

Algorithm Design
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Solution of Exercise R-1.8

The worst case running time of find2D is $O(n^2)$. This is seen by examining the worst case where the element x is the very last item in the $n \times n$ array to be examined. In this case, find2d calls the algorithm arrayFind n times. arrayFind will then have to search all n elements for each call until the final call when x is found. Therefore, n comparisons are done for each arrayFind call. Since arrayFind is called n times, we have $n * n$ operations, or an $O(n^2)$ running time. This is not a linear time algorithm; it is quadratic. If this were a linear time algorithm, the running time would be proportional to its input size.