

## SUMMARY

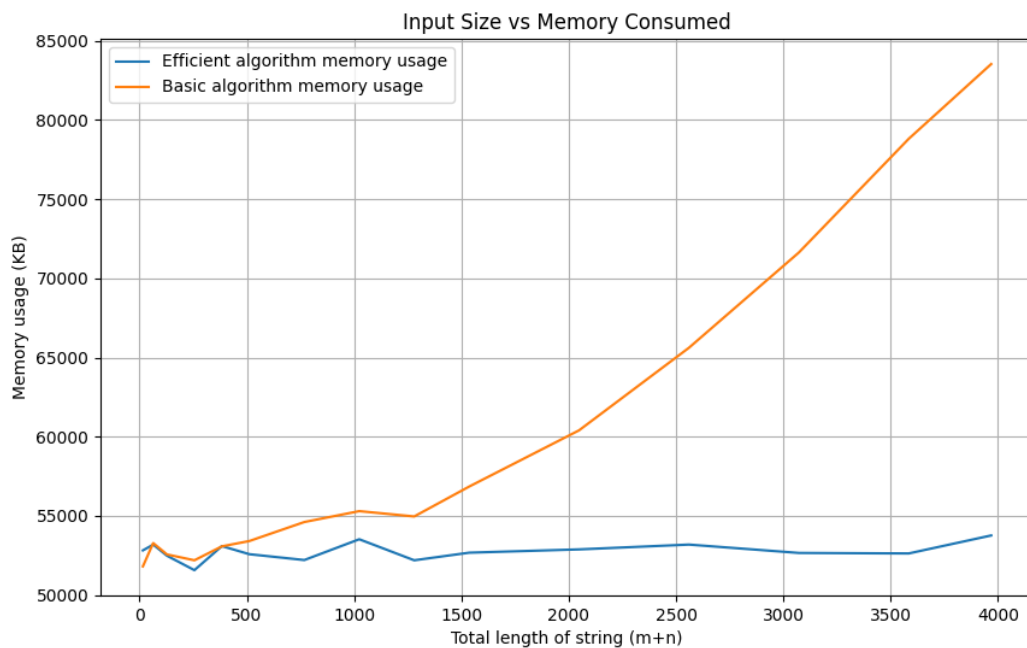
USC ID/s: 6494261668, 6104797766, 1198271852

### Datapoints:

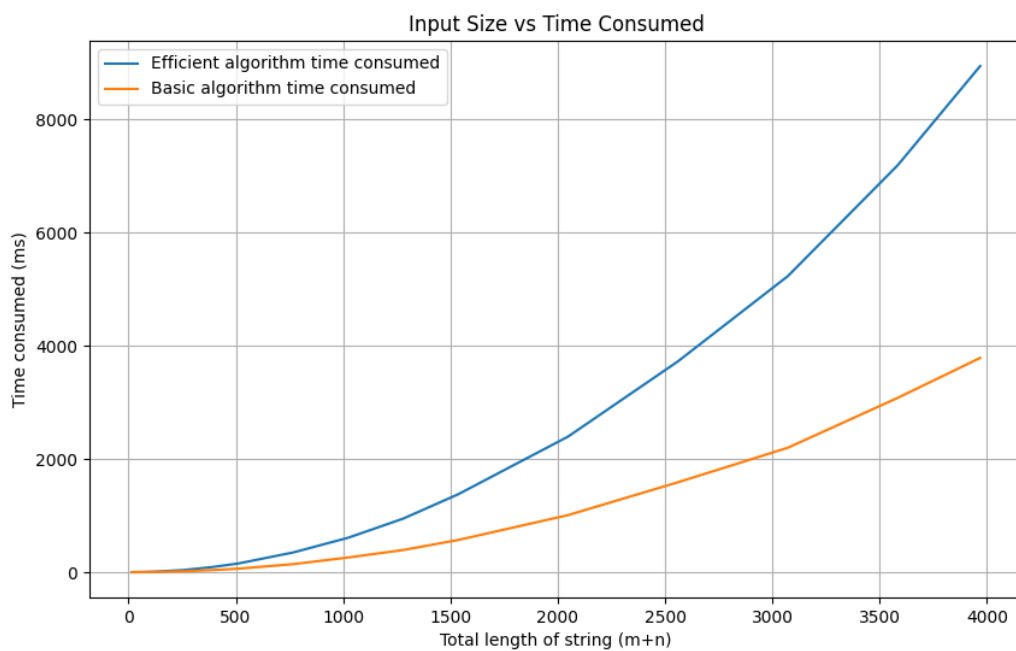
M+N	Time in MS (Basic)	Time in MS (Efficient)	Memory in KB (Basic)	Memory in KB (Efficient)
16	0.19311904907226600	0.3619194030761720	51808	52816
64	1.1949539184570300	2.5169849395752000	53280	53184
128	4.092931747436520	9.493112564086910	52560	52480
256	15.527009963989300	37.24479675292970	52192	51568
384	35.37416458129880	87.18681335449220	53072	53088
512	61.556100845336900	153.5470485687260	53408	52576
768	142.36807823181200	348.70004653930700	54608	52208
1024	259.28807258606000	608.7350845336910	55296	53520
1280	391.5109634399410	946.2659358978270	54960	52192
1536	568.5429573059080	1376.0950565338100	56848	52672
2048	1007.9638957977300	2395.1637744903600	60400	52880
2560	1588.2270336151100	3724.60222442630	65616	53184
3072	2198.4591484069800	5230.1530838012700	71632	52656
3584	3079.756021499630	7189.682960510250	78816	52624
3968	3785.0418090820300	8940.824031829830	83536	53760

### Insights:

- Graph1 – Memory vs Problem Size (M+N)



- Nature of the Graph (Logarithmic/ Linear/ Polynomial/ Exponential)
  - *Basic*: Polynomial
  - *Efficient*: Linear
  - *Explanation*: Basic algorithm has space complexity of  $O(mn)$  whereas efficient algorithm has space complexity of  $O(\min(m,n))$  where  $m$  and  $n$  are the lengths of input string. Thus, memory consumption by the efficient algorithm is significantly less compared to the basic algorithm.
- Graph2 – Time vs Problem Size (M+N)



- Nature of the Graph (Logarithmic/ Linear/ Polynomial/ Exponential)
  - *Basic*: Polynomial
  - *Efficient*: Polynomial
  - *Explanation*: Both efficient and basic algorithm take  $O(mn)$  time. However, the number of computations done in efficient algorithm are twice than that of the basic one. In addition to that we also need to take into account the time required to manage the recursive calls made in our Divide and Conquer approach.

### Contribution:

- 6494261668: Equal Contribution
- 6104797766: Equal Contribution
- 1198271852: Equal Contribution