IGME 201

PE-5: Number Sorting Algorithm

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Initial Instructions:

Use 10 index cards (or sheets of paper).  
Write a random number on 5 of the index cards.  
  
The 5 randomly-numbered index cards represent an unsorted array, and the 5 blank index cards will contain the sorted array.  
  
Put the unsorted pile to your left, and place the 5 blank sheets of paper in a pile to your right.   
  
Submit a Word document which has in English (not computer code) the exact steps to sort and copy the numbers in ascending order from the pile on the left to the pile on the right, without changing the order of the unsorted array. Any time you touch any piece of paper, you must have an instruction written down.

**My Numbers:** 9 – 6 – 3 – 8 – 1

**Step 1:** Take the first number from the left pile (9) and copy it to the first position in the pile on the right.

**Step 2:** Take the second number from the left pile (6) and compare it to the first number of the right pile (9).

* If it is less than the first number of the right pile, move the first number of the right pile to the second position and then copy the second number of the left pile to the first position of the right pile.
* If it is greater than the first number of the right pile, copy it to the second position of the right pile (because that is the next free position).

(9 is moved to the second position of the right pile and 6 is copied to the first position of the right pile)

**Step 3:** **:** Take the third number from the left pile (3) and compare it to the first number of the right pile (6).

* If it is less than the first number of the right pile, move the second number of the right pile to the third position, then move the first number of the right pile to the second position, and then copy the third number of the left pile to the first position of the right pile.
* If it is greater than the first number of the right pile, compare it to the second number of the right pile (9).
  + If it is less than the second number of the right pile, move the second number of the right pile to the third position and then copy the third number of the left pile to the second position of the right pile.
  + If it is greater than the second number of the right pile, copy it to the third position of the right pile (because that is the next free position).

(9 is moved to the third position of the right pile, 6 is moved to the second position of the right pile, and 3 is copied to the first position of the right pile)

**Step 4:** Take the fourth number from the left pile (8) and compare it to the first position of the right pile (3).

* If it is less than the first number of the right pile, move the third number of the right pile to the fourth position, then move the second number of the right pile to the third position, then move the first number of the right pile to the second position, and then copy the fourth number of the left pile to the first position of the right pile.
* If it is greater than the first number of the right pile, compare it to the second number of the right pile (6).
  + If it is less than the second number of the right pile, move the third number of the right pile to the fourth position, then move the second number of the right pile to the third position and then copy the fourth number of the left pile to the second position of the right pile.
  + If it is greater than the second number of the right pile, compare it to the third number of the right pile (9).
    - If it is less than the third number of the right pile, move the third number of the right pile to the fourth position, then copy the fourth number of the left pile to the third position of the right pile.
    - If it is greater than the third number of the right pile, copy it to the fourth position of the right pile (because that is the next free position).

(9 is moved to the fourth position of the right pile and 8 is copied to the third position of the right pile)

**Step 5:** Take the fifth number from the left pile (1) and compare it to the first position of the right pile (3).

* If it is less than the first number of the right pile, move the fourth number of the right pile to the fifth position, then move the third number of the right pile to the fourth position, then move the second number of the right pile to the third position, then move the first number of the right pile to the second position, and then copy the fifth number of the left pile to the first position of the right pile.
* If it is greater than the first number of the right pile, compare it to the second number of the right pile (6).
  + If it is less than the second number of the right pile, move the fourth number of the right pile to the fifth position, then move the third number of the right pile to the fourth position, then move the second number of the right pile to the third position and then copy the fifth number of the left pile to the second position of the right pile.
  + If it is greater than the second number of the right pile, compare it to the third number of the right pile (8).
    - If it is less than the third number of the right pile, move the fourth number of the right pile to the fifth position, then move the third number of the right pile to the fourth position, then copy the fifth number of the left pile to the third position of the right pile.
    - If it is greater than the third number of the right pile, compare it to the fourth number of the right pile (9).
      * If it is less than the fourth number of the right pile, move the fourth number of the right pile to the fifth position and then copy the fifth number of the left pile to the fourth position of the right pile.
      * If it is greater than the fourth number of the right pile, copy it to the fifth position of the right pile (because that is the next free position).

(9 is moved to the fifth position of the right pile, 8 is moved to the fourth position of the right pile, 6 is moved to the third position of the right pile, 3 is moved to the second position of the right pile, and 1 is copied to the first position of the right pile)

**Now that you have gone through each of the 5 numbers in your unsorted pile, you should have a sorted pile of those numbers on the right.**

**My Left Pile:** 9 – 6 – 3 – 8 – 1

**My Right Pile:** 1 – 3 – 6 – 8 – 9