1. Insert the numbers 12, 11, 13, 10, 20 into an empty skip list using the coin flips HHTHTHTTHHHHT. Afterwards, delete 13 from the resulting skip list.

2. Explain how to implement the PriorityQueue ADT using a skip list. In particular, assume that you have a skip list implementation that can do Skip-Insert(L,k,v), Skip-Delete(L,k), and Skip-Search(L,k) in O(log n) expected time. Skip-Search(L, k) returns an item p with key p.key = k. For any item p, after(p) denotes an item that follows p and before(p) denotes an item that precedes p. Explain how to implement the operations insert(k,v) and deleteMax() if n items are stored in a skip list. All operations should take O(log n) expected time.

3. Let L be a list of n elements. Give a sequence of m search such that both of the following conditions are satisfied: (a) the average cost of a search under the MTF heuristic is O(1) and (b) the average cost of a search under the Transpose heuristic is O(n).

4. Draw the compressed trie containing the following keys: 0000, 1010, 111, 01, 1011, 0011, 100.