**MAT 2440 Insertion Sort Activity (for 5 to 8 “volunteer” students)**

Note: all references “right” and “left” are from the point of view of the audience and the computer “Hal”

1. Line up randomly with first and last initials visible in front (use clip or hold card)
   1. Except for first person, have your back to the classroom.
2. The designated “computer” Hal points with right hand to the 2nd person in line and verbally says:
   1. “Turnaround” and the person faces classroom;
   2. “Forward” and the person takes one (biggish) step forward.
3. Hal now points with left hand to the first person in line and verbally says:
   1. “Forward” and that person takes one (biggish) step forward.
4. Hall points to both forward people and asks “are they in order?”
   1. If “Yes”, then Hal:
      1. Points to left person forward (with left hand) and says “back”;
      2. Hal moves left hand right to next person in line and asks “is person forward?”:
         1. If “yes”, then Hal says “back”. Go to step 5.
         2. If “no”, then Hall moves left hand to next person in line & says “forward”. Go to step 4.
   2. If “No”, then Hal says “rotate right” (done with all people between & including those pointed at):
      1. Everyone up to & including left person standing forward moves 1 step to right (left person standing forward also moves back)
      2. Person forward on right moves to left and then back to fill in hole.
5. Insertion step has completed, so Hal points with right hand to next person facing the wall and says “turnaround” and “forward”
   1. Return to step 3.

NOTES: for connecting to algorithm 5 below:

1. *j* corresponds to the index of the person pointed to by the right hand
2. *i* corresponds to the index of the person pointed to by the left hand
3. *k* corresponds is the loop variable for the rotation.
   1. The item being inserted *aj*, the right most item in the sublist, is assigned to the temp variable *m*
   2. The remaining sublist is then moved over one unit to the right.
   3. The hole in the *i*th slot then gets filled with *m*.

