

Step 2: Extract and visualize trees

Styling: In the layered layout please avoid depicting enumerated x- and y-axes if they are not necessary for your reasoning. However, showing horizontal lines (if your layout is vertical as suggested during the lecture) would be very useful. Showing vertical lines can also be useful to check the minimal distances between the nodes are as you planned. Yet, choose a light color for the lines in order to avoid additional clutter. In the radial layout, also choose a light color to depict the circles. Play with the distance between the lines in the layered layout (circles in the radial or bubble layout) to make the drawings more readable.

Experiment – types of spanning trees: Present drawings of the spanning trees (BFS, DFS) for the asked graphs next to each other. Evaluate the quality of the produced trees drawings visually. How does the type of the tree that you visualize impact the visualization you obtain? Do some trees produce better visualizations, how, and why?

Experiment – different nodes Note that the BFS and DFS trees are extracted from the same graph. However, depending on which part of information we extract, we get a totally different picture. This is an example of how misleading it can be to visualize only a *part* of your data. Same for choosing a different root node. Observe how choosing different root nodes impacts the visualization. Try to find a few extreme choices of the root nodes that will produce very different visualizations. Discuss the produced differences.

Experiment – spanning tree to draw the whole graph Now add to the drawings the original non-tree edges of the graph. Use a different color to depict the non-tree edges. Discuss whether this overall method (using an extracted tree and adding remaining edges) is a valid method for drawing some graphs. Which graphs do you think can be drawn meaningfully by this method, and why? Have you seen such graphs in some applications? If yes, present examples and references. Conversely, where do you see problems with this method?

Shortcomings of the algorithm: Discuss in detail any shortcoming of the tree visualization algorithm you have implemented and how (you think) they can be improved. Can you formulate your improvements in terms of quality metrics or drawing conventions? Do you have ideas of how optimizing these quality metrics or conventions can be done algorithmically?

Subtrees: In the layered layout, if you have implemented the algorithm correctly, identical subtrees are drawn in an identical way. Please examine the drawings visually and show the evidence of that in your experiments.