Using Union-Find and the Disjoint Set Data Structure to Find Components of a Graph

Figure 1 shows some of the steps in finding the components of the graph:

$$(\{1,2,3,4,5,6,7,8,9\},\{\{1,3\},\{2,3\},\{4,5\},\{4,6\},\{7,8\},\{6,7\},\{8,9\}\})$$

The first four steps (which are easier than the remaining steps) are not illustrated. Note that path compression occurs in the last step.

Your assignment is to show the steps of the union-find algorithm described in class, found at: `http://en.wikipedia.org/wiki/Disjoint-set_data_structure`
while it finds the components of the graph:

$$(\{1,2,3,4,5,6,7,8,9\},\{\{1,2\},\{3,4\},\{1,3\},\{2,3\},\{8,9\},\{5,6\},\{1,4\},\{3,6\}\})$$

You are required to process the edges in the order given. When you form the union of two sets, be sure to attach the smaller to the larger, or the one of lower rank to the one of higher rank, as explained in class. Be sure to use path compression.

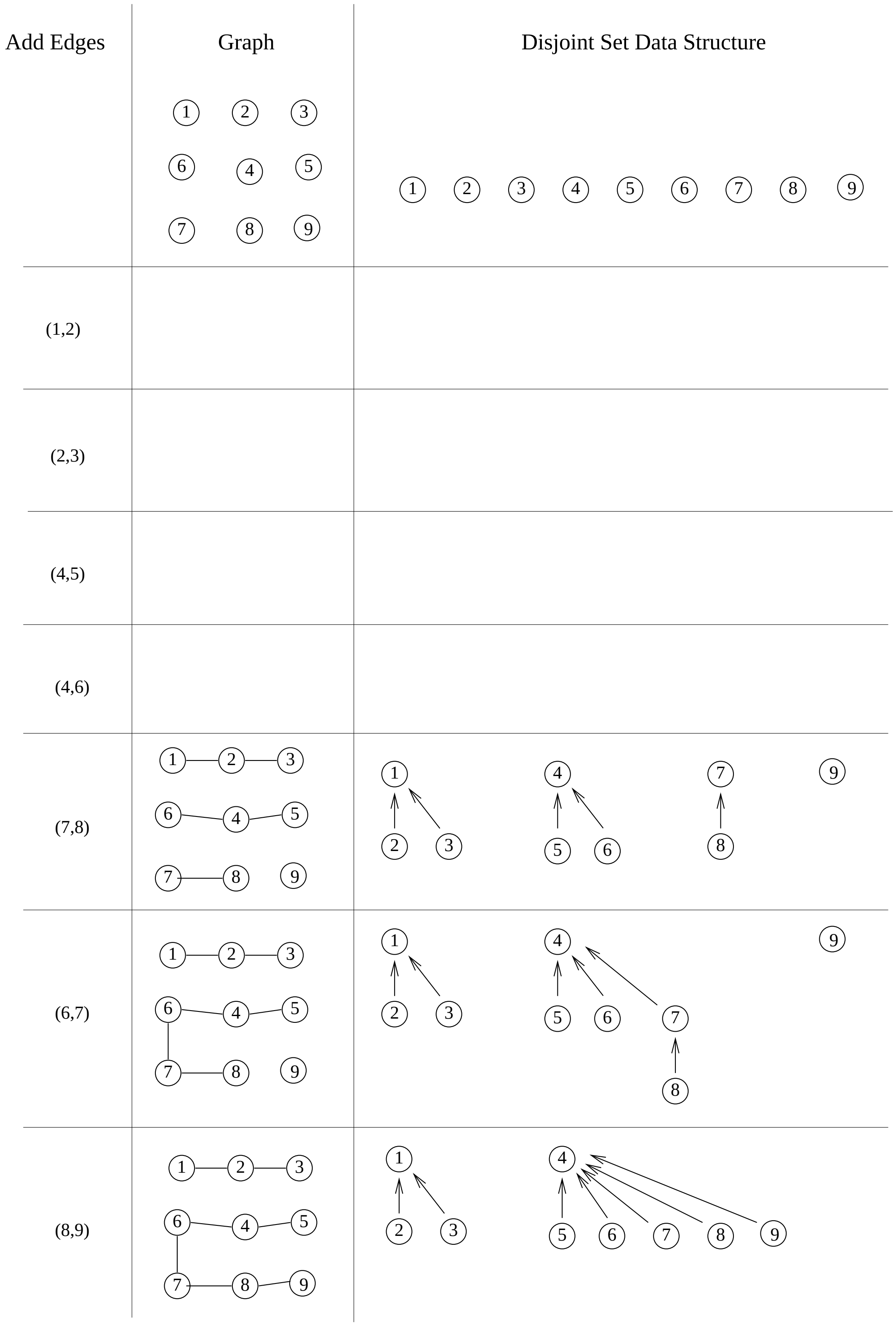

Figure 1: Finding the Components of a Graph using Union-Find