15.2-2 Can the black-heights of nodes in a red-black tree be maintained as fields in the nodes of the tree without affecting the asymptotic performance of any of the red-black tree operations? Show how, or argue why not.

15.3-4 Given an interval tree $T$ and an interval $i$, describe how all intervals in $T$ that overlap $i$ can be listed in $O(\min(n, k\log n))$ time, where $k$ is the number of intervals in the output list. (Optional: Find a solution that does not modify the tree.)

22.1-3 During the execution of CONNECTED-COMPONENTS on an undirected graph $G = (V, E)$ with $k$ connected components, how many times is FIND-SET called? How many times is UNION called? Express your answers in terms of $|V|$, $|E|$, and $k$.

22.2-2 Show the data structure that results and the answers returned by the FIND-SET operations in the following program. Use the linked-list representation with the weighted-union heuristic.

(1) for $i \leftarrow 1$ to 16
(2) do MAKE-SET($x_i$)
(3) for $i \leftarrow 1$ to 15 by 2
(4) do UNION($x_i$, $x_{i+1}$)
(5) for $i \leftarrow 1$ to 13 by 4
(6) do UNION($x_i$, $x_{i+2}$)
(7) UNION($x_1$, $x_5$)
(8) UNION($x_{11}$, $x_{13}$)
(9) UNION($x_1$, $x_{10}$)
(10) FIND-SET($x_2$)
(11) FIND-SET($x_9$)