Complexity Analysis of the Class ScoreKeeper

Below I will describe the worst case complexity of each method of ScoreKeeper individually.

I will refer to the amount of characters in a string as n

convert_to_number(input,position)

This method converts a char in the string input at a given position and returns a value that corresponds to the char.

The worst case complexity of this method is $O(1)$ because this method looks up returns values based on conditional statements.

compute_number_of_throws(input)

This method goes through each character in a string and computes how many throws were made in a game. Therefore this loop runs n times and has a worst case complexity of $O(n)$.

calculate(input)

Calculate starts off by calling compute_number_of_throws and then executes a one loop that loops n times. Each iteration of the loop consists of checking multiple conditionals $O(1)$ resulting in a worst case complexity of $O(n)$.

Therefore, ignoring constants, this class has a total worst case complexity of $O(n) + O(n) + O(1) = O(n)$