1. Extend the RIC for closest pair in two dimensions to closest pair in three dimensional space. Provide complete analysis along with details of any geometric properties and data structures used.

2. Consider the trivial algorithm for selecting the minimum element among $n$ elements. We scan the elements given in an array $A[]$ and keep track of the minimum elements among the elements scanned so far - call it the temporary minimum. At the $i$-th step, we either update the minimum or we retain it. If the elements are presented to us in a random order, what is the expected number of times that we update the temporary minimum.

3. Complete the analysis of the incremental Quicksort described in class by filling in complete details.

4. How would you choose a random subset of $r$ elements from a given set of $n$ elements ($r < n$)? Prove a bound on the maximum size of the intervals similar to binomial sampling.