Homework 1

September 29, 2020

Graph class

During the last office hours we started to write a graph class. You can find the code on Google Drive or write your own. In this exercise you will need to modify this class to directed graphs with additional properties and algorithms.

- What is the best way to implement a weighted directed graph class? Implement it.
- Implement a function that search some paths between two vertices, outputs edges in the path and distance (sum of the edges in the path).
- Implement an algorithm that outputs all directed triangles in the graph. Find its complexity, add notes in the comments. Note, that in the graph class from the class, we store edges in the list. Can we do better?
- Write a function that checks if an input graph is a DAG (directed graph without any cycle). If yes, output a topological sort of the vertices. If no, output an empty list.
- Implement DeleteEdge, VertexCount, EdgeCount functions. Make sure that VertexCount and EdgeCount functions take $O(1)$ time.
- You can get additional points for outstanding quality code. This metric is totally subjective.

Deadline - October 11 (midnight EST)