Exercise 10: Braided Graph **(20 points)**

Due: 17.07.2023 8AM

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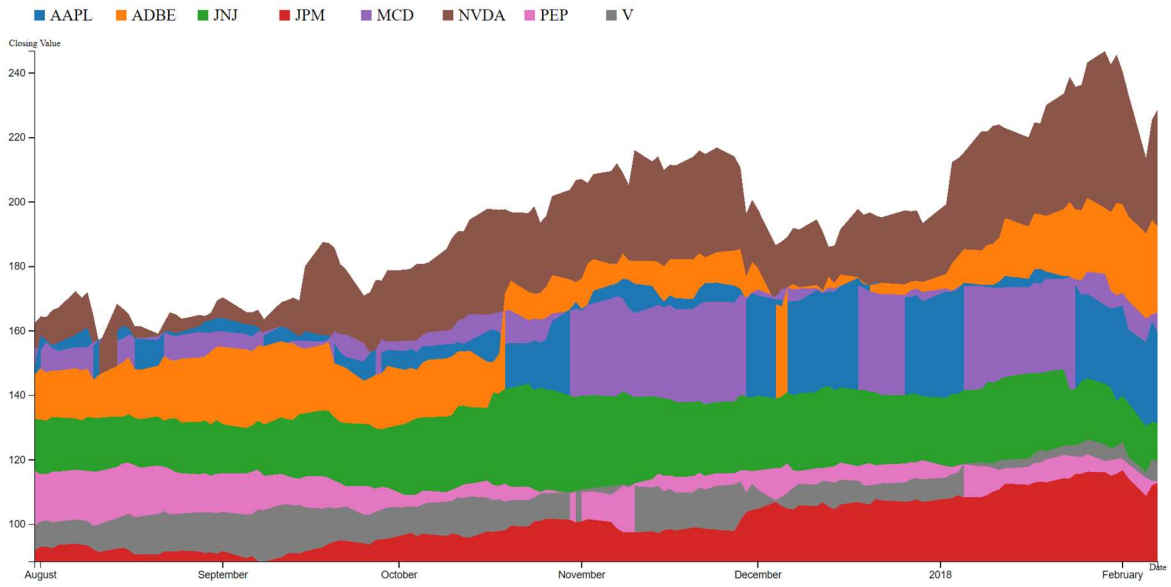
Task 1: (12 points)

Braided Graph



For this exercise, your task is to create a braided graph of the appended *stonks.js* dataset as shown in the figure above. You may use your own previously written code as orientation.

Mind the following hints as orientation:
When building the visualization, it makes sense to group the data by its days. For each day, create a *g* element. Draw a respective *path* element between the current and the next timestamp for each stock within each created *g*. Think of plotting the higher value first to make the smaller elements visible.

Additional Hint: To avoid vertical rendering lines between the paths, set the css attribute *shape-rendering*. *(https://developer.mozilla.org/en-US/docs/Web/SVG/Attribute/shape-rendering)*

shape-rendering: auto

shape-rendering: crispEdges

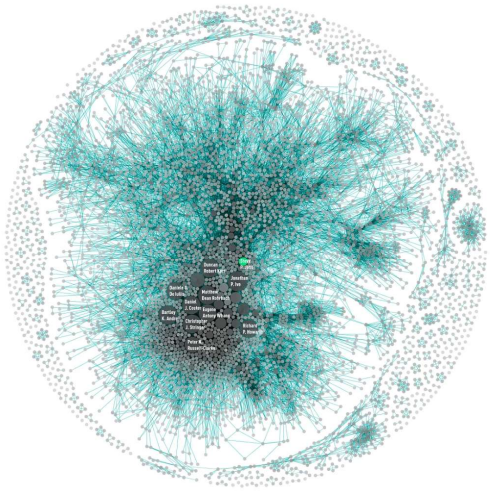
Task 2: (8 points)

2a) Name and explain two advantages of node-link diagrams for representing relational data.

- Node link diagrams are very good for visualizing hierarchical structures and therefore solving tasks that include hierarchical data. For example, if one would like to find out who the owner of a company for which employee x work for one can visualize the hierarchical structure of the company and follow the path from the employee to the boss. This would also give a good overview about the company structure.
- Also, one can visualize all entities (nodes), allowing the viewer to have a complete overview of the data.

2b) Explain the overplotting problem in node-link diagrams. Illustrate with an example.

If there are a lot of nodes and edges in a very small space, the plot can become very difficult to read very fast. Then it will be hard to identify structures and solve tasks with them. The following example shows a node link diagram which might look cool but it is very difficult to read, making it hard to extract information from it. (Taken form: https://medium.com/kineviz-blog/visualizing-node-link-graphs-84a40a9b2fcc)



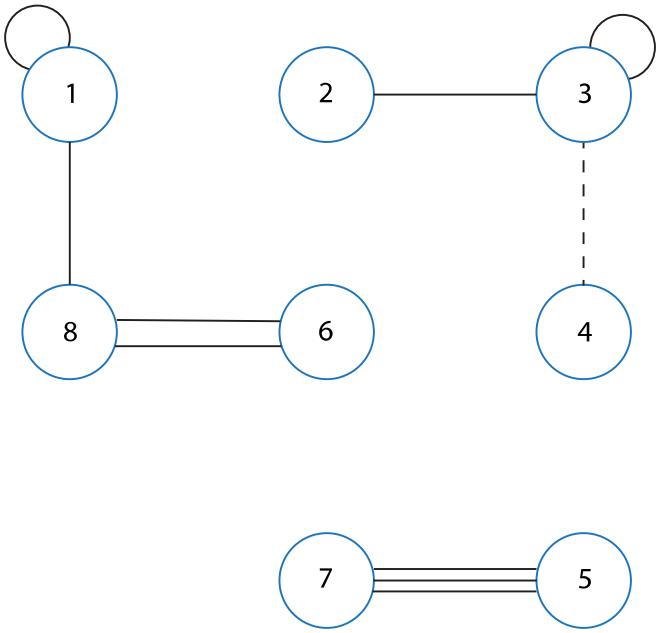
A node-link graph of Apple Patent collaborators. From FastCompany / Periscopic

Hint: For the illustration, can include an image based on your own past work or from a third-party source (remember to add a reference, e.g., a URL when taking an example from a different source).

2c) Give an example of how you can use a node-link diagram to show the hierarchical relationship in data. Name two disadvantages associated with your example.

One could visualize a pyramid scheme with a node link diagram where the parent nodes are the individuals who relucted the persons represented in the child nodes. The amount of money they earn from the scheme could be represented by the node size.
2 problems arise from this representation of the scheme gets too large.
1. The diagram will have to many nodes and edges and will look like a hairball where it won't be possible to identify any structure.
2. The size encoding of the earnings will not be helpful because one won't be able to compare the sizes or identify the larges/smallest node.

2d) Define: "adjacency matrix" in your own words. Draw the adjacency matrix of the following graph:



The adjacency matrix is a representation of relational data to visualize the distribution of edges. Each node is represented by a column and a row of the matrix, if there is one (or x) relationships between two nodes i and j the spot of the matrix with the coordinates i and j gets a 1 (or x) and if there are no edges between the two nodes it gets a 0. Note that for undirected graphs the matrix is symmetric, while for directed graphs the entries for [i,j] might differ from [j,i]. The adjacency matrix of the undirected graph above looks as follows:

	1	2	3	4	5	6	7	8
1	1	0	0	0	0	0	0	1
2	0	0	1	0	0	0	0	0
3	0	1	1	1	0	0	0	0
4	0	0	1	0	0	0	0	0
5	0	0	0	0	0	0	3	0
6	0	0	0	0	0	0	0	2
7	0	0	0	0	3	0	0	0
8	1	0	0	0	0	2	0	0

Hint: You can include a photo of your hand-drawn solution. Please make sure, that it's easily readable.

Submission: Zipped folder including all necessary files to display the visualizations. Please state both your names on the submission.