

Renjun Zheng's Programming Assignment 3 Report
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Table of run-times, output of the packing(width, height, x-coordinate, y-coordinate)

input file	run-times	width	height	x-coordinate	y-coordinate
r0_flr.txt	0.000000e+00	6.488700e+04	9.299900e+04	0.000000e+00	0.000000e+00
r1_flr.txt	0.000000e+00	1.663549e+06	1.812356e+06	1.425763e+06	0.000000e+00
r2_flr.txt	0.000000e+00	3.411589e+06	4.923995e+06	5.193600e+05	0.000000e+00
r3_flr.txt	0.000000e+00	9.793506e+06	2.573651e+06	9.637800e+05	2.320255e+06
r4_flr.txt	0.000000e+00	9.653391e+06	1.018544e+07	7.987561e+06	3.441761e+06
r5_flr.txt	1.000000e-02	2.745456e+07	1.320092e+07	2.447639e+07	1.683258e+06
r6_flr.txt	0.000000e+00	1.100000e+01	1.500000e+01	9.000000e+00	0.000000e+00

The time complexity is $O(n)$. All the functions for print needs to go through $\log(n)$ number of nodes. When calculate the width, height, x-coordinate, y-coordinate, use recursion which runs through all the nodes which the time complexity is $O(n)$. So the overall time complexity is $O(n)$.

The space complexity is $O(n)$. Only n number of nodes need to malloc. And all the calculation don't involve any memory allocation.