1) (10 pts) ANL (Algorithm Analysis)

Consider the following algorithm to find the smallest item in a list of *n* distinct integers:

1. Pick an element, *x*, from the list at random.
2. Go through every other element in the list. If an element is less than *x* put it in list 1, and if it's more than *x*, put it in list 2. (Note: Since all elements in the list are distinct, none will equal *x*.)
3. If list 1 is empty, then return *x*, since it's the smallest element. If list 1 is NOT empty, go back to the first step, only using list 1.

In terms of *n*, what is the best case run-time of this algorithm? In terms of *n*, what is the worst case run-time of this algorithm? Please give justifications (both words and equations) for both answers. (Note: 8 points out of the 10 come from the justifications and the actual Big-Oh answers are only worth 1 point each.)