Lab 1. Percolation
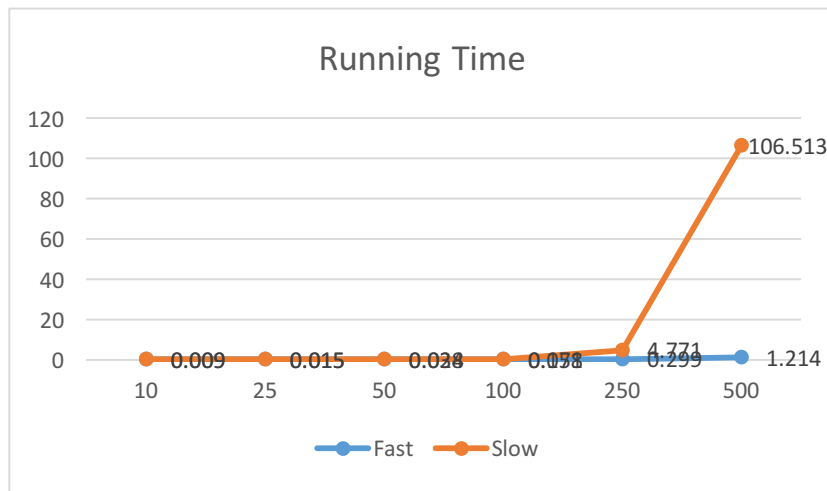
What differences can be found in terms of execution time?
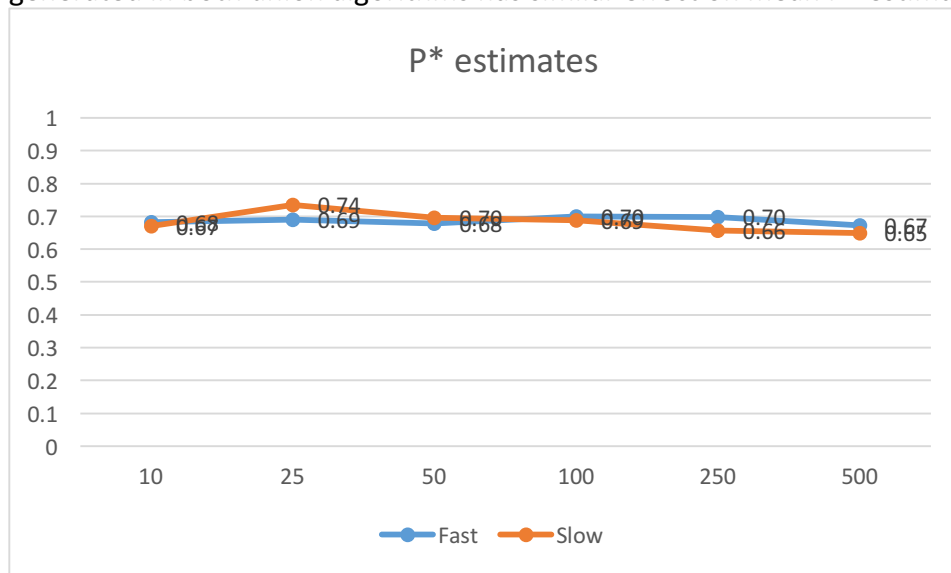
Answer: After ranging matrix from 10*10 to 500*500, we can easily recognize that execution time from both union algorithms are increasing, but Quick Find(slow) appears to be increasing exponentially after 250*250 and reached over 1 minute when dealing with larger matrix like
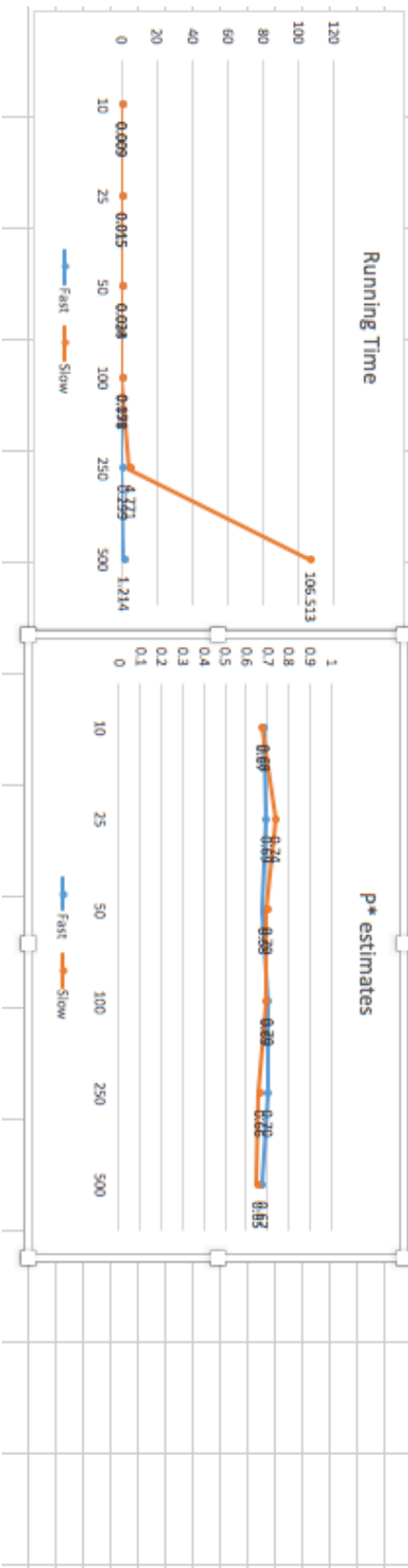

Running Time

500*500.

What is the behavior of the estimates of p*?

Answer: The mean P* estimate in the given range (10*10 – 500*500) appears to be around 60% no matter how big the matrix is. It fluctuates up and down around 60%. Since P* is a probability of opened cell divided by the total number of cells, it represents that the cell randomly generated in both union algorithms has similar effect on mean P* estimate.

P* estimates

Data

T\N	10		25		50		100		250		500	
	fast	slow	fast	slow	fast	slow	fast	slow	fast	slow	fast	slow
mean Thre	0.681333	0.669667	0.69072	0.73552	0.677827	0.696187	0.700087	0.688387	0.698362	0.657777	0.672511	0.649111
stddev Thre	0.147057	0.151668	0.136827	0.125679	0.129367	0.139664	0.127054	0.144938	0.128343	0.124545	0.128544	0.102582
total time	0.009	0.009	0.015	0.015	0.028	0.034	0.078	0.151	0.299	4.771	1.214	106.513
mean Time	3.00E-04	3.00E-04	5.00E-04	5.00E-04	9.33E-04	1.13E-03	0.0026	0.005033	0.009967	0.159033	0.040467	3.550433
stdev time	0.001119	9.52E-04	0.001137	9.74E-04	0.001507	0.001502	0.001714	0.008381	0.004522	0.316684	0.018203	9.702637

Running Time

P* estimates