Skill Problem C: Sorting

An array A holds $n + O(n^{1/2})$ integers. The elements $A[0]$ to $A[n - 1]$ are already in sorted order. The remaining $O(n^{1/2})$ integers are in random order. For this problem, do the following:

1. [5 points] Give an $O(n)$ algorithm for putting A in sorted order. Give a general description of your idea for this algorithm and then express your algorithm in pseudo-code.

2. [4 points] Prove that your algorithm runs in $O(n)$ time.

What to turn in:

A document (or multiple documents) that contains the following

- Your idea for an algorithm to solve the problem
- Your algorithm expressed in pseudo-code
- Your proof that your algorithm runs in O(n) time