SUMMARY

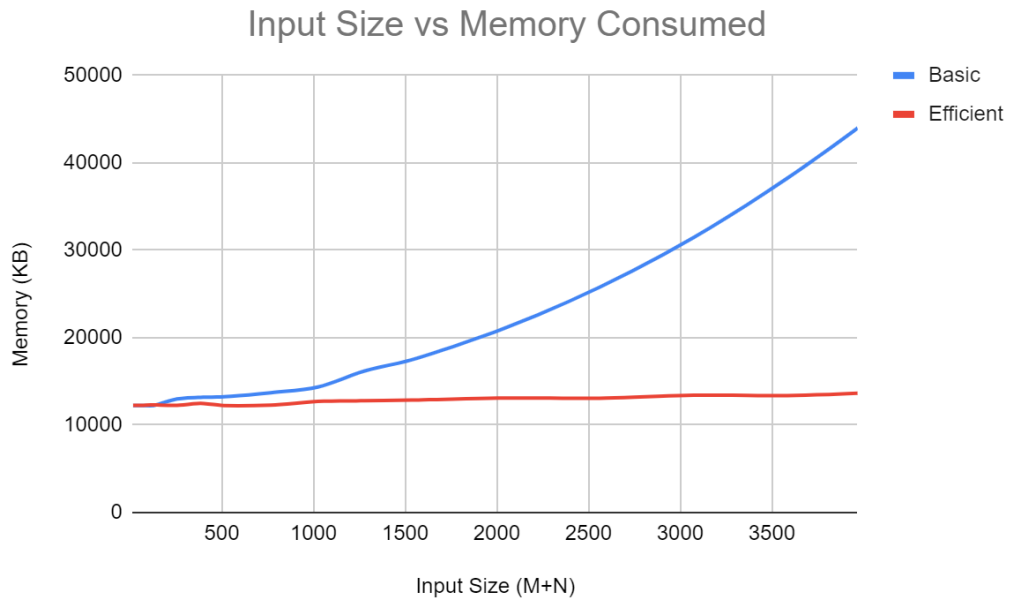
USC ID/s: 2218535210

Datapoints

M+N	Time in MS (Basic)	Time in MS (Efficient)	Memory in KB (Basic)	Memory in KB (Efficient)
16	0.05745887756	0.1614093781	12228	12256
64	0.6568431854	1.591444016	12232	12264
128	2.616882324	4.835128784	12244	12316
256	10.19096375	17.10700989	12984	12264
384	24.03378487	41.19491577	13172	12476
512	41.19062424	73.87447357	13240	12248
768	98.73986244	167.453289	13708	12288
1024	176.1677265	284.6302986	14352	12704
1280	266.1049366	443.9632893	16204	12788
1536	387.3753548	625.6766319	17468	12856
2048	699.0852356	1132.918358	21128	13096
2560	1139.216185	1838.141441	25776	13076
3072	1586.331367	2533.311129	31440	13420
3584	2203.624249	3540.958405	38240	13376
3968	2720.019102	4461.748123	43988	13640

Insights

Graph1 – Memory vs Problem Size (M+N)



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

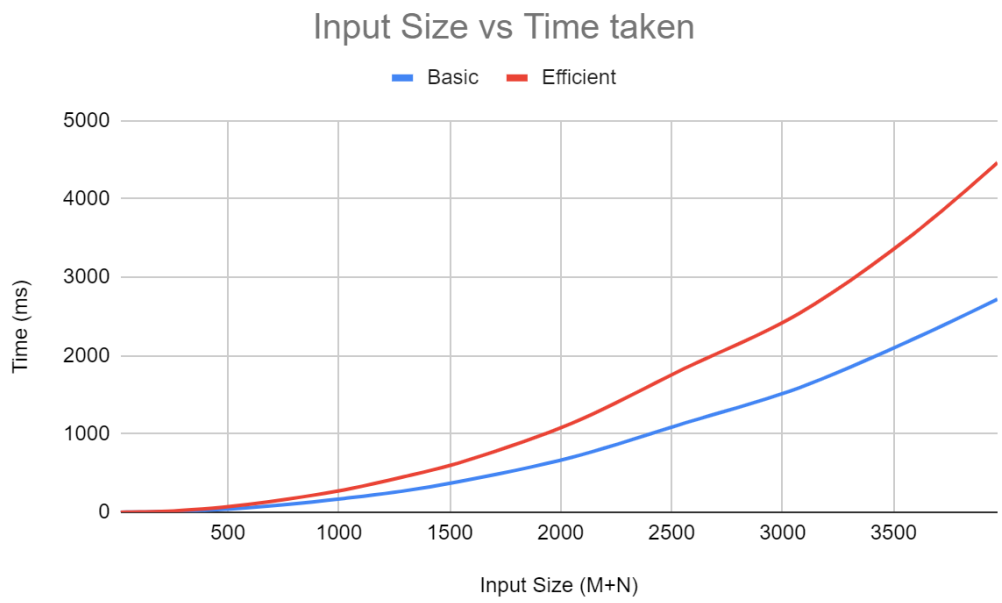
Basic: Polynomial

Efficient: Linear

Explanation:

As we can see from the graph, the basic algorithm's memory consumption increases polynomially with the size of the input, while the efficient algorithm's memory usage is almost constant / rising linearly with the input. This shows that efficient algorithm uses lesser memory than basic algorithm and this allows efficient algorithm to handle larger input sizes without throwing any out-of-memory / memory exhausted errors.

Graph2 – Time vs Problem Size (M+N)



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

Basic: Polynomial

Efficient: Polynomial (with a higher constant factor)

Explanation:

Both basic and efficient algorithm's running times are increasing polynomially with respect to the size of the input. From the graph, we can observe that for efficient algorithm the total time taken is comparatively higher than basic algorithm. This is because efficient algorithm has a runtime complexity of 2*m*n while the basic algorithm has a runtime complexity of just m*n, thus making it evident in the plot where efficient algorithm's plot is at most twice the basic algorithm's plot.

Contribution

Individual Contribution (USC ID: 2218535210)