1. Consider a hash table of size $m = 1000$ and a corresponding hash function $h(k) = \lfloor m(kA \mod 1) \rfloor$ for $A = (\sqrt{5} - 1)/2$. Compute the locations to which the keys 61, 62, 63, 64, and 65 are mapped.

2. Consider inserting the keys 10, 22, 31, 4, 15, 28, 17, 88, 59 into a hash table of length $m = 11$ using open addressing with the auxiliary hash function $h'(k) = k$. Illustrate the result of inserting these keys using linear probing, using quadratic probing with $c_1 = 1$ and $c_2 = 3$, and using double hashing with $h_1(k) = k$ and $h_2(k) = 1 + (k \mod (m - 1))$.

3. Write pseudocode for HASH-DELETE as outlined in the lectures, and modify HASH-INSERT to handle the special value DELETED.

4. Consider an open-address hash table with uniform hashing. Give upper bounds on the expected number of probes in an unsuccessful search and on the expected number of probes in a successful search when the load factor is $3/4$ and when it is $7/8$.

5. What is the difference between the binary-search-tree property and the min-heap property? Can the min-heap property be used to print out the keys of an $n$-node tree in sorted order in $O(n)$ time? Show how, or explain why not.

6. Consider a binary search tree $T$ whose keys are distinct. Show that if the right subtree of a node $x$ in $T$ is empty and $x$ has a successor $y$, then $y$ is the lowest ancestor of $x$ whose left child is also an ancestor of $x$. (Recall that every node is its own ancestor.)