**

**}**

**}**

**int main(int argC,char\* argV[]){**

**if(argC!=2)**

**printf("Usage : %s <file containing graph data>");**

**else**

**floydWarshall(loadGraph(argV[1]));**

**return 0;**

**}**