Reading Exercise 2

Due: Friday 2/13 at the beginning of class

Read sections 21.1 and 21.3 from the text. These introduce the disjoint set problem and a data structure for it. Then complete the following, which can be submitted on paper or via email. Follow the pseudocode listed on page 571 for these operations.

1. (4 points) Draw the data structure after the following operations beginning with singleton sets labeled by the letters a through g:
   \[ \text{UNION}(a, b) \]
   \[ \text{UNION}(c, d) \]
   \[ \text{UNION}(c, d) \]
   \[ \text{UNION}(e, f) \]

   Mark each set with its rank.

2. (2 points) Draw the data structure after the additional operation \( \text{UNION}(d, f) \) is performed, starting with the data structure you created for part (a). Mark each set with its rank.

3. (2 points) Draw the data structure after the additional operation \( \text{UNION}(g, a) \) is performed, starting with the data structure you created for part (b). Mark each set with its rank.