BIO425 / 790 Homework 1

Due February 16th by the end of the day. Total points 99.999.

Upload .pdfs or .doc files containing written answer to the question a screencapture (not picture from smartphone) of you Google Collab, completed quiz etc. Please upload everything in a single document, as a file to the homework entry on the Blackboard's course page The Google Collab output screencapture should be clean code, without errors

Late homeworks will not be accepted, and will be graded as zero

Question 1, 33.333 points.

Complete the quiz from this link on the Intact database You will need to go over the tutorial materials from Intact which we covered in our first lecture.

Question 2, 33.333 points

- Using the following data file visualize the network with the labels on the nodes.
- Find the longest (simple) path in the graph as with the code we showed in the Google Collab in the lecture
- Which nodes this consists of, and how long is it ?
- What are the dimensions of the adjacency matrix of this graph, and is it symmetric and why / what does symmetric means ?
- All the above need to be answered through Python code on the Google Collab.

Question 3, 33.333 points

- Describe briefly what is a Hamiltonian and what is an Eulerian graph.
- Using the same graph / data as in Question 2, check whether it is Hamiltonian or Eulerian or both.
- In this graph, which is the most connected node (or more than one equally connected) as measured by the centrality metric.
- If the most connected node is removed, would the graph would break apart ? (answer this by looking at the graph visualization).
- Look into the functions available by networkx and write code to: return all neighboors of the most connected node, check if the graph has self loops, return a path between the most connected node and another one you choose
- Looks into the algorithms available by networkx and write code to: compute connectivity between all pairs of nodes (what format is the returned output), find number of cliques in the graph (use a couple of functions in that respect)
- All the above (except the 1st bullet point) need to be answered through Python code on the Google Collab.