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**SUBJECT NAME – DESIGN AND ANALYSIS OF ALGORITHMS LAB**

**SUBJECT CODE – CSL4403**

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**BRANCH – CSE 2**

**ASSIGNMENT-10**

**Q10. WAP to implement Shortest Path using Bellman Ford’s Algorithm.**

**Source Code in C++ Language:**

#include <bits/stdc++.h>

struct Edge {

int src, dest, weight;

};

struct Graph {

int V, E;

struct Edge\* edge;

};

struct Graph\* createGraph(int V, int E)

{

struct Graph\* graph = new Graph;

graph->V = V;

graph->E = E;

graph->edge = new Edge[E];

return graph;

}

void printArr(int dist[], int n)

{

printf("Vertex Distance from Source\n");

for (int i = 0; i < n; ++i)

printf("%d \t\t %d\n", i, dist[i]);

}

void BellmanFord(struct Graph\* graph, int src)

{

int V = graph->V;

int E = graph->E;

int dist[V];

for (int i = 0; i < V; i++)

dist[i] = INT\_MAX;

dist[src] = 0;

for (int i = 1; i <= V - 1; i++) {

for (int j = 0; j < E; j++) {

int u = graph->edge[j].src;

int v = graph->edge[j].dest;

int weight = graph->edge[j].weight;

if (dist[u] != INT\_MAX && dist[u] + weight < dist[v])

dist[v] = dist[u] + weight;

}

}

for (int i = 0; i < E; i++) {

int u = graph->edge[i].src;

int v = graph->edge[i].dest;

int weight = graph->edge[i].weight;

if (dist[u] != INT\_MAX && dist[u] + weight < dist[v]) {

printf("Graph contains negative weight cycle");

return;

}

}

printArr(dist, V);

return;

}

int main()

{

int V = 5;

int E = 8;

struct Graph\* graph = createGraph(V, E);

graph->edge[0].src = 0;

graph->edge[0].dest = 1;

graph->edge[0].weight = -1;

graph->edge[1].src = 0;

graph->edge[1].dest = 2;

graph->edge[1].weight = 4;

// add edge 1-2 (or B-C in above figure)

graph->edge[2].src = 1;

graph->edge[2].dest = 2;

graph->edge[2].weight = 3;

graph->edge[3].src = 1;

graph->edge[3].dest = 3;

graph->edge[3].weight = 2;

graph->edge[4].src = 1;

graph->edge[4].dest = 4;

graph->edge[4].weight = 2;

graph->edge[5].src = 3;

graph->edge[5].dest = 2;

graph->edge[5].weight = 5;

graph->edge[6].src = 3;

graph->edge[6].dest = 1;

graph->edge[6].weight = 1;

graph->edge[7].src = 4;

graph->edge[7].dest = 3;

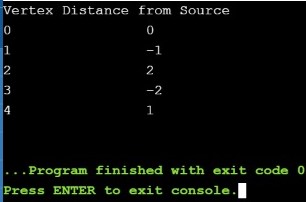
graph->edge[7].weight = -3;

BellmanFord(graph, 0);

return 0;

}

**Output Screenshot:**

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