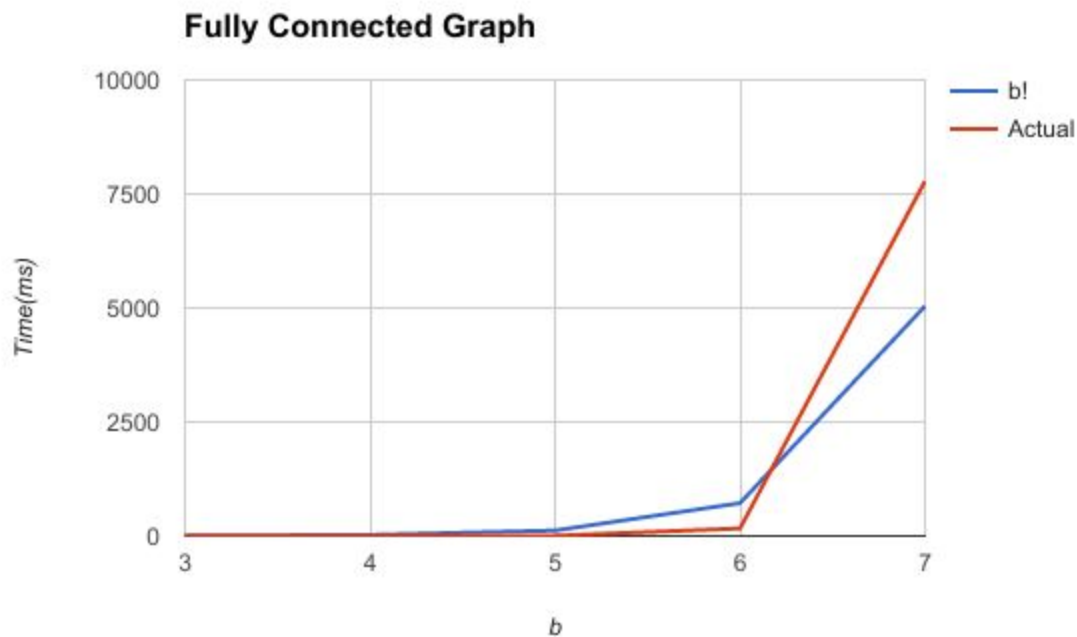


Noah Ransom

Homework7 Experimental Results

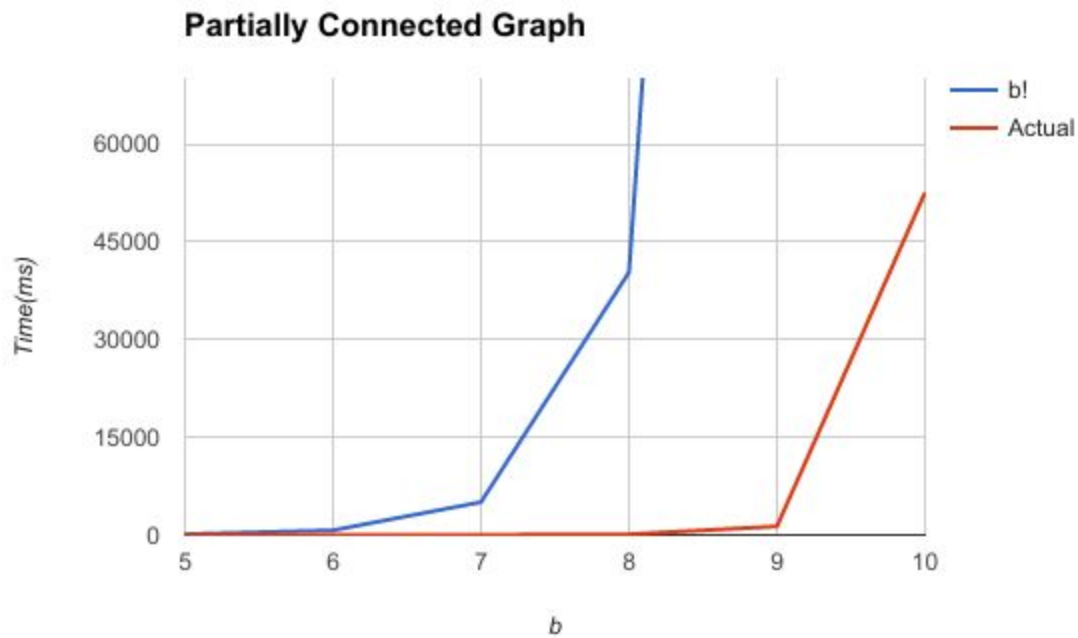
Fully Connected Graphs:

During my testing, I gained as much data as possible using fully connected graphs. The experimental data I was able to gain was small, due to the huge increase in computation time beyond 7 islands. The data I do have does conform to a runtime factorial in the number of islands, within a constant factor, but I have some concerns beyond 7. Since $8!$ is roughly 40,000, or 40 seconds, and I allowed it to run for 4 minutes, or 240,000 milliseconds, and did not finish a test, I am concerned that it may be larger than factorial, or the constant must be very large. I suspect that, in these extreme cases, $O(b^2!)$ may be a better upper bound than $O(b!)$, where b is the number of islands. Unfortunately, I was not patient enough to get data to test this.



Fully Connected Graphs

I also performed some tests using partially connected graphs. To be specific, odd islands connect to even islands, and even islands to odd ones, with no direct connections between odd islands and odd islands, and even islands and even islands. This test data conformed much more accurately to $O(b!)$ than the fully connected graphs did. I would argue that a partially connected graph is far more likely than a fully connected graph, and so $O(b!)$ is thus a satisfactory bound in realistic cases. Indeed, in these tests, $b!$ was far larger than the actual test data.



Raw Data and Test Procedures

My raw data and information about testing procedures can be found in the test code and the readme.