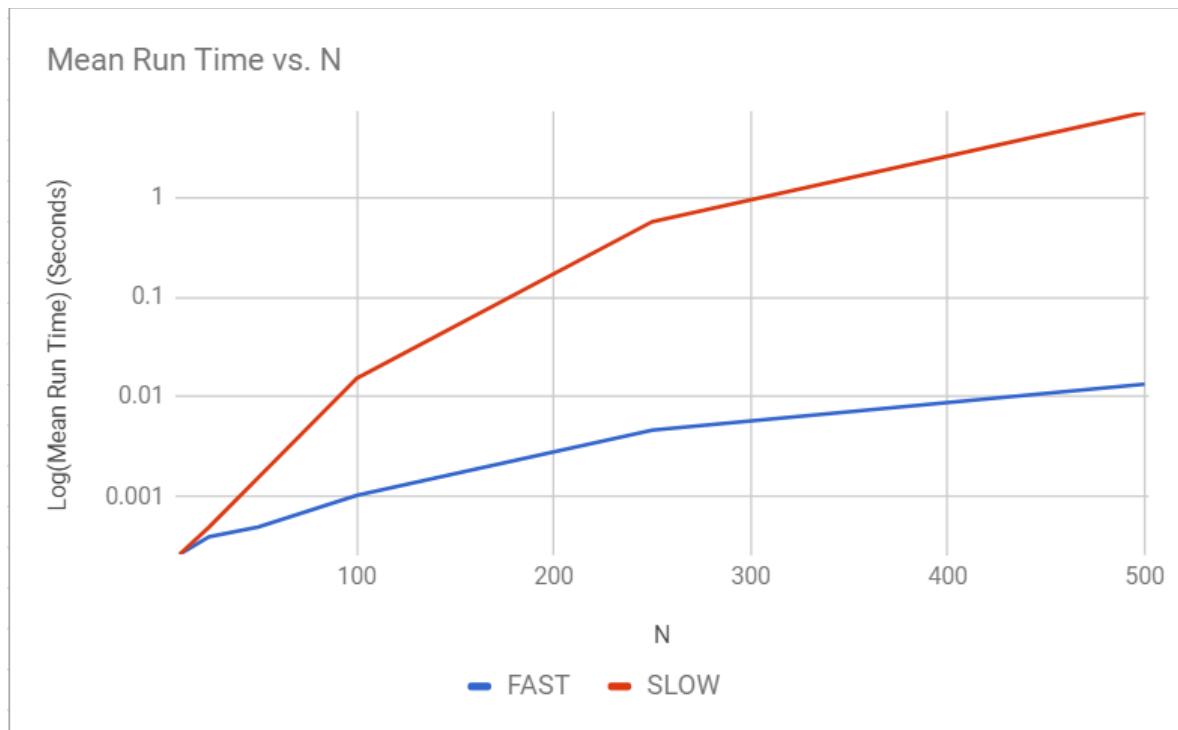


## CS251 Project 1: Percolation Analysis

Jacob Miecznikowski

In terms of execution time, the WeightedQuickUnionUF run time was substantially faster than QuickFindUF. The estimates of  $p^*$  varied much more in the tests when the grid size was smaller. This makes sense because as the size of  $N$  increases, then the probability of getting a quick successful percolation decreases. For example, to get a lucky percolation on a grid size of  $4 \times 4$ , you only need 4 lucky random spots to be filled. But in a grid size of  $100 \times 100$ , you would need 100 lucky random spots to be selected to get a quick percolation. As the  $N$  size got very large, then the correct estimate of  $p^*$  became more accurate.

The following two graphs show plots of Mean Run Time vs.  $N$  and Mean  $P^*$  vs.  $N$ . The red line (slow) denotes the QuickFindUF algorithm and the blue line (fast) denotes the WeightedQuickUnionUF algorithm.



Mean P \* vs. N

