# California State University, Fresno

# DEPARTMENT OF COMPUTER SCIENCE

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| Class: | **Algorithms & Data Structures** | | | Semester: | **Spring 2022** |
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| Laboratory number: | **12 – BellmanFord** | | |
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**1. Statement of Objectives**

This lab asks for implementation of BellmanFord’s Algorithm. This algorithms is used to find the shortest path from one source to other vertexes in a graph.

**2. Experimental Procedure**

**Data Structure introduction:**

**Bellmanford()**

Text

Description automatically generated

This function generates a list named “distance list” which represents the distancefrom every vertex to the source in the graph. Then initialized the distance to infinity for every vertex except the source vertex. For the source vertex it should be initialized with 0. Then for every edge E (u,v), if the sum of the distance of u to source d.u and the edge E(u.v) is smaller than the distance of v to source d.v

: d.u+E(u,v) < d.v. Then replace the distance d.v to d.u + E(u,v). After that, for every edge, check if there still exist the sum of the distance of u to source d.u and the edge E(u.v) is smaller than the distance of v to source d.v. If there is, that means there is a circular with negative edge. Then the program should report the existence of the circular. In the end print the content of the distance list to show the distance of each vertex to the source.

**3. Analysis**

**Main function**

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In the main function, user should defined their own number of vertexes **v**, number of edges **e,** and the source vertex **s**, and the set of edges. After putting those above into the BellmanFord function, it will print the minimum distance of each vertex to the source vertex.

**Output**

Text

Description automatically generated

**4. Encountered Problems**

I did not encounter any problem when implementing this program.

**5. Conclusions**

This experiment gave me a deeper understanding of BellmanFord Algorithm. Also made me handier in the simplification and optimization of data results like graph. This algorithms have also been widely applied in practice, which are very important and must be known.

**6. References**

I did not use any reference in this lab.