OFF-LINE-MINIMUM \((m, n)\)

1. for \(i = 1\) to \(n\)
2. determine \(j\) such that \(i \in K_j\)
3. if \(j \neq m + 1\)
4. \(\text{extracted}[j] = i\)
5. let \(l\) be the smallest value greater than \(j\)
6. for which set \(K_l\) exists
7. \(K_l = K_j \cup K_l\), destroying \(K_f\)
8. return \(\text{extracted}\)

b. Argue that the array \(\text{extracted}\) returned by OFF-LINE-MINIMUM is correct.

c. Describe how to implement OFF-LINE-MINIMUM efficiently with a disjoint-set data structure. Give a tight bound on the worst-case running time of your implementation.