Analysis of Optimal Get Stars Solutions

In this experiment I set out to characterize the following values:

1. The number of optimal solutions per Get Stars board (each with the same length)
2. The length of optimal solutions for each Get Stars board

In order to collect data on these values, I created a JavaScript program which generates random Get Stars boards and finds all optimal solutions. I have decided not to release this program to the general public because it could be used for nefarious purposes. However, you can see screenshots from the program at the end of this document.

The program operates in the following manner:

1. Determine an optimal path between every pair of stars (and the player) through Dijkstra's algorithm
2. Iterate throw all 3,628,800 possible orderings in which to visit stars to find optimal solutions

I allowed the program to run overnight, and it analyzed 19,276 Get Stars boards. The results are listed below.

Average number of optimal solutions per board: 4.58
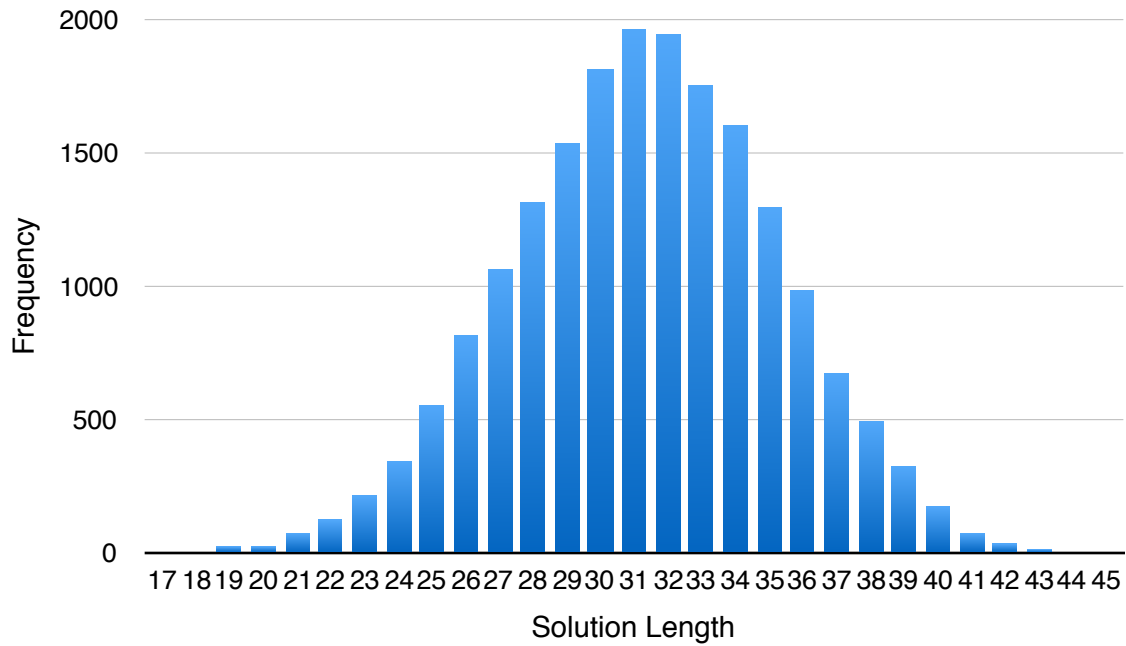Standard deviation: 6.02

Average optimal solution length: 31.3
Standard deviation: 3.95

It is worth noting that the number of optimal solutions is the number of orderings to visit stars (out of 3,628,800 possible orderings) which are optimal.

Solution Count Frequency

Frequency vs Solution Count
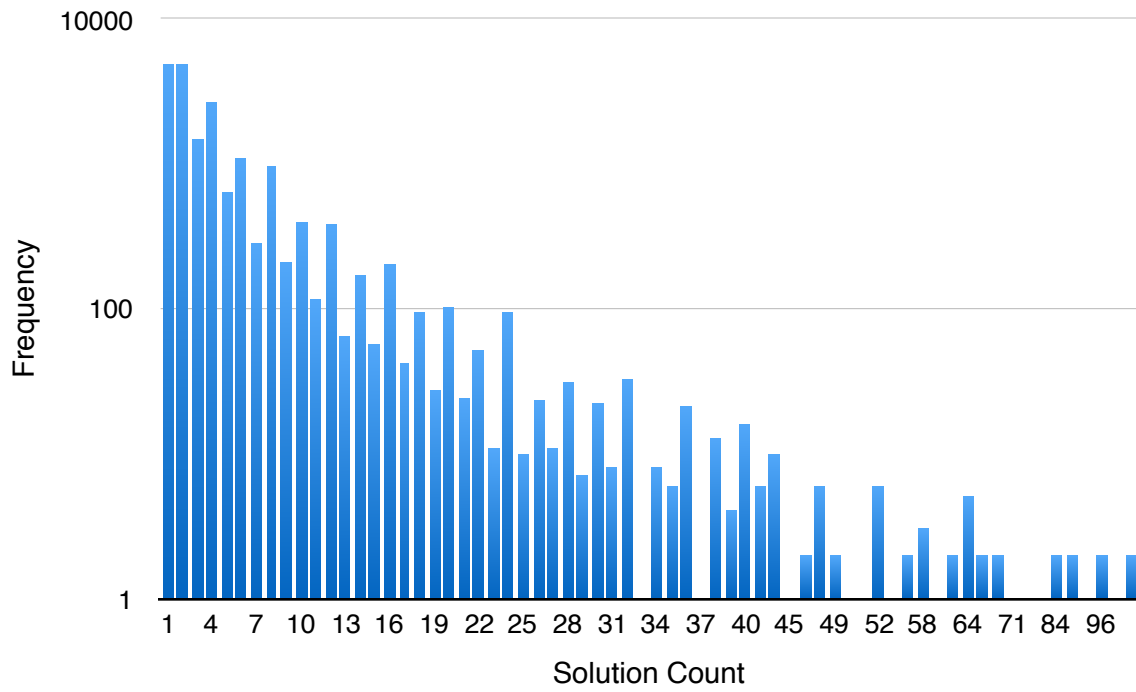
Solution Length Frequency

Frequency vs Solution Length

Sample of optimal solutions generated by the program: