CS222 - Algorithm Design

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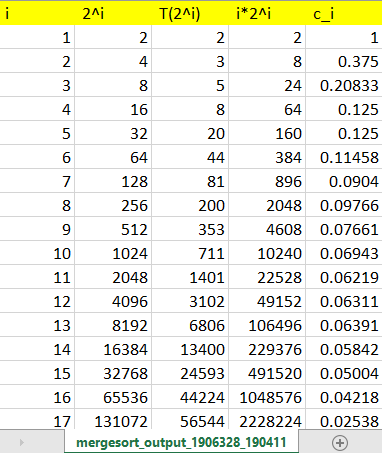
*Assignment – 1 : Sorting*

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1. **Merge sort :**

*The values obtained using our code are as follows:*



*Observations about the fraction*

* The Expected value of is 0.070271 ms.
* The Variance of is 0.000589 ms^2.
* Note that the above values of Expectation and Variance keep changing due to the randomness, but order will be same.
* The values of the **’s** is becoming smaller as the value of **i** increases.
* The ci values are essentially a comparison of time taken and the idealistic time complexity.
* So, the reducing value of **’s** signify that our algorithm is working fine.

*Complexity Analysis of our* ***Merge Sort*** *:*

Time Complexity :

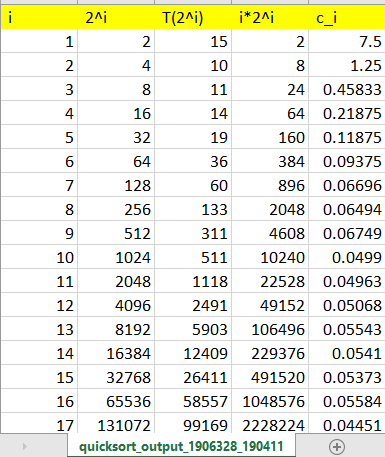
*Best* Case : O()

*Average* Case : O()

*Worst* Case : O()

Space Complexity : O()

1. **Quick sort :**

*The values obtained using our code are as follows:*

*Observations about the fraction*

* The Expected value of is 0.060093 ms.
* The Variance of is 0.000394 ms^2.
* Note that the above values of Expectation and Variance keep changing due to the randomness, but order will be same.
* The values of the **’s** is becoming smaller as the value of **i** increases.
* The ci values are essentially a comparison of time taken and the idealistic time complexity.
* So, the reducing value of **’s** signify that our algorithm is working fine.

*Complexity Analysis of our* ***Quick Sort*** *:*

Time Complexity :

*Best* Case : O()

*Average* Case : O()

*Worst* Case : O() *{ Though it is O(n^2) in general, we reduced by using Median-of-3 method for randomly picking Pivot}*

Space Complexity : O() *{Due to function call stack }*

----- The End -----