Efficiency Class for Algorithm 2: Connecting Pairs of Persons

We will be using the step counting method to determine and prove the efficiency class of the algorithm.

When the function is initialized, such as defining an integer ‘n’ and creating an empty hash map, we can infer that this complexity is of O(1).

Considering that we have to loop through the rows for n times to find the positions of the people in the hashmap, we find that this step is O(n) complexity.

We also have to iterate through the rows again in order to find the seating arrangements of two. Since we have to iterate through the row, this step is also of O(n) complexity.

When we find the positions in the hashmap that can hold partners, we now have to begin swapping between positions in order to match the right couples.

Considering that the swapping and updating of the hashmap does not contain any nested loops, the worst case complexity is O(n).

So with the initialization and the loops through the hashmap showing no further indication of an increase of complexity, it can be inferred that our complexity is:

$$O(1) + O(n) + O(n) + O(n) = O(n)$$