

Please upload your solutions to Ilias. Deadline: 24th November 23.55 pm

Exercise 3

- 1) In the lecture we discussed the pipeline of network visualisation. For this task, you will look at different layout methods and will visually discuss and analyse the methods. You can find three different networks in Ilias (Protein_core.gml, add32.gml, crack.gml).
 - a. Use three different layout methods for each network to generate visualisations with OGDF. Report running times and how they scale, dependent on graph characteristics (e.g. size) and upload the layouts as images. Please also upload your c++ scripts.
 - b. Compare the layouts visually. What do you notice for the different layouts? Report similarities and differences. What is your choice for the best layout? Explain why.
- 2) For this task you will look at different quality criteria for network visualisation and their dependency on clusters in the visualisations. Please use OGDF for this task. Please also upload your c++ scripts.
 - a. Generate a network with 30 nodes and 70 edges. Use randomSimpleGraph() Generator. Calculate and report the diameter and average path length.
 - b. Use the network from 2a to generate 10 (for each!) clustered graphs using the randomClusterGraph() method with the following setting:
 - i. a maximal number of clusters = 10
 - ii. a maximal number of clusters = 5
 - c. Calculate and report the number of clusters for the 20 networks (2b) you generated.
 - d. For all 20 clustered networks: Calculate, report and compare the following parameters for each cluster of each network.
 - i. Distribution of degrees
 - ii. Number of connected components
- 3) **Bonus exercise:** Calculate, report and compare modularity for each cluster of each of the 20 networks. Please also upload your c++ scripts. (+4 Points)

20 points