Assignment 4

CS221: Data Structures and Algorithms

Usman Institute of Technology

Fall 2018

Release Date: 08 January 2019

Submission Mode: Soft-copy

- How to submit:
  - Create an account on http://www.turnitin.com/ as a Student
  - Use following information at the time of sign-up
    - Class ID: 19412335
    - Enrollment Key: CS211FALL18
  - You can submit your assignment by **14 January 2019 06:00 am.**
- Make sure that function names must be similar as asked in the assignment.
- **YOU HAVE TO SUBMIT ONLY ONE .CS FILE**
- **YOUR FILE NAME MUST BE IN THE FORMAT OF <YOUR ROLL NUMBER>.CS**
  - **For example, if you Roll Number is 15B-121-BS then your file name must be 15B-121-BS.cs**
- You must read Academic Integrity at the end of this document.
  - **If more than one of your assignments found plagiarized then all marks of assignment will be marked Zero (0).**

Grading Rubric:

	Good (80, 100]	Fair [50,80)	Poor [0,50)
Description	All required functionalities are implemented correctly without Main function and using appropriate methods of Graph ADT.	All desired functionalities are implemented but either some of them not working correctly or some of them not implemented correctly.	Most of functionalities are not working correctly or not implemented correctly.

Instructions:

You have to create following functions in a class ***'Graph'***. Make sure the signature of the name should be the same as given and your submitted **file should not have any main function**. The file may contain other functions, if required.

Reading Graphs

Signature: void ReadGraph(string filename)

Create a function to read **a directed graph** from a file and store in an adjacency matrix (adjacency matrix should be class member of Graph, means accessible to all functions of Graph class). The path of the file will be given as the parameter of the function.

The file will be consisting of multiple lines where each line represents an edge. Each line consists of three integer values separated by a space. First two values are IDs for vertices whereas the last integer is the weight of the edge between both vertices. The following is the sample of an input file for a graph of 4 vertices and 3 edges:

1 3 12
3 4 20
4 2 30

Shortest Path using Bellman-Ford's Algorithm

Signature: void BellmanFord (int source)

Create a function to print the shortest path using the Bellman-Ford's algorithms. The function must print the shortest paths from source to all vertices.

The following is the example of output for a graph:

1 -> 3 = 12
1 -> 3 -> 4 = 32
1 - > 3 -> 4 -> 2 = 62

Academic Integrity

Each student in this course is expected to make sure that any work submitted by a student in this course for academic credit will be the **student's own work**. Scholastic dishonesty shall be considered a serious violation of these rules and regulations and is subject to strict disciplinary action. Scholastic dishonesty includes, but is not limited to, cheating on exams, plagiarism on assignments, and collusion.

PLAGIARISM: Plagiarism is the act of taking the work created by another person or entity and presenting it as one's own for the purpose of personal gain or of obtaining academic credit. Plagiarism includes the submission of or incorporation of the work of others without acknowledging its provenance or giving due credit according to established academic practices. This includes the submission of material that has been appropriated, bought, received as a gift, downloaded, or obtained by any other means. Students must not, unless they have been granted permission from all faculty members concerned, submit the same assignment or project for academic credit for different courses.

CHEATING: The term cheating shall refer to the use of or obtaining of unauthorized information in order to obtain personal benefit or academic credit.

COLLUSION: Collusion is the act of providing unauthorized assistance to one or more person or of not taking the appropriate precautions against doing so. Any student caught violating academic integrity will suffer an academic penalty. All violations of academic integrity will also be immediately reported to the Disciplinary Committee. Any student violating academic integrity a second time in this course will receive a failing grade for the course, and additional disciplinary sanctions may be administered through the Disciplinary Committee.

Conclusively, each student need to be take care of:

1. You must not share your solutions with other students. You are encouraged to discuss the problems but each student is supposed to take care of his or her own solution.
2. You must not submit solution of other students as yours.
3. You must duly cite all resources you used in development of your solution.
4. **If more than one of your assignments found plagiarized then all marks of assignment will be marked Zero (0).**