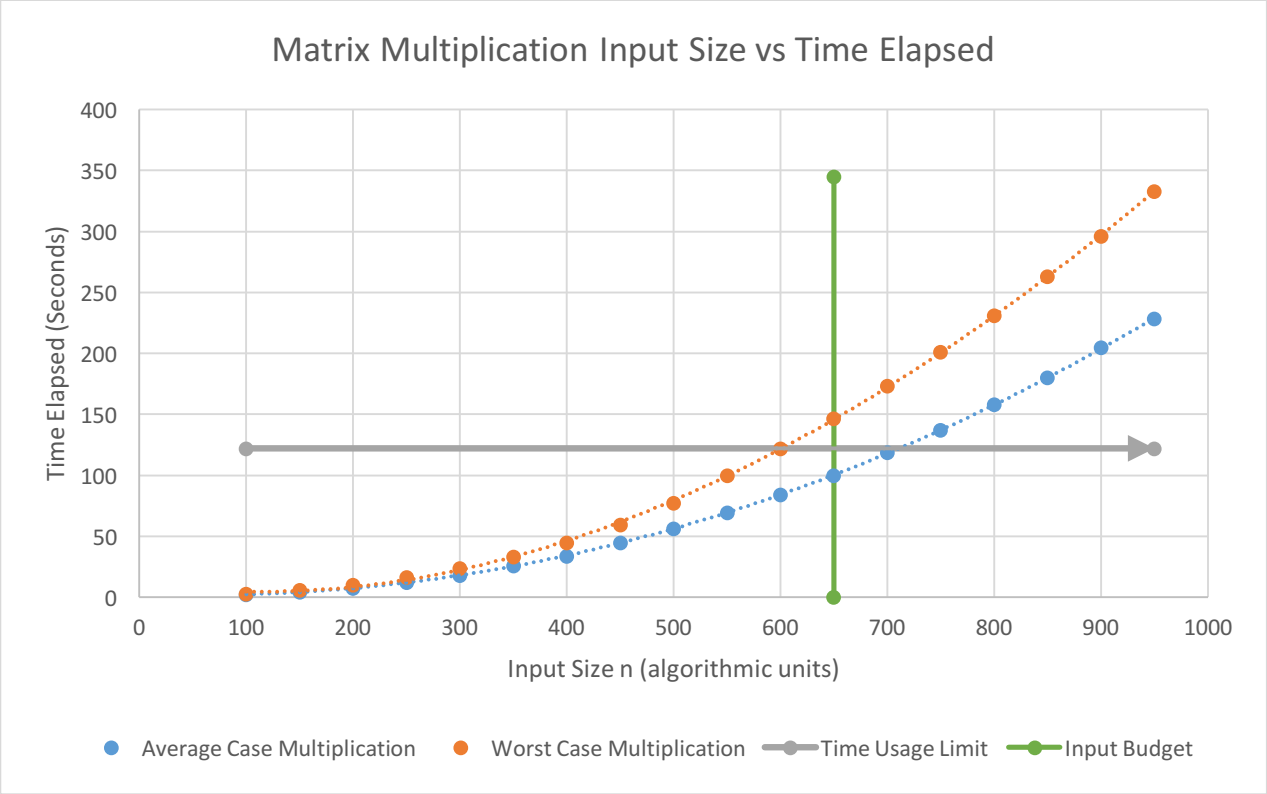
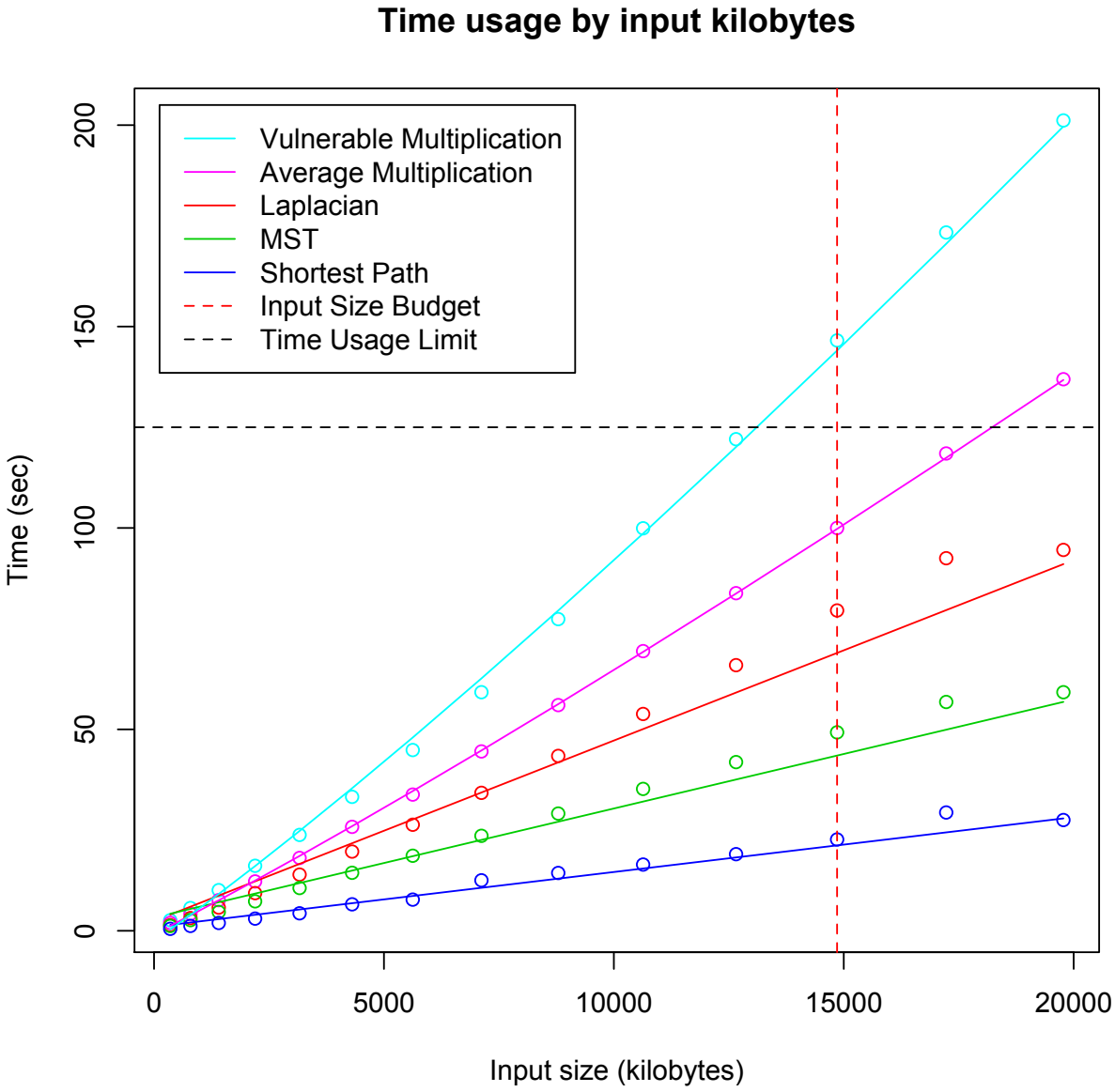
Input Budget and Time Usage Limit

The graph below shows empirical results of the varying time usage as the size of the square matrix varies in n, i.e., the size number of rows and columns in the square matrix. The time usage is shown for both normal matrices and also those which induce the worst case behavior for the matrix multiplication algorithm.

The graph also visually indicates the challenge problem input budget and wall-clock time usage limit that we have selected. For the input budget, we let n=650, which maps to roughly 15,300,000 bytes. The time usage limit at that input budget is 125 seconds.



The average and worst cases for matrix multiplication are charted below along with the worst case performances of the non-vulnerable functions supplied by the service. Note that since some of the functions take as input only a single matrix, that matrix can be significantly larger than those provided to the multiplication operation without violating the budget. As such, to demonstrate that the other algorithms are not vulnerable we have plotted these series as a function of input size rather than the size of the square matrix n.


Time usage by input kilobytes
Vulnerable Multiplication
Average Multiplication
Laplacian
MST
Shortest Path
Input Size Budget
Time Usage Limit
Time (sec)
0
50
100
150
200
0
5000
10000
15000
20000
Input size (kilobytes)