1. Using Figure 8.2 as a model, illustrate the operation of COUNTING-SORT on the array $A = (6, 0, 2, 0, 1, 3, 4, 6, 1, 3, 2)$.

2. Using Figure 8.3 as a model, illustrate the operation of RADIX-SORT on the following list of English words: COW, DOG, CAT, SEA, MUG, RUG, ROW, MOB, BOX, TAR, BAR, EAR, BIG, DIG, TEA, NOW, FOX.

3. What is the largest possible number of internal nodes in a red-black tree with black-height 4? In general, what is the largest possible number of internal nodes in a red-black tree of height $k$?
4. What is the smallest possible number of internal nodes in a red-black tree with black-height 4? In general, what is the smallest possible number of internal nodes in a red-black tree of height $k$?

5. What is the minimum number of edges in a connected, undirected graph with $n$ vertices?

6. What is the maximum number of edges in a connected, undirected graph with $n$ vertices?

7. Show the red-black trees that result from successively inserting the keys 8, 19, 12, 31, 38, 41 into an initially empty red-black tree. See page 315 of our textbook for RB-INSERT and the slides from 4/1/19 for RB-INSERT-FIXUP. Show the color and the black-height at each node after every new node is inserted. Write down any violations that occur, and mention any recoloring and rotations as shown in class on 4/3/19. You can show black nodes with a single circle and red nodes with a double circle in lieu of using colors (but using colors is fine).