SUMMARY

USC ID/s:

7418934031

8519965458

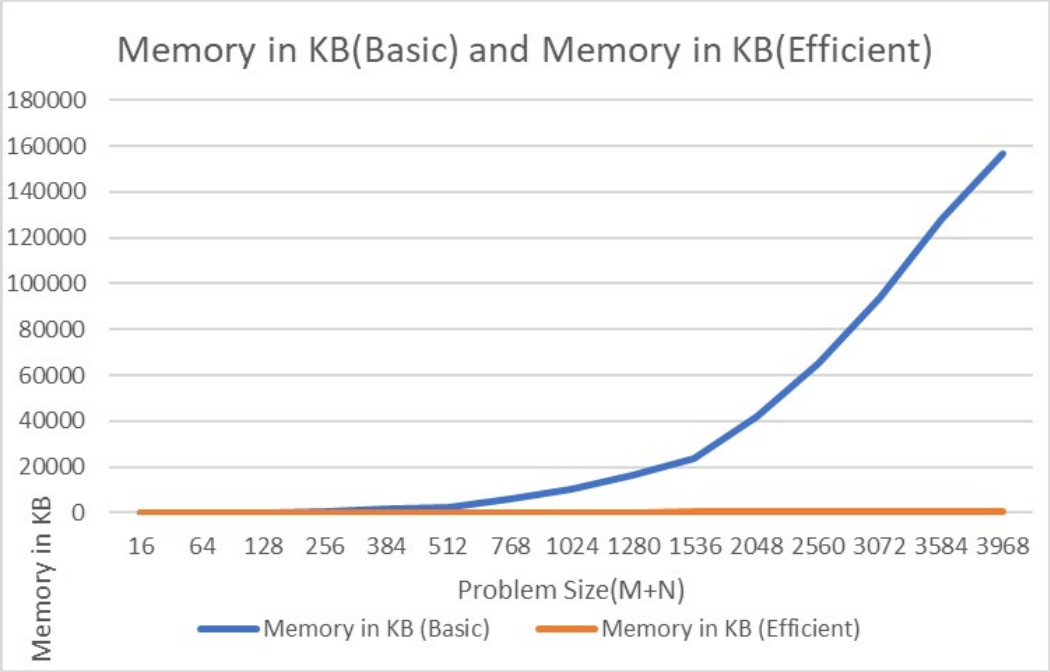
9347096813

M+N	Time in MS (Basic)	Time in MS (Efficient)	Memory in KB (Basic)	Memory in KB (Efficient)
16	1.0001659393310547	0.7100105285644531	2.0	16
64	1.9958019256591797	1.9931793212890625	88.0	24
128	4.986286163330078	8.975505828857422	156.0	32
256	12.996196746826172	27.918100357055664	632.0	96.0
384	33.90836715698242	75.30951499938965	1488.0	96.0
512	66.83683395385742	103.72161865234375	2624.0	112.0
768	132.645845413208	247.34115600585938	6008.0	112.0
1024	241.10746383666992	470.7345962524414	10576.0	92.0
1280	351.0739803314209	696.2287425994873	16528.0	168.0
1536	506.64472579956055	1041.0325527191162	23516.0	320.0
2048	955.1734924316406	2218.8665866851807	41808.0	360.0
2560	1464.069128036499	3472.6901054382324	65392.0	504.0
3072	2049.670457839966	4580.138683319092	93928.0	536.0
3584	2985.949993133545	6155.249357223511	127840.0	800.0
3968	3555.0918579101562	7175.60887336731	156604.0	736.0

Datapoints

Insights

Graph1 – Memory vs Problem Size (M+N)



Nature of the Graph (Logarithmic/ Linear/ Polynomial/ Exponential)

Basic: Polynomial

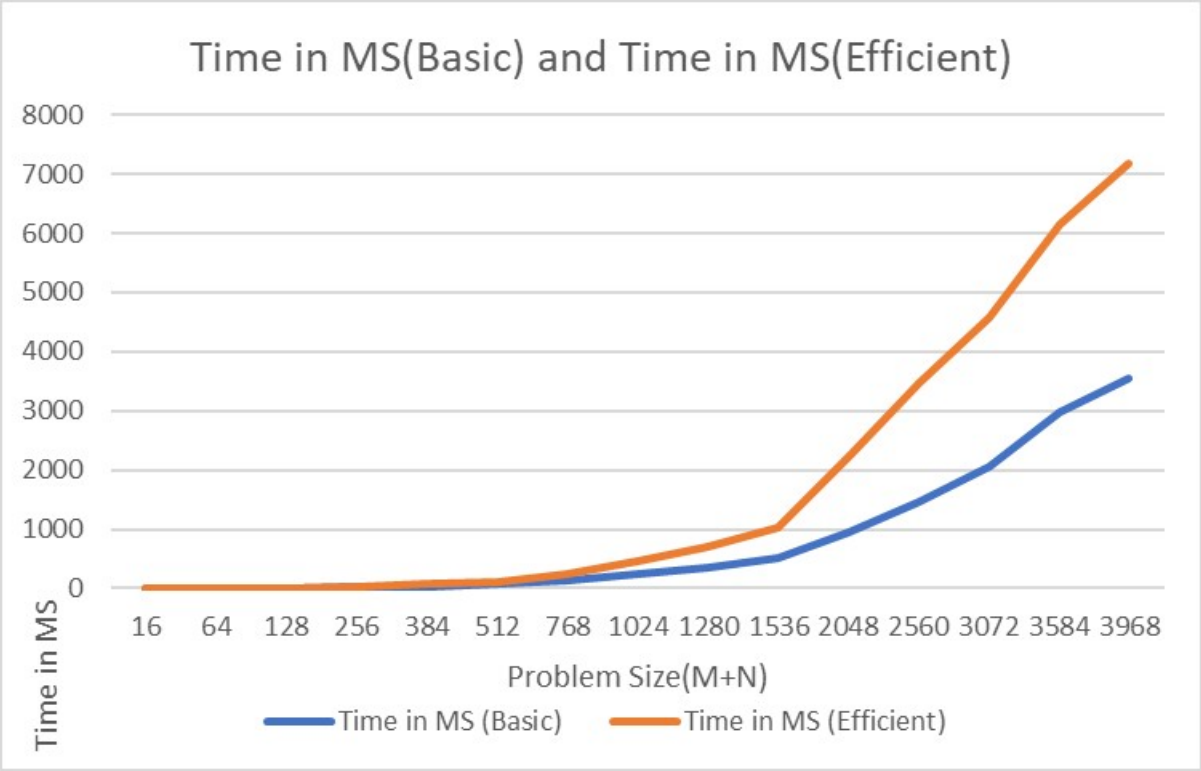
Efficient: Linear

Explanation:

The basis Dynamic programming algorithm create a M*N table space to calculate the optimal cost and find the minimum cost by backtracking. So it takes O(M*N), as M+N growth, it increase in polynomial.

The efficient algorithm recursively divide string A in half and use a total 2*len(stringB) memory space to calculate the cost of dynamic programming for every divided parts. The actual memory cost for this algorithm is a 2*N table space to the DP process. So it is O(N) or O(M)

Graph2 – Time vs Problem Size (M+N)



Nature of the Graph (Logarithmic/ Linear/ Polynomial/ Exponential)

Basic: Polynomial

Efficient: Polynomial

Explanation:

Both time costs of the two algorithms is Polynomial.

The time cost for basic algorithm is O(M*N) as it calculates the M*N DP table.

The time cost for efficient algorithm is O(M*N) as well. It is Roughly 2* what the basic algorithm takes. As each time we divide our strings into parts, we calculate the DP space of 1*M*N+(1/2)*M*N+(1/4)*M*N+…… ≈2*M*N

Contribution

(Please mention what each member did if you think everyone in the group does not have an equal contribution, otherwise, write “Equal Contribution”)

Equal Contribution