1. Which is the correct invariant relating `equals()` and `hashCode()`?
   (A) Two objects that have the same `hashCode` must be equal.
   (B) Two objects that are equal must have the same `hashCode`.

2. Choose an appropriate ADT for each of the following applications.
   (a) A telephone book with names and phone numbers.
      set    stack    queue    priority queue    dictionary
   (b) An index for a book with terms and page numbers.
      set    stack    queue    priority queue    dictionary
   (c) A router that forwards packets in a computer network.
      set    stack    queue    priority queue    dictionary

3. Which of the following concrete data structures has the fastest worst-case lookup time for elements in an ordered set?
   linked list    sorted array    unsorted array    hashtable

4. Fill in the blanks.
   (a) Time for lookup in a hashtable is $O(\quad)$ expected and $O(\quad)$ worst-case.
   (b) The load factor of a hashtable is $$, where $n$ is ________________
       and $m$ is ________________.
   (c) Every comparison-based sorting algorithm takes at least $\Omega(\quad)$ time
       in the worst case.