1. **Bucket Sort.** Bucket sort differs from insertion sort, selection sort, heap sort, merge sort, and quick sort because it does not use __________ comparisons __________.

   Assuming there are \( n \) elements to be sorted and that the bucket sort uses \( N \) buckets, the running time of bucket sort is \( O(n + N) \).

2. **True or False: Bucket sort is a stable, in-place sort.**

3. **Radix Sort.** Radix sort internally applies Bucket sort to lexicographically order a set of tuples. Assuming each of the \( n \) tuples have \( d \) dimensions and there are \( N \) buckets, the running time of radix sort is \( O(d(n + N)) \).

4. **True** or **False (Circle one):** Radix sort is a stable sort and is not in-place.

5. **The Selection Problem.** The selection problem is to find the \( k \)th smallest element (also known as the \( k \)th order statistic) from a set of \( n \) elements.
   - The 1st order statistic is also known as ________ Minimum ________.
   - The \( n \)th order statistic is also known as ________ Maximum ________.
   - The \( \lfloor \frac{n}{2} \rfloor \)-nd order statistic is also known as ________ Median ________.

6. **True** or **False (Circle one):** Given a sorted sequence of \( n \) elements stored in an array, the selection problem can be solved in \( O(1) \) time.

7. **Quick Select.** Quick select is an algorithm that applies the prune-and-search paradigm. Quick select partitions the original problem of size \( n \) into \( 1 \) subproblems and spends \( O(n) \) time total to partition the problem into subproblems. Quick select runs in \( O(n) \) expected time.

   Write down the recurrence relation showing the best case running time of quick select:
   
   \[
   T(n) = T\left(\frac{n}{2}\right) + O(n)
   \]

8. The best known selection algorithm runs in time ________ \( O(n) \) ________.