Zixian Lai

Report

The table of the elapsed time, and the outputs of the packing.

File name	r5_sp.txt	r0_sp.txt	r3_sp.txt
Elapsed time	3.11e+01	2.49e-04	7.85e-01
Width	9.72e+06	6.48e+04	3.27e+06
Height	9.13e+06	9.29e+04	2.85e+06
x-coordinates	1.54e+06	2.93e+04	1.25e+05
y-coordinates	5.05e+02	0.00e+00	9.08e+05

The run time complexity for the part where I use the sequence pair to generate the graph would be O(n^2), because the program run through all the number of nodes and find all the other node's index number to determine where that node is at, so the time complexity would be O(n^2).

The run time complexity for the part where the program finds the longest path in the graph would be O(V+E). The graph generated by the sequence pair would always be a DAG where topological sort would work the best for finding the longest pair with time complexity O(V+E).

The space complexity for the program would be O(V+E) since The program uses the adjacency list to implement the graph with space complexity O(V+E). And the program uses stack to store the topological sort order with space complexity O(V).